RESOURCE ADEQUACY IN COLORADO:

AN ANALYSIS OF POTENTIAL LEGISLATION

COLORADO RURAL ELECTRIC ASSOCIATION
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COLORADO'S ELECTRIC COOPERATIVES

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INTRODUCTION

"Resource adequacy" refers to the ability of the electric system to supply aggregate electric power and energy to meet the requirements of consumers at all times, taking into account peak loads and both scheduled and unscheduled outages of system components. The resource mix on which utilities rely to serve customer load includes increasing amounts of variable generation, including wind, solar and emerging technologies. Moreover, electric demand continues to evolve due to the integration of renewable resources such as net-metered rooftop solar, electric vehicle charging, and demand response, in addition to more severe and frequent weather events. As a result, there is growing concern about the adequacy of electric resources to meet customer load.

This document is intended to provide an overview of resource adequacy, including current challenges and existing regulatory schemes addressing resource adequacy. It will also offer the perspectives of the Colorado Rural Electric Association (CREA) and its member cooperatives on this important issue.

ABOUT CREA AND COLORADO'S ELECTRIC COOPERATIVES

CREA is the statewide trade organization representing the interests of Colorado's electric distribution cooperatives and Tri-State Generation and Transmission Association. Colorado's electric cooperatives provide power to approximately 1.5 million consumers and their service territory covers roughly 70% of Colorado's landmass. On average, Colorado's electric cooperatives serve 7.9 consumers per mile of line (municipal utilities average 48 consumers per mile of line and investor-owned utilities average 34 consumers per mile of line). Colorado's electric cooperatives are not-for-profit entities that face unique challenges compared to municipal or investor-owned utilities due to the low density of consumers and limited revenue generated through electric sales.

Unlike investor-owned utilities, electric cooperatives are owned by the customers they serve, referred to as their "consumer-members." The cooperative model is successful because electric cooperatives rely on locally elected boards to provide guidance to cooperative staff in an effort to provide affordable, safe, reliable and environmentally conscious power to all of their consumer-members. Much has changed since Colorado's first electric cooperative started providing power to rural consumers in 1936. Today, Colorado's electric cooperatives employ over 2,500 individuals and have a network of nearly 80,000 miles of distribution and transmission lines. Colorado's electric cooperatives provide electric service to farms and ranches, in towns and suburbs, and at ski resorts and businesses across Colorado.

Colorado's electric cooperatives are committed to playing a leading role in the transition to cleaner energy and a sustainable future. Within this commitment, Colorado's electric cooperatives are focused on maintaining reliability and affordability, advancing innovative solutions and enhancing community resilience.

BACKGROUND

WHAT IS RESOURCE ADEQUACY?

At its core, "resource adequacy" is a simple concept, referring to the requirement that a load-serving entity has adequate resources to meet its anticipated peak load, taking into account planned and unplanned system outages. This means not only having sufficient resources to meet expected energy requirements, but also a "reserve margin" to account for contingencies that might be expected to impact the availability of resources (e.g. loss of a transmission line or the outage of a generation resource) or the load requirements at any given time (e.g. a spike in energy consumption due to changed weather conditions). If resources are inadequate to serve load at any given time, a utility may be required to shed load (e.g. a "rolling blackout") to avoid instability of the grid.

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The standard for resource adequacy planning in the United States is to procure sufficient resources to expect to shed firm load less than once every 10 years. This is commonly referred to as the 1-day-in-10-years standard. This standard has historically been interpreted one of two ways: 1) A single firm load shed event over a 10-year period calculated with the Loss of Load Expectation (LOLE) metric, or 2) 24 hours of firm load shed over a 10-year period calculated with the Loss of Load Hours (LOLH) metric. These two interpretations of the 1-day-in-10 standard result in materially different levels of reliability since a single load shed event might last only 2-3 hours. Thus, the LOLH interpretation generally has about 10 more days with firm load shed than the LOLE interpretation. To achieve these standards of reliability, utilities usually plan reserve margins of between 15 and 20 percent of their anticipated load.

