NEW MEXICO GRID MODERNIZATION ROADMAP

BACKGROUND

New Mexico's Energy Grid Modernization Roadmap of 2020 ("the Act") tasked the Energy, Minerals and Natural Resources Department (EMNRD) with drafting a roadmap for grid modernization.[1] The Energy Conservation and Management Division (ECMD) of EMNRD led development of a grid modernization roadmap that will help the state transition to a low-carbon electricity generation mix, support consumers, and modernize the electric grid. The Act complements the state's Energy Transition Act of 2019 ("ETA") which set the state's electricity providers on a path to 80 percent renewable energy and 100 percent zero-carbon energy.

The Act defined "grid modernization" as:

> "improvements to electric distribution or transmission infrastructure, including related data analytics equipment, that are designed to accommodate or facilitate the integration of renewable electric generation resources with the electric distribution grid or to otherwise enhance electric distribution or transmission grid reliability, grid security, demand response capability, customer service or energy efficiency or conservation. . ."[2]

That is, grid modernization is defined as a set of potential upgrades to the electric grid in service to multiple objectives, including reliability, security, affordability, and the deployment and use of clean energy.

The primary purpose of this roadmap is to guide New Mexico's electricity providers, as well as the associated industries, the research community, and energy consumers through the state's transition to a zero-carbon electricity grid.[3] The roadmap considers actions that could be taken across the next eight years (2022-2030) to achieve grid modernization.

New Mexico's electric grid is subject to a multi-faceted regulatory and policy landscape as well as aging physical infrastructure. A universal prescription for grid modernization actions is, therefore, inappropriate – the right first step for one part of the state will not be best for other regions, service territories, or groups

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[1] Energy Grid Modernization Roadmap Act of 2020 (71-11-1 NMSA 1978).

[2] Ibid.

[3] The formalized direction for the state's investor-owned utilities is outlined in Section 62-16-4 NMSA 1978. This statute is the state's renewable portfolio standard (RPS) for investor-owned utilities (IOUs), which underwent modification through the passage of the 2019 Energy Transition Act (ETA). The RPS now has the following milestones for IOUs: By 2020, at least 20% of retail sales must be from renewable energy resources; by 2025, at least 40% of retail sales must be from renewable energy resources; by 2030, at least 50% of retail sales must be from renewable energy resources; by 2040, at least 80% of retail sales must be from renewable energy resources, and; by 2045, 100% of retail sales must be from zero-carbon resources.[3]

of energy consumers. The complexity of New Mexico's grid is visible first and foremost in the variety of the state's electricity providers. Three main investor-owned utilities (IOUs) operate in the state: Public Service Company of New Mexico (PNM); Southwestern Public Service Company (SPS), a subsidiary of Xcel Energy which serves 14 communities and many large industrial consumers in southeast New Mexico; and El Paso Electric, based in Texas and serving Las Cruces, New Mexico and surrounding areas. Only PNM's customer base is entirely contained within New Mexico. PNM also owns and maintains most of the high-voltage transmission lines in the state.

In addition to the three IOUs, New Mexico is also home to sixteen rural electric cooperatives, which serve as energy distributors. The electricity distributed by all but one of the cooperatives is supplied by either Tri-State Generation and Transmission Cooperative or Western Farmers Generation and Transmission Cooperative. Tri-State and Western Farmers are "cooperatives of cooperatives" that provide both generation and transmission services through long-term power supply contracts with their member distribution cooperatives. Three additional rural cooperatives, Navopache, Duncan, and Rio Grande, are based out-of-state but serve some New Mexico customers. In addition, several New Mexico localities, including Farmington, Los Alamos County, and Gallup, are served by municipally-owned utilities.

The IOUs and to a lesser extent, the cooperatives, are under the jurisdiction of the New Mexico Public Regulation Commission (PRC). The PRC regulates public utility rates and stipulates Integrated Resource Plan (IRP) requirements, interconnection requirements, utility energy efficiency program requirements and net-metering requirements. In addition to the jurisdiction of the PRC, SPS and Western Farmers are also members of the Southwest Power Pool (SPP) regional transmission organization (RTO), connecting them to the eastern interconnection grid of the United States. This relationship further complicates New Mexico's energy landscape by adding layers of regional and federal oversight. A roadmap for grid modernization in New Mexico must be flexible enough to accommodate this varied regulatory landscape.

