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Outline of Testimony  
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I. Qualifications

- Professor of Economics and Chairman of the Economics Department where I have been on the faculty for 36 years.
- My fields are natural resource economics and regional economic development. Fields in which I have written five books and over a hundred books chapters, papers, and reports.
- Since the mid-1970s I have done considerable work on energy development and the regulation of public utilities.
  - That work began with a National Science Foundation grant in 1974-75 the sought to project the likely level of coal-based energy development in Eastern Montana and the Northern Great Plains
  - At the same time the Montana Public Service Commission asked me to analyze Montana Power's need for its share of the Colstrip 3 and 4 plants.
  - Since then I have testified in over a hundred regulatory proceedings across the nation.
  - I have served on various energy taskforces established by Montana governors including, most recently, Governor Martz's energy task force.
  - I was a founding member in 1988 of Montana Power's Integrated Resource Planning Advisory Committee and served on it continuously through the transition to ownership by NorthWestern Energy. That Committee is now known as NorthWestern's Technical Advisory Committee although it deals with the same electric resource acquisition issues.
  - It is on electric resource acquisition that I have been asked to testify.

## II. Electric Utility Resource Acquisition

1. Popular view of the problem: Relatively simple problem of choosing the cheapest resource available. Look at the price; the choice is obvious
2. This would be partially true if NorthWestern were making daily purchases of a relatively uniform product.
  - a. Similar to our daily purchases of bread or milk.
  - b. But even then there are choices to be made about health considerations, quality, and taste and what we are willing to pay for particular mixes of those attractive characteristics.
3. But in electric supply, besides the possibility of shopping for electricity hour-by-hour and day-by-day, there is also the opportunity to purchase the output of a generating facility over the life of the plant, 20 to 30 years, or even for the utility to build and own the plant itself, a plant that may last 50 or 100 years.
4. There are many resource choices of different duration in between hourly purchases on the regional market and a 30 to 50 year commitment to a particular facility.
  - a. Such choices between short and long term resources are tied to concerns over the volatility of electric prices in regional markets. The 2000-2001 Western electricity crisis showed us how high electric prices could go and how disruptive to the economy that volatility in electric prices can be.
  - b. Electric price stability is valuable to customers. But arranging that stability is not free. It can be very costly as when a commitment to a stable but high priced source of supply is made and then electric prices fall and customers are locked into a costly supply.
  - c. What should we pay for price stability? Who should make that decision for customers?
  - d. Clearly the choice of resources is not just a matter of buying the lowest priced resource. Almost all of Montana's industrial operations bought what they thought were the lowest price electric resources in the late 1990s and then had to shut down for extended periods in 2000-2001 because those "cheap" sources of supply became impossibly expensive.
  - e. We expect our electric utilities to adopt strategies to protect residential and small commercial customers from some of this type of electric price volatility. But how?
5. The duration of a supply contract and how fixed the price is are just two important types of non-price characteristics that have to be considered. There are many others: Choices among
  - i. Managing demand versus expanding supply: Improving the efficiency with which we use electricity may be a cheaper way of meeting our electric needs than expanding electric supply.
  - ii. Fuels: coal, natural gas, wind, hydropower, nuclear, solar, etc.
  - iii. Generating technologies: for each fuel there are a variety of technologies with different characteristics. For natural gas there are simple cycle combustion turbines, combined cycle combustion turbines, and internal combustion technologies. For coal there is