There are many factors that complicate resource adequacy. First and foremost, the shift away from traditional baseload generation resources (such as coal and natural gas) to renewable energy (such as wind and solar) has resulted in more variability in the availability of generation across the grid. This variability means utilities may be required to significantly overbuild renewable resources to ensure that resources in some regions will be available to generate when resources in other regions are not. The results of modeling by the Finland-based energy firm Wartsila concluded that solar capacity reaching up to 4.3 times peak load in sunny regions, and wind capacity of up to 2.1 times peak load in windy regions, would form the basis of a least-cost all-renewables resource mix in regions across the United States.[1] While the cost of energy generated from a renewable facility has steadily declined over the years, overbuilding generation at this level significantly increases the cost of a utility's energy supply.

Variability in renewable resources can be mitigated to some extent through the use of battery storage; however, storage technology has not developed to the point where it is a reliable and cost-effective solution. The most common grid-scale battery solutions today are rated to provide two to six hours of electricity at their rated capacity, which may be insufficient to meet load requirements during extended cloudy periods with little or no wind when neither solar nor wind resources are able to generate. Moreover, the storage capacity of batteries tends to degrade over time as they are charged and discharged, requiring costly replacement or augmentation as well as disposal of expended batteries. While storage technology continues to evolve, it will be several years at least before more reliable and cost-effective options are readily available at an affordable cost.

A second factor complicating resource adequacy is the increasing frequency of severe weather, which can affect both generation and demand for electricity. According to a recently published report from the United Nations[2], In the period 2000 to 2019, there were 7,348 major recorded disaster events. This is a sharp increase over the previous 20 years. Between 1980 and 1999, 4,212 disasters were linked to natural hazards worldwide. Floods and storms were the most prevalent events. During this period, the number of major floods more than doubled from 1,389 to 3,254, while the incidence of storms grew from 1,457 to 2,034. In addition, there has been a significant rise in heat waves (which increases demand for electricity) as well as drought conditions (which, among other things, threatens available hydropower resources). According to the Intergovernmental Panel on Climate Change[3], heat waves that were likely to occur once per decade are now 2.8 times more frequent while extended droughts are 1.7 times more frequent. Much of the difference in

Factors that are impacting resource adequacy:

1. **shift away from traditional baseload generation to more variable renewable energy**
2. **storage technologies are not yet cost effective to reliably address RA concerns**
3. **increase in severe weather events that stress the grid (e.g. heat waves or major winter storms)**

[1] "Overbuilding solar at up to 4 times peak load yields a least-cost all-renewables grid," https://pv-magazine-usa.com/2020/05/14.

[2] "The Human Cost of Disasters 2000-2019," United Nations Office for Disaster Risk Reduction, October 13, 2020.

[3] "Climate Change 2021: The Physical Science Basis," Intergovernmental Panel on Climate Change, August 7, 2021.

extreme weather conditions is attributed to climate change, and these conditions are expected to worsen over the next decade.

Addressing these challenges is complicated by the fact that energy used to serve loads in one state often comes from another state, and much of that energy is supplied by entities that are not subject to jurisdiction of a state regulatory authority. In Colorado, for example, many load-serving entities receive energy from a municipal entity such as the Municipal Energy Agency of Nebraska (MEAN) or various power marketers such as Guzman Energy. Thus, resource adequacy is an interstate issue that requires a regional approach — individual states such as Colorado cannot solve for resource adequacy because Colorado, as a net importer of electric energy, is dependent on out-of-state energy resources and is vulnerable to potential failures of the system outside of Colorado.

