

## Comments to the Climate Legislative and Executive Workgroup

The Climate Legislative and Executive Workgroup is interested in hearing public views on approaches to reducing greenhouse gas emissions in Washington State.

Comments and suggestions (please write legibly):

Put A Tax on Carbon. Fossil Fuel Companies have been supported by subsidies and they never pay the cost of climate degradation. We have to tax carbon to pay to support alternative energy development and infrastructure development.

**\*\*Please continue on back or attach pages if needed\*\***

### Optional Information:

Name: Bobby Righi

Organization: .....

Address: ...

City, State, Zip: Sea, 98103

Email: .....

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[climateworkgroup@ecy.wa.gov](mailto:climateworkgroup@ecy.wa.gov)

**The deadline for submitting comments is October 30, 2013.**

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## Comments to the Climate Legislative and Executive Workgroup

The Climate Legislative and Executive Workgroup is interested in hearing public views on approaches to reducing greenhouse gas emissions in Washington State.

Comments and suggestions (please write legibly): I am a 64-year-old grandma and retired school librarian. My grandchildren are 4 years old, one year old, and presently ~~being~~ under construction (due in January). I am extremely concerned and worried about the kind of Earth they will live in. I know it won't be as lovely as the one I've been fortunate to live in, but I don't want it degraded more than it has been already. Also, my faith calls on me to "respect the interdependent web of existence of which we are a part."

We must completely go off fossil fuels! I want to see our state enact a carbon tax as did British Columbia, to discourage fossil fuel use. I want the fossil fuel companies to pay the full cost of producing their products, i.e., pollution and contamination of our water, soil, and air which they presently use as dumping grounds. How about taxes levied to force them to clean up and, ultimately, switch to cleaner products? I want the state and local govt. to help average citizens switch to cleaner fuels. My husband (the grandpa) and I have solar panels and solar hot water and a heat pump, but we could afford most of it only because of an inheritance. We must stop mining fossil fuels and stop shipping them (no coal/oil tanks or ships!) because such practices destroy the Earth which is home not only to us but to other animals and plants. We are and must do better for the sake of generations to come.

**\*\*Please continue on back or attach pages if needed\*\***

### Optional Information:

Name: Deejah Sherman-Petersen

Organization: .....

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Comments and suggestions (please write legibly):

Please define the best Carbon tax Policy. This requires defining the tax rate and the method to return the tax revenue via reducing other existing taxes. Please give Cities and Counties the right to create a carbon tax in their jurisdictions

**\*\*Please continue on back or attach pages if needed\*\***

### Optional Information:

Name: Cathy Carruthers

Organization: Kick Carbon

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Email: .....

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Comments and suggestions (please write legibly):

WE MUST AND WE CAN REDUCE GREENHOUSE  
GAS EMISSIONS IN WA. THE LONGER  
WE WAIT THE MORE DIFFICULT THE  
JOB WILL BE.

**\*\*Please continue on back or attach pages if needed\*\***

### Optional Information:

Name: GEORGE GUTTMAN  
Organization: \_\_\_\_\_  
Address: \_\_\_\_\_  
City, State, Zip: SEA WA 98115  
Email: \_\_\_\_\_

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Comments and suggestions (please write legibly):

Carbon tax on the model of VC Canada  
Coal trains are the past - we desperately  
need a new approach to renewable  
energy. This requires renewable  
energy subsidies that are reliable &  
no threat of being cut off.  
Reward citizens for conservation -  
reward renewable energy conservation.

**\*\*Please continue on back or attach pages if needed\*\***

### Optional Information:

Name: Vandana Whitney  
Organization: 350.org  
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City, State, Zip: Bothell, WA 98011  
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Comments and suggestions (please write legibly):

Use surplus power from water and wind during spring runoff to produce Hydrogen. This can be used for fuel cells. Investment to build these facilities will create more jobs than the ~~cost~~ proposed coal export terminals.

**\*\*Please continue on back or attach pages if needed\*\***

### Optional Information:

Name: ..... Robert Schuler-Schroder  
Organization: ..... WEC, Sierra Club, CCL, etc  
Address: .....  
City, State, Zip: ..... Seattle, WA 98177  
Email: .....

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Comments and suggestions (please write legibly):

- Increase mass transit funding
- Fund UW research into geothermal, tidal, and Algae energy
- Increase subsidies for solar on homes
- Deny coal trans permit
- Fund all of this with carbon tax

**\*\*Please continue on back or attach pages if needed\*\***

### Optional Information:

Name: Jennifer Grosman

Organization: .....

Address: .....

City, State, Zip: Kent

Email: .....

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Comments and suggestions (please write legibly):

It's a terrible idea to export U.S. coal!

Why?

- China is already moving away from this centuries old fuel and all the infrastructure we create to export will be a financial disaster.
- Does WA State want invest in such a dirty destructive activity? Already China has horrible air pollution that is spread across the Pacific to Seattle.
- The solution, as Governor Jay Inslee has already written books about is clean renewable 21st Century technologies that we'll be able to profit from for several decades.

**\*\*Please continue on back or attach pages if needed\*\***

### Optional Information:

Name:

Deven 'Day' Björn Murti

Organization:

Citizen of WA State

Address:

City, State, Zip:

Seattle, WA 98177-4637

Email:

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Comments and suggestions (please write legibly):

I believe that the Workgroup should strongly consider following the example of our neighbors to the North, BC, who have created an excellent revenue neutral carbon tax. Including provisions that limit the tax's regressive impacts on low-income individuals should be included. We also have a cap-and-trade model in CA to learn from. In either case, we must adopt a plan to limit our carbon emissions significantly, and soon, because individuals cannot be expected to change their carbon-heavy lifestyles without incentives. We also should not forget that the global rural poor will be most affected by our actions, and that addressing climate change is one of the few ways we can directly influence global poverty.

**\*\*Please continue on back or attach pages if needed\*\***

### Optional Information:

Name: Benjamin Kvanne Conway

Organization: NA

Address: .....

City, State, Zip: Seattle WA

Email: .....

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Comments and suggestions (please write legibly):

Denial!! We need to go  
Beyond Coal But  
now. Let's try!!

**\*\*Please continue on back or attach pages if needed\*\***

### **Optional Information:**

**Name:** .....

**Organization:** .....

**Address:** .....

**City, State, Zip:** .....

**Email:** .....

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Comments and suggestions (please write legibly):

I think increased funding for mass transit is most important in reducing greenhouse gas emissions. Give counties the right to raise their own taxes to support mass transit!!

**\*\*Please continue on back or attach pages if needed\*\***

### Optional Information:

Name: Nancy Bagley  
Organization: League of Women Voters  
Address: ....  
City, State, Zip: Seattle, WA 98119  
Email: .....

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Comments and suggestions (please write legibly):

I believe that the state of Washington needs to increase its utilization of solar power to fight the impact of climate change. Enough sunlight falls in eastern Washington to power this state many times over. Right now we're exploiting this resource to provide less than 1% of our energy needs. I'm calling on the governor and legislature to set renewable energy standards and get Washington working towards 150,000 solar roofs.

**\*\*Please continue on back or attach pages if needed\*\***

### Optional Information:

Name: Vernon Brown  
Organization: Environment Washington  
Address: \_\_\_\_\_  
City, State, Zip: Seattle, WA, 98136  
Email: \_\_\_\_\_

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Comments and suggestions (please write legibly):

Coal exports are hurting local communities while essentially funding climate change.

Green jobs are good for the environment and a sustainable economy. Building coal terminals is a poor solution to economic stimulus, especially when the health cost of coal is considered.

**\*\*Please continue on back or attach pages if needed\*\***

### Optional Information:

Name: Amber Smith

Organization: Greendeale

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City, State, Zip: Seattle, WA 98107

Email: .....

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Comments and suggestions (please write legibly):

- I would like to see WA State offer grants & other funding options for start-ups that have a positive impact on climate change, such as, industrial hemp manufacturing.
- House Bill 1888 was proposed last session (earlier in 2013), but not voted on. I would like this Workgroup to consider the potentials of the industrial hemp, ~~industry~~ legalization in WA State, and its relation to CO2 sequestration.

**\*\*Please continue on back or attach pages if needed\*\***

### **Optional Information:**

Name: Tara Devine

Organization: Bainbridge Ecovate Distibute

Address: .....

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Comments and suggestions (please write legibly):

AS A CLEANTECH INVESTOR, I HAVE INVESTED MILLIONS OF DOLLARS IN DIRECT EQUITY INVESTMENTS IN STARTUP COMPANIES, VENTURE FUNDS, HEDGE FUNDS, BOND FUNDS, ETC., ALL IN CLEANTECH.

POLICIES I RECOMMEND:

- ① TIME OF USE PRICING FOR ALL ENERGY SOURCES - DO NOT UNDERESTIMATE THE POWER OF SELF-INTEREST OF RATE PAYERS
- ② A POOL OF WASHINGTON STATE MATCHING FUNDS TO INVEST IN CLEANTECH STARTUP COMPANIES - IF A COMPANY HAS ATTRACTED A MINIMUM DOLLAR INVESTMENT (FOR EXAMPLE \$150,000 \$250,000 ETC), THIS FUND WOULD GRANT AN EQUAL AMOUNT TO THE COMPANY.
- ③ PUT A PRICE ON CARBON - EITHER A CARBON TAX, OR A CAP & TRADE MODEL. FOLLOW CALIFORNIA'S LEAD. ~~AND~~ A CARBON MARKET IS ESSENTIAL.

**\*\*Please continue on back or attach pages if needed\*\***

### Optional Information:

Name: ..... KIKI TIDWELL  
Organization: ..... MEMBER OF NORTHWEST ENERGY ANGELS, PRESIDENT TIDWELL  
Address: ..... TIDWELL FOUNDATION  
City, State, Zip: ..... SEATTLE WA 98121  
Email: .....

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Comments and suggestions (please write legibly):

Of the tools available to the state, the approach that has the greatest potential to achieve the emissions targets ~~and~~ quickly and preserve our economy is a revenue-neutral carbon tax. The sooner we act to redirect tax revenues towards transitioning away from fossil fuels, the better.

I don't want the workgroup to consider allowing any coal export terminals to be built in WA state! We need to lead the U.S. west coast in sane climate policy by blocking the extraction and combustion of N. American coal deposits

**\*\*Please continue on back or attach pages if needed\*\***

### Optional Information:

Name: .....

Meg Chadsey

Organization: .....

self

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City, State, Zip: .....

Seattle WA 98103

Email: .....

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Comments and suggestions (please write legibly):

Just tax carbon emissions!

And stop coal exports and mining and use.

**\*\*Please continue on back or attach pages if needed\*\***

### Optional Information:

Name: Annie Phillips

Organization: Sierra Club, LVA member

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City, State, Zip: Burien, WA 98166

Email: ....

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Comments and suggestions (please write legibly):

Solar Energy offers great <sup>energy</sup> solutions - Here in WA there are incentives for purchasing a made-in-WA solar energy system. I did that last year & now the incentives are helping me recoup my costs. ~~From~~ To achieve the goals of sustainable clean green jobs & businesses in WA, it is critically important to continue these incentives past the 2020 sunset. My new suggestion is that there should also be some type of incentive for hiring a ~~Washington~~ Washington-based solar installation company. The locally based companies are poised to meet the challenge of growing consumer demand. So, my themes for tonight are BUY LOCAL, go solar and say NO to ~~coal~~ <sup>OIL</sup> trains. I live in a rural

area where coal trains currently cross at grade - in fact about 15 crossings where I frequently travel. more coal train is a really bad idea. Thanks.

\*\*Please continue on back or attach pages if needed\*\*

### Optional Information:

Name: ..... Joan Schrammeck

Organization: .....

Address: .....

City, State, Zip: ..... Camano Is, WA 98282

Email: .....

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Comments and suggestions (please write legibly):

Transportation is the single largest contributor to greenhouse gases in the Puget Sound region. The most effective way to reduce GHG emissions in the transportation industry is to eliminate them entirely. The new generation of electric vehicles should be a big piece of the response. As an electric vehicle owner, I am committed to reducing my carbon footprint by producing my own fuel with solar power. My PV array on the roof of my house in Seattle (!) produces enough energy to operate my vehicle for 20,000 miles a year, with ZERO GHG emissions. State incentives to encourage EV adoption should include HOV lane access, extending the sales tax exemption to a percentage of registered vehicles instead of just a random date, and adopting building codes that required EV infrastructure. We need robust incentives for solar and EV charging installation. And the state should be taking the lead by requiring solar and EV charging at all public facilities where practical. Clean energy NOW!

**\*\*Please continue on back or attach pages if needed\*\***

### Optional Information:

Name: Grace Reamer  
Organization: Seattle Electric Vehicle Association  
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Email: .....

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Comments and suggestions (please write legibly):

SPECIFIC ACTIONS & POLICIES:  
SIGNIFICANTLY INCREASE AUTO REGISTRATION FEES FOR  
LOW-MPG AUTOS, SUBSIDIZE PURCHASE  
OF HI-MPG AUTOS (FOR LOW INCOME HOUSEHOLDS)  
TENFOLD INCREASE OF TAXES ON ELECTRICITY GENERATED BY COAL,  
PUT ALL THE REVENUE INTO MITIGATING CO<sub>2</sub> &  
FORCE COAL PLANTS OUT OF BUSINESS BY PAYING  
THEIR FULL COSTS,  
INCREASE URBAN DENSITY & URBAN PUBLIC TRANSIT SUPPORT,  
REQUIRE THE CONSIDERATION OF THE CLIMATIC IMPACT OF  
EVERY PIECE OF LEGISLATION,  
PREVENT COAL TRAINS!  
PROHIBIT USE OF SCHOOL TEXTBOOKS WHICH DENY CLIMATE CHANGE  
AND OR EVOLUTION. IGNORANCE  
IS NOT EDUCATION!

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### Optional Information:

Name: RICHARD FRITH  
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Comments and suggestions (please write legibly):

*Please* Transition to Zero Emission Energy in Washington state as soon as possible, <sup>Policy:</sup> State tax incentives for Zero Emission Electric generation (wind and solar) and zero emission vehicles. Phase out coal electric generation. Encourage electric light efficiency through adoption of LEDs. Incentives for networked smart EV charging to balance the grid at night. Speed the speed of fast DC quick charging spots to speed electric vehicle adoption. Make use of used electric vehicle batteries to backup the grid at night. Change Building code for apartment EV charging. *Call strip down*

**\*\*Please continue on back or attach pages if needed\*\***

### Optional Information:

Name: Kevin McMahon

Organization: Sierra Club

Address: \_\_\_\_\_

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Comments and suggestions (please write legibly):

Fossil fuel reserves are limited, and we can only afford to burn  $\frac{1}{3}$  of those reserves without cooking the planet, so our ultimate goal is not to reduce but to eliminate our fossil-fuel use. This feels like an impossible goal. In Washington State, it's our job to prove otherwise, leading by example and giving other regions the confidence to go fossil free as well. And we're already doing it. On the oil front, the Pacific Northwest Electric Highway has begun to show how to get people out of gasoline-powered cars and into electric vehicles; also, the Seattle-Tacoma public transit system is among the best in the nation and uses some electric buses and trains, enabling the lifestyle of people like me who don't own cars.\* On coal, we have two ways to be part of something globally significant: closing down the Powder River Basin, whose coal mines provide 40% of America's coal every year. The big one is blocking coal exports through our ports. The smaller but still crucial issue is the Colstrip coal-fired power plant, which Puget Sound Energy has the leverage to retire. But, how do we retire that plant without building more gas-fired plants, which may be even worse for the climate than coal due to methane leaks on fracking fields? Coal and gas combined provide over 60% of my electricity; replacing all that with variable wind and solar power requires huge amounts of electricity storage. Luckily, here too we're already doing it: Grand Coulee Dam pumps water uphill to a lake when demand is low, and runs it down through turbines when demand outstrips other supply. Let's prove that going fossil free is possible! \*Don't let Metro lose 14% of its funds!

**\*\*Please continue on back or attach pages if needed\*\***

### Optional Information:

Name: Benjamin Sibelman

Organization: Sierra Club, Coal Free PSE campaign (volunteer)

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Comments and suggestions (please write legibly):

I do not want to see implemented to reduce greenhouse gas emissions in WA State:

- Efforts, incentives, strategies that include nuclear energy

- Efforts, incentives, strategies for natural gas fracking to produce natural gas

- Efforts, incentives, strategies for more small hydropower generation or any new dams

It is clear we haven't addressed problems of radioactive material disposal as is shown by problems of Hanford + also production (Fukushima). As a former US Forest Service employee I reviewed small hydropower proposals - very large impact on small stream riparian areas + forests - Not a good solution for the large gains to be made by efficiency, wind + solar

<sup>containment and</sup>

<sup>WA State compared to</sup>

<sup>Went + solar</sup>

<sup>Went + solar</sup>

**\*\*Please continue on back or attach pages if needed\*\***

### Optional Information:

Name: ..... Allison Warner

Organization: .....

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Comments and suggestions (please write legibly):

I have been listening & watching the session on 10/23/2013 at Bell Harbor Conf. Center and the working group has been very attentive to the excellent speakers. I hope you can work to get any Washington companies using coal to stop. I gave up driving a car in the 1990's and have been taking buses and walking - riding with others when necessary - if more folks could do this the air would be cleaner. Any policies your working group and legislature can bring forth to help would be very appreciated by this citizen. The future is upon us lets leave the air purer for the next generation and be an example to our brothers and sisters of the world. Also, accept some of the examples they have presented to us. Thank you for your time tonight.  
Mary Ann

**\*\*Please continue on back or attach pages if needed\*\***

### Optional Information:

Name: .....

Organization: ..... Sierra Club

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Email: .....

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## Comments to the Climate Legislative and Executive Workgroup

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Comments and suggestions (please write legibly):

- Reduce Packaging - support Vegetable Packaging
- BAN UNNECESSARY straw usage
- STOP COAL USAGE / TRANSPORTATION
- BAN UNSTABLE TRAIN CARS THAT WILL fail if Derailed
- if spills happen have corporations be financially responsible for clean-up.
- ENCOURAGE WORLD BANK NOT TO INVEST IN COAL PLANTS
- GEES - HELP THEM SURVIVE
- JET FUELS - fall onto our forests, lakes rivers
- Don't support WA ST FERRIES w/ Natural Gas
- Construction - Don't use polystyrene carpet products -  
increase nylon carpets
- Don't use flat paint - not a useful paint
- No Coal Trains / Exports - write letter to China re:

\*\*Please continue on back or attach pages if needed\*\*

NO COAL  
EXPORTS

### Optional Information:

Name: Joanne Schaeffler arch

Organization: EMERALD GROVE : David / Fellowship of

Address: RECOMMENDATION

City, State, Zip: Seattle WA 98102-6202

Email:

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Comments and suggestions (please write legibly):

Legislators,

Enacting a unilateral carbon tax for Washington only would be a huge mistake. Washington State is already set to lose Boeing and other large manufacturers will abandon the area as well. Our economy is not large enough to set policy independent of other states. We will make a political statement only and lose jobs, add to the social welfare roles, and shift manufacturing to other less regulated areas of the world.



**\*\*Please continue on back or attach pages if needed\*\***

### Optional Information:

Name: Ted Lehmann  
Organization: Cosr. Management Services  
Address: .....  
City, State, Zip: Neenah, WI 98070  
Email: .....

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Comments and suggestions (please write legibly):

CAREFUL EVALUATION OF ANY AND ALL NEW PROGRAMS TO  
REDUCE GREENHOUSE GAS EMISSIONS ARE CRITICAL.  
EVALUATION ISSUES TO ADDRESS INCLUDE:

- IS A PROGRAM/POLICY TOO COMPLICATED TO DEVELOP?
- DOES A PROGRAM DEMAND SACRIFICES OF ALL SEGMENTS OF SOCIETY
- DOES A PROGRAM ENGENDER PUBLIC CONFIDENCE AND IS IT SIMPLE TO BE UNDERSTOOD?
- IS THE PROGRAM DISTRIBUTING ANY TAXES COLLECTED IN AN EQUITABLE WAY?
- DOES A PLANNED PROGRAM APPEAR TO BE A GOOD CHOICE GIVEN OTHER COUNTRIES' EXPERIENCE TO DATE

**\*\*Please continue on back or attach pages if needed\*\***

### Optional Information:

Name: TIM NEWCOMB

Organization: .....

Address: ...

City, State, Zip: SEATTLE, WA. 98125

Email: .....

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Comments and suggestions (please write legibly):

Please make it a priority to allow Washington farmers to grow the valuable and environmentally sustainable crop industrial hemp. Industrial hemp acts as a biospheric sponge, absorbing CO<sub>2</sub> emissions, and can be grown organically.

Environmentally sustainable building materials - such as hempcrete - result in a negative carbon footprint and paper made from hemp requires far less chemicals than tree paper, is stronger than tree paper, and can be recycled many more times than tree paper. Trees take 100's of years to grow while hemp takes 70-120 days!

While industrial hemp absolutely cannot be converted to a drug, it is definitely converted into biomass energy and diesel fuel. A car powered on 100% hemp diesel fuel has already traveled across North America.

Bioplastics and fibre "glass" has been made with hemp for nearly a century and the December 1941 issue of Popular Mechanics describes in detail Henry Ford's wish that he "grow from the soil"... a plastic car made from hemp cellulose. Let's revitalize our farming industry + economy with this biosphere sponge!

**\*\*Please continue on back or attach pages if needed\*\***

### Optional Information:

Name: Jay Beckerman Maher  
Organization: Hemp Industries Association & WA Farm Bureau  
Address: .....  
City, State, Zip: Edmonds WA 98020  
Email: .....

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Comments and suggestions (please write legibly):

I am proud to be an investor in Micro Energy Credits, a Seattle based co that has already taken 500,000 tons of carbon out of the air by bringing clean energy like clean cookstoves & solar to the developing <sup>simple</sup> world. By trading the carbon offsets on the world carbon markets, MEC has created a scalable biz that improves the health of people everywhere - in the yorts of Mongolia, where mothers no longer need to burn dirty coal, their babies grow up healthy. Putting a price on carbon pollution is the answer. It's what drives this innovative business. Our experience is that any carbon price should have a reasonable floor price. That will take the matter at the political processence the market is established. That's the lesson of Europe.

**\*\*Please continue on back or attach pages if needed\*\***

### Optional Information:

Name: Roberta Riley  
Organization: NW Energy Angels member; Investor in Micro Energy Credits  
Address: .....  
City, State, Zip: Seattle WA 98122  
Email: .....