Grid modernization will also occur within a dynamic policy landscape. Interstate energy sales, flows, and distributed energy resource (DER) market principles and guidelines are set by the Federal Energy Regulatory Commission (FERC).[4] On the customer side, federal renewable energy tax credits, whether alone or in combination with state incentives and policies (e.g., net-metering), have encouraged distributed renewable generation growth for over a decade. In the past year, federal policy has shifted with toward clean energy resource development, clean energy jobs, and electricity infrastructure improvements including transmission expansion, grid security investments, and the deployment of electric vehicle charging infrastructure.

[4] See discussion of PURPA in *Baseline*, p. 16.

ROADMAPPING PROCESS AND FRAMING

In response to the Act's directive, EMNRD convened a Grid Modernization Advisory Group (GMAG) for a series of eight virtual workshops from September to December 2020. The members of the GMAG include over 40 electricity sector representatives, scientists working at National Labs, academics, renewable energy experts, and environmental and consumer advocates. The GMAG members hold expertise in grid technologies, electricity business models and finance, and energy policy (see **Appendix A** for list of participants). The group's recommendations are contained in eleven whitepapers which were collectively authored by the GMAG and opened for public comment. These recommendations constitute a comprehensive list of potential actions to modernize New Mexico's electric grid.

The GMAG identified four main drivers of grid modernization for New Mexico:

1. The need to decarbonize in the face of climate change is driving a transition from fossil fuel generation resources to renewable energy resources.
    → The variability of renewable resources requires a shift in grid infrastructure and technology.

2. A growing renewable generation industry is already seizing on the abundant supply of renewable resources in New Mexico.
    → A modern grid opens up opportunities for this industry to supply energy to New Mexicans as well as export surplus energy to states with equally ambitious renewable resource targets.

3. Customers want to take advantage of New Mexico's world class resources and new technologies.
    → A modern distribution grid allows customers to produce and consume energy as they desire.

4. There is a recognized need for economic diversification, technological advancements, and job opportunities (both short- and long-term) throughout New Mexico, as well as a desire to generally improve the lives of New Mexicans by lowering carbon emissions and providing more opportunities for New Mexicans to engage in the energy transition.
    → A modern grid can enable a just energy transition as well as encourage resource-conscious industries to locate here.

In considering what is best for the state, the GMAG contemplated several objectives or attributes of a modern grid. The GMAG frequently returned to two: *reliability* and *affordability*. As this was an area of universal agreement, these two objectives served as the frame for this grid modernization roadmap. It should be noted that there is tension between these two central objectives. An absolutely reliable – as well as resilient and secure – grid is expensive. As New Mexico accelerates toward a clean energy transition, the overarching goal of the state's grid modernization project should be to stay within these two guardrails.

GRID MODERNIZATION ADVISORY GROUP RECOMMENDATIONS

This section summarizes the recommendations put forward by the GMAG in the eleven whitepapers. While there was consensus[5] that the subjects of each of the whitepapers were the right 'big ideas' that should be explored, there were varying levels of agreement on details, feasibility, methodology, and advisability of the various recommendations found within the whitepapers. Hammering out the details will take time and further debate in other forums. Therefore, the following summary includes three categories of recommendations: a) recommendations that achieved widespread consensus; b) ideas and concepts that were collectively acknowledged to be critical to grid modernization, but which no consensus was achieved as regards to an implementation strategy; and c) recommendations which were supported only by a portion of the GMAG.

There is no prioritization or ranking of importance implied by placing a recommendation in a particular category; merely a reflection of the level of consensus achieved during the GMAG process.

