

Statement of Gregory C. Miller on behalf of Public Service Company of New Mexico  
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Thank you for the opportunity to represent PNM here today. New Mexico is rich in solar and wind energy resources (Slide 1). As NM's largest utility and with a system that bisects one of the major wind energy areas, PNM finds itself literally in the middle of the action and with a strong interest in the topics being discussed here today. PNM is committed to being a good environmental steward and the New Mexico Wind Energy Center (NMWES) is a prime example of that commitment. Through our participation in Governor Richardson's "Clean Energy State" initiative and discussions with wind developers and various regional planning and commercial practices forums, PNM is making an effort to be part of the solution to further accommodation of these resources.

With the completion of the NMWES in the summer of 2003, PNM has one of the country's largest wind farms operating on its system. The NMWES is a successful real world example of the integration of a large wind farm on a small system. PNM and FPLE collaborated to construct, interconnect and bring the wind farm into operation in about 5 months. That's fast, so fast in fact, that not all of the associated network upgrades could be completed before initial operation, but we have since completed them all. The NMWES employs the most advanced technology available and, for the first time in this country, a low-voltage ride-through criterion was established and implemented. PNM, FPLE and GE Wind teamed to ensure the wind turbines would not trip off-line for faults on the New Mexico transmission grid. PNM is also working with NREL and others to develop better wind plant models for use in system studies based upon the NMWES. In all, PNM's experience has been positive but not entirely without challenges.

PNM has over 600 MW of wind generation in its interconnection queue. Almost all of this generation is planned to be located in the same general area and interconnecting to the same transmission line as the NMWES. We will face several technical and economic challenges in fully developing these facilities. In this area, the maximum wind energy

availability has typically been at night and otherwise when PNM's load is not at peak. I have shown graphically the available wind energy plotted against the time of day and day of the month for an entire year to show this mismatch (Slides 2,3 and 4). Some of the issues to be resolved before we will be able to bring these resources to realization include the level of network upgrades required the lack of energy production diversity, the large line losses and the hazard created by interconnecting this magnitude of generation to the single line.

The NMWES represents between 10% and 20% of the supply for the PNM control area load at any given time. This high level of intermittent supply presents control performance challenges. PNM has seen its CPS2 measurements drop from a pre-wind farm level in the mid 90% range, more recently closer to the minimum standard of 90%. This control challenge can be understood better when one considers that PNM has regulating resources that are capable of ramping speeds in the 7-10 MW/minute range. The wind power variability that we have experienced has been as high as 75 MW in one minute. The next slide demonstrates the impact on ACE of the wind farm fluctuations (Slide 4). Common, region wide, flexible scheduling practices are needed for accommodation of changes in wind farm output. Also, where control performance issues would otherwise limit the amount of intermittent resources, the use of pitch control technology to moderate the ramp rates of the wind turbines to levels more easily followed by conventional generation sources should be considered.

PNM is near the limit of its ability to sink wind energy to load in its control area. We do not however believe that this precludes further wind energy development on the PNM system. Additional intermittent resources that are developed will likely need to be dynamically scheduled to the customer's destination control area.

PNM has exceeded the pro-forma tariff requirements by offering hourly firm transmission service. We believe this can provide additional delivery flexibility for a wind resource. PNM has designated the NMWES a Network Resource per its OATT and this meets our needs since PNM takes all of the energy produced. However, apart from these types of services

and circumstances, PNM does not believe that the present OATT transmission products fit well with the needs of intermittent resources. PNM supports the development of new transmission products such as conditional firm and priority non-firm. These products promise to permit higher utilization of the existing grid and seem to fit with developers needs. However, the attributes of these products need further development to ensure that existing firm customers are not negatively impacted due to more frequent or deeper curtailments than they might otherwise incur and that queuing and network upgrade responsibilities are fair. Not every path is suitable for provision of this type of service. Conditional firm will have the most value on paths where the loading is largely driven by load cycles. Load growth will likely limit the effective term of these services. Because of this, PNM believes this type of product should be considered as a transitional mechanism for a wind developer, to fill a gap prior to the time that the permanent solution of new firm transmission can be made available.

With that I will close and PNM looks forward to participating in the on-going dialogue.