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November 18, 2013

Millennium Bulk Terminals-Longview EIS
c/o ICF International
710 Second Avenue, Suite 550
Seattle, WA 98104

Dear Co-Lead Agencies' Representatives for Cowlitz County, WA State Department of Ecology, and U.S. Army Corps of Engineers:

As a resident of Washington state, and more specifically the San Juan Islands, please accept the attached Environmental Impact Statement Scoping Comment on *The Risks of Climate Change* relevant to the Millennium Bulk Terminals Longview (MBTL) permit application, developed in consultation with Al Gillespie.

Based on the findings of significant and unmitagatable adverse impacts, I ask that you deny the permit for the proposed Millenium Bulk Terminals Longview (MBTL).

Sincerely,

Ms. Sophia M. Shoen

Environmental Impact Statement Scoping Comments for the proposedMillennium Bulk Terminals Longview:

The Risks of Climate Change

Sophia Shoen/Alexander Gillespie

November 5, 2013

According to the proposal by Millennium Bulk Terminals (MBT) Longview, when its coal facility is at capacity, it will be shipping a 'nominal' 44 million metric tons of coal per year.[1] It is expected that all of this traded coal will go directly to China. In doing so, both the transport and use of the coal itself, presents considerable risks which should be examined by the Environmental Impact Statement.

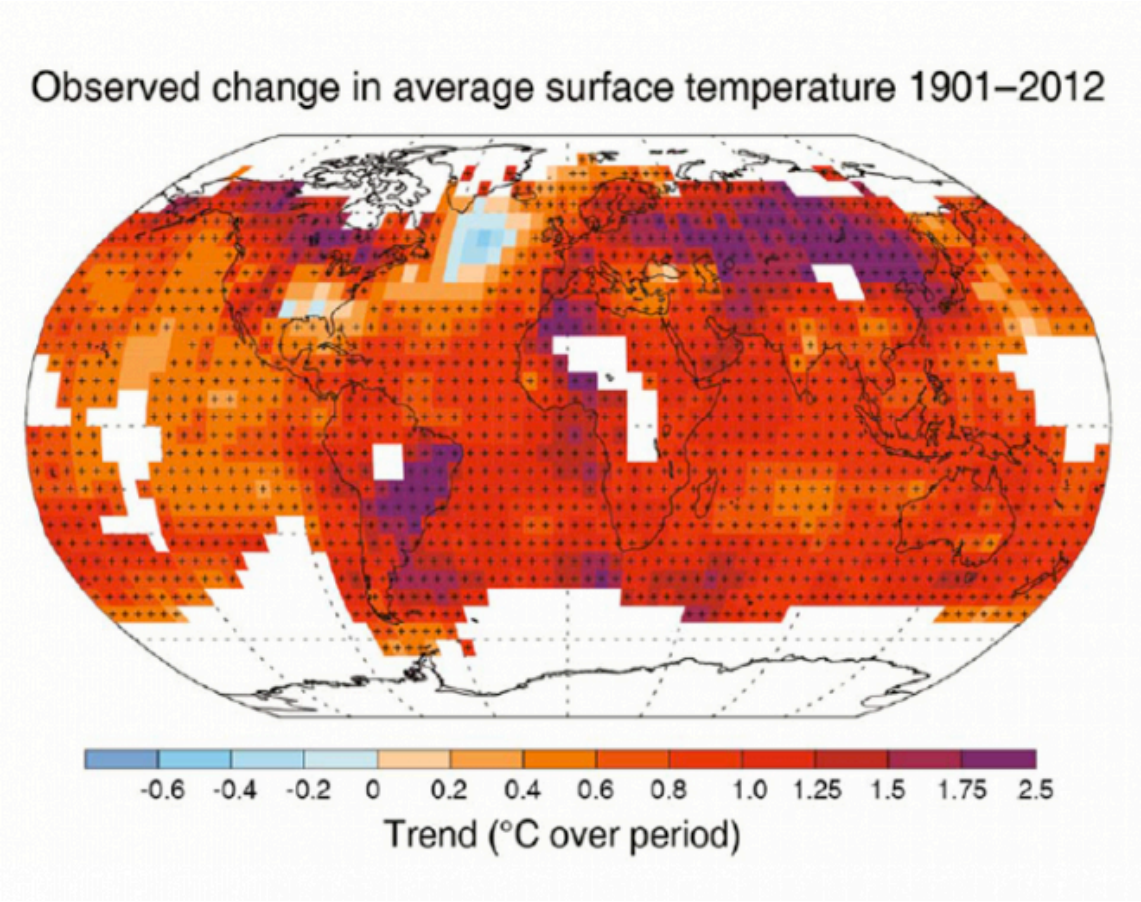
1. The reasonably foreseeable risk

According to the 2013 Report, *The Physical Science Basis*, from the Intergovernmental Panel on Climate Change, warming of the climate system is now considered 'unequivocal'.[2] It is *extremely likely* that human influence has been the dominant cause of the observed warming since the mid-20th century. Currently, the atmospheric concentrations of carbon dioxide (CO2), methane, and nitrous oxide have increased to levels unprecedented in at least the last 800,000 years. CO2 concentrations have increased by 40% since pre-industrial times, primarily from fossil fuel emissions and secondarily from net land use change emissions. Since the 1950s, many of the observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, sea level has risen, and the concentrations of greenhouse gases have increased.

Each of the last three decades has been successively warmer at the Earth's surface than any preceding decade since 1850. In the Northern Hemisphere, 1983–2012 was *likely* the warmest 30-year period of the last 1400 years. The ocean has absorbed about 30% of the emitted anthropogenic carbon dioxide, causing both acidification and changes in temperature. Ocean warming dominates the increase in energy stored in the climate system, accounting for more than 90% of the energy accumulated between 1971 and 2010. It is *virtually certain* that the upper ocean (0−700 m) warmed from 1971 to 2010. In addition, over the last two decades, the Greenland and Antarctic ice sheets have been losing mass, glaciers have continued to shrink almost worldwide, and Arctic sea ice and Northern Hemisphere spring snow cover have continued to decrease in extent. The rate of sea level rise since the mid-19th century has been larger than the mean rate during the previous two millennia. Over the period 1901–2010, global mean sea level rose by 0.19.