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Comments and suggestions (please write legibly):

In San Diego there is a fleet of Electric Vehicles available for sharing thanks to the Car2Go company and Blink EV chargers. Seattle should make an investment which would allow for the same sort of deployment & ease charging for EV owners in apartments or without off-street parking.

**\*\*Please continue on back or attach pages if needed\*\***

### Optional Information:

Name: Lee Colleton  
Organization: Seattle Electric Vehicle Association  
Address: .....  
City, State, Zip: Seattle WA 98122  
Email: .....

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Comments and suggestions (please write legibly):

*It took less than five-minutes for a miracle of a twelve-year old girl to show me, that us adults have a lot of growing-up to do. In other words, we need to stop punishing children, for having fresh-brains and start listening to them! ☺*

**\*\*Please continue on back or attach pages if needed\*\***

### Optional Information:

Name: JEROME D. SMITH

Organization: DISABLED VETERAN

Address: \_\_\_\_\_

City, State, Zip: SEATTLE, WA 98101-1154

Email: ... \_\_\_\_\_

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Comments and suggestions (please write legibly): With 3 proposed coal export terminals and all proposed shale oil/tarsands terminals in Wash State (Lincoln) the State needs to not only work to reduce greenhouse gases within the State and the region but should also not export greenhouse gases by <sup>allowing the</sup> exporting of coal and oil out of the region. Greenhouse gases and climate change is a global problem and ignoring the fact that the fossil fuels proposed to be exported from this state will be burned elsewhere - harming our climate and extracted elsewhere - damaging the environment and in many cases (oil extraction) contributing to climate change. These proposals will also significantly increase the number of trains and ships plying the region - also contributing significant greenhouse gases to the atmosphere and increasing climate impacts in the region. This panel should direct all state agencies, especially the Dept. of Ecology, to fully review all proposed fossil fuel exports including the impacts from these projects on climate change from the mining to the transport by train to the shipment by

\*\*Please continue on back or attach pages if needed\*\* ocean-going vessel to the burning of these fossil fuels wherever it may occur.

### Optional Information:

Name: Marcie Keever  
Organization: Friends of the Earth  
Address: Seattle  
City, State, Zip: Berkeley CA 94704  
Email: .....

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## Comments to the Climate Legislative and Executive Workgroup

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Comments and suggestions (please write legibly):

Hi, I am Karin Frank, and I am here on behalf of Washington Interfaith Power and Light, a part of the national Interfaith Power and Light, a religious response to climate change. Religious organizations today are unanimous in the urgent need for us to reduce carbon emissions dramatically and rapidly. All faith traditions agree on the importance of justice, on the value of life and our ecosystems, and on our responsibility to future generations. These are the religious denominations and organizations with strong statements on the need for us to curb carbon emissions: World Council of Churches, World Alliance of Reformed Churches, Church World Service, National Council of Churches of Christ, YMCA, Salvation Army, American Baptist Church, Alliance of Baptists, Southern Baptist Church, Roman Catholic Church, Orthodox Ecumenical Council, Episcopal Church, Church of the Brethren, National Association of Evangelicals, Christian Reformed Church, Evangelical Lutheran Church of America, Mennonite Church, Presbyterian Church USA, American Friends Society, United Church of Christ, United Methodist Church, Reformed Church in America, Unitarian Universalist Church, the Muslim World League, the Bahai, <sup>faith</sup> the Sikhs, <sup>faith</sup> the International Buddhist Confederation, the Jain Institute, countless indigenous organizations, the World Jewish Congress, Jewish Council for Public Affairs, Reform Judaism, Renewal Judaism, Conservative Judaism, the Council of Religious Institutions of the Holy Land, the United Religions Initiative, and the World Council of Religious Leaders.

**\*\*Please continue on back or attach pages if needed\*\***

### Optional Information:

Name: Karin Frank

Organization: Washington Interfaith Power & Light

Address: .....

City, State, Zip: Seattle, WA

Email: .....

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Not only is ~~strong~~<sup>robust</sup> climate action economically the best choice,  
it is morally the only option. That is why Washington  
Interfaith Power and Light, on behalf of the ~~largest~~ faith  
community, are asking you ~~for~~<sup>\*</sup> strong actions like cap and  
trade, ~~and~~ a <sup>tax</sup> ~~price~~ on carbon, <sup>\*\*</sup> that will ~~any~~ make a real  
difference in emissions. Thank you.

<sup>sustainable</sup>  
\*\* investment in transportation, and support for green industries,

\* to fulfill our moral obligation to reduce emissions through

## Comments to the Climate Legislative and Executive Workgroup

The Climate Legislative and Executive Workgroup is interested in hearing public views on approaches to reducing greenhouse gas emissions in Washington State.

Comments and suggestions (please write legibly):

I've heard a lot about Renewable energy and transportation solutions target. Yes, energy and transportation are low-hanging fruit when it comes to climate policy.

But, did you know that when you take a systems view of our GHG emissions and integrate energy + transportation emissions across the economy, you see a whole new suite of opportunities. These opportunities aren't currently even on your radar. This systems view shows that 42% of all domestic GHG emissions come from "stuff" - essentially the lifetime provision of products, goods, and food. The role of Materials Management in Climate Mitigation and Adaptation should be integrated into the state's Climate Strategy AND updates to the WA State Dept. of Ecology's Beyond Waste Plan. If you ignore sustainable consumption + production, you will only be acting on a fraction of the full array of climate action opportunities.

WA state has been an active member of the EPA-convened West Coast Climate and Materials Management Forum. Please take action and support high leverage Materials Management solutions. Please develop a ~~state~~ consumption-based emissions inventory to inform your actions, like King County. Please take action and support Community Food Waste Prevention

**\*\*Please continue on back or attach pages if needed\*\***

### Optional Information:

Name: Ashley Zanelli

Organization: US EPA Region 10

Address: .....

City, State, Zip: Seattle WA 98122

Email: .....

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Low carbon government purchasing, Green building & building for deconstruction, product stewardship and the environmental footprinting of products to drive upstream design changes. We have consumed more resources in the last 50 years than in all previous human history.

Thank you for your consideration and for all that you do. Let's have WA State lead the way when it comes to impactful Climate Action in the US.

- Ashley Zanolli,

~~Citation~~ Co-lead, West Coast Climate & Materials Management Forum ([www.westcoastclimateforum.com](http://www.westcoastclimateforum.com)).

[1] Opportunities to reduce GHGs through Landuse changes and Materials Management



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Comments and suggestions (please write legibly):

What has become more apparent the more I research issues around clean energy, clean water, salmon recovery, ect, I realize that our state agencies do not communicate with each other around 'new' environmental issues are only lethal now, but we've known about them all along. We do not have sufficient staff at the EPA, Dept of Ecology, DFW to make informed decisions on issues like Coal trains and new hydro, which are both very controversial. For example, Commissioner Goldmark of the DNR and Marc Deery of Puget Sound Partnership both spoke about the massive efforts to remove copper from Puget Sound, as copper interferes with salmon's sense of smell, which they use to avoid predators & find their spawning beds. But neither of the speakers had heard about a proposed hydro project that is planning to drill a massive 42" diameter tunnel 200' long through copper-laced granite mining country in Snohomish County. Populations relying heavily on Puget Sound salmon (Native Americans) are getting very sick due to poisoning of minerals like copper, lead

### Optional Information:

Name: Andrea Morte  
Organization: Wild Washington Rivers  
Address: ...  
City, State, Zip: Seattle, WA 98256  
Email: a  
Snohomish County  
Populations relying heavily on Puget Sound salmon (Native Americans) are getting very sick due to poisoning of minerals like copper, lead

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arsenic, cadmium, etc.

Todd True of Earth Justice recently said of salmon in the Northwest 'Salmon are the canaries in the coal mine'. When the salmon die, so do all the creatures that rely on them, including humans.

We need to move off coal, and what people infrequently forget to mention, is that no matter ~~where~~ <sup>now</sup> the coal gets to China, if they burn it, we pay for it in acid rain and air you can chew.

But allowing ANY new hydro (run of river)

① Can't be used in this state more than 2 of demand months in a given year, and not much power would be <sup>even</sup> produced, as the rivers are still in snowpack, for the most part.

② Expose soil and rock, typically containing some adverse minerals, directly into our rivers, which lead right into the Sound.

Shoshone County PUD has at least 2 new hydro projects right at Copper Pines -

① Sunset Fall Hydro on the South Fork Shoshone

② Hancock Creek Hydro.

But our state is staff depleted to make good decisions and Big Corporations (even if they claim they're public) are selling off our <sup>state</sup> resources for their parts.



## Comments to the Climate Legislative and Executive Workgroup

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Comments and suggestions (please write legibly):

IF the goal is to attract venture capital, equity and debt to advance clean tech, renewable energy and more significant sustainability the amount of political capital necessary to force Cap and Trade far exceeds the benefits. ~~to~~  
As a private developer executing large scale green energy and chemical projects nationally and internationally a Cap and Trade environment is far down the list of things we care about. "See back"  
\*\*Please continue on back or attach pages if needed\*\*

### Optional Information:

Name: BOB DIVERS  
Organization: UNITED POWER CO  
Address: \_\_\_\_\_  
City, State, Zip: Seattle, WA 98116  
Email: \_\_\_\_\_

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The state of Washington is fortunate because the tax burden to industry is not yet extreme so that industry can still compete. All the tools necessary to attract world class venture capital, equity and institutional debt ~~to~~ necessary to sustain and encourage, higher levels of sustainability, good stewardship of resources and new industry already exists under current legislation and regulation.

The Key is Port Districts. The State of Washington has 39 counties and in 38 of those counties there are 75 ~~port~~ Port Districts. Neither the Governor nor the Port Commissioners, Port Managers ~~or~~ or their general counsel understand the power of Ports but if the Governor put a staff person on the subject for a few days they would discover that all they have to do is investigate and then create.

Best Regards

Bob Dineen

## Comments to the Climate Legislative and Executive Workgroup

The Climate Legislative and Executive Workgroup is interested in hearing public views on approaches to reducing greenhouse gas emissions in Washington State.

Comments and suggestions (please write legibly):

Although a member of several environmental NGOs, I am commenting personally as an environmental advocate.

I strongly support science-based action on climate mitigation and adaptation. Past interagency task forces have compiled recommendations for action. Hopefully this Workgroup is merely refining them because they need strong implementation. NOW! WA has made great progress toward its CO<sub>2</sub> emission reduction goals and it's past time to ramp it up.

I support increased use of alternate energy and attention to energy efficiency. I strongly support phasing out fossil fuel use and denying coal ~~import~~ exportation from the NW. I strongly support a carbon tax and strongly advise against cap and trade.

**\*\*Please continue on back or attach pages if needed\*\***

### Optional Information:

Name: Katherine Low  
Organization: Sustainable Redmond, Sierra Club, Union of Concerned Scientists  
Address: \_\_\_\_\_  
City, State, Zip: Sammamish WA 98074  
Email: \_\_\_\_\_

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I also comment as the mother of 26 year old twins. I'm looking forward to being a grandmother - whenever the kids decide the time is right. But the scientist in me is a fairly-dismally bleak - about the future if humanity doesn't radically alter course. If climate scientists are even close to correct about global warming consequences, I don't want grandchildren.

Now that's not my call to make, but it scares me to envision the monstrous world they will inhabit. And that's incredibly sad. But I find hope in CO<sub>2</sub> reduction actions large and small. People, governments and businesses are taking action and we all need the state government to support those actions and encourage more.

## Comments to the Climate Legislative and Executive Workgroup

The Climate Legislative and Executive Workgroup is interested in hearing public views on approaches to reducing greenhouse gas emissions in Washington State.

Comments and suggestions (please write legibly):

I would like to see our state move beyond coal to environmentally friendly + sustainable options such as wind, solar and hydro power. We have installed a solar system in our home and drive an electric leaf and a Toyota Prius. We would LOVE to see more level 3 fast chargers to make use of electric vehicles feasible for more families. Tax incentives to help off set ~~the~~ costs for solar + electric vehicle use. Also help 'green' businesses to prosper by rewarding them with tax breaks and other perks.

**\*\*Please continue on back or attach pages if needed\*\***

### Optional Information:

Name: Deborah McMahon

Organization: Sierra Club

Address: \_\_\_\_\_

City, State, Zip: Maple Valley, WA 98038

Email: \_\_\_\_\_

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I strongly believe we should shut down coal fired plants and that coal trains should not be allowed to run through our cities and towns. I would love to see a switch toward <sup>more</sup> Compostable products in restaurants, venues for concerts, fairs etc. Move away from being a throw away society. Ban plastic water + beverage bottles replacing with refillable glass as a first choice and recyclable cans as a 2nd choice. Fund mass transit systems which we sorely lack in Wt. Reward use of public transportation, carpooling etc, car share programs. Approve developments of green, sustainable communities over others.



## Comments to the Climate Legislative and Executive Workgroup

The Climate Legislative and Executive Workgroup is interested in hearing public views on approaches to reducing greenhouse gas emissions in Washington State.

Comments and suggestions (please write legibly): My name is Fred Fellenman, I'm the NW Consultant for Friends of the Earth. Thank you for this opportunity.

- On July 20th a colleague and I published an article in *Consent*, "Exporting Pollution: a new way to reduce carbon footprint." In it we criticized Obama's Army Corps for their failure to consider the cumulative impacts of the 3 remaining coal terminals proposed for Washington. We then called on Governor Inslee to make up for the Corps shortfall (see attached)
- The next day we were delighted to read that Washington state was going to require NEPA which the Corps neglected.
- While I'm not expecting such immediate response again, but it is time that the state show the same leadership exhibited in the recent coal terminal, to the 11 crude oil terminals being built to export Bakken shale.
- The Department of Ecology has not required EIS for any of these projects that is bringing fractured crude to waterways such as Grays Harbor and Columbia River for the 1st time - in less any cumulative impact analysis w/ coal. (see attached)
- Instead we are left to fight this in a piecemeal fashion as we just accomplished in Grays Harbor
- please put a moratorium on towing shale in rail terminals until a pyrolytic analysis is completed. Also please intervene on the Natural Energy Board process in Canada to represent our interests as they attempt to export shale oil from the tar sand crude exports

**\*\*Please continue on back or attach pages if needed\*\***

### Optional Information:

Name: Fred Fellenman

Organization: Friends of the Earth

Address: .....

City, State, Zip: Seattle, WA 98117

Email: .....

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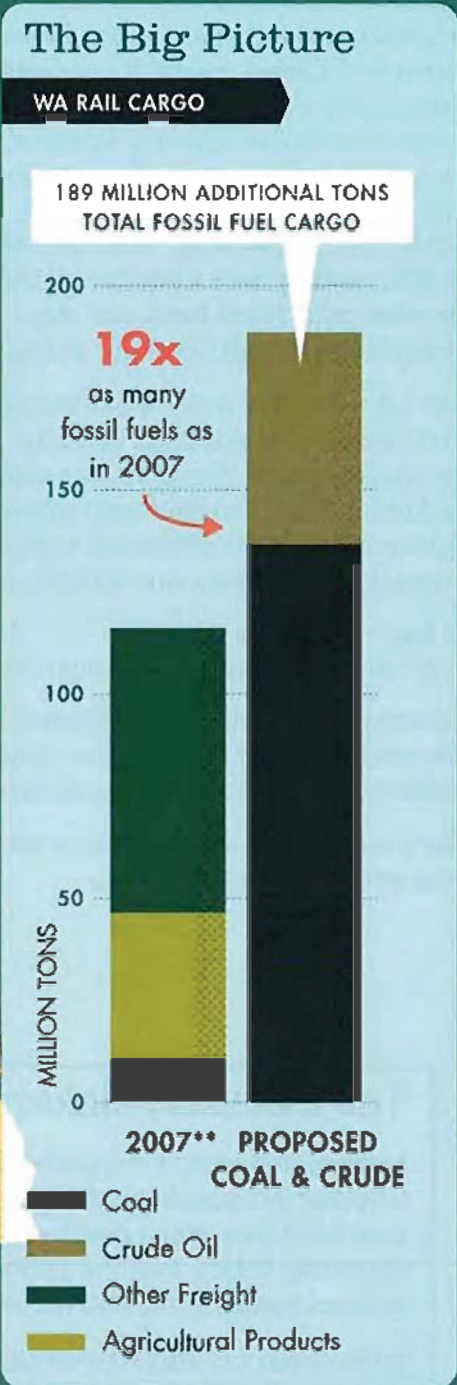
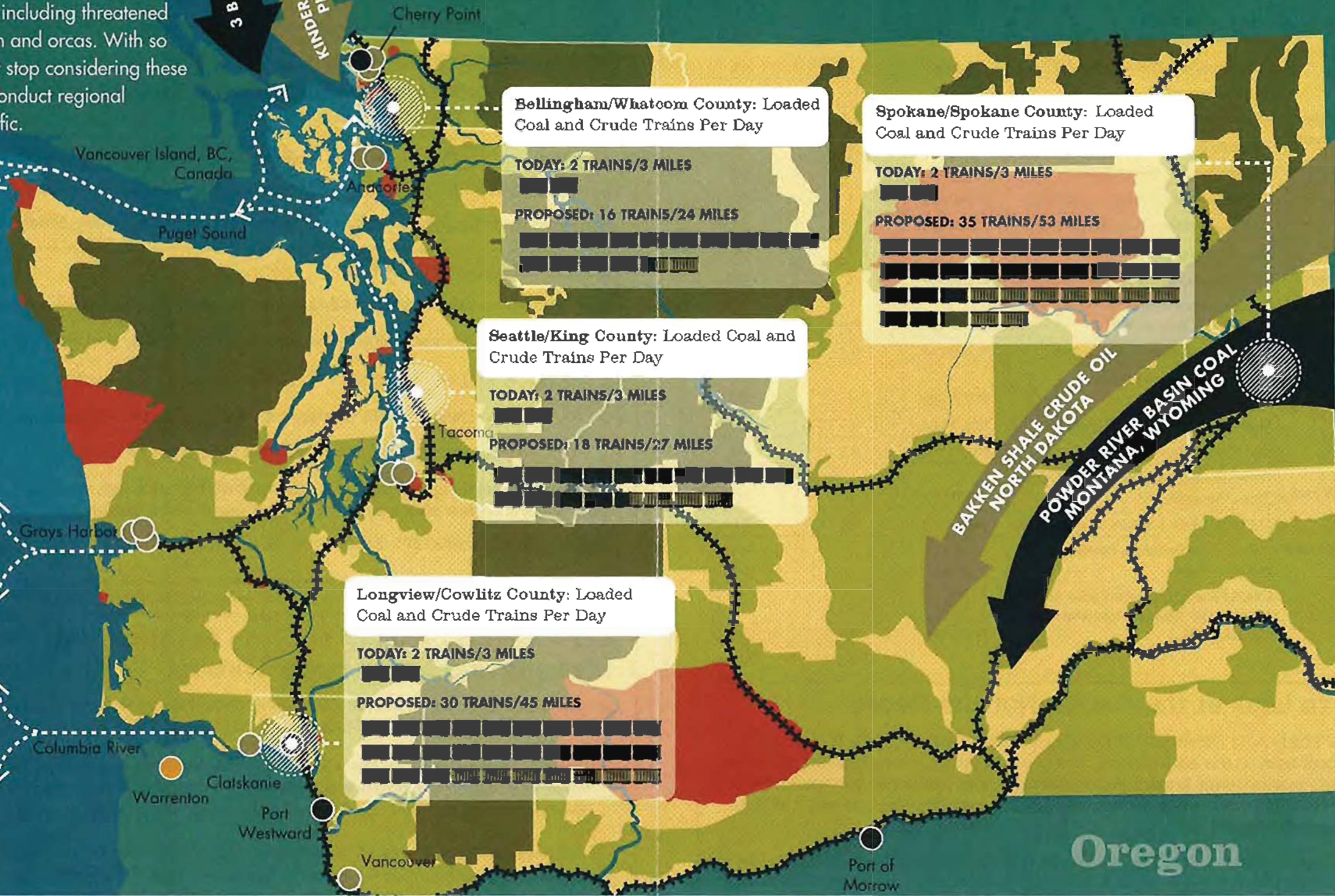
Large corporations propose the unprecedented construction or expansion of roughly 20 coal or crude oil terminals or refineries in Washington, Oregon, and British Columbia. These high-risk exports would transect Washington's wetlands, rivers, marine resources, and prime farmlands, threatening the health and viability of our communities' human health, cultures, economies, and environments, including threatened and endangered species such as salmon and orcas. With so much at stake, permitting agencies must stop considering these proposals in a piecemeal fashion and conduct regional cumulative studies of rail and vessel traffic.

# Gateway to Extinction

## Proposed Fossil Fuel Transport through Washington\*

### ANNUAL COAL AND CRUDE OIL EXPORTS

Note that for every 2 additional ships, add 1 bunker (fuel) barge



PRODUCED BY HEALTHY PLANET/HEALTHY PEOPLE (HPHP) IN COLLABORATION WITH FRIENDS OF THE EARTH

HPHP is a coalition of individuals and organizations including Protect Whatcom, Safeguard the South Fork, and Friends of the San Juans

\* Information current as of 9/23/13. For data sources and updated information, go to [ProtectWhatcom.org](http://ProtectWhatcom.org). \*\* Last available data. Source: Wash. DOT. \*\*\* All trains travel west through the Columbia River Gorge. Actual rail traffic is double because of returning trains, which use one of three routes east: the Columbia River Gorge, or through Stampede or Stevens Pass.

[protectwhatcom.org](http://protectwhatcom.org)



# Ask Elected Leaders to Add Up the Trains and Vessels

If proposed coal and crude terminals are permitted in Washington, an unprecedented number of 1.6 mile long trains would travel through our communities in the Pacific Northwest.

Considered individually, the increase in train and vessel traffic for a single proposed export terminal, or the expansion of an existing terminal, may appear relatively insignificant. However, when reviewed cumulatively, the collective impacts of train and vessel traffic add up to 35 additional trains loaded with fossil fuels per day traveling through Spokane alone.

At 1.6 miles per train, that's more than 100 miles of trains daily directly associated with these 19 proposals. In addition, the terminals and refineries place over 2,900 additional high-risk vessels a year onto our shared waters.

\* bpd = barrels/day of crude  
mmta = million metric tons/annum of coal

Sources: permit applications, Mitigated Determinations of Nonsignificance, general press, industry, and Sightline Institute publications.

For a complete list of sources and a full size table visit [protectwhatcom.org](http://protectwhatcom.org).

