To: Comments@efsec.wa.gov
From: efsec@efsec.wa.gov
Received: 2024-04-16T00:33:18+00:00
Subject: FW: Horse Haven Hills wind project
Has attachment? False

From: Chuck & Karen <crbatish@pocketinet.com>
Sent: Monday, April 15, 2024 5:11 PM
To: EFSEC (EFSEC) <efsec@efsec.wa.gov>
Subject: Horse Haven Hills wind project

External Email

I have looked over you "Site Certification Agreement between "Horse Heaven Wind Farm, LLC" and Scout Clean Energy LLC."

I believe The "Commissions plans" appear to be be completely bogus and lacking the call for responsibility for both the Wind Farm and Scout Energy. **For Example:**

*The "Restoration Plan" that starts on page 38 goes on for ten pages or so completely ignores one word about what will be restored. There is no definition for what "restored" might mean. Certainly, as soon as the machines turn on the Hills will be lacking all their bat populations. The construction will drive out the wild animals and probably the migrating flocks.Not to mention that no solar or wind farm has yet to actually restore the land before or after use. Scout should be able to prove it has reserves set aside for clean up as well as for maintenance, but no business that that much money to preserve.

*Wind Farms have gone bankrupt because the Federal Government only gives them enough to start building, None are actually cost effective over their life time because they have already used up more energy to construct than they will ever put back into the electrical grid. EVERY wind tower has a higher "energy cost" to build than it will ever replace during it's lifetime. Wind Farms are largely avoided by investors since they understand wind-

power's risky history, again and again. Further, they cost the consumer a double electrical fee because of the gigantic cost of building them and their comparatively short life span for pay off. Plus the payback for expense is slower to accumulate in this case due to the fact that, according to the Department of Energy, usable winds for driving a wind turbine exist less than one third of the time over the Hills. This fact alone should make it plain that this project, at such a great expense, does not merit consideration on this site.

Section G says that mitigation of the storm water and soil erosion will not even begin until operation begins, by then the area will be devoid of any wildlife. Nor does it mention construction caused erosion. Furthermore it does not mention that the need to prevent contaminated soil from becoming airborne during construction. I don't believe the Commissioners have a good understanding of the geological facts of the Horse Haven Hills.

Section I is a hand-wave over a black box signifying that "Dangerous, hazardous and general waste" will never be required to be properly removed. Indeed they cannot be cleaned up and remain where they are left.

Please, reconsider more carefully what a dangerous and expensive environmental experiment this project presents.

Thank you for your consideration. . . . Karen Batishko

Attachments:

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To: Comments@efsec.wa.gov
From: efsec@efsec.wa.gov
Received: 2024-04-16T19:42:44+00:00
Subject: FW: Horse Heaven Wind/Solar Farm Draft SCA, Citizen Comments
Has attachment? False

From: John Endres <jmmendres@tds.net>
Sent: Tuesday, April 16, 2024 12:42:35 PM (UTC-08:00) Pacific Time (US & Canada)
To: EFSEC (EFSEC) <efsec@efsec.wa.gov>
Subject: Horse Heaven Wind/Solar Farm Draft SCA, Citizen Comments

External Email

Hello:
Will the citizen comments for the recent comment period regarding the Horse Heaven Wind and Solar project be available for citizens to read?
Thank you,
John M. Endres
jmmendres@tds.net

Attachments:

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To: Comments@efsec.wa.gov
From: bettyyakima@everyactioncustom.com
Received: 2024-04-16T04:17:41+00:00
Subject: Thank you for your commitment to balancing renewable energy development with preservation
Has attachment? False

External Email Dear EFSEC Comments, As an avid birder and member of Audubon in Washington, I am writing to express my strong support for the recent EFSEC recommendation and draft Site Certification Agreement for the Horse Heaven Wind Project. Specifically, I support the Council’s recommendations to augment the mitigation measures identified in the Final Environmental Impact Statement as follows: 1. Restrict the siting of wind turbines within 2 miles of documented Ferruginous Hawk nests and siting of primary project components with 0.5 miles of documented nest sites. 2. Restrict the construction of project components in priority linkage zones for wildlife connectivity, 3. Avoid siting solar arrays in rabbitbrush shrubland habitat or other WDFW-designated Priority Habitats, and 4. Conduct surveys for Burrowing Owls and develop a Burrowing Owl Management Plan if active burrows are found. Protecting birds and their habitats from habitat loss and climate change is a cause that is deeply personal to me, and I am grateful for EFSEC's responsiveness to the concerns of the conservation community, especially regarding the state endangered Ferruginous Hawk and wildlife connectivity. I am encouraged by EFSEC's commitment to balancing renewable energy development with the preservation of these vital habitats and species. Renewable energy is crucial for reaching our state’s ambitious climate goals, but we must proceed in a way that is compatible with our species and habitat recovery goals. Thank you for your dedication to preserving the beauty and wonder of Washington's precious landscapes. Sincerely, Amanda Dickinson 1322 S 18th Ave Yakima, WA 98902-5264 bettyyakima@aol.com

Attachments:

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To: Comments@efsec.wa.gov
From: amy.moon@efsec.wa.gov
Received: 2024-04-17T21:48:05+00:00
Subject: FW: Horse Heaven Energy Center
Has attachment? False

From: Karen Brun <karen@tricitiescares.org>
Sent: Wednesday, April 17, 2024 2:41 PM
To: Moon, Amy (EFSEC) <amy.moon@efsec.wa.gov>; Greene, Sean (EFSEC) <sean.greene@efsec.wa.gov>
Subject: Horse Heaven Energy Center

External Email

Just listened to your synopsis of changes to the Site Certification Agreement based on public comments and letters. Thank you for not succumbing to pressure from Scout Clean Energy.
One thing I didn't hear was a clarification on the amount of generating capacity for wind and solar. The agreement states 1150MW for wind and 800 MW for solar which is incorrect. It should be 1150 total.
Karen Brun
Tri-Cities CARES

Attachments:

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To: Comments@efsec.wa.gov
From: weberet3@gmail.com
Received: 2024-04-17T18:38:48+00:00
Subject: Horse Heaven Wind Farm
Has attachment? False

External Email This is a brief comment which is submitted for the record of public comments on the subject project. For the record, I am in support of all comments advocating restrictions to this project as previously submitted or referenced to these source: >Washington Audubon Society >Lower Columbia Audubon Society >Save-Our-Ridges Organization (the citizens group located in the Tribal-Cities WA who have previously submitted detailed comments regarding impacts to the local area and citizens and recommendations for restrictions.) >Benton County PUD I believe that this proposed wind farm is not in the best interests of the citizens of Washington state. Low power density, renewable electric power sources are a useful part of future electricity sources. However, such sources require huge land areas and offer relatively short useful/design unit life spans (about 20-30 years) and experience numerous maintenance/repair outages. I advocate for more highly distributed sources (i.e. - solar panels on buildings, wind turbines in remote areas, if cited with appropriate attention to protecting natural ecosystems (including potential for restoration of degraded areas). I also am concerned for electric grid reliability resulting from generation sources that can be interrupted by weather systems, which can last for days to weeks, well beyond makeup by current/economical battery storage units proposed by solar an wind developers. My comment on meeting the future power needs of Washington state is that our interests are best served building new nuclear power reactors, especially the new modular small reactor (SMR) designs, and more of the proven, highly reliable larger (i.e. 1000mgW range) plants. Studies by MIT have shown that nuclear power represents the least environmental impacts, land use impacts and longest usable lifespan for materials resources of any currently available electrical generating technologies. E. Thomas Weber 6622 W. Victoria Ave. Kennewick, WA 99336

Attachments:

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To: Comments@efsec.wa.gov
From: efsec@efsec.wa.gov
Received: 2024-04-19T01:36:11+00:00
Subject: FW: Questions on HHH Project
Has attachment? False

From: Judy <goosie1515@aol.com>
Sent: Thursday, April 18, 2024 6:36:02 PM (UTC-08:00) Pacific Time (US & Canada)
To: Drew, Kathleen (EFSEC) <kathleen.drew@efsec.wa.gov>; Hafkemeyer, Ami (EFSEC) <ami.hafkemeyer@efsec.wa.gov>; Moon, Amy (EFSEC) <amy.moon@efsec.wa.gov>; Grantham, Andrea (EFSEC) <andrea.grantham@efsec.wa.gov>; EFSEC (EFSEC) <efsec@efsec.wa.gov>
Subject: Questions on HHH Project

External Email

Would you please explain what this paragraph means in layman's terms? Thank you.
Administrative relief may be available through a petition for reconsideration, filed within 20 days of the service of the Orders within the Recommendation Package to the Governor. If any such petition for reconsideration is filed, the deadline for answers is 14 days after the date of service of each such petition, see RCW 80.50.100.

1. When will Gov. Inslee receive EFSEC's recommendation for the HHH Project?
2. After Gov. Inslee receives EFSEC's recommendation for the HHH Project, will there be a time period for public comment to him?
3. If there will be a time period for public comment to the governor, when will this happen?
4.How will the people know when to comment? Will there be a public announcement?
5. In the above paragraph in blue, are you saying that EFSEC can renege on their original recommendation to the governor?

Thank You,

Judy

Attachments:

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To: Comments@efsec.wa.gov
From: efsec@efsec.wa.gov
Received: 2024-04-19T20:01:37+00:00
Subject: FW: Sean Greene Clarification- # Turbines in Option #2.
Has attachment? False

From: Dave Sharp <dave@tricitiescares.org>
Sent: Friday, April 19, 2024 12:42 PM
To: EFSEC (EFSEC) <efsec@efsec.wa.gov>; Greene, Sean (EFSEC) <sean.greene@efsec.wa.gov>; Moon, Amy (EFSEC) <amy.moon@efsec.wa.gov>; Hafkemeyer, Ami (EFSEC) <ami.hafkemeyer@efsec.wa.gov>; Bumpus, Sonia (EFSEC) <sonia.bumpus@efsec.wa.gov>
Subject: Sean Greene Clarification- # Turbines in Option #2.

External Email

Follow-up to the Wednesday EFSEC meeting and your presentation. Regarding your #2 that posed maximum height and maximum number of turbines but excluded a maximum for Option #2. In the final ASC the Applicant clearly limits the number of the Option #2 turbines to 147. No less than nine places in the FASC have they said so. That number should appear in the SCA. Likewise, the SCA shouldalso list the maximum height for option #1 turbines as 499'. That has also clearly been in all of the ASC's.

We recognize that the Applicant's comment and letter of April 10 stated they were reconsidering their previous exclusionof turbines. By having the SCA silent on the maximums, it allows a passive change in the Application: by omission. First, it is not appropriate, and second, it gives the appearance of the lead agency favoring the Applicant. Ask yourself this, would the Applicant take advantage of that omission?

A last thought. If the Applicant intends to regain excluded turbines by crowding them closer together, or using a turbine model outside of the ASC height limits it opens up other SEPA issues. If EFSEC has been led to believe that option #1 turbines are not available within the ASC limits, consider it bad information.

David Sharp
Tri-Cities CARES
Email: dave@tricitiescares.org
Webpage: www.tricitiescares.org

Attachments:

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From:	EFSEC (EFSEC)
To:	EFSEC mi Comments
Cc:	Hafkemeyer, Ami (EFSEC); Moon, Amy (EFSEC); Greene, Sean (EFSEC)
Subject:	FW: Horse Heaven Comments and Questions
Date:	Tuesday, April 23, 2024 1:41:50 PM
Attachments:	Horse Heaven Draft SCA Comments_jme_20240410.docx

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From: John Endres <jmmendres@tds.net>
Sent: Tuesday, April 23, 2024 12:19 PM
To: EFSEC (EFSEC) <efsec@efsec.wa.gov>
Subject: Horse Heaven Comments and Questions

External Email

re: Horse Heaven Wind and Solar Project: Unanswered Questions

Hello:
I did not receive answers to my questions in my Comment Letter regarding the Horse Heaven Wind and Solar Project. My comments were submitted and received on April 10, 2024 at 2:25 pm.
In my comments regarding the Horse Heaven Wind and solar Project I requested the following information (Questions are in Bold). My questions are copied into this document from my original letter (which I am also attaching).
If possible, can you please provide answers to my questions?

1. A preliminary Carbon Footprint (CFP) and Life Cycle Inventory/Assessment (LCI/LCA) of the Horse Heaven Wind and Solar project has not be done.
A preliminary Carbon Footprint (CFP) and Life Cycle Inventory/Life Cycle Assessment (LCI/LCA) analysis must be done before any further action on this project can proceed.
Q1: How will we know if this project will actually save more Greenhouse Gases (GHG) than it produces throughout its life cycle?

2. Solar Arrays, Modules, Panels
Q2: Please provide the total estimated number of Crystal Silicon Solar Panels, Silicon Solar Panel dimensions, and Silicon Solar Panel mass values; and the total estimated number Cadmium-Telluride Solar Panels, dimensions, and mass values.

Q3: Where will the Quartzite for Silicon Solar Panels be Sourced (mined) from?
Q4: Will explosives be used for Quartzite mining?
Q5: How much fossil fuel will be used for mining equipment and transport of Quartzite to the silicon smelter?

2.3 Which Silicon Smelting Facilities will provide the Metallurgical-Grade Silicon (MgSi)?
Q6: How much Coal will be mined and used in the Silicon Smelting process, and where are the coal mines located?

Q7: Which smelter(s) will be used? How much Charcoal will be used, and how many Trees will be harvested for Woodchips for the smelting process, and where will they be sourced from?

Q8: What will be the total mass (tons) of coal, charcoal, and wood that will used in the smelting process?
Q9: How will these items be transported to the smelter, and what type of fuel will be used?
Q 10: How much electric energy will be used, and what will be the energy source for the smelting process?
Q 11: How many tons of Greenhouse Gases will be emitted from the silicon smelting process while obtaining the metallurgical grade silicon (MgSi) for the silicon solar panels to be used in this

project?

Q 12: 2.4 Where will the MgSi be further processed into monocrystalline or polycrystalline panels?

A	***Q 13: How much energy will be used and what mass of GHGs will be emitted for processing the MgSi into mono-crystalline and/or poly-crystalline silicon solar panels?*** ***Q 14: What will be the total number of Silicon Solar Panels for this project?***

2.5 Balance of Systems (BOS) for Silicon Solar Panels

A	***Q15: How much Steel, Copper, Aluminum and other metals will be used for Solar Panel framing, mounting, and electrical connections***? ***Q16: Where will the metals be mined, smelted, and processed?*** ***Q17: How will the supplies be transported to the Horse heaven site? Please provide quantities in mass values.***
B	***Q 18: Where will Inverters and other electrical components be sourced from, and how will they be transported?***

2.6 Cadmium Telluride (CadTe) Solar Panels

A	***Q 19:* Cadmium*. What ores will provide the source of Cadmium-- Zinc, Copper, Lead?*** ***Q 20: Where will the ores be mined, and where will they be processed for the extraction and smelting to obtain the Cadmium?*** ***Q 21: What will be the estimated total amount of Cadmium obtained for use in Solar Panels?*** ***Q 22: What will be the emissions from the extraction process. Please provide the quantity and mass of Cadmium that will be used.*** ***Q 23: Cadmium is very toxic, what precautions will be taken to ensure Cadmium is not leaked into the environment?***
B	**Q 24: Tellurium.** ***What ores will be the source of Tellurium—Copper mining, or other metal mining?*** ***Q 25: Where will the ores be mined and where will they be processed for extraction to obtain the Tellurium? What will be the emissions from the extraction process***. ***Q 26: Will the source of Tellurium be in the USA, or a foreign country?*** ***Q 27: Please provide the quantity and mass of Tellurium that will be used***. ***Q 28: Tellurium is a toxic substance, what precautions will be taken to ensure Tellurium is not leaked into the environment?***

2.7 Balance of Systems (BOS) for CadTe Solar Panels

A	***Q 29: See 2.5 A above***
B	***Q 30: See 2.5 B above***

2.8 Solar Arrays, Battery Energy Storage Systems (BESS), Inverters, Transformers, and Substations

A	***Q 31: Where will the Lithium be mined for the storage batteries?*** ***Q 32: Please provide the mass quantity of Lithium that will be mined, and the quantity of fossil fuels that will be used for mining and transport. Also provide the mass quantity of silicon that will be used in the Lithium batteries.***
B	Inverters, Transformers, and Substations can generate man-made electromagnetic fields (emfs). ***Q 33: What will be the radius of intensity of the emfs?*** Man-made emfs can be detrimental to all life forms. Man-made emfs are "polarized" and are different than the earth's natural "non-polarized" emfs [2]. ***Q 34: What measurements of the man-made emfs will be taken, and what are the potential negative impacts on flora and fauna?***
C	***Q 35: Tracking System: How much steel will be used for the solar array racking system and steel post foundations? Please provide the total mass of steel to be used, and the source of the steel***.
D	***Q 36: The Solar Arrays will obscure much of the soil surface and natural habit from: sunlight, natural precipitation, wind and air movement, etc.*** ***What impacts will this have on soil micro-flora and fauna, insects, native plants, reptiles,***

	mammals, birds, etc.?

3. Wind Turbines

3.1 Wind Turbine Towers

A	It is assumed that the Wind Towers will of the Tubular Steel type. ***Q 37: How much steel (tons) will comprise each of the Towers, and what/where is the source of the steel?***

3.2 Wind Turbine Main Shaft

A	***Q 38: What will the Main shaft be made of: Steel, Aluminum, or Fiberglass? Please specify the material, and the source of the material: e.g., Steel smelter, Aluminum smelter, or Fiberglass manufacturing facility.*** ***Q 39: Please provide the mass (tons) of the metal or fiberglass Main Shaft for the various Wind Turbines that will be part of this project.***

3.3 Wind Turbine Blades

A	Do the blades consist of the standard "Fiberglass Reinforced Polyester (or Epoxy) plus Kevlar or Carbon Fiber" type, or of some other composition? ***Q 40: Please provide the source of the Blade materials and the mass per Blade.***

3.4 Wind Turbine Concrete Foundations

A	***Q41: Please Provide the total amount of Concrete (tons) that will be used for Wind Turbine Foundations.***

3.5 Wind Turbine Nacelle

A	***Q 42: What is the Nacelle box or casing made of? Steel, Aluminum, or Fiberglass?***
B	Internal components of the Nacelle: Gearbox assembly, Aerodynamic braking system, Mechanical braking system, Turbine generator, Electrical power transmission systems. ***Q 43: Please provide the amount (mass) of metals: Steel, Aluminum, Copper, Iron, etc. Please provide the source of these components.*** ***Q 44: Specifically, please address the special Rare-Earth mineral Magnets used in the Generator. See item C***

C	**Rare Earth Minerals**. From the Institute for Energy Research (IER): "Big Wind's Dirty Little Secret: Toxic Lakes and Radioactive Waste", 2023 [3] "The specialized magnets used in the Generator consist of the Rare Earth Minerals Neodymium and Dysprosium, and are sourced from China" "According to the Bulletin of Atomic Sciences, a 2 megawatt (MW) wind turbine contains about 800 pounds of neodymium and 130 pounds of dysprosium. The MIT study cited above estimates that a 2 MW wind turbine contains about 752 pounds of rare earth minerals. "To quantify this in terms of environmental damages, consider that mining one ton of rare earth minerals produces about one ton of radioactive waste, according to the Institute for the Analysis of Global Security. In 2012, the U.S. added a record 13,131 MW of wind generating capacity. That means that between 4.9 million pounds (using MIT's estimate) and 6.1 million pounds (using the Bulletin of Atomic Science's estimate) of rare earths were used in wind turbines installed in 2012. It also means that between 4.9 million and 6.1 million pounds of radioactive waste were created to make these wind turbines." ***Q 45: Please provide the total mass of the Rare Earth Minerals "NEODYMIUM" and "DYSPROSIUM" that will be used in the Wind Turbines, and the total amount of RADIOACTIVE WASTE that will be generated. Also please provide the Source of the Rare Earth Minerals, how they will be transported, and where the Radioactive waste will be stored/disposed.***

Thank you,
John M. Endres
jmmendres@tds.net

Horse Heaven Draft SCA Comments, John M. Endres, April 10, 2024

1. A preliminary Carbon Footprint (CFP) and Life Cycle Inventory/Assessment (LCI/LCA) of the Horse Heaven Wind and Solar project has not be done.

A preliminary Carbon Footprint (CFP) and Life Cycle Inventory/Life Cycle Assessment (LCI/LCA) analysis must be done before any further action on this project can proceed. How will we know if this project will actually save more Greenhouse Gases (GHG) than it produces throughout its life cycle?

2. Solar Arrays, Modules, Panels

Please provide the total estimated number of Crystal Silicon Solar Panels, Silicon Solar Panel dimensions, and Silicon Solar Panel mass values; and the total estimated number Cadmium-Telluride Solar Panels, dimensions, and mass values. Please note: Published Carbon Footprint values of Silicon Solar Panels are significantly flawed, as described below:

2.1 Silicon Solar Panels

In 2017 – 2022, the proposed HiTest/PacWest Silicon Smelter in Newport, WA prompted an investigation into: "The Impact of Silicon Smelting on Crystal Silicon Solar Panel Carbon Footprints" [1]. This study revealed several critical flaws with published Silicon Solar Panel Carbon Footprint determinations, which are listed below:

- **A** Reported carbon footprint values of silicon solar panels found in reviewed literature do NOT include the silicon smelting process, which is perplexing since silicon is the critical component of silicon solar panels.
- **B** Carbon footprint calculations use a process known as Life Cycle Assessment and Life Cycle Inventory. These methods are highly subjective, yield inconsistent and noncomparable results, are not governed by a standard unifying method, and are typically performed by industry instead of independent bodies.
- **C** According to the Intergovernmental Panel on Climate Change (IPCC), greenhouse gas emissions from biomass sources (trees, woodchips, charcoal, etc.) are NOT accounted for at the point of combustion in energy and industrial sectors, including smelting. But we all know that burning wood and charcoal emits carbon dioxide and other gases into the atmosphere. A number of reviewed papers challenge the IPCC's "non-accounting" of biomass emissions at the point of combustion.
- **D** The carbon dioxide sink loss due to the harvest of trees for wood chips and charcoal used in the smelting process is NOT included in silicon solar panel carbon footprints. It can take decades to more than 100 years to replace the carbon dioxide sink loss due to tree harvest.
- **E** A clear and quantifiable definition of "green" does not exist, and "greenwashing" is a persistent problem.
- **F** Using the provided raw material and emissions quantities for the proposed smelter, the impact of silicon smelting on silicon solar panel carbon footprints was estimated and suggests that silicon solar panels account for more atmospheric carbon dioxide than they save over a presumed lifetime of 30 years.

2.2 Where will the Quartzite for Silicon Solar Panels be Sourced (mined) from?

- **A** Will explosives be used for Quartzite mining? How much fossil fuel will be used for mining equipment and transport of Quartzite to the silicon smelter?

2.3 Which Silicon Smelting Facilities will provide the Metallurgical-Grade Silicon (MgSi)?

- **A** How much Coal will be mined and used in the Silicon Smelting process, and where are the coal mines located? Which smelter(s) will be used? How much Charcoal will be used, and how many Trees will be harvested for Woodchips for the smelting process, and where will they be sourced from? What will be the total mass (tons) of coal, charcoal, and wood that will used in the smelting process? How will these items be transported to the smelter, and what type of fuel will be used? How much electric energy will be used, and what will be the energy source for the smelting process? How many tons of

Greenhouse Gases will be emitted from the silicon smelting process while obtaining the metallurgical grade silicon (MgSi) for the silicon solar panels to be used in this project?

2.4 Where will the MgSi be further processed into monocrystalline or polycrystalline panels?

A How much energy will be used and what mass of GHGs will be emitted for processing the MgSi into mono-crystalline and/or poly-crystalline silicon solar panels? What will be the total number Silicon Solar Panels for this project?

2.5 Balance of Systems (BOS) for Silicon Solar Panels

A How much Steel, Copper, Aluminum and other metals will be used for Solar Panel framing, mounting, and electrical connections? Where will the metals be mined, smelted, and processed? How will the supplies be transported to the Horse heaven site? Please provide quantities in mass values.

B Where will Inverters and other electrical components be sourced from, and how will they be transported?

2.6 Cadmium Telluride (CadTe) Solar Panels

A **Cadmium.** What ores will provide the source of Cadmium-- Zinc, Copper, Lead? Where will the ores be mined, and where will they be processed for the extraction and smelting to obtain the Cadmium? What will be the estimated total amount of Cadmium obtained for use in Solar Panels? What will be the emissions from the extraction process. Please provide the quantity and mass of Cadmium that will be used. Cadmium is very toxic, what precautions will be taken to ensure Cadmium is not leaked into the environment?

B **Tellurium.** What ores will be the source of Tellurium—Copper mining, or other metal mining? Where will the ores be mined and where will they be processed for extraction to obtain the Tellurium? What will be the emissions from the extraction process. Will the source of Tellurium be in the USA, or a foreign country? Please provide the quantity and mass of Tellurium that will be used. Tellurium is a toxic substance, what precautions will be taken to ensure Tellurium is not leaked into the environment?

2.7 Balance of Systems (BOS) for CadTe Solar Panels

A See 2.5 A above

B See 2.5 B above

2.8 Solar Arrays, Battery Energy Storage Systems (BESS), Inverters, Transformers, and Substations

A Where will the Lithium be mined for the storage batteries? Please provide the mass quantity of Lithium that will be mined, and the quantity of fossil fuels that will be used for mining and transport. Also provide the mass quantity of silicon that will be used in the Lithium batteries.

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C Tracking System: How much steel will be used for the solar array racking system and steel post foundations? Please provide the total mass of steel to be used, and the source of the steel.

D The Solar Arrays will obscure much of the soil surface and natural habit from: sunlight, natural precipitation, wind and air movement, etc. What impacts will this have on soil micro-flora and fauna, insects, native plants, reptiles, mammals, birds, etc.?

3. Wind Turbines

3.1 Wind Turbine Towers

A It is assumed that the Wind Towers will of the Tubular Steel type. How much steel (tons) will comprise each of the Towers, and what/where is the source of the steel?

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3.3 Wind Turbine Blades

A Do the blades consist of the standard "Fiberglass Reinforced Polyester (or Epoxy) plus Kevlar or Carbon Fiber" type, or of some other composition. Please provide the source of the Blade materials and the mass per Blade.

3.4 Wind Turbine Concrete Foundations

A Please Provide the total amount of Concrete (tons) that will be used for Wind Turbine Foundations.

3.5 Wind Turbine Nacelle

A What is the Nacelle box or casing made of? Steel, Aluminum, or Fiberglass?

B Internal components of the Nacelle: Gearbox assembly, Aerodynamic braking system, Mechanical braking system, Turbine generator, Electrical power transmission systems. Please provide the amount (mass) of metals: Steel, Aluminum, Copper, Iron, etc. Please provide the source of these components. Specifically, please address the special Rare-Earth mineral Magnets used in the Generator. See item C

C **Rare Earth Minerals**. From the Institute for Energy Research (IER): "Big Wind's Dirty Little Secret: Toxic Lakes and Radioactive Waste", 2023 [3]

"The specialized magnets used in the Generator consist of the Rare Earth Minerals Neodymium and Dysprosium, and are sourced from China"

"According to the Bulletin of Atomic Sciences, a 2 megawatt (MW) wind turbine contains about 800 pounds of neodymium and 130 pounds of dysprosium. The MIT study cited above estimates that a 2 MW wind turbine contains about 752 pounds of rare earth minerals.

"To quantify this in terms of environmental damages, consider that mining one ton of rare earth minerals produces about one ton of radioactive waste, according to the Institute for the Analysis of Global Security. In 2012, the U.S. added a record 13,131 MW of wind generating capacity. That means that between 4.9 million pounds (using MIT's estimate) and 6.1 million pounds (using the Bulletin of Atomic Science's estimate) of rare earths were used in wind turbines installed in 2012. It also means that between 4.9 million and 6.1 million pounds of radioactive waste were created to make these wind turbines."

3.6 Other Environmental Concerns of Wind Turbines/Wind Farms

A Noise Pollution and Wind Turbines: Seeking Silent Solutions in Urban Settings BLOG / By Windcycle Energy [4]

"Noise pollution, including that generated by wind turbines, can have various adverse effects on both physical and mental well-being. Physiologically, excessive noise can disrupt sleep patterns, increase stress levels, and contribute to cardiovascular issues. Psychologically, continuous exposure to noise can lead to annoyance, reduced concentration, and decreased productivity."

B "Vibrational noise from wind energy-turbines negatively impacts earthworm abundance" [5]

"Human-induced sensory pollutants can directly affect organisms through an impact on their perception, physiology and behavior (Brumm and Slabbekoorn 2005, Barber et al. 2010, Kight and Swaddle 2011, Naguib 2013, Velilla and Halfwerk 2019). It is possible that wind turbine-induced vibrational noise masks the vibrational cues of approaching foraging moles, making earthworms in noisy areas more prone to predation (Dominoni et al. 2020). Vibratory noise could also be misleading to earthworms (Dominoni et al. 2020), who may not be able to distinguish between vibratory cues coming from an approaching predator such as a mole, and the subterranean waves from the turbines."

"We found that, on average, the number of earthworms decreased by 40% at the point furthest away from the turbines compared to the closest point to the turbines where we measured (128 m versus 8 m). Our results confirm that earthworm abundance decreased substantially as the amplitude of vibrational noise increased. The maximum amplitude difference over the range at which we surveyed earthworms was on average 13 dB. We therefore predict the impact of vibratory noise to be even bigger when measured over the whole transect, as vibrational noise levels near the base of the turbine are up to 30 dB higher than at our furthest sites (> 200 m from the turbine)."

C **Birds and Bats**. Please consult the book: "Bright Green Lies" by Derrick Jensen, Lierre Keith, and Max Wilbert, 2021 [6] for a discussion regarding the numbers of Bird and Bat mortalities. Actually, please consult this well-researched, well-referenced book for the most comprehensive discussion regarding alternative energy issues that is available.

Summary

I oppose the Horse Heaven Wind Solar Farm.

This massive project will significantly damage the entire habitat of this area of Washington State in a multitude of ways, and will do more harm than good with regard to Climate Change. We have not been provided with necessary and complete information to completely assess this project. Concerned citizens should have access of complete information to assess the carbon footprint and environmental footprint of this project. For a project of this magnitude, more time should have been allowed for citizen comment. Instead of pushing for more electrical energy, we should start reducing our seemingly constant demands for more energy and more "things". We are doing significant damage to our planet in our industrial pursuits for more and more energy, and this is only exacerbating climate change. We should start reducing our energy demands. We should stop allowing unnecessary energy demands for projects like "crypto currency", enormous Electronic Server Farms for digital corporations, etc., etc., etc.

References

[1] "The Impact of Silicon Smelting on Crystal Silicon Solar Panel Carbon Footprints", John M. Endres, 2022, Pre-Print paper, ResearchGate

[2] "Polarization: A Key Difference between Man-made and Natural Electromagnetic Fields, in regard to Biological Activity" Dimitris J. Panagopoulos, Olle Johansson & George L. Carlo. Oct 12, 2015. www.nature.com/scientificreports

[3] "Big Wind's Dirty Little Secret: Toxic Waste and Radioactive Waste". October 13, 2023. IER, Institute for Energy Research. https://www.instituteforenergyresearch.org/renewable/wind/big-winds-dirty-little-secret-rare-earth-minerals/

[4] "Noise Pollution and Wind Turbines: Seeking Silent Solutions in Urban Settings". Blog, by Windcycle Energy. https://windcycle.energy/noise-pollution-and-wind-turbines/

[5] "Vibrational noise from wind energy-turbines negatively impacts earthworm abundance". 2021. Estefania Velilla, Eleanor Collinson, Laura Bellato, Matty P. Berg and Wouter Halfwerk. www.oikosjournal.org. https://nsojournals.onlinelibrary.wiley.com/doi/full/10.1111/oik.08166

[6] "Bright Green Lies: How the Environmental Movement Lost Its Way and What We Can Do About It". Derrick Jensen, Lierre Keith, Max Wilbert. 2021

To: Comments@efsec.wa.gov
From: joan.owens@efsec.wa.gov
Received: 2024-04-23T15:14:17+00:00
Subject: FW: HORSEHEAVAN HILLS APPROVAL.
Has attachment? False

Thanks,
~Joan Owens

NOTE: EFSEC email addresses have changed to @efsec.wa.gov! Please update your EFSEC contacts.

Energy Facility Site Evaluation Council
Executive Assistant
Email: joan.owens@efsec.wa.gov
Phone number: (360) 664-1920
EFSEC Email: efsec@efsec.wa.gov
EFSEC phone number: (360) 664-1345
Address: 621 Woodland Square Loop SE, Lacey WA 98503-3172
Mailstop/P.O. Box: 43172
www.efsec.wa.gov

From: Holappa, Karl (EFSEC) <karl.holappa@efsec.wa.gov>
Sent: Monday, April 22, 2024 6:55 AM
To: Owens, Joan (EFSEC) <joan.owens@efsec.wa.gov>
Subject: FW: HORSEHEAVAN HILLS APPROVAL.

Good morning, Joan,

I received this email this morning. I figured you'd be the best person to help me get it to where it needs to be. Thank you!

Best,

Karl Holappa
Public Information Officer
karl.holappa@efsec.wa.gov
Phone: (360) 515-2012

Energy Facility Site Evaluation Council (EFSEC)
www.efsec.wa.gov

From: Richard Yrjanson <dyrjanson@hotmail.com>
Sent: Sunday, April 21, 2024 10:10 PM
To: Holappa, Karl (EFSEC) <karl.holappa@efsec.wa.gov>
Subject: HORSEHEAVAN HILLS APPROVAL.

External Email

This project should not be approved because it is not needed and wind and solar will only increase our costs to the consumer. Over the last 10 years we have wasted money building solar and wind which will not provide reliable power sources and only compete with the hydrogen bub in centralia wa and will require all the power to produce hydrogen production including river water. They are looking at removing the dams and on the Snake

River and I see no effort to coordinate our electrical grid. I followed the present governor's 8 years of spending our tax dollars and look forward to getting a new governor which will not follow present governor's record of providing healthcare, electricity, and relationship with unions, retirement plans, etc, etc. It is good to see him go before gas gets to 5.90 a gallon. The state better start looking into the Biden's hydrogen hub which is going to start electrical costs to soar^. I'm 83 years and lived in this beautiful state for 53 years and seen the first 3 wind generators built by Boeing on the hill overlooking the Columbia River near Goldendale WA they are gone now but our lovely state is nothing more than Wind and Solar eyesores. I am tired of the waste, and unplanned cost that was given to corporations building solar and wind equipment and receiving tax breaks and speaking up with the majority of citizens who are suffering from the highest electrical cost in the country, and the efforts to do away of greenhouse gas. I joined thousands of other people suffering the results of this administration and look forward now to saying enough and will no longer keep on trying to try to understand how this state and present admininistration operate and will no longer even attempt to understand of what a good state government is. So I will quit and enjoy the rest of my time in enjoying my travels out of state as much as possible.

Richard Yrjanson
212 EB Browning Drive
Centralia Wa 98531

509-783-2994

Attachments:
[]

To: Comments@efsec.wa.gov
From: amy.moon@efsec.wa.gov
Received: 2024-04-23T22:31:09+00:00
Subject: FW: Sean Greene Clarification- # Turbines in Option #2.
Has attachment? False

From: Dave Sharp <dave@tricitiescares.org>
Sent: Friday, April 19, 2024 12:42 PM
To: EFSEC (EFSEC) <efsec@efsec.wa.gov>; Greene, Sean (EFSEC) <sean.greene@efsec.wa.gov>; Moon, Amy (EFSEC) <amy.moon@efsec.wa.gov>; Hafkemeyer, Ami (EFSEC) <ami.hafkemeyer@efsec.wa.gov>; Bumpus, Sonia (EFSEC) <sonia.bumpus@efsec.wa.gov>
Subject: Sean Greene Clarification- # Turbines in Option #2.

External Email

Follow-up to the Wednesday EFSEC meeting and your presentation. Regarding your #2 that posed maximum height and maximum number of turbines but excluded a maximum for Option #2. In the final ASC the Applicant clearly limits the number of the Option #2 turbines to 147. No less than nine places in the FASC have they said so. That number should appear in the SCA. Likewise, the SCA should also list the maximum height for option #1 turbines as 499'. That has also clearly been in all of the ASC's.

We recognize that the Applicant's comment and letter of April 10 stated they were reconsidering their previous exclusion of turbines. By having the SCA silent on the maximums, it allows a passive change in the Application: by omission. First, it is not appropriate, and second, it gives the appearance of the lead agency favoring the Applicant.

Ask yourself this, would the Applicant take advantage of that omission?

A last thought. If the Applicant intends to regain excluded turbines by crowding them closer together, or using a turbine model outside of the ASC height limits it opens up other SEPA issues. If EFSEC has been led to believe that option #1 turbines are not available within the ASC limits, consider it bad information.

David Sharp
Tri-Cities CARES
Email: dave@tricitiescares.org
Webpage: www.tricitiescares.org

Attachments:
[]

To: Comments@efsec.wa.gov
From: donnachrispowers@gmail.com
Received: 2024-04-27T16:19:35+00:00
Subject: HH Wind/solar
Has attachment? False

External Email

Once again the government manages to obscure the facts of a project in order to allow "wiggle" room to override the concerns of the local population. Let the wind in Western WA be the basis for your next project.

Attachments:
[]

To: Comments@efsec.wa.gov
From: djcrager@outlook.com
Received: 2024-04-28T13:26:43+00:00
Subject: EFSEC's failure to release the Adjudication Order for Public Review (HH Windfarm Project in Tri-Cities)
Has attachment? False

External Email

I object to the EFSEC not releasing the Adjudication Order for public review before voting on the HH Project. Since there are considerable changes to this project, there should be a supplemental SEPA review at the very least, as this project is being thrust on this area even though arguments against it have been solid. It seems our state government is going to make this happen no matter the negative impact on our community and its wildlife. Sadly, the benefit of some energy output here is outweighed by the everlasting negative impacts it will cause here.

Did EFSEC even read the public comments? Or was the decision made to just go through the bureaucratic hoops, and force it through for the governor's signature as he would be most pleased. As a resident of Kennewick Washington I consider this a devasting project for the Tri-Cities; for its intrusion of turbines that will stop Kennewick's ability to grow any further to the south, unsightly turbines to spoil our hills, killing of our wildlife, especially the hawks, the fire danger that will be imposed; and in the end these turbines won't generate nearly as much electricity as our clean energy hydropower does [FYI - our dams should not be breached]. Solar and hydropower are what makes sense here, not wind power.

Just because wind farm companies are welcomed by our state and no doubt will receive subsidized support to do so, does not mean that it makes sense to operate in this state. Studies show wind farms don't generate much energy in this state. Focus on hydropower or solar please.