CURRENT RESOURCE ADEQUACY REGULATORY SCHEME

1. Federal resource adequacy regulations – FERC and NERC

The 1935 Federal Power Act, as amended, gives the federal government near complete authority over sales of electricity from power plants and transmission of that power over the "bulk power system" — the facilities that move electricity long distances from the generation facilities to the systems that distribute it to end-use customers. Under Section 215 of the Federal Power Act, FERC has jurisdiction over any regional entities, and all users, owners and operators of the bulk power system for purposes of approving "reliability standards" and enforcing compliance with those standards.[4] Although the adequacy of generation and transmission resources has a significant impact on the reliability of the bulk power system, FERC's rulemaking authority does not extend to requirements to enlarge or construct new facilities. Section 215(a)(3) of the Federal Power Act defines a "reliability standard" as:

> a requirement, approved by the Commission under this section, to provide for reliable operation of the bulk power system. The term includes requirements for the operation of existing bulk power system facilities, including cybersecurity protection, and the design of planned additions or modifications to such facilities to the extent necessary to provide for reliable operation of the bulk power system, but the term does not include any requirement to enlarge such facilities or to construct new transmission or generation capacity.[5]

Thus, although a system that is "inadequate" should take steps to add new facilities to maintain reliability, FERC may not impose reliability standards that would require such expansions or additions.

Subject to such limitations, on July 1, 2022, FERC published a notice of proposed rulemaking to direct transmission providers to submit one-time informational reports describing their current or planned policies and processes for conducting extreme weather vulnerability assessments.[6] This was a follow up to a FERC technical conference held in June 2021 to discuss threats to electric system reliability posed by climate change and extreme weather events. Under the proposed rule, transmission providers would prepare an extreme weather vulnerability assessment that identifies where and under what conditions transmission assets and operations are at risk from the impacts of extreme weather events, how those risks will manifest themselves, and what the consequences will be for system operations. The one-time FERC submission would describe how the transmission provider established the scope for the extreme weather vulnerability assessment, developed inputs, identified vulnerabilities and determined exposure to extreme weather hazards, estimated the costs of impacts, and developed mitigation measures to address extreme weather risks. Although this proposed rulemaking is for the purpose of information gathering only, the data derived could form the basis of new regulations affecting resource adequacy and reliability.

Separate and apart from its ability to promulgate rules, FERC is responsible for approving tariffs submitted by regional transmission organizations (RTOs) and other jurisdictional entities, which typically include resource adequacy provisions. This authority to regulate wholesale markets has been expanded to include some aspects of distribution systems, such as the participation of distributed energy resources and storage resources in markets under FERC Order 2222.

FERC has delegated responsibility for the development of specific reliability standards to the North American Electric Reliability Corporation (NERC), the designated Electric Reliability Organization

[4] 16 U.S.C. § 824o.

[5] Id., § 824o(a)(3).

[6] 87 Fed. Reg. 39414 (July 1, 2022).

(ERO) under the Federal Power Act. NERC administers those standards through six regional entities, including the Western Electric Coordinating Council (WECC) which covers most of the western interconnection, including Colorado. Each of NERC's regional entities sets criteria for resource adequacy which define the amount, and in some cases the location, of generation needed to reliably serve load in the region. However, the failure of a region to meet its own adequacy criteria does not impose any obligation on a utility in the region to construct new facilities.

Each year, NERC is responsible for independently assessing and reporting on the overall reliability, adequacy, and associated risks that could impact the upcoming summer and winter seasons as well as the long-term, 10-year period. As emerging risks and potential impacts to reliability are identified, special assessments are conducted that provide similar technical frameworks and insights about the range and specific aspects of these risks to guide steps that may be warranted.

By identifying and quantifying emerging reliability issues, NERC provides risk-informed recommendations and supports improved reliability performance in the industry. NERC's recommendations, along with the associated technical analysis, are used for enhancements to resource and transmission planning methods, planning and operating guidelines, and NERC Reliability Standards.

