Business & Technology Surveillance

The Value of Cooperative Data

By Emma Stewart, David Pinney, and ADL Ventures

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SUBJECT MATTER EXPERT ON THIS TOPIC

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Introduction

As America's power grid becomes more distributed and digitized, it is increasingly essential to promote and practice decision-making among utilities and other grid stakeholders that is grounded in accurate, complete, and timely data.

The development of data driven decision-support systems to evolve towards a more complex and dynamic electric delivery system will be critical in securely, cost-effectively, safely, and reliably maintaining the supply, demand, and flow of power on tomorrow's grid. Electric co-ops receive hundreds of requests each month to share their data with the U.S. government, research communities, and commercial entities. Utilities also integrate products which require data sharing with commercial entities of all kinds, including demand response (DR) via smart thermostat platforms like Google's Nest, as well as have the need and desire to share with advanced operational cyber security monitoring and response organizations, like the Electricity Information Sharing and Analysis Center (E-ISAC). Some of these technologies and institutions also require either anonymous or referenced data sharing with other entities, such as aggregators or the federal government.

Smart Demand Response is one example where this can be both a benefit and a challenge. In Texas and Colorado, many consumers were provided free smart thermostats in exchange for agreeing to provide data and control to their utility during emergency conditions.[1] Those conditions have occurred frequently in the past year—indeed, billion-dollar weather and climate disasters continue to rise each year, according to NOAA[2]—and many customers were surprised they had agreed to share both control and their data with the DR administrator.

1 https://www.denver7.com/news/contact-denver7/thousands-of-xcel-customers-locked-out-of-thermostats-during-energy-emergency

2 https://www.aoml.noaa.gov/extreme-weather

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A second example is cybersecurity, and in particular, operational technology (OT)/industrial control system (ICS) monitoring. Many consumers, through both government-funded programs and contracting language, agree to provide their data without fully understanding the ownership model for data. One value stream the receiving entity gets is the use of data for threat intelligence, which in turn is sold back to data providers themselves. While one utility dataset does not (and cannot) create all of this value, the fractional asset that is the dataset is one of the underlying value creators and should be factored into pricing models.

In summary, if data is an asset, there should be a mechanism to monetize it, or at least establish a dollar value for that data, along with a clear set of ownership guidelines. Data anonymization should not draw the ownership boundary, and entities such as utilities should understand the value they provide when agreeing—knowingly or unknowingly—to downstream activities.

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Why This is Worth Solving for Co-ops

Cooperatives are in a unique situation to having both the benefits and drawbacks of being relatively small for the industry. With small size comes the need to be agile and efficient, something at which cooperatives are proficient. Advancements in grid and system technology present opportunities to find data rich options that support economies and operational improvements. Co-ops, like all utilities, are becoming increasingly reliant on a data intensive business model. However, small size also can be a hindrance to research and industry partnerships that would create value opportunities from that data.

While co-ops are known for being agile and innovative in the right conditions—they also boast a much higher advanced metering infrastructure (AMI) "smart meter" deployment rate (78%) than the rest of the industry (63%)—co-ops *individually* are often too small and lean to fund meaningful internal R&D or to warrant attention from leading third-party technology vendors, limiting their ability to modernize and optimize their operations. As a leading grid analytics startup said: *"We are absolutely looking for ways to get plugged into the co-op ecosystem... [but] have not taken the time to explore many of them individually, just given their size."*

Yet, rural co-ops tend to run relatively lean, economically efficient operations. For example, co-ops generally must construct and maintain more line-miles per customer, raising their maintenance costs and subsequently cost of service. Other utilities collect four times as much revenue per line-mile as co-ops[3]. This necessitates efficient and effective asset management programs, optimizing inspections and maintenance with the rising cost of materials and truck rolls alike. Digitization and the resulting real-time visibility into grid conditions is becoming more and more necessary for serving power safely, reliably, and cost-effectively.