[1] 2010 Washington State, Joint Aquatic Resources Permit Application: Millennium Bulk Terminals Longview. 2012, February 2nd. Available from, < http://www.ecy.wa.gov/geographic/millennium/20120222_JARPAapplication.pdf> Section 6d.

[2] Intergovernmental Panel on Climate Change (2013). *The Physical Science Basis: Summary for Policy Makers*. (IPCC, Twelfth Session of Working Group I, AR5, Sept 27). 2-7.

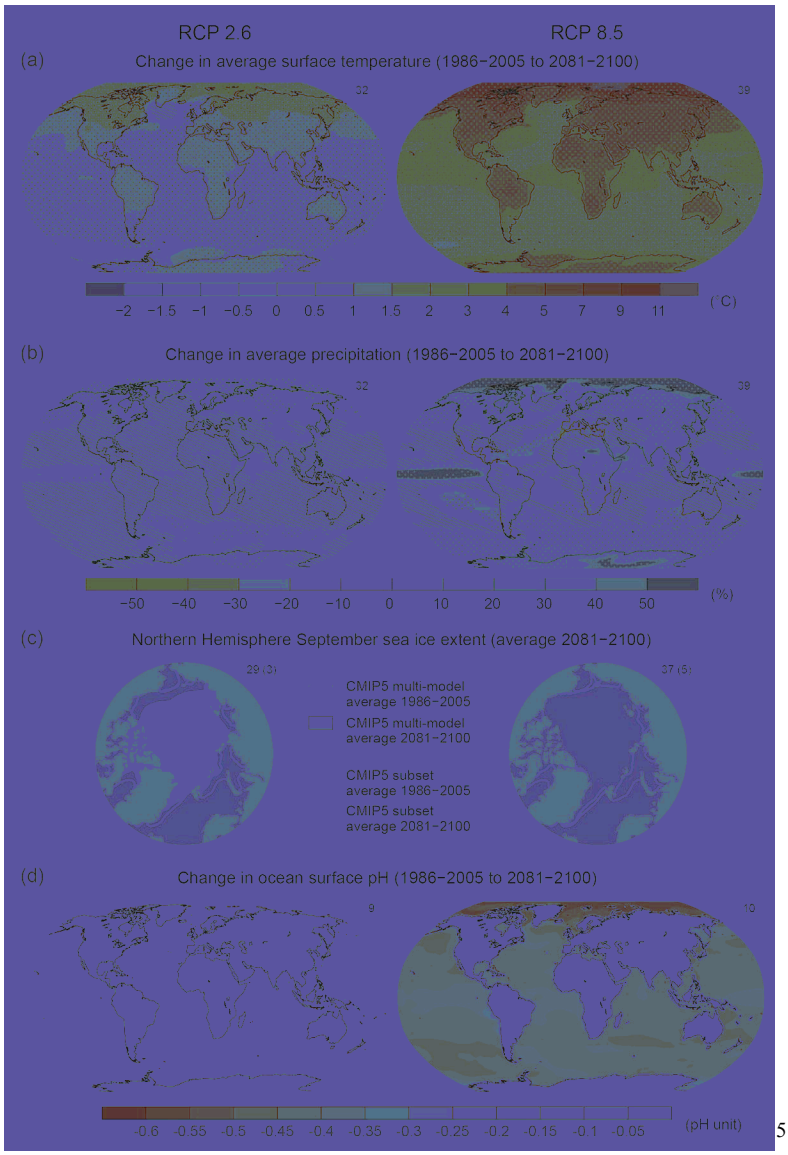


[3]

Depending on the increase of climate change emissions, global surface temperature change for the end of the 21st century is *likely* to exceed 1.5°C relative to 1850 to 1900 for most climate projection scenarios put forward, although it could equally exceed 2°C, and then continue to rise post 2100. In all cases, the global ocean will continue to warm, the Arctic sea ice cover will continue to shrink and thin and the Northern Hemisphere spring snow cover will decrease, global glacier volume will further decrease, and global mean sea level will continue to rise during the 21st century.[4]

[3] Intergovernmental Panel on Climate Change (2013). *The Physical Science Basis: Summary for Policy Makers*. (IPCC, Twelfth Session of Working Group I, AR5, Sept 27). 5.

[4] Intergovernmental Panel on Climate Change (2013). *The Physical Science Basis: Summary for Policy Makers*. (IPCC, Twelfth Session of Working Group I, AR5, Sept 27). 4-8.



[5]

The projections and analysis from the Intergovernmental Panel on Climate Change are consistent with recorded changes occurring in the United States. For example, the National Climatic Data Centre of the National Oceanic and Atmospheric Administration recorded that the average temperature for the contiguous United States during August 2013 (and in line with similar, continued, record breaking in other months), tied for fourth highest on record, while ocean surface temperatures tied for the record highest.[6] The Draft 2014 National Climate Assessment suggests, with one eye on the present, and one on the future, that:

1. Changes in the timing of streamflow related to changing snowmelt are already observed and will continue, reducing the supply of water for many competing demands and causing far-reaching ecological and socioeconomic consequences.

[5] Intergovernmental Panel on Climate Change (2013). *The Physical Science Basis: Summary for Policy Makers*. (IPCC, Twelfth Session of Working Group I, AR5, Sept 27). 6.
[6] http://www.ncdc.noaa.gov/sotc/global/2013/08/

2. In the coastal zone, the effects of erosion, inundation, threats to infrastructure and habitat, and increasing ocean acidity collectively pose a major threat to the region.

