

Grid Modernization and the NM PRC: Advanced Metering as a Bridge to Grid Modernization

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Statement of the Presentation

The State of New Mexico is engaged in a multi-faceted initiative to promote the modernization of the electric grid. Legislative and interagency efforts seek to define Grid Modernization and establish policies to direct utility investments into programs and system upgrades that will accommodate more diverse, interactive and lower-carbon transportation, energy & utility sectors.

Following pending rulemakings for revised Interconnection policies and Integrated Resource Planning, plus the recently approved Community Solar program, Advanced Metering Infrastructure (AMI) has now moved to the front of the line for consideration at the NM Public Regulation Commission.

AMI is considered a foundational element of Grid Modernization, but approval of NM utility proposals to date has been subject to “fits and starts” with particular difficulties in justifying the cost/benefit analysis and potential ratepayer impacts.

Resolving an acceptable approach to evaluating AMI projects in the regulatory context may provide a framework for dealing with other Grid Modernization project proposals.

Throughout the presentation, you may hear echoes from prior webinar discussions, most especially Jim Ogle (PNNL) overview of AMI from March 17 and John Shenot (RAP) discussion of Benefit/Cost Analysis on June 2.

It should be clear that an effective AMI system is an enabler of Grid Modernization initiatives, providing insights into energy consumption for more effective load forecasting and distribution planning & investment decisions, as well as serving as the basis for new rate options, especially Time of Use.

Disclaimer

This presentation and opinions expressed do not represent any official policy statements of the New Mexico Public Regulation Commission.

Although I provide advisory support to the PRC for several rulemaking proceedings, I have not been involved in any of the past or active proceedings related to AMI applications by NM's investor-owned utilities.

Because one of these cases is currently in formal process, any comments or descriptions of the issues in that case should not be interpreted as an indication of how the Commission may decide on the application.

Grid Modernization & New Mexico PRC 2022

1. HB 233 (2020) and the Public Regulation Commission
2. AMI Status in New Mexico:
3. Past and Current Applications for AMI investment by IOUs
4. Making the New Case for AMI and Grid Mod
5. Bridging AMI to support the PRC's Action Plan for Grid Mod
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1. HB 233 (2020) and the Public Regulation Commission

Grid Modernization Act of 2020 (HB 233) recognized the need to bring New Mexico grid into the 21st century, but stopped short of new requirements for utility planning or projects:

- Required a “road map” report from Energy Minerals & Natural Resources Department (EMNRD);
- Convened a stakeholder process to identify possible actions and provide useful background “white papers”;
- 11 action items were determined, many requiring involvement from Public Regulation Commission;
- But resource constraints – and no incremental budget allocations – meant PRC had to prioritize what it can work on.

After considering the draft Road Map in early 2021, the PRC focused on three of the action items:

- Updating Interconnection rules/manual [20-00171-UT/22-00266-UT]
- Adopting standards for advanced inverters (IEEE 1547-2018/UL 1741 SB)
- Revise Integrated Resource Planning and Procurement polices [21-00128-UT]

Other issues forced onto the agenda:

- Legislation, Community Solar Act 2021 (SB 84) required that policies for a 200 MW program be in place by April 1, 2022 [21-00112-UT]
- Utilities applied for vehicle electrification programs [various dockets]
- SPS application for Advance Metering Infrastructure (AMI) [21-00148] and an AMI funding application from El Paso Electric specifically citing the Grid Modernization Act [21-00269-UT].