NERC's Reliability Assessment group develops several key reports to fulfill the statutory requirements of the Energy Policy Act of 2005. These include:

1. Long-Term Reliability Assessments to annually assess the adequacy of the Bulk Power System over a 10-year period. The reports project electricity supply and demand, evaluate transmission system adequacy, and discuss key issues and trends that could affect reliability;

2. Summer and Winter Assessments assess the adequacy of electricity supplies in the United States and Canada for the upcoming summer and winter peak demand periods; and

3. Special Assessments are conducted on a regional, interregional, or interconnection-wide basis, as needed.

Federal jurisdiction under the Federal Power Act is exclusive and preempts state authority in this space. Courts have long recognized a "bright line" rule separating federal jurisdiction over the bulk power system from jurisdiction over retail distribution of electricity, which is reserved to the states.[7] The "bright line" rule, however, has been blurred somewhat with the introduction of distributed energy generation and renewable energy technologies, which impact both the bulk power system and retail distribution. A host of relatively new technologies — including batteries, low-cost wind and solar facilities, and technologies that allow customers to respond to price fluctuations — are rapidly being deployed across the grid. While these technologies promise enormous economic and environmental benefits, they do not fit easily within the jurisdictional lines drawn in the Federal Power Act. However, while the scope of federal preemption is not as clear as it was in the past, courts continue to recognize preemption and have invalidated numerous state energy laws, particularly where such laws affect interstate transmission of electricity or rates associated therewith.[8] Thus, any attempt to regulate resource adequacy at the state level is constrained by federal authority under the Federal Power Act.

2. Resource adequacy in western states

Outside of the California Independent System Operator (CAISO), there is no single or common resource adequacy standard or process for states in the western interconnection. States in this region typically allow each individual utility to independently establish methods to ensure resource adequacy as part of an integrated resource plan (IRP) or similar modeling process, which is subject to review by a state public utilities commission. This process applies, however, only to jurisdictional utilities, and most states exclude municipally-owned utilities and electric cooperatives from this process. The California Public Utilities Commission, for example, has established deliverability criteria that each load-serving entity must meet and provides rules for counting the resources that

[7] See, e.g., Mississippi Power & Light Co. v. Mississippi ex rel. Moore, 487 U.S. 354, 374 (1988) ("Congress has drawn a bright line between state and federal authority in the setting of wholesale rates and in the regulation of agreements that affect wholesale rates."); FPC v. Southern Cal. Edison Co., 376 U.S. 205, 215–16 (1964) ("Congress meant to draw a bright line easily ascertained, between state and federal jurisdiction . . . .").

[8] See Coalition for Competitive Elec. v. Zibelman, 906 F.3d 41, 54 (2d Cir. 2018); Electric Power Supply Ass'n v. Star, 904 F.3d 518, 522–24 (7th Cir. 2018); see also New Eng. Ratepayers Ass'n, 168 FERC ¶ 61,169, para. 43 (Sept. 19, 2019) (finding that "the FPA preempts" a New Hampshire clean energy law because the law "sets an interstate wholesale rate, contravening the [FPA's] division of authority between state and federal regulators" (alteration in original) (quoting Hughes v. Talen Energy Mktg., LLC, 136 S. Ct. 1288, 1297 (2016))); National Ass'n of Reg. Util. Comm'rs (NARUC) v. FERC, 964 F.3d 1177, 1181 (D.C. Cir. 2020).

must be made available to CAISO; however, these rules apply only to investor-owned utilities, community choice aggregators and energy service providers. As of the date of this white paper, we are unaware of any state in the West that requires all load-serving entities to make a filing or other submission to regulators demonstrating resource adequacy.