Sincerely,

Joan Crager

Attachments:
[]

To: Comments@efsec.wa.gov
From: gramason1@gmail.com
Received: 2024-04-28T06:08:20+00:00
Subject: HHWF
Has attachment? False

External Email

Hello
To whom this may concern:
I'm a Tri-Cities resident opposed to said proposed Wind project at Horse Heaven Hills.
There is no reason why this wind farm needs to proceed at this particular area other than to spite those that oppose.
There is plenty of lands that would be ideal away from the public eye.
This battle has become a power ggrabbed over reach to suffice the Biden agenda and defy the will of the people of those that reside in the area.
Listen to us!!
Shame on those determined to destroy Horse Heaven Hills serenity.
This beautiful area needs to stay clear and pristine for the future of our animals and Indigenous significance of this heritage territory.
We say no
No more pushing us around.
We don't want a wind farm here we have enough.
How would you like some unknown to come take your view without your permission??

Thanks for your understanding and doing the right thing.

Sonia Ayala

Attachments:
[]

To: Comments@efsec.wa.gov
From: dwshepherd49@yahoo.com
Received: 2024-04-28T15:30:30+00:00
Subject: Horse Heaven Hills Wind Farm Project
Has attachment? False

External Email

We, the residents, homeowners, business owners, and visitors of the Tri-Cities and vicinity (stakeholders) oppose the Horse Heaven Hills Wind Farm Project.

This industrial-scale wind farm is presented as green, clean, and beneficial. However, there is ample evidence that this is not true.

This huge and poorly cited project will have significant negative impacts on wildlife, cultural resources, real estate and property values, tourism, air quality, public safety, and the growth and development of local and regional economies.

We ask that the responsible parties deny the Site Certification.

Attachments:
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To: Comments@efsec.wa.gov
From: akueconsult@gmail.com
Received: 2024-04-28T03:47:19+00:00
Subject: Horse Heaven Hills Wind Project
Has attachment? False
External Email I understand EFSEC has reviewed comments by various parties and has forwarded a recommendation to Jay Inslee, WA State Governor on thie HH Wind Project. I appreciate the time and hard work EFSEC has put forward. With all due respect, in addition to concerns of local citizens, the WA State DNR and Tribes, I still have a concern that all reasonable alternatives to the wind & solar energy sources were not evaluated. Particularly since we need reliable energy sources with high capacity factors to transition from fossil fuels while maintaining the lifestyle that supports a civil society. Low capacity factor electrical sources are prone to inadequate supply leading to brownouts and blackouts. Lack of adequate energy will endanger health, safety, security and can disrupt a civil society. It is not clear why inherently safe, proven technology, small modular reactors such as NuScale and High Temperature Gas were not considered. Especially since the USDOE Hanford Site is a viable site with existing access to electrical transmission capacity. I look forward to a response. Thank you in advance. Anthony M Umek CEO AKU Enterprises West Richland, WA 509-438-6700 Sent from my iPhone
Attachments:
[]

To: Comments@efsec.wa.gov
From: lburton@ci.benton-city.wa.us
Received: 2024-04-29T13:09:22+00:00
Subject: Eagles
Has attachment? False

External Email

We now have bald eagles residing and nesting on the Yakima River by Benton City. Last Saturday they were flying between the river and Horse Heaven hills. This is a new development that we have not seen before. Any windmills on or near the hills could be devasting on these raptors.

Len Burton
Mayor Benton City, WA
lburton@ci.benton-city.wa.us
Cell 509-554-4746
Work 509-588-3322

Attachments:
[]

To: Comments@efsec.wa.gov
From: isaacstanfield@gmail.com
Received: 2024-04-29T00:02:36+00:00
Subject: Horse Heaven Hills turbine project
Has attachment? False

External Email

I am disappointed that the EFSEC council chose to approve the Horse Heaven Hills turbine project without releasing information on the adjudication order. The public will expect there to be a supplemental SEPA review if there are substantial changes to the project.
Isaac Stanfield

Attachments:
[]

To: Comments@efsec.wa.gov
From: cswakw@frontier.com
Received: 2024-04-29T23:07:52+00:00
Subject: Horse heaven Windfarm issue
Has attachment? False
External Email As a question, could EFSEC point to another wind project that was sent to the governor with the turbine size and location undefined, and no determined water supply? Thanks Chris Wright Sent from my iPhone
Attachments:
[]

Tri-Cities CARES
Response to Draft ASC, based upon EFSEC Council Meeting April 17, 2024
Date: April 31, 2024
Dave Sharp

The Draft SCA opens more questions and confusion about the project than it answers. After the 3-year process of public comment, the SEPA process, the adjudication process and Council deliberation, the lack of specificity in the draft SCA threatens the SEPA process. Leaving specifics out of the SCA has left loopholes for the Applicant's advantage. It does not put guardrails in place that protects the arduous work that has already been done in the SEPA Process.

We heard for the first time in the EFSEC meeting of April 17 the term "Exclusion by Area" rather than by Turbine. This gives give the appearance of EFSEC changing horses, not in mid-stream, but after crossing the river. This is an abrupt change from discussions in the deliberation process. What are the implications of this change? Can the Applicant simply respace turbines, or survey in new micrositing corridors just outside of exclusion areas? The fact that the draft SCA does not reference the turbines excluded to date, and allows up to 222 Turbines in the Draft SCA leaves the door open for the Applicant to relocate or space turbines closer together. This would have the effect of by-passing the SEPA process.

The Council is to be commended for recognizing that a significant number of turbines caused multiple high and unavoidable impact, whether it be further endangering an endangered avian species, or having impact on wildlife corridors, visual, recreation, noise, dust, firefighting techniques, and Native American Traditional Cultural Property.

The Council, as part of their deliberations, voted to exclude 116 turbines from Option #1, leaving 115 turbines, and to exclude 75 turbines from Option #2, leaving 72 turbines. Reference FEIS Chapter 2, Figure 2-5, Areas of High Impact. Those excluded turbines included those most impactful to the environment in at least 3 categories.

Guardrails Need to be Included in the SCA-

- The Draft SCA should include by ID # the non-excluded turbines from the two options listed above.
- EFSEC should pair these turbines with location coordinates. If the coordinates have not been provided by the Applicant, EFSEC should require their submittal for documentation to support the SCA.
- Any changes in location, or additional turbines that had been previously excluded should be subject to Council approval. Doing so will provide a baseline for the SCA, and ensure that any changes do not simply move a high impact turbine to another high impact location, or create a high impact turbine where it did not previously exist.

These are reasonable guardrails that the Council should put in place.

In the Draft SCA, pages 14-15, the Council recommends modifying Hab-1, and putting restrictions on both primary and secondary components that cross high and medium impact wildlife corridors. Those restrictions may result in exclusion or relocation of primary components not included in the deliberations decision numbers referenced, as well as relocation or elimination of some secondary

components. Before finalizing the SCA, those turbines need to be identified by ID #, and if areas of exclusion are to be utilized the areas need to be specifically identified by survey or coordinate locations.

Future Environmental Issues-In the course of time from SCA to start of construction, if other environmental impacts are identified for existing turbines, EFSEC should maintain the right to exclude additional turbines if the impacts rise to the level of the original excluded turbines.

Significant Turbine Exclusions are the Norm in the Permitting Process-The exclusions identified by the Council as a result of public comment and the EIS process is far from abnormal. Reference the latest greenfield wind project in Washington: Skookumchuck reduced from 100 to 38 turbines. EFSEC processed projects Desert Claim, Kittitas Wind, and Whistling Ridge all resulted in reductions of turbines as a result of the SEPA process.

Applicant Refusal to Offer Alternative Build Scenarios is Not Normal-The findings uncovered throughout public comment and SEPA Process indicate an Applicant that either did not perform proper due diligence for the site, or knew the sensitivity of the site but chose not disclose the issues.

How Respacing Turbines Will Affect the SEPA Process-

- Visual Representations were location specific and only prepared, presented, and analyzed for the two options. Closer spacing alters visual impact and invalidates conclusions drawn by expert witnesses, technical reports. In effect, respacing turbines require a comprehensive review to ensure that the SEPA process is not compromised.
- The same with noise, and shadow flicker.
- Avian species will see increased collision risk with closer spacing proportional to the decrease in spacing.

Overall-Avian Issues-This portion of the Horse Heaven Hills is unique, and very different from any other project sited in the Northwest. The project is located within peninsula of land bounded by the Big Bend of the Columbia River, where three other Rivers feed into Columbia. The area is rich in both population and diversity of avian species, as well as being on the Pacific Flyway migration path for Sandhill Cranes and other migratory species. The Skookumchuck project mentioned above included three avian species of interest. The HHH project has no less than 14, of which 12 were observed during Avian Mean Use Surveys.

- The vast majority of attention, comment and analysis has been directed toward the Ferruginous Hawk and their nests. There has not been much attention to the bigger pictures of overall avian mean use and other avian species of interest.
    - Avian Mean Use Surveys and Appendix M Issues-TCC has reviewed existing Appendix M and underlying AUS Surveys and have found a number of issues.
        - There is no Environmental Specialty Company attribution for Appendix M-Bird and Bat Conservation Strategy: arguably the most important document needed to analyze, estimate and compare avian fatalities in the HHH and other projects across the Northwest.
        - The Applicant provided no modeling for Avian Fatality projections, or even a scientific basis for estimation. Their only number provided is as an opinion that the Fatality Rate would be in line with the Nine Canyon number of 2.76 fatalities/mw/year.

- Avian Mean Use Surveys indicated a high mean use by diurnal raptors, on par with the highest seen for any wind project in the Northwest.
- The aggregated Avian Use Survey final report does not represent the totality of avian impact of the project to include flight path data and species differentiation that earlier Surveys show.
- Mean Use Survey results of a sensitive survey point were excluded from the final Horse Heaven East Survey, and at the same time, another survey point not within the project boundary was included. The survey point excluded had the highest diurnal and Buteo mean use of any survey point in the project. This had the effect of presenting more favorable data and obscuring a sensitive high use area from the public and Council review.
    - The excluded survey data overlaid Turbine #'s 182-184, and A175 for Turbine Option #1, and 183 and 184 for Option #2. Reference FEIS Figure 2-5 High Impact Areas. These turbines have not been excluded by the Applicant.
- AUS surveys were utilized to estimate collision risk using a "Bird Exposure Index", a unitless number not meant for that purpose. The BEI was then used to discriminate collision risk between turbine models without considering other risk factor components. This is not a standard practice. TCC believes that the only turbine model correctly represented in the Appendix M BEI is the GE-2.82 model. Reference FEIS Appendix 4.6-1

- The Applicant argues that larger, but less turbines will result in less avian fatalities/mw without scientific analysis or modeling. Operating hours, ground clearance, rotational velocity, rotor span, blade pitching correlated with wind speed, and blade dimensional characteristics all impact avian risk. As an example, the larger rotor diameter models such as the GE-3.03mw are meant to operate at lower wind speeds and operate more hours/year. That increases avian risk. Add to that the larger diameter rotor, and low ground clearance which puts both large and small avian species at greater risk. Appendix 4.6-1 identifies the GE-3.03 machine is higher risk to avian species than a GE-2.82 machine. TCC agrees. That itself illustrates that the Applicant's argument is not necessarily true. Larger Nameplate is not always better.
- For these above reasons, TCC believes that any relocation or spacing changes after the SCA is certified should closely examined from an avian risk standpoint as a SEPA issue.

Turbine Model Changes-In addition to turbine spacing, any change in turbine models that increase height, rotor diameter, estimated operating hours, or nameplate generation parameters should be assessed for overall avian risk.

The Applicant argues that larger but fewer turbines reduce overall avian risk. That argument only holds if the Applicant intends to reduce the number of turbines. For example, if a new Option 1 turbine model increases nameplate by 10%, then the Applicant should decrease the number of turbines by 10%.

From:	RICHARD L MCKIE
To:	EFSEC mi Comments
Subject:	Governor Inslee"s New Position on Horse Heaven Hills Wind Farm is Incorrect - for Reasons Unknown to the EFSEC
Date:	Friday, May 24, 2024 1:54:41 PM
Attachments:	EU President responce on ERU Reply_ARES_2024_1236716.pdf 1984 POD MOD Test Results Pg. 1.png 1984 POD MOD Test Results Pg. 2.png US 5,146,395 Richard L. McKie ERU Patent.pdf

External Email

To: Ms. Kathleen Drew / Chairperson / EFSEC
From: Mr. Scott McKie / The POD MOD Project
Subject: The POD MOD -- An Electric Power Supply That Governor Inslee Refuses to Acknowledge / Exists
Dear Ms. Drew,
If you Google "...Scott McKie - POD MOD -- "Over-Unity" power generator..." you will find a Seattle Times newspaper article written by then staff reporter Mr. Terry McDermott / published "center - front-page" - because the Publisher at the time; felt that the content warranted it:
--- on June 23rd. 1993.
To begin: Nikola Tesla discovered / developed / and US Patented the multiphase AC power system the world uses today
Mr. McDermott's article was written about a Nikola Tesla based / US Invented / US developed (laboratory tested by Northwest Laboratories of Seattle WA.(1984) / US Patented (1992) / "over-unity" / electric power supply -- that is going to Europe first - because:
--- all Washington State / City / State / US Federal Government Agencies / US Universities / and US Commercial entities contacted over the life of the Project totally refused to even consider making funding or technical help available.
So -- at the official written request of Europe's EC President Ursula von der Yelen - through a letter received from Mr. Vincent Berrutto / Head of Unit / Directorate-General of Energy / under the management of Professor Antonio Marco Pantaleo / EC - EIC Accelerator Programme Manager of Breakthrough / Disruptive Technologies -- I have an accelerated application for full funding underway -- for Europe -- first.
You need to also know that the viability of the Project was verified by Mr. Nicholas G. "Nick" Butler - BSEE / Graduate of the University of Washington / BPA Senior Electrical Engineer / who oversaw and was responsible for not only:
--- the several Northwest University located research projects associated with; but also:
--- the location of, and initial design for - the first major sized, BPA funded, Wind Turbine Wind Farms in the Northwest:
--- starting with the vertical shaft "egg-beater" test design - located just North of I-90 / and just West of Ellensburg / on Stuart Anderson's old ranch.
Mr. Butler became a "silent partner" to the POD MOD Project - after I demonstrated a "table-top" demonstration to him - of a Tesla based / "over-unity" - "variable load following" design that produced a "120 VAC / 60 Hz / output power" to "120 VAC / 60

Hz (wall-power)" ratio of over 150% "over-unity":
--- that didn't violate any Laws of Physics.
The system didn't violate any "Laws" --because it "worked" the very same way that every "radio station to radio station tuning circuit" found in every AM or FM radio manufactured after Tesla invented and applied for his US Patent for the radio:
--- on Mar. 20th. 1900
--- over 124 years ago.
For reasons only known to them: Washington State Officials running this state - from Governor Inslee on down - have refused (save for State Senator Andy Billig - who ended accomplishing nothing:
--- refused to even acknowledge that they received the information I sent them.
This is what they have refused acknowledging.
The POD MOD is:
--- totally solid-state / no "fuel of any kind or type" required / environmentally clean- it emits nothing / small - 2.5 cu. ft. / lightweight - 30 lb.
--- modular / inexpensive to produce - less than $2000 per unit / "stand-alone - it has it's own on-board "start-up" power source:
--- does not require a connection to any external power source at any time / does not require "recharging" at any time
--- can have multiples of units connected together for larger / higher output power levels -- just like the 7,920 batteries in a TESLA Model S Plaid.
The POD MOD has a "selectable" VDC or VAC / continuous / "over-unity" electric output power levels:
--- 24 VDC; 48 VDC; 72 VDC; 120 VDC; 230 VDC (reduced from 240 VDC); 240 VDC; 260 VDC; 330 VDC (reduced from 380 VDC); 360 VDC (reduced from 380 VDC); 380 VDC; 400 VDC; and 480 VDC.
"Selectable" VDC outputs can be DC / AC (PWM) inverted to the following VAC continuous / "over-unity" / electric power output levels:
--- 120 VAC; 230 VAC; 240 VAC; 260 VAC; 330 VAC; 360 VAC; 380 VAC; 400 VAC; and 480 VAC.
All VAC output levels will have the following:
--- the correct number of output phases / output voltage / output frequency / and output amperage level
--- 400 VDC / 480 Amps, or
--- 3-phase / 400 VAC / variable frequency / 160 Amps per phase (480 Amps total) is available for all moving vehicle power - because:
The POD MOD has been designed to be manufactured and installed - either as a single unit - or in multiples as required either:
a.) "at" any existing or new "stationary" location; i.e., any home; apartment; office-space (in each floor's power room per occupant);
commercial; or industrial-site -- in Washington State / the US / and world-wide, or:
b.) "in" any existing or new "movable" vehicle - be it battery or internal combustion engine (of any kind or type) powered - by retrofitting-repowering each vehicle with either directly connected AC power as required, or with AC power AC motor(s) as required - be that vehicle on land / "in" or "on" the seas / or in the air as a propeller(s) ; rotor(s) of hi-bypass jet powered private or commercial aircraft (can you say Boeing)
--- making available:
b1.) unlimited range of travel and / or movement, and;

b2.) unlimited time of travel and / or movement.
Remember Mr. Butler - who suddenly passed away soon after retiring from his beloved BPA -- way too soon:
While giving me a tour of the Priest Rapid and then Wanapum Dams on the Columbia River - he realized the following: we could use POD MOD power units to retrofit-repower any and all existing Hydro powered dam sites - along with all existing "heat-sourced" (including Atomic) high voltage electric power plants by:
--- installing multiples of "rack-mounted" POD MOD units against the interior walls of each site's Turbine Hall(s):
--- connecting the new / clean / matching output power through the control room(s) to the existing connected power grid(s):
--- allowing for the shutting down / turning off / of "only the polluting power source(s) and revolving generator(s)" - while allowing each site:
--- to continuously produce it's full / maximum output level / 24 - 7 / 365 days a year -- which they can't do now due to reduced winter snowpack levels - which are only going to get worse.
--- and keeping the site - and all of the jobs - going past any "termination date" due to pollution considerations.
Simply stated: -- the POD MOD technology makes everything, including all renewables / used to produce electricity and power vehicles:
--- redundant - full stop.
Finally: "Nick" and I designed the POD MOD specifically to combat something that he had found while researching some Oil and Gas Industry in the early '80s..
What he had stumbled across - was the earlier research done by Oil and Gas Industry scientist / "participants" - where they found that "...there was a chance..." that their product lines could cause something called Climate Change... (paraphrase).
Well guess what happened.
IF you want any reason to tell the out going Governor -- to "rethink his position" which I've cleaned up for possible public viewing -- you've got it -- because of the following:
Irrespective of the fact that the US/DOE-IPO Title 17 specifically "denies" the POD MOD technology from any US Government funding - not because it doesn't work -- but because:
--- it hasn't been "commercialized" i.e., "front-end debt loading" via the standard means of financing presently in vogue / has not been "accepted" as a "standard means" of producing electricity.
All commercial size / remotely located installations" - require connection to our aging / full to capacity / FERC controlled / 5 year back-logged / power grids -- including any Wind Turbines installed at Horse Heaven.
A POD MOD (or multiples as required) - can be installed and connected, by our "not-for-profit" 501(c)(4):
--- to any power utility / power grid / connected "stationary" or "movable / vehicle" location:
--- just as any other "emergency generator" can be installed.
And if there is no "...contract for power..." in place:
--- that "stationary" or "movable/ vehicle" location -- is not legally required to use any of the "available" electricity from either a "connected power utility or power grid.
I won't do this at present - as I believe it is going to "hit the fan" / politically and economically / here in the State of Washington - and across the US:

--- when it becomes known that the electric bill payers and vehicle fuel purchasers in this state (and the US) - have been denied the following:
--- long term (10 -30 year) / extremely low - set rate - with only inflation connected increases /
--- $0.10 "per hour" / $72 per 30 day month per POD MOD / standard billing / without any installation costs for single home locations and negotiated installation costs for commercial and industrial installations / clean electricity.
If the US/DOE-PPA can make this available to single "stationary" location owners (with all installation costs on the site owner) -- we will go better.
Europe is going to get the economic benefits - first - because the State Governor - would not allow himself to be contacted on this.
I'm going to be converting my vehicles and my home s soon as I can -- because I am sick and tired of Politicians that are married to the idea of "Profits first / the good 'ol consumer will pick up the tab".
I'm supplying the following:
1.) EC President von der Yelen's request letter,
2.) Northwest Laboratories of Seattle test affidavit (two pages)
Had the licensed Electrical Engineer doing the testing - followed the specific instructions given him -- as noted on page two of the affidavit:
--- the total "output power" to "input power" ratio, i.e., what is the "over-unity" feature of the POD MOD - would have been well over 400%.
The bottom two entries on page 2, i.e., 120 VAC / 60 Hz / 0.06 A when compared to the 75 VAC / 60 Hz / 0.03 A actually powering the generator's drive motor - creates the "over-unity" / Tesla based / electric condition allowing the POD MOD to "do what it does".
3.) US Patent 5,146,395 -- and "Richard" is my legal first name
4.) a photo of the finalized hand wired and tested design taken on Sept.19th. 2023 - on my work space -- in my basement.
The electronics to the left and middle - are in transition to a single 7 x 8 professionally manufactured pc-board status for up-to full voltage output Beta testing.
The POD MOD exists - and is "very well, thank you".
If any questions come up concerning the information here - please fee free to contact me at your convenience -- as $1.2 Billion dollars - just for the purchase and installation for something that Nick initially located -- shouldn't be put on the shoulders of the rate payer - simply because the State Politicians and Governor didn't listen.
If you make known this information to the public -- there will be a reaction -- because Frank Blethen, the present Publisher / owner of the Seattle Times:
--- is pulling a "Jay Inslee" - "...I don't see anything new' / don't hear anything new / don't speak anything new..." move.
Yours,
Scott McKie / The POD MOD Project
2846 NW 73rd. St.
Seattle, WA 98117-6253
(206) 782-0856
scotsman7@comcast.net

EUROPEAN COMMISSION
DIRECTORATE-GENERAL FOR ENERGY

Directorate B – Just Transition, Consumers, Energy Security, Efficiency and Innovation
B.5 – Digitalisation, Competitiveness, Research, and Innovation

Brussels
ENER.B.5/VB/kke(2024)2024593

Mr Scott McKie
The POD MOD Project
2846 NW 73rd. St.
Seattle, WA. USA 98117- 6253
(206) 782-0856
scotsman7@comcast.net

Dear Mr McKie,

Thank you for your email of 28 January regarding your patent for solid-state electric power supplies. President von der Leyen has asked me to respond on her behalf as Head of the Research, Innovation, Digitalisation and Competitiveness Unit.

The European Union offers strong financial support to research, innovation and deployment of technologies aimed at decarbonising energy systems and strengthening the security of supply. This is done through several funding programmes and instruments that benefit from substantial financial allocations. Two relevant examples are presented below:

Horizon Europe is the EU's key funding programme for research and innovation, helping to mature the technological readiness of innovative solutions. It currently has a budget of over EUR 95 billion, and tackling climate change is one of its primary objectives. More information can be found on the link below. Please refer to the 'Climate, Energy and Mobility' part of the programme, which would hold the most relevance for your areas of interest.

https://ec.europa.eu/info/research-and-innovation/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe_en.

Additionally, the EU Innovation Fund is one of the world's largest funding programmes for the demonstration of innovative low-carbon technologies, which bring European 'value added' and can significantly reduce GHG emissions. More information is available at:

https://cinea.ec.europa.eu/programmes/innovation-fund_en#:~:text=The%20EU%20Innovation%20Fund%20is,contribute%20to%20greenhouse%20gas%20reduction.

I therefore encourage you to examine those funding opportunities and, if interested, get in direct contact with the management authorities of the programmes for further discussions and details. The web links above contain all the relevant information for helping you to take an informed decision.

Yours sincerely,

Vincent BERRUTTO

Head of Unit

NORTHWEST LABORATORIES

of Seattle, Incorporated

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Technical Services for: Industry, Commerce, Legal Profession & Insurance Industry

1530 FIRST AVENUE SOUTH • SEATTLE, WASHINGTON 98134 • Telephone: (206) 622-0680

Report To: Miller Dobbs & Company Date: September 10, 1984

Report On: Electrical Device/Demonstration Lab No: E 31425

On September 5, 1984 a demonstration of a device to improve the electrical efficiency of an electric motor was witnessed at Marelco Distributing, 3901 Leary Way NW, Seattle, Washington.

Exhibit I attached is a rough schematic sketch of the system demonstrated. The purpose of the demonstration was to show an increase in electrical efficiency. The results of Test 3 purport to show this increase (Power feed V2 = 75 volts, A2 = 0.03 amps; power delivered V4 110 volts A4 - 0.06 amps). This shows a power improvement of $\frac{110 \text{ volts} \times 0.06 \text{ amps}}{75 \text{ volts} \times 0.03 \text{ amp}} = \frac{6.6 \text{ watts}}{2.25 \text{ watts}}$ or 293%.

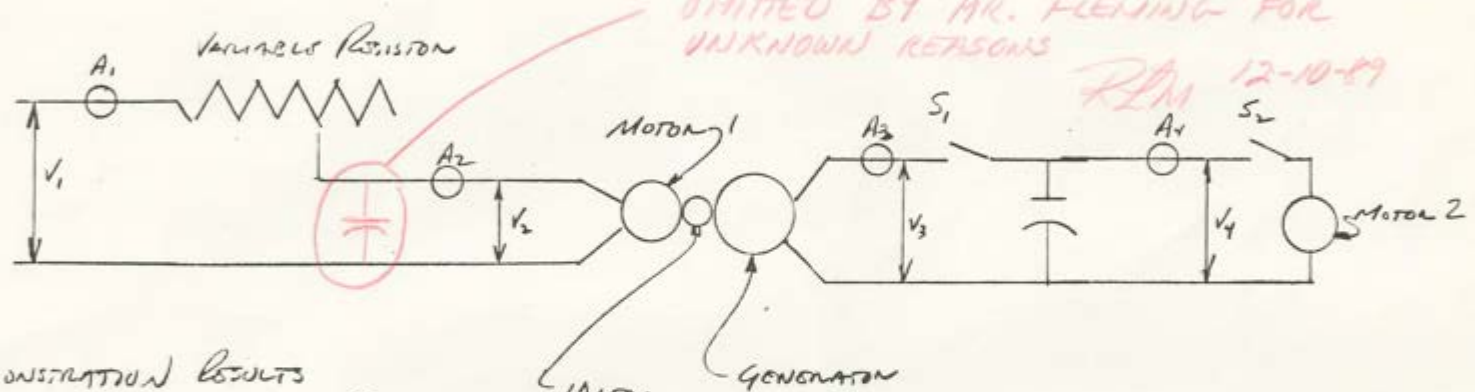
Additional tests at my request showed:

- As a load is applied to Motor #2 the output voltage of the generator (V3) drops.
- When Motor #2 is plugged into a 110V supply it draws 0.03 amps.

SUMMARY AND CONCLUSIONS

- This writer is not qualified to evaluate the electrical circuitry involved on a theoretical basis.
- Under the no-load motor #2 conditions, the device demonstrated shows improved efficiency (V2-75 volts A2 - 0.03 amps) over plugging the motor into City Light supply (110 volts; 0.03 amps) (i.e. the motor is driven with less power ($\frac{75 \times 0.05}{110 \times 0.03}$ = 68%).
- When motor #2 is loaded the circuitry does not function properly. It was reported that the demonstrators knew how to correct the problem but needed additional hardware to demonstrate properly.
- Normally electric motors are designed to operate most efficiently at rated load. Under reduced or no-load conditions the power factor falls and efficiency is reduced. This condition can be partially or wholly corrected by adding capacitors to the circuit. While this writer is not an electrical engineer, it appears that the device demonstrated is basically a capacitator.

V – Voltage
A – Amps
S – Switch



Demonstration Results

	Test 1	Test 2	Test 3
Generation R.P.M	400	400	400
V_1	120	120	120
A_1	—	—	—
V_2	55	85	75
A_2	.02	.03	.03
S_1	OPEN	CLOSED	CLOSED
V_3	105	131	110
A_3	N.A	2.3	~0
S_2	OPEN	OPEN	CLOSED
V_4	N.A	N.A	110
A_4	N.A	N.A	.06

Exhibit I
Electrical
Schematic

US005146395A

United States Patent [19]

McKie

[11] Patent Number: 5,146,395

[45] Date of Patent: Sep. 8, 1992

[54] **POWER SUPPLY INCLUDING TWO TANK CIRCUITS**

[76] Inventor: **Richard L. McKie,** 4618 3rd Ave., N.W., Seattle, Wash. 98107

[21] Appl. No.: **742,761**

[22] Filed: **Aug. 9, 1991**

[51] **Int. Cl.**[5] **H02M 3/07**

[52] **U.S. Cl.** **363/13;** 320/1; 363/16

[58] **Field of Search** 320/1; 363/1, 13, 16, 363/27, 28

[56] **References Cited**

U.S. PATENT DOCUMENTS

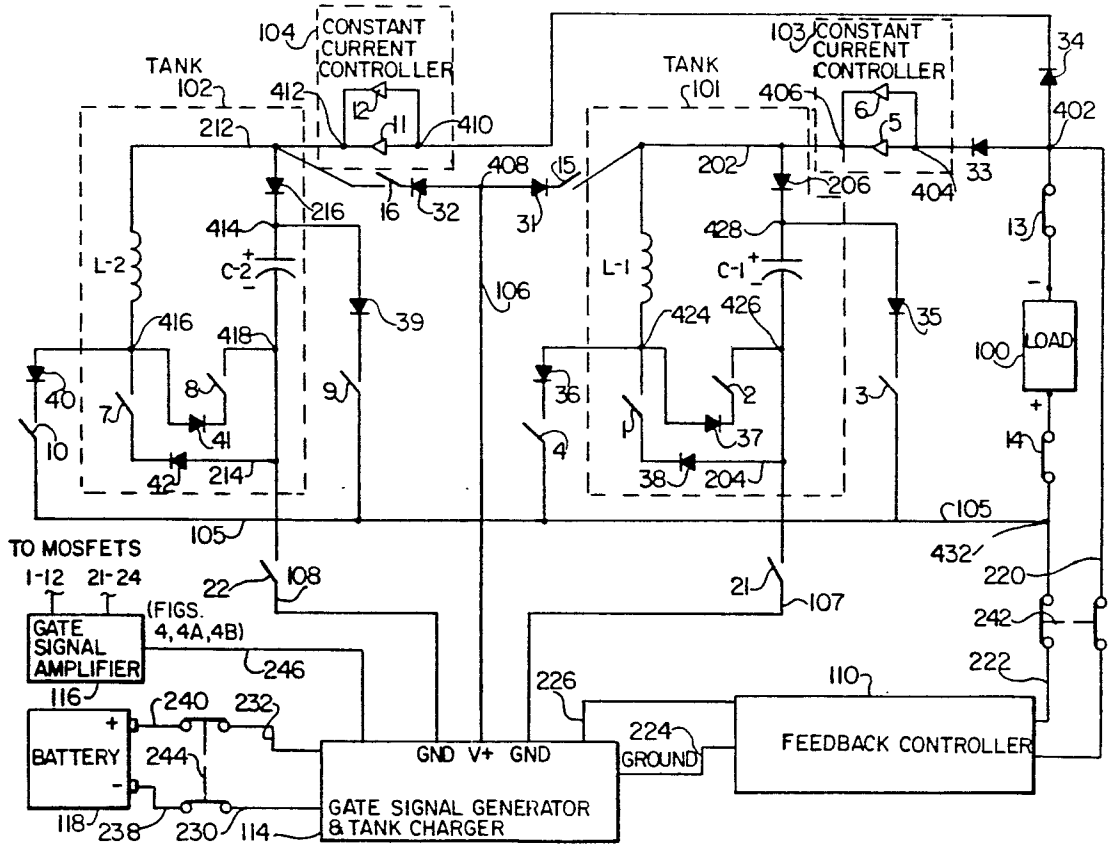
3,387,201	6/1968	Greenberg et al. .	
3,886,429	5/1975	Maillard et al. .	
4,319,315	3/1982	Keeney, Jr. et al.	363/22
4,488,214	12/1984	Chambers	363/71
4,513,226	4/1985	Josephson	363/37
4,542,440	9/1985	Chetty et al.	363/26
4,628,284	12/1986	Bruning	363/22
4,709,323	11/1987	Lien	363/97
4,748,311	5/1988	Thomas et al.	363/24

Primary Examiner—William H. Beha, Jr.
Attorney, Agent, or Firm—Mason, Fenwick & Lawrence

[57] **ABSTRACT**

The present invention provides a power supply for supplying electrical power to a load. The power supply includes first and second tank circuits having a common resonant frequency, and functions repetitively in two "major periods." In the first major period, the first tank is disconnected from powering the load and the second tank supplies power to the load while charging the first tank. In the second major period, the second tank is disconnected from powering the load, and the first tank supplies power to the load while charging the second tank. The tank circuits are arranged with constant current controllers and switches to function so that the major periods each include first and second minor "intervals." The first minor interval of the first major period defines a time during which the second tank's capacitor is providing power to the load and is charging the first tank circuit; the second minor interval of the first major period defines a time during which the second tank's inductor is charging the first tank circuit and providing power to the load. During the second major period's two minor intervals, the tank circuits perform functions identical to those performed in the first two minor intervals.