HB 233 authorizes utility expenditures for Grid Mod projects:

“A public utility may file an application with the commission to approve grid modernization projects that are needed by the utility, *or upon request of the commission.*”

- Investments or incentives
- Rate designs
- Programs that incorporate technologies, equipment, or infrastructure
- Customer education & outreach to increase awareness of grid modernization benefits

The Act identifies 12 types of Grid Mod investments:

- Advanced Metering Infrastructure (AMI)

- Intelligent grid devices for real time or near real time analysis
- Automated control systems for T&D circuits & substations
- High-speed communication networks/automated control
- Distribution system hardening
- Physical security measures at critical distribution substations
- Cybersecurity measures
- Improved distribution system planning capabilities
- Demand response technologies
- Energy storage and microgrids
- EV charging infrastructure/community/industry electrification
- Customer information platforms

In considering applications for approval, 7 factors to review:

- Improve utility system efficiency, reliability, resilience and security; meet energy demands through flexible, diversified and distributed portfolio
- Support connection with regional energy markets for export of renewables
- Increase access to and use of clean and renewable energy, especially low-income customers and underserved communities
- Contribute to reduction of air pollution and GHG
- Increase utility product offerings and allow for private investment, skilled jobs and consumer protection
- Transparent public reporting requirements
- Otherwise consistent with state's grid modernization planning processes and priorities.

The EMNRD Road Map identified AMI as “a foundation for a ‘smart grid’ ...essential for modernization of the distribution grid in New Mexico.”

AMI allows two-way communication between the utility and the customer’s meter, opening up a new realm of capabilities that will allow innovative applications.

The Road Map recommended that “all utilities in the state invest in the implementation of AMI and other smart grid technology with a full suite of capabilities in their territories. This includes AMI (‘smart’) meters for all customers of each utility, as well as the advanced features and services that a smart grid can provide.”¹

¹ EMNRD Grid Modernization Roadmap, Whitepaper 1: AMI 2019

2. AMI Status in New Mexico

Jim Ogle had shown a map of AMI deployment in the US, indicating New Mexico was at the very bottom, with about 15 percent AMI penetration.

NM rural cooperatives and some public power utilities have embraced AMI investments to a far greater extent than IOUs.²

Table 1: AMI Penetration by Rural Coops

Co-op	Total AMI	Total Meters
Central New Mexico	18,440	18,440
Central Valley	14,894	14,897
Columbus Electric	4,680	4,790
Jemez Mountains	7,508	31,154
Kit Carson	30,724	34,138
Mora-San Miguel	11,195	11,230
Otaro County	19,829	19,829
Roosevelt County	6,065	6,065
Sierra Electric	4,290	4,290
Socorro Electric	12,771	12,775
Springer Electric	2,901	3,047
Total Coops (~83%)	133,297	160,655

² 2020 EIA 861 Annual Electric Power Industry Report

Table 2: AMI in Public Power and IOU territories

Public Utility	Total AMI	AMR Meters	Total Meters
Los Alamos	1,669	0	8,702
Navajo Tribal Utility	10,743	0	10,743
City of Farmington	0	39,166	44,882
City of Gallup	0	10,510	10,510
Total (~20%)	12,412	49,676	62,088
Investor Owned Utilities			
PNM	0	34,413	553,013
SPS	0	3,500	119,835
EPE	0	115,423	116,965
Total	0	153,336	789,813

3. Past and Current Applications for AMI investment by IOUs

AMI has been under consideration at the PRC since 2006, with an Inquiry into Advanced Metering and Time of Use Rates [06-00391-UT] but after taking comments, the docket closed without action. Since, there have been several utility proposals and PRC directives:

PNM	15-00312-UT	Total \$120 million	Rejected by PRC 04/11/18
	20-00087-UT	EE Pilot \$2.9 million	Not recommended for approval Oct. 2020
	22-00058-UT	PRC request	Deferred until Grid Mod Plan expected Oct. 2022
SPS	21-00148-UT	~\$30 million	Withdrawn by SPS March 2022; new application due July 2022
EPE	21-00269-UT	~\$40 million	Stipulation by parties April 2022 Legal briefs due June 30, 2022

3.1 Why Was PNM’s 2015 AMI Application Rejected?

- Even though PNM claimed there would be a net benefit over a 20-year life of its AMI project, Parties showed that the immediate impact would be rate increases of \$5.9 million per year initially.
- PNM shareholders would earn over \$54 million pre-tax return on the new meters and retiring legacy meters. Approx. 65% of that would be profit to shareholders.
- Hearing Examiner found: “the plan does not fairly balance the interests of investors and ratepayers.”
- Proposed \$42.72/month Opt-out fee is too high.
- Program did not include energy efficiency benefits, based mostly on reducing costs by laying off 125 meter readers, and ability to disconnect non-paying customers.
- PNM project was “designed without public input and without examining alternatives.”
- PNM should “not be prohibited from adopting an AMI program. The recommendation is that PNM’s AMI project not be approved at this time in its current form.”³