3. The combined impact of increasing wildfire, insect outbreaks, and diseases is virtually certain to cause additional forest mortality by the 2040s and long-term transformation of forest landscapes. Almost complete loss of subalpine forests is expected by the 2080s.

4. While the agriculture sector's technical ability to adapt to changing conditions can offset some of the adverse impacts of a changing climate, there remain critical sector-specific concerns with respect to costs of adaptation, development of more climate resilient technologies and management, and availability and timing of water. [7]

Washington State is already recording average yearly temperatures that are rising faster than the global average. In addition, mountain glaciers in the North Cascades have lost up to a third of their area since 1950 and snow pack in the Cascades has declined by 35%. Peak spring river runoff is occurring 10 to 30 days earlier and the proportion of stream flow that arrives in summer decreasing as much as 34% in sensitive river basins. Similarly, in Oregon, the evidence suggests that it is very likely that the State will see an increase in extreme heat events; reduced snowpack and water availability in some basins, and changes in water quality and timing of water availability. The frequency and intensity of wildfires is likely to increase, as will ocean temperatures and ocean acidification, increased incidences of drought, coastal erosion and risk of inundation from increasing sea levels, increases in diseases and the spread of invasive species and the loss of wetland ecosystems and services.[8] In the case of both Washington and Oregon, key species, which are already endangered, such as salmon, are expected to face even more increased pressure.[9] The impact upon shared ecosystems between both Washington and Oregon, such as the Columbia River, is expected to be monumental. [10]

These changes are all consistent with, and linked into, one of the foremost challenges for humanity in the 21st century, which is climatic change. This concern is clear at the

[7] National Climate Assessment and Development Advisory Committee (2013). Draft National Climate Assessment. Chapter 21. See also, National Research Council 2012. Sea-Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future (NRC, Washington). 7-10.

[8] State of Oregon (2010). *The Oregon Climate Change Adaptation Framework.* (Oregon Department of Transportation, Eugene). 5-9. The facts on Washington State are taken from the Office of the Governor, Executive Order 07-02, Washington *State Climate Change Challenge.*

[9] Irvine, J. (2011). 'Pacific Salmon Abundance Trends and Climate Change'. *ICES Journal of Marine Science.* 68(6): 1122-1130. Crozier, L. (2008). 'Predicting Differential Effects of Climate Change at the Population Level for Chinook Salmon'. *Global Change Biology*. 14(2): 236-249.

[10] Osborn, R. (2012). 'Climate Change and the Columbia River Treaty'. *Washington Journal of Environmental Law.* 2(1): 75-123.

international[11] and domestic levels. President Obama identified climate change as one of the foremost threats to the United States. Specifically, he has stated, 'We want our children to live in an America that isn't burdened by debt, that isn't weakened by inequality, that isn't threatened by the destructive power of a warming planet'.[12]

The potential impacts of this change upon the Earth, the United States, and the region are astronomical. Within the United States, amidst dozens of other clear impacts, it is expected that crop and livestock production will be increasingly challenged by increased heat, pests, water stress, diseases, and weather extremes. Expectations are that human health will also be increasing challenged as a result of heat stress, waterborne diseases, poor air quality, extreme weather events, and diseases transmitted by insects and rodents.[13] Such impacts are also expected to impact the individual regions detrimentally. For example, Washington State is believed to be particularly vulnerable to a warming climate particularly because of its snow-fed water supplies that provide drinking water, irrigation for agriculture and which are also responsible for nearly three-fourths of the state's electrical power. Close to 40 communities, including some of the state's largest population areas, exist along 2,300 miles of shoreline, which is threatened by rising sea levels and ocean acidification. If no action is taken, potential costs to Washington (alone) from climate change impacts are projected to reach nearly $10 billion per year by 2020 from increased health costs, storm damage, coastal destruction, rising energy costs, increased wildfires, drought, and other impacts.[14]

Pacific coast leaders in the United States see this threat to their regional environment an economy. On October 28, 2013, leaders of California, Oregon, Washington and British Columbia signed the Pacific Coast Action Plan [15] on Climate and Energy. Of note, the four governments agreed to work together to carbon pricing programs in all four regions and to work towards cleaner transportation and reduce the amount of greenhouse gas (GHG) emissions from the transportation sector. Such measures are designed to help support meaningful international action in this area.

2. Indicators of significant risk

- The 1992 United Nations Framework Convention on Climate Change.
- The 2007 and 2012 Memorandum of Understanding to Enhance Cooperation on Climate Change, Energy and Environment Between the Government of the United States of America the Government of the Peoples' Republic of China.
- Federal Executive Order 12114: Environmental Effects Abroad.

[11] See United Nations General Assembly Resolution 2011, A/RES/66/200.
[12] http://www.examiner.com/article/president-obama-addresses-climate-change-acceptance-speech
[13] Global Change Research Programme (2009). *Global Climate Change Impacts in the United States* (GCRP, Washington).
[14] Department of Ecology, State of Washington (2012). *Preparing for a Changing Climate Washington State's Integrated Climate Response Strategy.* (DOE, Olympia, Publication No. 12-01-004) 2-6.
[15] http://www.pacificcoastcollaborative.org/Documents/Pacific%20Coast%20Climate%20Action%20Plan.pdf

- Washington State Executive Order EO 07-02 The Climate Change Challenge.
- Washington State Executive Order EO 09-05. Climate Leadership**.**
- Oregon House Bill, 3543. Global Warming Actions.
- Revised Code of Washington 70.235.020 Greenhouse Gas Emissions Reductions.
- The Western Climate InitiativePreparing for a Changing Climate: Washington State's Integrated Climate Change Response Strategy
- The Intergovernmental Panel on Climate Change Report, 2013
- The Pacific Coast Collaborative Climate Action Plan, 2013