RECOMMENDATIONS WHICH ACHIEVED WIDESPREAD CONSENSUS

RECOMMENDATION 1: UTILITIES SHOULD INVEST IN ADVANCED METERING INFRASTRUCTURE (AMI)

The GMAG recommends that electricity providers – both IOUs and co-ops – should invest in advanced metering infrastructure and other smart grid technologies with a full suite of capabilities within their respective territories.[6] According to data from the U.S. Energy Information Administration,[7] New Mexico's rural electric cooperatives are leading the state on adoption of AMI, primarily for the purposes of collecting usage data and more efficient billing. None of the New Mexico IOUs have adopted AMI.[8]

The primary benefits of AMI to a modernized grid are *reliability* and *resilience*, which are both improved when the utility is able to quickly identify faults in the system, dispatch repair crews, and/or quickly reconfigure the grid to restore power to some areas. In addition, the ability to collect customer usage data is essential for designing advanced rate structures that can incentivize customers to use energy more efficiently and reduce need overall. AMI creates the opportunity for flexibility in integration of clean utility-scale generation. Coupled with savings on billing labor and related expenses, AMI has the potential to reduce customer costs in the long-term. AMI that includes a distributed energy resources management system (DERMS) allows utilities to manage distributed generation and distributed energy storage charge/discharge to the benefit the grid.[9] AMI works best when deployed fully (e.g., the smart meter as a

[5] In the facilitation context, consensus is defined as "spanning enthusiastic support to tolerance." (Source: The Scheinman Institute, Cornell University).

[6] See Grid Modernization Advisory Group (2021), *Whitepaper Series #1: Advanced Metering Infrastructure*

[7] EIA-861 2018 Annual Electricity Industry Report, captured in the *Baseline* and found here: https://www.eia.gov/electricity/data/eia861/

[8] See *Baseline*, Exhibit 21, p. 45.

[9] See also U.S. DOE (2016). *Advanced Metering Infrastructure and Customer Systems: Results from the Smart Grid Investment Grant Program*, p.4.

sensor can provide information that feeds multiple systems such as outage and voltage management systems and the communications system can support multiple applications as well).

While the GMAG supports this recommendation, the group points out the large upfront capital investment for utilities. The GMAG estimates a cost of between $200 and $600 per meter.[10] For PNM, that equates to an investment of $108 to $325 million for 541,639 meters.[11] This expense would either need to be borne by New Mexicans through rate recovery or accounted for through other utility funding – and might be financially infeasible for co-op customers in particular. In addition, the GMAG pointed out that the PRC has previously denied an AMI installation cost recovery request from PNM[12], which creates continuing regulatory uncertainty around AMI.

RECOMMENDATION 2: UPDATE THE NEW MEXICO INTERCONNECTION RULE AND MANUAL

The GMAG recommends that New Mexico update its interconnection rule and manual.[13] New Mexico's Interconnection Rule and Manual was last updated in 2008.[14] Since then, the volume of interconnection requests has increased as the cost of distributed generation resources (e.g., solar) has declined, and thousands of customers have taken advantage of both state and federal tax credits to obtain their own distributed generation resources. In addition, as discussed below (see Recommendation 3), inverters with advanced capabilities are now available, changing the dynamics of grid interconnection.

The process of updating the Interconnection Rule and Manual is currently underway at the Public Regulation Commission, with a notice of proposed rulemaking released for public comment on December 1, 2021.[15]

RECOMMENDATION 3: UPDATE THE STANDARDS FOR ADVANCED INVERTERS

Advanced inverters should become a staple of electric grid modernization efforts.[16] The purpose and recommended functionality for AC/DC inverters in the electric grid has evolved in recent years. Prior to 2012, the existing standard and recommended functionality for inverters required the immediate shutdown of both inverters and their associated grid-tied generation units during power outage disruptions, for the protection of the entire system. However, this policy leaves self-generating customers unable to access their own energy supply during a multi-day outage event. Currently, the modern standard requires that inverters have reactive power control and ride-through functionality that allow

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[10] Rough approximation for Xcel of $1.8B and 3.3M customers/3.9M meters is $462/meter (estimates by Xcel for system wide deployment)

[11] See *Baseline*, Exhibit 21, p.45.

[12] New Mexico PRC Docket No. 15-00312-UT.

[13] See Grid Modernization Advisory Group (2021), *Whitepaper Series #8: Update Interconnection Rules and Manual*

[14] The current interconnection standards and procedures apply to Generating Facilities with a rated capacity up to and including 10 MW.