In addition to the lack of uniform standards for resource adequacy in the West, there is no uniform standard of review. In some states, such as Colorado, an IRP requires approval by the Public Utilities Commission.[9] Currently Colorado's two investor-owned utilities, Public Service Company of Colorado (PSCo) and Black Hills Colorado Energy, and Tri-State are required by law to submit IRPs to the Colorado PUC for approval every five years. These IRPs include detailed information regarding each utility's load forecasts and the resources that will supply the electricity to serve those loads. Other states, however, such as Washington, do not review the IRPs submitted by jurisdictional utilities but simply acknowledge that they have a plan in place.[10]

Absent a wholesale market or regulatory model for determining resource adequacy in the West, several organizations conduct regional resource adequacy analyses, although they have no authority to require a utility or balancing authority to adopt any specific measures. The Northwest Power and Conservation Council, created by the 1980 Northwest Power Act, prepares a regional power plan for the Columbia River Basin, a 20-year plan every five years, and an annual resource adequacy analysis. Similarly, the Pacific Northwest Utilities Conference Committee, formed by investor-owned utilities, public power utilities and independent power producers, develops a Northwest Regional Forecast including an analysis of resource adequacy in the region. The Western Power Pool (WPP) is a NERC-registered entity whose members share contingency reserves. Colorado utilities became part of the WPP after the Rocky Mountain Reserve Group was merged into the Northwest Power Pool, which was then renamed the WPP. While reserve-sharing does not constitute a resource adequacy plan or process, sharing contingency reserves reduces the cost of compliance with NERC balancing standards and increases reliability across the western interconnection.

Finally, members of the WPP have formed a Western Resource Adequacy Program (WRAP), which is developing programs to measure resource adequacy on a collective utility basis and determine each utility's short- or long-term position. The development of a regional standard for resource adequacy over a broad footprint is intended to allow for the standardization of capacity products which can be traded among utilities in a bilateral market. WRAP recently published a proposed tariff, which will require each balancing authority within the group to demonstrate its ability to meet the reliability standard in both the winter and summer seasons.[11] These submissions will be reviewed by WPP, which may require participants to remedy any deficiencies and impose penalties on participants that fail to do so.

3. Resource adequacy in wholesale markets

In regions served by a regional transmission organization (RTO) or independent system operator (ISO), resource adequacy is generally addressed by the market operator pursuant to a FERC-approved tariff. This allows a regionalized approach to resource adequacy and permits optimization of both generation and transmission resources to ensure efficient dispatch of energy as well as reducing the required reserve margins that would be required of individual utilities. Market participants report their load forecasts to the market operator and bid their generation resources into the market, which then optimizes the available resources for the benefit of all market participants. Each member, however, is responsible for ensuring that it has sufficient resources to serve its individual load. For example, in the Southwest Power Pool (SPP) load serving entities (which SPP refers to as "load-responsible entities" or "LREs") are responsible for ensuring that they have access to enough generating capacity to meet their load obligations, including a planning reserve margin sufficient to cover peak demand. LREs satisfy this requirement by identifying their owned resources in a submission required under the SPP tariff or by procuring capacity through bilateral contracts. If an LRE fails to meet its resource adequacy requirements, SPP will charge a deficiency payment based on the shortfall. SPP is also developing accreditation policies for wind, solar and storage resources which will go into effect in 2023.

Resource adequacy is addressed through a regional market, not a state regulator.

[9] As a result of the passage of S.B. 19-236, Tri-State is also required to submit an IRP to the Colorado PUC.

[10] See Rev. Code Wash., 19.280.040.

[11] The draft tariff can be found at www.westernpowerpool.org/private-media/documents/2022-07-14_WPP_WRAP_Tariff_-_DRAFT.pdf.

While several utilities in Colorado are participating in Southwest Power Pools Markets Plus (Markets +), which allows utilities to access the day-ahead market and real-time unit commitment and dispatch, Markets + is not a fully integrated RTO. This energy imbalance market allows participants to purchase energy to meet periodic shortfalls in generation and to sell excess energy on an optimized basis but does not solve for systemic resource inadequacies. As discussed below, pursuant to S.B. 21-072 adopted by the General Assembly in 2021, Colorado is expected to enter an organized wholesale market on or before January 1, 2030, although it is far from certain how such a market will look even if this deadline is met.

