Northwest Power and Conservation Council

June 10, 2009

MEMORANDUM

TO: Council Members

FROM: Terry Morlan, Director, Power Planning Division
John Fazio, Senior Power Systems Analyst

SUBJECT: Chapter 10 - Climate Change Issues

Climate change presents a daunting challenge for regional power planners. There are at least two ways in which climate can affect the power plan. First, warming trends would alter electricity demand and change precipitation patterns, river flows and hydroelectric generation. Second, policies enacted to reduce green house gases will affect future resource choices. There remains a great deal of uncertainty surrounding both of these issues. Chapter 10 describes the second of these issues, namely how current policies affect the plan's resource strategy and what future policies may help achieve reduction goals. The first issue, relating to physical changes resulting from climate change, is discussed in Appendix L. The effects of these impacts on the resource plan are still being analyzed.

Today's discussion focuses on three major sections of chapter 10; 1) actions that can be taken to reduce CO_2 emissions, 2) policies that are aimed at emission reduction and, most importantly, 3) a summary of key findings related to climate issues.

While work on this issue is ongoing, some of the key findings already extracted from the analysis include:

- Regardless of carbon policy assumptions, aggressive conservation is still a low-cost and low-risk resource for the region.
- Renewable Portfolio Standards appear to be a cost-effective response to likely, but uncertain future carbon costs.
- With the uncertain future carbon costs assumed in the Council base case, it is expected that carbon emission goals would be met on average. However, these results are not ensured under all future conditions. Retirement or curtailment of existing coal-fired generation would be required to ensure meeting those goals.
- In the absence of carbon control policies (RPS, penalties, and RECs), aggressive conservation is still cost-effective, but renewable resources would play little role in the

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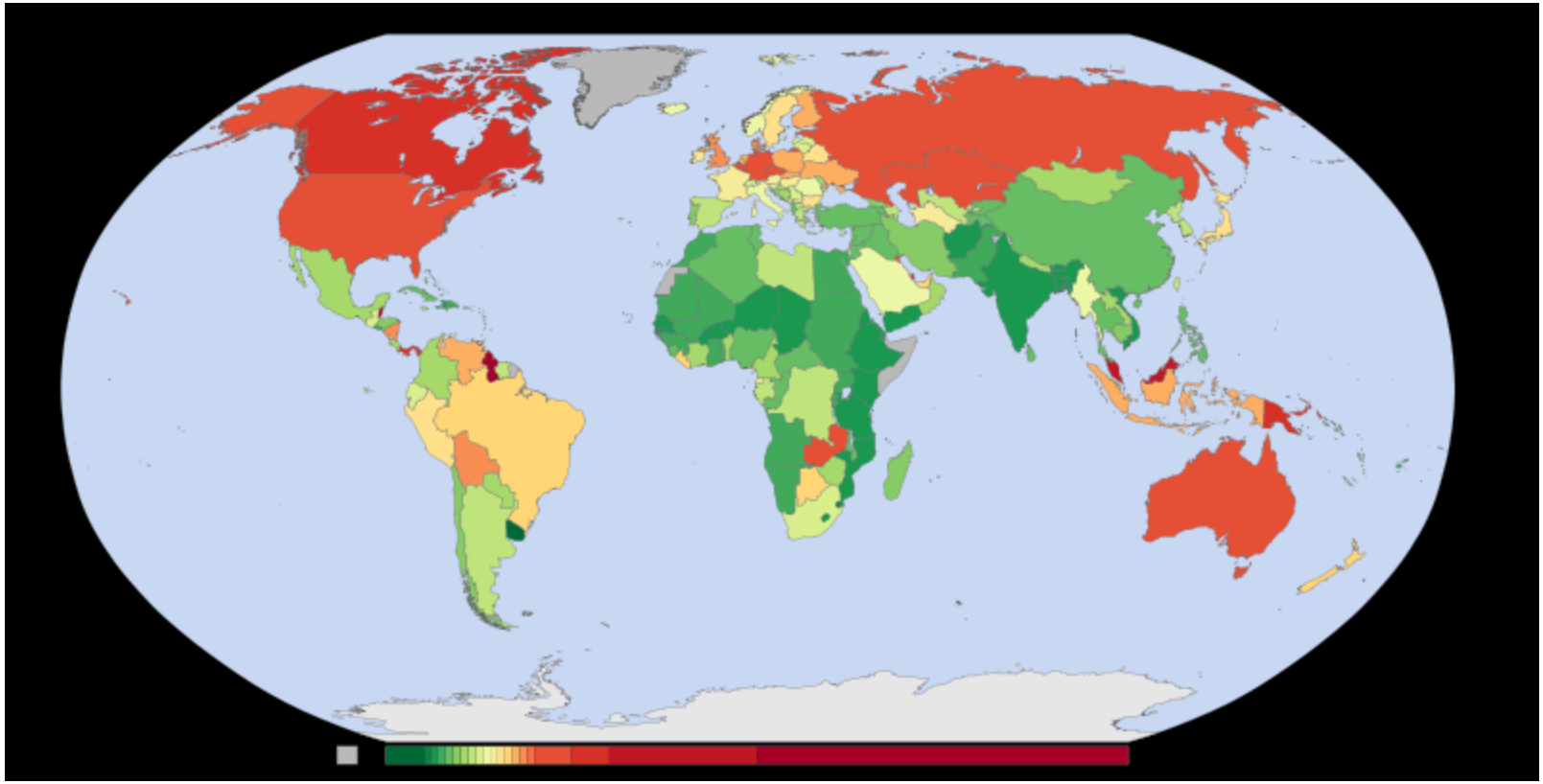
regional power system and future costs of the power system would be much lower and carbon emissions would show little change from current levels.