15 Claims, 10 Drawing Sheets



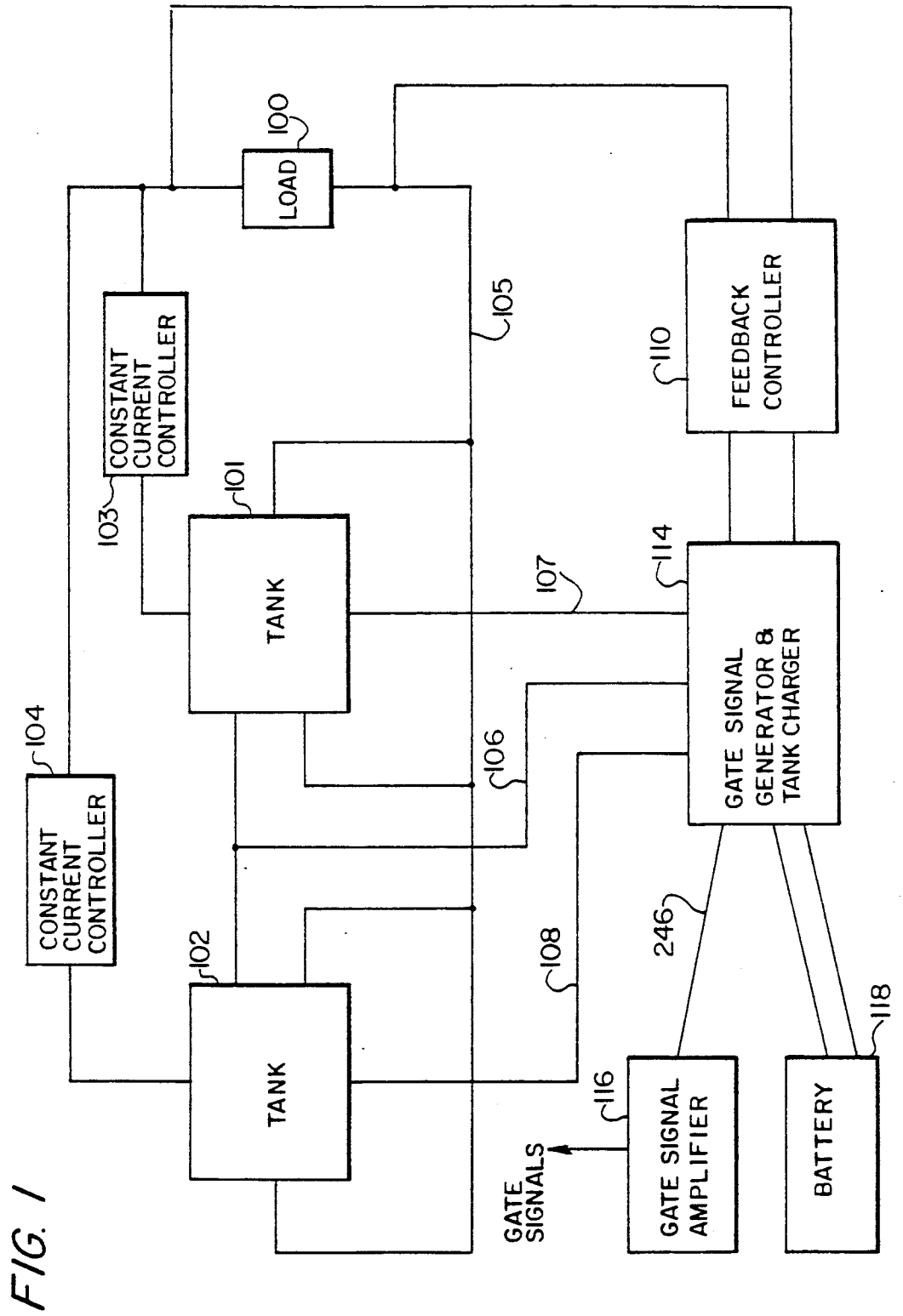

LOAD
100
CONSTANT CURRENT CONTROLLER
103
TANK
101
105
FEEDBACK CONTROLLER
110
107
114
GATE SIGNAL GENERATOR & TANK CHARGER
CONSTANT CURRENT CONTROLLER
104
106
TANK
102
108
246
GATE SIGNALS
GATE SIGNAL AMPLIFIER
116
BATTERY
118

FIG. 1

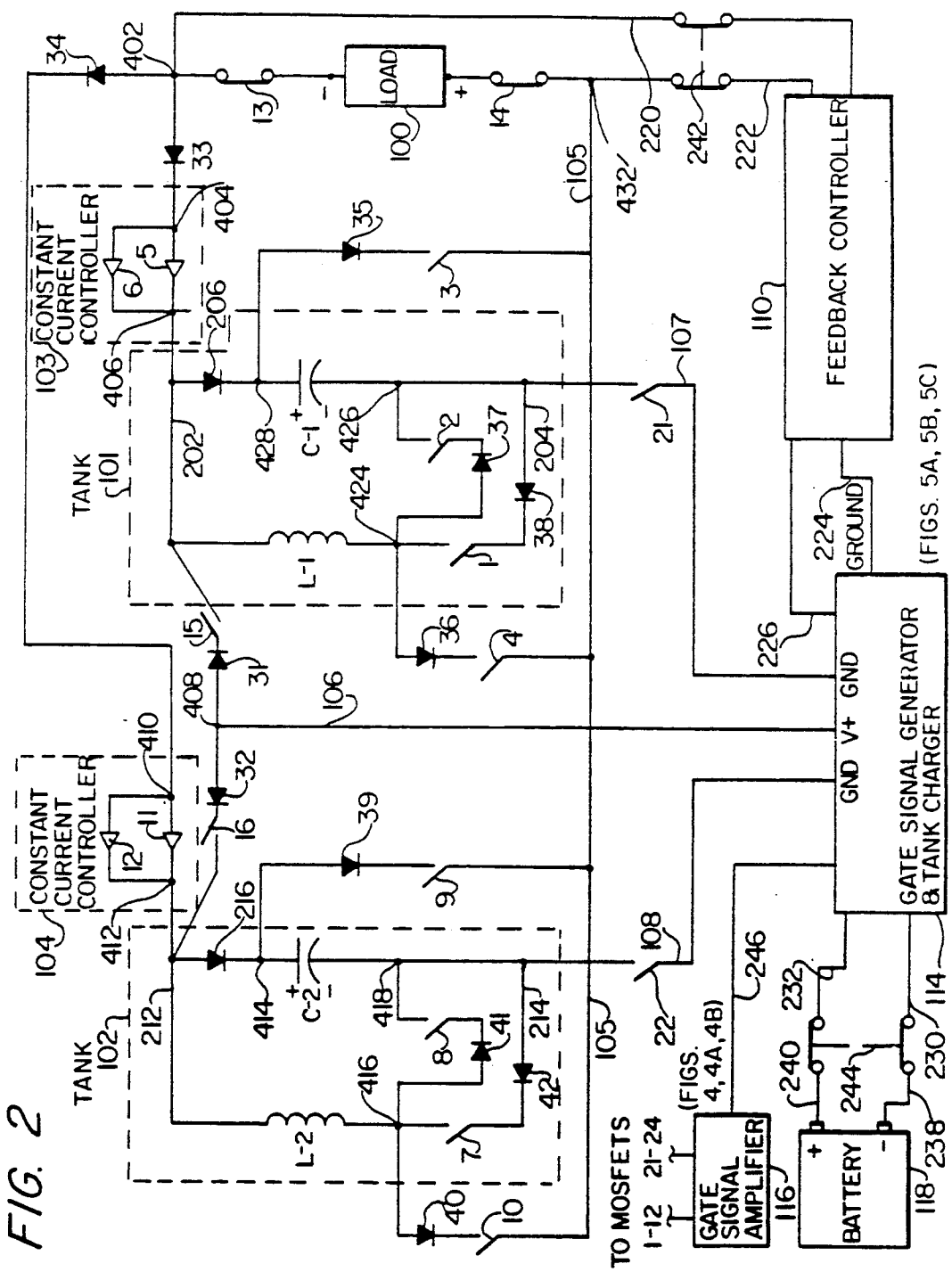

LOAD
100
CONSTANT CURRENT CONTROLLER
103
CONSTANT CURRENT CONTROLLER
104
TANK 101
TANK 102
C-1
C-2
L-1
L-2
FEEDBACK CONTROLLER
110
GATE SIGNAL GENERATOR & TANK CHARGER
GND V+ GND
GROUND
224
(FIGS. 5A, 5B, 5C)
TO MOSFETS 1-12 21-24
(FIGS. 4, 4A, 4B)
GATE SIGNAL AMPLIFIER
116
BATTERY
118
105
106
107
108
114
220
222
226
230
232
238
240
242
244
246
432

FIG. 2

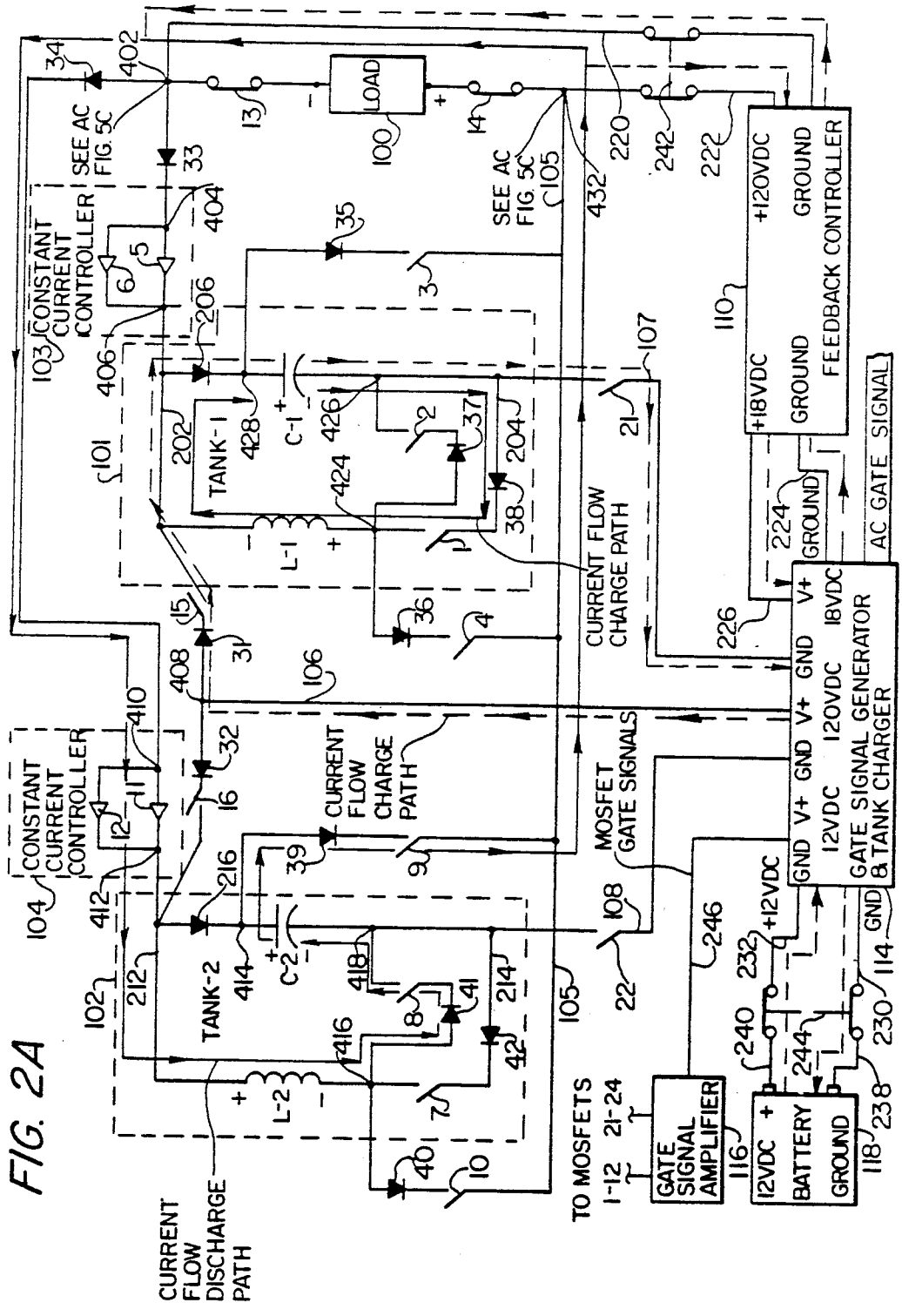

CONSTANT CURRENT CONTROLLER
SEE AC FIG. 5C
LOAD
TANK-1
TANK-2
L-1
L-2
C-1
C-2
CURRENT FLOW CHARGE PATH
CURRENT FLOW DISCHARGE PATH
MOSFET GATE SIGNALS
TO MOSFETS 1-12 21-24
GATE SIGNAL AMPLIFIER
12VDC BATTERY
GROUND
+12VDC
GROUND
+18VDC
FEEDBACK CONTROLLER
GATE SIGNAL GENERATOR & TANK CHARGER
AC GATE SIGNAL
GND V+ GND V+ GND V+
12VDC 12VDC 18VDC

FIG. 2A

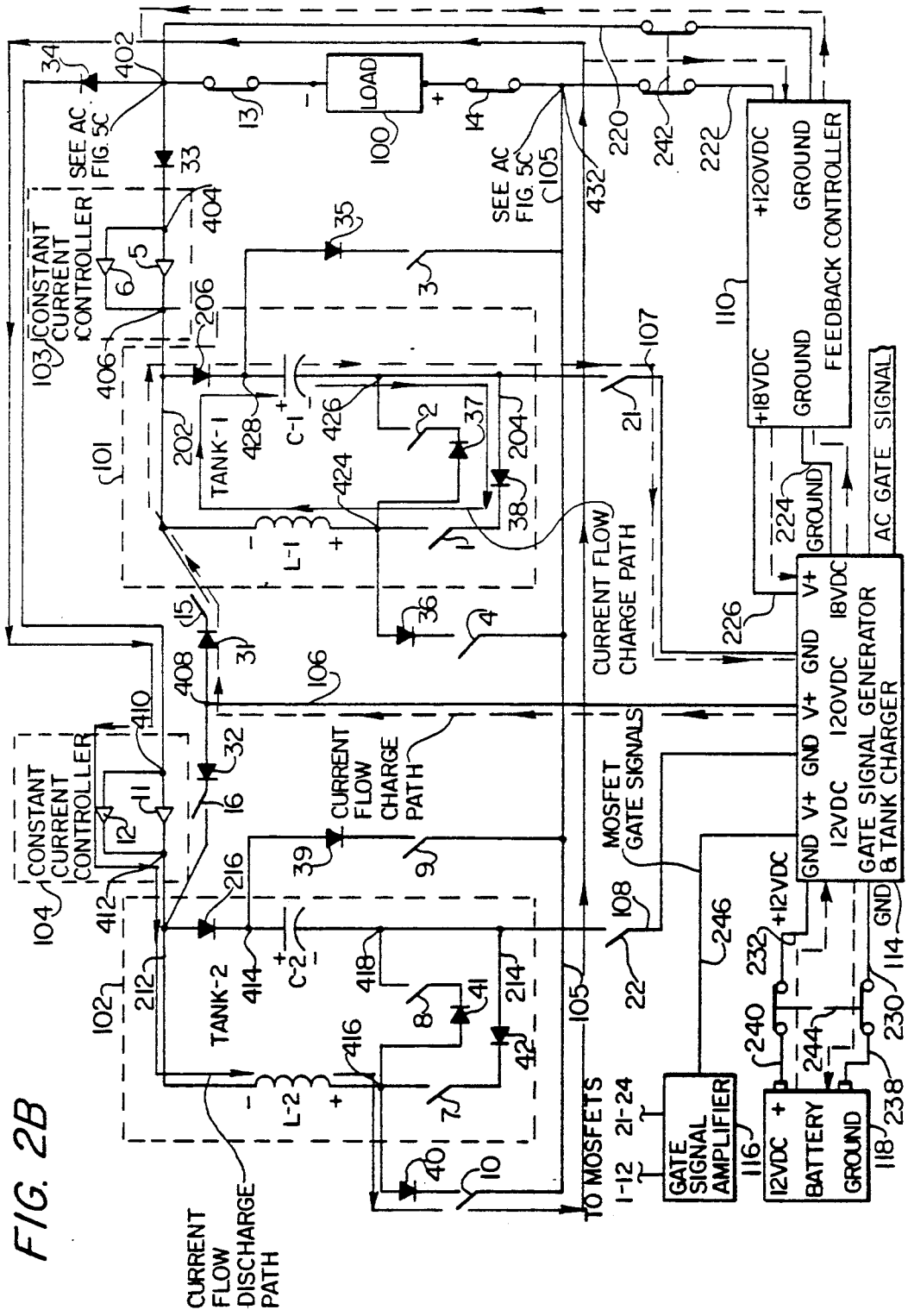

LOAD
100
SEE AC FIG. 5C
CONSTANT CURRENT CONTROLLER
103
TANK-1
C-1
L-1
101
CONSTANT CURRENT CONTROLLER
104
TANK-2
C-2
L-2
102
CURRENT FLOW CHARGE PATH
CURRENT FLOW DISCHARGE PATH
MOSFET GATE SIGNALS
TO MOSFETS 1-12 21-24
GATE SIGNAL AMPLIFIER
116
12VDC + BATTERY GROUND
118
FEEDBACK CONTROLLER
110
+18VDC
+120VDC
GROUND
GATE SIGNAL GENERATOR & TANK CHARGER
AC GATE SIGNAL
+12VDC
GND
V+
18VDC
120VDC
12VDC

FIG. 2B

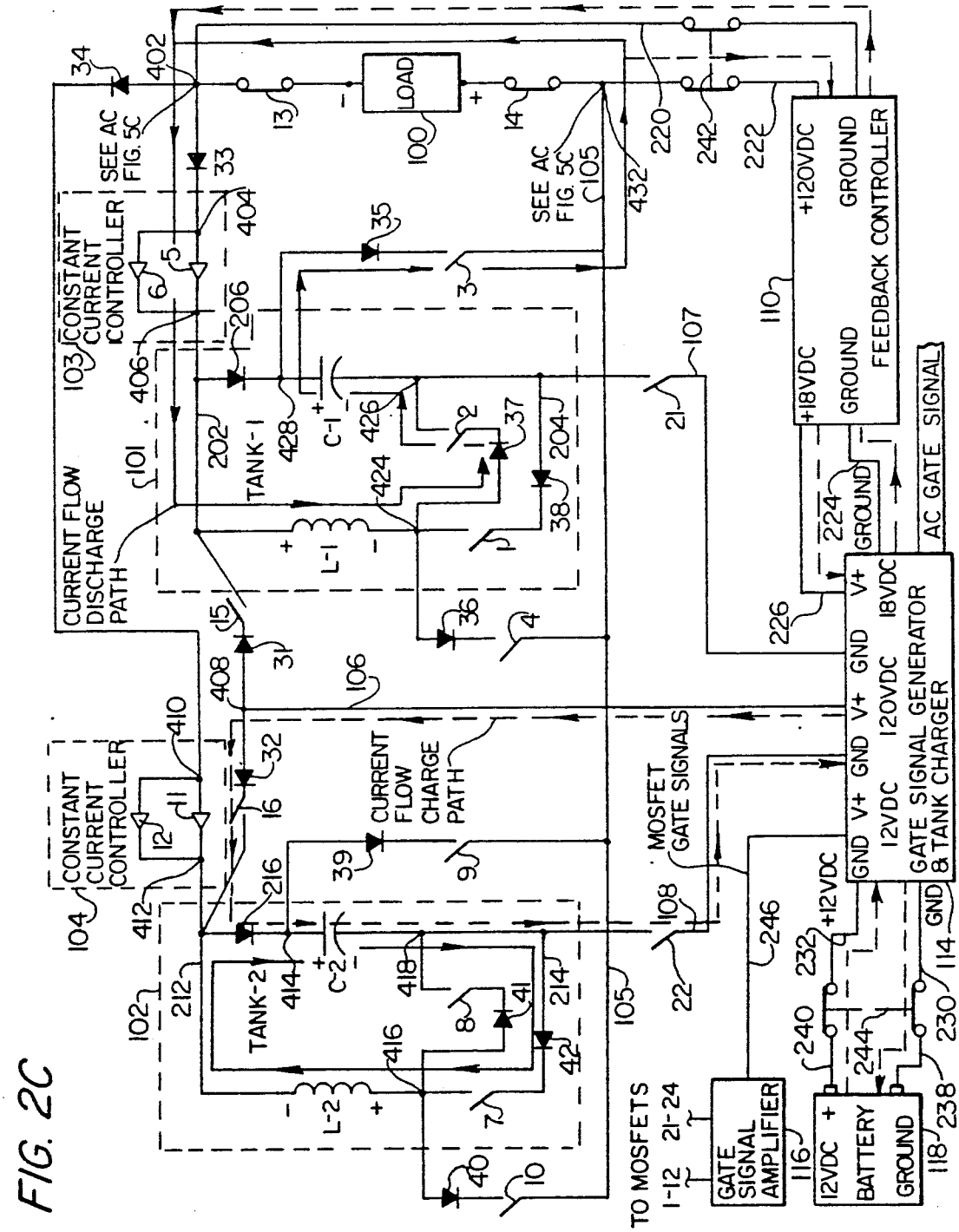

CONSTANT CURRENT CONTROLLER
CONSTANT CURRENT CONTROLLER
CURRENT FLOW DISCHARGE PATH
CURRENT FLOW CHARGE PATH
TANK-1
TANK-2
L-1
L-2
C-1
C-2
LOAD
SEE AC FIG. 5C
SEE AC FIG. 5C
FEEDBACK CONTROLLER
+120VDC
GROUND
+18VDC
GROUND
GROUND
AC GATE SIGNAL
GATE SIGNAL GENERATOR & TANK CHARGER
V+ GND V+ GND V+ GND
18VDC
12VDC
12VDC
MOSFET GATE SIGNALS
TO MOSFETS 1-12 21-24
GATE SIGNAL AMPLIFIER
+12VDC
12VDC + BATTERY
GROUND
GND

FIG. 2C

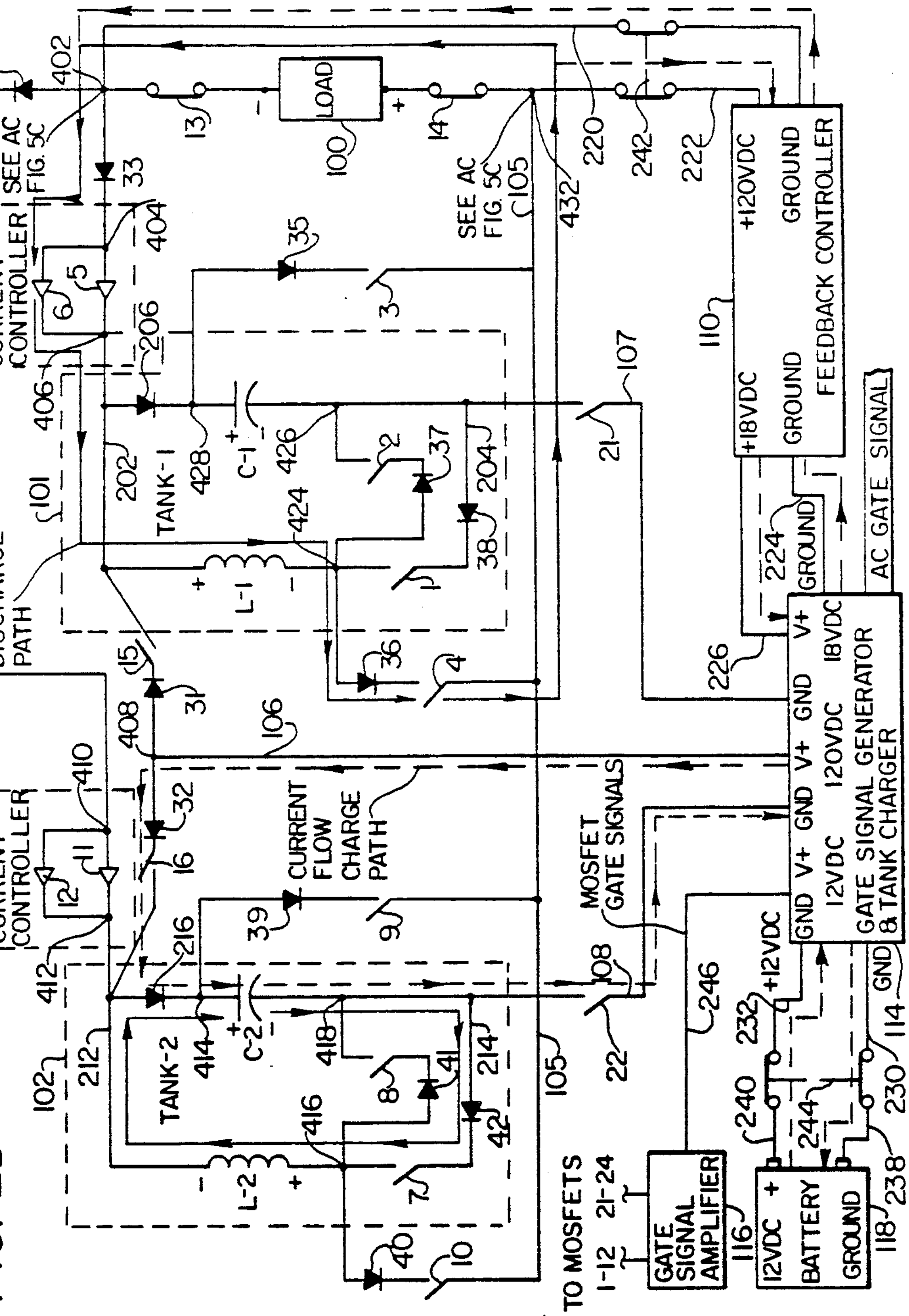

LOAD
CONSTANT CURRENT CONTROLLER
CURRENT FLOW DISCHARGE PATH
CURRENT FLOW CHARGE PATH
SEE AC FIG. 5C
TANK-1
TANK-2
C-1
C-2
L-1
L-2
MOSFET GATE SIGNALS
FEEDBACK CONTROLLER
+120VDC GROUND
+18VDC GROUND
AC GATE SIGNAL
GATE SIGNAL GENERATOR & TANK CHARGER
GND V+ 12VDC GND V+ 120VDC GND V+ 18VDC
GATE SIGNAL AMPLIFIER
TO MOSFETS 1-12 21-24
12VDC + BATTERY GROUND
+12VDC
GND

FIG. 2D

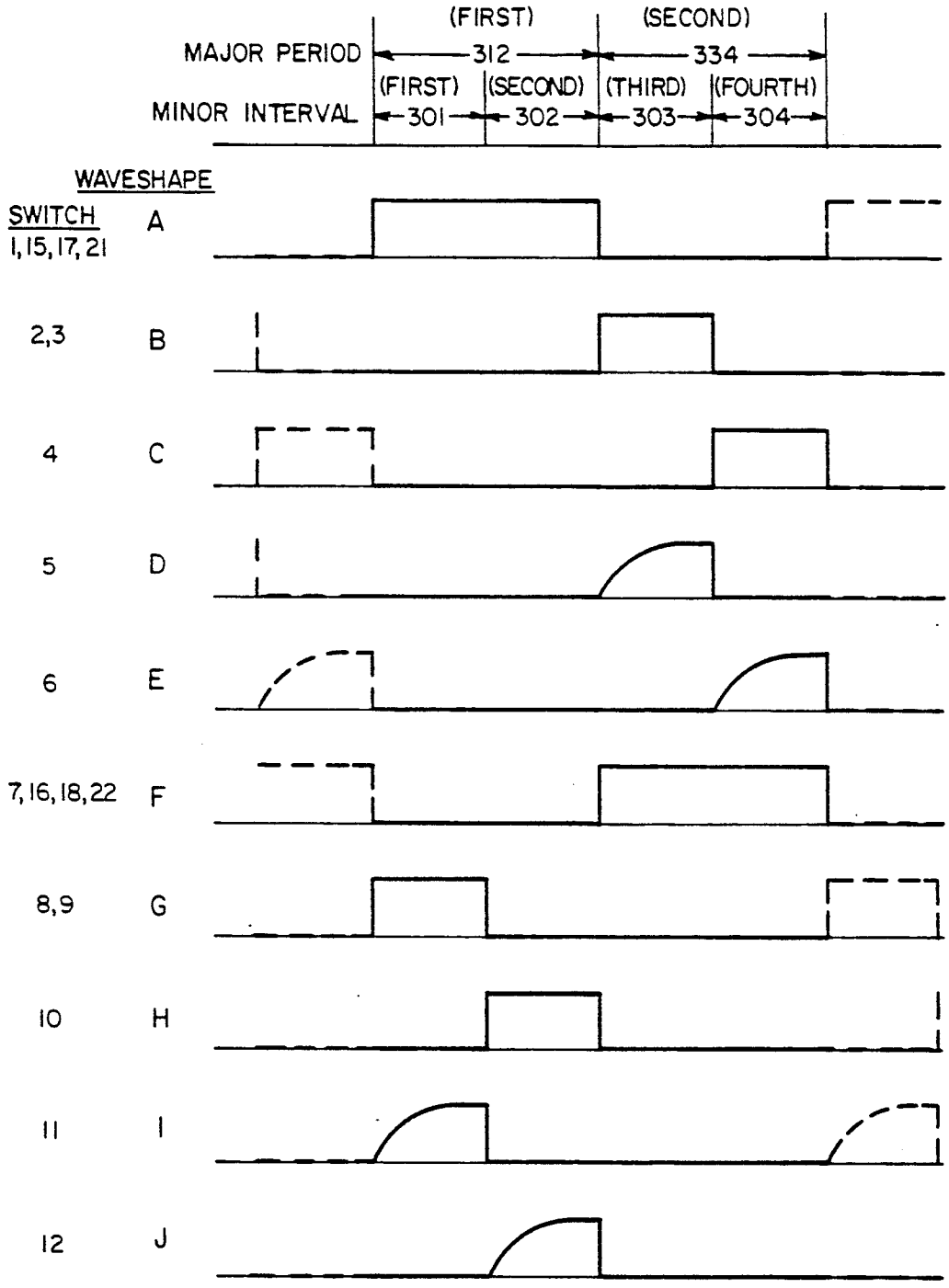

(FIRST)
(SECOND)
MAJOR PERIOD
312
334
(FIRST)
(SECOND)
(THIRD)
(FOURTH)
MINOR INTERVAL
301
302
303
304
WAVESHAPE
SWITCH
1,15,17,21
A
2,3
B
4
C
5
D
6
E
7,16,18,22
F
8,9
G
10
H
11
I
12
J

FIG. 3

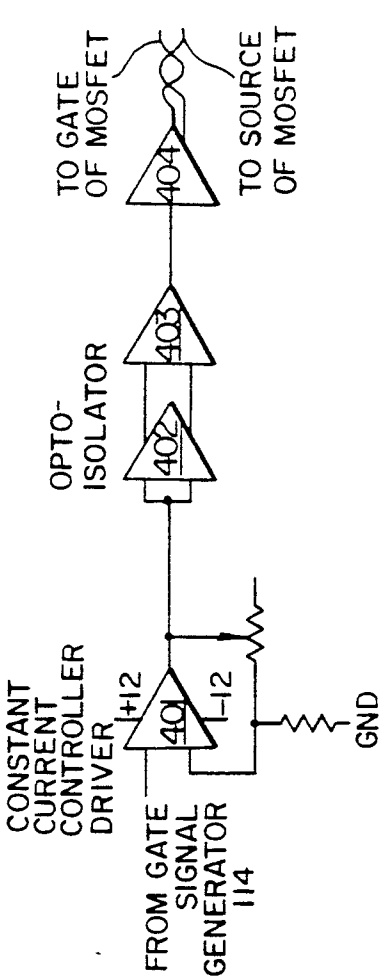


FIG. 4A

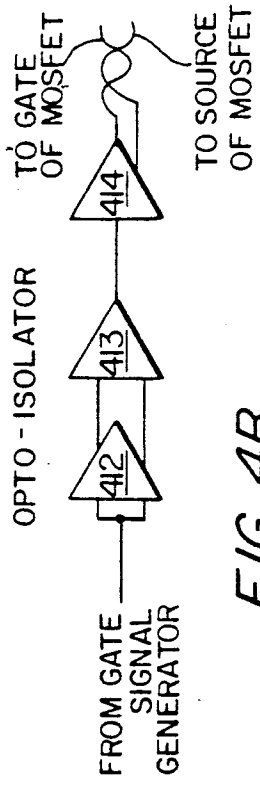


FIG. 4B

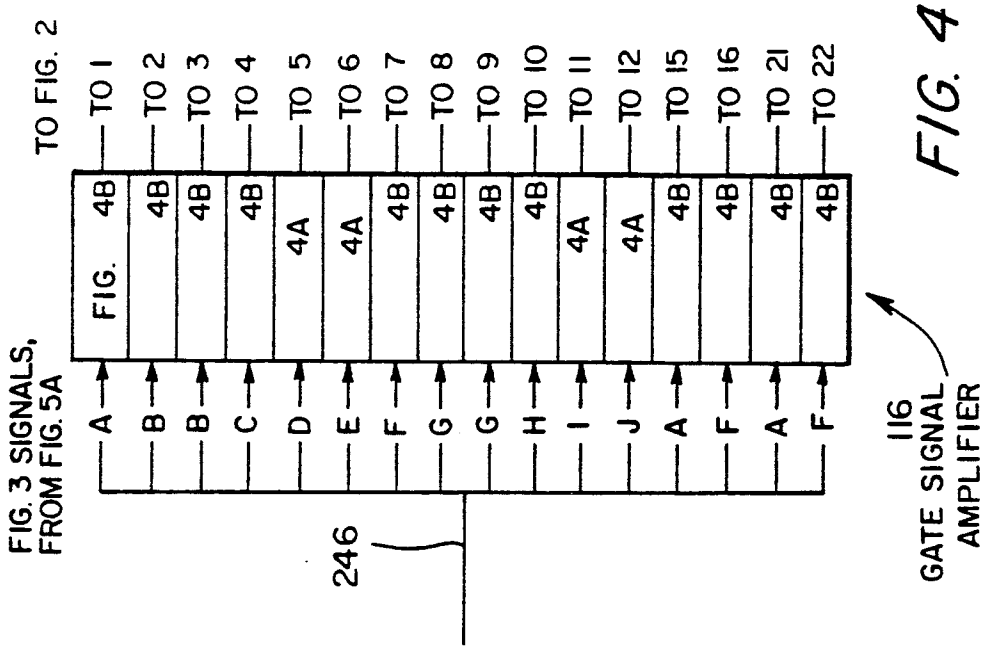


FIG. 4

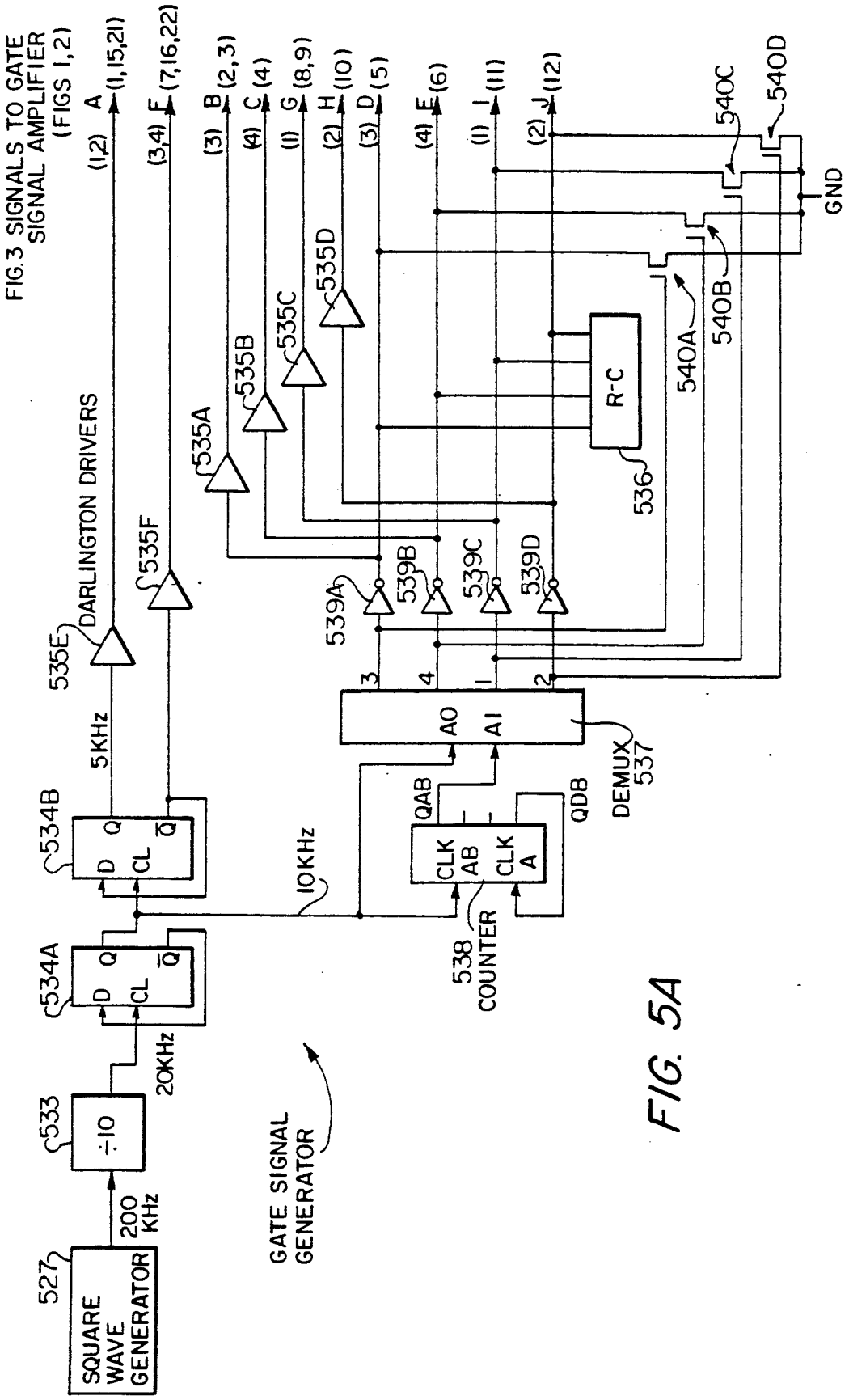


FIG.3 SIGNALS TO GATE SIGNAL AMPLIFIER (FIGS 1,2)
A (1,15,21)
F (7,16,22)
B (2,3)
C (4)
G (8,9)
H (10)
D (5)
E (6)
I (11)
J (12)
(12)
(3,4)
(3)
(4)
(1)
(2)
(3)
(4)
(1)
(2)
540C
540D
GND
540A
540B
535D
535C
535B
535A
535F
R-C
536
539A
539B
539C
539D
DARLINGTON DRIVERS
535E
5KHz
534B
534A
D Q
CL Q̄
10KHz
3
4
1
2
A0
A1
DEMUX 537
QAB
QDB
CLK AB
CLK A
538 COUNTER
533
÷10
20KHz
200 KHz
527
SQUARE WAVE GENERATOR
GATE SIGNAL GENERATOR

FIG. 5A

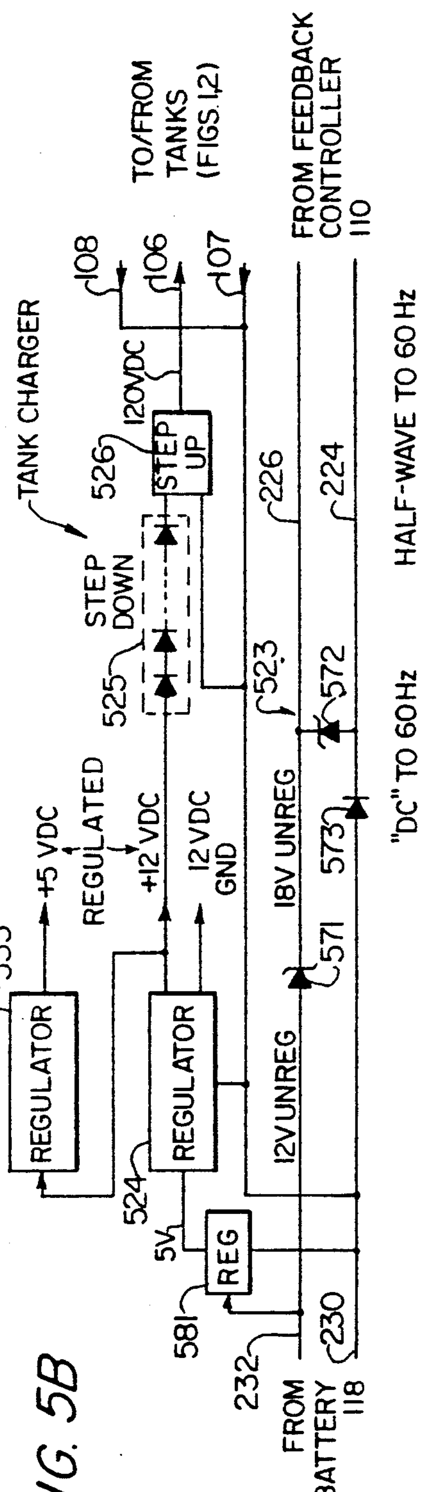

TANK CHARGER
TO/FROM TANKS (FIGS. 1,2)
FROM FEEDBACK CONTROLLER 110
108
106
107
120VDC
526
STEP UP
STEP DOWN
525
REGULATED
+5 VDC
+12 VDC
12 VDC GND
533
REGULATOR
524
REGULATOR
5V
REG
581
226
224
523
572
18V UNREG
573
571
12V UNREG
232
230
FROM BATTERY 118
HALF-WAVE TO 60 Hz FULL WAVE 550
"DC" TO 60Hz HALF-WAVE 549

FIG. 5B

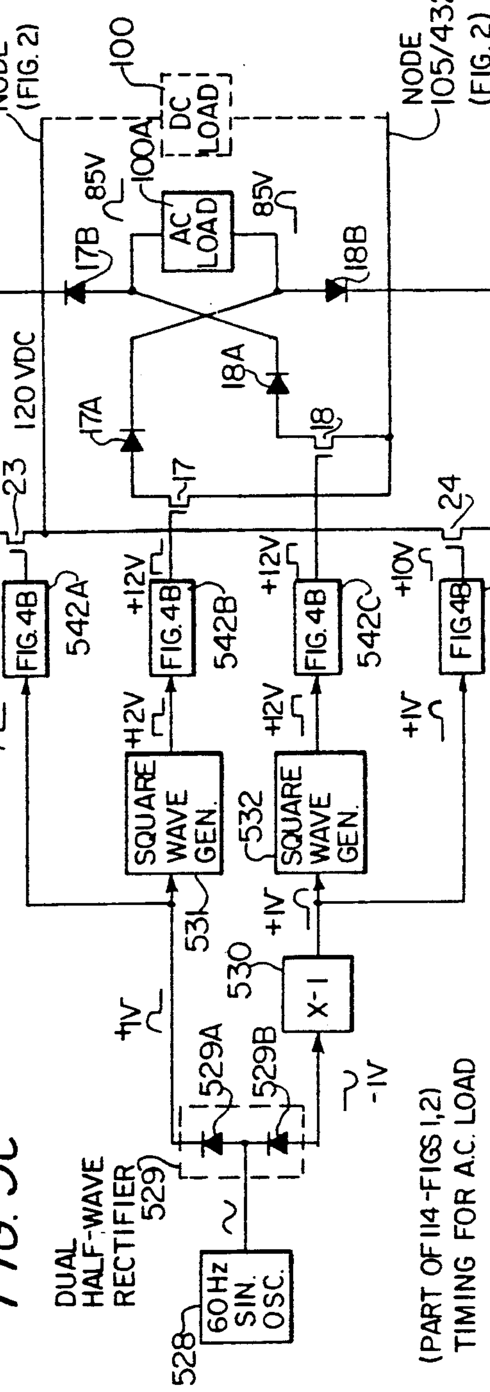

402 NODE (FIG. 2)
100
DC LOAD
NODE 105/432 (FIG. 2)
85V
100A
AC LOAD
85V
17B
18B
85V (PEAK)
120 VDC
17A
18A
18
17
23
24
PRE-DRIVERS
+10V
+12V
+12V
+10V
FIG. 4B
542A
FIG. 4B
542B
FIG. 4B
542C
FIG 4B
542D
+1V
+12V
+12V
+1V
SQUARE WAVE GEN.
SQUARE WAVE GEN.
532
531
+1V
530
X-1
+1V
529A
529B
-1V
DUAL HALF-WAVE RECTIFIER 529
60Hz SIN. OSC.
528
(PART OF 114-FIGS 1,2) TIMING FOR A.C. LOAD

FIG. 5C

POWER SUPPLY INCLUDING TWO TANK CIRCUITS

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to power supplies for supplying electrical power to a load. More specifically, the invention relates to a high-efficiency power supply including plural tank circuits whose function and interaction are controlled by a set of specially controlled switches and constant current controllers.