Terminal or Refinery Locations (North to South)	Volume & Commodity*	Unit Trains per Day (1 way)	Vessels per Annum
Kinder Morgan pipeline/ Westridge Marine Terminal, Burnaby, BC	890,000 bpd	n.a.	358
Ridley Terminals, Prince Rupert, BC	13 mmta	2	na
Neptune Terminals, Vancouver, BC	10 mmta	1.5	176
Fraser-Surrey, Vancouver, BC	8 mmta	1.3	40
Westshore Terminal, Vancouver, BC	6 mmta	1	104
Gateway Pacific Terminal, Ferndale, WA	54 mmta	9	487
BP Cherry Point Refinery, Ferndale, WA	71,500 bpd	1	33
Phillips 66 Refinery, Ferndale, WA	35,750 bpd	0.5	17
Tesoro Refinery, Anacortes, WA	50,000 bpd	1	36
Shell Refinery, Anacortes, WA	61,286 bpd	1	45
Transcor Astra Group's U.S. Oil & Refining Co., Tacoma, WA	40,000 bpd	0.6	29
Targa Sound Terminal, Tacoma, WA	30,000 bpd	0.4	22
Imperium Bulk Liquid Terminal, Grays Harbor, WA	68,250 bpd	1	200
Westway Terminal, Grays Harbor, WA	28,692 bpd	0.4	60
Grays Harbor Rail Terminal	50,000 bpd	0.7	54
Tesoro-Savage, Vancouver Energy Dist'n Term., Vancouver, WA	360,000 bpd	5	386
Millennium Bulk Logistics, Longview, WA	44 mmta	7.4	850
Coyote Island Terminals, Boardman, OR. Port of St. Helens	8 mmta	1	156 + 624 barge tows
Global Partners' Columbia Pacific Bio- Refinery/ Port Westward Industrial Park, Clatskanie, OR	28,600 bpd	0.4	31
Totals		35.2	3,084

## Tell Decision Makers to Look at the Puzzle, Not the Pieces

Federal and state Environmental Policy Acts (NEPA and SEPA) require permitting agencies to consider whether proposals pose significant risks to the environment. If, after a threshold determination, agencies conclude they must conduct and Environmental Impact Statement (EIS), they will invite comments from agencies, tribes, and the public. They will then weigh various alternatives, including the proposals with or without mitigations, and the no action alternative.

While a full EIS should include a cumulative impacts analysis of all combined rail and vessel impacts, they almost never do. By continuing to consider single proposals in a piecemeal fashion, we never fully analyze the costs and benefits of the proposals in a programmatic way consistent with state or federal energy policy. That narrow approach has to end.

Ask Washington Department of Ecology to conduct a programmatic EIS for all of the proposed crude-by-rail terminals and rail expansions at existing refineries to determine the net effect on rail and vessel traffic. Contact Annie Szvetcz, SEPA Policy Lead, 360-407-6925, [aszv461@ecy.wa.gov](mailto:aszv461@ecy.wa.gov).

# Comment on the proposed Millennium Bulk Logistics Coal Terminal in Longview, Washington through November 18, 2013

During the scoping process for Millennium, the lead agencies (Cowlitz County, WA Dept of Ecology, and the US Army Corps of Engineers) seek comments on what to analyze in the Environmental Impact Statement (EIS).

## Comment online, by email, and/or in-person at a scoping hearing.

Online: [www.millenniumbulkeiswa.gov](http://www.millenniumbulkeiswa.gov) Email: [comments@millenniumbulkeiswa.gov](mailto:comments@millenniumbulkeiswa.gov)  
In-person: 5-8 pm; doors open at 4 pm. Your oral comment at a scoping hearing may summarize an issue you address in a more detailed written comment.

Oct 17: Tacoma Convention Center, Scoping Hearing.

For information a fact sheet on impacts associated with this coal export proposal go to:  
[http://www.lwvbellinghamwhatcom.org/files/2013\\_Millennium\\_Fact\\_Sheet\\_for\\_Comments-final.pdf](http://www.lwvbellinghamwhatcom.org/files/2013_Millennium_Fact_Sheet_for_Comments-final.pdf)

## Scoping Comment Guide

- The EIS addresses only **significant adverse impacts, alternatives, and mitigations.**
- a. Introduce yourself. Briefly tell who you are and why you are concerned.
  - b. Ask to measure the impact of \_\_\_\_ on things such as human health, the environment, an economy, etc.
  - c. Tell why it is significant (because it impacts you, other people, places, environments, etc.).
  - d. Can this be mitigated? If not, ask that the permit be denied.

An impact is anything that would not occur **but for** activities related to the proposal. In your comment, consider what is known about the impact, what needs to be known, and if it could be mitigated.

Statements of opinion are not comments.

# Ask Elected Leaders to Stop Externalizing the Costs of Transporting Fossil Fuels Through Washington State

- 1 Ask Gov. Jay Inslee to initiate rulemaking requiring tug escorts for all crude tankers on the Columbia River and in Grays Harbor. Contact: Ted Sturdevant, Exec. Dir. of Legislative Affairs & Policy, 360-902-4111.
- 2 Ask Gov. Inslee to direct the WA Dept. of Commerce State Energy Office to reinstate the Petroleum Markets Databook tracking the movement of fossil fuels by mode of transportation in WA. Contact: Ted Sturdevant, Exec. Dir. of Legislative Affairs & Policy, 360-902-4111.
- 3 Ask Senator Maria Cantwell to pass legislation classifying tar sands derived crude as "oil" to subject it to existing federal barrel taxes. Email at <http://www.cantwell.senate.gov/public/index.cfm/email-maria> or call one of her offices listed at <http://www.cantwell.senate.gov/public/index.cfm/office-locations>.
- 4 Ask state legislators to create the state barrel tax on crude oil moving through state lands and waters in ships, barges, pipelines, and trains. (The money should be held in a fund to pay for the public costs and risks associated with that transport.) Contact your legislators at: [app.leg.wa.gov/districtfinder/](http://app.leg.wa.gov/districtfinder/).
- 5 Support existing efforts to impose a carbon tax on fossil fuels used, based on their CO2 contribution. Learn how at: <http://SupportCarbonWA.org>.



## **Exporting Pollutants: No way to reduce a carbon footprint**

Guest Opinion: Puget Sound's health is at risk if Washington becomes the fossil fuel gateway to Asia.

President Obama says he's open to "better ideas." Time for state leaders to give him some.

<http://crosscut.com/2013/07/30/environment/115719/stephan-michaels-and-fred-felleman-exporting-pollu/>

**By Fred Felleman and Stephan Michaels July 30, 2013.**

**There was much ado** over President Barack Obama's long awaited climate speech this past month, which garnered praise for its laudable ambitions to reduce carbon pollution, and legitimate criticisms for its striking ironies. The most glaring omission was the president's failure to mention the climatic effects of exporting U.S. coal to Asia.

That oversight came just one week after the Acting Chief of Regulatory Programs for The U.S. Army Corps of Engineers testified before the U.S. Congress that the Corps would neither study the effects of burning American coal in Asia nor the cumulative impacts from three coal ports being proposed for the Pacific Northwest. The acting chief maintained that those significant impacts "are outside the Corps' control and responsibility."

The president's speech and the testimony of a high ranking Army Corps official beg the question: Does the Obama Administration actually think the United States can reduce its carbon footprint by exporting its pollutants?

**First, the Corps' interpretation** of the National Environmental Policy Act (NEPA) is disputable, especially considering that two of the coal terminals proposed for Washington state are on the Columbia River and would result in increased shipping traffic.

NEPA actually authorizes the broadest review of impacts from such massive projects, including cumulative effects from associated endeavors such as transporting explosive crude from Canada and North Dakota through Northwest communities by rail and waterway.

No surprise. Taking the narrow view has long been a hallmark of the Corps, as documented in the five-part series by Washington Post writer Michael Grunwald, including "[For Oil Projects, Corps' Answer is Almost Always 'Yes'](#)" (9/13/2000).

While the Corps claims that international shipping is also outside its purview, it must review the impacts of the enormous bulk carriers — twice the size of oil tankers allowed to call on Puget Sound and lacking their tug escorts or double hull requirements — as they diesel through Washington and U.S. waters. These bulk carriers have the worst accident record of all cargo vessels.

Given the Corps' dismal track record when it comes to conducting environmental analysis — it has yet to produce the Environmental Impact Statement for BP's refinery dock expansion that was required by the Ninth Circuit Court eight years ago — all eyes now turn to Washington Gov. Jay Inslee, Peter Goldmark, the state's commissioner of public lands and head of its Department of Natural Resources, and Washington's Department of Ecology to fill this void.



**The governor and the ecology department have clear** authority over impacts to the marine environment associated with the unprecedented onslaught of fossil fuel infrastructures being proposed for Washington state. And any enterprise seeking to build a dock will also need a permit from Goldmark's Department of Natural Resources (DNR). Indeed, DNR has an important card to play in the coal export debate. The proposed Gateway Pacific Terminal (GPT) at Cherry Point is surrounded by DNR's Cherry Point Aquatic Reserve, whose management plan calls for the restoration of the genetically unique herring stock found there.

At full buildout, GPT estimates it will require approximately 487 bulk carriers to ship 48-million tons of coal across the Pacific each year. These high-risk vessels would be competing for passage with oil tankers and other vessel traffic through the already congested shipping lanes around the San Juan Islands. How this impacts the risk of an oil spill is the subject of a current EPA-funded collaborative study hosted by the Puget Sound Harbor Safety Committee.

But as early as 1999, a DNR-commissioned study recognized that increased vessel traffic from the BP Refinery, less than a mile from GPT, "will inevitably increase the risk of an oil spill," and "if such a spill were to occur ... the impact to Cherry Point herring could be catastrophic." That was the conclusion before anyone understood the full scale of GPT and that the commodity in question would be coal.

Endangered southern resident killer whales subsist on endangered Chinook salmon that, in turn, depend on forage fish like the already decimated herring population at Cherry Point.

**While the Seattle media recently** afforded extensive coverage to transient orcas arriving in Puget Sound, and also to the great success of the once-orphaned "Springer," the orca who just gave birth to her first calf, those stories should be overshadowed by the dire status of our resident killer whales. The Center for Whale Research recently reported that only 82 southern resident orcas remain in J, K and L pod populations, their lowest number since 2001. Significantly expanding commercial traffic to export fossil fuel would be an irresponsible contribution to our resident orcas' demise and, ultimately, to global pollution.

In concluding his climate speech, Obama said he was "open to all sorts of new ideas, maybe better ideas" to combat threats from climate changing pollutants. Gov. Inslee and Commissioner Goldmark, that's your invitation to help the Obama administration evaluate the combined impacts and prevent the potential disaster of allowing Washington's waterways to become the fossil fuel gateway to Asia.

*Fred Felleman came to the Northwest in 1980 to study killer whales for his graduate research at the University of Washington. He championed creation of the Olympic Coast National Marine Sanctuary and the Neah Bay rescue tug and successfully challenged BP's expansion of a refinery dock. He is currently a consultant for Friends of the Earth. Fred can be reached at*

*Stephan Michaels is a Northwest Washington freelance journalist who writes about ecology and coal exports. Stephan can be contacted through*  
<http://www.2ndwindproductions.org>

1) Maintain incentives &  
we'll keep building  
solar.

2) We need more illustrations  
including T-ray numbers, of  
what happens chemically &  
physics w/ carbon, water, ~~acidification~~  
acidification, etc.

John Pearson, Rothell



Why can't nearly all commercial/industrial buildings have solar on their roofs. I don't know what the obstacles are but ~~they~~ those roofs have great solar potential because they usually have little shade from trees. Especially in suburban + rural areas.

---

Go fleet conversions to electric.

## Comments to the Climate Legislative and Executive Workgroup

The Climate Legislative and Executive Workgroup is interested in hearing public views on approaches to reducing greenhouse gas emissions in Washington State.

Comments and suggestions (please write legibly):

**\*\*Please continue on back or attach pages if needed\*\***

### Optional Information:

Name: LIVIA Jackson  
Organization: Citizens for climate change  
Address: \_\_\_\_\_  
City, State, Zip: Seattle WA 98115  
Email: \_\_\_\_\_

**Please turn this sheet into one of the comment boxes before leaving the Public Hearing.**

If you have additional comments after the meeting, please submit by email at:  
[climateworkgroup@ecy.wa.gov](mailto:climateworkgroup@ecy.wa.gov)

**The deadline for submitting comments is October 30, 2013.**

*\*Please note any information provided on this sheet is public information and may be posted online.*

for climate work group  
@ccy.wa.gov

October 23, 2013 9:34 AM

To: Livia Jackson  
speech 3

Hi- I'm Livia Jackson. First I'm so grateful for our governor's vision to move us past fossil fuels.

I hear we still need to get all CO2 down 6% a year to prevent point-of-no-return global warming. To that end I support a carbon tax and dividend like the one in BC operant for 5 years. Citizens Climate Lobby a national organization and Carbon Wa. a state group both support this plan. CCL's proposal gradually raises the price on carbon emissions, returns 100% of the dividend to citizens, is revenue neutral, market based thus palatable to many conservative economists. It gives businesses a predictable platform for change.

Our climate crisis is vast and the dangers to our public health are staggering. Even in our state tropical diseases are a threat. Dengue fever has reached us because the winters aren't cold enough to kill the mosquitoes, just as the pine bark beetles now devastate our forests.

You know the list of profound suffering on our planet now: megastorms, fires, droughts, floods and dying oceans. Not so long ago 70,000 people died in Europe in one heat wave. Respiratory emergencies in N. China due to coal burning right now.

are

Please, let's set the pace with an efficient carbon plan. It's much easier to negotiate CO2 treaties with China and India when we ourselves have taken these necessary steps to change. Thank you

rec:

The book... Fevered- Why a Hotter Planet Will Hurt Our Health-and What We Can Do About It. by Linda Marsa  
just out- 2013

Sites I like- Inside Climate News (won a Pulitzer)-a new book... Clean Break-Germany's Energy Transformation by Osha Gray Davidson was just put out by them.

CCL & CARBON WA!

Eco Watch

The Daily Climate

Dot Earth (at the New York Times)

Grist

Climate Progress

Renewable Energy World

Renewables International

Testimony to the Washington State Climate Legislative and Executive Workgroup

October 23, 2013

Governor Inslee and members of the workgroup,

My name is Daniel Malarkey and I serve as Vice President at 1Energy Systems, a software company whose products and services help electric utilities integrate renewable energy into the grid.

Our company favors any state policy that puts a price on carbon. Our strong preference is for a BC-style carbon tax. British Columbia took the policy advice of Seattle's Sightline Institute and implemented a tax shift that increased taxes on carbon and lowered taxes on jobs and sales. To be clear, I am not advocating a tax increase but rather a tax shift that would immediately improve our economy's performance by better matching market prices to true social costs.

1Energy belongs to a tech sector in this state that has been the primary driver of economic growth since the recession. This entire sector could become an ally of a BC-style tax shift if a relatively small share of carbon revenues were used to lower taxes on research and development. Governor, you have supported an extension of the current R&D tax credit as well as adding a new tradable R&D tax credit that would benefit smaller companies like ours. A carbon tax could fund a generous R&D credit that would help our state develop the technologies and jobs of the future and turn the entire tech community into advocates for a price on carbon.

Technology leaders don't deny science, they rely on it for their business. When it comes to climate change, companies like ours are looking for practical, market-oriented solutions. Indeed, Microsoft last year adopted a carbon price that is added to all purchases within the company so business units confront the costs of carbon emissions in every business decision, from booking travel to building data centers.

With the right carbon pricing policy and a tax incentive for R&D, we can meet our carbon reduction goals and help grow a clean and prosperous economy for all of Washington. Thank you.

Daniel Malarkey

Vice President, Business Development and Public Policy  
1Energy Systems, Inc.  
811 First Ave, Suite 510  
Seattle, WA 98104

98, 105



## Comments to the Climate Legislative and Executive Workgroup 10/23/2013

To Governor Inslee, Senators Ericksen, Ranker, Brown, Cleveland, and Representatives Fitzgibbon, Short, Fey, and Pike:

Puget Sound Solar has been installing solar energy systems in western Washington since 2001, starting with the first net-metered photovoltaic system in Seattle. We have also driven electric vehicles for the last seven years, and have installed 300 EV charging stations.

Thank you for the opportunity to address this esteemed workgroup.

Transportation is the largest consumer of energy in Washington and, at 46%, is the largest greenhouse gas emitter. Electrification of much of that transportation is a logical way to reduce both carbon emissions and the flow of money out of the state; Seattle City Light, for example, has estimated that 25,000 electric cars could charge on its grid without additional generating capacity. We have already started down this road, so that begs the question, 'where will new generation come from to supply this growing load?'

**Solar energy** is our most accessible source of renewable electricity, and distributed solar generation is one of the most efficient. It is also well known now that all the energy for a family's cars can easily be generated on the rooftop of that family's home.

Our legislature and Governors past have wisely introduced various incentives for individuals and businesses to take advantage of this inexhaustible resource, but we are still far from reaching our potential use of it. As this workgroup considers many proposals for mitigating climate change, please add the following actions under the tab 'Solar Energy':

1. **Develop sustainable programs**, rather than those that are subject to 'boom-and-bust' cycles
2. Continued development of **local manufacturing** and **local installation labor force**
3. Ease the burden on our electric utilities of administering distributed generation
4. **Reduce the upfront cost** for solar consumers through PACE-type financing
5. **Develop incentives for commercial-scale** installation of distributed solar generation

Jeremy Smithson, CEO



Whereas, The 36<sup>th</sup> District Democrats is an organization run by hundreds of politically active citizens who annually engage in face-to-face conversations with thousands of voters regarding their political interests and concerns, and their goals and desires for the future of our shared community; and

Whereas, the 36<sup>th</sup> District Democrats, as an organization, seeks to carry the stories and dreams of those many thousands to as wide an audience as possible; to do its utmost to inform the public about the positions of its members, and to effect lasting change in public policy in accordance with its values;

Therefore, the 36<sup>th</sup> District Democrats (we) do hereby take the following position on potential policy initiatives in Washington State being considered to address climate change, and direct this message to the Climate Legislative Executive Workgroup (Workgroup), created under E2SSB 5802 in 2013.

We strongly support the proposal for a comprehensive cap on carbon emissions in Washington State, and believe it is essential to meeting the goals established in Chapter 70.235 by the 2008 legislature. At the same time, we are deeply intrigued by the success of British Columbia's revenue-neutral carbon tax, and are keen to share in that success. We are acutely aware of a citizen proposal to institute a similar model here in Washington, and believe it very likely that such a proposal will be on the general election ballot in 2014. As such, we strongly encourage the Workgroup to further examine approaches to implementing a cap on carbon emissions which would be compatible with a potentially voter-approved carbon tax and dividend.

We also strongly support an intensive effort by Washington State to support the transition of our public utilities away from their continued use of coal-powered electricity generation. We recall the comprehensive, bi-partisan process by which the state assisted Trans-Alta Centralia in developing a plan to shut down their coal-fired power plant in our state, and we agree that it offers a model for transitioning our utilities off of coal, and on to cleaner technologies. We fundamentally endorse the notion that using electricity generated out-of-state by burning coal burdens us with the responsibility for GHG emissions created through its generation. Coal represents one of the single largest contributors of GHGs, and it is critical that we build on existing momentum to transition to cleaner solutions.

Furthermore, just as we believe that importing electricity generated by burning coal leaves us responsible for the resulting emissions, so too do we contest that exporting coal through Washington State leaves us directly responsible for the GHGs emissions that result when that fuel is burned. We acknowledge that Washington has a difficult path in meeting our 2035 emissions targets, but we believe that the final 2050 targets should factor in the projected GHG emissions of any major fossil fuels exported through our state. Surely our extensive efforts to address global climate change would seem paltry if we only succeeded in shifting the burden to other populations around the world.

And finally, we encourage the Workgroup to build on, and strengthen existing paths toward reducing GHG emissions. As residents of Seattle, we are particularly supportive of investments in energy efficiency, and in developing a vastly more robust and comprehensive investment in public transit. We remain excited by the direction of the Workgroup, and encourage its members to be bold, thoughtful, and intently focused on a long-term vision for our state, our children, and our planet.



## Western Washington Clean Cities Coalition

1904 Third Avenue, Suite 105  
Seattle, WA 98101

T: 206.689.4055 • F: 206.343.7522  
[www.wwcleancities.org](http://www.wwcleancities.org)

October 23, 2013

The Honorable Governor Jay Inslee  
Climate Legislative and Executive Workgroup  
P.O. Box 40002  
Olympia, WA 98504

### Comments to the Climate Legislative and Executive Workgroup:

Western Washington Clean Cities Coalition supports Washington State's commitment to reducing greenhouse gas emissions and encourages the State to strongly consider carbon market policies that result in significant transportation emission reductions such as cap and trade, carbon taxes or a low carbon fuel standard.

We need these policies to establish a reliable and stable market for alternative fuels and vehicle technologies, and shift our state's transportation energy to cleaner sources.

Many shifts are already taking place. Western Washington Clean Cities works every day to help fleets transition to lower carbon alternative fuels, and also find more efficient ways to get their work done. We encourage investment in fuels sourced in Washington, which provides economic opportunities – and environmental and health benefits -- for our communities. Last year alone, our members eliminated the use of 15 million gallons of petroleum by using mostly local, sustainable alternative fuels. This in turn reduced 97,000 metric tons of carbon and prevented \$38 million from being spent outside this state on foreign oil.

But more is possible, and much more is needed if we are going to reach the state's emission reduction targets. While our Coalition has demonstrated success with alternative fuels and vehicle technologies, we need a more level playing field to allow these domestic fuels to get a foothold in the Washington state market and become accessible to everyone.

We believe carbon market policies would allow the good work of organizations like Western Washington Clean Cities to expand, and allow our state to play a lead role in benefitting the climate, human health, and our state's economy.

Sincerely,

A handwritten signature in black ink, appearing to read "Stephanie Meyn".

Stephanie Meyn  
Program Manager  
Western Washington Clean Cities Coalition

Climate Workgroup Seattle Hearing  
Bell Harbor Conference Center  
2211 Alaskan Way, Seattle, WA 98121

On October 23, from 6pm-8pm, Governor Inslee and legislators from the Climate Legislative and Executive Workgroup will be holding a public hearing in Seattle to hear from you about climate action. Come to the hearing to show support and raise your voice for meaningful climate action in Washington.