3. The base problem and the need for two cumulative views

A cumulative assessment is required to reveal risks that, which perhaps appearing to be minor on an individual level, once quantified in a much larger and integrated framework, may actually turn out to be highly relevant contributors to the risk profile when placed in the context.[16] This requirement is especially important when dealing with inter-related projects that will utilize the same resource and where further growth, beyond the incremental increase of the project at hand, can reasonably be foreseen. To take all of these contributions together, cumulatively, greatly assists the decision-making authorities.[17] This type of cumulative thinking is especially important in the area of global warming, or as the Court of Appeals for the Ninth Circuit explained, 'the impact of greenhouse gas emissions on climate change is precisely the kind of cumulative impact analysis that NEPA requires agencies to conduct'.[18]

In the current situation, two cumulative assessments are required. The first pertains to the contribution that coal freight trains in Washington State are making to the national budget of greenhouse gas (GHG) emissions. The second relates to the contribution of coal from the United States to China, and its scientific and contextual linkage into greenhouse gas emissions from a global perspective.

[16] Kern v. United States Bureau of Land Mgmt., 284 F.3d 1062, 1075 (9th Cir. 2002). As Judge Wright famously criticized 'crabbed interpretations' that made 'a mockery' of the NEPA, adding that, 'NEPA was meant to do more than regulate the flow of papers in the federal bureaucracy'. Calvert Cliffs v. U.S Atomic Energy Commission. 449 F.2d (D.C Cir. 1971).

[17] Zhao, M. (2012). 'Barriers and Opportunities for Effective Cumulative Impact Assessment Within State-Level Environmental Review Frameworks in the United States'. *Journal of Environmental Planning and Management.* 55(7): 961-978. Senner, R. (2011). 'Appraising the Sustainability of Project Alternatives: An Increasing Role for Cumulative Impact Assessment'. *Environmental Impact Assessment Review.* 31: 502-505. Hegmann, G. (2011). 'Alchemy to Reason: Effective Use of Cumulative Effects Assessment in Resource Management'. 31 *Environmental Impact Assessment Review*. 31: 484-490. Gunn, J. (2011). 'Conceptual and Methodological Challenges to Cumulative Effects Assessment'. *Environmental Impact Assessment Review*. 31: 154-160. Therivel, R. (2007). 'Cumulative Effects Assessment: Does Scale Matter ?' *Environmental Impact Assessment Review*. 27: 365-385. Burris, R. (1997). 'Facilitating Cumulative Impact Assessment in the EIA Process'. *International Journal of Environmental Studies*. 53: 1-2, 11-29. Thatcher, T. (1990). 'Understanding Interdependence in the Natural Environment: Some Thoughts on Cumulative Impact Assessment Under the National Environmental Policy Act'. 20 *Environmental Law*. 611. Eckberg, D. (1986). 'Cumulative Impacts Under NEPA'. 16 *Environmental Law*. 673.

[18] Center for Biological Diversity v. National Highway Traffic Safety Administration. 538 F. 3d 1172 (9th Cir. 2008)(NHTSA). Note also, Coalition for Progress v. Surface Transportation Board, 345 F.3d 520 (8th Cir. 2003). See generally, Reitze, A. (2012). 'The Role of NEPA in Fossil Fuel Resource Development and Use in the Western United States'. Boston College Environmental Affairs Law Review. 39(2): 283, 369-374.

Before a cumulative assessment can be triggered, it is essential that the project(s) make a significant contribution to the alleged risk. Thus, as the Supreme Court explained, there must be, 'a reasonably close causal relationship between the environmental effect and the alleged cause'.[19] In the instance of climatic change, the Courts have looked unsympathetically upon claims which would not change overall GHG emissions or which would only make a minimal contribution, such as increasing global GHGs by 0.088%, or U.S. emissions by less than 0.03%.[20] Overlapping with such concerns, and the need to have a significant contribution to trigger concerns in this area, the Council on Environmental Quality has suggested in its *draft* NEPA Guidance on Climate Change, that projects that could reasonably anticipated to cause direct emissions of 25,000 metric tons or more of CO2-equivalent greenhouse gas equivalent emissions on an annual basis, would be an adequate trigger to scope the potential impacts of the project..[21]

(i). The Significant Contribution of Greenhouse Gases to the National Output

The first cumulative assessment that is required relates to the contribution that coal freight trains in Washington State and Oregon are making to the national budget of GHG emissions.

Putting the requirement for such an assessment in context, at the global level, transport accounts for 13% of total greenhouse gas emissions by source and it is one of the few sectors where emissions are growing with little restraint. Car use, road freight and aviation are the principal contributors to greenhouse gas emissions from the transport sector. The GHG emissions of the transport sector for the United States are more than double the global average. In 2010, greenhouse gas emissions from transportation accounted for about 27% of total U.S. greenhouse gas emissions, making it the second largest contributor of U.S. greenhouse gas emissions after the electricity sector. Greenhouse gas emissions from transportation have increased by about 19% since 1990. The combustion of petroleum-based products like gasoline, in internal combustion engines, of which private vehicles are the dominant source, are primarily responsible for this increase.

The internal dynamics of the transport sector are changing, as different modes jockey for position. With regards to trains, and freight trains in particular, many studies have shown that moving freight from road to rail creates many environmental benefits in terms of reducing traffic gridlock, better fuel consumption and energy intensity. However, rail is not a perfect solution. Rail transport is by no means as efficient as it could be. Its carbon footprint, largely

[19] Department of Transportation v. Public Citizen. 541 U.S. 752, 767.

