

# How to Improve the Efficiency of the World's Biggest Machine

While Solving a Few Other Problems  
Along the Way

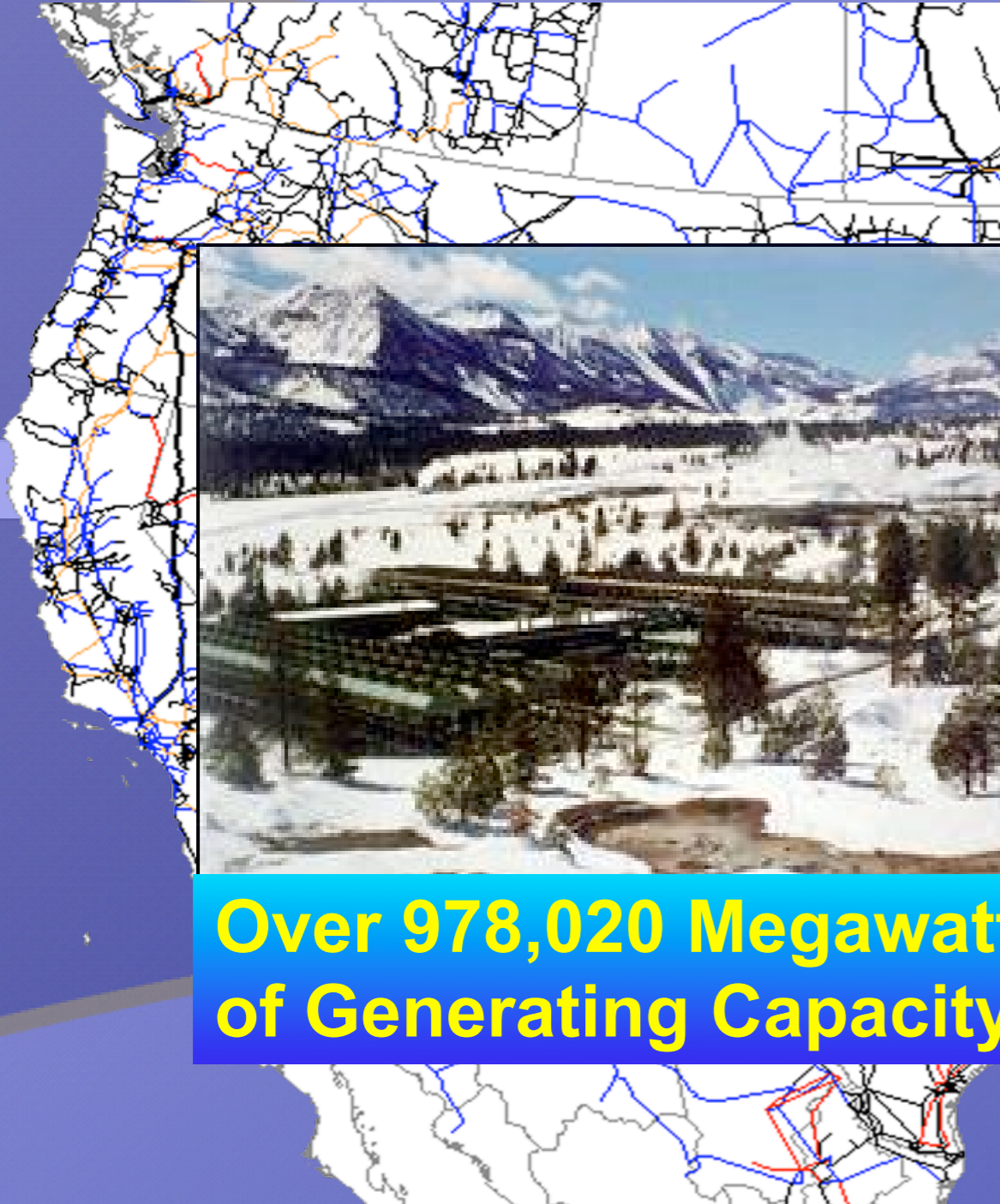
**4th Annual  
Cascadia Transportation  
Conference**

*Jon Wellinghoff, Commissioner  
Federal Energy Regulatory Commission  
May 7, 2007*



# A Little Over a Century Later ...

## “Most Complex Machine in the World”



**Over 978,020 Megawatts  
of Generating Capacity**



**Over 351,000 Miles of  
Transmission Lines**



# Electric Grid: Billions in Investment & in Costs

Generation    Transmission    Distribution    End Use



~\$940 B



~\$120 B



~\$140 B



\$97 B residential



\$94 B commercial



\$78 B industrial

= \$1.2 Trillion

5% Improvement = \$60 Billion Savings

(replacement costs)



# Multiple Issues Seeking Solutions

Managing hydro system constrained by fish, water, treaties & future markets

Integrating 100+ GW of wind in the West and Midwest

Global warming & increasing reliance on coal

Overall Grid Efficiency and Central Station Model Inefficiencies

Wholesale Markets Need Improvement and More Elasticity to Keep Consumer Prices Reasonable

Integrating new technology that could help: demand response, distributed generation, distribution automation