2. Related Art

Power supplies including charge storage elements (or, more broadly, energy storage elements), are known in the art.

For example, U.S. Pat. No. 4,628,284 (Bruning) discloses a high-frequency, high-voltage supply involving switching of transistors for, for example, magnetrons of microwave ovens. A "dead time" is provided between the intervals when one or the other of the transistors is off.

U.S. Pat. No. 4,319,315 (Keeney, Jr. et al) discloses a DC-to-DC convertor with oppositely conducting transistor pairs.

U.S. Pat. No. 3,886,429 (Maillard et al) discloses a symmetrical power pack for adapting to different sources. The power pack provides for alternate blocking and saturation of pairs of switching transistors.

U.S. Pat. No. 4,748,311 (Thomas et al) discloses a chopper circuit having a push-pull frequency f_O and parallel tuned circuit at $2xf_O$. A goal of the Thomas et al circuit is to reduce power loss in their switching means.

U.S. Pat. No. 4,542,440 (Chetty et al) discloses a current sensor involving two power switches and two associated snubber circuits which operate 180° with respect to each other.

U.S. Pat. No. 5,513,226 (Josephson) discloses a ballast inverter circuit which comprises two tank circuits. The two tank circuits operate at a common resonant frequency. A pair of transistors are switched in opposition so as to operate in a push-pull manner.

U.S. Pat. No. 4,709,323 (Lien) discloses a parallel resonant converter in which resonant circuitry recovers energy which would otherwise be lost in the circuit's switching operation.

Efficiency of power supplies has been measured in terms of the amount of energy which is consumed internally, within the power supply itself. Of course, it is desirable to minimize the amount of energy which is consumed internally, as energy which is consumed internally cannot be delivered to the load.

There is always a need to provide power supplies having greater efficiency. The present invention fulfills this need.

SUMMARY OF THE INVENTION

The present invention is a power supply for supplying electrical power to a load. The power supply includes first and second tank circuits having a common resonant frequency, and functioning repetitively in two "major periods". In the first major period, the first tank is disconnected from powering the load and the second tank supplies power to the load while charging the first tank. In the second major period, the second tank is disconnected from powering the load, and the first tank supplies power to the load while charging the second tank.

In a particular embodiment, the inventive power supply may include a plurality of constant current controllers, which may be metal oxide semiconductor field effect transistors (MOSFETs), for connecting the tank circuits to the load. The inventive power supply may also include a set of switches for selectively interconnecting the tank circuits, constant current controllers and load.

The tank circuits, constant current controllers and switches are arranged to function in the first and second "major periods", each of which includes first and second "minor intervals". The first tank circuit comprises a first capacitor and inductor, whereas the second tank circuit comprises a second capacitor and inductor. The first minor interval of the first major period defines a time during which the second capacitor is simultaneously providing current flow through the second inductor, providing power to the load, and charging the first tank circuit; the second minor interval of the first major period defines a time during which the second inductor is simultaneously charging the first tank circuit and providing power to the load. The first minor interval of the second major period defines a time during which the first capacitor simultaneously provides current flow through the first inductor, charges the second tank, and provides power to the load; and the second minor interval of the second major period defines a time during which the first inductor charges the second tank and provides power to the load.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention is better understood by reading the following Detailed Description of the Preferred Embodiments with reference to the accompanying drawing figures, in which like reference numerals refer to like elements throughout, and in which:

FIG. **1** is a high-level block diagram schematically indicating an embodiment of the power supply according to the present invention.

FIG. **2** illustrates in greater detail the embodiment of FIG. **1**. FIGS. **2A** and **2B** illustrate current flow during the first and second minor intervals associated with the first major period, as shown graphically in FIG. **3**. FIGS. **2C** and **2D** illustrate current flow during the third and fourth minor intervals associated with the second major period, as shown graphically in FIG. **3**.

FIG. **3** is a Waveshape and Timing Diagram of certain voltage signals provided by the Gate Signal Generator to the control terminals (gates) of the switches and Constant Current Controllers of the embodiment shown in FIGS. **1** and **2**

FIG. **4** illustrates a preferred Gate Signal Amplifier shown in FIGS. **1** and **2**, FIGS. **4A** and **4B** showing details thereof.

FIGS. **5A**, **5B** and **5C** respectively illustrate details of a preferred Gate Signal Generator, Tank Charger, and AC Load Timing Circuit, as shown schematically in FIGS. **1** and **2**.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

In describing preferred embodiments of the present invention illustrated in the drawings, specific terminology is employed to describe preferred elements and circuits for the sake of clarity. However, the invention is not intended to be limited to the specific terminology

so selected, and it is to be understood that each specific element and circuit includes all technical equivalents which operate in a similar manner to accomplish a similar purpose. It is further understood that "gate signal generator and tank charger," "gate signal amplifier," "feedback controller," and "constant current controller," are used in the Detailed Description to include all associated circuitry, but that the scope of the invention and the interpretation of claims elements should not be so limited. Also, "node", "path", "pathway" are understood to be any suitable means to conduct electrical current from one circuit element or circuit to another and/or serve as a point where two or more such conductors are connected together. The terms "path" and "pathway" to be broadly interpreted, and may include circuit elements other than conductive nodes. According to convention, positive current flow is described; however, it is understood by those skilled in the art that positive current flow, involving flow of negatively charged electrons in the opposite direction, is but a convention to which operation of the invention is not limited.

FIG. 1 is a high-level block diagram of a preferred embodiment of the power supply according to the present invention. The power supply is designed to provide power to a load **100**. FIG. 2 illustrates the power supply embodiment in more detail.

The power supply itself includes first and second tank circuits **101**, **102**, respectively. The tank circuits **101**, **102** are connected to a negative terminal of the load **100** via respective constant current controller circuits **103**, **104** and isolating switch **13** (FIG. 2).

A common node **105** connects, via isolating switch **14** (FIG. 2), the positive terminal of the load to both tank circuits **101**, **102**. Tank circuits **101**, **102** are connected via a common node **106** and dedicated paths **107**, **108**, respectively, to gate signal generator & tank charger **114**. The two terminals of the load are connected via respective pathways **220** and **222** to a feedback controller **110** Feedback controller **110** is connected via respective pathways **226**, **224** to gate signal generator & tank charger **114**. Power is provided to the gate signal generator and tank charger **114** by either a feedback controller **110** (which may be a MOSFET gate drive circuit) or a battery **118**. Gate signal generator and tank charger **114** oversees, via gate signal amplifier **116**, the functioning of the constant current controller circuits **103**, **104**, as well as various switches which are not specifically illustrated in FIG. **1**.

Various switches and constant current controller elements (which may be MOSFETs), as well as current direction controllers (preferably Schottky diodes), have been purposely omitted from FIG. **1** for the sake of clarity. Referring now to FIG. **2**, the power supply of FIG. **1** is illustrated in greater detail.

First tank circuit **101** is shown to comprise a variety of elements extending between two nodes **202**, **204**. An inductor L1 is connected in series with a node **424**, a switch **1** and a diode **38** between nodes **202**, **204**. Similarly, a diode **206** is connected in series with a node **428**, capacitor Cl and node **426** between nodes **202**, **204**. A diode **37** and a switch **2** are connected in series between node **424** (between inductor L1 and switch **1**) and node **426** (between capacitor Cl and node **204**).

Second tank circuit **102** is structured in a manner similar to tank circuit **101**. Specifically, nodes **212**, **214** correspond to nodes **202**, **204**. Similarly, second inductor L2 and second capacitor C2 respectively correspond to first inductor L1 and first capacitor Cl. Finally, switches **7** and **8**, and diodes **42**, **41**, and **216** respectively correspond to switches **1** and **2**, and diodes **38**, **37**, and **206**.

Diodes **206**, **216** are oriented so as to allow current to flow from node **202**, through respective nodes **428**, **414**, to respective capacitors Cl, C2. The positive terminals of capacitors Cl and C2 are connected, respectively, through nodes **428**, **414**, to diodes **206** and **216**; the capacitors' negative terminals are connected, respectively, through nodes **426**, **418** to nodes **204**, **214**.

The polarity of inductors L1 and L2 varies with the interval of operation of the circuit. During the first and third minor intervals (described in greater detail below), associated, respectively, with the discharging of tanks **102**, **101** through their capacitors and inductors to load **100**, the terminal of the inductor which is connected to node **212** (first minor interval **301**) or **202** (third minor interval **303**) is the positive terminal; during the second and fourth minor intervals (described in greater detail below), this polarity is reversed.

As briefly introduced in the discussion related to FIG. **1**, the negative terminal of load **100** is connected through isolating switch **13** to respective tank circuits **101**, **102** via respective constant current controller circuits **103**, **104**. FIG. **2** illustrates the connection in more detail than FIG. **1**. Specifically, the negative terminal of load **100** is connected via node **402** to a diode **33** which in turn is connected to the input node **404** of constant current controller circuit **103**. An output node **406** of constant current controller circuit **103** is connected to node **202** (within tank circuit **101**). Diode **33** is oriented to allow current to flow from the negative terminal of load **100** through isolation switch **13** and node **402** to the constant current controller circuit **103**. Constant current controller circuit **103** includes two parallel-connected constant current controller elements **5** and **6** which may be MOSFETs. Regulation of the current passing through constant current controller elements **5** and **6** is separately controlled by the gate signal generator in **114**, described below.

In a manner similar to the connection of isolation switch **13**, node **402**, diode **33**, node **404**, constant current controller elements **5** and **6**, node **406**, and node **202**, the negative terminal of load **100** is connected to the second tank circuit **102** via isolation switch **13**, node **402**, a diode **34**, node **410**, two parallel-connected constant current controller elements **11**, **12** which may be MOSFETs, node **412**, and node **212**.

The positive terminal of load **100** is connected to two points within each of tank circuits **101**, **102**. Specifically, the positive terminal of load **100** is connected via isolation switch **14**, nodes **105**, a switch **3**, and a diode **35** to node **428** between diode **206** and capacitor Cl. Also, the positive terminal of load **100** is connected via a switch **14**, node **105**, a switch **4**, and a diode **36** to node **424** between first inductor L1 and switch **1**.

In an analogous manner, the positive terminal of load **100** is connected via isolating switch **14**, node **105**, a switch **9**, and a diode **39** to node **414** between diode **216** and capacitor C2. Finally, the positive terminal of load **100** is connected via isolating switch **14**, node **105**, a switch **10**, and a diode **40** to node **416** between second inductor L2 and switch **7**.

Node **106**, which was shown schematically in FIG. **1** as commonly connected to tank circuits **101**, **102**, is more specifically illustrated in FIG. **2** to be connected to diodes **31** and **32**. Diodes **31**, **32** are connected

through respective switches **15**, **16** to allow current to flow from node **106** to respective nodes **202**, **212** within respective tank circuits **101**, **102** only when those tanks are being charged. Node **204** (within tank circuit **101**) and node **214** (within tank circuit **102**) are connected to respective switches **21**, **22** on respective pathways **107**, **108**. The opposite terminals of switches **21**, **22** and node **106** are presented to gate signal generator and tank charger **114**. Switches **21** and **22** operate in conjunction such that they are not both simultaneously connected to their respective tank circuits **101**, **102**.

The negative and positive terminals of load **100** are connected via respective paths **220**, **222** and switch **242**, to feedback controller **110**. Feedback controller **110** is connected via paths **224**, **226** to the gate signal generator and tank charger **114**. Path **224** is considered ground whereas path **226** is a DC voltage, typically +18 volts.

Gate signal generator and tank charger **114** receives its power from either feedback controller **110** or a battery **118** (or other equivalent power source). Typically, the positive DC voltage input **232** of the gate signal generator and tank charger **114** is connected to the positive terminal **240** of battery **118**. Similarly, ground input **230** of gate signal generator and tank charger **114** is typically connected to the negative terminal **238** of battery **118**. Switch **244** connects respective battery terminal **238**, **240** to gate signal generator and tank charger **114** inputs **230**, **232**.

In operation, gate signal amplifier **116** performs the function of amplifying the gate signals generated by gate signal generator in **114** and passed to it on paths indicated as **246**. Gate signal amplifier **116** distributes the amplified signals to the gates of respective switches and constant current controllers which control the function of the inventive power supply.

Switches **1–4**, **7–10** and **21–22** may advantageously be implemented using metal oxide semiconductor field effect transistors (MOSFETs). As illustrated in FIG. **2**, switches **3**, **4**, **9**, **10**, **21**, and **22**, may be implemented so that the source of the MOSFET is oriented toward the bottom of FIG. **2**, and the drain of the MOSFET oriented toward the top of FIG. **2**. For switches **1**, **2**, **7**, and **8**, the source of the MOSFET is oriented toward the top o right of FIG. **2** and the drain of the MOSFET is oriented toward the bottom or left. For MOSFET switches **5**, **6**, **11**, and **12**, the source is oriented toward the left and the drain is oriented toward the right of FIG. **2**. The source of MOSFET **16** is oriented to the left, and the source of MOSFET **15** is oriented to the right.

The gates of the MOSFETs are the controlling elements of the switches, and are provided, via the gate signal amplifier **116**, with appropriate voltage signals from gate signal generator in **114**. Isolation switches **13**, **14** may be advantageously implemented using mechanical, vacuum, or solid state devices suitable for connecting load **100** to, and disconnecting it from, the power supply.

Constant current controller circuits **5**, **6**, **11**, and **12** may also be implemented as MOSFETs. However, these MOSFETs are not operated as binary switches. Rather, as indicated by the generic term "constant current controller," these MOSFETs may advantageously be operated in their linear regions, serving as current controllers. As illustrated in FIG. **2**, the source of each constant current controller MOSFET may be connected, via respective nodes **406**, **412**, to the top node **202**, **212** of the tank circuits **101**, **102**. The drain of each MOSFET may be connected, via respective nodes **404**, **410** to the diodes **33**, **34**. The gate of each MOSFET is connected to the gate signal generator & tank charger **114** via gate signal amplifier **116**.

Regenerative feedback controller **110** (FIGS. **1** and **2**) is preferably implemented as a Vicor VI L53 Cy DC-to-DC converter, having 120 volts DC on the tank output (load) side, and a +18 volt DC output between paths **226** and **224**.

FIG. **3** is a waveshape and timing diagram illustrating signals produced by gate signal generator and tank charger **114** which controls the switches and constant current controller elements **1–12** and **21–22**.

As described above, the power supply includes first and second tank circuits. The tank circuits having a common resonant frequency, and function repetitively in two "major periods" **312** and **334** (FIG. **3**). In the first major period **312**, the first tank **101** is disconnected from powering load **100** and the second tank **102** supplies power to load **100** while charging first tank **101**. In the second major period **334**, second tank **102** is disconnected from powering load **100**, and first tank **101** supplies power to load **100** while charging second tank **102**.

The major periods each include first and second "minor intervals." The first minor interval **301** of first major period **312** defines a time during which the second capacitor C2 is simultaneously providing power to load **100**, is maintaining current flow through inductor L2, and is charging first tank circuit **101**; the second minor interval **302** of the first major period **312** defines a time during which the second inductor L2 is charging first tank circuit **101** and providing power to load **100**. The first minor interval **303** of the second major period **334** defines a time during which the first capacitor Cl simultaneously charges second tank **102**, maintains current flow through inductor L1, and provides power to load **100**; and the second minor interval **304** of the second major period **334** defines a time during which the first inductor L1 charges second tank **102** and provides power to load **100**. The timing of the minor intervals and major periods is controlled by the switches in the following manner.

The first and second minor intervals of the first major period are followed immediately by the first and second minor intervals of the second major period. Consequently, they may be referred to as first, second, third, and fourth consecutive minor intervals. The first through fourth minor intervals are illustrated in FIG. **3** as elements **301**, **302**, **303**, and **304**, respectively. It is understood that the waveforms shown in FIG. **3** are repetitive, extending before and after the illustrated time segments. By convention, a high-level signal indicates that a binary switch is "on" (conducting), with a "low" level indicating the binary switch is "off" (nonconducting). The gate signal generator and tank charger **114** generates these waveforms in the illustrated synchrony.

For tank **101**, waveform A is input to switches **1**, **15**, and **21** (FIG. **2**) and **17** (FIG. **5C**). Waveform B is input to switches **2** and **3**. Waveform C is input to switch **4**. Waveform D is input to constant current controller element **5**. Waveform E is input to constant current controller element **6**.

Similarly, for tank **102**, waveform F is input to switches **7**, **16**, **22** (FIG. **2**) and **18** (FIG. **5C**). Waveform G is input to switches **8** and **9**. Waveform H is input to switch **10**. Waveform I is input to constant current

controller element **11**. Finally, waveform J is input to constant current controller element **12**.

In the preferred embodiment, waveforms A and F are consecutively timed, positive-going square waves having a 50/50 duty cycle and a nominal frequency of 20 kHz. Waveforms B, C, G, and H are positive-going square waves having a 25/75 (25%) duty cycle at 20 kHz. Waveforms D, E, I, and J, are positive-going exponential waves having a 25/75 (25%) duty cycle at 20 kHz. The illustrated waveshapes are used with a positive voltage power supply. Not shown are the complementary negative waveshapes which could be used with a complementary negative power supply applying the same principles as the illustrated power supply.

Only one of waveforms B, C, G, and H are active in a minor interval. Waveform G is active during the first minor interval; waveform H, during the second minor interval; waveform B, during the third minor interval; and finally, waveform c is active during the fourth minor interval. Waveforms I, J, D, and E are activated during the first, second, third, and fourth minor intervals, respectively. These waveforms are carefully-controlled analog waveforms, preferably exponential in shape, which regulate the amount of current supplied by respective constant current controller elements **11**, **12**, **5**, and **6**, so as to control the current ultimately fed to the load **100** by respective tank circuits !02 and **101**. The exponential waveforms may be generated in any suitable fashion, such as using analog networks or digitally implemented waveform generators in a manner known to those skilled in the art.

The flow of current in the circuit of FIG. 2 for start-up operation during the first through fourth minor intervals is now described. The function of the various circuit components is the same as during steady-state operation, described more fully below.

During start-up, switches **13** and **14** are opened, isolating load **100** from the power supply. Switch **244** is closed, providing power from battery **118** (or an equivalent power supply) to the gate signal generator and tank charger !14. Switch **242** is also closed, thus connecting feedback controller **110** to the output of the tanks, which, under steady-state operation, serves load **100** as well as feedback controller **110**. The gate signal generator and tank charger **114** is turned on and, simultaneously, switches **1**, **8**, **9**, **11**, **15**, and **21** are turned on and switches **4**, **6**, **7**, **16**, and **22** are turned off. Thus begins the charging of tank **101** during major period **312**, minor interval **301** (FIG. 3).

Tank **102** has no charge at this time, consequently, it cannot perform its steady state operation which is to provide power to load **100** and charge tank **101**. The switches of tank **102** are, however, connected during startup in the same sequence as they would be during steady-state operation.

Since only tank **101** needs to be charged initially during startup, power only needs to be routed from battery **118** (or equivalent power supply) through gate signal generator and tank charger **114**, tank **101**, and feedback controller **110**, finally returning to the gate signal generator and tank charger **114**.

At the end of minor interval **301**/beginning of minor interval **302**, switches **8**, **9**, and **11** are turned off and, simultaneously, switches **10** and **12** are turned on. At the end of minor interval **302**, major period **312**/beginning of minor interval **303**, major period **334**, switches **1**, **10**, **12**, **15**, and **21** are turned off, and, simultaneously, switches **2**, **3**, **5**, **7**, **16**, and **22** are turned on, during which tank **101** discharges through feedback controller **110** and gate signal generator & tank charger **114** to begin charging tank **102**. Finally, at the end of minor interval **303**/beginning of minor interval **304**, switches **2**, **3**, and **5** are turned off and, simultaneously, switches **4** and **6** are turned on. At the end of major period **334**, both tanks continue in their respective charge/discharge sequence, as indicated in FIG. 3.

During both major periods and all four minor intervals, gate signal generator and tank charger **114**, through gate signal amplifier **116**, provides the necessary voltage signals to the switches in order to allow them to control the charging and discharging of tanks **101**, **102** according to the timing sequence presented in FIG. 3. At the end of major period **312**, isolation switches **13** and **14** can be closed, providing power to load **100**.

Operation during steady-state conditions will now be described. Special reference is made to FIGS. 2A–2D which respectively illustrate current flow during the four consecutive minor intervals.

During the first minor interval **301**, capacitor C2 simultaneously maintains current flow through inductor L2, charges tank circuit **101**, and provides power to the load **100**. Current passes from the positive terminal of C2 through node **414**, diode **39**, switch **9**, node **105** and switch **14** to the positive terminal of load **100**. From the negative terminal of load **100**, current passes through node **402**, diode **34**, node **410**, MOSFET **11**, and node **412** to re-enter tank circuit **102**. Current then passes through inductor L2, node **416**, diode **41**, MOSFET **8**, and node **418** to return to the negative terminal of capacitor C2.

It is understood that, within tank circuit **101**, an internal tank current is flowing in a clockwise direction (as viewed in FIG. 2A).

At the same time, tank circuit **101** is being charged. Current flows from gate signal generator and tank charger **114** through node **106**, diode **31**, switch **15**, node **202**, diode **206**, and node **428** to capacitor Cl. Current continues to flow from the opposite (negative) terminal of C! through node **426**, switch **21**, along path **107** before returning to the gate signal generator & tank charger **114**.

Feedback controller **110** receives some of the current from node **432** through switch **242**, along path **222**, with current passing along path **226** to gate signal generator & tank charger **114**. Current also passes from gate signal generator & tank charger **114** along path **224**, through feedback controller **110**, along path **220**, through switch **242**, node **402** and switch **13** to the negative terminal of load **100**.

In the second minor interval **302**, inductor L2 provides power to load **100** while charging tank circuit **101**. Specifically, current passes from conductor L2 through node **416**, diode **40**, switch **10**, node **105** (**432**), and isolation switch **14** to the positive terminal of load **100**. Current then passes from the negative terminal of load **100** through isolation switch **13**, node **402**, diode **34**, node **410**, constant current controller MOSFET **12**, and node **412** before returning to inductor L2. The description of currents during this second minor interval **302** is otherwise identical to the description of those in the first minor interval **301**.

During the third minor interval **303**, a process occurs which is a repeat of that in the first minor interval **301**, with tank **101** supplying power to load **100**, tank **102**, and associated circuitry. Capacitor Cl within the first

tank circuit **101** now provides power to the load and charges the second tank circuit **102**. Specifically, current flows from the positive terminal of capacitor C1 through node **428**, diode **35**, switch **3**, node **105** (**432**), and isolation switch **14** to the positive terminal of load **100**. Current then flows from the negative terminal of load **100** through isolation switch **13**, node **402**, diode **33**, node **404**, constant current controller MOSFET **5**, nodes **406**, **202**, inductor L1, node **424**, diode **37**, switch **2**, and node **426** before returning to the negative terminal of capacitor C1.

Inside tank circuit **102**, an internal resonant current flows in a clockwise direction, as viewed in FIG. **2C**. Current flows from gate signal generator and tank charger **114** through node **106** (**408**), diode **32**, switch **16**, node **212**, diode **216**, and node **414** to the positive terminal of capacitor C2. Current also flows from the negative terminal of capacitor C2 through node **418**, switch **22**, along path **108** before returning to gate signal generator and tank charger **114**.

Current flows from node **432** and switch **242** along path **222** to feedback controller **110**, and then along path **226** to the gate signal generator and tank charger **114**. Current returns along path **224** through the feedback controller **110** through switch **242** along path **220** to node **402**.

During the fourth minor interval **304**, inductor L1 provides power to the load and charges the second tank circuit **102**. Specifically, current flows from the positive terminal of inductor L1 through node **424**, diode **36**, switch **4**, node **105** (**432**), and isolation switch !4 to the positive terminal of load **100**. Then, current flows through isolation switch **13**, node **402**, diode **33**, node **404**, constant current controller MOSFET **6**, and nodes **406**, **202** to return to the negative terminal of inductor L1. Other current flow in the circuit during the fourth minor interval **304** is identical to that described above, with respect to the third minor interval **303**.

Appropriate gate control signals are sent from the gate signal generator & tank charger **114**, along path **246**, to gate signal amplifier **116**, and then on to the gates of MOSFETs **1–12**, **21**, **22**, according to the timing and waveshape diagram FIG. **3**.

Specific values which have been found advantageous for various components in FIG. **2** are provided in the following Table. However, it is to be understood that substitutions of and variations upon the following components, component values, component types, and parameter ranges may be made by those skilled in the art while still remaining within the spirit and scope of the present invention, as defined by the claims which follow this specification.

TABLE ONE

Element	Implementation
Switches 1–4	IRF350 MOSFETS (400 volt, 60 amp pulsed)
Switches 7–10	IRF350 MOSFETS (400 volt, 60 amp pulsed)
Switches 21–22	IRF641 MOSFETS (150 volts, 72 amps pulsed)
Switches 15–16	IRF350 MOSFETS (See above)
Constant current controllers 5–6	IRF350 MOSFETS (See above)
Constant current controllers 11–12	IRF350 MOSFETs (See above)
Diodes 206, 216	IRF60HFU(R)200 (200 volts, 60 amps-(Super Fast Recovery)
Diodes 31, 32	IRF60HFU(R)200 (200 volts, 60 amps-(Super Fast Recovery)
Diodes 33, 34	IRF60HFU(R)200 (200 volts, 60 amps-(Super Fast Recovery)
Diodes 35-38	IRF60HFU(R)200 (200 volts, 60 amps-(Super Fast Recovery)
Diodes 39-42	IRF60HFU(R)200 (200 volts, 60 amps-(Super Fast Recovery)
Inductors L1, L2	MICROTRAN SL4-23-F (Toroid/21 μH @ 30 amps)
Capacitors C1, C2	COMPONENTS RESEARCH 3.14 uF/600 volts/30 amps @ 200 kHz

(IRF = International Rectifier Co.)

Referring now to FIGS. **4**, **4A**, and **4B**, the gate signal amplifier **116** (FIGS. **1** and **2**) is illustrated in more detail. In particular, gate signal amplifier **116** is shown to be an array of a plurality of drivers and pre-drivers. Various signals which pass along paths **246** from gate signal generator **114** to the gate signal amplifier **116** (FIGS. **1** and **2**) are input to respective drivers/pre-drivers. The details of the generation of the various signals which travel along path **246** are described below, with reference to FIG. **5A**.

Referring to FIG. **4**, the signals which pass on paths **246** to the gate signal amplifier **116** are shown diverging to respective drivers and pre-drivers. The signals entering from the left of FIG. **4** ar those signals A–J which are illustrated in FIG. **3**. Each of the FIG. **3** signals generated in FIG. **5A** is input to one of two circuits, the two circuits being respectively illustrated in FIGS. **4A** and **4B**. The circuits shown in FIGS. **4A** and **4B** are shown in block form in FIG. **4**, for purposes of clarity. Each of the blocks shown in FIG. **4** drives a respective gate of a MOSFET switch or constant current controller shown in FIG. **2**.

Signals D, E, I, and J drive constant current controllers **5**, **6**, **11**, and **12**, and are analog signals. The circuit shown in FIG. **4A** is used for these analog signals. Most of the signals shown exiting to the right of FIG. **4** are binary signals, the binary signals being input to MOSFETs which function as on-off switches. The circuit shown in FIG. **4B** is used for these binary signals.

Referring to FIG. **4A**, four series-connected elements **401**, **402**, **403**, **404** are illustrated. The first element **401** is a constant current controller MOSFET gate input signal driver which is preferably implemented as an International Rectifier IR2129. The gain and drive characteristics of the driver **401** are determined by fixed and adjustable resistors which are connected and adjusted in accordance with manufacturer's specifications provided in published data sheets.

Driver **401** drives the input of a MOSFET opto-isolator pre-driver comprising elements **402**, **403**, and **404**. Element **402** is preferably a CD40107BEX, and element **403** is preferably an HCPL-2231. Elements **402**, **403** effectively provide electrical isolation through use of optical isolation technology. A final MOSFET gate driver **404** is indicated, although it is optional in many embodiments.

It is understood that each of elements **401–404** are provided with regulated power (+12 volts DC and −12 volts DC from FIG. **5B**).

Referring now to FIG. **4B**, series-connected elements **412**, **413**, and **414** are illustrated. These elements correspond respectively to elements **402**, **403**, and **404** (FIG. **4A**). Because the circuit in FIG. **4B** does not drive a constant current controller MOSFET gate, no element corresponding to FIG. **4A** element **401** is required. Otherwise, the function of FIG. **4B** is substantially the same as that of FIG. **4A**.

Referring now to FIG. 5A, the gate signal generator (part of element **114** in FIGS. **1** and **2**) is illustrated. A square wave generator **527** produces a 200 kHz square wave output, nominally **1** volt in magnitude and having a 50/50 duty cycle. The square wave generator **527** may be implemented using a Texas Instruments SN74LS624N voltage controlled oscillator.

The output of square wave generator **527** is received by a frequency divider **533**, a divide-by-10 element, which produces a 20 kHz square wave. The implementation of divide-by-10 element **533** is preferably a Motorola MC74HC4017 synchronous counter.

The 20 kHz square wave output by divider **533** is input to the clock input of a first D flip-flop **534A**. The non-inverting output of flip-flop **534A** is input to the clock input of a second D-flip-flop **534B**. The inverted outputs of flip-flops **534A**, **534B** are fed back to their respective D inputs. In this configuration, on the rising edge of each clock input, the respective outputs are toggled to the respective opposite states, as determined by the state of the inverted output during the previous cycle of the clock input. In this manner, each of the flip-flops **534A**, **534B** functions as a divide-by-2 frequency divider. Thus, the output of flip-flop **534A** is a 10 kHz square wave, whereas the output of flip-flop **534B** is a 5 kHz square wave.

The non-inverted output of flip-flop **534A** is input to the CLK AB input of a counter **538**, as well as to the less significant address input bit **A0** of a demultiplexer **537**. The QAB output of counter **538** is input to the more significant address bit A1 of demultiplexer **537**. Also, the most significant counter bit QDB of counter **538** is fed back to the CLK A input of the counter.

Flip-flops **534A**, **534B** may be implemented as an RCA 249CD4013AE Dual D flip-flop chip. Demultiplexer **537** may be implemented as a Motorola 832100 M74LS139T 1-of-4 Decoder/Demultiplexer chip. Finally, counter **538** may be implemented as a Motorola Dual 4-Stage Binary Ripple Counter, with a clock AB input being pin **15**, the clock A input being pin **1**, and the QAB and QDB outputs being pins **13** and **9**, respectively.

Demultiplexer **537** has four outputs. Only one of the four outputs is active at the same time. The signals input to address inputs **A0** and A1 ensure that, at a suitable frequency to synchronize with the outputs of flip-flop **534B**, the demultiplexer signal which is active scans progressively from one output of the demultiplexer to the next. The labels **1**, **2**, **3**, and **4** at the output of demultiplexer **537** indicate the minor interval (as defined with reference to FIG. **3**) in which the corresponding output is active. The presence of counter **538** ensures that no "lock-up" occurs and that the scanning of the active pulse is continuous and repetitive.

The outputs of flip-flop **534B** as well as the outputs of demultiplexer **537** determine the timing for all of MOSFETs **1–12**, **15–16**, and **21–22** (shown in FIGS. **1** and **2**). These signals are labelled A–J at the right of FIG. **5A**, and correspond to similarly labelled signals in FIG. **3**. Also, the minor interval (**1**, **2**, **3**, or **4**) during which each signal is active is also labelled, near the right of FIG. **5A**.

The manner in which the outputs of flip-flop **534B** and demultiplexer **537** determine these control signals is no described. The four outputs of demultiplexer **537** are input to respective logical inverters **539A**, **539B**, **539C**, and **539D**, which may be implemented as part of a Motorola MC74HC04N Hex inverter chip. Modified (exponentially shaped) outputs of inverters **539A**, **539B**, **539C**, **539D** provide signals D, E, I, J, respectively, which control the gates of constant current controller MOSFETs **5**, **6**, **11**, **12**, respectively.

It is understood from previous discussion that the signals D, E, I, and J are not binary signals, but are preferably exponential signals. To provide this exponential wave shaping, a wave shaping element **536**, which may be conceptualized as essentially an R-C wave shaper, is employed. In a preferred embodiment, wave shaper **536** may be an RCA CA324E, connected to the outputs of inverters **539A–539D** in a manner readily implemented by those skilled in the art using published data sheets for the CA324E.

To provide additional current boosting for the signals D, E, I, and J, the respective outputs of the demultiplexer **537** are input to the gates of four MOSFETs **540A**, **540B**, **540C**, and **540D**. The drain-source pathways of these MOSFETs are connected between respective wave shaped outputs of the inverters and ground. MOSFETs **540A**, **540B**, **540C**, **540D** are preferably implemented using Siliconix VN10KM N-Channel MOSFETs, rated at **60** volts and **1** amp (pulsed). Thus, the proper shape and power gate signals D, E, I, and J are provided via gate signal amplifier **116** (FIG. **4**) to constant current controller MOSFETs **5**, **6**, **11**, and **12**.

Meanwhile, the binary MOSFET gate signals A, F, B, C, G, and H are produced by Darlington drivers **535E**, **535F**, **535A**, **535B**, **535C**, and **535D**, respectively. These Darlington drivers, preferably implemented as a Motorola ULN2003A Darlington Transistor Array, receive respective outputs from the non-inverted and inverted outputs of flip-flop **534B**, and the respective outputs of inverters **539A**, **539B**, **539C**, and **539D**.

All the signals exiting the right of FIG. **5A** are sent to the gate signal amplifier **116** offered in detail in FIGS. **4**, **4A**, and **4B**, before controlling the timing and operation of the MOSFETs which are in the tank circuit shown in FIGS. **1** and **2**.

It is understood that the circuit elements illustrated in FIG. **5A** are provided with proper power in the form of regulated voltage signals. The regulated voltage signals are generated on FIG. **5B**.

Referring now to FIG. **5B**, voltage regulators and the tank charger considered a part of element **114** (FIGS. **1** and **2**) are illustrated. The bottom of FIG. **5B** illustrates the connection between battery **118** (at the left of FIG. **5B**) and feedback controller **110** (at the right of FIG. **5B**). The difference between the unregulated 18 volts received from feedback controller **110** (FIGS. **1** and **2**) and the unregulated 12 volts from the battery **118** (FIGS. **1** and **2**) is provided by a Zener diode **571**, preferably a 5.1 volt Zener used as a voltage shifter. Similarly, a second Zener diode **572** is provided between the positive and ground lines **226**, **224**, the Zener diode **572** preferably implemented as a 12.1 voltage Zener used as a voltage regulator. Finally, a third diode allows passage of current from battery **118** on path **230** to path **224** to feedback controller **110**. The third diode **573** is preferably implemented as a **IN914** functioning as a reverse polarity protector.

Regenerative feedback controller **110** (FIGS. **1** and **2**) is preferably implemented as a Vicor DC-to-DC converter, having 120 volts DC on the tank output (load) side, and a +18 volt DC output between paths **226** and **224**. The Zener diode **572** ensures a 12 volt DC potential matches that from battery **118**.

Regulated power is provided as follows. Referring again to FIG. 5B, a first regulator **524** is connected to ground and to the unregulated 12 volt input from battery **118** on path **232**. through a voltage regulator **581**. Voltage regulator **581** is preferably implemented as a **7805**. Regulator **524**, preferably implemented as a Maxim MAX743 Dual Output Switch Mode Regulator operating with two Maxim LM78L12 Linear Regulators, produces regulated +12 volt DC and −12 volt DC outputs. The +12 volt DC output is input to a second regulator **533**, which is preferably implemented as a **7805** UC8621 **5** volt regulator. Regulators **524** and **533** provide the regulated +12 volt DC, +5 volt DC, and −12 volt DC levels to circuits in FIG. **5A**, **5C**, **4A**, and **4B**, in a manner readily appreciated by those skilled in the art.

The tank charger portion of element **114** (FIGS. **1** and **2**) may be implemented as follows. In FIG. **5B**, the tank charger circuitry which controls paths **106**, **107**, **108** (FIGS. **1** and **2**) is shown to comprise a series-connected step down element **525**, and a step up element **526**. Step down element **525** receives the 12 volt DC regulated power and steps it down through a series of **12** series-connected diodes and an adjustable resistor to provide an output of +5.14 volts DC. Then, step up element **526**, preferably implemented as an E12-12-1.5150 ERG Inc. DC-to-DC voltage converter, produces a regulated **120** volt DC output. The output of step u element **526** provides power through node **106** (also shown in FIGS. **1** and **2**) to both tank elements **101**, **102**. The ground lines leading to the respective tanks via switches **21** and **22** (FIG. **2**) are shown as pathways **107**, **108** (FIGS. **1**, **2**, **5B**).

Referring now to FIG. **5C**, circuitry which provides timing for an AC load **100A** is illustrated. This circuit is in contrast to that providing power to a DC load **100** (shown in FIGS. **1** and **2**). The circuit illustrated in FIG. **5C** provides a 60 Hz, 120 volt RMS signal to the AC load **100A**.

More specifically, a 60 Hz sinusoidal oscillator **528** produces a 1.0 volt 0-to-peak sinusoidal signal. Preferably, the sinusoidal oscillator is implemented as a Micro Linear ML2036 Programmable Sine Wave Generator, programmed to produce the above-mentioned signal applying information in published data sheets accompanying the Micro Linear product. The sinusoidal output of oscillator **528** is input to a dual half-wave rectifier **529**. Half-wave rectifier **529** includes two diodes **529A**, **529B**. The positive portion of the sine wave is passed along a top path to both a square wave generator **531** and a first pre-driver **542A**. Conversely, the negative portion of the sine wave is inverted by a unity-gain invertor before being input to a second square wave generator **532** and a fourth pre-driver **542D**. Square wave generators **531**, **532** are similarly constructed square wave generators which produce +12 volt square waves synchronous with their respective sinusoidal inputs. The outputs of square wave generators **531**, **532** are input to second and third pre-drivers **542B**, **542C**. Pre-drivers **542B**, **542C** produce +12 volt square waves substantially synchronous with their respective inputs.