RESOURCE ADEQUACY IN COLORADO

ELECTRIC SUPPLY FOR COLORADO'S ELECTRIC COOPERATIVES

As member-owned utilities, Colorado's electric cooperatives are not subject to PUC jurisdiction or oversight regarding resource adequacy.[12] **Decisions regarding resources used to serve the electric requirements of Colorado's cooperatives are made by the boards of directors of those cooperatives, which in turn are directly answerable to the consumer-members they serve.** Cooperative boards and their staffs thoroughly vet power supply options available to serve the requirements of their consumer-members, and cooperatives have compiled an impressive historic record of reliable and sustainable energy supply. Having said that, the vast majority of Colorado's electric distribution cooperatives currently receive all or a substantial part of their wholesale electric requirements from Tri-State or PSCo, both of which are required to submit IRPs to the Colorado PUC for approval. The IRP filings incorporate load forecasts for the cooperatives served by these wholesale suppliers, and demonstrate the adequacy of existing and planned resources to serve those loads.

Tri-State supplies all or a substantial portion of the electric requirements of 17 Colorado electric distribution cooperatives. Under Tri-State's current wholesale power supply agreement, its electric cooperative members may self-supply up to 5 percent of their electric requirements. There is currently a proceeding pending before the FERC[13] to alter Tri-State's membership agreement to allow members to take less than their full requirements, and several Colorado cooperatives have indicated interest in this arrangement. Other cooperatives are considering alternative power supply arrangements or supplying their own electric requirements in whole or in part. The source of this electric supply will likely be through power supply agreements with third-party power producers or power marketers, self-generation, or some combination thereof.

Four Colorado cooperatives currently receive all or a substantial portion of their wholesale electric requirements from PSCo. Two of these cooperatives self-supply a substantial portion of their electric requirements from renewable resources and fractional ownership in the output of PSCo's Comanche Unit 3 generation station. One cooperative has given notice that it will terminate its power supply agreement with PSCo by the end of 2025. Thus, these PSCo wholesale customers will be developing their own power supply portfolios in the next few years as well.

Finally, one Colorado cooperative has already terminated its membership with Tri-State and is receiving its wholesale power supply from a third-party power marketer, Guzman Energy, and from renewable energy resources.

RESOURCE ADEQUACY CONCERNS IN COLORADO

Colorado's elected officials have been focusing on reducing greenhouse gas emissions; incentivizing electrification of the built environment and transportation sector; and directing Colorado's utilities to enter a regional transmission organization by 2030.[14] In accordance with these policies, Colorado's electric utilities have committed to the early closure of coal plants which will result in an 80 percent reduction in greenhouse gas (GHG) emissions from the utility sector by 2030.[15] In turn, Colorado's utilities are bringing online more renewable energy and variable energy resources to offset the loss of energy production in Colorado, as coal power plant closures have been codified in Air Quality Control Commission rulemaking. The top priority of Colorado's electric cooperatives is to maintain reliability and affordability for their consumer-members.

[12] In 1983, the General Assembly adopted a statute permitting electric cooperatives to opt out of PUC jurisdiction, finding that cooperatives are "regulated by the member-consumers themselves acting though an elected governing body" and, therefore, regulation by the PUC is "neither necessary nor cost effective." C.R.S. § 40-9.5-101.

[13] Although electric cooperatives are generally not subject to FERC jurisdiction, Tri-State amended its bylaws to admit non-cooperative members in 2019 and filed tariffs for approval by FERC. There are several pending legal proceedings challenging FERC's jurisdiction over Tri-State; however, as of this date FERC continues to exercise jurisdiction over Tri-State.