[20] Border Power Working Group v. Department of Energy, 260 F. Supp. 2d 997 (S.D. CaI. 2003) Barnes v. U.S. Department of Transportation, 655 F.3d 1 124, 1 139 (9th Cir. 201 1), Minnesota Center for Environmental Advocacy v. Holsten, No. 31-CV-07-3338 (Minn. 9th Jud. Dist., filed Oct. 15, 2008). Senville v. Peters, 327 F. Supp. 2d 335 (D. Vt. 2004). For some supporting academic commentary in this area, see Squillace, M. (2012). *NEPA and Climate Change*. Colorado Legal Studies Research Paper Series, number 12-16. Squillace, M. (2011). *NEPA, Climate Change, and Public Lands Decision Making*. Colorado Legal Studies Research Paper Series, Number 11-13. Smith, M. (2010). 'NEPA and Climate Change'. Environmental Practice 12(2): 182-186. Dupont, N. (2009). 'NEPA and Climate Change: Are We At The Tipping Point ?' *Natural Resources and Environment*. 23(4): 18-25. Allen, L. (2009). 'Indirect Impacts and Climate Change'. *Natural Resources and the Environment*. 23(4): 30-36.Kass, M. (2008). 'Little NEPAs Take on Climate Goliath'. *Natural Resources and the Environment*. 23(2): 40-42.

[21] Council on Environmental Quality (2010). *Draft NEPA Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions* (CEQ, Washington). 3.

attributed to diesel trains which typically make up nearly 90% of the source of rail emissions expands with its growth. This trend is evident is many comparable countries, such as Britain, which has seen a 35% increase in greenhouse gas emissions from rail between 1990 and 2010. A similar situation exists in the United States where this sector was responsible for 39 million tons of greenhouse gas equivalent emissions in 1990. By 2010, this figure had risen to 46.3 million tons.[22]

The need to take a cumulative view of this part of the transport sector as part of the national evaluation of the overall greenhouse budget is important, although the national obligations in this area are still emerging[23] and a number of states have their own targets set in law. For example, in Washington State:

> The legislature finds that Washington has long been a national and international leader on energy conservation and environmental stewardship, …. Washington is also unique among most states in that in addition to its commitment to reduce emissions of greenhouse gases, it has established goals to grow the clean energy sector and reduce the state's expenditures on imported fuels. The legislature further finds that Washington should continue its leadership on climate change policy by creating accountability for achieving the emission reductions established in RCW.[24]

Following on from this statement, the Governor of Washington State declared the state's commitment to address climate change in a series of Executive Orders. These Orders established the target for Washington State to return to 1990 levels of emissions of greenhouse gas emissions by 2020, by 2035, to reduce emissions to 25% below 1990 levels, and, by 2050, to reduce emissions to 50% below 1990 levels.[25] The Governor subsequently ordered, *inter alia,* the Department of Ecology to begin focusing on sectors which emit more than 25,000 metric tons, or carbon dioxide equivalent, with a view to achieving the state's 2020 emission reduction targets. This directive overlaps with requirements for consultation to begin with business and other interested stakeholders, including the transportation sector, to develop emission benchmarks, based on industry best practices by industry sector, including transportation, which at 46% of the greenhouse budget, is the dominant contributor.[26]

(ii). The Significant Contribution of Greenhouse Gases to the Global Output

[22] EPA (2012). *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2010*. (EPA, Washington). 1-3. Department of Transport (2011). *Greenhouse Gas Emissions From Transport* (DoT, London). 17-20.
[23] See generally, Council on Environmental Quality (2011): *Federal Actions for a Climate Resilient Nation Progress Report of the Interagency Climate Change Adaptation Task Force* (CEQ, Washington). For some legal commentary, see Hillsdale Environmental Loss Prevention, Inc. v. U. S. Army Corps of Engineers, No. 10-2008-CM-DJW, 2011 WL2579799 (D. Kan. 2011). Natural Resources Defense Council, Inc. v. California Department of Transportation, Region Seven, 201 1 CaI. App. ULEXIS 8987 (Nov. 22, 2011) (unpublished).
[24] Revised Code of Washington (RCW). Section 70.235.005 Findings — Intent.
[25] Executive Order 07-02, Washington State Climate Change Challenge. http://www.governor.wa.gov/execorders/default.asp
[26] Executive Order 09-05, Washington's Leadership on Climate Change. http://www.governor.wa.gov/execorders/default.asp

The second cumulative study that is required relates to the contribution of coal from the United States to China, and its scientific and contextual linkage, to greenhouse gas emissions from a global perspective.

The need for this second cumulative study is consistent with the NEPA, which requires Federal agencies to support international cooperation by recognizing:

> The global character of environmental problems and, where consistent with the foreign policy of the United States, lend appropriate support to initiatives, resolutions, and programs designed to maximize international cooperation in anticipating and preventing a decline in the quality of mankind's world environment.[27]

This requirement has been supplemented by Executive Order 12114,[28] Supreme Court decisions[29] and mirrors obligations at the State level. For example, the (Washington) State Environmental Policy Act, requires decision makers to:

> Recognize the worldwide and long-range character of environmental problems and, where consistent with state policy, lend appropriate support to initiatives, resolutions, and programs designed to maximize international cooperation in anticipating and preventing a decline in the quality of the world environment.[30]

The usefulness of a second cumulative assessment is that it will help decision-makers to examine the extent to which the actions at hand are undermining, or otherwise, the obligations that the United States has already accepted at the international level through the United Nations Framework Convention on Climate Change. The particular obligation of note is article 2 of this Convention which stipulates:

> The ultimate objective of this Convention and any related legal instruments that the Conference of the Parties may adopt is to achieve, in accordance with the relevant provisions of the Convention, stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.[31]

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[27] Section 102(2) (F), 42 U.S.C. § 4332(2) (F).

[28] This order clearly extended the purpose of NEPA abroad by requiring federal agencies to consider the significant environmental effects of major federal actions outside of the United States, and in this case, to the global commons.