Meanwhile, energy delivery overall is faced with a disruptive grid transformation which is poised to shift the "balance of power"—so to speak. Co-op territories, as many are rural, tend to have more distributed energy resource potential (e.g., sunlight area) per customer, raising the potential share of distributed generation capacity. As a result, rural co-ops could see substantial shifts in net load as solar and other DER installations are commissioned, EVs are plugged in, homes electrify (but also become more energy-efficient), and other relevant trends continue. As the flow of electricity shifts away from the simple power-plant-to-consumer model and towards a complex system of "prosumers", the role of the utility must evolve accordingly—and only new, data-intensive business models can help support a healthy and nimble grid through such transitions.

These conditions lead to a need to rapidly consider other assets in the future digitized space, potentially even more rapidly than investor-owned utilities. This article proposes valuation of data as an asset to empower co-ops in both for current and future efforts as they expand their ability to operate in a more digital energy world.

3 Co-op Facts and Figures: **https://resources.uwcc.wisc.edu/Utilities/NCS-2815_Co-op-Facts-and-Figures.pdf**

Use Cases & Valuation

Monetization of data describes the process by which an entity (i.e., an electric co-op) integrates, manages, and presents analytics from data to improve business intelligence, applications, and asset management.

Asset valuation is widely practiced in the utility industry, but data driven asset maintenance—i.e., utilizing data streams to create valuable efficiencies in operations and repair—is a newer practice. Valuing that data and the societal surplus borne from utilization of the data is one method by which the industry could provide resources. While that may not improve utilities' profit margins, data is undeniably a value stream capitalized upon by many vendors, and it is a worthwhile question whether that value should return to those generating the data, and to what extent, in particular for the electric grid.

In a recent effort, NRECA and ADL Ventures sought to identify and quantify some of the major use cases for better utility data sharing and the value it could provide to the co-op ecosystem. Results of this effort are shown in Figure 1, demonstrating the size of each problem to be solved (in orders of magnitude of dollars on the Y-axis) and the complexity of execution (on the X-axis). The highest impact categories include programs and initiatives for better managing peak load and associated demand charges at both the utility and consumer levels, as well as leveraging data analytics and engineering for predictive maintenance and optimization of grid investments and operations.

The breadth and depth of data collected by approximately 900 electric co-ops represent an immensely valuable resource, but most individual co-ops are typically too small to