Talking Points:

- Energy Efficiency is at the core of addressing carbon emissions. Reducing consumption reduces emissions.
- There are still significant opportunities for savings in the residential and small commercial energy efficiency retrofit market, and Washington State is helping to lead the way nationally through programs such as CEEP and LIWX
  - These state investments have broad positive societal impacts:
    - Reduce the need to generate new energy through increasingly expensive generation methods, which helps to keep energy rates low
    - Retain affordable housing for low-income residents by improving the efficiency and therefore affordability of the housing, as well as addresses the building's durability
    - Support healthy community initiatives including addressing asthma and other respiratory illnesses through improving the indoor air quality of aging housing stock
    - Creates and supports jobs for local contractors and suppliers. These jobs create revenue for local municipalities through permitting fees and sales tax, as well as revenue at the state level through employment and sales tax
    - By reducing expenses relating to energy costs, homeowners, business owners, and renters have increased funds available for other use

Wade Gardner  
Opportunity Council.

The following information from the Department of Energy details several of the environmental, economic, and social benefits the Low-Income Weatherization Program brings to families and communities:

#### Environmental

- Weatherization measures taken reduce carbon dioxide output by nearly a metric ton per weatherized home. Carbon dioxide is often cited as a likely contributor to global environmental changes.
- Weatherized homes reduce overall energy demands to the residential area, which decreases power plant emissions and associated air pollution.
- Weatherization procedures reduce energy consumption on a national scale and reduce dependency on imported oil.

#### Economic Advantages

- According to ongoing program evaluation, weatherization efforts bring a return of \$1.83 in direct energy savings to the homeowner for every \$1 spent on weatherization.
- Combining both energy-related benefits and non energy-related benefits, the combined return per dollar spent is \$2.69.
- 52 jobs are directly created for each million dollars invested into the weatherization program.

#### Social Benefits

- Prior to weatherization, Lower-income families typically spend around 20% of their total annual income on energy. Weatherization provides a long-term solution for low-income families, protecting them from rising energy prices.

Wade Gardner  
Opportunity Council

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Testimony of Renée Klein,  
President and CEO for the American Lung Association of the Mountain Pacific  
Before the Climate Legislative Executive Workgroup  
Regarding Reducing Green House Emissions in Washington State  
October 23, 2013  
Seattle, Washington

---

Good evening. I'm Renée Klein, president and CEO of the American Lung Association of the Mountain Pacific. Thank you Governor Inslee, and committee members, for working towards solutions to reduce the impact of climate change and greenhouse gas emissions in Washington state.

Our mission work guides us to ensuring everyone has clean and healthy air to breathe – so we are very concerned about climate change and the impact it has on public health and lung health.

The American Lung Association stands strong in supporting a clean fuels standard similar to the California low carbon fuel standard to protect public health and ensure Washington is successful in producing cleaner, healthier and more efficient fuels.

Pollution from cars, trucks, buses and freight transportation sources is responsible for a majority of our region's air quality problems – and our public health suffers from exposure to air pollution.

Dirty air endangers the health of Washingtonians, particularly children, the elderly and the nearly one million residents living with asthma and other respiratory diseases in our state. We are particularly troubled by the effects of poor air quality on children. Children exposed to pollution have a higher chance of developing lung diseases or reduced lung function as adults.

Investing in cleaner fuels will help reduce asthma attacks, lung cancer and lung diseases; will relieve pressure on overcrowded hospitals and emergency rooms; will curb premature deaths AND save health care dollars associated with air pollution.

Let's invest more attention in the air we all breathe. Let's work harder to preserve and protect our communities from air pollution.

Cleaner fuels are a healthy solution for Washington. Taking action TODAY on climate pollution is crucial for our public health; anything less short-changes our children and our health.

Thank you for your time and your attention.

Renée Klein  
President and CEO  
[rklein@lungmtpacific.org](mailto:rklein@lungmtpacific.org)

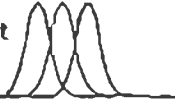
***Fighting for Air***



What is burned in China doesn't stay in China. The coal and oil that we send to China by rail and sea will be sent back to us by air in the form of particulate and carbon based gases with the prospect of cities in Washington becoming as choked with pollution as Chinese cities. Any coal and oil shipped from rail terminals in Washington that is destined to be burned in other nations should be added to our carbon footprint as we are directly involved in their contribution to climate change.

Steve Gons Rexmore WA

Energy Transitions Northwest



Hello my name is Greg Rock with Energy Transitions Northwest. I'm here to urge CLEW to request that SAIC produces a complete climate impact study for our state. By that I mean they should draw a box around Washington State and create quantitative estimates of all the GHG emissions: CO<sub>2</sub>, Methane, Nitrous Oxide and others that are emitted from our state as well as what is being absorbed by our forests and other natural sinks.

This is fairly far removed from SAIC's current methodology which appears to focus primarily on CO<sub>2</sub> emissions created by burning fossil fuels and a few specific non-fossil fuel sources.

While burning fossil fuels is the primary contributor to human induced climate change, reducing those CO<sub>2</sub> emissions is not necessarily the most cost effective way for us to shrink our State's total contribution to global warming.

For example, we have large forests and agricultural lands which leads to significant biomass decomposition. As a result Washington is probably one of the largest producer of naturally occurring methane emissions in the United States. Depending on the time frame you are analyzing Methane is 20 to 60 times more potent a GHG than CO<sub>2</sub>. By capturing and burning this methane we can utilize a domestic renewable energy source that has a negative, mind you not a reduced, but actually a negative GHG emission profile.

While biomass gasification is probably one of the more cost effective mitigation option it and many others are likely to be ignored because this study fails to quantify all the naturally occurring GHG emissions created by our State.

Again, I urge the Climate Legislative and Executive Workgroup to request that SAIC produces a complete climate impact study of all man-made as well as naturally occurring GHG emissions and absorptions for our state. This should be done for today as well as 1990 as that is the baseline we are comparing to.

Thank you,

Greg Rock  
Political Outreach Chair  
Energy Transitions Northwest  
[www.energytransitionsnw.com](http://www.energytransitionsnw.com)

Seattle, WA 98107

My name is David Kendall. I am a recently retired marine biologist with a keen interest in protecting the environment and addressing climate change impacts. I am very concerned about ocean acidification currently impacting Washington State right now, as well as sea level rise, increased wildfires, more intense storms, droughts, loss of glaciers which is dramatically illustrated in the documentary movie: "Chasing Ice". I am profoundly alarmed at the lack of United States action to deal effectively with climate change, and would like to see Washington State be a leader implementing policies that drive solutions. Taking personal responsibility to do something, my wife and I downsized to an all electric solar panel equipped home, and brought an EV, and are presently net electricity producers.

I want to express my strong support for Governor Inslee's Bold efforts and interest in coming up with solutions to Climate Change. I deeply appreciate his efforts on this extremely important issue, and feel bold action is strongly required. As an active member in Citizen's Climate Lobby I would like you to also consider a revenue neutral; carbon tax as a potential alternative. This would be a steadily rising tax at the source, with revenues returned to the public to offset the increased costs of fossil-fuel energy (oil, gas, coal). This would send a clear price signal to the marketplace that carbon based fuels will only get worse as a prospective investment, promoting and driving change to clean renewable energy alternatives. This would avoid the cumbersome regulation or elaborate mechanisms necessitated by a cap and trade approach.

October 23, 2013

Climate Workgroup Hearing

Bell Harbor International Conference Center

Members of the Workgroup,

Before becoming Washington's governor in 2013, Jay Inslee was a champion for clean energy, and it is commendable that we are here today to continue the momentum behind solving this imperative issue.

However, in order to optimize the solutions to the situation we are in, it is necessary to prioritize the precious assets and funds that we have as a state and a community. It's surprising to a broad range of people in our community that Governor Inslee's first state bill upon taking office was to push through a \$130 million spending bill for the highly controversial Yakima Basin Plan that is ostensibly to help the valley's agricultural industry adapt to climate change.

The plan, which will ultimately cost taxpayers more than \$5 billion, includes two massive, destructive, and highly contentious new dams. In the era of celebrating the decommissioning of the Elwha dam and the return of a more natural ecosystem, this appears on the surface to be another excuse for the Bureau of Reclamation to revive the same water management practices that helped decimate Northwest fisheries in the first place. "It's hard to imagine that there is any benefit so great that it would justify building another dam," says John Osborn, director of the Sierra Club's Columbia River Future Project.

The State of Washington, the taxpayers in this room, and the rest of the country can't afford to waste billions of dollars responding to climate change by building wasteful and environmentally damaging storage dams for irrigators, particularly when mandatory conservation and water marketing have been left off the table.

Climate action is essential and there is broad support for it both inside and outside this room. My request is that you prioritize real solutions and not embrace political boondoggles such as the Yakima Plan.

Thank you,

Chris Maykut

Seattle, WA 98103



Statement before the Climate Legislative and Executive Workgroup

by Rob Smith, Northwest Regional Director

National Parks Conservation Association

October 23, 2013 in Seattle, WA

Governor Inslee and members of the Workgroup,

I am Rob Smith, Northwest Regional Director for the National Parks Conservation Association. NPCA is a national non-partisan organization with more than 26,000 members and supporters here in Washington who are dedicated to protecting America's national parks.

The national parks which surround Seattle offer important reminders about why it is important to reduce human-caused carbon dioxide pollution.

North Cascades National Park is home to one third of all glaciers within the Lower 48 states and they are all in retreat due to the warming climate. That means less water and earlier runoff into Ross Lake reservoir, making it more difficult to balance recreation, fish runs and power generation. Customers of Seattle City Light rely on 24% of our electricity from the Ross power house.

Mt. Rainier National Park is losing its subalpine meadows to forests as the climate changes. Paradise could become Paradise Lost as less snowfall allows trees to invade where wildflowers now bloom.

Olympic National Park has glaciers which feed the headwaters of the Elwha River, now being restored with the removal of dams. But shrinking glaciers has reduced streamflow in the Elwha by 25% during the late summer and fall period favored by the threatened Chinook salmon.

And a thousand miles to the east is the huge Colstrip coal-fired power plant in Montana, one-third owned by Puget Sound Energy. The Colstrip plant contributes to the carbon load in the atmosphere which ultimately melts our snowfields and glaciers here in Washington.

Our national parks are letting us know that carbon pollution is a problem. Please act before the last glaciers melt and while there is still time to pass on Washington's great natural heritage to future generations.

Thank you.

Northwest Regional Office

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Susan  
Thoman

## ~~DRAFT~~ Cedar Grove Testimony

### Introduction:

Thank you Governor Inslee and honorable committee members. My name is Susan Thoman and my company, Cedar Grove Composting, is ready to write the next chapter in organics recovery in our state by taking the food scraps and other organic inputs from our homes, workplaces and schools to make fuel and provide local jobs in the clean energy sector.

We have reviewed the consultant reports and understand that Washington will not reach its statutory reduction goals without new policy tools. We are pleased to be able to share our experiences in how good environmental policies can drive job creation.

[66 words]

### Company Commercial—What you do:

Cedar Grove Composting reduces greenhouse gas emissions by recycling organic waste into high quality soils for garden, landscaping, storm water management and agricultural uses. To date, the existence of Cedar Grove's program has resulted in the avoidance of over 5.4 million metric tonnes of carbon from being emitted.

The next generation of organic waste management is to extract the energy out of food and yard waste before we turn it into compost. This anaerobic digestion technology creates a renewable natural gas that can displace petroleum use in vehicles.

[75 words, 141 total]

### Recommendations—What you want:

One of the policies your consultant evaluated was a clean fuels standard. A clean fuels standard would provide a more favorable economic environment to extract the latent energy of our organic waste and turn it into a zero-carbon fuel source for our transportation sector. If enacted, a clean fuels standard would help Cedar Grove create more clean energy investment and clean energy jobs in Washington State.

[66 words, 217 total]

### Conclusion:

I appreciate your engagement in this issue. Cedar Grove Composting looks forward to working with you to create clean energy jobs as we transition to a low-carbon economy.

[27 words, 244 total]

Governor Inslee, members of the Climate Action Workgroup, thank you for allowing us to share our thoughts. My name is Margo Polley from North Bend, Washington. My comments are based on the article last year by Bill McKibben, Climate Change's Terrifying New Math. I earnestly ask that you read it carefully, and I have a copy here to submit to you.

There are three numbers in the terrifying new math.

The first number is 2 degrees Celsius. The US and 166 other nations signed the Copenhagen Summit agreement to limit global warming to 2 degrees. It is the number beyond which life on this planet is threatened, and, in fact, many scientists believe it is far too lenient a target. Some even call it a "suicide pact". We are currently at 1 degree of warming and we see 1/3 of the arctic sea ice gone, our oceans are 1/3 more acidic, super storms such as Katrina and Sandy ravage our cities; we see more and larger wild fires, and increased flooding and devastating droughts result in severe impacts on agricultural areas world-wide. At 2 degrees, we will see more and more unprecedented storms and weather conditions; we will run out of potable water and food for the planet.

The second number is 565 gigatons. Scientists predict the global community can pour another 565 gigatons of carbon into the atmosphere before we hit 2 degrees of warming. At our current rate this will occur in 15 years.

The third number: 2,795 gigatons. This is the amount of coal, oil and gas reserves already discovered, identified, on the balance sheets, and stockholder portfolios, of the fossil fuel companies. We must keep 4/5 of this carbon **IN THE GROUND**. ... A critical first step is to transition off of coal and fossil fuel as fast as we can.

The first thing to do is to get my power provider, Puget Sound Energy, to retire their coal plant in Montana – which supplies 30% of their power.

The second thing, put a price on carbon - a revenue-neutral carbon tax that can be recycled back to reduce property tax, sales taxes and B&O taxes – a big win for everyone.

The third thing: develop a 20-year plan that gets us to a fossil-free future.

The next 20 years will be the most important in human history. As Bill McKibben has said, we are the first generation to feel the effects of climate change, and we are the last generation that can do something about it. Climate change is real; it is terrifying. If we don't stop it, we will not survive it. Thank you.

Hello,

My name is Sara Grendon. I'm 16. 16. Now being this young I should theoretically have lots of time left on this planet, but I don't. It's not like I'm gonna die or anything, but THIS planet as it is now won't exist in my adult life. Not if we don't seriously change the way we approach energy. Which is why I implore you, make a carbon neutral plan and do it fast. Because the latest science demonstrates that if we're going to prevent the furthering of climate change we must do it NOW, in THIS decade.

I've grown up with a cartoon on my refrigerator that depicts a young boy talking to his grandpa in a post apocalyptic scene and he's asking him "where were you when all this was happening" don't let us have to ask you that! Don't let me, my generation, our kids, and there kids have to ask "what were you doing while this was happening"

As children and young adults we have to trust that the politicians and the people with power will make choices in our best interest. In this decade that means getting to carbon neutral, not in 25 years or 50, because then it will be too late, but NOW. The children and young adults of today need YOU to protect US and our future by protecting the planet. Don't let your children have to ask you "where were you when all this was happening"

Input to Climate Leg + Exec Workgroup

To achieve the goals of growing more sustainable, clean, green jobs and businesses located in WA and expanding use of renewable energy, it is critically important to have customer cost recovery incentives that encourage BOTH Made-In-WA solar/wind components AND based-in-WA installers (such as the business that installed my solar panels last year).

I think we need to add to the current incentive system a requirement to use headquartered and based in Washington installers.

The incentive system also needs to be extended because it currently expires in 2020. So as long as the law needs to be revamped, now is the perfect time to add an enhancement for the jobs and businesses that install solar energy like the current enhancement for businesses that make solar energy systems.

Joan Schrammeck

Camano Island, WA 98282

Also "Cap" but "no trade."

Also No NEW dams!

particularly on Skykomish,

Instead: Efficiency / conservation

## Emerald Services Testimony

### Introduction:

Thank you Governor and honorable committee members. My name is John Brigham and my company Emerald Services is providing jobs in the clean energy sector in Tacoma and Seattle.

We have reviewed the consultant reports and understand that Washington will not reach its statutory reduction goals without new policy tools. We are pleased to be able to share our experiences in how good environmental policies can drive job creation.

[69 words]

### Company Commercial—What you do:

Emerald Services recycles used motor oil to displace the need for new barrels of petroleum. Our 371 employees turn a hazardous waste problem for hundreds of Washington businesses into a revenue stream for them, while creating recycled petroleum products for other Washington businesses.

Last year, Emerald Services invested \$13 million to build a state-of-the-art recycling facility in Tacoma.

[58 words, 127 total]

### Recommendations—What you want:

One of the policies your consultant evaluated was a clean fuels standard. A clean fuels standard would provide a more favorable economic environment to recycle used motor oil into a transportation fuel. This is especially viable in the maritime industry, where our low-sulfur, recycled fuel can help the shipping industry meet EPA standards for reduced sulfur emissions in the Puget Sound.

[61 words, 188 total]

### Conclusion:

I appreciate your engagement in this issue. Emerald Services looks forward to working with you to create clean energy jobs as we transition to a low-carbon economy.

[27 words, 215 total]

John F. R. L.  
Emerald Services, Inc.



**Climate Legislative and Executive Workgroup  
Public Hearing - October 23, 2013**

**Comments of Sara Patton, Executive Director of NW Energy Coalition**

Thank you for this opportunity. My name is Sara Patton, executive director of the NW Energy Coalition. First let me say that Governor Inslee's climate leadership and his recommendations to this Workgroup both delight and inspire all of us at the Coalition

Our policymakers, citizens and businesses face no greater challenge than climate change. Climate change will disrupt all aspects of our economy and environment, from agriculture to hydropower. Low- and moderate-income communities will bear a disproportionate share of the burdens of climate change. Failing to address the causes of climate change will cost far more than acting now to transform our economy and reduce climate pollution. It is critical to recognize the real economic benefit -- not just cost -- of investing in change. We expect you, as state leaders, to address this challenge head-on so the people and businesses of our state can enjoy the economic benefits and avoid the burdens.

No silver-bullet policy can by itself reduce emissions to levels science says we must meet while we move to an economy based on clean energy technologies. Washington state must maintain **and augment** its portfolio of successful policies.

According to the SAIC report, the Clean Energy Initiative (I-937) is our **largest single emissions-reduction policy through 2020**. The legislature and Governor must maintain the I-937's goals, timelines and resources to keep Washington on-path to reduced greenhouse gas emissions and associated economic and environmental benefits.

The SAIC report also stresses the substantial emissions savings potential from improving our energy code for buildings. In 2010, our legislature called for energy codes that make new buildings and major retrofits use 70% less energy in 2030. This kind of policy drives innovation. Our state building code council needs more resources to work effectively with the building community for highly efficient, low-carbon buildings.

In addition to Washington's existing policies, the state should signal the marketplace that carbon dioxide emissions come with limits and costs. This signal will stimulate investment in efficiency, renewable energy and clean fuels while allowing the market to determine the least-cost strategy for maximum emissions reductions.

Thank you.

Our economy depends on the transportation industry's ability to move goods in a timely and cost effective way, to and from our ports. Many regulations have a dramatic impact on shipping, trucking, and rail.

Carbon regulation is stifling economic growth with uncertainty and over regulation.

Penalizing people for VMT will reduce personal choices when making decisions about where to live and available job opportunities.

Clean energy is a mainstay of Washington energy production, with hydroelectric power being the largest source of clean energy.

In 2011, Washington was the leading producer of electricity from hydroelectric sources and produced 29 percent of the Nation's net hydroelectric generation. This energy is renewable, reliable, and resilient.

We should also produce additional clean energy through nuclear power, a method used throughout France. The French utility EDF operates 59 nuclear plants that generate more than 75% of the country's energy.

They are energy independent and have created real jobs and prosperity for the French people.

France, a country roughly the size of the Pacific NW, is the world's largest net exporter of electricity due to its very low cost of generation. Gains are over 3 billion EUR, 4 billion US dollars per year from this commerce. They are now building plants in the UK.

We can all agree that Co2 is 400 PPM of our atmosphere and that this number equates to .040 of one percent.

What is the economic cost of these trace gas regulations?

Are they necessary?

Rather than trying to reduce trace GHG's through social engineering, expensive rail projects, reducing VMT, densification of our urban areas let's get to work on building clean energy that is proven, cost effective and will reduce our dependence on imported energy.

Laurie Lyford

Bellevue, WA 98004

My Name Is Steve Marquis, Fall City, I am an Electronic Engineer by trade and a student on the topic of government and climate science. I have before me the US senate report endorsed by name by 700 of the world's top climate scientist dissenting from the view that human behavior is the significant cause of Global warming.

Here is another; An open letter to the UN Sec General signed by 125 more of the world's top climate scientists. "We the undersigned, qualified in climate-related matters, wish to state that current scientific knowledge does not substantiate your assertions."

Here are links to 1100+ Peer-Reviewed Papers rejecting the notion of human caused Global Warming.

This has become a political tool searching for a scientific justification; not the other way around.

- **"We've got to ride the global-warming issue. Even if the theory of global warming is wrong, we will be doing the right thing, in terms of economic policy and environmental policy."** Timothy Wirth, Clinton Administration Under Secretary of State
- **"No matter if the science is all phony, there are collateral environmental benefits...Climate change provides the greatest chance to bring about justice and equality in the world."** Christine Stewart, former Canadian Environment Minister
- **"The trick may be to decide on the main message and use that to guide what's included and what is left out [of the IPCC Reports]."** Jonathan Overpeck, Director, Institute for the Study of Planet Earth, University of Arizona
- **"Kevin and I will keep them out [of the IPCC Report] somehow - even if we have to redefine what the 'peer-review literature' is!"** Phil Jones, Director of Climate Research Unit, UEA, UK.

The Science is far from settled and the utterly phony claim of 97% consensus was actually derived from one more agenda-driven computer model just scanning papers for certain words. This arrogant author that other alarmists are now endlessly quoting never bothered to ask the scientist directly, but a lot of those scientist are now demanding he redact their name from his report!

This is far from settled, It would be wrong to disparage or simply dismiss the credentials of these top minds. For example MIT Scientist professor Robert Rose, linked warming and cooling cycles to the "orbit and the tilt and wobble of the axis of the Earth's spin. He questioned climate model predictions stating, "Clearly, these are not 'facts.' ...these models appear to be incorrect," "Cooler heads [are] needed in the global warming debate,"

I would urge you to follow this advice and go slow and let the science catch up with this **rush to do something**. Tim Barnett, Scripps Institution of Oceanography, USA said "I doubt the modeling world will be able to get away with this [tuning] much longer."