3.2 Why did PNM’s AMI Energy Efficiency Pilot Fail?

The proposal in 20-00087-UT to install 5,000 smart meters for an EE pilot was “not recommended for approval” by PNM because it failed the utility cost benefit analysis. Utility Cost Test (UTC) showed 0.003. >1.0 is cost-effective.

3.3 Why was SPS’ AMI Program Withdrawn?

The proposal in 21-00148-UT was withdrawn by the utility to prevent “rate shock” as it would add 7.5 percent rate increase, when other replacement resource cases were also raising residential rates.

3.4 Is EPE’s AMI Project Cost-Effective?

The Commission has not made a determination in 21-00269-UT, but intervenor Yellowbird Services claims the program is not cost-effective under the Total Resource Cost test, alleging only \$8.2 million in savings benefits for \$41 million cost (plus \$12 million in shareholder profits).⁴

4. Making the New Case for AMI and Grid Mod

Any utility proposal for AMI will need to address several contentious issues that will be raised by intervenors:⁵

- Technical capabilities of the program
- Customer Outreach & Education
- Costs of the implementation vs. Benefits; Rate impacts
- Balance of benefits utility/ratepayers
- Stranded costs of legacy meters
- Job losses
- Opt-Out policies and fees
- Health & Safety of Smart Meters (EMF and alleged fires)
- Privacy of data and cyber security

³ Hearing Examiner’s Recommended Decision March 18, 2018, accepted by PRC April 11, 2018.

⁴ See Testimony of Rocky Bacchus Opposing the Stipulation in 21-00269, pg. 9

⁵ List of Issues Addressed in 15-00312.

- Ratemaking treatment

For our purposes, the focus will be on the Cost and Benefit analysis, which will also be faced by other Grid Mod initiatives.

4.1 The Cost-Effectiveness Conundrum

RAP's John Shenot offered an overview of cost/benefit analysis techniques highlighting the fact that there remains a lot of inconsistency among states in evaluating new technologies and programs, and applying tools developed to evaluate energy efficiency poses difficulties. "You have to recognize that it is difficult, if not impossible [to quantify some benefits] in a way that you can defend."

While many utilities have determined that basic AMI/AMR investments may be cost-effective based solely on operational savings (i.e., replacing meter readers), there are substantive costs to develop the data collection/analysis systems necessary to provide benefits beyond billing efficiencies. Robust, two-way communications and the systems that support these benefits are far more costly than meter replacement for improved billing and automated meter reading (AMR), and difficult to value.

It is also difficult to put monetary values on some of the future benefits of projecting energy efficiency savings, improved visibility into distribution networks, outage reduction and restoration, or verifying the output of distributed energy resources.

Technology does not stand still, and many early AMI/AMR systems were built for communications networks that were limited and may now be obsolete (i.e., 3G technology platforms). Additional investment or replacement may be required and built into cost projections.

Such issues may be endemic to the evaluation of many Grid Modernization initiatives...resolving for AMI may provide a bridge to decision-making.

4.2 New Directives from PRC

In directing PNM and SPS to file new applications for AMI projects, the Commission has provided some guidance as to the nature of an acceptable program:

- SPS was directed to file a new application in four months (July 2022) that addresses these issues:
- The application should be filed as related to the Grid Modernization Act;
- Show how the application impacts cumulative rate increases over past 5 years;
- How the application would mitigate rate shock impacts;
- How the application would use smart meters beyond automatic meter reading and fault detection;
- Include rate design options;
- Identify demand response and grid management options being considered to use smart meter capabilities, show how rate design principles work with them.⁶

Similarly, PNM was directed to file an AMI application within four months and make a showing that:

⁶ Order Granting Southwest Public Service's Motion to Withdraw, Closing Docket and Order to Refile Updated Application, in 21-00148-UT, March 2, 2022.