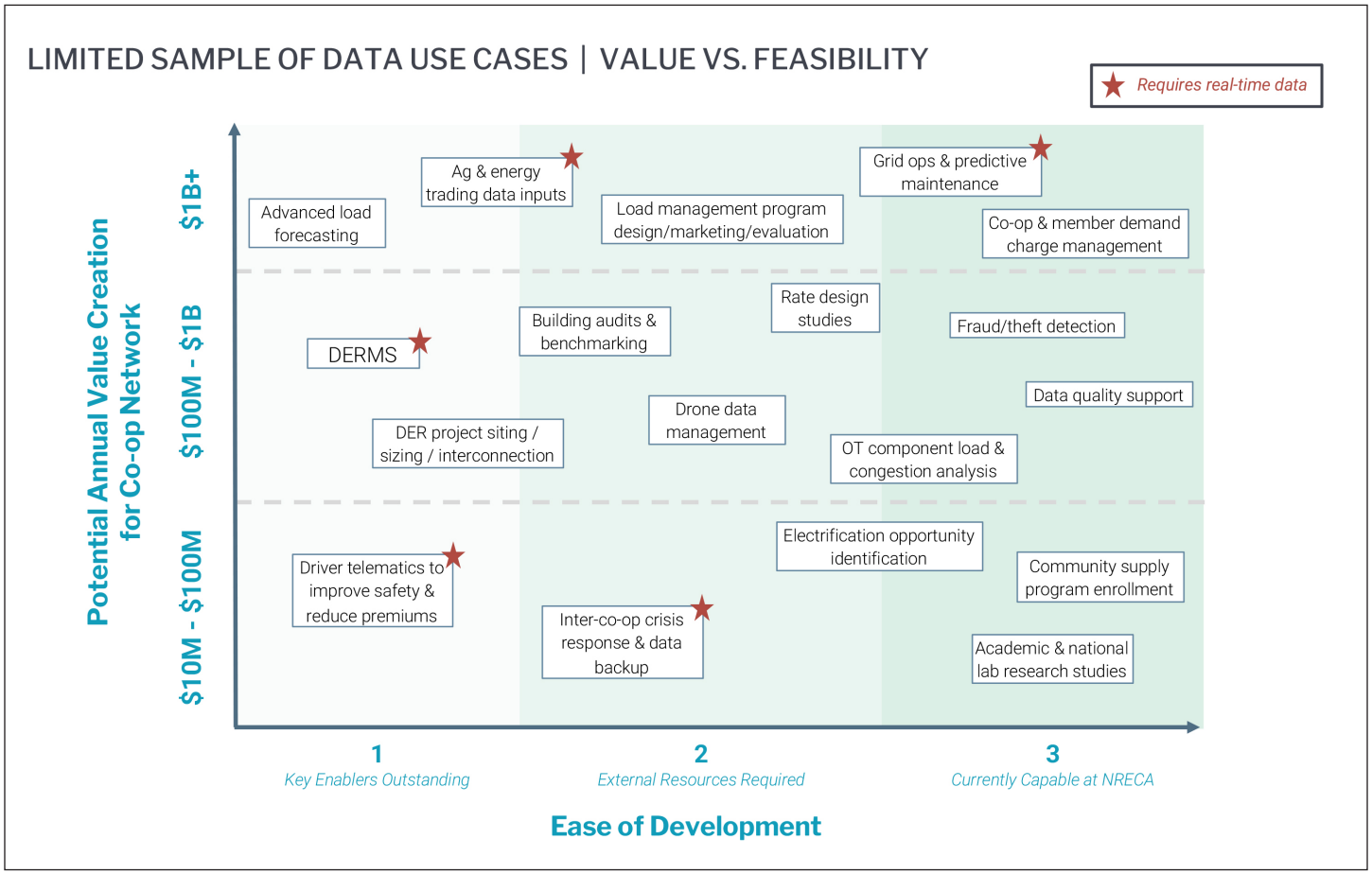

FIGURE 1: Limited Sample of Data Use Cases | Value vs. Feasibilty

be targeted by leading data and analytics service providers. This presents a major barrier in sharing co-op data widely and efficiently with different user groups. One possible solution is the establishment of a common data platform where co-ops can upload their data so that third parties could request data from, for example, all co-ops in a desired state or region. This could amplify data access for all ecosystem users and drastically reduce the overhead required to identify, scope, and analyze projects and services. While direct financial incentive for sharing data may not be optimal in all cases, many value receiving direct analytics, tools, or services.

This concept is illustrated in Figure 2, including data providers (i.e., co-ops) on the left and multiple notable user groups on the right side of the figure. For example, original equipment manufacturers (OEMs) may want access to consumption data to more effectively target consumers for high-efficiency appliances, and energy services companies (ESCOs) may want the data to identify, design, benchmark and evaluate performance of energy efficiency projects or DR programs.

By aggregating and standardizing co-op data and offering simple and secure access to third parties, existing efforts to safely, reliably, and affordably provide sustainable power for all co-op consumer-members can be accelerated and amplified, while also providing additional value back to the co-ops themselves per the business model by which they exist.