Fearing exactly that Tommy Wils, Swansea University worried **"What if climate change appears to be just mainly a multidecadal natural fluctuation? They'll kill us probably."**

I hope not, but I leave you with the cogent advice of Henk Tennekes, Dutch Royal Meteorological Institute who said, **"We only understand 10 percent of the climate issue. That is not enough to wreck the world economy with Kyoto-like measures."**

# Consensus is a self-proclaimed notion by eco-alarmists

- **As a practical matter of politics, nobody knows what Kyoto is or what it commits us to.**  
Michael Ignatieff , former leader, Liberal Party of Canada
- **The Kyoto Protocol is a political solution to a non-existent problem without scientific justification.**  
Dr. Timothy Ball, former climatology professor
- **Isn't the only hope for the planet that the industrialized civilizations collapse? Isn't it our responsibility to bring that about?**  
Maurice Strong, Senior Advisor to UN Secr-General Kofi Annan
- **Consensus is the business of politics. If it's consensus, it isn't science. If it's science, it isn't consensus. Period.**  
Michael Crichton, author
- **Until a continuous climate observing system is established, both climate models and observations will remain uncertain.**  
Wielicki et al. Science June 21, 2002
- **We can no longer absolutely conclude whether globally the troposphere is cooling or warming relative to the surface.** Thorne et al, BAMS Oct 2005
- **We only understand 10 percent of the climate issue. That is not enough to wreck the world economy with Kyoto-like measures.**  
Henk Tennekes, former research director, Dutch Royal Meteorological Institute
- **The minute you begin to believe your own hypothesis, you're a dead duck as a scientist.**  
Frank Beales - former U. of Toronto Professor
- **We've got to ride the global-warming issue. Even if the theory of global warming is wrong, we will be doing the right thing, in terms of economic policy and environmental policy.**  
Timothy Wirth, Clinton Administration Under Secretary of State
- **Not only do journalists not have a responsibility to report what skeptical scientists have to say about global warming, they have a responsibility not to report what these scientists say.**  
Ross Gelbspan, former editor of The Boston Globe
- **I would freely admit that on global warming we have crossed the boundary from news reporting to advocacy.**  
Charles Alexander, Time magazine science editor
- **I think if we don't overthrow capitalism, we don't have a chance of saving the world ecologically.** Judi Bari, Earth First! Member
- **No matter if the science is all phony, there are collateral environmental benefits...Climate change provides the greatest chance to bring about justice and equality in the world.**  
Christine Stewart, former Canadian Environment Minister

- **Skepticism is the highest of duties, and unverified belief the one unpardonable sin.**  
Thomas H. Huxley, Biologist
- **Some people will do anything to save the earth . . . except take a science course.**  
P. J. O'Rourke, author, journalist
- **A global warming treaty must be implemented even if there is no scientific evidence to back the [enhanced] greenhouse effect.** Richard Benedick, deputy assistant secretary of state, USA
- **We have to offer up scary scenarios (about global warming) ... each of us has to decide what the right balance is between being effective and being honest.**  
Stephen Schneider, Stanford University environmentalist
- **I've just completed Mike's Nature trick ... to hide the decline.** Phil Jones, Director of Climate Research Unit, UEA, UK.
- **Mike, Can you delete any emails you may have had with Keith regarding the latest IPCC report? Keith will do likewise. ...Can you also email Gene and get him to do the same?**  
Phil Jones, Director of Climate Research Unit, UEA, UK
- **There is no reason to give them any data, in my opinion, and I think we do so at our own peril**  
Michael Mann, Director Earth System Science Center, Pennsylvania State University
- **The fact is that we can't account for the lack of warming at the moment and it is a travesty that we can't.** Kevin Trenberth, National Center For Atmospheric Research, USA
- **We are nowhere close to knowing where energy is going or whether clouds are changing to make the planet brighter ... We are not close to balancing the energy budget.**  
Kevin Trenberth, National Center For Atmospheric Research, USA
- **No reviewer has ever asked to see the data.** Phil Jones, Director of Climate Research Unit, UEA, UK.
- **Kevin and I will keep them out [of the IPCC Report] somehow - even if we have to redefine what the "peer-review literature" is!** Phil Jones, Director of Climate Research Unit, UEA, UK.
- **If they [McIntyre and McKlrick] ever hear there is a Freedom of Information Act now in the United Kingdom, I think I'll delete the file rather than send it to anyone.**  
Phil Jones, Director of Climate Research Unit, UEA, UK.
- **If I were on the greenhouse deniers' side, I would .. focus on the wide range of paleoclimatology results and the differences between them as an argument for dismissing them all.** Tom Wigley, University Corporation for Atmospheric Research
- **Mike, the figure you sent is very deceptive [...] there have been a number of dishonest presentations of model results by individual authors and by IPCC** Tom Wigley, University Corporation for Atmospheric Research, USA



- **Observations do not show rising temperatures throughout the tropical troposphere ... This is just downright dangerous.** Peter Thorne, Hadley Centre, Met Office, UK
- **The trick may be to decide on the main message and use that to guide what's included and what is left out [of the IPCC Reports].** Jonathan Overpeck, Director, Institute for the Study of Planet Earth, University of Arizona
- **But it will be very difficult to make the MWP [Medieval Warm Period] go away in Greenland.** Henry Pollack, University of Michigan
- **What if climate change appears to be just mainly a multidecadal natural fluctuation? They'll kill us probably.** Tommy Wils, Swansea University
- **Weighting the solar irradiance more strongly in the models, then much of the 19th to mid 20th century warming can be explained from the sun alone.** Rob Wilson, School of Geography & Geosciences, University of St Andrews
- **I am not convinced that the 'truth' is always worth reaching if it is at the cost of damaged personal relationships"** Thomas J. Crowley, Nicholas School of the Environment and Earth Sciences, Duke University
- **This will reduce the 1940-1970 cooling in Northern Hemisphere temperatures. Explaining the cooling with sulphates won't be quite as necessary.** Phil Jones, Director of Climate Research Unit, UEA, UK
- **It is interesting to see the lower tropospheric warming minimum in the tropics in all three plots, which I cannot explain. ...It is remarkably robust against my adjustment efforts.** Leopold Haimberger, Department of Meteorology and Geophysics, University of Vienna
- **I also got recently a paper from Rob which says 'London's UHI [Urban Heat Island effect] has indeed become more intense since the 1960s especially during spring and summer'** Geoff Jenkins, Met Office, UK
- **We found the [urban warming] effect is pretty big in the areas we analyzed. Unfortunately, when we sent our comments to the IPCC AR4, they were mostly rejected.** Guoyu Rean, National Climate Centre (NCC) of China, Beijing
- **I'm sure you agree--the Mann/Jones GRL paper was truly pathetic and should never have been published.** Raymond S. Bradley, Director, Climate System Research Center, University of Massachusetts
- **How can we be critical of Crowley for throwing out 40-years in the middle of his calibration, when we're throwing out all post-1960 data** Tim Osborn, Climatic Research Unit, UEA, UK
- **It will not be models or theory, but observation that will provide the answer to the question of how the climate will change in many decades time.** Andrew Watson, School of Environmental Sciences, UEA, UK
- **There is no individual model that does well in all of the SST [sea surface temperature] and water vapor tests we've applied.** Ben Santer, Lawrence Livermore National Laboratory, USA

- **I doubt the modelling world will be able to get away with this [tuning] much longer.**  
Tim Barnett, Scripps Institution of Oceanography, USA
- **So using the 20th century for tuning [the IPCC models] is just doing what some people have long suspected us of doing** Gabriele Hegerl, Nicholas School for the Environment and Earth Sciences, Duke University
- **Basic problem is that all models are wrong - not got enough middle and low level clouds.**  
Phil Jones, Director of Climate Research Unit, UEA, UK.
- **I've been told that IPCC is above national FOI Acts. One way to cover yourself and all those working in AR5 would be to delete all emails at the end of the process**  
Phil Jones, Director of Climate Research Unit, UEA, UK.
- **Any work we have done in the past is done on the back of the research grants we get - and has to be well hidden.** Phil Jones, Director of Climate Research Unit, UEA, UK.
- **Very little research has ever been funded to search for natural mechanisms of warming... it has simply been assumed that global warming is manmade.**  
Roy W. Spencer, University of Alabama in Huntsville
- **Everyone in IPCC WG3 should be terminated and, if the institution is to continue, it should be re-structured from scratch.** Steve McIntyre, Climate Audit
- **Why should I make the data available to you, when your aim is to try and find something wrong with it?**  
Phil Jones, Director of Climate Research Unit, UEA, UK
- <http://www.friendsofscience.org>
- <http://envirottruth.org/516.html>
- **1100+ Peer-Reviewed Papers Supporting Skeptic** <http://www.populartechnology.net/2009/10/peer-reviewed-papers-supporting.html>
- **125 scientists do not substantiate Ban Ki-Moon assertions on weather and climate**  
<http://opinion.financialpost.com/2012/11/29/open-climate-letter-to-un-secretary-general-current-scientific-knowledge-does-not-substantiate-ban-ki-moon-assertions-on-weather-and-climate-say-125-scientists/>
- **Senate report 700 International Scientists Dissent**  
[http://www.epw.senate.gov/public/index.cfm?FuseAction=Minority.Blogs&ContentRecord\\_id=2674e64f-802a-23ad-490b-bd9faf4dcdb7](http://www.epw.senate.gov/public/index.cfm?FuseAction=Minority.Blogs&ContentRecord_id=2674e64f-802a-23ad-490b-bd9faf4dcdb7)

Brenna Davis  
[brenna.davis@vmmc.org](mailto:brenna.davis@vmmc.org)

WRITTEN TESTIMONY OF  
BRENNA M. DAVIS  
DIRECTOR OF SUSTAINABILITY, VIRGINIA MASON MEDICAL CENTER

CLIMATE LEGISLATIVE AND EXECUTIVE WORKGROUP  
PUBLIC HEARING#2, SEATTLE, WA  
OCTOBER 23, 2013

INTRODUCTION

Governor Inslee and members of the Climate Legislative and Executive Workgroup, it is an honor to speak to you today in regard to reducing Greenhouse Gas Emissions in Washington State. I am the director of Sustainability at Virginia Mason Medical Center. At Virginia Mason, we see the interconnection between reducing our environmental impact and providing the highest quality of care. When we conserve our resources, we reduce the cost of providing the highest quality care. When our team members use alternative transportation, they not only reduce particulate emissions, but also make it easier on our patients with asthma and other respiratory illness. When we move to green cleaning, we also reduce the incidents of environmental illness. And when we partner with organizations that preserve the natural environment, we also preserve opportunities for our patients to stay fit and reduce stress levels.

The recent International Panel on Climate Change report confirms that the climate is “unequivocally warming” and that greenhouse gas levels are now the highest they’ve been in at least the last 800,000 years. The latest report also tells us that human activity has very likely caused this warming and that it will go on for centuries, even if we stop our emissions now. By the end of the century, our grandchildren will live with not only increased sea levels, but also shifts in our climate that are likely to cause increased drought, heavier precipitation events, and increased storms, which will make providing basic needs and reliable infrastructure more difficult.<sup>1</sup>

The World Health Organization has confirmed that shifting climate patterns could significantly affect human health across the globe. Anticipated effects include an increase in diseases associated with poverty, and emergencies arising from extreme weather events and disease outbreaks.<sup>2</sup>

Virginia Mason is committed to improving the health of our patients-- and the health of the generations to come. The linkage between human health and the health of the natural environment

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<sup>1</sup> International Panel on Climate Change, *Climate Change 2013: The Physical Science Basis, Approved Summary for Policy Makers*, 2013.

<sup>2</sup> World Health Organization, *Atlas of Health and Climate*, 2012.

are well documented. For this reason, we support a comprehensive climate change strategy in Washington State.

The Virginia Mason team is actively working to reducing our carbon footprint in all areas of our operations. Our biggest successes have been in waste reduction—together with our patients, we've reduced **600 tons of food waste through composting**, recycled over **3,000 tons of waste**, which includes recycling over **5 tons of plastic packaging from our operating room** every year.

Virginia Mason has also led environmental efforts in the region by serving on the board of the Seattle 2030 District. In addition, we have partnered with Seattle Public Utilities, Seattle City Light, and Puget Sound Energy to fund small scale retrofits of equipment that have reduced our carbon footprint with great success. Working with our partners we have saved **4 million gallons of water** and **cut our electricity use by 8 million kilowatt hours** per year across our campuses.

As much as we enjoy working with our conservation partners, the paper work can be time consuming, there is no standard paperwork, and their funding is limited. Since the energy consumption from buildings makes up 44.6%<sup>3</sup> of all carbon emissions, we encourage the committee to consider a more generous, streamlined, and standardized process for large-scale retrofits of existing buildings. With this improved efficiency effort, we may realize a more rapid improvement in building efficiency to meet the state's 2050 goal.

Nearly 70% of all of our regions' air emissions comes from vehicles, which emit more greenhouse gas than any other source in our region.<sup>4</sup> Creating a zero emission vehicle mandate, such as considered in the CLEW report, will reduce emissions. At the same time, we should not forget our transit system, which is currently in crisis. We recommend refocusing efforts on creating a best-in-class transit system that encourages our citizens to bus, bike, and walk to work. 70% of Virginia Mason team members are leading this effort by commuting to work using alternate transportation. However, even this group's enthusiasm is threatened by crippling cuts to transportation funding. This should never happen in a state with such a profound commitment to reducing our greenhouse gas emissions.

Thank you for the opportunity to share with you today. Virginia Mason will continue to work on reducing our carbon footprint to protect the health of both our patients and future generations. It was an honor to comment on your historic and important climate change leadership effort.

Brenna Davis  
Director of Sustainability  
Virginia Mason Medical Center  
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cc: Katerie Chapman, Vice President of Perioperative and Support Services  
Kathleen G. Paul, Vice President of Communications & Public Policy  
Ross C. Baker, Public Policy Direc

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<sup>3</sup> [http://architecture2030.org/the\\_problem/problem\\_climate\\_change](http://architecture2030.org/the_problem/problem_climate_change)

<sup>4</sup> <http://www.pscleanair.org/programs/climate/transportation.aspx>

Testimony to the Climate Legislative and Executive Workgroup  
October 23, 2013

Mike Ruby - Seattle

I'd like to call your attention to the recently issued Summary for Policymakers of the 5<sup>th</sup> Assessment Report of the Intergovernmental Panel on Climate Change. The scientists who wrote that report have been working for many years on measuring and modeling greenhouse gases in the atmosphere. They have developed reasonably accurate numbers for the emissions that have occurred over time. They have now agreed on an estimate of just how much more emissions the earth can tolerate and still maintain an average temperature increase of less than 3.6 degrees Fahrenheit (2 degrees Celsius), the target that was agreed to by the world's nations attending the UN Climate Change Conference [pursuant to a treaty ratified by the United States] last year in Qatar. I am providing you with the pertinent chapter of that report.

Their report provides, as scientists often do, a range of values. The central value is 3083 [gigatons] billion tons of carbon dioxide equivalent (GtCO<sub>2</sub>e) [they express their numbers as "carbon" rather than "carbon dioxide", which requires an adjustment by a factor of 3.67]. [That figure takes into account a range of other factors besides just the carbon dioxide emissions that will determine the eventual global average temperature change given that loading of carbon dioxide.] That is the total that can be tolerated, but they calculate 1949 billion tons CO<sub>2</sub>e have already been released by 2011. Thus the net available going forward is just 1134 billion tons CO<sub>2</sub>e.

When the world's nations assemble this November in Warsaw for the next meeting of the UN Climate Change Conference they are tasked with deciding how to apportion that remaining amount among the world's people. We can be certain there will be a major dispute. If they just allocate the remaining amount by the population of each country, we can calculate that the amount allowed for Washington state would be 1.07 billion tons CO<sub>2</sub>e. If they were to agree to allocate the remainder by the relative size of the current economies of each country [using gross domestic product], the amount that would be assigned to Washington state would be 5.54 billion tons CO<sub>2</sub>e. It is unlikely that the China, India, Brazil, etc. emerging economies of the world would agree to allow the U.S. to claim the lion's share that would come by a relative economies approach, so this should be considered a far upper limit of what is likely.

According to the greenhouse gases emission inventory compiled by the Washington Department of Ecology, the 2010 annual emissions of greenhouse gases in Washington state was 96.1 million tons CO<sub>2</sub>e. If we are able to keep our state emissions from growing any more as our economy grows over the coming years, in other words, stay right where we are, we would exhaust a population-based allocation in just 11.2 years and an economy-based allocation in 57.6 years. If we can reduce our emissions significantly over the coming years, these "drop dead" dates would extend.

Based on this range, it would appear to be judicious for Washington state to plan on achieving zero anthropogenic greenhouse gas emissions within 20 to 25 years. Now stop and think for a minute just what that means. We need to completely move away from using any fossil fuel combustion within 25 years. No natural gas for our homes; no gasoline for our cars; no diesel for our buses and ferry boats. As they say, the impossible will take a little time. So if we are to have a vibrant economy then, we can't wait to start. We need to have action now to begin creating the economy of the future.



**Working Group I Contribution to the IPCC Fifth Assessment Report  
Climate Change 2013: The Physical Science Basis  
Summary for Policymakers**

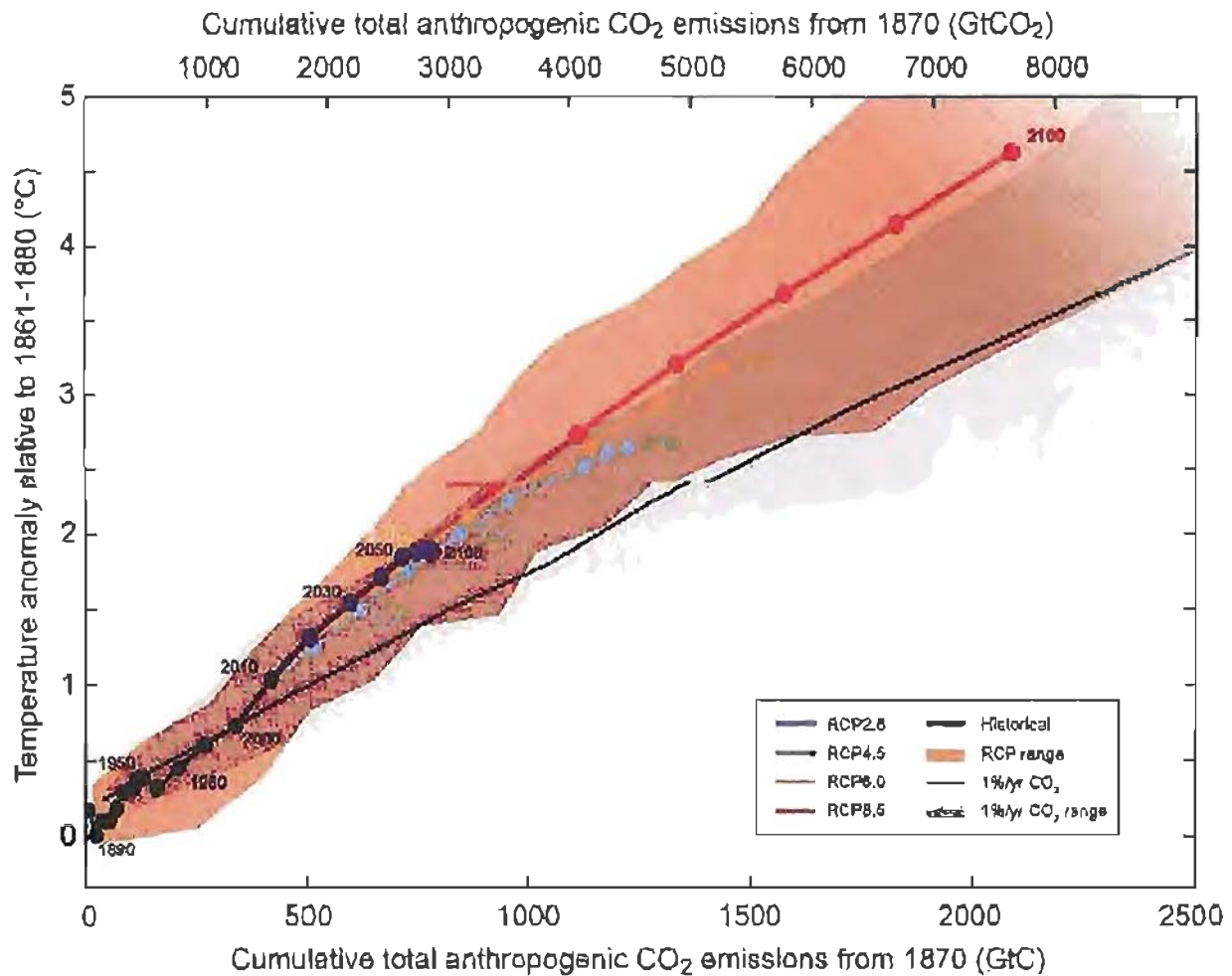
***E.8 Climate Stabilization, Climate Change Commitment and Irreversibility***

Cumulative emissions of CO<sub>2</sub> largely determine global mean surface warming by the late 21st century and beyond (see Figure SPM.10). Most aspects of climate change will persist for many centuries even if emissions of CO<sub>2</sub> are stopped. This represents a substantial multi-century climate change commitment created by past, present and future emissions of CO<sub>2</sub>. {12.5}

- Cumulative total emissions of CO<sub>2</sub> and global mean surface temperature response are approximately linearly related (see Figure SPM.10). Any given level of warming is associated with a range of cumulative CO<sub>2</sub> emissions<sup>21</sup>, and therefore, e.g., higher emissions in earlier decades imply lower emissions later. {12.5}
- Limiting the warming caused by anthropogenic CO<sub>2</sub> emissions alone with a probability of >33%, >50%, and >66% to less than 2°C since the period 1861–1880<sup>22</sup>, will require cumulative CO<sub>2</sub> emissions from all anthropogenic sources to stay between 0 and about 1560 GtC, 0 and about 1210 GtC, and 0 and about 1000 GtC since that period respectively<sup>23</sup>. These upper amounts are reduced to about 880 GtC, 840 GtC, and 800 GtC respectively, when accounting for non-CO<sub>2</sub> forcings as in RCP2.6. An amount of 531 [446 to 616] GtC, was already emitted by 2011. {12.5}
- A lower warming target, or a higher likelihood of remaining below a specific warming target, will require lower cumulative CO<sub>2</sub> emissions. Accounting for warming effects of increases in non-CO<sub>2</sub> greenhouse gases, reductions in aerosols, or the release of greenhouse gases from permafrost will also lower the cumulative CO<sub>2</sub> emissions for a specific warming target (see Figure SPM.10). {12.5}
- A large fraction of anthropogenic climate change resulting from CO<sub>2</sub> emissions is irreversible on a multi-century to millennial time scale, except in the case of a large net removal of CO<sub>2</sub> from the atmosphere over a sustained period. Surface temperatures will remain approximately constant at elevated levels for many centuries after a complete cessation of net anthropogenic CO<sub>2</sub> emissions. Due to the long time scales of heat transfer from the ocean surface to depth, ocean warming will continue for centuries. Depending on the scenario, about 15 to 40% of emitted CO<sub>2</sub> will remain in the atmosphere longer than 1,000 years. {Box 6.1, 12.4, 12.5}
- It is *virtually certain* that global mean sea level rise will continue beyond 2100, with sea level rise due to thermal expansion to continue for many centuries. The few available model results that go beyond 2100 indicate global mean sea level rise above the pre-industrial level by 2300 to be less than 1 m for a radiative forcing that corresponds to CO<sub>2</sub> concentrations that peak and decline and remain below 500 ppm, as in the scenario RCP2.6. For a radiative forcing that corresponds to a CO<sub>2</sub> concentration that is above 700 ppm but below 1500 ppm, as in the scenario RCP8.5, the projected rise is 1 m to more than 3 m (*medium confidence*). {13.5}