- Its program includes automatic meter reading, remote fault detection, and includes a discussion of updated rate design options consistent with variable availability options that use smart meter capabilities and should include time-of-use options;
- Identify **demand response** and **grid management programs** being considered for implementation, and how they work with smart meter capabilities.⁷

PNM responded by requesting a deferral of the application until about October, when the utility would present a more comprehensive Grid Modernization program that would also include AMI. Details are currently in development.⁸

The EPE AMS application is still under review, but a multi-party stipulation presented in the case makes several amendments to the original proposal:

- EPE should first install AMI for new service and meter replacements;
- EPE should seek federal funding under the Infrastructure Act;
- Revised depreciation schedule (15 years for meters/10 years for IT);
- Recover stranded costs of legacy meters over 10 years; no rate of return on meters removed;
- Revised Opt-Out fee schedule;
- EPE will file a proposal to allow customer authorized data sharing with 3rd Parties via Green Button platform;
- Utility/stakeholder advisory group commences in January 2023 to develop “the full customer use of AMS capabilities.”;
- Pilot programs for customer rate options in 4Q 2023.⁹

5. Bridging AMI to support the PRC’s Action Plan for Grid Mod

5.1 What needs to go into a Grid Mod Rulemaking¹⁰

- Reconciling all the potential project possibilities with priorities
- Delineating maintenance upgrades from new initiatives
- Align Act’s requirements with other existing rules/mandates
- Refine process for IOUs bringing applications or PRC requesting them
- [Determining qualitative criteria for evaluating projects/applications](#)
- [Promoting a holistic approach, rather than one-off projects](#)
- [Maximizing benefits from programs for ratepayers & communities](#)
- [Fair cost allocation and mediating rate impacts](#)
- [Measuring and evaluating effectiveness](#)

We can see that the PRC directives for AMI applications from PNM & SPS begin to address these matters; the pending stipulation in the EPE case also appears to move the proposal toward some of these goals.

⁷ Order Requesting Public Service Company of New Mexico to File an Application for Authorization to Implement Grid Modernization Components that Include Advanced Metering Infrastructure, in 22-00058-UT, March 24, 2022.

⁸ PNM Response to Order Requesting Public Service Company of New Mexico to File an Application for Authorization to Implement Grid Modernization Components that Include Advanced Metering Infrastructure, in 22-00058-UT, April 12, 2022.

⁹ Unopposed Comprehensive Stipulation in 21-00269-UT, April 29, 2022.

¹⁰ “Grid Modernization and the NM PRC” Gridworks Webinar presentation by Arthur O’Donnell, February 17, 2022.

The terminology differs, but here the PRC is essentially identifying such Grid Mod initiatives as Time of Use rates for demand response and distribution planning for grid management.

While addressing the “What” goes into a utility proposal, these directives still do not resolve the cost/benefit analysis issue. “Least Cost” requirements and traditional regulatory analysis (whether Utility Cost Test, Total Resource Cost Test, or even Social Cost Test) are not effective.

Other jurisdictions are also grappling with this issue, and resolve the analysis of project reasonableness is differing ways for different kinds of investments.

5.2 A Framework from Hawaii

John Shenot had recommended looking at the state of Hawaii’s Grid Mod strategy. This following construct was adopted as part of Hawaiian Electric Company’s (HECO) Grid Modernization strategy (August 2017).

Expenditure Categories and Evaluation Methodologies (HECO 2017)

A. Standards & Safety Compliance	Lowest Reasonable Cost (aka Least Cost/Best Fit)
Grid expenditures to ensure reliable operations, comply with service quality, and transform the physical infrastructure from analog to digital	
B. Policy Compliance	Lowest Reasonable Cost
Expenditures needed to comply with state policy goals like RPS, interconnections and access to DER	
C. Net Benefits	Total Resource Cost Test
Not A. or B. but investments would provide net benefits for customers	
D. Self-Supporting Projects	Does not require benefit/cost justification ¹¹
Expenditures incurred for a specific customer (e.g. interconnection upgrades) with costs directly assigned to that customer.	