The unity-gain invertor is preferably implemented as an LM **318** configured for unity gain but opposite polarity. Square wave generators **531**, **532** are readily implemented by those skilled in the art. Finally, pre-drivers **542A**, **542B**, **542C**, and **542D** are constructed in accordance with FIG. **4B**.

The outputs of pre-drivers **542A** and **542D** drive gates of respective MOSFETs **23**, **24**. MOSFETs **23**, **24** comprise the elements of a DC to 60 Hz half-wave convertor **549**. The node between MOSFETs **23** and **24** is the same as node **402** (FIGS. **1** and **2**) which is at the negative side of DC load **100** (illustrated in phantom in FIG. **5C**).

MOSFETs **17** and **18**, with diodes **17A**, **17B**, **18A**, and **18B** collectively comprise a half-wave to full wave converter.

The outputs of pre-drivers **542B** and **542C** drive gates of respective MOSFETs **17** and **18**. The source of MOSFET **17** is connected to the source of MOSFET **24** via series-connected diodes **17A** and **18B**. The node between diodes **17A** and **18B** is connected to a first terminal of the AC load **100A**. Similarly, the source of MOSFET **18** is connected to the drain of MOSFET **23** via series-connected diodes **18A** and **17B**. The node between diodes **18A** and **17B** is connected to a second terminal of the AC load **100A**.

The drain of MOSFET **17** is connected to the drain of MOSFET **18**, their common connection being the node **105** (**432**) which is the node at the positive terminal of the DC load **100** (shown in phantom in FIG. **5C**).

MOSFETs **17**, **18**, **23** and **24** are preferably implemented as IRF350's. Finally, Diodes **17A**, **17B**, **18A**, and **18B** are preferably implemented as 200-volt, **30A** diodes functioning as reverse polarity protectors.

In operation, the half-wave sinusoidal signals entering the gates of MOSFETs **23** and **24** are 180° out of phase with each other, thus allowing power passing from nodes **402** and **105** to pass through the AC load **100A** in oppositely phased time frames. The 85 volt peak voltage half-wave sinusoids provided by each of the MOSFETs **23**, **24** arranged in opposite polarities thus provides a 60 Hz full wave 120 volt RMS output to the AC load **100A**.

The structure and operation of the preferred embodiment of the present invention has been described. For a more conceptual understanding, the following description is provided.

As described above, the preferred embodiment includes two tank circuits that are resonant at the same frequency. In the illustrated embodiment whose components are listed above, the resonant frequency is 20 kHz. The tank circuits have identical associated drive systems, master-time-controlled by signals A and F (FIG. **3**) from gate signal generator and tank charger **114**, operating at 20 kHz. Signals A and F are identical but oppositely phased positive-going, **50/50** duty cycle square waves. Each signal controls the time frame by which all other operations take place by controlling the grounding sequence between the tank circuits and their respective current source through respective grounding MOSFETs **21** and **22**. Thus, alternation of functioning of the tank circuits is achieved.

Regarding operation of tank **101**, at the beginning of the first major period **312**, at the beginning of the first minor interval **301**; at the instant that MOSFET **21** receives a positive going (0 to +12 volts) 50/50 duty cycle square wave gate voltage signal A , MOSFET **22** is receiving a neutral going (+12 volts to 0 volts) 50/50 duty cycle square wave gate voltage signal F. Tank **101** is thus connected to the gate signal generator and tank charger **114** and capacitor Cl is allowed to charge (under resonant conditions) where the inductive reactance equals the capacitive reactance to V+voltage, which in the preferred embodiment is **120** volts. Page

4–134, *Electricity One-Seven,* (Harry Mileaf, the totality of which is incorporated herein by reference) includes an explanation of parallel resonant tank circuit charging as generally understood by those skilled in the art.

At the same time that MOSFET **21** receives its positive going square wave gate signal A, MOSFET **1** of tank **101** receives the same gate signal. This opens a current flow path within tank **101** including only resistances associated with the inductor, MOSFET switch, diodes, capacitor and conductors connecting these components in series. The series resistance includes: the resistance of multi-strand wire, which may be #12 copper wire with having 0.00102 ohms resistance/foot used as conductors connecting the various components in series; the 0.15 Ohm internal drain-to-source resistance of MOSFET **1**; the internal resistances of diodes **206** and **38**; negligible capacitor resistance; and 12–14 inches of copper wire, which may be #12 single strand wire which makes up the coil of tank **101**'s inductor L1.

The magnetic core of the inductor is preferably a ferrite toroid with associated magnetic quadrature tuning circuitry. This circuitry between the positive and negative terminals of Cl makes up the complete current charging path within tank **101**, which is only about 12–18 inches in length. The extremely low value of the total internal tank circuit resistance allows the tank to be operated at a high "Q" or "quality." Adjustment of the "Q" in the preferred embodiment is accomplished by varying the inductive reactance of the inductor L1. This is preferably accomplished by increasing or decreasing a DC current through the windings around a "C" cored electro-magnet physically placed at 90 degrees (at quadrature) to the axis of the toroid inductor L1. The induced magnetic field within the "C" cored electro-magnet controller changes, or "modulates" the inductive reactance of the inductor L1. Other possible means of manual or automatic physical or electronic adjustment of the tank's inductance lie within the ability of those skilled in the art for tuning the inventive power supply, and need not be further described.

Tank **102**'s internal charging path circuitry, associated controlling circuitry and associated current paths are functionally, and as close as possible, physically, exact duplicates of those of tank **101**.

At the beginning of the first major period, tank **102**, having just completed its resonant charging sequence, is at the same instant decoupled from the exterior current source as "grounding" MOSFET **22** receives neutral going (+12 to 0 volt) square wave gate signal F so that it is turned off to a non-conducting state. Also at this same instant, a current flow path is established between the negatively charged terminal of C2, the load **100**, and the positive terminal of C2, because of the 0 to +12 volt, 25/75 duty cycle signal G (applied to the gates of MOSFETs **8** and **9**), and signal I (applied to the gate of MOSFET **11**). MOSFETs **8** and **9** receive the 0 to +12 volt, 25/75 duty cycle gate G signal which turns them on.

MOSFET **11** receives a 0 to +12 volt, 25/75 duty cycle "exponential" gate signal that is specifically designed to utilize the full 25% time period of minor interval **301** in reaching its maximum +12 volt level. It is sequenced to start at the same instant as the gate signal going to MOSFET **8**. In the illustrated embodiment, all trailing, or neutral going +12 to 0 volt edges of the exponential signals are vertical; they do not ramp downward nor do they extend below the zero line.

At the end of this first minor interval, the voltages at the gates of MOSFETs **8**, **9**, and **11** are forced instantaneously to zero volts. This minor interval comprises only half the overall **50** percent duty cycle as determined by the gate signal generator and tank charger **114**'s 20 kHz rate (signals A and F).

At the instant that MOSFETs **8**, **9** and **11** are turned off, MOSFETs **10** and **12** are turned on by receiving 0 to +12 volt 25/75 duty cycle gate voltage signals H and J respectively. MOSFET **10** receives a 0 to +12 volt, 25/75 duty cycle gate voltage like that sent to the gates of MOSFETs **8** and **9**. MOSFET **12** receives a 0 to +12 volt, 25/75 duty cycle "exponential" gate voltage signal identical to that sent earlier to the gate of MOSFET **11**.

This second set of MOSFET controls the discharging path during the second minor interval **302** (and therefore, the timing of th collapse of the magnetic field of L2) which was created by the discharge of capacitor C2. This second minor interval **302** (occupying the second 50 percent of the first major period time frame) takes up the remaining portion of the discharge time frame. This discharge time frame is the first major period allotted to tank **102** by the 20 kHz signals A and F from the gate signal generator and tank charger **114**.

This is the preferred configuration of MOSFETs **8–12** in the discharge current path of tank **102**, and the preferred configuration of MOSFETs **21** and **1** in the current capacitor charge path of tank **101**. As stated above, MOSFETs **1–4**, **7–10**, and **21–22** act as "on/off" switches, thus changing the various current flow paths, while other MOSFETs (**5**, **6**, **11**, and **12**) act as constant current controllers. MOSFET **11** controls the current discharge flow rate of tank **102**'s capacitor C2, while MOSFET **12** controls the current flow rate created by the controlled collapse of the magnetic field of tank **102**'s inductor L2. By design, the tank capacitors are not in the current flow discharge path of the tank inductors. When a tank inductor discharges within in the second minor interval, it does not change polarity as in standard tank circuits. Nor do the tank capacitors change in polarity as in standard tank circuits; they charge in one direction only. This action is totally different than that of standard tank circuit.

The advantages of the present invention are many, but include:

1) Each resonant tank is directed to charge its capacitor independent of any exterior load being connected to it, thereby realizing the resonance charging conditions to the fullest.

2) Each tank element is discharged through the load in a uniform manner with a common and unchanging polarity to the load (for DC operation).

A discussion is presented here to amplify the advantages summarized in the previous paragraphs; for it is here that the present invention demonstrates some of its advances in the art.

By first controlling the current flow discharge rate of the resonant tank capacitor, and then controlling the discharge rate of the resonant tank inductor, the following occurs. First, a non-resonant RC circuit, and then a non-resonant LR circuit, powers the load. Powering a load using non-resonant circuits is standard practice today in some power supplies, but any powering circuits are used independently of each other. In contrast, the present embodiment sequentially uses a non-resonant RC circuit and a non-resonant LR circuit. Also, and more important, by discharging the elements of both resonant tank circuits in exactly half the time that

was allotted for resonant charging of the individual tank capacitors, twice the available current (and thus, correspondingly increased power) is made available to the load in comparison to the situation in which each capacitor is discharged at its resonant charging rate. In fact, discharging each capacitor at its resonant charging rate would bring about very disastrous conditions for most loads. This is because series resonant conditions would come into play with its associated condition of reactive voltage increases which would be impressed across the load.

By utilizing the MOSFETs **5**, **6**, **11**, and **12** as variable resistors (functioning as constant current controllers) and decreasing their resistance exponentially from maximum to minimum during the "on" portion of the appropriate minor interval, the following is accomplished: By decreasing the internal resistance to current flow within each tank capacitor's discharge circuit over the full minor interval in a manner that exactly counteracts and yet controls the decreasing voltage of the discharging tank capacitor, the load is presented with controlled, even current. Thus, the load can react evenly, as if fed by a constant voltage, constant current source. Similarly, by decreasing the internal resistance within each tank inductor's discharge circuit over the entire minor interval in a manner that exactly counteracts and yet controls the decreasing voltage associated with the collapsing magnetic field, the load is again presented with controlled current.

This advantage is accomplished by exactly matching the previous negative polarity to positive polarity supplied by the tank capacitor (only now from the tank inductor) during the entire time frame in which inductor magnetic field collapse is experienced. The different voltage potentials (+120V and neutral, or ground) required by the load to operate properly is first supplied by the tank **102** capacitor C2 during minor interval **301**, then by tank **102** inductor L2 during minor interval **302**, then by tank **101** capacitor Cl during minor interval **303**, and finally by tank **101** inductor L1 during minor interval **304**; at which time minor interval **301** begins again and the entire sequence repeats. Again, it is as if a non-changing, constant voltage source is being applied to the load.

Each of the discharge time "minor intervals" is exactly one-half the full tank charge time "major periods". This fulfills the requirement of balancing the charge/-discharge ratio to obtain equilibrium within the circuit As described above, as the tank **102** components C2 and L2 are discharging through the load in a non-resonant manner, tank **101** is charging the capacitor Cl (which is not connected to the load) under parallel resonant conditions. The individual series-connected discharge time rates are one-half the charge time rate, so that the discharge current flow rate is twice as fast, thus affording the load twice the available current compared with a set of operating conditions where each discharge time rate is equal in time to each charge time rate. After the elements of tank **102** have discharged through the load, encountering only series resistive losses due to the conductive paths, the inductor coil, tank diodes, and the load, they are disconnected from the load by MOSFETs **8**, **9**, **10**, **11**, and **12** as they receive neutral going +12 to 0 volt signals G, G, H, I, and J, respectively at their gates. At the same instant, the proper positive going gate voltages are applied to the appropriate tank **101** MOSFETs (tank **101** having just completed resonant charging of its capacitor Cl), and the cycle of powering the load during the second major period **334** during minor intervals **303**, **304**, (from the elements of tank **101**) can begin.

In summary, the described embodiment has the following features:

The ability to use reactive power to completely power a load through the process of controlled current flow from alternately employed series non-resonant LR and RC circuits of which the L and C components, during the charging cycle, form a parallel resonant tank circuit.

The ability to utilize the natural magnification characteristics of a resonant tank circuit to bring about the full charge condition of a capacitor through a circuit path other than only through the current's voltage source (as in a series resonant circuit).

The ability to double the effective available current to a load. This is accomplished by halving the available discharge time per element, from the capacitor and then from the inductor of each tank.

The ability to continuously power a pseudo-series-connected load by using two identical resonant tank circuits. One tank circuit's capacitor under resonant conditions is charged from an external voltage source while being isolated from the load. The other previously charged tank circuit's elements discharge (under controlled series circuit conditions as described above) through the load while being isolated from the external voltage source.

The ability to continuously power a load with an electronic power supply that cannot suffer from the problem of voltage drop (a dropping or decreasing voltage potential experienced by known generators).

The ability to continuously power a load with an electrical power source. The external voltage/current source (battery **118**) supplies the necessary voltage and current to fulfill the power requirements to charge up Cl in tank **101** during the first major period. After the resonant charging of one of the two resonant tanks, the charged tank elements start to discharge through the load.

As can be seen from the above description of circuit operations, the circuitry operates in both "best mode" cases of resonance. First, regarding series resonance, the illustrated embodiment has the ability to deliver maximum available power to a load. Second, regarding parallel resonance, the illustrated embodiment has the ability to charge a capacitor to act as a voltage potential source utilizing the absolute minimum amount of current from an external current source.

Additional circuitry may be added to the illustrated embodiment to utilize the ability of a DC "power" source to be non-discriminatory in its own power requirements under the condition known as DC superposition. In this scenario, the resonant tank circuitry takes its required current and voltage from whatever source such as battery **118** and/or feedback controller **110**, or a combination of both, as long as each has the correct voltage polarity and minimum required current. The system may be specifically designed to utilize feedback controller **110** for the primary (internal) DC voltage and current source, and may use battery **118** as an external DC voltage and current source for the secondary DC source.

The system exhibits maximum impedance to current flow from the point of view of looking out from the resonant tank circuit toward its voltage and current source, as any resonant tank circuit should. At the same

time, it powers the load as a series circuit would, with impedance to current flow coming only from line resistance (determined by the size and other properties of the wire used in the discharge path). The system is not under series resonant conditions in the discharge mode because the discharge frequency is twice that of the charge frequency: 40 kHz versus the 20 kHz resonant frequency of the system.

The dual, yet independent series LR and RC discharge circuits making up tanks **101** and **102** have the ability to fulfill all electrical power requirements: each can supply the necessary voltage and current to each other as the internal system "power source", (feedback controller **110**, gate signal generator and tank charger **114**, gate signal amplifier **116**, and associated circuitry) that is charging the other tank circuit (which is charging under resonant conditions at 20 kHz) as a load in parallel to load **100**. The reason for this condition is that the particular section of the system being charged under resonant conditions is connected (from a load-power-requirements point of view) to the other part of the power supply that is powering load **100** at that instant. Only those resonant tank circuit components that had been previously charged up under resonant conditions, and were previously disconnected from the "internal" power source (the other tank circuit but not feedback controller **110**) during this time frame is powering the total parallel load. In this usage of the term "load", the "internal" tank circuit control circuitry and the other charging tank circuit are a part of the total "load", not just load **100**.

Under conditions of resonance, "tunnel diodes", or "Esaki diodes", can be used in the resonant tank circuit, and all necessary outside current directly fed to the tank circuit itself can be eliminated. The reason is that a tunnel diode creates a condition known as "negative resistance". The effect it can have upon the tank circuit in which it is placed is to reduce the effective pure resistance to an absolute minimum. Therefore, with an effective internal pure resistance at an absolute minimum within the tank itself as described above, an absolute minimum "line current" running through node **106** is necessary.

As shown in FIG. **2**, two circuits are operating at the same time. In the first minor interval **301** (FIG. **3**), tank **101** is being charged, and is disconnected from load **100** and feedback controller **110** as MOSFETs **2**, **3**, **4**, **5**, and **6** are not conducting. Tank **101** is connected to the internal power source (feedback controller **110**; gate signal generator and tank charger **114**; and gate signal amplifier **116**) through its diode on the positive **120V** node **202** through node **106**. MOSFET **21** provides the connection to the ground side.

Tank **102**'s capacitor and then its inductor discharge through the "load" (which, for these purposes, is considered to include tank **101**, the internal power source (feedback controller **110**, gate signal generator and tank charger **114**, gate signal amplifier **116**, and parallel load **100**)). At this time, tank **102** is disconnected from the internal power supply (feedback controller **110**, gate signal generator and tank charger **114**, gate signal amplifier **116**) because diode **216** at the positive terminal of capacitor C2 does not allow the capacitor to discharge directly to it. MOSFET **22**, positioned between tank **102** and the internal power source ground, has also been turned off, thus isolating tank **102** discharge circuitry from the internal and external power source grounds.

In this manner, each discharging tank circuit component forms both its own ground source and current source to load **100** and its parallel load made up of feedback controller **110**, gate signal generator and tank charger **114**, gate signal amplifier **116**, and the other tank circuit. MOSFETs **11** and **12**, each receiving a exponential gate signal, control the amount of current allowed to be delivered to the loads as described earlier for the following reason.

Current should be delivered in a steady, even manner to obtain the desired effect of powering the load evenly. An evenly applied amount of current supplied to a steady and unchanging load will allow the proper, even, designed voltage drop to be developed across the load. The availability of current flow (up to a predetermined maximum amount as determined by the dual tank circuit components and discharge circuitry) applied to a changing load; either resistive, inductive, capacitive, or a combination thereof, can power that load as supplied by the system. Because "current flow" (and not voltage) is the "common denominator" in all four load conditions listed above, the various different voltage drops; and their individual phase relationships at the individual loads can be developed by the various loads as required. The present system utilizes the ability of a power MOSFET to be used as a variable resistor in controlling the current flow rate. The present system controls the current flow rate supplied to the load by decreasing its resistance to current flow in a manner that is an exact correlation to the dropping source voltage being supplied first by tank capacitors and then tank inductors. This arrangement delivers the correct flow of current needed to pass through and as required by the load. As the voltage of, first, the tank capacitor and then the tank inductor, drops, the controlling MOSFETs' internal resistance also must drop.

During the first minor interval **301** (FIG. **3**) the discharging of the tank **102** capacitor C2 supplies the necessary difference of potential between its terminals to cause current flow through the parallel loads, as controlled by MOSFET **11**.

During the second minor interval **302** (FIG. **3**) the collapsing magnetic field of the tank **102** inductor L2 supplies the necessary difference in potential between its poles to cause current flow through the load, as controlled by MOSFET **12**.

During minor intervals **303** and **304** (FIG. **3**), the above described current flow occurs again. Tank **101** powers the "load" (which now includes both tank **102** and the internal power source as described previously). Tank **101** capacitor Cl is disconnected from gate signal generator and tank charger **114** through node **106** by diode **206** at C1's positive terminal, thus not allowing Cl to discharge back into itself, MOSFET **15** being turned off, and by the non-conducting ground controlling MOSFET **21** being turned off. MOSFET controls the discharge time of capacitor Cl, in the same manner as MOSFET **11** controls the discharge time of capacitor C2. MOSFET **6** controls the decay time of the magnetic field of inductor Ll, in the same manner as MOSFET **12** controls the decay time of the magnetic field of inductor L2. MOSFETs **8**, **9**, and **10** are turned off to allow tank **102** to charge capacitor C2 to the applied 120 volts supplied from the gate signal generator and tank charger **114**.

Modifications and variations of the above-described embodiments of the present invention are possible, as appreciated by those skilled in the art in light of the

above descriptions. It is therefore to be understood that, within the scope of the appended claims and their equivalents, the invention may be practiced otherwise than as specifically described.

What is claimed is:

1. A power supply for supplying power to a load, the power supply comprising:

a) a first tank circuit having a resonant frequency; and

b) a second tank circuit having a resonant frequency substantially identical to the resonant frequency of the first tank circuit;

wherein the two tank circuits are constructed and adapted to function repetitively in two major periods,

A) in the first major period, the first tank is disconnected from powering the load and the second tank supplies power to the load and charges the first tank; and

B) in the second major period, the second tank is disconnected from powering the load, and the first tank supplies power to the load and charges the second tank.

2. The power supply of claim **1**, further comprising:

c) a plurality of switches for selectively interconnecting the tank circuits and the load; and

d) a gate signal generator for generating gate signals for controlling the switches.

3. The power supply of claim **2**, further comprising:

e) a gate signal amplifier, receiving the gate signals from the gate signal generator, for producing amplified gate signals which are connected to the switches.

4. The power supply of claim **2**, further comprising:

f) a tank charger for providing power to the first and second tank circuits;

g) a battery for selectively providing power to the gate signal generator and tank charger; and

h) a feedback controller, connected between the load and the tank charger, for selectively providing additional power from the tank circuits to the gate signal generator and tank charger.

5. The power supply of claim **4**, further comprising:

at least one regulator circuit, responsive to either the battery or the feedback controller, for producing regulated voltage used by the gate signal generator and the tank charger.

6. The power supply of claim **4**, wherein:

the tank charger includes:

1) a step down circuit for converting a regulated voltage from the at least one regulator circuit to a voltage smaller than the regulated voltage; and

2) a step up circuit, responsive to an output of the step down circuit, for producing a tank drive voltage which is larger than the regulated voltage;

wherein the first tank circuit and the second tank circuit are responsive to the tank drive voltage.

7. The power supply of claim **2**, wherein the gate signal generator includes:

a circuit for producing a plurality of minor interval signals, only one of which is active at the same time, the one of the minor interval signals which is active scans successively and repetitively among the plurality of minor interval signals, the scanning being completed in a period of time substantially equal to the two major periods.

8. The power supply of claim **7**, wherein the circuit for producing the plurality of minor interval signals includes:

a demultiplexer having first, second, third, and fourth minor interval outputs, wherein:

1) the first and second outputs being successively active during respective first and second minor intervals in the first major period; and

2) the third and fourth outputs being successively active during respective third and fourth minor intervals in the second major period.

9. The power supply of claim **2**, wherein the gate signal generator includes:

a circuit for producing first and second major period signals, wherein:

1) the first major period signal being active during the first major period and inactive during the second major period; and

2) the second major period signal being active during the second major period and inactive during the first major period.

10. The power supply of claim **1**, further comprising a timing circuit for an AC load, the timing circuit for the AC load including:

a sinusoidal generator for generating a first sinusoidal signal of a first magnitude;

a first circuit for converting the first sinusoidal signal into two oppositely phased sinusoidal half-waves;

a second circuit for converting the first sinusoidal signal into two oppositely phased square waves; and

a conversion circuit, responsive to the first circuit and second circuit, that, under control of the square waves, combines the two sinusoidal half-waves into a full wave sinusoid of a second magnitude, the full wave sinusoid being applied to the AC load.

11. The power supply of claim **1**, wherein:

each of the first tank circuit and the second tank circuit includes:

1) a first node and a second node;

2) a first pathway between the first node and the second node including a series-connected inductor, a first intermediate node, and first switch;

3) a second pathway between the first node and the second node including a capacitor; and

4) a third pathway, connected between the first intermediate node in the first pathway and the second node, the third pathway including a second switch;

wherein the first and second switches govern current flow within and through the first and second tank circuits.

12. The power supply of claim **11**, wherein:

each of the first tank circuit and the second tank circuit further has associated with it:

5) a fourth pathway connecting the first intermediate node with a first terminal of the load via a third switch; and

6) a fifth pathway connecting the first node to the first terminal of the load via a fourth switch.

13. The power supply of claim **11**, wherein:

each of the first tank circuit and the second tank circuit has associated with it:

7) a constant current controller connected between a second terminal of the load and the first node.

14. The power supply of claim **13**, wherein the constant current controller includes:

two MOSFETs which operate in linear regions so as to control current which enters the first node.

15. A power supply for supplying power to a load, the power supply comprising:

a) a first tank circuit having a resonant frequency, the first tank circuit comprising a first capacitor and a first inductor which substantially determine the resonant frequency of the first tank circuit;

b) a second tank circuit having a resonant frequency substantially identical to the resonant frequency of the first tank circuit, the second tank circuit comprising a second capacitor and a second inductor, which substantially determine the resonant frequency of the second tank circuit;

c) a plurality of constant current controllers for connecting the tank circuits to the load; and

d) a set of switches for selectively interconnecting the tank circuits, constant current controllers and load; wherein the tank circuits, constant current controllers and switches ar constructed and arranged to function in first and second major periods, each of the first and second major periods comprising first and second minor intervals, wherein:

1) the first minor interval of the first major period defines an interval during which the second capacitor is providing power to the load and is charging the first tank circuit;

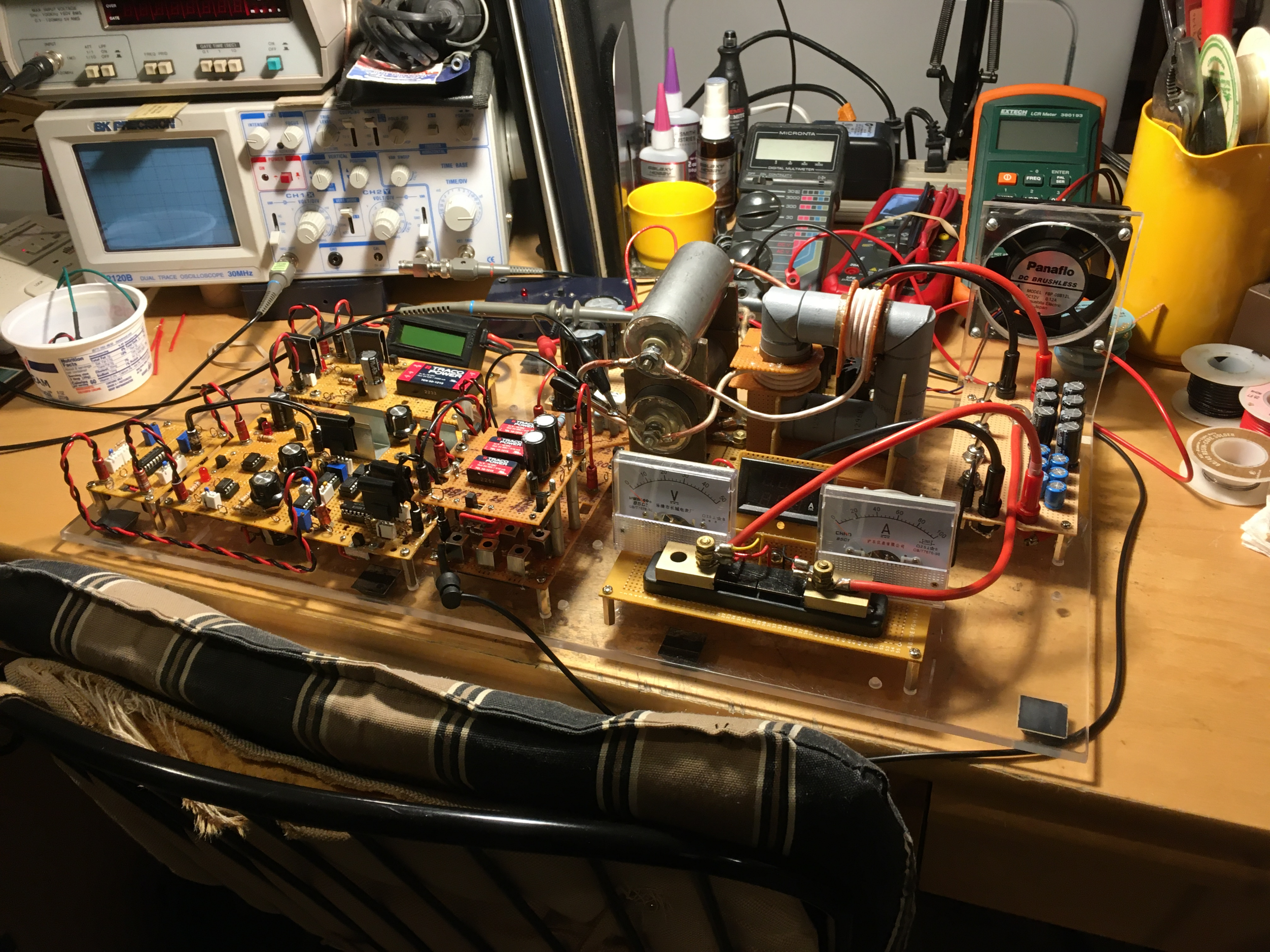
2) the second minor interval of the first major period defines an interval during which the second inductor is charging the first tank circuit and providing power to the load;

3) the first minor interval of the second major period defines an interval during which the first capacitor charges the second tank and provides power to the load; and

4) the second minor interval of the second major period defines an interval during which the first inductor charges the second tank and provides power to the load;

wherein the switches control the timing of the minor intervals and major periods.

* * * * *


BK PRECISION
2120B DUAL TRACE OSCILLOSCOPE 30MHz
TIME BASE
TIME/DIV
CH1
CH2
MICRONTA
DIGITAL MULTIMETER
EXTECH LCR Meter 380193
FREQ
ENTER
Panaflo
DC BRUSHLESS
TRACO POWER

To: Comments@efsec.wa.gov
From: kmbrun@gmail.com
Received: 2024-05-24T18:05:52+00:00
Subject: Governor Inslee's Remand Letter
Has attachment? False

External Email

I just want to let you know that I feel Governor Inslee, in sending this directive three days after a Motion for Reconsideration was filed and before any of the other intervenors have responded to it, seems like a violation of several statutes including WAC 463-30-355(3), SEPA, and the Administrative Procedures Act. I'm in the process of writing a response letter to him, with a copy to you, that focuses on the fallacies of this directive.

It's almost like Stoel Rives wrote this letter for him as it directs you to narrowly tailor impacts rather than use cumulative impacts (as required by 10 CFR 1508.7) to justify your decision for exclusion areas. I urge you to do the absolute minimum on his demands and send the draft SCA back with very few changes.

If the Governor can direct you to rescind all the hard work you've done and side with the applicant on its original proposal, then EFSEC might as well be disbanded as it serves no useful purpose.

Karen Brun
Kennewick, WA

Attachments:
[]

To:
efsec@efsec.wa.gov;Comments@efsec.wa.gov;efsec@efsec.wa.gov;sonia.bumpus@efsec.wa.gov;kathleen.drew@efsec.wa.gov;joanne.snarski@efsec.wa.gov;andrea.grantl
From: cease2020@aol.com
Received: 2024-05-26T23:52:42+00:00
Subject: C.E.A.S.E. HHH PROJECT DECISION
Has attachment? False

External Email

EFSEC, you followed the RCWs and made good decisions on the HHH project. Inslee now wants you to ignore the laws and change your decisions with narrow mitigation. He should just say give Scout Clean Energy what they want or else you're out of a job. WILL you stand by your decisions or cave in to Inslee's demands? I ask that you stand by your decisions for the all the reasons you sited. Follow the laws and protect the east side citizens of Benton County. Respectfully, Greg Wagner C.E.A.S.E. CITIZENS EDUCATED ABOUT SOLAR ENERGY

20240523_HH_GOV_ResponseLetter_0.pdf (wa.gov)

Attachments:
[]

To: Comments@efsec.wa.gov
From: efsec@efsec.wa.gov
Received: 2024-05-28T15:37:10+00:00
Subject: FW: No Horse Heaven wind farm
Has attachment? False

From: bcmcconnel49 <bcmcconnel49@gmail.com>
Sent: Monday, May 27, 2024 12:19 PM
To: EFSEC (EFSEC) <efsec@efsec.wa.gov>
Subject: No Horse Heaven wind farm

External Email

Wind does 10 times more environmental damage than nuclear.

https://thebreakthrough.org/issues/energy/its-settled-more-nuclear-energy-means-less-mining

Sent from my Verizon, Samsung Galaxy smartphone

Attachments:
[]

To: Comments@efsec.wa.gov
From: northwestgirl94@gmail.com
Received: 2024-06-12T23:00:14+00:00
Subject: Horse Heaven Hills
Has attachment? False

External Email

Hi, I'm a local resident of West Richland. I'm begging you to please stick to your recommendation of removing half the number of turbines. Please, please, please. I'm all for green energy but we also really need to think about the safety of surrounding communities. We get a lot of wildfires out here and we need the space for aerial firefighting. Not to mention our wildlife is very important. Ferruginous Hawk have their nests out there and and if you add back in the number of Turbines back that removes a 2 mile buffer for their nests. I don't think that's right. Thank you for your hard work and please please PLEASE think about the opinions of the local residents who are directly impacted by this.

Attachments:
[]

To: Comments@efsec.wa.gov
From: efsec@efsec.wa.gov
Received: 2024-06-11T19:53:24+00:00
Subject: FW: HH wind farm
Has attachment? False
-----Original Message----- From: Patricia Loera Sent: Tuesday, June 11, 2024 12:48 PM To: EFSEC (EFSEC) Subject: HH wind farm External Email EFSEC committee members, I urge you to stand firm and uphold your original decision to half the wind farm project by removing the “red” turbines. I would like to see this entire project squashed but would support your recommendations. Cutting the project back would protect wildlife & cultural sites and lessen the visual impacts. Thank you for the many, many hours you spent reading and reviewing lengthy documents and listening to public comments. Your efforts are appreciated and your recommendations should be acknowledged and accepted. Do not let Mr Inslee sway you! Thank you for supporting Eastern Washington! Patricia Loera Sent from my iPad
Attachments:
[]

To: Comments@efsec.wa.gov
From: efsec@efsec.wa.gov
Received: 2024-06-11T19:53:13+00:00
Subject: FW: HH wind farm
Has attachment? False
-----Original Message----- From: Pat Loera Sent: Tuesday, June 11, 2024 12:36 PM To: EFSEC (EFSEC) Subject: HH wind farm External Email Committee, Thank you for all the time and effort you have put into preparing your recommendations for Mr Inslee. I urge you to uphold your decision to have the “red” turbines removed. He should listen to the advice of those who put in the work studying the volume of information and hearing public comments. Please stand firm in your recommendation. Thank you, Joe Loera Sent from my iPad
Attachments:
[]

To: Comments@efsec.wa.gov
From: efsec@efsec.wa.gov
Received: 2024-06-10T20:55:26+00:00
Subject: FW: Horse Heaven Wind & Solar Project
Has attachment? False

From: Dawn McKinney <dklmckinney@gmail.com>
Sent: Monday, June 10, 2024 1:44 PM
To: EFSEC (EFSEC) <efsec@efsec.wa.gov>
Cc: Dawn McKinney <dklmckinney@gmail.com>
Subject: Horse Heaven Wind & Solar Project

External Email

To those who have worked diligently on the above referenced project,

Please accept my sincerest thanks and appreciation for all you've done to downsize the HH wind turbine project to protect our land, cultural sites, pristine views, wildlife habitats and wildlife.

We desperately need to protect our land from fires as our climate becomes hotter with bigger, more prevalent fires. As the cousin of a firefighting plane pilot, I am acutely aware of the hazards caused by closely spaced turbines that put those who put their own lives at risk to save our land, personal property and on occasion, lives.

I honor the work you have done and urge you to continue to do all you can to fight our governor's shortsightedness on this issue.

Sincerest appreciation,
Dawn McKinney
Richland, WA

Attachments:
[]

To:
efsec@efsec.wa.gov;adjudication@efsec.wa.gov;Comments@efsec.wa.gov;Tim.Mcmahan@stoel.com;Ariel.Stavitsky@stoel.com;Emily.Schimelpfenig@stoel.com;Willa.Polc.org
From: steptoe.fan@gmail.com
Received: 2024-06-09T23:08:39+00:00
Subject: In the matter of the application for Horse Heaven Wind Farm
Has attachment? False

In the Matter of the Application of:

Scout Clean Energy, LLC, for Horse Heaven Wind Farm, LLC, Applicant

Delivered to:

efsec@efsec.wa.gov
adjudication@efsec.wa.gov
comments@efsec.wa.gov
With certificate of service to additional parties of record, appended, on June 10, 2024

l Introduction

Nothing in the record to date supports Governor Jay Inslee's conclusion that Washington State's growing energy needs must be met by building the Horse Heaven Hills Wind and Solar Farm Project ("Project") specific to the enormous size, scale, and location proposed by Applicant, Scout Clean Energy ("Applicant"). Rather, the Energy Facility Site Evaluation Council's ("Council") record reflects a lack of the proper conclusion based upon engineering principles, meteorological data and omission of applicable published studies regarding intermittent energy sources.

ll Background

Recent credible analyses done for future grid reliability point out the expected worst-case scenario - the peak load will be in the winter when temperatures are coldest, that is a multi-day period winter wind lull. One example, the New York Independent System Operator has done similar analyses which showed that winter wind lulls that coincide with low solar availability and high loads will be the ultimate grid problem.

Credible renewable resource projection analyses use historical meteorological data, projections of future load during worst case periods, and estimates of electric resource availability based on assumed deployment of existing base load and intermittent generation technologies needed to supply the expected load. Hourly profiles of weather variables produced via the weather forecast modeling techniques and historical wind and solar availability must be used to develop hourly demand forecasts and energy output profiles for any wind/solar resource being considered. **Credible** analyses only differ in their assumptions for the characteristics of the buildouts and the sophistication of potential availability based on climatological and geographical constraints. Once an analysis is complete the resulting data can be used to identify the worst case that must be supported, **with reserves.**

As example, one of the important results presented in the Independent System Operator-New England (ISO-NE) analysis was a table of projected system risk for weather events over a 72-year data record. In the analysis, system risk was defined as the aggregated unavailable supply plus the exceptional demand during a 21-day event. Note that the analysis considered sliding windows for the 21-day events by shifting the 21-day window every seven days. The unsurprising point I want to highlight is that the system risk increases as the analysis lookback period increases.

III Discussion

I submit the U.S. can never have an electric grid that will provide reliable power when it is needed the most. Intelligent design would ensure that systems and components integrate to realize a gird with maximum reliability. Today electric system resource adequacy planners don't have to worry that many generating resources might not be available at the same time. In a future electric grid that relies on wind and solar the fact that those intermittent resources DO NOT correlate in time with **demand** is what I think is the insurmountable planning problem. All solar goes away at night and wind lulls affect entire regional transmission organization (RTO) areas at the same time. This issue is exacerbated by the fact that the wind lull will cover multiple RTO areas at the same time the highest load is expected. Has this Council asked the Bonneville Power Administration (BPA) for comments on how its balancing authority, as part of the Western grid, will co-exist with increasing intermittent energy sources and their designed load carrying capacity ?