- fluidized bed and integrated gasification technologies. For each of these technologies there is the choice of the size of the facility.
- iv. Water, air, and noise pollution control technologies.
  - v. Location: near fuel but with high transmission costs, near load centers but with high fuel transportation costs, in locations where pollutants are more easily "naturally" dispersed or in other locations requiring more costly levels of pollution control.
6. Each of these choices, like the short-term versus long-term resource commitment or fixed versus variable prices has different types of risks associated with it.
- i. How stable or unstable are fuel costs likely to be?
  - ii. How reliable is the generating technology?
  - iii. How will changing loads affect the appropriate mix of generation?
  - iv. What will loads be? Miscalculation can lead to costly shortages or costly surpluses.
  - v. How will pollution control laws change and how will that affect the cost of operating a facility? Control of mercury; charges for carbon emissions; limitations on generation to avoid violating stricter pollution limits, etc.
7. Let me say something about these environmental characteristics
- a. Environmental costs are real economic costs. Not just a matter of aesthetics.
    - i. Air and water pollution affect human health and life expectancy.
    - ii. Air and water pollution affect the productivity of our agricultural and forest lands.
    - iii. Energy development impacts the water supply agriculture depends on.
    - iv. Hydroelectric facilities dramatically change natural rivers and their adjacent riparian lands, changing habitat, wildlife, fisheries, and recreation potential.
    - v. Although we may heatedly debate it, it seem highly likely that in the not too distant future we will have to limit carbon emissions to stabilize global climate. That will impose significant costs on electric generation. Just as the pollution control measures imposed in the 1970s and 1980s were startling from the point of view of the 1960s, we are likely to see a similar costly adjustment aimed at controlling carbon emissions in the coming two decades.
  - b. Not controlling these environmental impacts does not make the costs go away. The costs are real; they simply get shifted to the victims rather than being paid by the polluters. That may make electricity appear to be cheaper only because we have forced someone else to pay that cost.
8. There are two other considerations that are particularly important in Montana: Controlling market power in electricity markets and the impact of resource choice on local and state economic development
- a. Controlling market power: As a result of electric restructuring in Montana, we created a dominant unregulated electric supplier: PPL-Montana. We also created a dominant electric buyer: NorthWestern Energy that also controls part of the wholesale transmission network. As a result of this

arrangement, various parties see themselves at the mercy of these dominant market players. For that reason there are periodic calls for resource choices to be guided by the intention to reduce the dominance of one or both of these players. I should add that each of these dominant players also sees itself as the victim of the other.

- b. **Economic Development:** Many Montanans hope that the development of Montana's energy resources and the conversion of that energy to electricity for local use or export will stimulate economic development, especially in Eastern Montana. As a result, they believe that economic development considerations should influence the choice of electric resources.
9. The point of this long list of concerns is that a utility faces a broad range of choices about the mix of resources it picks to serve its customers' loads. Each aspect of that choice has cost and risk implications that have to be managed. This leads to a relatively complex planning process called **resource portfolio analysis** in which different combinations of resources are tested against various possible future conditions to determine which combinations have the best mix of low cost and low risk.
    - a. In such analysis it is almost never the case that only one type of resource is chosen. It is almost always a mix of resources that minimizes risk and expected cost. You do not put all of your eggs in one basket in an uncertain world.
    - b. In this portfolio analysis a variety of public policy issues have to be addressed. It is not entirely clear that a private business, our investor-owned utilities, should be making these public policy decisions. Those issues include:
      - i. What balance should be struck between low prices and stable prices? What should we pay for price stability?
      - ii. What responsibility for demand-side management, improving the efficiency with which electricity is used, should we place on the utility? Should we require that these private businesses to help reduce the amount of their product their customers buy?
      - iii. What weight should be placed on the environmental characteristics of different types of generating technologies and fuels? What should we be willing to pay for more environmentally benign facilities?
      - iv. How important are market power considerations in Montana? What cost should we be willing to pay to increase competition among suppliers in Montana?
      - v. Can electric generation contribute significantly to local and state economic development? If it can, what should we be willing to pay to support that objective?
  10. I hope I have made clear that our electric utilities and their regulators face a very challenging and difficult set of choices as they seek to provide the optimal set of resources to serve our citizens' electric needs. Those choices go far beyond simply purchasing whatever is currently the cheapest source of supply.
  11. I would be happy to try to answer any questions you may have.