[15] See NM PRC Docket No. 21-00266-UT

[16] See Grid Modernization Advisory Group (2021), *Whitepaper Series #2: Advanced Inverters*

systems to remain in operation during an outage event.[17] New Mexico's standards for inverters have not been updated to match these new technological capabilities. The primary benefit of advanced inverters is the secure integration of higher penetrations of distributed energy resources on the distribution grid, as well as the enablement of customers to "keep the lights on" (*reliability*) during a disruption. Updating the standards for advanced inverters is connected to updating New Mexico's Interconnection Rule and Manual.

RECOMMENDATION 4: CREATE AND SUPPORT A COORDINATED STATEWIDE TRANSMISSION PLANNING GROUP

The GMAG participants recommend the creation of and ongoing support for a coordinated statewide transmission planning group[18] charged with delivering and continuously updating a statewide transmission modernization strategy. New transmission corridors are widely seen as essential for the successful adoption of low-carbon generation such as utility-scale wind. An expansion of transmission line capacity can enhance *reliability* and *resiliency* (provided there are agreed-upon standards and metrics for resiliency). The GMAG recommends that transmission planning should take into consideration ways to maximize capacity on existing lines while avoiding energy losses, and that transmission planning should account for the impact of distributed generation and non-wires alternatives.

The transmission planning group should be comprised of representatives from the state's electric utilities, transmission service providers, state agencies, land managers, and one or more independent technical analysis organization. The group must include the New Mexico Renewable Energy Transition Authority (RETA). The charter for the group would be most effective if it includes sharing information for the purpose of modernizing the transmission infrastructure in New Mexico – i.e., something analogous to that of the Colorado Coordinated Planning Group (CCPG), which serves as a technical forum for transmission planning discussions in Colorado.

RECOMMENDATION 5: STRATEGICALLY DEPLOY ENERGY STORAGE ON THE NEW MEXICO GRID

The GMAG provided several recommendations for increasing the penetration of energy storage technology in New Mexico's grid,[19] acknowledging that, as the state's utilities transition from fossil fuel generation to clean energy resources, storage will be necessary to maintain essential grid services for grid reliability that existing fossil fuel plants currently provide. The location-specific provisions of energy storage are an important component of a modern *affordable*, *reliable,* and *resilient* grid. Today's power grid is a 'just-in-time' system, whereby power is supplied precisely when demanded. At the time of publication, the grid's need for storage has not yet reached a critical threshold, as nuclear and gas-fired combustion turbines continue to supply 'firm' energy resources at the same time as more variable energy resources (e.g., wind and solar) are introduced. However, there is general consensus that storage technologies will be necessary in the near future. New Mexico utilities are already deploying energy

[17] Standard is IEEE 1547-2018. Power control is for voltage stability (sustaining the electric and magnetic fields of alternating current equipment).

[18] See Grid Modernization Advisory Group (2021), *Whitepaper Series #7: Create a Statewide Transmission Planning Group*

[19] See Grid Modernization Advisory Group (2021), *Whitepaper Series #11: Storage*

storage technology as part of their resource mix, including a significant part of the replacement power for San Juan Generating Station being developed by PNM.

The GMAG's recommendations are primarily for further study and codification of the present state of storage in the New Mexico grid – i.e., documentation of storage capabilities, energy management software requirements,[20] hydro and geothermal resources in New Mexico, and similar topics. The GMAG envisions a study in the mode of RETA's 2020 transmission study.

The GMAG also recommended that storage projects be incentivized through pilot program funding, tax policy, and goal-setting. However, the GMAG did not reach consensus on how much, or by which specific method, the state should enable or accelerate storage deployment. Those discussions will likely play out in the legislative arena.