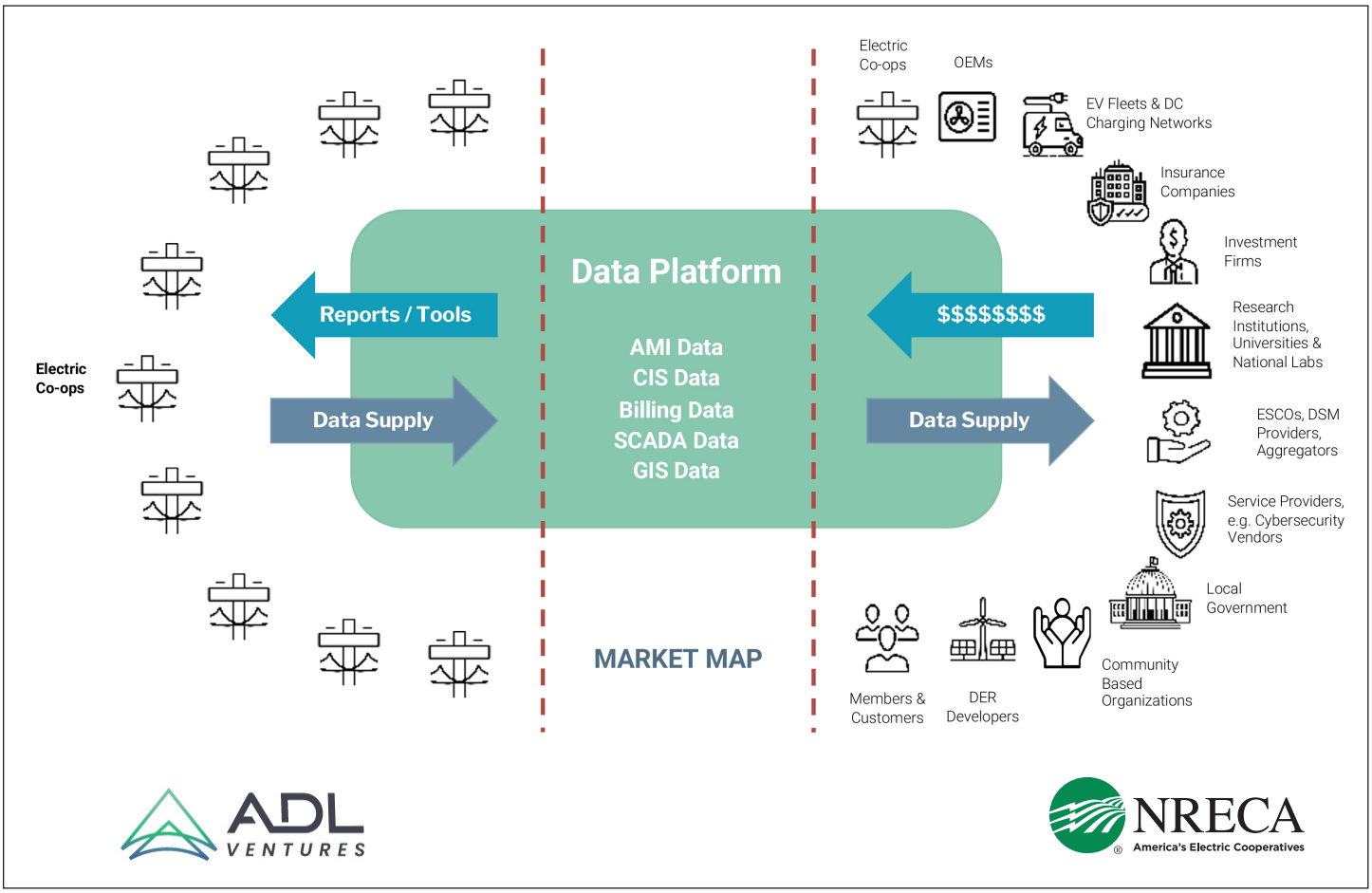

FIGURE 2: Data Platform Amplifies Data Access for All Ecosystem Users

Pricing & Methods for Analysis[4]

While utilities continue to discover new ways to take greater advantage of their own data, sharing this data with third parties is a challenge—and one which, in some cases, is skipped over during contract reviews. UtilityAPI and Arcadia are examples of leading vendors in the utility data platform space, providing customer billing and usage information to approved third parties at scale. These datasets are used for many things including quoting and analyzing the feasibility of DERs, making recommendations on when to perform energy-intensive tasks such as charging EVs, and even simplifying the billing process for energy systems (such as combining the monthly bills for rooftop solar and storage systems).