- Sustained mass loss by ice sheets would cause larger sea level rise, and some part of the mass loss might be irreversible. There is *high confidence* that sustained warming greater than some threshold would lead to the near-complete loss of the Greenland ice sheet over a millennium or more, causing a global mean sea level rise of up to 7 m.
- Current estimates indicate that the threshold is greater than about 1°C (*low confidence*) but less than about 4°C (*medium confidence*) global mean warming with respect to pre-industrial. Abrupt and irreversible ice loss from a potential instability of marine-based sectors of the Antarctic Ice Sheet in response to climate forcing is possible, but current evidence and understanding is insufficient to make a quantitative assessment. {5.8, 13.4, 13.5}
- Methods that aim to deliberately alter the climate system to counter climate change, termed geoengineering, have been proposed. Limited evidence precludes a comprehensive quantitative assessment of both Solar Radiation Management (SRM) and Carbon Dioxide Removal (CDR) and their impact on the climate system. CDR methods have biogeochemical and technological limitations to their potential on a global scale. There is insufficient knowledge to quantify how much CO<sub>2</sub> emissions could be partially offset by CDR on a century timescale.
- Modelling indicates that SRM methods, if realizable, have the potential to substantially offset a global temperature rise, but they would also modify the global water cycle, and would not reduce ocean acidification. If SRM were terminated for any reason, there is *high confidence* that global surface temperatures would rise very rapidly to values consistent with the greenhouse gas forcing. CDR and SRM methods carry side effects and long-term consequences on a global scale. {6.5, 7.7}

**Figure SPM.10** (Following page): Global mean surface temperature increase as a function of cumulative total global CO<sub>2</sub> emissions from various lines of evidence. Multi-model results from a hierarchy of climate-carbon cycle models for each RCP until 2100 are shown with coloured lines and decadal means (dots). Some decadal means are indicated for clarity (e.g., 2050 indicating the decade 2041–2050). Model results over the historical period (1860–2010) are indicated in black. The coloured plume illustrates the multi-model spread over the four RCP scenarios and fades with the decreasing number of available models in RCP8.5. The multi-model mean and range simulated by CMIP5 models, forced by a CO<sub>2</sub> increase of 1% per year (1% per year CO<sub>2</sub> simulations), is given by the thin black line and grey area. For a specific amount of cumulative CO<sub>2</sub> emissions, the 1% per year CO<sub>2</sub> simulations exhibit lower warming than those driven by RCPs, which include additional non-CO<sub>2</sub> drivers. All values are given relative to the 1861–1880 base period. Decadal averages are connected by straight lines. {Figure 12.45; TFE.8, Figure 1}



<sup>21</sup> Quantification of this range of CO<sub>2</sub> emissions requires taking into account non-CO<sub>2</sub> drivers.

<sup>22</sup> The first 20-year period available from the models.

<sup>23</sup> This is based on the assessment of the Transient Climate Response to Cumulative Carbon Emissions (TCRE) (see Section D.2)



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August 23, 2012

## Thermal Energy's Role in Long Term Carbon Mitigation and "The Virtual Battery Concept at Seattle Steam Company"

Hello, thank you for the opportunity to present my comments. My name is Stan Gent and I am the President and CEO of Seattle Steam Company. Seattle Steam is a district energy system located in the heart of downtown Seattle, and serving over 200 buildings with low-carbon steam generated from renewable wood waste and natural gas. Our sole purpose as a company is to provide reliable, low cost, low carbon heat to our customers so that they can be warm, have hot water, and for a variety of other purposes such as sterilization of surgical equipment at all three downtown hospitals.

Thermal energy is a largely ignored in energy planning and carbon impact, yet it is a significant part of the state's energy mix. The heat we generate and the heat we waste in the State – are a significant part of the state's energy mix. We burn fossil-fuels to create heat, only to turn around and waste it through inefficiencies. Most of this wasted heat is from power plants, industry and buildings, and of course from vehicles. Coincidentally, these are also some of the larger sources of greenhouse-gases in Washington, and so by reducing the amount of heat we waste, we reduce carbon. Unfortunately, state policies are not focused on heat and so waste heat recovery is generally outside the scope of most conservation projects, check out the 'cost-effectiveness criteria' requirements set forth in the State's 'Energy Independence Act', or "1937" and in fact the most recent report to CLEW which only mentions waste heat recovery once. Current estimates from the Governor's climate workgroup show that we are in danger of failing to meet our State's carbon reduction goals by 2020. By linking our electric and thermal energy needs we can accomplish a more holistic approach to carbon reduction, as well as potentially save money for consumers. 1937 has successfully created a framework for large amounts of renewable electricity coming to grid – but it largely ignores thermal energy - including district energy and waste heat recovery.

On the electric energy side, intermittent renewable resources need to be 'balanced' on the transmission grid. This is normally done by ramping up and down other power plants so that they can 'smooth the curve' of intermittent electric-generation. Large sums of money is being expended to complete R&D into battery design to effectively store electricity, the technology is still in its infancy. However, instead of using power plants to balance renewables, we can use existing technologies such as CHP paired with electric boilers to accomplish the same goal. Seattle Steam's proposed 'virtual battery' brings surplus intermittent renewable electricity into large electric boilers to create steam, which is then distributed into the district energy system as heat. When electricity is once again needed on the grid, it can be generated using the Combined Heat and Power with the heat generated once again being used in the district energy system for buildings it serves. Normally, fossil-fuel is burned in boilers to create the heat and so the virtual battery directly offsets carbon by using surplus renewable electricity instead of fossil-fuels. When used in this way, district energy systems such as Seattle Steam have the ability to help



balance variable wind and hydro loads as well as transmission capacity. This enables renewable energy project developers to keep their wind turbines and solar projects online, while also allowing a direct offset of fossil-fueled heating in downtown Seattle. Thermal energy can and should play a key role in the journey to lower carbon emissions in the State of Washington and in the Nation

Thank you, again, for the opportunity to comment. I am available for any questions or comments.



I am Anne Engstrom, leader of the Seattle Chapter of Citizens Climate Lobby (CCL). It is a volunteer grassroots organization that started 5 years ago with 3 groups, now there are 134 all over the US and Canada, even one in Sweden. We are expanding rapidly because of our dynamic approach to empowering citizens to lobby for effective climate change legislation of Carbon Tax and Dividend.

We like Governor Inslee's idea of a cap on fossil fuels, but without the "trade" part.

Cap and trade has failed miserably in Europe. The cost of the permits are so low there won't be a cap on carbon and no reduction for years. Auctions do not make fees predictable so businesses cannot plan. Trading and offsets are complicated to implement, impossible to regulate and uncertain as to the actual impact it would have on greenhouse gases.

The alternative that CCL proposes is a rising fee on Carbon at the source with border adjustments at the point of entry and all the dividends coming back to citizens. The strategy is simple, implementation can begin within 6 months. It is transparent and predictable for businesses and equitable for citizens. In short George Shultz Sec. of State's article says conservative economists believe revenue neutral carbon tax or tax swap would help increase jobs, income, technology and innovation.

The best Climate Policy in the world is in BC Canada. Not only are they ahead of their projections in reducing carbon emissions, but the provincial economy has grown with the Revenue Neutral Carbon Tax and most people are paying less taxes. A win – win for all.

We strongly urge Governor Inslee to seriously consider the Carbon Fee and Dividend as Washington State approach to dealing effectively with climate change.

Thank you,

Anne Engstrom  
Citizens Climate Lobby Seattle Chapter

Citizens Climate Lobby's legislative proposal  
<http://citizensclimatelobby.org/files/images/FeeAndDividendLegProposal081811.pdf>

NY Times most Sensible tax of all  
[http://www.nytimes.com/2012/07/05/opinion/a-carbon-tax-sensible-for-all.html?\\_r=2&](http://www.nytimes.com/2012/07/05/opinion/a-carbon-tax-sensible-for-all.html?_r=2&)

George Shultz Climate Insurance  
<http://cleantechnica.com/2013/10/17/george-shultz-calls-gop-climate-insurance-policy/#j4Zgq6QBhTxEEDZz.99>

# Legislative proposal: Carbon Fee and Dividend

## Proposed Findings:

1. **Causation:** Whereas the weight of scientific evidence indicates that greenhouse gas emissions from burning fossil fuels and other sources are causing rising global temperatures,
2. **Mitigation (Return to 350 ppm or Below).** Whereas the weight of scientific evidence also indicates that a return from the current concentration of more than 387 parts per million ("ppm") of carbon dioxide ("CO<sub>2</sub>") in the atmosphere to 350 ppm CO<sub>2</sub> or less is necessary to slow or stop the rise in global temperatures,
3. **Endangerment:** Whereas further increases in global temperatures pose imminent and substantial dangers to human health, the natural environment, the economy and national security and an unacceptable risk of catastrophic impacts to human civilization,
4. **Co-Benefits:** Whereas the measures proposed in this legislation will benefit the economy, human health, the environment and national security, even without consideration of global temperatures, as a result of advances in clean-energy technology, reductions in non-greenhouse-gas pollutants, reducing the outflow of dollars to oil-producing countries and improvements in the energy security of the United States,
5. **Benefits of Carbon Fees:** Whereas phased-in carbon fees on fossil fuels (1) are the most efficient, transparent and enforceable mechanism to drive an effective and fair transition to a clean-energy economy, (2) will stimulate investment in clean-energy technologies by insuring that fossil fuels lose their competitive price advantage over clean energy within a 10-year time frame, and (3) give all businesses powerful incentives to increase their energy-efficiency and reduce their carbon footprints in order to remain competitive,
6. **Equal Monthly Per-Person Dividends:** Whereas equal monthly dividends (or "rebates") from carbon fees paid to each American household can help insure that families and individuals can afford the energy they need during the transition to a clean energy economy and the dividends will stimulate the economy,

## Therefore the following legislation is hereby enacted:

1. **Collection of Carbon Fees/Carbon Fee Trust Fund:** Upon enactment, impose a carbon fee on all fossil fuels at the point where they first enter the economy. The fee shall be collected by the Internal Revenue Service. The fee on that date shall be \$15 per ton of CO<sub>2</sub> equivalent emissions and result in equal charges for each ton of CO<sub>2</sub> equivalent emissions potential in each type of fuel. The Department of Energy shall propose and promulgate regulations setting forth CO<sub>2</sub> equivalent fees for other greenhouse gases including methane, nitrous oxide, sulfur hexafluoride, hydrofluorocarbons (HFCs) emitted as a byproduct, perfluorocarbons, and nitrogen trifluoride. The Internal Revenue Service shall also collect the fees imposed upon the other greenhouse gasses. All fees are to be placed in the Carbon Fees Trust Fund and be rebated 100% to American households as outlined below.
2. **Ensuring that Clean Energy Becomes Competitive Within a Ten year Time Frame:** The yearly increase in carbon fees including other greenhouse gasses, shall be at least \$10 per ton of CO<sub>2</sub> equivalent each year to ensure that fossil fuel energy

loses its competitive price advantage with respect to the clean energy technologies we have today, including, at a minimum, wind, geothermal and industrial solar energy, within 10 years of the date of enactment. Annually the Department of Energy shall determine whether an increase larger than \$10 per ton per year is needed to achieve program goals. Yearly price increases of at least \$10 per year shall continue until total U.S. CO<sub>2</sub>-equivalent emissions have been reduced to 10% of U.S. CO<sub>2</sub>-equivalent emissions in 1990.

3. **Equal Per-Person Monthly Dividend Payments:** Equal monthly per-person dividend payments shall be made to all American Households (1/2 per child under 18 years old, with a limit of 2 children per family) each month. The total value of all monthly dividend payments shall represent 100% of the total Carbon Fees collected per month.
4. **Border Adjustments:** In order to ensure that U.S.-made goods can remain competitive at home and abroad and to provide an additional incentive for international adoptions of carbon fees, Carbon-Fee-Equivalent Tariffs shall be charged for goods entering the U.S. from countries without comparable Carbon Fees/Carbon Pricing. Carbon-Fee-Equivalent Rebates shall be used to reduce the price of exports to such countries and to ensure that U.S. goods can remain competitive in those countries. The Department of Commerce will determine rebate amounts and exemptions if any.
5. **Phase Out of Fossil Fuel Subsidies:** All existing subsidies of fossil fuels, including tax credits, shall be phased out over the 5 years following enactment.
6. **Moratorium on New or Expanded Coal-Fired Power Plants:** Beginning on the date of enactment, there shall be no new coal-fired power plants permitted, constructed, or operated. There shall also be no expansions in capacity of any existing coal power plants permitted, constructed, or operated. And any previously permitted coal-fired power plants that have not yet been constructed or put into operation prior to the date of enactment shall not be put into operation and shall not be further constructed.
7. **Seeking Treaties:** The President in consultation with the United States Department of State shall seek treaties with other countries that encourage adoption of programs similar to the ones provided for in this Act to reduce CO<sub>2</sub> and other greenhouse gas emissions in other countries.

Legislation introduced in the 111<sup>th</sup> Congress by Rep. Larson (D-CT), H.R. 1337 America's Energy Security Trust Fund Act, and by Rep. Inglis (R-SC), H.R. 2380 Raise Wages Cut Carbon Act, reflects an approach very similar to this.

# George Shultz Calls For GOP “Climate Insurance Policy”

*Originally published on Future 500 by Bill Shireman, President and CEO of Future 500*

Former Secretary of State George Shultz proposed that the U.S. adopt a “Climate Insurance Policy” to simultaneously bolster the economy and reduce the risk of global warming.

In a recent interview with reporters, Shultz suggested that Republican leaders follow a Reagan-era strategy that would drive innovation while also cutting carbon emissions.

Shultz’s approach would also deliver a political benefit to the Republican Party, which is struggling to redefine itself after losing two national elections to Democrats, and failing to capture a majority in the Senate, as most analysts had expected.

His plan would emulate the GOP’s leadership on ozone protection during the Reagan administration, which resulted in a “no regrets” approach that was beneficial to the economy, whether or not ozone science was borne out.

“There were ozone skeptics back then, just as there are climate skeptics now,” said Shultz. “But we all agreed that, if what some scientists feared were to happen, it would be disastrous. So we took out an insurance policy.” The Montreal Protocol quickly led to innovations that vastly reduced ozone depleting substances. “In retrospect, the non-skeptics turned out to be right, and the Montreal Protocol came around just in time.”

On climate, Shultz’s policy preference combines sound policy with deft political strategy. It would tend to reduce federal tax and spending levels over time, by shifting taxes from forms of prosperity that tend to go up, to forms of pollution that tend to go down.”

Tax cuts or dividends would reduce taxes on income, profits, savings, or payroll under the proposal. The difference would be made up by a price on carbon or other pollutants. While the switch would start off revenue neutral, shifting taxes to

pollution would lead to gradual reductions over time.

Carbon emission rates generally decline about 1% each year. A tax shift to carbon would drive an average annual tax cut of at least that amount, reversing historic trends.”

The tax swap is supported by conservative economists, including Greg Mankiw of Harvard, Kevin Hassett of American Enterprise Institute, Luigi Zingales of the University of Chicago, and Arthur Laffer, father of the supply side economic theories associated with President Reagan.

Retailers and consumer product companies would also benefit. This puts more money in the pockets of WalMart moms. Prices for energy would go up just as much, but consumers could choose whether to use their dividends to buy the same amount of energy, and come out even, or shift their spending elsewhere, and save.

Economically, many economists believe the shift would help increase jobs, income, technology and innovation. It would smooth the transition toward natural gas and renewables, and away from coal. The dividend approach would also enable a higher share of tax cuts to go to coal states, where that sector's decline has been steady.

Despite its economic and environmental benefits, selling a tax swap in the GOP won't be easy. Carbon, unfortunately, has become an ideological litmus test on both the left and right. The hard left uses it to advocate economy-wide regulation – and the hard right resists the science because they fear the regulations the hard left thinks are needed.

The problem is, with no alternatives proposed, the regulatory approach is the only option offered.

Some GOP strategists argue that by offering a market-based solution on the climate issue, the party would lose a wedge issue that can mobilize the base against the Democrats. But as a lifelong Republican, I disagree. This is a one-time opportunity to achieve a long-term GOP priority: to drive taxes down and growth up. Why would we not take that?

More attractive than a carbon-focused approach might be a pollution tax shift that covers a “market basket” of contaminants, rather than just carbon. Unlike other taxes, pollution taxes are supported by a plurality of GOP voters.



According to Shultz, even if some GOP lawmakers remained skeptical, the party would seize the issue from Democrats, and regain its historical conservation leadership. "All of the most important federal environmental actions were taken by Republican presidents," Shultz said.

The new GOP approach would appeal to young voters, including conservatives, who reject the idea that to grow the economy you have to damage the environment. This is not the coal age. This is three generations into the information economy. Environmental protection is fully compatible with economic growth. It's expected – it's assumed.

When forced to choose between the economy and environment, young voters split about evenly, giving a slight edge to the environment. A March 2013 Gallup survey of American adults showed more 18- to 29-year-olds saying environmental protection should take priority (49%) than those saying economic growth should take priority (45%).

Yet in terms of urgency, the economy needs help right now. People need jobs to put food on the table today. They need the environment to live for the long term. So 45% want political leaders focused on the economy as their top priority, while only 8% want them focused first on climate change, according to polls by the Conservative Republican National Committee (CRNC).

Republican climate "skeptics" use that data to argue that young voters don't care much about the environment. Yet a majority of young conservatives under age 35 – some 30% of whom doubt climate change is real – still favor action on climate. They are simply not convinced government action will work.

But if nothing else is on the table, they favor government action. About 80% of voters under 35 support "President Obama's climate change plan" – even though most have no idea what's in that plan. But they favor action. If the GOP doesn't offer an action plan, they won't expend a lot of effort to figure out a better approach – they will take what's on the table that the Democrats set.

The failure of the GOP so far to offer a climate policy of its own makes a big government approach a self-fulfilling prophecy. GOP leaders rightly worry that a Democrat-led climate policy will lead to more regulations, higher costs, and higher taxes. Strategic Republicans could seize the high ground on the issue, and offer a no-regrets alternative that's good for the economy and provides insurance against the risk of climate change.

July 4, 2012

# The Most Sensible Tax of All

By YORAM BAUMAN and SHI-LING HSU

ON Sunday, the best climate policy in the world got even better: British Columbia's carbon tax — a tax on the carbon content of all fossil fuels burned in the province — increased from \$25 to \$30 per metric ton of carbon dioxide, making it more expensive to pollute.

This was good news not only for the environment but for nearly everyone who pays taxes in British Columbia, because the carbon tax is used to reduce taxes for individuals and businesses. Thanks to this tax swap, British Columbia has lowered its corporate income tax rate to 10 percent from 12 percent, a rate that is among the lowest in the Group of 8 wealthy nations. Personal income taxes for people earning less than \$119,000 per year are now the lowest in Canada, and there are targeted rebates for low-income and rural households.

The only bad news is that this is the last increase scheduled in British Columbia. In our view, the reason is simple: the province is waiting for the rest of North America to catch up so that its tax system will not become unbalanced or put energy-intensive industries at a competitive disadvantage.

The United States should jump at the chance to adopt a similar revenue-neutral tax swap. It's an opportunity to reduce existing taxes, clean up the environment and increase personal freedom and energy security.

Let's start with the economics. Substituting a carbon tax for some of our current taxes — on payroll, on investment, on businesses and on workers — is a no-brainer. Why tax good things when you can tax bad things, like emissions? The idea has support from economists across the political spectrum, from Arthur B. Laffer and N. Gregory Mankiw on the right to Peter Orszag and Joseph E. Stiglitz on the left. That's because economists know that a carbon tax swap can reduce the economic drag created by our current tax system and increase long-run growth by nudging the economy away from consumption and borrowing and toward saving and investment.

Of course, carbon taxes also lower carbon emissions. Economic theory suggests that putting a price on pollution reduces emissions more affordably and more effectively than any other measure. This conclusion is supported by empirical evidence from previous market-based policies, like those in the 1990 amendments to the Clean Air Act that targeted sulfur dioxide emissions. British

Columbia's carbon tax is only four years old, but preliminary data show that greenhouse gas emissions are down 4.5 percent even as population and gross domestic product have been growing. Sales of motor gasoline have fallen by 2 percent since 2007, compared with a 5 percent increase for Canada as a whole.

What would a British Columbia-style carbon tax look like in the United States? According to our calculations, a British Columbia-style \$30 carbon tax would generate about \$145 billion a year in the United States. That could be used to reduce individual and corporate income taxes by 10 percent, and afterward there would still be \$35 billion left over. If recent budget deals are any guide, Congress might choose to set aside half of that remainder to reduce estate taxes (to please Republicans) and the other half to offset the impacts of higher fuel and electricity prices resulting from the carbon tax on low-income households through refundable tax credits or a targeted reduction in payroll taxes (to please Democrats).

Revenue from a carbon tax would most likely decline over time as Americans reduce their carbon emissions, but for many years to come it could pay for big reductions in existing taxes. It would also promote energy conservation and steer investment into clean technology and other productive economic activities.

Lastly, the carbon tax would actually give Americans more control over how much they pay in taxes. Households and businesses could reduce their carbon tax payments simply by reducing their use of fossil fuels. Americans would trim their carbon footprints — and their tax burdens — by investing in energy efficiency at home and at work, switching to less-polluting vehicles and pursuing countless other innovations. All of this would be driven not by government mandates but by Adam Smith's invisible hand.

A carbon tax makes sense whether you are a Republican or a Democrat, a climate change skeptic or a believer, a conservative or a conservationist (or both). We can move past the partisan fireworks over global warming by turning British Columbia's carbon tax into a made-in-America solution.