The reason we can never trust a wind, solar, and energy storage grid is because if we depend on energy-limited resources that are a function of the weather, then a system designed to meet the worst-case is likely impractical. Consider the ISO-NE event where it was found that the most recent 10-year planning lookback period would plan for a system risk of 8,714 MW. However, if the planning horizon covered the period back to 1961, the worst-case to 1950, an additional 446 MW would be required to meet the system risk.

IV Omitted considerations

(a) An analysis for calm wind days for the Tri-Cities area 1961 – 1990.

www.climage.gov wind roses by month 1961 – 1990

Station # 24243 Yakima Airport Terminal WA

Calm wind days for the month, December – 16.59 percent
Calm wind days for the month, January – 13.98 percent
Calm wind days for the month, February – 10.36 percent

The responsibility rests with the Council to verify and include all such data in any consideration of approval.

(b) An analysis for calm wind days for the Tri-Cities area 2000 – 2018

www.ncei.noaa.gov wind rose table data by days 2000 – 2018

Pasco/Tri-Cities airport WA
number of observations : 111,537 of 166560 possible.

Wind speed less than 8 miles per hour – 37.4 percent
Wind speed less than 4 miles per hour – 16.2 percent

The responsibility rests with the Council to verify and include all such data in any consideration of approval.

(c) Volcanic disruption

Future Eruptions at Mount St. Helens

United States Geological Society usgs.gov November 3, 2023

"We know that Mount St. Helens is the volcan in the Cascades most likely7 to erupt again in our lifetimes. It is likely that the types, frequencies and magnitudes of past activity will be repeated in the future. However, neither a large debris avalanche nor a major lateral blast like those of May 18, 1980 is likely now that a deep crater has formed. "

(d) Battery sizing

BATTERY SYSTEM CAPITAL COSTS, OPERATING COSTS, ENERGY LOSSES, AND AGING

https://www.windtaskforce.org/profiles/blogs/battery-system-capital-costs-losses-and-aging

https://www.tesla.com/megapack/design

Batttery discussion - Horse Heaven Wind Farm, LLC

The ASC (Application for a Site Certification) proposes the construction of a renewable energy generation facility that would have a nameplate energy generating capacity of up to 1,150 megawatts (MWs) for a combination of wind and solar facilities as well as battery energy storage systems (BESS).

… with their capacity dependent on the approved location, technology, and power market interest.

Two battery energy storage systems are proposed that would have a storage capacity of up to 300 MW (megawatt capacity) using lithium-ion batteries. The Council needs to be transparent on how this capacity (which should be expressed in MW hours) serves state balancing authorities and the Western grid. The applicant lacks any transparency regarding battery inclusion. 1,150 MW of intermittent generation with only up to 300 MW of storage ? ! Is the Council concerned at all about the expected load carrying capacity of this or any intermittent application ?

This Council should support a requirement for all new intermittent generation sources connected to the grid to include sufficient storage to render them dispatchable and with sufficient excess generation capacity to recharge storage after use, where battery capacity is down to 20 percent of full charge. The storage necessary to meet this requirement would depend on the maximum number of consecutive hours or days during which the generators were unable to operate due to low solar isolation or low or excessive wind conditions. The requirement must be linked to the frequency of such occurrences. Looking back in time, for any proposed location the generators must be required to be dispatchable 85 percent of the year, a common dispatchability percentage for fossil fuel generation.

Intermittent generators must not only (at their expense) cover intermittency backup, they must also cover their lack of grid inertia (frequency control) by adding site static condensers to add to grid inertia mass.

It is not enough for this Council to allow approval on "cut and paste" intermittent energy projects proposed by politicians, lobbyists and their lawyers, at the profit of limited liability corporations. The very mention of "LLC" should raise a red flag with Council.

(e) Wind lulls overlapping other intermittent sources

It should be obvious to the Council that any wind lull affecting the proposed site will most likely affect other intermittent wind generation in the state. What consideration has the Council given ?

(f) Utilization of China supplied components or sub-assemblies

China is positioned to adversely influence lithium-ion battery production worldwide. China has monopoly control over processed graphite, an essential component of almost all lithium-ion batteries. Virtually all processed graphite, natural and synthetic, is made in China then exported to the battery makers worldwide. China is just now beginning to implement an export control program for processed graphite. A lot has been written about China's market power in other crucial materials like cobalt and rare earths however these cases are weak compared to its monopoly in processed graphite.

China has experience and success in fighting against attempts to reduce their monopoly, and should be expected to resist losing graphite control similar to the way they fought Rare Earth processing. Rare Earth concentrate from the Mountain Pass, California mine was shipped to China for processing and refining, due to environmental resistance to the process on-site in California. Then, in mid-2023 MP Materials announced plans to separate Rare Earths at the California site. In late 2023 China announced a ban on utilizing rare earth separation and refining technologies, which patents they controlled. China is gaining power and influence by a wide range of tactics, and any country or U.S. state that doesn't like it needs to examine the path to self-sufficiency.

V Conclusion

I have argued elsewhere that WA state should perform a feasibility study to determine if the net-zero outline to comply with the Climate Act in the Scoping Plan could possibly work. The tradeoff between the practicality of deploying resources for the observed worst-case resource deficit and the necessity to do so to prevent a catastrophic

blackout should be a key consideration in a site evaluation. Does the Council satisfy itself that all work has been completed ?

In my opinion any electric system that depends on wind and solar is impractical. Obviously, if the goal is a zero-emissions electric system then 4th generation nuclear must be the cornerstone. If affordability is a concern, then the pragmatic acceptance of a large reduction in emissions rather than a zero target would allow the use of some natural gas. Given the entrenched crony capitalists and special interests supporting wind and solar any shift in direction, even if necessary to protect health and safety, will be a tremendous lift. Council must understand their omissions to date.

Governor Inslee's failure to appropriately assess the gravity of damage this Project will inflict upon the Western grid, local grid operators and the Bonneville Power Administration requires that the Council fulfill their statutory duties by not only rejecting in total the request for reconsideration of the initial recommendation but also rejecting the application as originally submitted, in total.

Dated this 10th day of June, 2024.

____ /s/ Steven Keeler _____

www.not2green.org

CERTIFICATE OF SERVICE

I, Steven Keeler, certify that on June 10, 2024 I electronically filed the foregoing document with the Energy Facility Site Evaluation Council ("EFSEC") at Adjudication@efsec.wa.gov.
I further certify that on June 10th, 2024 I served the same upon all parties of record and identified EFSEC staff in this proceeding by electronic mail as follows:

Counsel of Record

Scout Clean Energy, LLC
Tim.Mcmahan@stoel.com
Ariel.Stavitsky@stoel.com
Emily.Schimelpfenig@stoel.com

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Julie@mjbe.com

Counsel for the Environment

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Julie.Dolloff@atg.wa.gov

Tri-Cities C.A.R.E.S

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Aramburulaw@gmail.com

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Catherine.taliaferro@efsec.wa.gov
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Andrea.Grantham@efsec.wa.gov
Alex.Shiley@efsec.wa.gov

Yakima Nation

ethan@yakamanation-olc.org

Attachments:
[]

To: Comments@efsec.wa.gov
From: sonia.bumpus@efsec.wa.gov
Received: 2024-06-07T19:41:42+00:00
Subject: FW: Location of Batch Plant for Phase 1
Has attachment? True

Sonia E. Bumpus
Executive Director
WA EFSEC
Office 360.664.1363 | Mobile 360.972.5687 | sonia.bumpus@efsec.wa.gov

---

From: Dave Sharp <dave@tricitiescares.org>
Sent: Sunday, January 21, 2024 5:27 PM
To: Bumpus, Sonia (EFSEC) <sonia.bumpus@efsec.wa.gov>; Moon, Amy (EFSEC) <amy.moon@efsec.wa.gov>; shawn.greene@efsec.wa.gov
Subject: Location of Batch Plant for Phase 1

External Email

Attached is a location map for the batch plant for Phase 1. This is an excerpt from FEIS Appendix 4.3-2.

I am sending it because in the last EFSEC meeting Kathleen Drew indicated she wanted to relocate the East solar area to the West. I noticed that Scout intends to locate the batch plant and lay down area right where the solar area is.

I thought her comment may have been made for a confidential reason and she probably would not want it there for the same reason.

David Sharp
Vice President, Tri-Cities CARES
Email: dave@tricitiescares.org
Webpage: www.tricitiescares.org

Attachments:

[{"@odata.type":"#microsoft.graph.fileAttachment","id":"AAMkADU1OGRmNDUyLWNhZDAtNGQ3Mi05N2YwLTkwMzcxY2IyZGY0NwBGAAAAAABHlkkqzHF2T6rbYiHzn_U-BwASg50NvGhiT597AeISAVy7AAAAAAEMAAASg50NvGhiT597AeISAVy7AAEduh6NAAABEgAQAMkSfXL5DaFKpo6U9K0wfh8=","lastModifiedDateTime":"2024-06-07T19:41:42+00:00","name":"Batch Plant location Phase 1.pdf","contentType":"application/pdf","size":147993,"isInline":false,"contentId":"f_lro8wjk50","contentBytes":"JVBERi0xLjcNCiW1tbW1DQoxIDAgb2JqDQo8PC9UeXBlL0NhdGFsb2cvUGFnZXMgMiAwIFIvTGFuZyhlbikgL1N0cnVjdFRyZWVSb290IDE2IDAgUi9NYXJrSW5mbzw8L01hcmtlZCB0cnVlPj4vTWV0YWRhdGEgMzAgMCBSL1ZpZXdlclByZWZlcmVuY2VzIDMxIDAgUj4+DQplbmRvYmoNCjIgMCBvYmoNCjw8L1R5cGUvUGFnZXMvQ291bnQgMS9LaWRzWyAzIDAgUl0gPj4NCmVuZG9iag0KMyAwIG9iag0KPDwvVHlwZS9QYWdlL1BhcmVudCAyIDAgUi9SZXNvdXJjZXM8PC9Gb250PDwvRjEgNSAwIFIvRjIgMTIgMCBSPj4vRXh0R1N0YXRlPDwvR1MxMCAxMCAwIFIvR1MxMSAxMSAwIFI+Pi9YT2JqZWN0PDwvSW1hZ2UxNCAxNCAwIFI+Pi9Qcm9jU2V0Wy9QREYvVGV4dC9JbWFnZUIvSW1hZ2VDL0ltYWdlSV0gPj4vTWVkaWFCb3hbIDAgMCA3OTIgNjEyXSAvQ29udGVudHMgNCAwIFIvR3JvdXA8PC9UeXBlL0dyb3VwL1MvVHJhbnNwYXJl

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uMy8iPgo8cGRmOlByb2R1Y2VyPk1pY3Jvc29mdMKuIFdvcmQgMjAxOTwvcGRmOlByb2R1Y2VyPjwvcmR
mOkRlc2NyaXB0aW9uPgo8cmRmOkRlc2NyaXB0aW9uIHJkZjphYm91dD0iIiAgeG1sbnM6ZGM9Imh0dHA6
Ly9wdXJsLm9yZy9kYy9lbGVtZW50cy8xLjEvIj4KPGRjOmNyZWF0b3I+PHJkZjpTZXE+PHJkZjpsaT5EYXZ
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jpEZXNjcmlwdGlvbiByZGY6YWJvdXQ9IiIgIHhtbG5zOnhtcD0iaHR0cDovL25zLmFkb2JlLmNvbS94YXAvM
S4wLyI+Cjx4bXA6Q3JlYXRvclRvb2w+TWljcm9zb2Z0wq4gV29yZCAyMDE5PC94bXA6Q3JlYXRvclRvb2w
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T48L3JkZjpEZXNjcmlwdGlvbj4KPHJkZjpEZXNjcmlwdGlvbiByZGY6YWJvdXQ9IiIgIHhtbG5zOnhtcE1NPSJ
odHRwOi8vbnMuYWRvYmUuY29tL3hhcC8xLjAvbW0vIj4KPHhtcE1NOkRvY3VtZW50SUQ+dXVpZDo2Mj
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To: Comments@efsec.wa.gov
From: efsec@efsec.wa.gov
Received: 2024-06-06T21:25:58+00:00
Subject: FW: Horse Heaven Wind Farm
Has attachment? False

From: Phyllis Riikonen <tpriikonen@hotmail.com>
Sent: Thursday, June 6, 2024 1:26 PM
To: EFSEC (EFSEC) <efsec@efsec.wa.gov>
Subject: Horse Heaven Wind Farm

External Email

To the Council,

I am writing in regard to Governor Inslee's response to the EFSEC recommendation regarding the Horse Heaven Wind Farm project. While I am one of many residents in the Tri-Cities area who are against the project entirely, I was at least resigned to the reduced number of turbines in your recommendation. The Governor's response after the Council's hundreds of hours of studies, meetings, and deliberations, is a complete slap in the face to all of you on the Council, as well as to all of the experts with whom you consulted and the local citizens who oppose this project.

On a personal note, in his response, the Governor states, "I have carefully reviewed photographs and perspectives in the record that depict the visual impacts on residential neighborhoods, and it is clear that turbines will be visible only from a distance and none of the turbines will loom over anyone's home." I live on the end of Taggart Rd. (off Badger Rd.) in the Horse Heaven Hills. The map that shows the original proposed turbine sitings indicates 4 turbines in neighboring land sections to the one in which our home is located - one of them well under a mile away on an upward slope behind our home. 500' turbines at that distance certainly would feel like they are looming over our home, not to mention the potential light flicker as the sun is setting from the many proposed turbines that would be to the west of us. I invite any of you to my home see for yourself, rather than relying on selected photos to make that sort of decision.

I would encourage you all to stand up to this (what I can only call) bullying and stick to your original recommendations. The Governor's points to discount your recommendations, which are based on expert's analyses, are blatantly false and only serve his own agenda without regard to the ramifications such a project would have on every factor which you so diligently covered in your report.

As a final thought, regardless of your stance on wind energy, I would encourage you to look into articles regarding other countries who have abandoned wind energy in favor of other forms of energy, namely nuclear power. The studies and numbers and facts are there for any to make a more informed opinion on where this push toward wind and solar power is going to take our beautiful state and country. If you need direction on informative fact-based articles to read, I would be happy to supply references.

With respect,

Phyllis Riikonen

Attachments:
[]

To: Comments@efsec.wa.gov
From: DJCrager@outlook.com
Received: 2024-06-06T19:47:37+00:00
Subject: Hold to Original Recommendation on HHH Project
Has attachment? False

External Email

EFSEC,

Thank you for the endless time spent reviewing documents, testimony, and public comments in your preparation of your recommendation to the Governor regarding the HHH Project.

Please hold to your original decision to remove half of the HH turbines. I support removal of the “red” turbines to allow aerial firefighting, to lessen visual impacts for locals and visitors and to protect wildlife, habitats and cultural sites.

Governor Inslee did not recognize the EFSEC’s recommendations regarding the HHH project even though the EFSEC completed thorough research as he directed them to do. **This makes one wonder what the purpose of the EFSEC is anyway if the governor can completely ignore your recommendations and the facts/the science and instead push through this massive project as originally planned.** No doubt the EFSEC was supposed to bring back an answer that pleases the governor, not a contrary one.

Mr. Inslee is leaving his governorship soon. All we can hope for is that he will yield to the EFSEC recommendations after all, or at least approve SOME project limitations. Otherwise, Scout will get all they desired. We know, even if the EFSEC recommendations had been approved by the governor, our community would still be tremendously impacted. Citizens here have tried to at least contain the area of impact and address real concerns the community has. But so far, the governor’s ears/eyes have been closed even to the EFSEC!

The Governor has also ignored the water/safety issue that EFSEC reported, which concerns fire safety issues in the HHH. Also, Scout, a private company, would be using a lot of water for its own purposes, taking away water from the local community.

The Tri-Cities community is concerned about the negative impacts the Scout wind farm project will have on us here! Only six miles to the south and covering the hills with turbines and power lines and sun panels. **No other community in Washington has a wind farm so close and so huge. I have learned the closest the existing farms are to a town is twenty miles**. I have also learned that once farmland has been taken over by wind/solar farms, the land cannot be used again as farmland until at least 20 years after the turbines/panels/and whatever else has to be built is removed.

How sad it is too that **Governor Inslee has no regard for the Ferruginous Hawk**, a species placed on Washington State’s endangered species list in 2021**. They nest in the HHH**. Inslee is not consistent in his decision making. He listened to the tribal nation when it spoke of the declining salmon runs, and so he pushed taking out our dams that produce hydropower (clean energy), yet he did not listen at all when the Yakama tribe spoke of what the Horse Heaven Hills and the hawks mean to the local tribes.

Please continue your efforts to convince the governor that he needs to make the right decision regarding this project, which for us the best we can do is hope he reconsiders and approves the EFSEC recommendations.

Thank you,

Joan Crager, Kennewick WA

Attachments:
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To: Comments@efsec.wa.gov
From: efsec@efsec.wa.gov
Received: 2024-06-06T16:46:51+00:00
Subject: FW: Stand strong on limits to turbines in Horse Heaven HIlls
Has attachment? False

From: Linda Carroll <lindalouise701184951@yahoo.com>
Sent: Thursday, June 6, 2024 9:40 AM
To: EFSEC (EFSEC) <efsec@efsec.wa.gov>
Subject: Stand strong on limits to turbines in Horse Heaven HIlls

External Email

As a native and current Washingtonian who has watched with chagrin as so many of our natural treasures have been damaged or destroyed, I applaud you for the countless hours that you have dedicated to reviewing documents, testimony and public comments in formulating your recommendation to the Governor concerning how to limit the potential damage that proposed turbines could do to our incomparably beautiful and beloved Horse Heaven Hills and their inhabitants of all species.

Please stand strong with your original decision to remove half of the HH turbine. I support the removal of the "red" turbines to facilitate aerial access by firefighters, to preserve the visual beauty of the region, and to protect the unique wildlife, habitats and cultural sites of the region.

As the daughter of a science teacher with a lifelong commitment to the preservation of our amazing nature, I thank you for your comprehensive science-based approach and encourage you to stand with your original recommendations.

With best regards,

Linda Carroll

Attachments:
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To: efsec@efsec.wa.gov
From: akueconsult@gmail.com
Received: 2024-06-06T01:45:29+00:00
Subject: HORAE HEAVEN HILLS WIND PROJECT
Has attachment? False

External Email

Dear EFSEC Members. I am a retired Energy & Environmental Company Executive and now my wife and I own a small LLC. Please accept my sincere appreciation for the time and expertise you put forward to submit a collaborative recommendation to Governor Inslee on the proposed Horse Heaven Hills Project. It was disappointing to learn the Governor did not accept your recommendation. Having spent years in the Energy business, it is abundantly clear that an appropriate mix of renewable hydro, nuclear, wind and solar can provide adequate electricity to move us forward and maintain the quality of life we all desire. Relying on low capacity factor wind and solar, without appropriate investments in nuclear and hydro, we will not achieve the goal of moving away from fossil fuels. The investment in only wind and solar will make the US noncompetitive in the world. If we do not maintain a competitive advantage, we will not be able to sustain the quality of life it has taken 350 years to achieve. Developing countries (e/g., China, India) are aggressively building coal, hydro & nuclear electrical production facilities. Reuters reports that China currently has **243 GW of new coal power plants under construction, or permitted for construction**. When plants currently announced or in the preparation stage but not yet permitted are included, this number rises to 392 GW of capacity at 306 different coal power plants.
India will start operating new coal-fired power plants with a combined capacity of 13.9 gigawatts (GW) this year, its power ministry said in a statement to Reuters, the highest annual increase in at least six years.
We are importing goods from these countries and helping fund their fossil fueled energy plants.
Your recommendation provides a reasonable investment in wind & solar and can free up financial resources to be applied to building small modular reactors at Hanford and further improving fish migration at our hydro dams. Again, thank you for all you do to help Washington make the right choices.

Tony Umek, CEO, AKU Enterprises,LLC
2972 Clark Court
West Richland,WA 99353
Tony Umek Sent from my iPhone

Attachments:
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To: Comments@efsec.wa.gov
From: efsec@efsec.wa.gov
Received: 2024-06-05T23:59:29+00:00
Subject: FW: HH Wind and Solar
Has attachment? False

From: Stephanie Bell <jasperjosh@comcast.net>
Sent: Wednesday, June 5, 2024 4:44 PM
To: EFSEC (EFSEC) <efsec@efsec.wa.gov>
Subject: RE: HH Wind and Solar

External Email

Dear Decision Makers at EFSEC:

All of us are trying hard to mitigate climate harm in this state of ecological crisis, but green energy isn't always what it seems. We must be judicious about not doing more harm under the guise of remedies. Toward this end, I applaud EFSEC for all the time you have spent reviewing documents, testimony and public comments as you prepared your recommendation to the Governor.

Respectfully, I ask you to uphold your original decision to remove half of the HH turbines. I strongly support removal of the "red" turbines to allow aerial firefighting, to lessen visual impacts for locals and visitors and to protect wildlife, habitats and cultural sites.

Might I hear from you soon?

Best,

Stephanie C. Bell

Attachments:
[{"@odata.type":"#microsoft.graph.fileAttachment","id":"AAMkADU1OGRmNDUyLWNhZDAtNGQ3Mi05N2YwLTkwMzcxY2IyZGY0NwBGAAAAAABHlkkqzHF2T6rbYiHzn_U-BwASg50NvGhiT597AeISAVy7AAAAAAEMAAASg50NvGhiT597AeISAVy7AAEccHxPAAABEgAQAKPN64Rui3xHsqs9rDElXJQ=","lastModifiedDateTime":"2024-06-05T23:59:29+00:00","name":"image001.gif","contentType":"image/gif","size":340,"isInline":true,"contentId":"image001.gif@01DAB767.8356A8A0","contentBytes":"R0lGODlhMgAyAIAAAP///wAAACH5BAAAAAAALAAAAAAyADIAAAIzhI+py+0Po5y02ouz3rz7D4biSJbmiabqyrbuC8fyTNf2jef6zvf+DwwKh8Si8YhMKicFADs="}]

To: Comments@efsec.wa.gov
From: efsec@efsec.wa.gov
Received: 2024-06-03T16:55:37+00:00
Subject: FW: Thanks for your help to remove wind turbines in our area
Has attachment? False

From: Ellen T <ellen@etcpress.net>
Sent: Monday, June 3, 2024 9:42 AM
To: EFSEC (EFSEC) <efsec@efsec.wa.gov>
Subject: Thanks for your help to remove wind turbines in our area

External Email

Thank you for the three years of work on removing wind turbines in our area. This is a beautiful natural area with many animals such as hawks that depend on the freedom of the skies and the wind.
We appreciate your years of work to protect this environment.
We urge you to stick to your recommendation of removing half the turbines, and appreciate all the effort it took to get that. Please don't let the governor or anyone else bully you into destroying our area, especially in the name of conservation and "protecting the environment"!
Peace,
Tom and Ellen Tomaszewski
Richland, WA residents
.

Attachments:
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To: govoutbound@iq.governor.wa.gov;GOVOutBound@gov.wa.gov
From: cease2020@aol.com
Received: 2024-06-02T18:19:09+00:00
Subject: C.E.A.S.E. INSLEE'S RENEWABLE SCAM
Has attachment? False

External Email

Hi, there is so much wrong with Inslee's renewable energy scam that it will ruin the future of the state and the citizens. With demand for electricity growing at a rate higher than predicted the current plentiful reliable affordable fossil fuel generated electricity would have a difficult time keeping up with the demand. With Inslee's grand renewable scam to eliminate fossil fuels and rely on wind/solar to supply the needed electricity it will NEVER happen. We will all be without electricity. The lack of transmission lines to deliver the electricity to the westside Inslee and his friends will suffer the most and that's good news. Renewable energy is so costly to go to 100% renewable will increase our utility bills IF they can deliver electricity to our homes. Inslee/PSE wants to eliminate Natural Gas forcing citizens to convert their homes to electricity which will place a greater demand on renewables and that will be disastrous. With a lunatic renewable dictator like Inslee our state is doomed. It is apparent that Inslee is a renewable dictator by the reports below. He is willing to violate the RCWs he helped draft to get his renewable scam in place. EFSEC followed Inslee's laws and reduced the HHH project, and he doesn't like it. He wants EFSEC to violate the laws and permit the HHH project. This is abuse of governmental power and state laws. Inslee used $85 million taxpayer dollars to support private industry and build EV charging stations across the state. Commerce awards over $85 million to expand electric vehicle charging across Washington state - Washington State Department of Commerce Inslee DOESN'T drive an EV. What a hypocrite. He gave Kaiser Aluminum a private corporation $5 million taxpayer's dollar to replace two old boilers. https://www.spokesman.com/stories/2024/may/22/washington-state-is-giving-5-million-to-a-massive-/ Kaiser Aluminum is a billion-dollar corporation and should not receive any taxpayer's money. Does Inslee receive some type of financial benefit for supporting private industries? Give the tax dollars back to the citizens. Every eastside county and citizen are in Inslee renewable crosshairs. We are just renewable collateral damage to Inslee. Greg Wagner C.E.A.S.E. CITIZENS EDUCATED ABOUT SOLAR ENERGY

Commerce awards over $85 million to expand electric vehicle charging acr...

Penny Thomas

Funding going to nonprofits, utilities, tribes and public agencies in communities with highest need OLYMPIA, WA ...

- NW demand for electricity projected to grow 30% in decade (Oregon Capital Chronicle/Capital Press)
- $2.7 million through Climate Committment Act awarded to Willapa Bay Enterprises for ocean wave energy project (KXRO Radio)
- **EDITORIAL: Inslee put politics ahead of science, undermining fair Eastern WA compromise (Tri-City Herald)**
- EDITORIAL: Inslee heeds no opposition to energy projects (Capital Press)

Attachments:
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To: Comments@efsec.wa.gov
From: efsec@efsec.wa.gov
Received: 2024-05-31T15:12:12+00:00
Subject: FW: HH Wind and Solar Project
Has attachment? False

From: Todd Cox <itoddcox@yahoo.com>
Sent: Thursday, May 30, 2024 6:24 PM
To: EFSEC (EFSEC) <efsec@efsec.wa.gov>
Subject: HH Wind and Solar Project

External Email

Please stop this terrible idea to put up wind turbines and solar generation project. Neither of the types of energy generation are needed. Also both of these projects have such a short life span it would be ill advised. The amount of pollution generated building turbines is terrible. People in this area Do Not want this to happen. Lastly they will cause terrible sight pollution. If they are truly needed have them built somewhere in Western Washington so that the people that seem to back this government boondoggle can admire how they look and how many birds will be killed. The wind is more consistent coming from the west also.
Sincerely
Todd Cox
Kennewick, Wa

Sent from Yahoo Mail for iPhone

Attachments:
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To: Comments@efsec.wa.gov
From: efsec@efsec.wa.gov
Received: 2024-05-30T15:32:26+00:00
Subject: FW: Inslee
Has attachment? False
-----Original Message----- From: Kip Daly Sent: Wednesday, May 29, 2024 7:54 PM To: EFSEC (EFSEC) Subject: Inslee External Email IGNORE recommendations for windmills Maintain Fire safety and Kill less There would be no windmills if everyone was aware of the hundreds of gallons of oil each one takes and the maintenance intervals to change it. The cost benefit analysis is off the charts bad business and the environmental impact statements are obviously political because of disposal impacts are also environmentally catastrophic. Respectfully / Kip Daly
Attachments:
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To:
Comments@efsec.wa.gov;efsec@efsec.wa.gov;efsec@efsec.wa.gov;sonia.bumpus@efsec.wa.gov;kathleen.drew@efsec.wa.gov;ami.hafkemeyer@efsec.wa.gov;joan.owens
From: cease2020@aol.com
Received: 2024-05-29T22:09:26+00:00
Subject: C.E.A.S.E. STAND
Has attachment? False

External Email

EFSEC, you followed Inslee's law RCW 80.50 and made the correct decisions for Horse Heaven Hills project. Are you willing to violate the laws you are required to abide by in order to please Inslee. The laws are to be followed by all Washingtonians including Inslee. Especially Inslee. A state judge certified your decision. Does Inslee have the right or power to override that decision? NO! Not without a court order. Do not change your decision. STAND YOUR GROUND. Respectfully, Greg Wagner C.E.A.S.E. CITIZEN EDUCATED ABOUT SOLAR ENERGY

Attachments:
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To: Comments@efsec.wa.gov
From: efsec@efsec.wa.gov
Received: 2024-05-29T19:05:02+00:00
Subject: FW: Wind Turbines Near Tri-Cities WA
Has attachment? False

From: lcep1977@gmail.com <lcep1977@gmail.com>
Sent: Wednesday, May 29, 2024 11:58 AM
To: EFSEC (EFSEC) <efsec@efsec.wa.gov>
Subject: Wind Turbines Near Tri-Ci es WA

External Email

Thank you for their 3 years of hard work on the wind turbine farm planned for the Horse Heaven Hills. Please to stick to your recommendation which removes half the turbines. Governor Inslee Is unilaterally making a decision contrary to yours, and putting political pressure on you to reconsider.

Sincerely,
L. Craig Swanson
45903 E Mayo Dr
Benton City, WA 99320

To: Comments@efsec.wa.gov
From: efsec@efsec.wa.gov
Received: 2024-05-29T17:03:52+00:00
Subject: FW: Wind turbines
Has attachment? False
-----Original Message----- From: James Cortese Sent: Wednesday, May 29, 2024 10:02 AM To: EFSEC (EFSEC) Subject: Wind turbines External Email Hi, my opinion of the wind turbines going into are area is detrimental to wildlife ! I think your option of 50 percent is a good solution. Please 🙏don't be influenced on Gov inslee's His way or the highway approach!!! Sent from my iPhone
Attachments:
[]

To: Comments@efsec.wa.gov
From: efsec@efsec.wa.gov
Received: 2024-05-29T16:14:18+00:00
Subject: FW:
Has attachment? False

From: Becky A. Hughes <becky@wmhughes.com>
Sent: Wednesday, May 29, 2024 8:38 AM
To: EFSEC (EFSEC) <efsec@efsec.wa.gov>
Subject:

External Email

Thank you for your service and please do not let Inslee destroy the hhh. Even the last recommendations were too much for the area but putting those turbines in residential areas like this would be a total disaster not only for the humans but for the wild life and the environment.

This breeding pair is right in its path and have been there several years, we need their hunting skills out here and with no ability to safely fight fires if the turbines don't kill them the fires will destroy their habitat and make insurance impossible to get at a reasonable rate out here if it is available at all! Many companies are already deciding they will not insure out here!

To: Comments@efsec.wa.gov
From: efsec@efsec.wa.gov
Received: 2024-05-29T16:13:54+00:00
Subject: FW: Wind Project
Has attachment? False
-----Original Message----- From: Robert Burke Sent: Wednesday, May 29, 2024 8:20 AM To: EFSEC (EFSEC) Subject: Wind Project External Email Please stick to your proposal for the people in the Tri-City community. Don’t let Insley push you into changing your decision just to help him tout his legacy of being this Big Clean Air/Energy producing State Governor czar at the expense of the people. It’s about time the West side of the state steps up and takes not only some risk on their side of the state but loss of their land, wildlife, and choices. After all, they benefit without giving up anything. Better yet… Stop the whole wind project! Send it west! Helen Burke
Attachments:
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To: Comments@efsec.wa.gov
From: efsec@efsec.wa.gov
Received: 2024-05-29T16:13:24+00:00
Subject: FW: Turbines
Has attachment? False

From: Linda Wilson <wilson.lin327@gmail.com>
Sent: Wednesday, May 29, 2024 5:17 AM
To: EFSEC (EFSEC) <efsec@efsec.wa.gov>
Subject: Turbines

External Email

Please stick to the modified bill you have recommended for the scaled down wind turbines. It's vital to protect the areas that you have accounted for.

Thank you,
Linda Wilson

Attachments:
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To: Comments@efsec.wa.gov
From: efsec@efsec.wa.gov
Received: 2024-05-29T16:12:54+00:00
Subject: FW: Supporting your recommendation
Has attachment? False

From: Dori Rhynalds <dorirhynalds@gmail.com>
Sent: Tuesday, May 28, 2024 10:13 PM
To: EFSEC (EFSEC) <efsec@efsec.wa.gov>
Subject: Supporting your recommendation

External Email

I want to thank you for your 3 years of work to get to your current suggestions for the wind farm.

I urge you to IGNORE Jay Inslee …and stick to your recommendation… of removing half the turbines.

Sincerely,
Dori Rhynalds
Resident of the Tri Cities

Sent from my iDori

Attachments:
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To: Comments@efsec.wa.gov
From: efsec@efsec.wa.gov
Received: 2024-05-29T16:12:38+00:00
Subject: FW: Wind turbines in Tri-Cities
Has attachment? False

From: Jen Salois <jsalois0223@gmail.com>
Sent: Tuesday, May 28, 2024 8:03 PM
To: EFSEC (EFSEC) <efsec@efsec.wa.gov>
Subject: Wind turbines in Tri-Cities

External Email

Thank you for your recommendation of the wind turbines. Please stick to your decision despite statements from the governor. Please help save some of our birds, and nesting hawks, as well as aerial fire fighting. Tri-Cities is essentially a desert, and so dry, need help with aerial fire fighting, esp with wildfires. Wildlife Conservation professionals state more birds are destroyed by these wind turbines than reported as it's hard to calculate numbers as the turbines usually annihilation. Thank you for your time.
Jennifer Salois
Kennewick, WA

Attachments:
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From: EFSEC (EFSEC)
To: EFSEC mi Comments
Subject: FW: Comment RE: Horse Heaven Hills wind project
Date: Thursday, June 20, 2024 8:24:20 AM

-----Original Message-----
From: Hal Enerson <henerson@fastmail.org>
Sent: Wednesday, June 19, 2024 1:30 PM
To: EFSEC (EFSEC) <efsec@efsec.wa.gov>
Subject: Comment RE: Horse Heaven Hills wind project

External Email

RE: Horse Heaven Wind Project

I am writing in support of Governor Inslee's request that EFSEC revise its recommendations on the Horse Heavens Wind Project.

The initial EFSEC recommendation to reduce the size of the project is inappropriate in light of our urgent need to expand alternative energy capacity.

I believe it is important to maximize clean energy opportunities. We need to go "all in" on the transition from fossil fuel energy to wind and solar. To that end, we should be pursuing the largest footprint possible in projects such as the Horse Heaven wind farm and other appropriate sites throughout the state.

In addition to wind power, much of our state, especially eastern Washington, is blessed with high solar potential. This, too, needs to be maximized. Some areas on the west side may be appropriate as well, such as rural areas of Lewis and Thurston counties.

Please do everything reasonably possible to maximize the Horse Heaven Hills wind project. Also, thank you for all the challenging work you have put in to these complex deliberations.

Thank you for considering my comments.

--
Hal Enerson
henerson@fastmail.org

To: Comments@efsec.wa.gov;efsec@efsec.wa.gov
From: karen@tricitiescares.org
Received: 2024-06-21T16:36:00+00:00
Subject: June 20, 2024 EFSEC Council Meeting
Has attachment? False

External Email

Having listened to yesterday's Council meeting, I am encouraged that 4 of the 6 Council members who spoke during the discussion on the Horse Heaven Wind/Solar Project had the courage to question the Governor's directive to disregard the cumulative impacts that led to exclusion area designations in favor of his "more narrowly tailored" impact directive. That's what the entire Council should be doing. EFSEC's job is to balance the desires of the applicant with the environmental, cultural, visual, safety, and social impacts caused by that desire.

Within a few days, Tri-Cities C.A.R.E.S. will be sending you and many others our response to Governor Inslee's remand letter.

Karen Brun
Treasurer, TRI-CITIES C.A.R.E.S.
Phone: 509-392-1156
Email: karen@tricitiescares.org

TRI-CITIES C.A.R.E.S.
Community **A**ction for **R**esponsible **E**nvironmental **S**tewardship
Visit: www.TriCitiesCARES.org

Attachments:
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Lower Columbia Basin Audubon Society
A CHAPTER OF THE NATIONAL AUDUBON SOCIETY
P.O. Box 1900 • Richland, WA 99352 • (509) 545-6115

June 19, 2024

Kathleen Drew, Chair
Energy Facility Site Evaluation Council
1300 S. Evergreen Park SW
PO Box 43172
Olympia, WA 98504

RE: Horse Heaven Wind Farm Project
May 23rd Letter of Direction from Gov. Inslee

Dear Chair Drew:

The Lower Columbia Basin Audubon Society, a chapter of the National Audubon Society, understands and supports the policy of the state of Washington to reduce dependence on fossil fuels to slow or stop global warming. This policy must also take into account the crisis we are experiencing with our shrub-steppe ecosystem. Siting of carbon free energy production such as wind turbines and solar must be compatible with maintaining or enhancing existing biodiversity.

In reading Governor Inslee's May 23rd Letter of Direction to EFSEC, we were disheartened to see his blatant disregard for the work done by the community to protect cultural sites, priority habitats, habitat corridors and species such as the Ferruginous Hawk. Protection of these resources by the stakeholder's involved and the mitigation efforts that correspond to those resources in Audubon's estimation are not "overboard" as stated by the Governor, but were based on sound science and appropriate cultural resource values.

Audubon understands that EFSEC will have to make some tough decisions to meet the directives of the Governor but we ask that cultural resources, habitat, and Ferruginous Hawks receive the highest priority in maintaining protection while visual impacts and recreation receive lower priority.

In making your decision to meet the Governor's directive, please rely heavily on those persons that have expertise in the appropriate fields of study related to habitat ecology and raptor knowledge. The Tribes input is critical for preserving the integrity of culturally significant sites and areas.

EFSEC is under pressure from the Governor's letter to compromise the well-founded standards which were painstakingly developed by the stakeholders and presented to Governor Inslee by EFSEC. It is necessary for EFSEC to uphold the current science based restrictions to set the standards by which all current and future projects must abide. To produce clean energy while sacrificing those valued resources to obtain the clean energy goal is contradictory to the overall good of those cultural and biological resources of the state of Washington and the region.

Sincerely,

Dana Carl Ward

Dana Carl Ward
President
Lower Columbia Basin Audubon Society

CC Governor Jay Inslee

To: Comments@efsec.wa.gov;efsec@efsec.wa.gov;sonia.bumpus@efsec.wa.gov;kathleen.drew@efsec.wa.gov
From: karen@tricitiescares.org
Received: 2024-06-24T14:09:29+00:00
Subject: Tri-Cities C.A.R.E.S. Response to Governor Inslee's Remand Letter
Has attachment? True

External Email

Attached please find the subject response to Governor Inslee's directive to the Council and EFSEC staff as promised in an email sent to you late last week.

Thank you for your consideration.