[29] Department of Transportation v. Public Citizen, 541 US 752 - Supreme Court 2004. 541 U.S. 752 (2004). Specifically, The Supreme Court has also applied itself to this area and has agreed with extending impact assessments beyond the borders when, amongst other issues, confirm to the 'rule of reason' which ensures that agencies determine whether and to what extent to engage in impact assessment, based on the usefulness of any new potential information to the decision-making process.

[30] SEPA, Chapter 43.21C RCW, section (f).

[31] See Gillespie, A. (2006). *Climate Change, Ozone Depletion and Air Pollution* (Brill, The Netherlands). Chapter 11.

The axiomatic problem is that the international community is failing to meet this commitment. The foremost reason for this failure is that the two countries which collectively are responsible for 42% of the global problem, the United States and China, have not accepted any binding commitments to reduce their national emissions of greenhouse gases.

In 1992, China produced half of the amount of national GHG emissions that the United States produced. Fifteen years later, China surpassed the United States with its total of national emissions of GHG. China exceeded the United States in cumulative energy-related carbon dioxide equivalent emissions between 2002-2011 with an estimated 64.5 billion tonnes compared with 62.9 billion for the United States. Broadly, this means that China is responsible for 23% of the total greenhouse gases, while the United States is responsible for 19%. Together, these two countries are responsible for over 40% of the entire planet's greenhouse emissions.[32]

Although the United States is contributing less of the overall global anthropogenic basis of the greenhouse gas budget, it is still producing more than it did originally. That is, in 2010, total U.S. greenhouse gas emissions were 6,821.8 million metric tons of CO2 equivalence. Total U.S. emissions have increased by 10.5 % from 1990 to 2010.[33] China's industrial emissions of CO_2 have grown phenomenally since 1950, when China stood tenth among nations based on annual fossil-fuel CO_2 emissions. From 1970 to 1997, China's fossil-fuel CO_2 emissions grew at an annual rate of 5.4%, before jumping to a 7.5% annual growth from 1997 to 2010. During the last period, China doubled its energy output and electrification increased to just over 99%. However, it should be noted that these figures are speculative as China has not reported its annual output of greenhouse gases since 1994, and evidence suggests that China's emissions could be as much as 20% higher than what they are assumed to be.[34]

Unlike most other countries, the growth in emissions from China is due to coal. While the global average of coal in the energy budget is 30%, for China, it is closer to 70% which is also approximately the same figure that coal contributes to the total of greenhouse gas emissions for China. This is not surprising given that China, with an estimated 15% of the world's reserves (some 114,500 million tons), is the world's largest coal producer obtaining some 3,471 million tons in 2011 with the United States coming second at 1004 million tons. China has an estimated 26,000 coal mines employing nearly 8 million workers. Coal accounted for 69% of the primary energy consumption in China 2005 and 75% of total electricity generation. Coal-fired power plants accounted for 83% of new generating capacity installed in 2005. In addition, coal is required for the country's roughly 410,000 industrial furnaces and 180,000 kilns. With such demands, in 2010, coal consumption in China

[32] EPA (2011). *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2010*. (EPA, Washington). iii-v.
[33] See EPA (2012). *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2010*. (EPA, Washington). 3.
[34] Anon (2012). Climate Change Rate Could Be Faster Than Thought'. *The Guardian*. June 11. A4. Anon. (2009). 'Clean Up Call'. New Scientist. April 25. 5. Yanli, H. (2007). 'China and Her Coal'. *World Watch* 20 (1): 14-15. Green, S. (2006). 'The Changing Climate of Coal'. *Power Engineering International* 14. (2): 5.

reached, most probably, 2.5 billion tons. By comparison, at this point, China was providing more energy through coal than all the oil produced in the Middle East.[35]

It is expected that this increasing trend will continue. This is a safe assumption because of the strong growth rates of GDP in China, in coal demand. Electricity demand alone is growing at about 15% per year, faster than any other country in the world. To meet the new demand, China is fast-tracking the construction of new generation facilities with over 500 being built between 2005 and 2012, about 80% of which are coal-fired. With such growth, the projections are for China to be consuming 2.9 billion tons of coal by 2020, with this coal making up more than 70% of its energy budget at this point.[36] Since 2008, the demand for coal within China has exceeded its own domestic supply capacity. Accordingly, China imports coal from other countries. This importation is part of a market of seaborne trade in coal which has increased, on average, by about 7% each year, reaching a global total of 1142 million tons in 2011. China is the largest importer of coal in the world, taking 190 million tons per year. The United States is fourth in terms of total coal exports, at 97 million tons per year, and a large percentage of this export goes directly to China.[37]

The continual, and expanding, inefficient burning of coal has created a multitude of problems in China, most notably with air pollution. China has applied itself to this particular problem with a strong commitment and has adopted the significant technological achievements that have been reached in the developed world to reduce the coal related air pollutants of sulphur and nitrous oxide. In addition, in mid-2011, China announced new emission standards for new and older thermal power plants, for nitrous oxide and mercury emissions, as well as tightening sulphur dioxide emissions and soot standards. The same progress has *not* been applied to reducing climate (carbon) pollution. China thus lags behind other industrialized countries in developing and deploying these technologies. While some of the technologies that China has been investing in, such as much more efficient coal gasification programmes, are underway, these remain both recent (the first being operational in 2009) and a very small percentage of their total coal plants. Moreover, despite China improving its energy intensity (an improvement of 10% over all coal power stations between 2002 and 2009), because its production capacity has more than doubled, any savings have been eclipsed. Accordingly, although China appears to be softening its resistance to taking action on climate change issues, and is expressing a greater willingness to partake in international efforts, whether China can adapt to the necessary changes, while also managing

[35] See generally, http://www.worldcoal.org/coal/coal-mining/

[36] Saeed, A. (2010). 'China: Climate Change is the Defining Challenge of our Age'. *Strategic Studies.* 30(3): 7-18. Liu, H. (2008). 'Strategic Thinking on IGCC Development in China'. *Energy Policy* 36. 1–11. Yanli, H. (2007). 'China and Her Coal'. *World Watch* 20 (1): 14-15. Hertgaard, M. (2000). 'China: The Coast of Coal'. *E : the Environmental Magazine* 11 (5): 27-28.