*Yoram Bauman, an environmental economist, is a fellow at Sightline Institute in Seattle. Shi-Ling Hsu, a law professor at Florida State University, is the author of "The Case for a Carbon Tax."*

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## Op-Ed Contributor: The Stormy Politics of Building

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There has been a recent uptick of books, articles and research studies documenting an endocrinological (or hormone) decline in the general male population. Male infertility can be diagnosed by sperm analysis, blood tests and radiographic scans of the testicles and other tests.

Recent analysis shows average testosterone levels receding in men of all ages. In addition, average sperm quality, quantity and even testicle size has seen a marked reduction.

Although many theories are presented as to why this is happening, from endocrine disruptors to the feminist movement, to evolutionary biology, researchers ultimately concede that the reason is still unknown.

For a healthy male, typical seminal fluid analysis values should be:

Volume: 2-6 ml

Density: 20-200 million/ml

Motility: greater than 60% motile

Possibly due to  
pollution  
& Environmental  
anomalies

However, according to the ever-increasing literature on sperm counts, these "normal" values are steadily decreasing and only a minute proportion of males will have normal semen values in today's Western Industrialized countries in the near future.

Not only are sperm counts decreasing, but also declining are the average sperm volumes which contain a greater proportion of deformed spermatozoa which have reduced motility's.

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(<http://www.ispub.com/ostia/index.php?xmlFilePath=journals/iju/vol2n1/sperm.xml>). The Internet Journal of Urology 2 (1): 1-21. [http://](http://www.ispub.com/ostia/index.php?xmlFilePath=journals/iju/vol2n1/sperm.xml)

[www.ispub.com/ostia/index.php?xmlFilePath=journals/iju/vol2n1/sperm.xml](http://www.ispub.com/ostia/index.php?xmlFilePath=journals/iju/vol2n1/sperm.xml).

Professor Niels Skakkebaeck, a Danish scientist, first alerted the world to the possibility of a substantial fall in male fertility levels in 1992. He did this by showing that sperm counts in healthy men appeared to have dropped by more than half in 50 years.

Professor Skakkebaeck's work attracted worldwide publicity at first-and then ridicule.

Testimony for Seattle Hearing on Climate Change  
12/23/2013

I am speaking today in support of strong, science-based action to reduce global warming emissions in Washington State.

I am a statistician. I remember the old so-called "uncertainty" about whether smoking causes cancer. There was good science and clear statistical evidence for the harm, but tobacco companies and a few hired scientists managed to delay action by spreading doubt, and people kept dying.

Now we have good science and data and overwhelming scientific consensus that climate change due to human activity is happening, causing harm, and accelerating. Don't let a few deniers delay action. The only uncertainty left is just how bad it will be, and that is no excuse for inaction. If you're driving too fast and are about to plow into a crowd of schoolchildren, do you keep going full-speed ahead because you don't know how many of them you'll kill?

Oysters are dying. Trees are dying. Coral is dying. Polar bears are dying. Crops are dying. And people are dying.

It is time to act. Get off coal. Move toward energy conservation, renewable energy, and electric vehicles. There's a lot we can do, some of it pretty simple, like the summer I spent weatherstripping college dorms. We can create jobs, stop sending our money to the middle east and Texas, and stop devastating the earth we share.

Tim Hesterberg, Ph.D.

Seattle, WA 98199



9  
9

We would not expect a difference here, because the response variable was a pretest. Keep in mind, however, that 5% of similar studies will show a significant difference in pretest scores between the groups, at the 5% level.

S-PLUS also returns the Mean Square values of (using the notation in IPS)  $SSG/DFG = 10.287$  and  $SSE/DFE = 9.08658$ .

End of Example 12.1

#### Command Line Notes

The `tapply` command is used to apply a function to a vector grouped by levels of a factor or several factors. The first argument is the vector whose values you are interested in. The second argument can be a factor or a list of factors. The third argument is the function.

```
> attach(reading)
> boxplot(split(prel, group))
> tapply(prel, group, stdev)
> detach()
> read.fit = aov(prel ~ group, data = reading)
> summary(read.fit)
```

## 12.2 Comparing the Means

sp

The ANOVA test tells us if there is a difference or not. It does not tell us which means are different (remember only 2 need to differ, so all but one could all be equal). S-PLUS provides the multiple comparisons needed to answer the more specific questions on which means are different.

### Example 12.2 All pairwise comparisons

We analyze the data in `fuel.frame` to see which types of cars have significantly different gas mileages.

1. Choose Statistics > ANOVA > Fixed Effects.... For Data Set: enter `fuel.frame`, for Response: select `Fuel` (gallons to go 100 miles), and for Explanatory: select `Type`.
2. Click on the Compare tab.
3. For Levels Of: select `Type`, and make sure that both `Print Results` and `Plot Intervals` boxes are checked, then click on OK.

Haifa Iversen

Stanwood, WA 98292

Dear Governor Jay Inslee and the Climate Workgroup,

I speak to you as a high school biology teacher. I teach Biology and AP Environmental Science at Arlington High School

I am a former Assistant Project Manager in the habitat conservation division of the California Department of Fish and Game where I worked on large ROW projects ensuring environmental compliance with CEQA and the NEPA.

As a teacher, I am teaching the Next Generation Science Standards that have been formally adopted by Washington State and state, "Science is also at the heart of the United States ability to continue to innovate, lead, and create jobs of the future" Washington state has also adopted Integrated Environmental and Sustainability Education (ESE) learning Standards that are aligned with social studies, math, and health and fitness standards.

**A few of the science standards that I teach include:**

**Learning Standard (LS) 2-7** Design evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.

**LS 4-6** Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.

**ESE Standard 1** Students develop knowledge of the interconnections and interdependency of ecological, social, and economic systems. They demonstrate understanding of how the health of these systems determines the sustainability of natural and human communities at local, regional, and global levels.

**LS4.D:** Humans depend on the living world for the resources and other benefits provided by biodiversity. But human activity is also having adverse impacts on biodiversity through overpopulation, overexploitation, habitat destruction, pollution, introduction of invasive species, and climate change. Thus sustaining biodiversity so that ecosystem functioning and productivity are maintained essential to supporting and enhancing life on Earth. Sustaining biodiversity also aids humanity by preserving landscapes of recreational or inspirational value.

If our students are expected to learn, design, evaluate, model, and refine solutions then we as citizens and leaders need to build awareness and provide options for responding to pollution and in doing so provide jobs and an economy that invests in alternative energy and sustainable technologies. I would like to see a broad, bipartisan, organized approach to addressing various types of pollution, energy reduction, and preserving biodiversity. We need to use scientific evidence of increased release of carbon dioxide and other greenhouse gases as a driver for reducing these emissions. *Washington State Department*

*of Ecology states "transportation is Washington's largest GHG emissions contributor, while electricity is the largest contributor for the U.S. as a whole. However, on a per capita basis, Washington produces slightly less on road motor gasoline GHG emissions gas the US average (see Table 3). Per capita on-road diesel emissions for 2010 were also slightly less for Washington as compared to the U.S. average."*

We need to reduce our burning of fossil fuels and invest in electric cars and hybrid technologies through rebates and tax incentives. I purchased the all-electric Nissan Leaf because of the federal tax rebates and Washington States omission of sales tax.

We also need to invest in more solar, wind, and geothermal energies at the residential and commercial level and make it more affordable helping to reduce greenhouse gas emissions.

We need to address the biggest polluter to Puget Sound; storm water pollution runoff.

Washington's seafood industry generates over 42,000 jobs and contributes at least \$1.7 billion annually. We cannot afford to ignore the effects of water pollution.

We need to design our economic and social systems to spread more sustainable forms of agriculture. Food production has a number of harmful environmental effects. According to a 2008 study by the Food and Agriculture Organization, more than 20% of the world's cropland (65%) in Africa has been degraded to some degree by soil erosion, salt buildup, and chemical pollution. Solutions could include high-yield polyculture, organic fertilizers, biological pest control, integrated pest management, efficient irrigation, perennial crops, crop rotation, water-efficient crops, soil conservation, and subsidies for sustainable farming.

Through education of our citizens, advertising of the positive effects of sustainable development, creating an environmentally conscious culture, and creation of sustainable development jobs, I am confident that Washington State can lead the nation in the actions that we take. This can only be done if we act immediately and get people with different views and values to build our social capital.

Thank you for your time and commitment.

Sincerely,



Haifa Iversen



## HS-LS2 Ecosystems: Interactions, Energy, and Dynamics

### HS-LS2 Ecosystems: Interactions, Energy, and Dynamics

Students who demonstrate understanding can:

- HS-LS2-1.** Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales. [Clarification Statement: Emphasis is on quantitative analysis and comparison of the relationships among interdependent factors including boundaries, resources, climate, and competition. Examples of mathematical comparisons could include graphs, charts, histograms, and population densities gathered from simulations or historical data sets.] [Assessment Boundary: Assessment does not include deriving mathematical equations to make comparisons.]
- HS-LS2-2.** Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales. [Clarification Statement: Examples of mathematical representations include finding the average, determining trends, and using graphical comparisons of multiple sets of data.] [Assessment Boundary: Assessment is limited to provided data.]
- HS-LS2-3.** Construct and revise an explanation based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions. [Clarification Statement: Emphasis is on conceptual understanding of the role of aerobic and anaerobic respiration in different environments.] [Assessment Boundary: Assessment does not include the specific chemical processes of either aerobic or anaerobic respiration.]
- HS-LS2-4.** Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem. [Clarification Statement: Emphasis is on using a mathematical model of stored energy in biomass to describe the transfer of energy from one trophic level to another and that matter and energy are conserved as matter cycles and energy flows through ecosystems. Emphasis is on atoms and molecules such as carbon, oxygen, hydrogen and nitrogen being conserved as they move through an ecosystem.] [Assessment Boundary: Assessment is limited to proportional reasoning to describe the cycling of matter and flow of energy.]
- HS-LS2-5.** Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere. [Clarification Statement: Examples of models could include simulations and mathematical models.] [Assessment Boundary: Assessment does not include the specific chemical steps of photosynthesis and respiration.]
- HS-LS2-6.** Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem. [Clarification Statement: Examples of changes in ecosystem conditions could include modest biological or physical changes, such as moderate hunting or a seasonal flood; and extreme changes, such as volcanic eruption or sea level rise.]
- HS-LS2-7.** Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.\* [Clarification Statement: Examples of human activities can include urbanization, building dams, and extermination of invasive species.]
- HS-LS2-8.** Evaluate the evidence for the role of group behavior on individual and species' chances to survive and reproduce. [Clarification Statement: Emphasis is on: (1) distinguishing between group and individual behavior, (2) identifying evidence supporting the outcomes of group behavior, and (3) developing logical and reasonable arguments based on evidence. Examples of group behaviors could include flocking, schooling, herding, and cooperative behaviors such as hunting, migrating, and swarming.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*.

#### Science and Engineering Practices

##### Developing and Using Models

Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show how relationships among variables between systems and their components in the natural and designed worlds.

- Develop a model based on evidence to illustrate the relationships between systems or components of a system. (HS-LS2-5)

##### Using Mathematics and Computational Thinking

Mathematical and computational thinking in 9–12 builds on K–8 experiences and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions.

- Use mathematical and/or computational representations of phenomena or design solutions to support explanations. (HS-LS2-1)
- Use mathematical representations of phenomena or design solutions to support and revise explanations. (HS-LS2-2)
- Use mathematical representations of phenomena or design solutions to support claims. (HS-LS2-4)

##### Constructing Explanations and Designing Solutions

Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories.

- Construct and revise an explanation based on valid and reliable evidence obtained from a variety of sources (including students' own investigations, models, theories, simulations, peer review) and the assumption that theories and laws that describe the natural world operate today as they did in the past

#### Disciplinary Core Ideas

##### LS2.A: Interdependent Relationships in Ecosystems

- Ecosystems have carrying capacities, which are limits to the numbers of organisms and populations they can support. These limits result from such factors as the availability of living and nonliving resources and from such challenges such as predation, competition, and disease. Organisms would have the capacity to produce populations of great size were it not for the fact that environments and resources are finite. This fundamental tension affects the abundance (number of individuals) of species in any given ecosystem. (HS-LS2-1), (HS-LS2-2)

##### LS2.B: Cycles of Matter and Energy Transfer in Ecosystems

- Photosynthesis and cellular respiration (including anaerobic processes) provide most of the energy for life processes. (HS-LS2-3)
- Plants or algae form the lowest level of the food web. At each link upward in a food web, only a small fraction of the matter consumed at the lower level is transferred upward, to produce growth and release energy in cellular respiration at the higher level. Given this inefficiency, there are generally fewer organisms at higher levels of a food web. Some matter needs to release energy for life functions, some matter is stored in newly made structures, and much is discarded. The chemical elements that make up the molecules of organisms pass through food webs and into and out of the atmosphere and soil, and they are combined and recombined in different ways. At each link in an ecosystem, matter and energy are conserved. (HS-LS2-4)
- Photosynthesis and cellular respiration are important components of the carbon cycle, in which carbon is exchanged among the biosphere, atmosphere, oceans, and geosphere through chemical, physical, geological, and biological processes. (HS-LS2-5)

##### LS2.C: Ecosystem Dynamics, Functioning, and Resilience

- A complex set of interactions within an ecosystem can keep its numbers and types of organisms relatively constant over long periods of time under stable conditions. If a modest biological or physical disturbance to an ecosystem occurs, it may return to its more or less original status (i.e., the ecosystem is resilient), as opposed to becoming a very different ecosystem. Extreme fluctuations in conditions or the size of any population, however, can challenge the functioning of ecosystems in terms of resources and habitat availability. (HS-LS2-2), (HS-LS2-6)

#### Crosscutting Concepts

##### Cause and Effect

- Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. (HS-LS2-8)

##### Scale, Proportion, and Quantity

- The significance of a phenomenon is dependent on the scale, proportion, and quantity at which it occurs. (HS-LS2-1)
- Using the concept of orders of magnitude allows one to understand how a model at one scale relates to a model at another scale. (HS-LS2-2)

##### Systems and System Models

- Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions—including energy, matter, and information flows—within and between systems at different scales. (HS-LS2-5)

##### Energy and Matter

- Energy cannot be created or destroyed—it only moves between one place and another place, between objects and/or fields, or between systems. (HS-LS2-4)
- Energy drives the cycling of matter within and between systems. (HS-LS2-3)

##### Stability and Change

- Much of science deals with constructing explanations of how things change and how they remain stable. (HS-LS2-6), (HS-LS2-7)

\*The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.

The section entitled "Disciplinary Core Ideas" is reproduced verbatim from *A Framework for K-12 Science Education: Practices, Cross-Cutting Concepts, and Core Ideas*. Integrated and reprinted with permission from the National Academy of Sciences.



## HS-LS2 Ecosystems: Interactions, Energy, and Dynamics

<p>and will continue to do so in the future. (HS-LS2-3)</p> <ul style="list-style-type: none"> <li>Design, evaluate, and refine a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (HS-LS2-7)</li> </ul> <p><b>Engaging in Argument from Evidence</b></p> <p>Engaging in argument from evidence in 9–12 builds on K–8 experiences and progresses to using appropriate and sufficient evidence and scientific reasoning to defend and critique claims and explanations about the natural and designed world(s). Arguments may also come from current scientific or historical episodes in science.</p> <ul style="list-style-type: none"> <li>Evaluate the claims, evidence, and reasoning behind currently accepted explanations or solutions to determine the merits of arguments. (HS-LS2-6)</li> <li>Evaluate the evidence behind currently accepted explanations to determine the merits of arguments. (HS-LS2-8)</li> </ul>	<ul style="list-style-type: none"> <li>Moreover, anthropogenic changes (induced by human activity) in the environment—including habitat destruction, pollution, introduction of invasive species, overexploitation, and climate change—can disrupt an ecosystem and threaten the survival of some species. (HS-LS2-7)</li> </ul> <p><b>LS2.D: Social Interactions and Group Behavior</b></p> <ul style="list-style-type: none"> <li>Group behavior has evolved because membership can increase the chances of survival for individuals and their genetic relatives. (HS-LS2-8)</li> </ul> <p><b>LS4.D: Biodiversity and Humans</b></p> <ul style="list-style-type: none"> <li>Biodiversity is increased by the formation of new species (speciation) and decreased by the loss of species (extinction). (secondary to HS-LS2-7)</li> <li>Humans depend on the living world for the resources and other benefits provided by biodiversity. But human activity is also having adverse impacts on biodiversity through overpopulation, overexploitation, habitat destruction, pollution, introduction of invasive species, and climate change. Thus sustaining biodiversity so that ecosystem functioning and productivity are maintained is essential to supporting and enhancing life on Earth. Sustaining biodiversity also aids humanity by preserving landscapes of recreational or inspirational value. (secondary to HS-LS2-7) (Note: This Disciplinary Core Idea is also addressed by HS-LS4-6.)</li> </ul> <p><b>PS3.D: Energy in Chemical Processes</b></p> <ul style="list-style-type: none"> <li>The main way that solar energy is captured and stored on Earth is through the complex chemical process known as photosynthesis. (secondary to HS-LS2-5)</li> </ul> <p><b>ETS1.B: Developing Possible Solutions</b></p> <ul style="list-style-type: none"> <li>When evaluating solutions it is important to take into account a range of constraints including cost, safety, reliability and aesthetics and to consider social, cultural and environmental impacts. (secondary to HS-LS2-7)</li> </ul>	
<p style="text-align: center;"><b>Connections to Nature of Science</b></p> <p><b>Scientific Knowledge Is Open to Revision in Light of New Evidence</b></p> <ul style="list-style-type: none"> <li>Most scientific knowledge is quite durable, but is, in principle, subject to change based on new evidence and/or reinterpretation of existing evidence. (HS-LS2-2), (HS-LS2-3)</li> <li>Scientific argumentation is a mode of logical discourse used to clarify the strength of relationships between ideas and evidence that may result in revision of an explanation. (HS-LS2-6), (HS-LS2-8)</li> </ul>		
<p><i>Connections to other DCIs in this grade-band:</i> HS.PS1.B (HS-LS2-3), (HS-LS2-5); HS.PS3.B (HS-LS2-3), (HS-LS2-4); HS.PS3.D (HS-LS2-3), (HS-LS2-4); HS.ESS1.A (HS-LS2-3); HS.ESS2.D (HS-LS2-5), (HS-LS2-7); HS.ESS2.E (HS-LS2-2), (HS-LS2-6), (HS-LS2-7); HS.ESS3.A (HS-LS2-2), (HS-LS2-7); HS.ESS3.C (HS-LS2-2), (HS-LS2-7); HS.ESS3.D (HS-LS2-2)</p>		
<p><i>Articulation across grade-bands:</i> MS.PS1.B (HS-LS2-3); MS.PS3.D (HS-LS2-3), (HS-LS2-4), (HS-LS2-5); MS.LS1.B (HS-LS2-8); MS.LS1.C (HS-LS2-3), (HS-LS2-4), (HS-LS2-5); MS.LS2.A (HS-LS2-1), (HS-LS2-2), (HS-LS2-6); MS.LS2.B (HS-LS2-3), (HS-LS2-4), (HS-LS2-5); MS.LS2.C (HS-LS2-1), (HS-LS2-2), (HS-LS2-6), (HS-LS2-7); MS.ESS1.A (HS-LS2-5); MS.ESS2.E (HS-LS2-6); MS.ESS3.A (HS-LS2-1); MS.ESS3.C (HS-LS2-1), (HS-LS2-2), (HS-LS2-6), (HS-LS2-7); MS.ESS3.D (HS-LS2-7)</p>		
<p><i>Common Core State Standards Connections:</i></p> <p><b>ELA/Literacy—</b></p> <p><b>RST.9–10.8</b> Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. (HS-LS2-6), (HS-LS2-7), (HS-LS2-8)</p> <p><b>RST.11–12.1</b> Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. (HS-LS2-1), (HS-LS2-2), (HS-LS2-3), (HS-LS2-6), (HS-LS2-8)</p> <p><b>RST.11–12.7</b> Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. (HS-LS2-6), (HS-LS2-7), (HS-LS2-8)</p> <p><b>RST.11–12.8</b> Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. (HS-LS2-6), (HS-LS2-7), (HS-LS2-8)</p> <p><b>WHST.9–12.2</b> Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. (HS-LS2-1), (HS-LS2-2), (HS-LS2-3)</p> <p><b>WHST.9–12.5</b> Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. (HS-LS2-3)</p> <p><b>WHST.9–12.7</b> Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. (HS-LS2-7)</p> <p><b>Mathematics—</b></p> <p><b>MP.2</b> Reason abstractly and quantitatively. (HS-LS2-1), (HS-LS2-2), (HS-LS2-4), (HS-LS2-6), (HS-LS2-7)</p> <p><b>MP.4</b> Model with mathematics. (HS-LS2-1), (HS-LS2-2), (HS-LS2-4)</p> <p><b>HSN-Q.A.1</b> Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. (HS-LS2-1), (HS-LS2-2), (HS-LS2-4), (HS-LS2-7)</p> <p><b>HSN-Q.A.2</b> Define appropriate quantities for the purpose of descriptive modeling. (HS-LS2-1), (HS-LS2-2), (HS-LS2-4), (HS-LS2-7)</p> <p><b>HSN-Q.A.3</b> Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. (HS-LS2-1), (HS-LS2-2), (HS-LS2-4), (HS-LS2-7)</p> <p><b>HSS-ID.A.1</b> Represent data with plots on the real number line. (HS-LS2-6)</p> <p><b>HSS-IC.A.1</b> Understand statistics as a process for making inferences about population parameters based on a random sample from that population. (HS-LS2-6)</p> <p><b>HSS-IC.B.6</b> Evaluate reports based on data. (HS-LS2-6)</p>		

\*The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice or Disciplinary Core Idea. The section entitled "Disciplinary Core Ideas" is reproduced verbatim from A Framework for K–12 Science Education: Practices, Cross-Cutting Concepts, and Core Ideas. Integrated and reprinted with permission from the National Academy of Sciences.