Karen Brun
Treasurer, TRI-CITIES C.A.R.E.S.
Phone: 509-392-1156
Email: karen@tricitiescares.org

TRI-CITIES C.A.R.E.S.
Community **A**ction for **R**esponsible **E**nvironmental **S**tewardship
Visit: www.TriCitiesCARES.org

Attachments:
[{"@odata.type":"#microsoft.graph.fileAttachment","id":"AAMkADU1OGRmNDUyLWNhZDAtNGQ3Mi05N2YwLTkwMzcxY2IyZGY0NwBGAAAAAABHlkkqzHF2
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06-24T14:09:29+00:00","name":"6-24-24 Response to EFSEC on Inslee
Edict.pdf","contentType":"application/pdf","size":163405,"isInline":false,"contentId":"f_lxt1zxhx0","contentBytes":"JVBERi0xLjcNCiW1tbW1DQoxIDAgb2JqDQo8PC9l

To: Comments@efsec.wa.gov
From: efsec@efsec.wa.gov
Received: 2024-06-25T18:41:35+00:00
Subject: FW: Proposed Horse Heaven Hills project
Has attachment? False

From: Jim Davison <pjdavison47@gmail.com>
Sent: Tuesday, June 25, 2024 9:29 AM
To: EFSEC (EFSEC) <efsec@efsec.wa.gov>
Subject: Proposed Horse Heaven Hills project

External Email

I find it very interesting that, after your group made it's recommendation regarding the Horse Heaven Clean Energy Center, that Gov. Inslee failed to accept the recommendation since it was based on study of the facts/area. What is really discouraging is the Governor then requested you to make exceptions.

Apparently he believes his "green" energy is a priority that tops environmental concerns. But, considering the lack of forethought for the end-of-life disposal for windmills blades and solar panels, that's not unusual.

It is hoped science wins out over the governor's personal preference.

Sincerely,

Jim Davison
PO Box 425
Waitsburg, WA 99361-0425

Attachments:
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To:
Comments@efsec.wa.gov;efsec@efsec.wa.gov;efsec@efsec.wa.gov;sonia.bumpus@efsec.wa.gov;kathleen.drew@efsec.wa.gov;joanne.snarski@efsec.wa.gov;andrea.grantł
From: cease2020@aol.com
Received: 2024-06-28T20:17:23+00:00
Subject: C.E.A.S.E.
Has attachment? False

External Email

EFSEC, you followed Inslee's RCWs and made the correct recommendation to him. Now he wants you to ignore and violate the laws so he can get HHH built. You did your job correctly so tell him you cannot make any other recommendations. Do not allow Inslee to destroy OUR state. BTW Inslee purchased his retirement home in Hayden, Idaho. He does not want to live in the state he ruined. Stand your ground don't back down. Greg Wagner C.E.A.S.E.

Attachments:
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To: Comments@efsec.wa.gov
From: gaye_tesar@hotmail.com
Received: 2024-07-02T17:55:38+00:00
Subject: Horse Heaven Hills
Has attachment? False

External Email

We live in the fire shadow of the HHH – close proximity and downwind. By restricting the use of aerial firefighting, you are dooming many residences to fire risks to life and property. Ensure that there is enough of a buffer around the project, particularly on the north and east sides, to allow use of large air tankers.

Gaye Tesar
Kennewick WA

Attachments:

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To:
Comments@efsec.wa.gov;efsec@efsec.wa.gov;sean.greene@efsec.wa.gov;amy.moon@efsec.wa.gov;ami.hafkemeye
From: tpriikonen@hotmail.com
Received: 2024-07-02T17:58:56+00:00
Subject: Horse Heaven Wind and Solar Project
Has attachment? False

External Email

To All Council Members,

I am writing to urge the council to stand by your original recommendations to the governor for the Horse Heaven Wind and Solor Project. To revise it to what the governor is asking of you means that all the hundreds of hours of study, research, as well as experts' testimonies means nothing! Please stand for logic rather than allowing one politician's agenda to determine your decision.

As someone who lives in the Horse Heaven Hills, my home would be one of those most directly impacted by the project. We currently enjoy the wildlife and fowl right outside our windows and would be saddened to see their habitat affected by the wind turbines. Also, light flicker and constant noise from the turbines is of great concern.

Thank you for your careful consideration as you make your decision.

Phyllis Riikonen

Attachments:

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To: Comments@efsec.wa.gov
From: henerson@fastmail.org
Received: 2024-07-02T18:59:18+00:00
Subject: Comment RE: Horse Heaven Hills wind project
Has attachment? False

External Email RE: Horse Heaven Hills Wind Project I am writing to reiterate my support of Governor Inslee's request that EFSEC revise its recommendations on the Horse Heaven Hills Wind Project. I strongly believe that the initial EFSEC recommendation to significantly reduce the size of the project is unwise in light of our urgent need to expand alternative energy capacity. Some adjustments may be needed, but surely such a drastic reduction is unwarranted. It is critically important to MAXIMIZE clean energy opportunities. We need to go "all in" on the transition from fossil fuel energy to wind and solar. We should be pursuing the largest footprint possible in projects such as the Horse Heaven wind farm and other appropriate sites throughout the state. I urge you to do everything reasonably possible to MAXIMIZE the Horse Heaven Hills wind project. Thank you for considering my comments. -- Hal Enerson henerson@fastmail.org

Attachments:

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To: Comments@efsec.wa.gov
From: genevacarroll@yahoo.com
Received: 2024-07-02T21:12:39+00:00
Subject: Horse Heaven Hills Wind Farm
Has attachment? False

External Email

After three years of hearings, public comments, input from affected parties' expert witnesses and the public, EFSEC has made a reasoned decision consistentwith other Washington wind projects by reducing the project to reflect protection of the environment and habitat, and have recognized the impacts that the project will have on adjacent populations including fire risk, and visually. Please stand by your decision.

Thank you,

Geneva Carroll

Attachments:

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To: Comments@efsec.wa.gov
From: ami.hafkemeyer@efsec.wa.gov
Received: 2024-07-02T21:33:13+00:00
Subject: FW: H.H.H. Proposed Wind Farm
Has attachment? False

Can this please be saved with the HH record?
Best wishes,
Amí Hafkemeyer
Director of Siting and Compliance
ami.hafkemeyer@efsec.wa.gov
Office 360.664.1305
Cell 360.972.5833

From: Kira Sutherland <kira@cbt-tc.com>
Sent: Tuesday, July 2, 2024 2:12 PM
To: Hafkemeyer, Ami (EFSEC) <ami.hafkemeyer@efsec.wa.gov>
Subject: H.H.H. Proposed Wind Farm

External Email

To whom it may concern,

I highly encouragethat you stick to your guns and not violate any WA laws that govern your duty to include local input, adjudication testimony and preservation of the environment in their recommendation to the Governor.

Below are some thoughts on why it is important to do so.

1. After three years of hearings, public comments, input from affected parties' expert witnesses and the public, EFSEC has made a reasoned decision consistentwith other Washington wind projects by reducing the project to reflect protection of the environment and habitat, and have recognized the impacts that the project will have on adjacent populations including fire risk, and visually. Please stand by your decision.
2. If EFSEC significantly changes what you have deliberated and approved by majority vote, it will shred the credibility of the EFSEC process and sow further distrust in our state institutions. You have threaded the needle trying to balance the multiple and significant impacts of the "out of place" HHH project. A project of this size does not fit or belong here, and one person should not be able to trump the SEPA process by undoing years of work and millions of dollars spent by state agencies and interested parties.
3. We live in the fire shadow of the HHH – close proximity and downwind. By restricting the use of aerial firefighting, you are dooming many residences to fire risks to life and property. Ensure that there is enough of a buffer around the project, particularly on the north and east sides, to allow use of large air tankers.
4. Where is the precedent in 50 years of EFSEC existence when a Governor has made such a radical and out of touch change to an EFSEC decision?
5. The Governor convened a gang of 7, made up primarily of lawyers and state policy experts, and in a period of about 2 weeks erased all of the effort that went into the

review of this project. This is not the action of a reasoned man. This is an action of a single man that wants a predetermined outcome. Please reject his demand. He is a lame duck, and will go down in history as doing irreparableharm to Washington with a bias against Eastern Washington. Please do the right thing.
6. The Governor's letter focused on the power needs of the State. Unfortunately, he knows just enough about power to be dangerous. First, the project does not commit any renewable energy to Washington electric customers. Second, the "1150 mw of generation" that the governor states as the project size is a fictitious number. The governor conflates generation as energy (megawatt hours) and nameplate (megawatts which is an instantaneous number). In reality, the project will only provide about 25-30% of the nameplate as a yearly average. And in times of need, like the depths of winter when the wind does not blow and the sun does not shine, we can expect only about 10%, or about 100 mw of energy. The governor discusses the reliability of the electric grid, but a project such as this is what will cause grid instability. Weather-dependent renewable energy is not reliable.
7. The Governor has ignored eventhe state avian experts regarding the ferruginous hawk mitigations that were deliberated. It appears from the Governor's letter that the only experts he listened to were from Scout. And theirmotive is profit and taking federal and state tax credits. If you backtrack and reverse what you have unanimously decided upon, the EFSEC process will be broken. Go with your original proposed direction.
8. The Governor discounts the visual impact. We live in the Benton City area, approximately 1 mile, ~5000 feet, from a wind turbine that will be in full view. If the smaller turbines are used, the top of the wind tower will be on a ridge about 2000' above my residence. When the Governor blatantly directed you to discount visual impacts, he totally ignored the topography of the area. This will be the dominating feature bearing down on my residence.
9. The Governor repeatedly returns to the dire consequences without the project. This project will make little to no difference. Washington and the Northwest does have a serious problem resulting from the more recent Climate CommitmentAct and a net zero goal. That problem was caused by an uninformed legislature and a State Energy Policy that reads like a chapter from Alice in Wonderland. It is a man-created problem, and it will eventually be corrected based upon what has happened all around the world when government got involved in the laws of physics. Do not buy the Governor's story about the benefit of the project. Sure, it will help some, but it will be very incremental and very small. Environmental costs out weighbenefits.
10.. Scout has been disingenuousabout the project from the very beginning. Their lack of transparency has been stunning. They still have not told the parties of their intent. Never, never, never accept an Applicationdone in this manner. They say the worst case scenario was used for impact, but that is not true. The visualizations used the smaller nameplate turbine, rather than the huge and close to the ground rotor span options, which is clearly the worst case scenario from a visual impact.
11. Is Governor Inslee a governor, a king, or a dictator? The letter he sent had numerous dictates to EFSEC. To sum up what he did: he did not get what he wanted, so change the project! Has any other Governor made such a sweeping change in an EFSEC proceeding? If you do what the Governor demands, you are setting Washington up for any unscrupulousdeveloper to come in and expect approval for any project they propose, regardlessof the impact.
12. Please have mercy on Eastern Washington. We love this area and the beauty it brings. It would be terrible to see so many move due to the destruction of our

landscape and views. Not to mention the negative health benefits that these wind farms cause people!
13. The Governor has an intense dislike for this area of Washington from an incident twenty years ago when he was voted out of his congressional seat after one term. How bad does a congressman have to be to be primaried after one term? The reason: he acted contrary to his constituents wishes and did what he wanted to do. He is doing the same to you (EFSEC). He is already a lame duck and it is not yourjob to fulfillhis legacy.
14. The EFSEC process needs to be changed. The reorganization performed several years ago did not anticipate that all power would be vested in one man. It was to streamline EFSEC, not give a single person absolute power. Please continue to display the courage you showed in the deliberation process, and formulate your final plan to be equivalent to what you earlier agreedon.
15. Through his directive, the Governor focused on the "need" for this project. That topic was not allowed to be a part of he adjudicative hearings and addressed by expert witnesses, so he does not get to use it as a basis for his argument in directing you to change the project to its full build-out capacity.
16. The Governor's remedy for mediation for the Yakama Nation's cultural properties and heritage sites is to require the Scout to ensure they have access. Seriously? Once again, the government is trying to shaft the Native Americans.

Kira Sutherland/REALTOR® / BROKER
kira@cbt-tc.com/Cell: 509.460.2663

Coldwell Banker Tomlinson
Office:509.783.4147/Fax:509.783.5826
8836 W. Gage Blvd., Suite 101B
Kennewick, WA 99336
www.cbt-tc.com

Attachments:

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To: Comments@efsec.wa.gov
From: chastings@pascochamber.org
Received: 2024-07-02T22:40:32+00:00
Subject: Horse Heaven Wind & Solar Project
Has attachment? False

External Email

Good afternoon –
After three years of hearings, public comments, input from affected parties' expert witnesses and the public, EFSEC has made a reasoned decision consistentwith other Washington wind projects by reducing the project to reflect protection of the habitat and environment, and recognized the impacts that the project will have on adjacent populations including fire risk and visual pollution of our natural landscape on the vista horizons. Please stand by your decision.
If EFSEC significantly changes what you have deliberated and approved by majority vote, it will shred the credibility of the EFSEC process and sow further distrust in our state institutions. This is an action of the governor thatwants a predetermined outcome. Please reject the governor's request to reconsider.
Thank you for your consideration.

Celebrating 110 years of Service
to the Greater Pasco Area!
Colin Hastings / Executive Director
chastings@pascochamber.org
Pasco Chamber of Commerce
509.547.9755
1110 Osprey Pointe Boulevard – Suite 101 Pasco, WA 99301
www.pascochamber.org

Attachments:

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07-
02T22:40:31+00:00","name":"image001.jpg","contentType":"image/jpeg","size":240997,"isInline":true,"contentId":"im

To: Comments@efsec.wa.gov
From: adp_jap@charter.net
Received: 2024-07-03T01:34:39+00:00
Subject: Horse Heaven proposal
Has attachment? False
External Email Deadset for any horse heaven windmills period! Very bad decision that ultimately has no value and can be sited somewhere else. Whats next? Dam removal I'm sure. FI! Sent from my iPhone
Attachments:

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To: Comments@efsec.wa.gov
From: amysings2360@gmail.com
Received: 2024-07-03T02:23:26+00:00
Subject: Wind turbines
Has attachment? False
External Email Three years of hearings, public comments and input from affected parties including expert witnesses and the public allows the EFSEC to make a reasonable divisions in reducing the wind project. It considers the environment, habitat, fire risks and visual problems. You made a good balanced decision. Stick by it!! You've become the experts. Don't cave to the governors opinion. He is one man who doesn't even live in eastern Washington. He doesn't have a true grasp of the situation. He didn't spend 3 years evaluating and listening to all parties. Please stick by your decision. It was a very reasonable decision. Sincerely, Amy
Attachments:

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To: Comments@efsec.wa.gov
From: connielgillispie@gmail.com
Received: 2024-07-03T05:08:39+00:00
Subject: Wind farms
Has attachment? False
External Email We live in the fire shadow of the HHH – close proximity and downwind. By restricting the use of aerial firefighting, you are dooming many residences to fire risks to life and property. One of my family members lost their home to a fire in that area. Ensure that there is enough of a buffer around the project, particularly on the north and east sides, to allow use of large air tankers. Where is the precedent in 50 years of EFSEC existence when a Governor has made such a radical and out of touch change to an EFSEC decision? Inslee forgets he represents the whole state. Sent from my iPhone
Attachments:

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To:
Comments@efsec.wa.gov;efsec@efsec.wa.gov;sean.greene@efsec.wa.gov;amy.moon@efsec.wa.gov;ami.hafkemeye
From: alphamom33@aol.com
Received: 2024-07-03T13:12:11+00:00
Subject: Wind project
Has attachment? False

External Email

We live in the fire shadow of the HHH – close proximity and downwind. By restricting the use of aerial firefighting, you are dooming many residences to fire risks to life and property. Ensure that there is enough of a buffer around the project, particularly on the north and east sides, to allow use of large air tankers.

Further, where is the precedent in 50 years of EFSEC existence when a Governor has made such a radical and out of touch change to an EFSEC decision?

The Governor convened a gang of 7, made up primarily of lawyers and state policy experts, and in a period of about 2 weeks erased all of the effort that went into the review of this project. This is not the action of a reasoned man. This is an action of a single man that wants a predetermined outcome. Please reject his demand. He is a lame duck, and will go down in history as doing irreparableharm to Washington with a bias against Eastern Washington. Please do the right thing.

The Governor's letter focused on the power needs of the State. Unfortunately, he knows just enough about power to be dangerous. First, the project does not commit any renewable energy to Washington electric customers. Second, the "1150 mw of generation" that the governor states as the project size is a fictitious number. The governor conflates generation as energy (megawatt hours) and nameplate (megawatts which is an instantaneous number). In reality, the project will only provide about 25-30% of the nameplate as a yearly average. And in times of need, like the depths of winter when the wind does not blow and the sun does not shine, we can expect only about 10%, or about 100 mw of energy. The governor discusses the reliability of the electric grid, but a project such as this is what will cause grid instability. Weather-dependent renewable energy is not reliable.

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The Governor repeatedly returns to the dire consequences without the project. This project will make little to

> no difference. Washington and the Northwest does have a serious problem resulting from the more recent Climate CommitmentAct and a net zero goal. That problem was caused by an uninformed legislature and a State Energy Policy that reads like a chapter from Alice in Wonderland. It is a man-created problem, and it will eventually be corrected based upon what has happened all around the world when government got involved in the laws of physics. Do not buy the Governor's story about the benefit of the project. Sure, it will help some, but it will be very incremental and very small. Environmental costs out weighbenefits.
>
> *Yvette*

Attachments:

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To: Comments@efsec.wa.gov
From: efsec@efsec.wa.gov
Received: 2024-07-03T15:32:00+00:00
Subject: FW: Horse Heaven Wind Farms
Has attachment? False

-----Original Message----- From: Connie Gillispie Sent: Tuesday, July 2, 2024 10:09 PM To: EFSEC (EFSEC) Subject: Horse Heaven Wind Farms External Email We live in the fire shadow of the HHH – close proximity and downwind. By restricting the use of aerial firefighting, you are dooming many residences to fire risks to life and property. One of my family members lost their home to a fire in that area. Ensure that there is enough of a buffer around the project, particularly on the north and east sides, to allow use of large air tankers. Where is the precedent in 50 years of EFSEC existence when a Governor has made such a radical and out of touch change to an EFSEC decision? Inslee forgets he represents the whole state. Sent from my iPhone

Attachments:

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To: Comments@efsec.wa.gov
From: efsec@efsec.wa.gov
Received: 2024-07-03T15:33:47+00:00
Subject: FW: Horse Heaven Hills Wind Farm
Has attachment? False

From: Geneva Carroll <genevacarroll@yahoo.com>
Sent: Tuesday, July 2, 2024 2:43 PM
To: EFSEC (EFSEC) <efsec@efsec.wa.gov>
Subject: Horse Heaven Hills Wind Farm

External Email

I don't know how the Governor could convene a gang of 7, made up primarily of lawyers and state policy experts, and in a period of about 2 weeks erase all of the effort that went into the review of this project. This is not the action of a reasoned man. This is an action of a single man that wants a predetermined outcome. Please reject his demand. He is a lame duck, and will go down in history as doing irreparableharm to Washington with a serious bias against Eastern Washington. Please do the right thing. Governor Inslee does not care about the citizens of Eastern Washington, even though he is supposed to represent us, not his wishes.
Geneva Carroll

Attachments:

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To: Comments@efsec.wa.gov
From: efsec@efsec.wa.gov
Received: 2024-07-03T15:33:58+00:00
Subject: FW: Horse Heaven Wind Farm
Has attachment? False

From: WILLIAM SARACENO <wsaraceno@aol.com>
Sent: Tuesday, July 2, 2024 1:22 PM
To: EFSEC (EFSEC) <efsec@efsec.wa.gov>
Subject: Horse Heaven Wind Farm

External Email

Where is the precedent in 50 years of EFSEC existence when a Governor has made such a radical and out of touch change to an EFSEC decision?

The Governor convened a gang of 7, made up primarily of lawyers and state policy experts, and in a period of about 2 weeks erased all of the effort that went into the review of this project. This is not the action of a reasoned man. This is an action of a single man that wants a predetermined outcome. Please reject his demand. He is a lame duck, and will go down in history as doing irreparableharm to Washington with a bias against Eastern Washington. Please do the right thing.
Respectfully
W.E. Saraceno

Attachments:

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To:
Comments@efsec.wa.gov;efsec@efsec.wa.gov;sean.greene@efsec.wa.gov;amy.moon@efsec.wa.gov;ami.hafkemeye
From: karen@tricitiescares.org
Received: 2024-07-03T18:09:21+00:00
Subject: EFSEC Response to 5/7/24 Request for Technical Assistance from Inslee
Has attachment? False

External Email

In reading your responses to the Governor's request, I need to question your answer to #17. Information on the Ferruginous Hawk (FEHA) nesting habitats where you state "Additionally, these canyons are important nesting and foraging habitat for FerruginousHawk, a State Threatened Species that is in process of being uplisted to Endangered.

According to the Washington Department of Fish and Wildlife, the FEHA is listed as Endangered and has been since August 7, 2021. By presenting inaccurate information to the Governor on this species, you have put it in further jeopardy as can be seen in his remand letter of 5/23/24 where he downplays the impacts and directs a full buildout of the project.

Karen Brun
Treasurer, TRI-CITIES C.A.R.E.S.
Phone: 509-392-1156
Email: karen@tricitiescares.org

TRI-CITIES C.A.R.E.S.
Community **A**ction for **R**esponsible **E**nvironmental **S**tewardship
Visit: www.TriCitiesCARES.org

Attachments:

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To: Comments@efsec.wa.gov
From: karenstrecker@gmail.com
Received: 2024-07-03T23:44:47+00:00
Subject: HHH project
Has attachment? False

External Email

Dear EFSEC committee members,

I am writing to encourage you to stick to your recommended amended plans for the HHH wind farm project. Please do not be party to violating any WA state laws that govern your duty to include input, adjudication testimony and preservation of the environment in your recommendation to the Governor.

If EFSEC significantly changes what you have deliberated and approved by majority vote, it will shred the credibility of the EFSEC process and sow further distrust in our state institutions. You have worked hard to balance the multiple and significant impacts of the "out of place" HHH project. A project of this size does not fit or belong here, and one person should not be able to trump the SEPA process by undoing years of work and millions of dollars spent by state agencies and interested parties.

The Governor convened a gang of 7 members, made up primarily of lawyers and state policy experts, and in a period of about 2 weeks erased all of the effort that went into the review of this project. This is not the action of a reasoned man, but of a single man who is demanding a predetermined outcome. Please reject his demand and do the right thing. He will go down in history as doing irreparable harm to Washington because of a bias against Eastern Washington.

My husband and I live in very close proximity and downwind of the HHH project. By restricting the use of aerial firefighting, you are dooming many residences to fire risks to life, homes and property. There must be proper buffers around the project, particularly on the north and east sides, to allow use of large air tankers.

Again, we ask that you please do what you know is right.

Thank you, Karen Strecker

Attachments:

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To:
Comments@efsec.wa.gov;efsec@efsec.wa.gov;efsec@efsec.wa.gov;sonia.bumpus@efsec.wa.gov;kathleen.drew@efs
From: cease2020@aol.com
Received: 2024-07-06T14:32:39+00:00
Subject: C.E.A.S.E. HHH
Has attachment? False

External Email

Hi, EFSEC stand your ground and don't back down. EFSEC you followed the laws and made your recommendations to Inslee on the Horse Heaven Hills project, and he now wants you to violate the laws. EFSEC does not cave in to Inslee's demands. If you do and the project is built in full you will destroy the area. Stand by the law. Do what's right. Don't let the renewable dictator force you to violate the laws. Laws that he created.Greg Wagner C.E.A.S.E.

Attachments:

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To: Comments@efsec.wa.gov
From: pixelate@mathsavers.com
Received: 2024-07-07T16:45:30+00:00
Subject: The HHH (Horse Heaven Hills) Wind, Solar and Battery Storage Project proposed for the TriCities
Has attachment? False

External Email

Hello EFSEC Administrators, Trustees and Associates –
Subject: The HHH (Horse Heaven Hills) Wind, Solar and Battery Storage Project proposed for the TriCities.
Context: I am the owner of 40 acres of mixed-use land in West Richland. Part of that land is presently being used for agricultural purposes. The land will eventually be developed for residential dwellings.

This Project should be cancelled or minimized for many reasons, specifically:

- Solar and wind power are neither renewable nor economically viable. They are both first order derivatives of hydrocarbon fuels.
- The sunlight and wind are renewable; the machines used to "harvest" the sun and wind are not. These so-called green energy solutions require continued maintenance and ultimately, they must be replaced.
- The total energy necessary for the mining, refining, manufacturing, transportation, installation, maintenance, and decommissioning of a wind turbine, along with hot-standby power that must be incorporated into the electrical supply systems (the wind blows intermittently), far exceeds the energy generated over a wind turbine's service life.
- This project is a disastrous misallocation of resources and will destroy the landscape and beauty of the Horse Heaven Hills. This project will crater property values in the area. Nobody wants to live next to or see a power plant near their home or business. This power operation will extend over 25 miles and be visible to much of the 300,000 people living and working in the TriCities.
- Washington State already receives over 70% of its electricity from efficient hydroelectric power. The plan to tear down existing dams on the Snake River while constructing an economically and environmentally damaging power station is beyond absurd.

Construction of the HHH Wind "Farm" would be a disaster for the environment, citizens of the TriCities and anyone that enjoins to relocate to the area.
Thank you for taking the time to read and understand my position.
Regards,
Patrick D. Grengs II / Landowner and Farmer in West Richland (owner of 40 acres).
Credentials: MS in Computer Science with 30+ years professional experience as a mathematician, software engineer, project manager, technical trainer, employee of multiple companies and contractors, plus lifetime entrepreneur and business developer. I am an internationally accomplished speaker and presenter. I will publicly debate anyone regarding the Climate Change Scam, and in particular the Wind Power Fraud, given ample notice. Although I have been formally retired from the software industry since 2019, my calendar is typically booked months in advance.

Wind Power is Proven to be an Economic Failure Across the Globe:

- Top Wind Firm Profits Tumble 98% in New Blow to Clean Energy / Goldwind squeezed by lower prices, sector's surplus capacity.
    - https://www.bloomberg.com/news/articles/2023-10-26/goldwind-profits-plunged-even-as-wind-power-surges-in-china
- Orsted A/S shares slumped to their lowest level in six years after the Danish utility dropped two US wind projects and recorded 28.4 billion kroner ($4 billion) in impairments as the crisis in the wind industry worsens.
    - https://www.bloomberg.com/news/articles/2023-11-01/orsted-drops-us-wind-projects-taking-4-billion-impairment-hit
- The crisis engulfing the US offshore wind industry escalated as Orsted A/S and BP Plc became the latest developers to take large write-downs on projects, putting President Joe Biden's targets for renewable energy generation at risk.
    - https://www.bloomberg.com/news/articles/2023-11-01/us-offshore-wind-crisis-escalates-with-5-billion-

in-writedowns

- The US offshore wind industry is “fundamentally broken” due to cost pressures and permitting delays, according to a top executive at BP Plc.
    - https://www.bloomberg.com/news/articles/2023-11-01/bp-says-us-offshore-wind-industry-is-fundamentally-broken
- Siemens Gamesa's turnaround plan underwhelms / Shares in Siemens Energy have recovered strongly since then but fell as much as 11.7% on Tuesday after focus shifted again to Siemens Gamesa, the world's largest maker of offshore wind turbines, where quality issues and ramp-up problems caused a 4.6 billion euro annual net loss.
    - https://www.reuters.com/business/energy/siemens-energys-struggling-wind-unit-unveils-436-million-cost-cuts-2023-11-21/
- Why America’s Wind Power Failures Are Good for GE / Ahead of CEO Larry Culp’s upcoming conglomerate breakup, recently canceled projects will free the company from more than $1 billion in unprofitable turbine contracts.
    - https://www.bloomberg.com/news/articles/2023-11-16/why-america-s-wind-power-failures-are-good-for-ge

Wind Turbine Demolition / Turbines are Clearly Not being Recycled:

- When wind turbines are no longer useful: They get explosive demolition.
    - https://wattsupwiththat.com/2021/05/22/when-wind-turbines-are-no-longer-useful-they-get-explosive-demolition/
- Twenty-One (21) Wind Turbines are destroyed - Controlled Demolition, Inc.
    - https://youtu.be/LbDnLiu6DCE?si=1-OLkEk4zwYAqNlO
- Wind Turbine Blades Can’t Be Recycled, So They’re Piling Up in Landfills.
    - https://www.bloomberg.com/news/features/2020-02-05/wind-turbine-blades-can-t-be-recycled-so-they-re-piling-up-in-landfills

Dissent and Truth are Cancelled by the Green Narrative:

- One of the most successful and prominent websites for exposing the fraud of the wind industry has been cancelled (shut-down). The voices for dissent and truth are being eradicated in the name of supporting political and financial fraud on a global scale. “Stop These Things” has recently been silenced. https://stopthesethings.com/author/stopthesethings/
- And yet, the voices to expose the wind power fraud remain alive and well on one of the most long-standing and successful websites for truth: “Watts Up With That” has been shining the brilliant light of facts, science and objectivity on the green-scam for nearly two decades, wind energy is in the center of the cross-hairs: https://wattsupwiththat.com/category/energy/wind-power/

Wind Turbines Cost More to Build than the Power They Produce:

- In spite of the green narrative, it is easily computable that the total power generated by a wind turbine over its operational lifetime will never eclipse the costs for its implementation (mining, refining, fabrication, shipping, construction, operation, maintenance, insurance, decommissioning). The green narrative fails to include two of the most basic elements concerning the life of a modern windmill: the concrete base that supports the tower and the cost for so-called “recycling.” As mentioned earlier, wind turbines are not recycled. Rather, they are demolished, cut into pieces and placed into landfills. Ample evidence for this exists both online and via county-assessor’s offices where the spent turbine junk is sequestered. Further, the costs for setting the concrete base (2,500 tons plus rebar and wood forms) are never included in the total cost allotment. These things are not green: the CO2 generated in the creation of the 600,000 pounds of cement needed for the base of each 2MW turbine is nearly 300 tons.
- Wind turbines are supported, in large measure, by financial incentives including: tax breaks for the contractor during construction, ongoing municipal tax breaks during wind plant operation, plus the requirement that utilities purchase their wholesale power from the wind-plants whenever that power is available.
- None of these wind turbines are necessary. Washington State receives over 70% of its electricity from the clean-green 100% reliable hydroelectric power. It is political folly that hydropower has not been designated as “renewable.” This effort is advanced as the means to replace the LSRD (Lower Snake River Dams) with economically and environmentally damaging wind plants.
- The largest cost associated with wind-turbines comes from the fact that wind is not consistent. Wind turbines provide, at most, 30 percent consistent power. When the wind stops, or the velocity is below the turbine cut-in

speed, hot-standby power must be instantly available. This is typically provided by natural gas. As such, the infrastructure for a natural gas plant must be three times that of the combined optimal power provided by wind. This green-renewable crowd never seems to acknowledge this fundamental element of power generation mathematics.

- By the year 2030, there will be over 800,000 wind turbines installed world-wide, including offshore. They all have a shelf life. The ones offshore degrade more quickly in the high-saline content environment. By 2045, the landscape will be littered with these rotting hulks. The energy necessary for their decommission will not be available as it will be apportioned to agriculture, housing, and basic transportation because of the ever-diminishing EROI (Energy Return On Investment) on hydrocarbons and the double-digit annual depletion rates on natural gas wells. Only then, will the insane misallocation of resources be fully acknowledged. This diabolical waste will be the legacy of so-called sustainable energy and political parasitism.

Property Values Crater when Power Plants such as Wind are Installed:

- Nobody in their right mind wants to live next to an industrial power plant. The HHH wind plant will destroy the beautiful vistas and skyline of the TriCities if the Seattle Space Needle sized towers are allowed to pollute the landscape. Only the scientifically and economically illiterate would be in favor of this destructive eyesore. Property values will drop 20-40 percent in context of the proximity to the massive 25-mile-long industrial plant.
- I own 40 acres of mix-use land within sight of the proposed “wind plant.” My million-dollar one-acre view lots atop Sandhill will crater in value in the context of this environmentally destructive eye-sore.

Regarding Washington State Governor Jay Inslee and his ignorance, corruption and sociopathology:

- If EFSEC significantly changes what you have deliberated and approved by majority vote, it will shred the credibility of the EFSEC process and sow further distrust in our state institutions. You have threaded the needle trying to balance the multiple and significant impacts of the "out of place" HHH project. A project of this size does not fit or belong here, and one person should not be able to trump the SEPA process by undoing years of work and millions of dollars spent by state agencies and interested parties.
- The Governor convened a gang of seven, made up primarily of lawyers and state policy experts, and in a period of about two weeks erased three years of effort that went into the review of this project. This is an action of an ignorant, corrupt, sociopath treading toward a predetermined outcome. He is a lame duck and will go down in history as doing irreparableharm to Washington with a bias against Eastern Washington.
- The Governor's letter focused on the power needs of the State. Unfortunately, he knows just enough about power to be dangerous. First, the project does not commit any renewable energy to Washington electric customers. Second, the "1150 mw of generation" that the governor states as the project size is fictitious. He conflates generation as energy (megawatt hours) and nameplate (megawatts which is an instantaneous number). In reality, the project will only provide about 25-30% of the nameplate as a yearly average. In times of need, like the depths of winter when the wind does not blow and the sun does not shine, we can expect only about 10%, or about 100 mw of energy. The governor discusses the reliability of the electric grid, but a project such as this is what will cause grid instability. Weather-dependent energy is not reliable.
- Scout has been disingenuousabout the project from the very beginning. Their lack of transparency has been stunning. They still have not told the parties of their intent. They say the worst-case scenario was used for impact, which is a lie. The visualizations used the smaller nameplate turbine, rather than the huge and close to the ground rotor span options, which is clearly the worst-case scenario from a visual impact.
- The letter sent by the Governor had numerous dictates to EFSEC. He did not get what he wanted, so change the project. Has any other Governor made such a sweeping change in an EFSEC proceeding? If you do what the Governor demands, you are setting Washington up for any unscrupulousdeveloper to come in and expect approval for any project they propose, regardlessof the impact.
- The EFSEC reorganization performed years ago did not anticipate that all power would be vested in one man. Display the courage you showed in the deliberation process and formulate your final plan to be equivalent to what you earlier agreedon.
- Through his directive, the Governor focused on the "need" for this project. That topic was not allowed to be a part of the adjudicative hearings and addressed by expert witnesses, so he does not get to use it as a basis for his argument in directing you to change the project to its full build-out capacity.
- The Governor is exercising the sociopathic tendencies found in envy-intoxicated individuals. He would, by edict, saddle the citizens of the TriCities with an environmentally and economically disastrous eyesore while he plans his retirement far outside the visual impact of Scout’s proposed Fraud-Induced Catastrophe.

Attachments:

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To: Comments@efsec.wa.gov
From: tenikam27@gmail.com
Received: 2024-07-07T23:53:36+00:00
Subject: Please stand strong EFSEC!
Has attachment? False

External Email

Just wanted to send an email to encourage you as part of the EFSEC to stand strong against the Governor's bullying tactics. He has NO cares about our area, only the $$. I live on the border of the project and I have DAILY hawks and eagles soaring over my property and migrating cranes 2x's a year. My heart is broken when I think of the damage the turbines will do to our sweet wildlife, not to mention all of our homes right in the line of the yearly fires which already occur but with no water or aerial firefighting, it seems like a disaster waiting to happen.

PLEASE STAND STRONG ON CHALLENGING INSLEE!

Thank you.

Tenika Morrison
Kennewick WA

Attachments:

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To:
Comments@efsec.wa.gov;efsec@efsec.wa.gov;sean.greene@efsec.wa.gov;amy.moon@efsec.wa.gov;ami.hafkemeye
From: bluemtngirl@hotmail.com
Received: 2024-07-08T16:52:01+00:00
Subject: Horse Heaven Hills Wind and Solar Project
Has attachment? False

External Email

Dear Members of the review board,

With the Endangered Species Act, Enviromental Protection Agency shut down almost all of the logging in Oregon due to the spotted owl and their nesting habitat.
Consequently, closing mills, nurseries and other businesses that were part of the logging industry. Family wage earning jobs were decimated. No one cared..
Horse Heave Hills have been designated as nesting grounds for the protected endangered ferruginous hawk nests, designated wildlife corridors and let's not forget the Yakima Nation cultural sites. Also it has been recommended to reduce visual impacts and to allow aerial firefighting for the frequent fires that RAGE across the Horse Heaven Hills area.
But, Governor Inslee has asked the EFSEC to recommend removing the protection of the designated nesting grounds for the endangered Ferruginous Hawk, the designated wildlife corridors and to not be concerned about aerial firefighting for the frequent fires on Horse Heaven Hills. Why?
Is it because we have all of this supposed Green Energy funding, that IS NOT green at all. How much money does it cost to build 1 windmill, ($2.5 million per windmill) are they built in the United States or does a foreign country benefit from this industry like China that has NO CHILD LABOR laws. Will the energy be used in the WASHINGTON state Or does it go to a different state like California?
We're put on time of use and charged extra when power is used. Why, I must ask.. When we have a nuclear power, we have some of the cleanest energy using hydrodam energy. And if the FISH are the problem, REINSTATE a BOUNTY on the SEALS that eat the fish, take ONE BITE out of the fish and then swim on to the next fish.
I support building more nuclear power plants. I support building fish ladders around the dams and KEEPING THE DAMS. Is that the very thing that got Oregon and WASHINGTON a good grade on GREEN ENERGY?
Tell me, what is the life span of the windmills? What is the amount of rebar and concrete that goes into building the base of these 650-foot windmills? What is the cost and procedure of removing these bases and windmills when their life span is up? How often do the motors have to be replaced? How much OIL do they use to operate. What happens to that oil when the motor must be replaced? OH, I know, they bring in big cranes pull the motor and set the motor on fire to burn up the oil. OKAY, now, how much water and where will the water come from?? Who pays for the decommissioning of these windmills? The landowner? So, these UGLY monstrosities will be a blight on our hills. What about the push to remove the hydro dams? Who pays for the decommissioning of the dams when they are taken out? What will replace the irrigation water for the big corporate farms?

What about the fault lines that run through this region and the tremors we get?

We live in the Benton City area and live in the shadow of the Horse Heaven Hills – close proximity and are downwind of this project. When the Governor blatantly directed you to discount visual impacts, he totally ignored the topography of the area. This will be the dominating feature bearing down on my residence. This project will affect the value of our property and increase the temperature as well. We live in the fire zone of Horse Heaven Hills and have frequent fires that are fought by aerial firefighting. By restricting the use of aerial firefighting, you are dooming my residence and many other residences, vineyards and orchards to fire risks to life and property. Ensure that there is enough of a buffer around the project, particularly on the north and east sides, to allow use of large air tankers.
If you all are so prone to having all of these windmills, why not put them in PUGET SOUND? How about you surround OLYMPIA capital of Washington, or ELLENSBERG with them.
Windmills and solar are an expensive type of electricity, the windmills are ugly and have to be replaced every 10

to 20 years. Then taken apart and shipped and have the blades buried in a burial ground in the Midwest. Solar is almost as bad.. How will the solar panels stand up to high winds, will the collapse and turn into a tangled mess of glass and metal? Like the solar farms from the 1990's in Victorville, CA?
I am pro NUCLEAR Power. I am Pro HYDRODAM Power. And having lived in this area for almost 20 years and have firsthand knowledge and experience in the fires that go through here like the fire that went through here in June of 2023. It is my opinion that with Governor Inslee telling the EFSEC to reinstate all the original plans for the Horse Heaven solar and wind farm is a dereliction of duty and puts our homes, property, and safety in jeopardy.