[37] Michieka, N. (2012). 'An Investigation of China's Coal Consumption'. *Energy Policy*. 48: 668. The countries ahead of the United States on coal exports each year are Indonesia at 309 Mt, Australia at 284 and Russia on 124. The import figures compare to others like Japan at 175 Mt, South Korea at 129 Mt, India at 105 Mt, Chinese Tapei at 66 Mt, Germany at 41 Mt and the UK at 33 Mt. See http://www.worldcoal.org/resources/coal-statistics/ Also, http://www.eia.gov/coal/production/quarterly/

its high economic growth, especially in times for a political agreement to be made, let alone ecological stability, is an open question.[38]

In sum, neither the United States nor China will accept reductions unless the other is also moving in a similar direction. This failure to find a 'grand bargain' is removing the chances of keeping the increasing concentrations of greenhouse gases below danger levels. This problem is being accentuated by the failure to set meaningful goals or commitments between the two Superpowers on this topic at the bilateral level. Specifically, in the 2009 Memorandum of Understanding to Enhance Cooperation on Climate Change, Energy and Environment between the Government of the United States of America the Government of the Peoples' Republic of China was agreed. As an interim step, this iterated commitment to the United Nations Framework Convention on Climate Change and the promise to look at 10 wide-ranging environmental themes, including, 'cleaner uses of coal, and carbon capture and storage'. [39] Earlier this year, the U.S.-China Climate Change Working Group reinvigorated their work, and as part of their five new initiatives aimed at reducing greenhouse gas emissions and air pollution by tackling the largest sources of emissions in both countries, they agreed to focus further on increasing carbon capture, utilization, and storage (CCUS), seeking to further cooperate to overcome barriers to deploying CCUS by implementing several large-scale, integrated demonstration projects in both countries.[40] However, despite the rhetoric around this cooperation, the question needs to be examined in the Environmental Impact Statement, what will the impact of all of this coal being exported to China actually do in terms of China's national emissions of greenhouse gases; their global impact, andthe likelihood that this trade is actually exacerbating, not shrinking, the clearly recognised problem of climatic change.

4. Mitigation

[38] Rennings, K. (2013). 'How Clean is Clean ? Incremental Versus Radical Technological Change in Coal-Fired Power Plants'. 23(2): 331-355 Zhu, L. (2013). 'A Low Carbon Road Map for China'. *Nature* 500 (7461): 143. Harris, P. (2013). 'China and Climate Justice: Moving Beyond Statism'. International Environmental Agreements: Politics, Law and Economics. 13(3): 291-305.Anon (2013). 'Can China Clean Up Fast Enough ?' Economist. August 10: 9-10. Kopra, S. (2013). 'A Responsible Developing Country: China and International Negotiations on Climate'. Quarterly Journal of Chinese Studies. 1(3): 121. Zhang, Z. (2011). 'A Chinese Roadmap on Climate Change'. International Environmental Agreements: Politics, Law and Economics. 11(3): 245-259. Gong, G. (2011). 'What China Wants: China's Climate Change Priorities in a Post-Copenhagen World'. *Global Change, Peace & Security* 23(2): 159-175. Anon (2011). 'China Looks to Balance Its Carbon Books'. *Science*. 334: November, 18. Chen, W. (2010). 'Clean Coal Technology Development in China'. *Energy Policy* 38: 2123–2130. Ma, Y. (2010). 'China's View of Climate Change'. *Policy Review*. June. 25-37. Lo, A. (2010). 'China's Response to Climate Change'. *Environmental Science and Technology. 44:* 5689–5690. Edmonds, R. (2009). 'China's Dilemma: Economic Growth, the Environment and Climate Change'. The China Quarterly. 198: 471.

[39] For commentary in this area, see Carraro, C. (2012). 'Energy and Climate Change in China'. *Environment and Development Economics*17 (6): 689-713. Harvey, F. (2012). 'China and the United States Key to Climate Solution'. *The Guardian.* Dec 12. Saeed, A. (2010). 'China: Climate Change is the Defining Challenge of our Age'. *Strategic Studies.* 30(3): 7-18. Seligsohn, D. (2009). *China, the United States, and the Climate Change Challenge*. (World Resource Institute, Washington). Anon (2009). 'Let's Agree to Agree; America, China and Climate Change'. *The Economist* Nov. 21. At 47.

[40] Office of the Spokesperson (2013). U.S.-China Climate Change Working Group Fact Sheet. (Washington DC. July 10/PRN: 2013/0860). John Kerry (2013). 'Getting the U.S.-China Climate Partnership Right'. Press Release. July 19. Also, Todd, S. (2013). 'Report of the U.S.-China Climate Change Working Group to the Strategic and Economic Dialogue'. July 10. The other four goals were reducing emissions from heavy-duty and other vehicles; increasing energy efficiency in buildings, industry, and transport; improving greenhouse gas data collection and management; promoting smart grids: deploying renewable and clean energy, and enhanced policy dialogues

Ideally, mitigation actions should, render potentially significant impacts insignificant. This is not possible in this situation. What is possible, however, is a reduction in the magnitude of the scale of the significant impact.[41]