DEPARTMENT OF  
**ECOLOGY**  
State of Washington

# **Washington State Greenhouse Gas Emissions Inventory 2009-2010**

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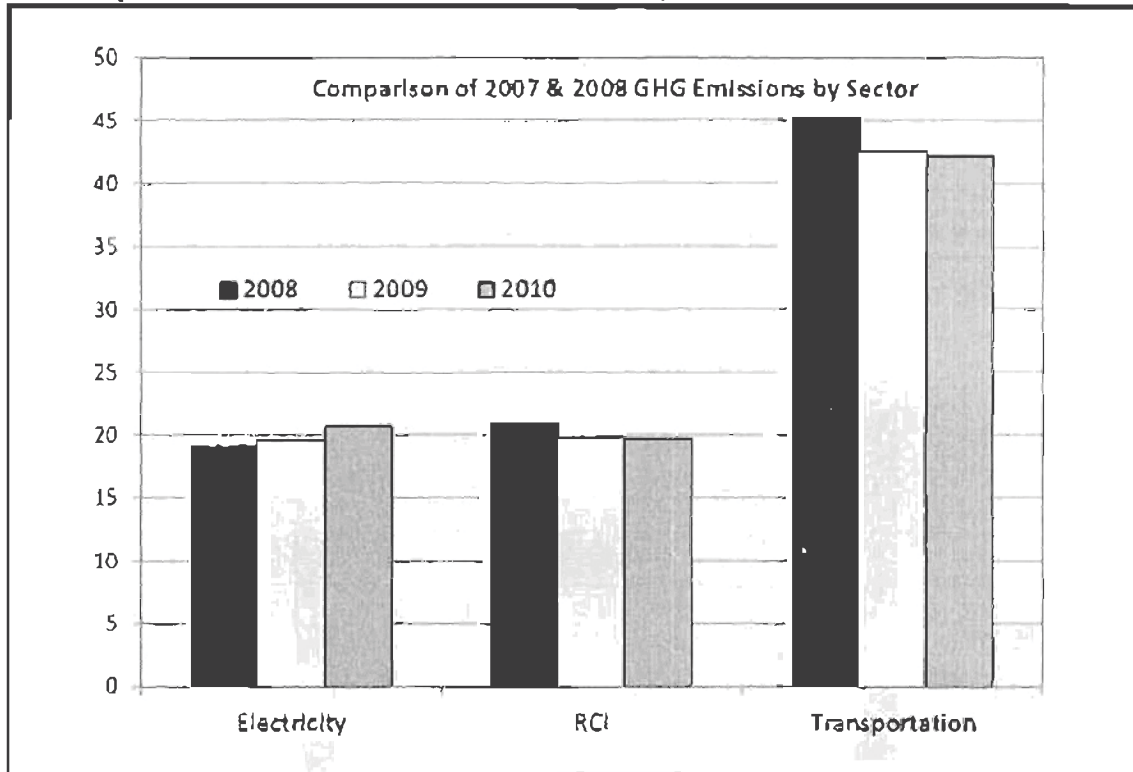
December 2012

Publication no. 12-02-034 (Revised September 2013)

## Trends by sector, 2008-2010

Figure 2 compares total 2008, 2009 and 2010 GHG emissions from the Electricity, RCI and Transportation Sectors. The most significant change is a 6.6 percent decrease in emissions from the Transportation Sector.

Figure 2: Total GHG emissions (MMt CO<sub>2</sub>e) by Sector for 2008-2010

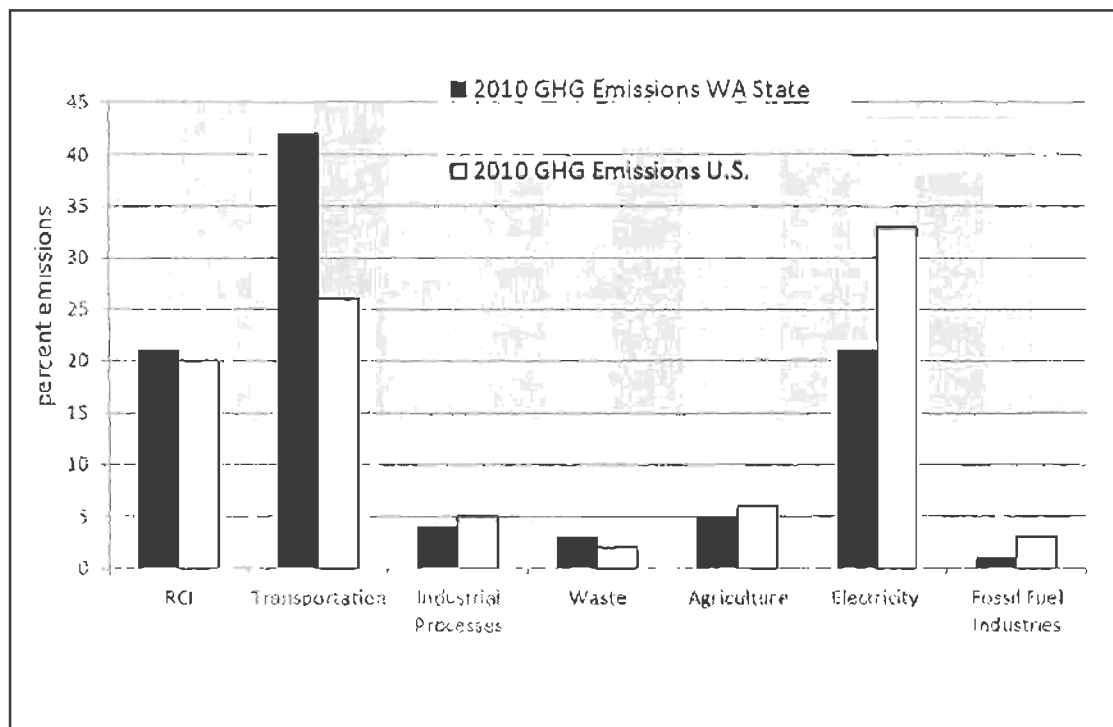


## Trends by sector, Washington and U.S.

On a national scale, the Electricity Sector is the largest contributor to greenhouse gases (see Figure 3). Because Washington uses hydropower for much of its electricity, the Electricity Sector is less significant in Washington. The Transportation Sector is Washington's most significant contributor of greenhouse gases.

It is also important to note that Washington's GHG emissions per capita are significantly lower than U.S. emissions per capita. Washington's 2010 per capita emissions are 11.2 Mt CO<sub>2</sub>e, while U.S. per capita emissions are 22.1 Mt CO<sub>2</sub>e.

Figure 3: Percent GHG Emissions by Sector - 2010, Washington State and U.S.



## Summary of Results by Sector

### Transportation Sector

As stated previously, transportation is Washington's largest GHG emissions contributor, while electricity is the largest contributor for the U.S. as a whole. However, on a per capita basis, Washington produces slightly less on-road motor gasoline GHG emissions as the U.S. average (see Table 3). Per capita on-road diesel emissions for 2010 were also slightly less for Washington as compared to the U.S. average.

Table 3: On Road GHG Emissions, 2010

2010	Population	MMt CO <sub>2</sub> e Motor Gasoline	MMtCO <sub>2</sub> e On road Diesel	Mt CO <sub>2</sub> e On Road Motor Gasoline per capita	Mt CO <sub>2</sub> e On Road Diesel per capita
US	308,745,538	1,110*	414.5	3.6	1.3
WA state	6,724,540	21.8	8.0	3.2	1.2

\* <http://www.epa.gov/climatechange/ghgemissions/usinventoryreport.html> Annex 3

Washington's most significant decrease in GHG emissions from 2008 to 2010 was in the Transportation Sector. This decrease was specifically from on-road gasoline, on-road diesel, and jet fuel (see Figure 4). According to the recent EPA inventory report, on a national level, "the more recent trend for transportation has shown a general decline in emissions, due to recent slow growth in economic activity, higher fuel prices, and an associated decrease in the demand for passenger transportation".<sup>1</sup> Decreases in GHG emissions from the transportation sector in Washington State seem to align with this national trend.

<sup>1</sup> Inventory of US Greenhouse Gas Emissions and Sinks, 1990-2011, EPA 430-R-13-001, Pg E8-11  
<http://www.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2013-Main-Text.pdf>



## Global Warming's Terrifying New Math

Three simple numbers that add up to global catastrophe - and that make clear who the real enemy is

by BILL MCKIBBEN  
JULY 19, 2012

If the pictures of those towering wildfires in Colorado haven't convinced you, or the size of your AC bill this summer, here are some hard numbers about climate change: June broke or tied 3,215 high-temperature records across the United States. That followed the warmest May on record for the Northern Hemisphere – the 327th consecutive month in which the temperature of the entire globe exceeded the 20th-century average, the odds of which occurring by simple chance were  $3.7 \times 10^{-99}$ , a number considerably larger than the number of stars in the universe.

Meteorologists reported that this spring was the warmest ever recorded for our nation – in fact, it crushed the old record by so much that it represented the "largest temperature departure from average of any season on record." The same week, Saudi authorities reported that it had rained in Mecca despite a temperature of 109 degrees, the hottest downpour in the planet's history.

Not that our leaders seemed to notice. Last month the world's nations, meeting in Rio for the 20th-anniversary reprise of a massive 1992 environmental summit, accomplished nothing. Unlike George H.W. Bush, who flew in for the first conclave, Barack Obama didn't even attend. It was "a ghost of the glad, confident meeting 20 years ago," the British journalist George Monbiot wrote; no one paid it much attention, footsteps echoing through the halls "once thronged by multitudes." Since I wrote one of the first books for a general audience about global warming way back in 1989, and since I've spent the intervening decades working ineffectively to slow that warming, I can say with some confidence that we're losing the fight, badly and quickly – losing it because, most of all, we remain in denial about the peril that human civilization is in.

When we think about global warming at all, the arguments tend to be ideological, theological and economic. But to grasp the seriousness of our predicament, you just need to do a little math. For the past year, an easy and powerful bit of arithmetical analysis first published by financial analysts in the U.K. has been making the rounds of environmental conferences and journals, but it hasn't yet broken through to the larger public. This analysis upends most of the conventional political thinking about climate change. And it allows us to understand our precarious – our almost-but-not-quite-finally hopeless – position with three simple numbers.

### The First Number: 2° Celsius

If the movie had ended in Hollywood fashion, the Copenhagen climate conference in 2009 would



I have marked the culmination of the global fight to slow a changing climate. The world's nations had gathered in the December gloom of the Danish capital for what a leading climate economist, Sir Nicholas Stern of Britain, called the "most important gathering since the Second World War, given what is at stake." As Danish energy minister Connie Hedegaard, who presided over the conference, declared at the time: "This is our chance. If we miss it, it could take years before we get a new and better one. If ever."

In the event, of course, we missed it. Copenhagen failed spectacularly. Neither China nor the United States, which between them are responsible for 40 percent of global carbon emissions, was prepared to offer dramatic concessions, and so the conference drifted aimlessly for two weeks until world leaders jetted in for the final day. Amid considerable chaos, President Obama took the lead in drafting a face-saving "Copenhagen Accord" that fooled very few. Its purely voluntary agreements committed no one to anything, and even if countries signaled their intentions to cut carbon emissions, there was no enforcement mechanism. "Copenhagen is a crime scene tonight," an angry Greenpeace official declared, "with the guilty men and women fleeing to the airport." Headline writers were equally brutal: COPENHAGEN: THE MUNICH OF OUR TIMES? asked one.

The accord did contain one important number, however. In Paragraph 1, it formally recognized "the scientific view that the increase in global temperature should be below two degrees Celsius." And in the very next paragraph, it declared that "we agree that deep cuts in global emissions are required... so as to hold the increase in global temperature below two degrees Celsius." By insisting on two degrees – about 3.6 degrees Fahrenheit – the accord ratified positions taken earlier in 2009 by the G8, and the so-called Major Economies Forum. It was as conventional as conventional wisdom gets. The number first gained prominence, in fact, at a 1995 climate conference chaired by Angela Merkel, then the German minister of the environment and now the center-right chancellor of the nation.

Some context: So far, we've raised the average temperature of the planet just under 0.8 degrees Celsius, and that has caused far more damage than most scientists expected. (A third of summer sea ice in the Arctic is gone, the oceans are 30 percent more acidic, and since warm air holds more water vapor than cold, the atmosphere over the oceans is a shocking five percent wetter, loading the dice for devastating floods.) Given those impacts, in fact, many scientists have come to think that two degrees is far too lenient a target. "Any number much above one degree involves a gamble," writes Kerry Emanuel of MIT, a leading authority on hurricanes, "and the odds become less and less favorable as the temperature goes up." Thomas Lovejoy, once the World Bank's chief biodiversity adviser, puts it like this: "If we're seeing what we're seeing today at 0.8 degrees Celsius, two degrees is simply too much." NASA scientist James Hansen, the planet's most prominent climatologist, is even blunter: "The target that has been talked about in international negotiations for two degrees of warming is actually a prescription for long-term disaster." At the Copenhagen summit, a spokesman for small island nations warned that many would not survive a two-degree rise: "Some countries will flat-out disappear." When delegates from developing nations were warned that two degrees would represent a "suicide pact" for drought-stricken Africa, many of them started chanting, "One degree, one Africa."

Despite such well-founded misgivings, political realism bested scientific data, and the world settled on the two-degree target – indeed, it's fair to say that it's the only thing about climate change the world has settled on. All told, 167 countries responsible for more than 87 percent of the world's carbon emissions have signed on to the Copenhagen Accord, endorsing the two-degree target. Only a few dozen countries have rejected it, including Kuwait, Nicaragua and Venezuela. Even the United Arab Emirates, which makes most of its money exporting oil and gas, signed on. The official position of planet Earth at the moment is that we can't raise the temperature more than two degrees Celsius – it's become the bottomest of bottom lines. Two degrees.

## The Second Number: 565 Gigatons

Scientists estimate that humans can pour roughly 565 more gigatons of carbon dioxide into the atmosphere by midcentury and still have some reasonable hope of staying below two degrees. ("Reasonable," in this case, means four chances in five, or somewhat worse odds than playing Russian roulette with a six-shooter.)

This idea of a global "carbon budget" emerged about a decade ago, as scientists began to calculate how much oil, coal and gas could still safely be burned. Since we've increased the Earth's temperature by 0.8 degrees so far, we're currently less than halfway to the target. But, in fact, computer models calculate that even if we stopped increasing CO<sub>2</sub> now, the temperature would likely still rise another 0.8 degrees, as previously released carbon continues to overheat the atmosphere. That means we're already three-quarters of the way to the two-degree target.

How good are these numbers? No one is insisting that they're exact, but few dispute that they're generally right. The 565-gigaton figure was derived from one of the most sophisticated computer-simulation models that have been built by climate scientists around the world over the past few decades. And the number is being further confirmed by the latest climate-simulation models currently being finalized in advance of the next report by the Intergovernmental Panel on Climate Change. "Looking at them as they come in, they hardly differ at all," says Tom Wigley, an Australian climatologist at the National Center for Atmospheric Research. "There's maybe 40 models in the data set now, compared with 20 before. But so far the numbers are pretty much the same. We're just fine-tuning things. I don't think much has changed over the last decade." William Collins, a senior climate scientist at the Lawrence Berkeley National Laboratory, agrees. "I think the results of this round of simulations will be quite similar," he says. "We're not getting any free lunch from additional understanding of the climate system."

We're not getting any free lunch from the world's economies, either. With only a single year's lull in 2009 at the height of the financial crisis, we've continued to pour record amounts of carbon into the atmosphere, year after year. In late May, the International Energy Agency published its latest figures – CO<sub>2</sub> emissions last year rose to 31.6 gigatons, up 3.2 percent from the year before. America had a warm winter and converted more coal-fired power plants to natural gas, so its emissions fell slightly; China kept booming, so its carbon output (which recently surpassed the U.S.) rose 9.3 percent; the Japanese shut down their fleet of nukes post-Fukushima, so their emissions edged up 2.4 percent. "There have been efforts to use more renewable energy and improve energy efficiency," said Corinne Le Quéré, who runs England's Tyndall Centre for Climate Change Research. "But what this shows is that so far the effects have been marginal." In fact, study after study predicts that carbon emissions will keep growing by roughly three percent a year – and at that rate, we'll blow through our 565-gigaton allowance in 16 years, around the time today's preschoolers will be graduating from high school. "The new data provide further evidence that the door to a two-degree trajectory is about to close," said Fatih Birol, the IEA's chief economist. In fact, he continued, "When I look at this data, the trend is perfectly in line with a temperature increase of about six degrees." That's almost 11 degrees Fahrenheit, which would create a planet straight out of science fiction.

So, new data in hand, everyone at the Rio conference renewed their ritual calls for serious international action to move us back to a two-degree trajectory. The charade will continue in November, when the next Conference of the Parties (COP) of the U.N. Framework Convention on Climate Change convenes in Qatar. This will be COP 18 – COP 1 was held in Berlin in 1995, and since then the process has accomplished essentially nothing. Even scientists, who are notoriously reluctant to speak out, are slowly overcoming their natural preference to simply provide data. "The

message has been consistent for close to 30 years now," Collins says with a wry laugh, "and we have the instrumentation and the computer power required to present the evidence in detail. If we choose to continue on our present course of action, it should be done with a full evaluation of the evidence the scientific community has presented." He pauses, suddenly conscious of being on the record. "I should say, a *fuller evaluation* of the evidence."

So far, though, such calls have had little effect. We're in the same position we've been in for a quarter-century: scientific warning followed by political inaction. Among scientists speaking off the record, disgusted candor is the rule. One senior scientist told me, "You know those new cigarette packs, where governments make them put a picture of someone with a hole in their throats? Gas pumps should have something like that."

### The Third Number: 2,795 Gigatons

This number is the scariest of all – one that, for the first time, meshes the political and scientific dimensions of our dilemma. It was highlighted last summer by the Carbon Tracker Initiative, a team of London financial analysts and environmentalists who published a report in an effort to educate investors about the possible risks that climate change poses to their stock portfolios. The number describes the amount of carbon already contained in the proven coal and oil and gas reserves of the fossil-fuel companies, and the countries (think Venezuela or Kuwait) that act like fossil-fuel companies. In short, it's the fossil fuel we're currently planning to burn. And the key point is that this new number – 2,795 – is higher than 565. Five times higher.

The Carbon Tracker Initiative – led by James Leaton, an environmentalist who served as an adviser at the accounting giant PricewaterhouseCoopers – combed through proprietary databases to figure out how much oil, gas and coal the world's major energy companies hold in reserve. The numbers aren't perfect – they don't fully reflect the recent surge in unconventional energy sources like shale gas, and they don't accurately reflect coal reserves, which are subject to less stringent reporting requirements than oil and gas. But for the biggest companies, the figures are quite exact: If you burned everything in the inventories of Russia's Lukoil and America's ExxonMobil, for instance, which lead the list of oil and gas companies, each would release more than 40 gigatons of carbon dioxide into the atmosphere.

Which is exactly why this new number, 2,795 gigatons, is such a big deal. Think of two degrees Celsius as the legal drinking limit – equivalent to the 0.08 blood-alcohol level below which you might get away with driving home. The 565 gigatons is how many drinks you could have and still stay below that limit – the six beers, say, you might consume in an evening. And the 2,795 gigatons? That's the three 12-packs the fossil-fuel industry has on the table, already opened and ready to pour.

We have five times as much oil and coal and gas on the books as climate scientists think is safe to burn. We'd have to keep 80 percent of those reserves locked away underground to avoid that fate. Before we knew those numbers, our fate had been likely. Now, barring some massive intervention, it seems certain.

Yes, this coal and gas and oil is still technically in the soil. But it's already economically aboveground – it's figured into share prices, companies are borrowing money against it, nations are basing their budgets on the presumed returns from their patrimony. It explains why the big fossil-fuel companies have fought so hard to prevent the regulation of carbon dioxide – those reserves are their primary asset, the holding that gives their companies their value. It's why they've worked so hard these past years to figure out how to unlock the oil in Canada's tar sands, or how to drill miles beneath the sea, or how to frack the Appalachians.



If you told Exxon or Lukoil that, in order to avoid wrecking the climate, they couldn't pump out their reserves, the value of their companies would plummet. John Fullerton, a former managing director at JP Morgan who now runs the Capital Institute, calculates that at today's market value, those 2,795 gigatons of carbon emissions are worth about \$27 trillion. Which is to say, if you paid attention to the scientists and kept 80 percent of it underground, you'd be writing off \$20 trillion in assets. The numbers aren't exact, of course, but that carbon bubble makes the housing bubble look small by comparison. It won't necessarily burst – we might well burn all that carbon, in which case investors will do fine. But if we do, the planet will crater. You can have a healthy fossil-fuel balance sheet, or a relatively healthy planet – but now that we know the numbers, it looks like you can't have both. Do the math: 2,795 is five times 565. That's how the story ends.

So far, as I said at the start, environmental efforts to tackle global warming have failed. The planet's emissions of carbon dioxide continue to soar, especially as developing countries emulate (and supplant) the industries of the West. Even in rich countries, small reductions in emissions offer no sign of the real break with the status quo we'd need to upend the iron logic of these three numbers. Germany is one of the only big countries that has actually tried hard to change its energy mix; on one sunny Saturday in late May, that northern-latitude nation generated nearly half its power from solar panels within its borders. That's a small miracle – and it demonstrates that we have the technology to solve our problems. But we lack the will. So far, Germany's the exception; the rule is ever more carbon.

This record of failure means we know a lot about what strategies *don't* work. Green groups, for instance, have spent a lot of time trying to change individual lifestyles: the iconic twisty light bulb has been installed by the millions, but so have a new generation of energy-sucking flatscreen TVs. Most of us are fundamentally ambivalent about going green: We like cheap flights to warm places, and we're certainly not going to give them up if everyone else is still taking them. Since all of us are in some way the beneficiaries of cheap fossil fuel, tackling climate change has been like trying to build a movement against yourself – it's as if the gay-rights movement had to be constructed entirely from evangelical preachers, or the abolition movement from slaveholders.

People perceive – correctly – that their individual actions will not make a decisive difference in the atmospheric concentration of CO<sub>2</sub>; by 2010, a poll found that "while recycling is widespread in America and 73 percent of those polled are paying bills online in order to save paper," only four percent had reduced their utility use and only three percent had purchased hybrid cars. Given a hundred years, you could conceivably change lifestyles enough to matter – but time is precisely what we lack.

A more efficient method, of course, would be to work through the political system, and environmentalists have tried that, too, with the same limited success. They've patiently lobbied leaders, trying to convince them of our peril and assuming that politicians would heed the warnings. Sometimes it has seemed to work. Barack Obama, for instance, campaigned more aggressively about climate change than any president before him – the night he won the nomination, he told supporters that his election would mark the moment "the rise of the oceans began to slow and the planet began to heal." And he has achieved one significant change: a steady increase in the fuel efficiency mandated for automobiles. It's the kind of measure, adopted a quarter-century ago, that would have helped enormously. But in light of the numbers I've just described, it's obviously a very small start indeed.

At this point, effective action would require actually keeping most of the carbon the fossil-fuel industry wants to burn safely in the soil, not just changing slightly the speed at which it's burned. And there the president, apparently haunted by the still-echoing cry of "Drill, baby, drill," has gone out of