According to existing sources and buyers of utility data, several factors can influence the price of data. More granular intervals (e.g., hourly vs. daily meter data) tend to fetch a higher price due to the higher number of observations, and thus inherent value; similarly, more frequent refreshes of data (e.g., daily vs. monthly pulls) carry higher price tags due to the more frequent cleaning and delivery of data. In addition, data vendors tend to offer discounts for pre-payments, paid memberships, or larger batches of data due to the reduced administrative burden of vetting, administering, and technically verifying and supporting each data purchase.

As such, pricing the data accessible on a collaborative data platform is a complex and multi-factor decision process, as it depends on how the data will be accessed, how frequently, and in what format. That said, here we present several methods of valuing data, and identify a potential fair market value range for AMI, SCADA, and GIS data. Note that the values presented in Table 1 are per meter-month (including SCADA and GIS data, the volume of which is assumed to correlate roughly with utilities' meter counts).

TABLE 1: Data Valuations (Per Meter Month)

Calculation Method	Description	Data Types	Low	High	Source(s)
UtilityAPI	Priced Meter Interval Data	**Meter**	**$1.60** *Monthly updates* *Paid annually* *20% discount*	**$30.00** *Daily updates* *Paid month-to-month* *No discount*	*Website*
Pecan Street	Priced Meter Interval Data	**Meter**	**$150.00** *15-min intervals*	**$200.00** *Minute intervals*	*Website*
Manual Data Request	Professionals such as real estate agents often call utilities directly for home utility data.	**Meter**	**$6.90** *10-min call*	**$14.00** *20-min call*	*ZipRecruiter* *ADL research* *ADL calculation*
CAC Reduction	Major home product and service offerings, such as SunRun, could reduce their customer acquisition cost (CAC) by targeting customers more effectively based on their load profiles.	**Meter**	**$56.50** *1% CAC reduction*	**$113.00** *2% CAC reduction*	*SunRun 2021 10-K* *ADL interviews* *ADL calculation*
Data Integration	The data integration process performed by service providers can take a software team months to complete.	**Meter** **SCADA** **GIS**	**$1.27** *Small team* *Large co-op*	**$29.00** *Big team* *Small co-op*	*Payscale.com* *ADL interviews* *ADL calculation*
GLOBAL MINIMUM & MAXIMUM			**$1.27**	**$200**	

4 Disclosure: Data valuations are provided as examples only. NRECA is not endorsing any particular valuation and is not suggesting the provided valuations are appropriate for every cooperative. Electric cooperatives are: (1) independent entities; (2) governed by independent boards of directors; and (3) affected by different member, financial, legal, political, policy, operational, and other considerations. For these reasons, each electric cooperative should make its own business decisions on whether and how to use this information and on what valuations are appropriate for that cooperative's own circumstances.

It should be noted that some observations were omitted, including data priced as high as $1,000 per meter-month[5] for per-second interval meter data. Such granularity is rare, and therefore, we avoid letting it skew the price range; at the same time, these granular data sets are expected to become more common and important as technologies like load disaggregation become more widely practiced.

Beyond meter data, co-ops collect more labor-intensive data sets, such as GIS models, as well as more novel sensor data, such as LiDAR point clouds captured from drones. Most of the use cases previously discussed require combining meter data with other sources like GIS. The table presented on the previous page of this article should be considered a conservative, lower-bound estimation for pricing today's typical meter data.