[14] "Senate Bill 21-072- Public Utilities Commission Modernize Electric Transmission Infrastructure" June 2021. https://leg.colorado.gov/bills/sb21-072

[15] "Colorado Green House Gas Pollution Reduction Roadmap" Colorado Energy Office, January 2021. https://energyoffice.colorado.gov/climate-energy/ghg-pollution-reduction-roadmap

Given these changes, resource adequacy is becoming more difficult to determine in the West as new technologies come online and as the grid transitions to more high-variable renewable energy. As Derek Stenclik writes in his article, *Five Principles of Resource Adequacy for Modern Power Systems,*

> The answer lies in resource adequacy analysis—a form of grid planning that ensures that grid operators have the resources available to balance supply and demand—taking into account uncertainties like unexpected generator outages, fluctuating load, and changes in the weather, which are becoming increasingly important. Evaluating these uncertainties statistically, grid planners project resource needs to reach an acceptably low level of risk of capacity shortages.[16]

NERC's 2022 *Summer Reliability Assessment,* an annual report regarding generation resources and transmission system adequacy across the United States and the ability to meet the projected summer peak demand (June-September), notes that the north and central regions of the United States face a capacity shortfall, resulting in high risk of energy emergencies during peak summer conditions. While the NERC assessment shows that the WECC, which Colorado participates in, has a slightly better outlook, there is still an elevated risk of not being about to meet customer demand.[17]

Further, WECC's December 2021 Analysis of Resource Adequacy states: "As early as 2025, all subregions will be unable to maintain 99.98% reliability because they will not be able to reduce the hours at risk for loss of load enough, even if they build all planned resource additions and import power."[18] The report highlights other significant issues leading to resource adequacy issues including an increase of variability of renewable energy production with a decrease in dispatchable base load from coal or natural gas power plants, complexities and regulatory hurdles relating to interconnection rules, and a lack of adequate transmission capacity. These factors are not unique to Colorado but are common across the utility sector and United States.

Resource adequacy is gaining more attention from regulators and the Colorado General Assembly. In May 2022, the Colorado PUC hosted a Commissioners' Informational Meeting on short-term resource adequacy concerns, and in August 2022 the PUC opened an investigatory docket to address short term resource adequacy concerns.[19] In addition, in the 2022 legislative session, a bill to require reporting by load serving entities regarding resource adequacy was discussed. Although that proposal did not garner sufficient support for late bill status and was not introduced, it is likely that resource adequacy will be addressed in future legislative sessions.

CONCLUSION

There is no dispute that resource adequacy is a significant concern for electric utilities and the customers they serve. However, Colorado's electric cooperatives have proven over the years that they are highly effective in providing reliable and sustainable energy to their consumer-members. The vast majority of Colorado's electric cooperatives currently receive their wholesale electric supply from sources that are already subject to regulatory and industry oversight with respect to resource adequacy.

As discussed above, resource adequacy has garnered substantial attention of late, and there are numerous agencies and entities already studying the issue from various perspectives, including FERC, NERC, WECC, WPP, WRAP and the Colorado PUC. Given the current studies and analyses, there is some question as to whether new resource adequacy legislation is necessary, as at best it would duplicate current efforts, and at worst it may result in conflicting recommendations. Moreover, given the regional nature of resource adequacy concerns, it is questionable whether legislation applicable only to Colorado utilities would result in any meaningful improvements in resource adequacy. **If Colorado were to undertake a resource adequacy program, it could conflict with programs established by an organized wholesale market such as SPP, potentially impeding the goal of RTO integration by 2030. Thus, while resource adequacy is a critical issue, further regulation in this arena should be approached with caution.**

[16] "Five Principles of Resource Adequacy for Modern Power Systems" Derek Stenclik, Energy Systems Integration Group, August 2020. https://www.esig.energy/five-principles-of-resource-adequacy-for-modern-power-systems/

[17] "2022 Summer Reliability Assessment" North American Electric Reliability Corporation, May 2022. https://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/NERC_SRA_2022.pdf

[18] "2021 Western Assessment of Resource Adequacy" Western Electricity Coordinating Council, December 2021 https://www.wecc.org/Administrative/WARA%202021.pdf

[19] PUC Docket No. 22M-0342E.

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