Global Climate Change Policy

A significant proportion of scientific opinion, based on both empirical data and large-scale climate modeling holds that the Earth is warming due to atmospheric accumulation of carbon dioxide (CO_2), methane, nitrous oxide and other greenhouse gasses. The increasing atmospheric concentration of these gasses appears to be largely from anthropogenic causes, in particular, the burning of fossil fuels. The effects of warming may include changes in atmospheric temperatures, storm frequency and intensity, ocean temperature and circulation, and the seasonal pattern and amount of precipitation. Possible beneficial aspects to warming, such as improved agricultural productivity in cold climates, on balance appear to be outweighed by adverse effects such as increased frequency of extreme weather events, flooding of low-lying coastal areas, ecosystem stress and displacement, increased frequency and severity of forest fires and northward migration of warm climate disease vectors. While the occurrence of warming and the general nature of its global effects are generally agreed upon, significant uncertainties remain regarding the rates and ultimate magnitude of warming and its effects.

The regional effects of climate change are more uncertain. Global models seem to agree that Northwest temperatures will be higher, but they disagree regarding levels of precipitation. Current thinking by Northwest scientists leans towards a warmer and wetter climate. The proportion of winter precipitation currently falling as high elevation snow is expected to decline and peak runoff expected to shift from springtime to winter. Summer stream flows would decline as a result of loss of snowpack. Warming would lead to a relative reduction in winter peak electricity demand and an increase in the frequency and intensity of summer peaks. The possible effects of climate change on the hydropower system are discussed in Appendix N.

Nationwide, the electric power system is a prime contributor to the production of CO_2, producing about 39 percent of U.S. anthropogenic CO_2 production in 2002[1]. Any meaningful effort to control greenhouse gas production will require substantial reduction in net power system CO_2 production. The most economically efficient means of achieving this likely to be through a combination of improved end use and generating plant efficiencies, addition of generating resources having low or no production of CO_2, and CO_2 sequestration. Because it is unlikely that significant reduction in CO_2 production can be achieved without some net cost, future climate control policy can be viewed as a cost risk to the power system of uncertain magnitude and timing.

Analytical consideration of the effects of climate change requires plausible estimates of the timing and magnitude of possible climate change actions. The approach used in this plan to capture the uncertainties of climate change policy was to separate the highly uncertain political factors (the probability and extent of actions being undertaken to control greenhouse gasses) from factors more subject to analysis (the cost of offsetting a ton of carbon dioxide).

The current state of climate change policy was summarized for the Council in April 2004 by Dr. Mark Trexler of Trexler Climate + Energy Services. Dr. Trexler noted that while the United States has not ratified the Kyoto Climate Protocol which establishes targets for reduction of

[1] U.S. Environmental Protection Agency. Inventory of U.S. Greenhouse Gas Emissions and Sinks1990 - 2002. April 2004.

greenhouse gas emissions, there is a good deal of climate policy action both in the US and internationally. Canada, for example, has ratified the Kyoto protocol, and compliance is a significant factor in Canadian energy policy. Elsewhere, a pilot cap-and-trade system for carbon dioxide is to be implemented in Europe in 2005 with a mandatory system in place by 2008[2].

Here in the United States, many states have or are developing climate change mitigation strategies. Oregon, Massachusetts, New Hampshire and Washington require partial offsets of CO_2 produced as a result of power generation.[3] The governors of the West Coast states, through the West Coast Governors' Global Warming Initiative have initiated an effort to develop common regional policy. California has recently adopted regulations that will require automakers to begin reducing the CO_2 production of vehicles sold in California by about 30 percent, beginning in model year 2009. Nationally, the United States Senate in late 2003 came within a few votes of passing the McCain-Lieberman Climate Stewardship Act that would have established a cap and trade system for the United States.[4] CO_2 reduction appears to be one of the primary drivers of efforts to reauthorize the federal renewable energy production credits and to expand state renewable portfolio standards and other renewable energy incentives. Finally, corporations increasingly are recognizing the likelihood of global climate change and the need to control greenhouse gas production[5].

Dr. Trexler presented three scenarios for the evolution of climate change policy in the United States. One scenario portrayed collapse of efforts to implement climate change policy. He viewed the probability of this to be low. A second scenario looked at the likelihood that a combination of factors would generate the political will to seriously tackle climate change. He viewed the probability of this as "modest" although perhaps somewhat greater than the probability of total collapse of climate change mitigation efforts. The third scenario was one that postulates that the issue will not go away and that there will be continue to be efforts to enact mitigation policy. He viewed the likelihood of this scenario to be high.

The Council's estimates of the cost of CO_2 offsets were guided by current state CO_2 offset experience, the conclusions of a Council-sponsored workshop held in May 2003, a June 2003 MIT study of the cost of implementing the McCain-Lieberman proposal[6] and an August 2003 MIT study of the costs of CO_2 sequestration[7]. A cap and trade allowance system, as called for in the McCain-Lieberman proposal and as used for a number of years for control of sulfur emissions, appears to be the most cost-effective approach to CO_2 control. However, to simplify modeling, a fuel carbon content tax was used as a proxy for the effects of climate change policy, whatever the means of implementation. The results are believed to be representative of any approach to control CO_2 production using carbon-proportional constraints on both existing and new generating resources.

[2] Define Cap and Trade
[3] Reference these actions.
[4] S139
[5] "Global Warming: Why Business is Taking it so Seriously" Business Week August 16, 2004.
[6] Massachusetts Institute of Technology Joint Program on the Science and Policy of Global change. Emissions Trading to Reduce Greenhouse Gas Emissions in the United states: The McCain-Lieberman Proposal. June 2003.
[7] Massachusetts Institute of Technology Laboratory for Energy and the Environment. The Economics of CO2 Storage. August 2003.

The estimates of CO_2 control costs from these sources are very wide. The Oregon and Washington offset requirements for new generating resources include a provision whereby a developer can pay a deemed fee for each ton of CO_2 required to be offset. These payments currently amount to about $0.87 per ton CO_2 for Oregon and $2.10 per ton CO_2 for Washington. It is generally acknowledged that actual offset costs are double to triple the Oregon rate. The MIT report on the costs of compliance the Climate Stewardship Act provide a series of time-dependent estimates based on various assumptions regarding implementation. These range from $0 to $39 per ton CO_2 in 2010, $10 to $70 per ton CO_2 in 2015 and $13 to $86 per ton CO_2 in 2020. The Council workgroup estimated offset credits on the international market to range from $5 to 10 per ton CO_2 in the 2005 - 2013 timeframe and $20 to 40 per ton CO_2 from 2010 - 2025. Finally, the MIT study on the costs of CO_2 sequestration estimated costs ranging from $2 to $23 per ton CO_2 for various forms of geologic sequestration. Not included in this latter estimate was the cost of CO_2 separation at the power plant or possible offsetting revenues from enhanced petroleum or natural gas recovery.