In Hawaii’s analysis, the Lowest Reasonable Cost (LRC) is used to evaluate components of the core platform necessary to comply with either a standard or to maintain safety. It accounts for new functional requirements and risks associated with new technologies. LRC is also used to evaluate expenditures that are necessary to comply with state or Commission policies, such as increasing renewable portfolio standards and increasing levels of distributed energy resources.

¹¹ New thinking on cost-causation policies may elevate these to B. or C.

HECO concluded: “A Lowest Reasonable Cost determination is the most practical approach to evaluating investments to build the core modern distribution grid.”¹²

5.3 So Where Does AMI/Grid Mod Fit?

In its order to PNM to file an AMI application, the PRC made a remarkable policy statement:

*“The Commission finds that the implementation of AMI comports with the Grid Modernization Statute, will benefit PNM’s New Mexico retail customers and the public, and will provide a net public benefit.”*¹³

AMI will:

- Facilitate grid modernization;
- Improve the efficiency, reliability, resilience and security of PNM’s system;
- Give customers real-time data regarding energy usage that allows them to monitor and reduce consumption as they deem appropriate;
- Allow PNM to maintain reasonable operations, maintenance and customer costs;
- Improve PNM’s ability to accommodate increased levels of distributed energy resources;
- Reduce emissions;
- Increase NM’s capability to supply regional needs for clean and renewable energy;
- Support a flexible, distributed energy portfolio;
- Improve customer education, and
- Allow for capital investment and skilled jobs in related services.

5.4 Conclusion

Given the statutory platform for Grid Modernization, the apparent consensus that AMI is fundamental for modernizing the grid, and the PRC’s already stated findings of a net public benefit, utility applications should not be constrained by inadequate cost/benefit analysis. A Lowest Reasonable Cost standard best fits the evaluation of new technologies in service of public policies and to enhance service reliability.

Proposals should, of course, also show that projected expenditures are reasonable to accomplish the program in a timely manner and meet the state goals detailed above. Projects should also:

- Promote a holistic approach, rather than one-off projects
- Maximize benefits from programs for ratepayers & communities, not shareholders
- Provide for fair cost allocation and mediate rate impacts
- Measure and evaluating effectiveness to inform future investments.

6. Grid Modernization Beyond AMI

Approval and implementation of AMI systems for New Mexico’s IOUs is a foundational step toward the creation of a modern grid that serves customers and meets state policies. But it is only the first step.

¹² Id. Pg. 47

¹³ Order Requesting Public Service Company of New Mexico to File an Application for Authorization to Implement Grid Modernization Components that Include Advanced Metering Infrastructure, in 22-00058-UT, March 24, 2022.

Gridworks will be presenting a more comprehensive approach to how the PRC might structure a Notice of Proposed Rulemaking for Grid Modernization, and as was discussed at our very first webinar, a lot of the issues we touched on today will need to be considered:

- Balancing competing needs in reviewing applications
- Minimizing costs to consumers while maximizing benefits of new investments
- Providing guidance to utilities on how to structure their applications for success
- Looking holistically and carefully timing the sequence of investments to optimize impacts.

If there is a “vision” that may help guide the future for Grid Mod, it requires deciding WHAT we want the future to look like and employ the regulatory tools we have available to achieve it.

Utilities and other electric service providers also need to adopt new analytical tools to plan their future investments to optimize the selection and location of new resources in order to allow consumers to become active managers of their electricity consumption.

Together, new technologies and planning tools will help:

- 1) Modernize the electric distribution system to accommodate two-way flows of energy and energy services throughout the utilities’ networks;
- 2) Enable customer choice of new technologies and services that reduce emissions of greenhouse gasses, and improve reliability in a cost-efficient manner; and
- 3) Encourage opportunities for distributed energy resources (DER) to provide grid services, including potential alternatives to traditional utility investment in costly transmission lines, central station generation and electrical substation infrastructure.

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