(i). Freight transport emissions at the national level

Over recent years, it has become increasingly clear that there is scope for improvement in terms of reducing the greenhouse gas emissions from the freight-train sector. That is, in addition to the updated 2008 EPA Emission Standards for locomotives, which are a clear improvement because they are now more closely aligned with international best practice, especially for engines that will be built after 2015,[42] a considerable raft of measures for reducing greenhouse gas emissions exist for dealing with older, existing, and shorter-term growth projected freight traffic. This range of measures particularly relates to fuel choices (or refinements), technologies adopted, the age (and standards) of the locomotives, operating practices, organization in terms of timing, routes interoperability, and enhanced cooperation with other freight providers.[43] The utilization of such practices with some freight haulers in the United States has already seen savings of around 90% in fuel efficiency since 1980, with further goals to reduce a further 8% from 2011 levels by 2020 by the active utilization of cutting-edge technologies.[44]

(i). Coal emissions at the international level

Theoretically, the most promising mitigation of the emission of greenhouse gases from coal power stations is carbon capture and storage. Experiments in capturing carbon from power stations (either natural gas or coal) and storing it underground in deep geological formations, reflect success rates of up to 99.7% capture of all CO2 emissions. In theory, if such practices were widely deployed, carbon capture and storage has the capacity to claim over 20% of the total required greenhouse gas emissions needed to keep the climate at a safe level. However, despite the impressive possibilities in this area, it is critical to realize that this technology still requires significant research before it is either proven safe, reliable and/or economically viable. These limitations are currently of such a degree that carbon capture and storage projects do *not* currently qualify for inclusion under the various international mechanisms

[41] See Eccleston, C. (2012). *Preparing NEPA Environmental Assessments*. (Taylor and Francis, NYC). 47.
[42] See generally, the Committee on State Practices in Setting Mobile Source Emissions Standards (2006). *State and Federal Standards for Mobile-Source Emissions* (National Research Council, Washington).
[43] Winebrake, J. (2012). 'Assessing Energy, Environmental, and Economic Tradeoffs in Intermodal Freight Transportation'. *Journal of Air and Waste Management.* 58:1004–1013. Eom, J. (2012). 'Trends in Freight Energy Use and Carbon Emissions in 11 IEA Countries'. *Energy Policy* 45: 327–341. Pan, J. (2010). 'The Reduction of Greenhouse Gas Emissions from Freight Transport by Pooling Supply Chains'. *International Journal of Production Economics* 12(4): 23-43.
Watson, R. (2010). 'Report Challenges Claims Of Rail's Fuel Efficiency'. *Transport Topics* 3878: 24. Spraggins, B. (2010). 'The Impact of Rail Freight Transportation Upon Environmental Sustainability'. *Journal of Academy of Business and Economics*. 10(2): 91. Lopez, I. (2009). 'A Methodology for Evaluating Environmental Impacts of Railway Freight Transportation Policies'. *Energy Policy* 37: 5393–5398. Chapman, L. (2007). 'Transport and Climate Change: a Review'. *Journal of Transport Geography* 15: 354–367. Vanek, F. (2000). 'Improving the Energy Efficiency of Freight in the United States Through Commodity-Based Analysis, Justification and Implementation'. Transportation Research Part D 5 11: 29. Plambeck, E. (2012). 'Reducing Greenhouse Gas Emissions Through Operations and Supply Chain Management'. *Energy Economics* 34: S64–S74.
[44] Anon (2012). Railroad Companies; CSX Sets Emissions Intensity Reduction Goal for 2020'. *Energy & Ecology*. June: 32.

that are designed to promote clean development under the applicable international regimes. As such, this technology does not have a valuable possibility, in practical terms, in the foreseeable future.[45]

The mitigation that has real potential in the present and the foreseeable future lies with power stations having much greater levels of efficiency. Efficiency in coal-fired power generation will play an important role in the production of electricity, both currently and in the future. A single percentage point improvement in the efficiency of a conventional pulverized coal combustion plant results in a 2-3% reduction in CO2 emissions. The average global efficiency of coal-fired plants is currently 28% compared to 45% for the most efficient plants. This means that highly efficient modern coal plants emit almost 40% less CO2 than their less efficient predecessors. This situation is particularly the case in developing countries and economies in transition where existing plant efficiencies are generally lower and coal use in electricity generation is increasing. Improving the efficiency of the oldest and most inefficient coal-fired plants, especially those older than 25 years, would reduce CO2 emissions from coal use by almost 25%, representing near a 6% reduction in global CO2 emissions.[46]

5. Recommended research programs

Based upon all of the above considerations, the decision-makers require four research programs as follows:

i. A cumulative assessment that shows the contribution of emissions that coal freight trains in Washington State and Oregon make in relation to the state budgets of greenhouse gas emissions. This study should establish what freight trains baseline of greenhouse gas emissions are currently, how the proposed expansion will impact upon the baseline and what additional reasonably foreseeable growth in this area would look like in terms of increased volume.

ii. A second cumulative study needs to examine the amounts of coal being exported from the United States to China. This study should also attempt to estimate the contribution that this coal trade is making to climate change from both the Chinese, and international, perspectives. This study should establish what the baseline of contributions currently are, and how this may, with reasonable foresight, look in the future.

[45] Biello, D. (2009). 'Can Captured Carbon Save Coal ?' 19(2) *Scientific American: Earth* 3.0. 52-29.
[46] World Coal Association (2012). *Coal – Energy for Sustainable Development* (WCA, London). 7-10. International Energy Agency (2011). *World Energy Outlook 2011* (IEA, London). 56-67.

iii. A third study should examine the potential for mitigations in the emission of greenhouse gases in the freight transport sector, with a view to seeing best industry practices in this area.

iv. A fourth study, in accordance with existing national obligations and bilateral aspirations, should seek to conduct a program of bilateral exchange on a continuing basis of information, shared in a transparent manner, concerning the linkage between coal from the United States and emissions of greenhouse gases in China. In particular, this study should seek to examine if the coal from the United States is making the problem of climate change better via suitable mitigation techniques in China or if it is making the situation worse (by not mitigating impacts by being linked to the most inefficient power stations).