CRITICAL ISSUES FOR GRID MODERNIZATION WITHOUT CONSENSUS RECOMMENDATIONS

CRITICAL ISSUE 1: STANDARDIZING AND COORDINATING UTILITY INTEGRATED RESOURCE PLAN (IRP) REQUIREMENTS

Integrated Resource Plans (IRPs) are planning documents which utilities use to plan resource adequacy over a 20-year planning horizon. In New Mexico, only the three IOUs are required to file IRPs with the PRC. Their filings are on staggered three-year cycles (i.e., each utility files a new IRP every three years, and only one of the three IOUs files an IRP in any one year). The remaining New Mexico electricity providers (rural electric coops and municipal utilities), which serve around 30% of the state's energy needs, are not required to file IRPs. The GMAG produced a whitepaper which recommended that New Mexico create a statewide, pan-utility IRP process which would align resource planning across all utilities (IOUs, municipal utilities, and co-ops). This standardization would create a comprehensive statewide IRP.[21]

The primary benefit of a comprehensive statewide IRP would be the efficient use of assets, particularly transmission, that could be coordinated among the various entities, which could lead to more rapid achievement of ETA goals. By taking account of all transmission, generation, and storage assets, including behind-the-meter and distribution assets, utilities may be able to avoid overbuilding infrastructure, thereby maintaining, or increasing *affordability*. Grid *reliability, resilience,* and *security* might also be improved with situational awareness of the entire grid system.

The GMAG agreed that New Mexico's current IRP format is not sufficiently robust to plan and communicate grid modernization over a 20-year planning horizon. However, there was little consensus around what a statewide IRP would look like; whether it would be cost-effective for non-IOU utilities to prepare; and even whether a collective planning IRP process would have any benefit to an individual

[20] Energy management system (EMS) balancing software is used by grid operators to ensure reliability across the grid. EMS software which is capable of dealing with and properly utilizing grid-edge as well as utility-scale storage capacity is necessary for properly integrating storage into the grid without creating reliability problems.

[21] See Grid Modernization Advisory Group (2021), *Whitepaper Series #3: Modifications to the Integrated Resource Plan and Statute and Rule*

utility's ability to modernize their portions of the grid. The IOUs, in particular, suggested that collective planning would *not* achieve grid modernization benefits.

Nevertheless, the whitepaper provides a compelling case for revising IRP requirements in New Mexico to provide a more actionable process, a more robust outlook, and more cost-effective planning. The whitepaper authors detailed a step-by-step program to create a wider IRP process based on recent IRP rulemakings in other states.

CRITICAL ISSUE 2: FAIR AND EQUITABLE ELECTRICITY RATE DESIGN(S) THAT PROPERLY VALUE DISTRIBUTED ENERGY RESOURCES

The GMAG broadly agreed that, as New Mexico's grid transitions to zero-carbon electricity sources and utilizes more demand-side resources (such as on-site generation and storage, energy efficiencies, and grid-interactive buildings), new or different rate designs which are fair and equitable to all customers will need to be developed.[22] More customers are employing on-site generation, storage and/or smart control technologies on their premises, giving them more flexibility and control over their own electricity supply. These technologies also provide ancillary grid services that could, under some rate structures, be compensated. Furthermore, customers producing and consuming energy (e.g., via EV charging) have real-time impacts on the supply and demand of energy – impacting prices and grid function[23] throughout the day. Diverse customer bases with varying levels of energy burden, different technologies, reliance on the grid, and levels of trust in new technologies complicate the picture. In many other states, traditional rate design is evolving to capture various value streams provided by the customer, as well as acknowledge and include the utility's compensatory need for DER-related grid upgrades.

The GMAG did not reach a conclusive recommendation on rate design(s). There was little consensus around the desirability of any one rate structure, aside from a general acceptance of time-of-use rates as useful in particular circumstances. Utilities, co-ops, the solar/storage industry, and low-and-moderate income (LMI) advocates[24] all disagree on the appropriate forms of rate design for a 'modern grid' – though they all agree that rate design is critical to grid modernization. These discussions lend themselves to consideration in a PRC proceeding.

CRITICAL ISSUE 3: CREATING PATHWAYS FOR LOW-AND MODERATE-INCOME (LMI) COMMUNITIES TO DIRECTLY BENEFIT FROM GRID MODERNIZATION

The GMAG acknowledged the profound importance of equitable and just grid modernization programs, particularly surrounding methods by which LMI communities could have both legal and financial pathways to directly benefit from the modernization of New Mexico's grid.[25] The primary benefit of focusing on LMI

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[22] See Grid Modernization Advisory Group (2021), *Whitepaper Series #9: Rate Design and DER Incentives*

[23] Even the relatively small growth of EVs among residents in rural cooperative territories could have significant impacts on load and risk overloading transformers, circuits, and feeders at certain times of day.