After three years of hearings, public comments, input from affected parties' expert witnesses and the public, EFSEC has made a reasoned decision consistentwith other Washington wind projects by reducing the project to reflect protection of the environment, habitat and have recognized the impacts that the project will have on adjacent populations including fire risk, and visually. Please stand by your decision.

Yet, if EFSEC significantly changes what you have deliberated and approved by majority vote, it will shred the credibility of the EFSEC process and sow further distrust in our state institutions. You have threaded the needle trying to balance the multiple and significant impacts of the "out of place" Horse Heaven Hills project. A project of this size does not fit or belong here, and one person should not be able to trump the SEPA process by undoing years of work and millions of dollars spent by state agencies and interested parties.

The Governor has ignored even the state avian experts about the Ferruginous hawk mitigation’s that were deliberated. It appears from the Governor's letter that the only experts he listened to were from Scout. And their motive is profit as well as taking federal and state tax credits. If you backtrack and reverse what you have unanimously decided upon, the EFSEC process will be broken. I encourage you to with your original proposed direction.

A concerned citizen of Benton City, Washington
Barbara J. Thompson

Attachments:

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To:
Comments@efsec.wa.gov;efsec@efsec.wa.gov;sean.greene@efsec.wa.gov;amy.moon@efsec.wa.gov;ami.hafkemeye
From: lw.fm.roberts@gmail.com
Received: 2024-07-09T16:03:22+00:00
Subject: Stand By Your Decision
Has attachment? False

External Email

Is Governor Inslee a governor, a king, or a dictator? The letter he sent had numerous dictates to EFSEC. After three years of hearings, public comments, input from affected parties' expert witnesses and the public, EFSEC has made a reasoned decision consistentwith other Washington wind projects by reducing the project to reflect protection of the environment and habitat, and have recognized the impacts that the project will have on adjacent populations including fire risk, and visually. **Please** stand by your decision.Maybe returning the approval of the project to the Benton County officials should be the final decision!
Thank you for your service.
Lee Roberts
Kennewick, Washington

Attachments:

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To: Comments@efsec.wa.gov
From: tanderson@everyactioncustom.com
Received: 2024-07-10T22:39:46+00:00
Subject: Protect Washington's Biodiversity and Cultural Resources
Has attachment? False

External Email Dear EFSEC Members, I am writing as a concerned citizen to express my support for responsible clean energy development in our state. While I recognize the urgent need to reduce our reliance on fossil fuels and combat climate change, it is equally important to protect our state's biodiversity and cultural heritage. In reviewing Governor Inslee's May 23rd Letter of Direction to EFSEC, I am concerned about the potential impact to cultural sites, priority habitats, habitat corridors, and species such as the Ferruginous Hawk that would result from following his directive. These resources are essential to maintaining the ecological and cultural integrity of our state, as highlighted by recent investments in biodiversity. EFSEC is under pressure to compromise critically important recovery efforts for a state-endangered species. It is crucial for EFSEC to uphold the science-based restrictions put forth in your April 29 recommendation to the Governor. Achieving clean energy goals should not come at the expense of our state's valuable cultural and biological resources. I strongly urge EFSEC to adhere to its original, science-based recommendation, which aligns with the principles of both responsible clean energy development and biodiversity conservation. Thank you for considering my comments. Sincerely, Ms. Teri Anderson 7001 Seaview Ave NW Seattle, WA 98117-6006 tanderson@audubon.org

Attachments:

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To: Comments@efsec.wa.gov
From: gapadelford@everyactioncustom.com
Received: 2024-07-10T23:32:36+00:00
Subject: Protect Washington's Biodiversity and Cultural Resources
Has attachment? False

External Email Dear EFSEC Members, I am writing as a concerned citizen to express my support for responsible clean energy development in our state. While I recognize the urgent need to reduce our reliance on fossil fuels and combat climate change, it is equally important to protect our state's biodiversity and cultural heritage. In reviewing Governor Inslee's May 23rd Letter of Direction to EFSEC, I am concerned about the potential impact to cultural sites, priority habitats, habitat corridors, and species such as the Ferruginous Hawk that would result from following his directive. These resources are essential to maintaining the ecological and cultural integrity of our state, as highlighted by recent investments in biodiversity. EFSEC is under pressure to compromise critically important recovery efforts for a state-endangered species. It is crucial for EFSEC to uphold the science-based restrictions put forth in your April 29 recommendation to the Governor. Achieving clean energy goals should not come at the expense of our state's valuable cultural and biological resources. I strongly urge EFSEC to adhere to its original, science-based recommendation, which aligns with the principles of both responsible clean energy development and biodiversity conservation. Thank you for considering my comments. Sincerely, Ms. Grace Padelford 6119 Barrows Dr Los Angeles, CA 90048-5301 gapadelford@hotmail.com

Attachments:

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To: Comments@efsec.wa.gov
From: anlchin@everyactioncustom.com
Received: 2024-07-10T23:32:41+00:00
Subject: Protect Washington's Biodiversity and Cultural Resources
Has attachment? False

External Email Dear EFSEC Members, I am writing as a concerned citizen to express my support for responsible clean energy development in our state. While I recognize the urgent need to reduce our reliance on fossil fuels and combat climate change, it is equally important to protect our state's biodiversity and cultural heritage. In reviewing Governor Inslee's May 23rd Letter of Direction to EFSEC, I am concerned about the potential impact to cultural sites, priority habitats, habitat corridors, and species such as the Ferruginous Hawk that would result from following his directive. These resources are essential to maintaining the ecological and cultural integrity of our state, as highlighted by recent investments in biodiversity. EFSEC is under pressure to compromise critically important recovery efforts for a state-endangered species. It is crucial for EFSEC to uphold the science-based restrictions put forth in your April 29 recommendation to the Governor. Achieving clean energy goals should not come at the expense of our state's valuable cultural and biological resources. I strongly urge EFSEC to adhere to its original, science-based recommendation, which aligns with the principles of both responsible clean energy development and biodiversity conservation. Thank you for considering my comments. Sincerely, Ms. Andrea Chin 6205 188th Ln NE # D103 Redmond, WA 98052-0518 anlchin@uw.edu

Attachments:

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To: Comments@efsec.wa.gov
From: moni_penni007@everyactioncustom.com
Received: 2024-07-10T23:33:01+00:00
Subject: Protect Washington's Biodiversity and Cultural Resources
Has attachment? False
External Email Dear EFSEC Members, I am writing as a concerned citizen to express my support for responsible clean energy development in our state. While I recognize the urgent need to reduce our reliance on fossil fuels and combat climate change, it is equally important to protect our state's biodiversity and cultural heritage. In reviewing Governor Inslee's May 23rd Letter of Direction to EFSEC, I am concerned about the potential impact to cultural sites, priority habitats, habitat corridors, and species such as the Ferruginous Hawk that would result from following his directive. These resources are essential to maintaining the ecological and cultural integrity of our state, as highlighted by recent investments in biodiversity. EFSEC is under pressure to compromise critically important recovery efforts for a state-endangered species. It is crucial for EFSEC to uphold the science-based restrictions put forth in your April 29 recommendation to the Governor. Achieving clean energy goals should not come at the expense of our state's valuable cultural and biological resources. I strongly urge EFSEC to adhere to its original, science-based recommendation, which aligns with the principles of both responsible clean energy development and biodiversity conservation. Thank you for considering my comments. Sincerely, Ms. Jeannette Nussbaumer 13505 NE 78th Cir Vancouver, WA 98682-3309 moni_penni007@msn.com
Attachments:

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To: Comments@efsec.wa.gov
From: nikkinashmusic@everyactioncustom.com
Received: 2024-07-10T23:33:05+00:00
Subject: Protect Washington's Biodiversity and Cultural Resources
Has attachment? False
External Email Dear EFSEC Members, I am writing as a concerned citizen to express my support for responsible clean energy development in our state. While I recognize the urgent need to reduce our reliance on fossil fuels and combat climate change, it is equally important to protect our state's biodiversity and cultural heritage. In reviewing Governor Inslee's May 23rd Letter of Direction to EFSEC, I am concerned about the potential impact to cultural sites, priority habitats, habitat corridors, and species such as the Ferruginous Hawk that would result from following his directive. These resources are essential to maintaining the ecological and cultural integrity of our state, as highlighted by recent investments in biodiversity. EFSEC is under pressure to compromise critically important recovery efforts for a state-endangered species. It is crucial for EFSEC to uphold the science-based restrictions put forth in your April 29 recommendation to the Governor. Achieving clean energy goals should not come at the expense of our state's valuable cultural and biological resources. I strongly urge EFSEC to adhere to its original, science-based recommendation, which aligns with the principles of both responsible clean energy development and biodiversity conservation. Thank you for considering my comments. Sincerely, Ms. Nikki Nafziger 12740 30th Ave NE Apt 523 Seattle, WA 98125-4395 nikkinashmusic@gmail.com
Attachments:

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To: Comments@efsec.wa.gov
From: hhjh@everyactioncustom.com
Received: 2024-07-10T23:33:10+00:00
Subject: Protect Washington's Biodiversity and Cultural Resources
Has attachment? False

External Email Dear EFSEC Members, I am writing as a concerned citizen to express my support for responsible clean energy development in our state. While I recognize the urgent need to reduce our reliance on fossil fuels and combat climate change, it is equally important to protect our state's biodiversity and cultural heritage. In reviewing Governor Inslee's May 23rd Letter of Direction to EFSEC, I am concerned about the potential impact to cultural sites, priority habitats, habitat corridors, and species such as the Ferruginous Hawk that would result from following his directive. These resources are essential to maintaining the ecological and cultural integrity of our state, as highlighted by recent investments in biodiversity. EFSEC is under pressure to compromise critically important recovery efforts for a state-endangered species. It is crucial for EFSEC to uphold the science-based restrictions put forth in your April 29 recommendation to the Governor. Achieving clean energy goals should not come at the expense of our state's valuable cultural and biological resources. I strongly urge EFSEC to adhere to its original, science-based recommendation, which aligns with the principles of both responsible clean energy development and biodiversity conservation. Thank you for considering my comments. Sincerely, Mrs. JOAN HUNT 22100 86th Ave W Edmonds, WA 98026-8101 hhjh@frontier.com

Attachments:

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To: Comments@efsec.wa.gov
From: drunnette@everyactioncustom.com
Received: 2024-07-10T23:33:13+00:00
Subject: Protect Washington's Biodiversity and Cultural Resources
Has attachment? False

External Email Dear EFSEC Members, I am writing as a concerned citizen to express my support for responsible clean energy development in our state. While I recognize the urgent need to reduce our reliance on fossil fuels and combat climate change, it is equally important to protect our state's biodiversity and cultural heritage. In reviewing Governor Inslee's May 23rd Letter of Direction to EFSEC, I am concerned about the potential impact to cultural sites, priority habitats, habitat corridors, and species such as the Ferruginous Hawk that would result from following his directive. These resources are essential to maintaining the ecological and cultural integrity of our state, as highlighted by recent investments in biodiversity. EFSEC is under pressure to compromise critically important recovery efforts for a state-endangered species. It is crucial for EFSEC to uphold the science-based restrictions put forth in your April 29 recommendation to the Governor. Achieving clean energy goals should not come at the expense of our state's valuable cultural and biological resources. I strongly urge EFSEC to adhere to its original, science-based recommendation, which aligns with the principles of both responsible clean energy development and biodiversity conservation. Thank you for considering my comments. Sincerely, Ms. Deirdre Runnette 2342 32nd Ave S Seattle, WA 98144-5534 drunnette@icloud.com

Attachments:

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To: Comments@efsec.wa.gov
From: hickink@everyactioncustom.com
Received: 2024-07-10T23:33:18+00:00
Subject: Protect Washington's Biodiversity and Cultural Resources
Has attachment? False
External Email Dear EFSEC Members, I am writing as a concerned citizen to express my support for responsible clean energy development in our state. While I recognize the urgent need to reduce our reliance on fossil fuels and combat climate change, it is equally important to protect our state's biodiversity and cultural heritage. In reviewing Governor Inslee's May 23rd Letter of Direction to EFSEC, I am concerned about the potential impact to cultural sites, priority habitats, habitat corridors, and species such as the Ferruginous Hawk that would result from following his directive. These resources are essential to maintaining the ecological and cultural integrity of our state, as highlighted by recent investments in biodiversity. EFSEC is under pressure to compromise critically important recovery efforts for a state-endangered species. It is crucial for EFSEC to uphold the science-based restrictions put forth in your April 29 recommendation to the Governor. Achieving clean energy goals should not come at the expense of our state's valuable cultural and biological resources. I strongly urge EFSEC to adhere to its original, science-based recommendation, which aligns with the principles of both responsible clean energy development and biodiversity conservation. Thank you for considering my comments. Sincerely, Ms. Kareen Hickinbotham 2950 Newmarket St Ste Pm 101 Bellingham, WA 98226-3872 hickink@gmail.com
Attachments:

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To: Comments@efsec.wa.gov
From: G123456F@everyactioncustom.com
Received: 2024-07-10T23:33:26+00:00
Subject: Protect Washington's Biodiversity and Cultural Resources
Has attachment? False
External Email Dear EFSEC Members, I am writing as a concerned citizen to express my support for responsible clean energy development in our state. While I recognize the urgent need to reduce our reliance on fossil fuels and combat climate change, it is equally important to protect our state's biodiversity and cultural heritage. In reviewing Governor Inslee's May 23rd Letter of Direction to EFSEC, I am concerned about the potential impact to cultural sites, priority habitats, habitat corridors, and species such as the Ferruginous Hawk that would result from following his directive. These resources are essential to maintaining the ecological and cultural integrity of our state, as highlighted by recent investments in biodiversity. EFSEC is under pressure to compromise critically important recovery efforts for a state-endangered species. It is crucial for EFSEC to uphold the science-based restrictions put forth in your April 29 recommendation to the Governor. Achieving clean energy goals should not come at the expense of our state's valuable cultural and biological resources. I strongly urge EFSEC to adhere to its original, science-based recommendation, which aligns with the principles of both responsible clean energy development and biodiversity conservation. Thank you for considering my comments. Sincerely, Dr. GLORIA FISCHER 905 SW City View St Pullman, WA 99163-2110 G123456F@YAHOO.COM
Attachments:

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To: Comments@efsec.wa.gov
From: mpdisbrow@everyactioncustom.com
Received: 2024-07-10T23:33:28+00:00
Subject: Protect Washington's Biodiversity and Cultural Resources
Has attachment? False

External Email Dear EFSEC Members, I am writing as a concerned citizen to express my support for responsible clean energy development in our state. While I recognize the urgent need to reduce our reliance on fossil fuels and combat climate change, it is equally important to protect our state's biodiversity and cultural heritage. In reviewing Governor Inslee's May 23rd Letter of Direction to EFSEC, I am concerned about the potential impact to cultural sites, priority habitats, habitat corridors, and species such as the Ferruginous Hawk that would result from following his directive. These resources are essential to maintaining the ecological and cultural integrity of our state, as highlighted by recent investments in biodiversity. EFSEC is under pressure to compromise critically important recovery efforts for a state-endangered species. It is crucial for EFSEC to uphold the science-based restrictions put forth in your April 29 recommendation to the Governor. Achieving clean energy goals should not come at the expense of our state's valuable cultural and biological resources. I strongly urge EFSEC to adhere to its original, science-based recommendation, which aligns with the principles of both responsible clean energy development and biodiversity conservation. Thank you for considering my comments. Sincerely, Mrs. Meghan Petersen 10502 NE 31st Ave Vancouver, WA 98686-4358 mpdisbrow@gmail.com

Attachments:

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To: Comments@efsec.wa.gov
From: sharynp921@everyactioncustom.com
Received: 2024-07-10T23:33:29+00:00
Subject: Protect Washington's Biodiversity and Cultural Resources
Has attachment? False

External Email Dear EFSEC Members, I am writing as a concerned citizen to express my support for responsible clean energy development in our state. While I recognize the urgent need to reduce our reliance on fossil fuels and combat climate change, it is equally important to protect our state's biodiversity and cultural heritage. In reviewing Governor Inslee's May 23rd Letter of Direction to EFSEC, I am concerned about the potential impact to cultural sites, priority habitats, habitat corridors, and species such as the Ferruginous Hawk that would result from following his directive. These resources are essential to maintaining the ecological and cultural integrity of our state, as highlighted by recent investments in biodiversity. EFSEC is under pressure to compromise critically important recovery efforts for a state-endangered species. It is crucial for EFSEC to uphold the science-based restrictions put forth in your April 29 recommendation to the Governor. Achieving clean energy goals should not come at the expense of our state's valuable cultural and biological resources. I strongly urge EFSEC to adhere to its original, science-based recommendation, which aligns with the principles of both responsible clean energy development and biodiversity conservation. Thank you for considering my comments. Sincerely, Mrs. Sharyn Pennington 20711 SE 335th St Auburn, WA 98092-2287 sharynp921@gmail.com

Attachments:

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To: Comments@efsec.wa.gov
From: marilyn@everyactioncustom.com
Received: 2024-07-10T23:33:37+00:00
Subject: Protect Washington's Biodiversity and Cultural Resources
Has attachment? False

External Email Dear EFSEC Members, I am writing as a concerned citizen to express my support for responsible clean energy development in our state. While I recognize the urgent need to reduce our reliance on fossil fuels and combat climate change, it is equally important to protect our state's biodiversity and cultural heritage. In reviewing Governor Inslee's May 23rd Letter of Direction to EFSEC, I am concerned about the potential impact to cultural sites, priority habitats, habitat corridors, and species such as the Ferruginous Hawk that would result from following his directive. These resources are essential to maintaining the ecological and cultural integrity of our state, as highlighted by recent investments in biodiversity. EFSEC is under pressure to compromise critically important recovery efforts for a state-endangered species. It is crucial for EFSEC to uphold the science-based restrictions put forth in your April 29 recommendation to the Governor. Achieving clean energy goals should not come at the expense of our state's valuable cultural and biological resources. I strongly urge EFSEC to adhere to its original, science-based recommendation, which aligns with the principles of both responsible clean energy development and biodiversity conservation. Thank you for considering my comments. Sincerely, Mrs. Marilyn Vail 2801 Bickford Ave Snohomish, WA 98290-1734 marilyn@essentially4you.com

Attachments:

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From: HawkRun@pm.me
To: EFSEC mi Comments
Subject: Horse Heaven Wind Turbin Project
Date: Sunday, August 18, 2024 7:55:55 PM

External Email

Please stand up to Gov Inslee about your recommendation of scaling back the Horse Heaven Wind Project. This project is NOT wanted by the residents of Benton County. The many reasons and problems you have already heard.

If Inslee insists on the total scale of this project, ask him to move part or all of it to near his home or over in the Puget Sound area somewhere. It is the West side of the state that would benefit most from the extra power. They should enjoy the "beauty" of these monster windmills.

How this can be called an environmentally friendly project is beyond me. It's ugly, will trash up our beautify skylines, be an environmental hazard as the blades and other worn parts are thrown into landfills - never to disintegrate. They take petroleum products to run will be a eyesore when they wear out. How is any of this good?

Please stand strong and uphold your original recommendation - Do not be strong-armed by an overreaching government. We are not supposed to be a dictatorship, we are supposed to be a republic where the people have a say.

Regards,
Ronne Fletcher
Benton City, WA
Benton County

From:	hilkefaber1@everyactioncustom.com on behalf of Hilke Faber
To:	EFSEC mi Comments
Subject:	Protect Washington"s Biodiversity and Cultural Resources
Date:	Wednesday, July 17, 2024 3:24:24 PM

External Email

Dear EFSEC Members,

I am writing as a concerned citizen to express my support for responsible clean energy development in our state. While I recognize the urgent need to reduce our reliance on fossil fuels and combat climate change, it is equally important to protect our state's biodiversity and cultural heritage.

In reviewing Governor Inslee's May 23rd Letter of Direction to EFSEC, I am concerned about the potential impact to cultural sites, priority habitats, habitat corridors, and species such as the Ferruginous Hawk that would result from following his directive. These resources are essential to maintaining the ecological and cultural integrity of our state, as highlighted by recent investments in biodiversity.

EFSEC is under pressure to compromise critically important recovery efforts for a state-endangered species. It is crucial for EFSEC to uphold the science-based restrictions put forth in your April 29 recommendation to the Governor. Achieving clean energy goals should not come at the expense of our state's valuable cultural and biological resources.

I strongly urge EFSEC to adhere to its original, science-based recommendation, which aligns with the principles of both responsible clean energy development and biodiversity conservation.

Thank you for considering my comments.

Sincerely,
Miss Hilke Faber
3921 25th Ave S Seattle, WA 98108-1510
hilkefaber1@msn.com

From: pumpkin@everyactioncustom.com on behalf of Sylvia White
To: EFSEC mi Comments
Subject: Protect Washington"s Biodiversity and Cultural Resources
Date: Wednesday, July 17, 2024 3:37:47 PM

External Email

Dear EFSEC Members,

I am writing as a concerned citizen to express my support for responsible clean energy development in our state. While I recognize the urgent need to reduce our reliance on fossil fuels and combat climate change, it is equally important to protect our state's biodiversity and cultural heritage.

In reviewing Governor Inslee's May 23rd Letter of Direction to EFSEC, I am concerned about the potential impact to cultural sites, priority habitats, habitat corridors, and species such as the Ferruginous Hawk that would result from following his directive. These resources are essential to maintaining the ecological and cultural integrity of our state, as highlighted by recent investments in biodiversity.

EFSEC is under pressure to compromise critically important recovery efforts for a state-endangered species. It is crucial for EFSEC to uphold the science-based restrictions put forth in your April 29 recommendation to the Governor. Achieving clean energy goals should not come at the expense of our state's valuable cultural and biological resources.

I strongly urge EFSEC to adhere to its original, science-based recommendation, which aligns with the principles of both responsible clean energy development and biodiversity conservation.

Thank you for considering my comments.

Sincerely,
Dr. Sylvia White
90 Bayview Ln Port Townsend, WA 98368-9617
pumpkin@olympus.net

From: mikkelborglaura@everyactioncustom.com on behalf of Laura Mikkelborg
To: EFSEC mi Comments
Subject: Protect Washington"s Biodiversity and Cultural Resources
Date: Wednesday, July 17, 2024 3:41:35 PM

External Email

Dear EFSEC Members,

I am writing as a concerned citizen to express my support for responsible clean energy development in our state. While I recognize the urgent need to reduce our reliance on fossil fuels and combat climate change, it is equally important to protect our state's biodiversity and cultural heritage.

In reviewing Governor Inslee's May 23rd Letter of Direction to EFSEC, I am concerned about the potential impact to cultural sites, priority habitats, habitat corridors, and species such as the Ferruginous Hawk that would result from following his directive. These resources are essential to maintaining the ecological and cultural integrity of our state, as highlighted by recent investments in biodiversity.

EFSEC is under pressure to compromise critically important recovery efforts for a state-endangered species. It is crucial for EFSEC to uphold the science-based restrictions put forth in your April 29 recommendation to the Governor. Achieving clean energy goals should not come at the expense of our state's valuable cultural and biological resources.

I strongly urge EFSEC to adhere to its original, science-based recommendation, which aligns with the principles of both responsible clean energy development and biodiversity conservation.

Thank you for considering my comments.

Sincerely,
Ms. Laura Mikkelborg
23781 Montecarlo Pl NW Poulsbo, WA 98370-9458
mikkelborglaura@gmail.com

From: charlene_tillequots@everyactioncustom.com on behalf of Charlene A Tillequots
To: EFSEC mi Comments
Subject: Protect Washington"s Biodiversity and Cultural Resources
Date: Wednesday, July 17, 2024 4:21:02 PM

External Email

Dear EFSEC Members,

I am writing as a concerned citizen to express my support for responsible clean energy development in our state. While I recognize the urgent need to reduce our reliance on fossil fuels and combat climate change, it is equally important to protect our state's biodiversity and cultural heritage.

In reviewing Governor Inslee's May 23rd Letter of Direction to EFSEC, I am concerned about the potential impact to cultural sites, priority habitats, habitat corridors, and species such as the Ferruginous Hawk that would result from following his directive. These resources are essential to maintaining the ecological and cultural integrity of our state, as highlighted by recent investments in biodiversity.

EFSEC is under pressure to compromise critically important recovery efforts for a state-endangered species. It is crucial for EFSEC to uphold the science-based restrictions put forth in your April 29 recommendation to the Governor. Achieving clean energy goals should not come at the expense of our state's valuable cultural and biological resources.

I strongly urge EFSEC to adhere to its original, science-based recommendation, which aligns with the principles of both responsible clean energy development and biodiversity conservation.

Thank you for considering my comments.

Sincerely,
Ms. Charlene A Tillequots
9841 Branch Rd Harrah, WA 98933-9765
charlene_tillequots@yakama.com

From: hopilight@everyactioncustom.com on behalf of Tess Sinclair
To: EFSEC mi Comments
Subject: Protect Washington"s Biodiversity and Cultural Resources
Date: Wednesday, July 17, 2024 5:09:09 PM

External Email

Dear EFSEC Members,

I am writing as a concerned citizen to express my support for responsible clean energy development in our state. While I recognize the urgent need to reduce our reliance on fossil fuels and combat climate change, it is equally important to protect our state's biodiversity and cultural heritage.

In reviewing Governor Inslee's May 23rd Letter of Direction to EFSEC, I am concerned about the potential impact to cultural sites, priority habitats, habitat corridors, and species such as the Ferruginous Hawk that would result from following his directive. These resources are essential to maintaining the ecological and cultural integrity of our state, as highlighted by recent investments in biodiversity.

EFSEC is under pressure to compromise critically important recovery efforts for a state-endangered species. It is crucial for EFSEC to uphold the science-based restrictions put forth in your April 29 recommendation to the Governor. Achieving clean energy goals should not come at the expense of our state's valuable cultural and biological resources.

I strongly urge EFSEC to adhere to its original, science-based recommendation, which aligns with the principles of both responsible clean energy development and biodiversity conservation.

Thank you for considering my comments.

Sincerely,
Ms. Tess Sinclair
3028 Rocky Point Rd NW Bremerton, WA 98312-1919
hopilight@aol.com

From: maryfoster@everyactioncustom.com on behalf of Mary Foster
To: EFSEC mi Comments
Subject: Protect Washington"s Biodiversity and Cultural Resources
Date: Wednesday, July 17, 2024 5:17:33 PM

External Email

Dear EFSEC Members,

I am writing as a concerned citizen to express my support for responsible clean energy development in our state. While I recognize the urgent need to reduce our reliance on fossil fuels and combat climate change, it is equally important to protect our state's biodiversity and cultural heritage.

In reviewing Governor Inslee's May 23rd Letter of Direction to EFSEC, I am concerned about the potential impact to cultural sites, priority habitats, habitat corridors, and species such as the Ferruginous Hawk that would result from following his directive. These resources are essential to maintaining the ecological and cultural integrity of our state, as highlighted by recent investments in biodiversity.

EFSEC is under pressure to compromise critically important recovery efforts for a state-endangered species. It is crucial for EFSEC to uphold the science-based restrictions put forth in your April 29 recommendation to the Governor. Achieving clean energy goals should not come at the expense of our state's valuable cultural and biological resources.

I strongly urge EFSEC to adhere to its original, science-based recommendation, which aligns with the principles of both responsible clean energy development and biodiversity conservation.

Thank you for considering my comments.

Sincerely,
Ms. Mary Foster
351 Mount Baker Dr Sequim, WA 98382-5903
maryfoster@rainierconnect.com

From: paul_potts@everyactioncustom.com on behalf of Paul Potts
To: EFSEC mi Comments
Subject: Protect Washington"s Biodiversity and Cultural Resources
Date: Wednesday, July 17, 2024 5:22:35 PM

External Email

Dear EFSEC Members,

I am writing as a concerned citizen to express my support for responsible clean energy development in our state. While I recognize the urgent need to reduce our reliance on fossil fuels and combat climate change, it is equally important to protect our state's biodiversity and cultural heritage.

In reviewing Governor Inslee's May 23rd Letter of Direction to EFSEC, I am concerned about the potential impact to cultural sites, priority habitats, habitat corridors, and species such as the Ferruginous Hawk that would result from following his directive. These resources are essential to maintaining the ecological and cultural integrity of our state, as highlighted by recent investments in biodiversity.

EFSEC is under pressure to compromise critically important recovery efforts for a state-endangered species. It is crucial for EFSEC to uphold the science-based restrictions put forth in your April 29 recommendation to the Governor. Achieving clean energy goals should not come at the expense of our state's valuable cultural and biological resources.

I strongly urge EFSEC to adhere to its original, science-based recommendation, which aligns with the principles of both responsible clean energy development and biodiversity conservation.

Thank you for considering my comments.

Sincerely,
Mr. Paul Potts
1720 Raymond, WA 98577
paul_potts@email.com

From: Meganmoore4136@everyactioncustom.com on behalf of Megan Moore
To: EFSEC mi Comments
Subject: Protect Washington"s Biodiversity and Cultural Resources
Date: Wednesday, July 17, 2024 5:27:36 PM

External Email

Dear EFSEC Members,

I am writing as a concerned citizen to express my support for responsible clean energy development in our state. While I recognize the urgent need to reduce our reliance on fossil fuels and combat climate change, it is equally important to protect our state's biodiversity and cultural heritage.

In reviewing Governor Inslee's May 23rd Letter of Direction to EFSEC, I am concerned about the potential impact to cultural sites, priority habitats, habitat corridors, and species such as the Ferruginous Hawk that would result from following his directive. These resources are essential to maintaining the ecological and cultural integrity of our state, as highlighted by recent investments in biodiversity.

EFSEC is under pressure to compromise critically important recovery efforts for a state-endangered species. It is crucial for EFSEC to uphold the science-based restrictions put forth in your April 29 recommendation to the Governor. Achieving clean energy goals should not come at the expense of our state's valuable cultural and biological resources.

I strongly urge EFSEC to adhere to its original, science-based recommendation, which aligns with the principles of both responsible clean energy development and biodiversity conservation.

Thank you for considering my comments.

Sincerely,
Mrs. Megan Moore
618 Warren Ave Everett, WA 98201-4161
Meganmoore4136@gmail.com

From: emilyjeagon@everyactioncustom.com on behalf of Emily Eagon
To: EFSEC mi Comments
Subject: Protect Washington"s Biodiversity and Cultural Resources
Date: Wednesday, July 17, 2024 5:31:17 PM

External Email

Dear EFSEC Members,

I am writing as a concerned citizen to express my support for responsible clean energy development in our state. While I recognize the urgent need to reduce our reliance on fossil fuels and combat climate change, it is equally important to protect our state's biodiversity and cultural heritage.

In reviewing Governor Inslee's May 23rd Letter of Direction to EFSEC, I am concerned about the potential impact to cultural sites, priority habitats, habitat corridors, and species such as the Ferruginous Hawk that would result from following his directive. These resources are essential to maintaining the ecological and cultural integrity of our state, as highlighted by recent investments in biodiversity.

EFSEC is under pressure to compromise critically important recovery efforts for a state-endangered species. It is crucial for EFSEC to uphold the science-based restrictions put forth in your April 29 recommendation to the Governor. Achieving clean energy goals should not come at the expense of our state's valuable cultural and biological resources.

I strongly urge EFSEC to adhere to its original, science-based recommendation, which aligns with the principles of both responsible clean energy development and biodiversity conservation.

Thank you for considering my comments.
Emily

Sincerely,
Mrs. Emily Eagon
27404 S 816 Pr SE Kennewick, WA 99338-7370
emilyjeagon@gmail.com

From: karenroll55@everyactioncustom.com on behalf of Karen Roll
To: EFSEC mi Comments
Subject: Protect Washington"s Biodiversity and Cultural Resources
Date: Wednesday, July 17, 2024 5:42:14 PM

External Email

Dear EFSEC Members,

I am writing as a concerned citizen to express my support for responsible clean energy development in our state. While I recognize the urgent need to reduce our reliance on fossil fuels and combat climate change, it is equally important to protect our state's biodiversity and cultural heritage.

Last year I saw a Ferruginous Hawk for the first time after 5 years of looking. I was very excited and really want to do all I can to protect its habitat.

In reviewing Governor Inslee's May 23rd Letter of Direction to EFSEC, I am concerned about the potential impact to cultural sites, priority habitats, habitat corridors, and species such as the Ferruginous Hawk that would result from following his directive. These resources are essential to maintaining the ecological and cultural integrity of our state, as highlighted by recent investments in biodiversity.

EFSEC is under pressure to compromise critically important recovery efforts for a state-endangered species. It is crucial for EFSEC to uphold the science-based restrictions put forth in your April 29 recommendation to the Governor. Achieving clean energy goals should not come at the expense of our state's valuable cultural and biological resources.

I strongly urge EFSEC to adhere to its original, science-based recommendation, which aligns with the principles of both responsible clean energy development and biodiversity conservation.

Thank you for considering my comments.

Sincerely,
Mrs. Karen Roll
21829 NE 30th Pl Sammamish, WA 98074-6358
karenroll55@hotmail.com

From: iankicawp@everyactioncustom.com on behalf of Ann Pryich
To: EFSEC mi Comments
Subject: Protect Washington"s Biodiversity and Cultural Resources
Date: Wednesday, July 17, 2024 5:45:16 PM

External Email

Dear EFSEC Members,

I am writing as a concerned citizen to express my support for responsible clean energy development in our state. While I recognize the urgent need to reduce our reliance on fossil fuels and combat climate change, it is equally important to protect our state's biodiversity and cultural heritage.

In reviewing Governor Inslee's May 23rd Letter of Direction to EFSEC, I am concerned about the potential impact to cultural sites, priority habitats, habitat corridors, and species such as the Ferruginous Hawk that would result from following his directive. These resources are essential to maintaining the ecological and cultural integrity of our state, as highlighted by recent investments in biodiversity.

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I strongly urge EFSEC to adhere to its original, science-based recommendation, which aligns with the principles of both responsible clean energy development and biodiversity conservation.

Thank you for considering my comments.

Sincerely,
Ms. Ann Pryich
5159 Skagit Highlands Pkwy Mount Vernon, WA 98273-6505
iankicawp@duck.com

From: sokinca@everyactioncustom.com on behalf of Suzanne O"Keefe
To: EFSEC mi Comments
Subject: Protect Washington"s Biodiversity and Cultural Resources
Date: Wednesday, July 17, 2024 5:47:25 PM

External Email

Dear EFSEC Members,

I am writing as a concerned citizen to express my support for responsible clean energy development in our state. While I recognize the urgent need to reduce our reliance on fossil fuels and combat climate change, it is equally important to protect our state's biodiversity and cultural heritage.

In reviewing Governor Inslee's May 23rd Letter of Direction to EFSEC, I am concerned about the potential impact to cultural sites, priority habitats, habitat corridors, and species such as the Ferruginous Hawk that would result from following his directive. These resources are essential to maintaining the ecological and cultural integrity of our state, as highlighted by recent investments in biodiversity.

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I strongly urge EFSEC to adhere to its original, science-based recommendation, which aligns with the principles of both responsible clean energy development and biodiversity conservation.

Thank you for considering my comments.

Sincerely,
Ms. Suzanne O'Keefe
1313 NW 98th St Vancouver, WA 98665-6440
sokinca@gmail.com

From: distfund@everyactioncustom.com on behalf of Mike Conlan
To: EFSEC mi Comments
Subject: Protect Washington"s Biodiversity and Cultural Resources
Date: Wednesday, July 17, 2024 5:47:48 PM

External Email

Dear EFSEC Members,

I am writing as a concerned citizen to express my support for responsible clean energy development in our state. While I recognize the urgent need to reduce our reliance on fossil fuels and combat climate change, it is equally important to protect our state's biodiversity and cultural heritage.

In reviewing Governor Inslee's May 23rd Letter of Direction to EFSEC, I am concerned about the potential impact to cultural sites, priority habitats, habitat corridors, and species such as the Ferruginous Hawk that would result from following his directive. These resources are essential to maintaining the ecological and cultural integrity of our state, as highlighted by recent investments in biodiversity.

EFSEC is under pressure to compromise critically important recovery efforts for a state-endangered species. It is crucial for EFSEC to uphold the science-based restrictions put forth in your April 29 recommendation to the Governor. Achieving clean energy goals should not come at the expense of our state's valuable cultural and biological resources.

I strongly urge EFSEC to adhere to its original, science-based recommendation, which aligns with the principles of both responsible clean energy development and biodiversity conservation.

Thank you for considering my comments.

Sincerely,
Dr. Mike Conlan
6421 139th Pl NE Apt 52 Redmond, WA 98052-4588
distfund@hotmail.com

From: nikkinashmusic@everyactioncustom.com on behalf of Nikki Nafziger
To: EFSEC mi Comments
Subject: Protect Washington"s Biodiversity and Cultural Resources
Date: Wednesday, July 17, 2024 6:24:37 PM

External Email

Dear EFSEC Members,

I am writing as a concerned citizen to express my support for responsible clean energy development in our state. While I recognize the urgent need to reduce our reliance on fossil fuels and combat climate change, it is equally important to protect our state's biodiversity and cultural heritage.

In reviewing Governor Inslee's May 23rd Letter of Direction to EFSEC, I am concerned about the potential impact to cultural sites, priority habitats, habitat corridors, and species such as the Ferruginous Hawk that would result from following his directive. These resources are essential to maintaining the ecological and cultural integrity of our state, as highlighted by recent investments in biodiversity.

EFSEC is under pressure to compromise critically important recovery efforts for a state-endangered species. It is crucial for EFSEC to uphold the science-based restrictions put forth in your April 29 recommendation to the Governor. Achieving clean energy goals should not come at the expense of our state's valuable cultural and biological resources.

I strongly urge EFSEC to adhere to its original, science-based recommendation, which aligns with the principles of both responsible clean energy development and biodiversity conservation.

Thank you for considering my comments.

Sincerely,
Ms Nikki Nafziger
12740 30th Ave NE Apt 523 Seattle, WA 98125-4395
nikkinashmusic@gmail.com

From: jodycaicco@everyactioncustom.com on behalf of Jody Caicco
To: EFSEC mi Comments
Subject: Protect Washington"s Biodiversity and Cultural Resources
Date: Wednesday, July 17, 2024 6:26:15 PM

External Email

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Sincerely,
Mrs. Jody Caicco
23402 NE 108th St Vancouver, WA 98682-9548
jodycaicco@icloud.com