- Loss of hydroelectric capability in the region, such as removal of the Lower Snake River Dams, would result in slightly more conservation and renewable energy, but mainly would be replaced by additional gas-fired resources with increased cost and increased carbon emissions.
- Carbon prices of about $40 per ton or higher would be required in the plan's base case to result in significant reductions in carbon emissions. Alternatively, policies to retire existing coal-fired generation could achieve substantial reductions.

Chapter 10
Climate Change Issues



NORTHWEST 6th POWER PLAN

Power Committee Meeting
Whitefish, MT
June 9, 2009

Northwest Power and Conservation Council

Chapter 10 Outline

I. Background

II. Actions to Reduce CO_2 Emissions

III. Policies to Reduce CO_2 Emissions

IV. Current Policies and Goals

V. Achieving CO_2 Reduction Goals

VI. Key Findings

Actions to Reduce CO_2 Emissions

- Load reduction
- Appropriate use of hybrid vehicles
- Use of low-carbon resources and reduced use or retirement of high-carbon resources
- Carbon sequestration
- Direct use of natural gas?

Policies to Reduce CO_2 Emissions

- Mandates
- Tax Incentives
- Cap-and-trade Programs
- Carbon Penalties

Key Findings (1)

Regardless of carbon policy assumptions, aggressive conservation is still a low-cost and low-risk resource for the region.

Key Findings (2)

Renewable Portfolio Standards appear to be a cost-effective response to likely, but uncertain future carbon costs.

Key Findings (3)

Carbon emission goals can be met, on average, assuming the Council's base case assumptions for future carbon penalties. However, these results are not ensured under all future conditions. To ensure meeting carbon emission goals, existing coal-fired generation would have to be retired.

Key Findings (4)

In the absence of carbon control policies (i.e. RPS, carbon penalties, and RECs); 1) renewable resources would only play a small role in the regional power system and 2) future costs of the power system would be much lower, but no reduction of carbon emissions.

Key Findings (5)

Loss of hydroelectric capability in the region, such as removal of the Lower Snake River Dams, would result in slightly more conservation and renewable energy, but mainly the loss of their generating capability would be replaced with additional gas-fired resources, which would lead to increased cost and increased carbon emissions.

Key Findings (6)

Carbon prices of about $40 per ton or higher would be required in the plan's base case to result in significant reductions in carbon emissions.