[24] Creating a low-income-specific rate structure requires legislative action due to the implications of the Mountain States court case.

[25] See Grid Modernization Advisory Group (2021), *Whitepaper Series #10: Low and Moderate Income Programs to Modernize the Grid* for detailed recommendations.

populations is to maintain a standard of *affordability* for grid modernization, while ensuring that all New Mexicans can benefit from the energy transition and beneficial electrification. The GMAG provided detailed examples of programs which could help to achieve these benefits for LMI communities, but did not come to consensus on prioritization, funding methods, or processes for achieving any specific program. The suggested programs include the following:

COMMUNITY SOLAR

The GMAG suggested that New Mexico implement community solar (a method of accessing solar energy where customers, LMI and non-LMI, subscribe to shared solar generation resources). While the GMAG did not come to conclusions as to what version of community solar would be most appropriate for New Mexico, in 2021, the state legislature passed, and the governor signed, the Community Solar Act. The PRC is developing rules to implement this new law by April of 2022.[26]

ENERGY EFFICIENCY PROGRAMS

Household energy efficiency programs, such as those developed by Prosperity Works in cooperation with the Partnership for Community Action, Central New Mexico Housing and PNM for Albuquerque-area households, are currently oversubscribed. Similarly oversubscribed at the state level is New Mexico's weatherization program administered by the Mortgage Finance Authority (MFA). The GMAG recommended that more energy efficiency programs, particularly those directed towards LMI communities, be developed and funded.[27] Energy efficiency programs can help decrease energy burden and have the added potential benefit of helping utilities adopt clean energy technologies through demand-side management.

PUBLIC SCHOOL ENERGY EFFICIENCY

Despite a mandate to save energy, schools often lack both financing and design/construction support to make energy-efficient upgrades to aging school infrastructure. The GMAG makes recommendations for supporting schools, including specific recommendations for changes to the Energy Performance Service Contracting (EPSC) mechanism, administered by EMNRD, to make it easier for schools to take advantage of this energy efficiency financing resource.

CRITICAL ISSUE 4: REGIONAL INTEGRATION

The benefits of regional grid integration are a topic of discussion throughout the West. States like Colorado and Nevada recently passed legislation which encouraging utilities to consider joining a regional transmission organization (RTO) which would create a more integrated market for western power

[26] See *Baseline*, pp.17-18 for a discussion of this new law.

[27] At the state level, New Mexico is currently constrained from directly funding energy efficiency upgrades (save through the MFA weatherization program) by the anti-donation clause. However, in the 2021 legislative session, HJR 9 attempted to add an exemption to the anti-donation clause for broadband, water, and power infrastructure. The bill passed the House but not the Senate. It is likely that another version of this bill will be filed in the 2022 legislative session.

generation. Several of New Mexico's rural electric cooperatives as well as SPS currently participate in the Southwest Power Pool (SPP) RTO which stretches east across a number of midwestern states. However, PNM and EPE, along with most of the other rural electric cooperatives, are not members of an RTO. Instead, electricity in the west is managed by 38 different balancing authorities and overlain by a web of transmission rights and availability. Energy trading is done through numerous bilateral agreements which make it more difficult to optimize the deployment and use of renewable energy resources across the region. Several of the West's utilities - including PNM as of April 2021 - participate in the California Independent System Operator's Western Energy Imbalance Market (EIM), which allows utilities to trade electricity on a sub-hourly basis. The EIM provides benefits to utilities such as reduced energy dispatch costs. Nevertheless, the EIM does not solve the problem of the balkanized transmission system, which can add layers of fees (called pancaking) each time electricity crosses a balancing territory.[28]

The GMAG did not reach consensus on whether any one – or all – of New Mexico's utilities should join an RTO. However, the GMAG did reach consensus that a more deliberate engagement with the questions of regional integration is necessary for grid modernization, and recommended that New Mexico create and provide ongoing support for a New Mexico RTO Task Force. The primary objective of the RTO Task Force would be to participate in discussions on region-wide grid integration on behalf of the state of New Mexico, looking for opportunities to explore the benefits to New Mexico that come from regional electricity coordination.[29] While a Task Force would not benefit the grid directly, the suggested benefits to the grid of regional coordination and cooperation include optimization of existing and future renewable generation and transmission assets as well as potential positive impacts on *affordability* if cost savings are achieved and passed on to consumers.

CONCEPTS SUPPORTED BY ONLY A PORTION OF THE GMAG

CONCEPT 1: ENGAGE AND PARTNER WITH CUSTOMERS TO MEET STATE ENERGY TRANSITION AND DECARBONIZATION GOALS

One of the whitepapers produced by the GMAG suggested that, to meet state energy transition and decarbonization goals, utilities might design and deploy programs which incentivized customers to participate in energy demand management. [30] The transition to renewable energy will mean that there are likely to be times when energy is more or less abundant and available. One option is to manage load by incentivizing customers to use electricity more at certain times of the day and less at other times (i.e., peak shaving and voluntary demand response). By taking advantage of demand response and other customer load-shifting behaviors, utilities could avoid expensive build-out of additional assets, passing the savings on to customers.

The whitepaper suggested that demand management might be more cost effective for utilities than renewable energy plus storage in the later stages of the energy transition when fossil fuel generation is no longer available to provide 'firm' power. However, none of the utility representatives on the GMAG agreed that such a program was likely to be a focus of their grid modernization efforts, at least in the near term.

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[28] See *Baseline*, Exhibit 29, p. 55.

[29] See Grid Modernization Advisory Group (2020), *Whitepaper Series #5: RTO Task Force*

[30] See Grid Modernization Advisory Group (2021), *Whitepaper Series #4: Customer Engagement*

CONCEPT 2: UTILITY DISTRIBUTION SYSTEM PLANS

The GMAG produced a whitepaper which recommended that New Mexico require utility Distribution System Plans (DSPs) to be submitted to the New Mexico Public Regulation Commission at three-year intervals, either in parallel to the IRP process or as part of it.[31] DSPs would allow the PRC – and thus utility customers, the general public, and other stakeholders – to have more transparency into the distribution system operated by utilities.

The distribution system in New Mexico represents approximately 12,000 miles of primary lines, 783 feeders,[32] 1,056,682[33] customer meters, and more than 24,000 distributed generation interconnections. For comparison, the transmission system represents about 2,900 miles of line and 14 generators.[34] Currently, there is limited regulatory insight or oversight of the distribution system, nor of the coordination between distribution and transmission planning. The whitepaper suggests that the benefits to the grid of requiring DSPs would include *asset optimization*, *affordability*, *market animation*, and enhanced grid *reliability*, *resiliency,* and *security*. DSPs can promote optimization of assets by prioritizing least-cost design and avoiding overbuilt distribution infrastructure capacity. A DSP can also signal areas of need that can encourage competition in providing grid services.

Utility commentary on required DSPs was negative: the utility representatives, as well as some other members of the GMAG, suggested that cost, complexity of required analysis for both utility and PRC staff, and the likelihood of DSP plans becoming rapidly obsolete as the grid changes would make formalized DSP planning not useful to grid modernization objectives.

GRID MODERNIZATION GRANT PROGRAM

EMNRD is also administering a Grid Modernization Grant Program. The Energy Grid Modernization Roadmap Act (NMSA 1978 § 71-11-2) established the Grid Modernization Grant Program and Fund to support pilot projects that advance research and understanding of grid technologies, customer behavior and other grid functions and operations. The grant program provides opportunities for testing and research that will help inform decisions going forward. Projects approved for grid modernization grant funding should be replicable, have broader economic and educational impacts, and be aligned with the goals and objectives articulated in this document.

CONCLUSION

[31] See Grid Modernization Advisory Group (2021), *Whitepaper Series #6: Distribution System Planning*

[32] Calculated from Whitepaper Series #6, p.5.

[33] Calculated from *Baseline*, Exhibit 21, p.45.

[34] Estimated by PNM in Whitepaper Series #6, p. 10, with exception of the above calculations.

New Mexico is quickly transitioning to zero-carbon electricity generation. Grid modernization must accompany that transition, and with a focus on *reliability and affordability* New Mexico will experience a just and equitable transition to renewable energy and zero-carbon electricity generation.