Valuing the dataset as a whole presents a different set of considerations, as data tends to be discounted when acquired in bulk (as opposed to one-off purchases) or purchased by vetted and paying subscribers. One rough estimate (using a reasonable lower bound of $3 per meter, and average of 30,000 meters per co-op, multiplied by 12 months, and including the approximately 900 distribution co-ops), broadly values bulk-loaded co-op meter data alone at roughly $1 billion per year.

Commercial costs for real-time data feeds imply a value up to ten times higher, while a bulk offering for active subscribers would likely be heavily discounted. This discussion illustrates how and why the actual commercial transactions could be structured quite differently across users and use cases, affecting the true aggregate value of the data.

Privacy Needs

In order to share data successfully, a robust understanding of lawful data access and privacy protections for consumers, end users, and customers is critical. In the U.S., data ownership and privacy are controlled by a patchwork of laws, regulations and agreements, which largely serve to protect consumers' personal information. Data "ownership" and "privacy" often overlap in principle, but should be considered separate features for this review.

In 2011, industry leaders—including the Department of Energy (DOE), the National Institute of Standards and Technology (NIST) and the White House Office of Science and Technology Policy (OSTP)—developed a standard set of best practices for the utility industry. The result was The North American Energy Standards Board (NAESB) Energy Services Provider Interface (ESPI) *Model Business Practices*.[6] Related to these data privacy efforts, various states have taken action to enact privacy laws as demonstrated in Figure 3.

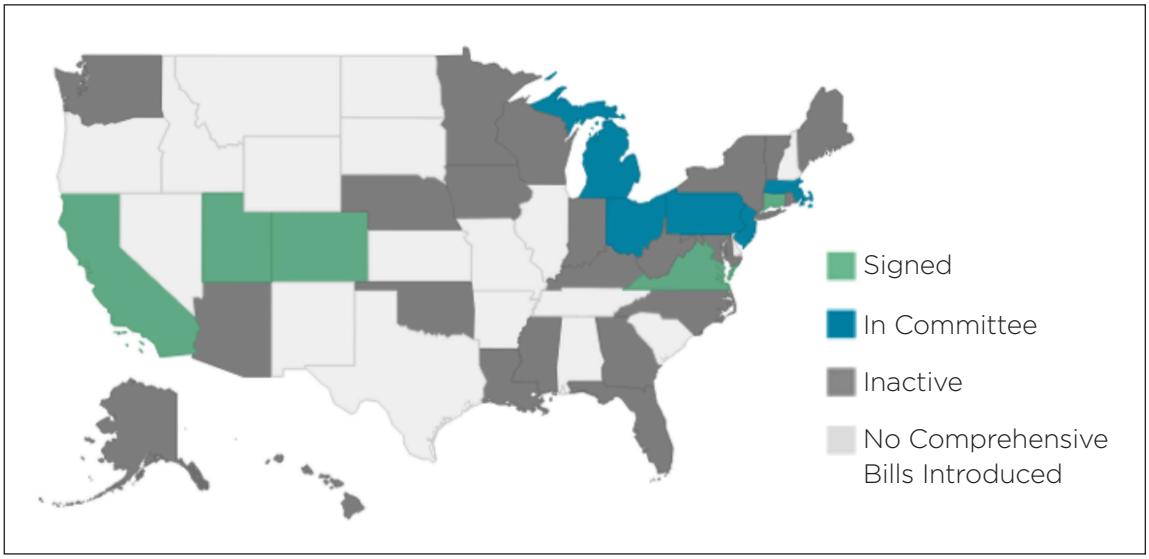

FIGURE 3: U.S. State Privacy Legislation—2022. Source: IAPP

5 https://www.pecanstreet.org/dataport/licenses/

6 https://www.naesb.org/ESPI_Standards.asp

Model Business Practices led to the creation of Green Button's Connect My Data (CMD)[7], which is now an industry standard for enabling easy access to and secure sharing of energy and water customer usage data. CMD is an open-data standard designed to unlock access to utility interval usage and billing data—providing easy, seamless access for software and manual applications. The CMD, importantly, still requires customer consent.

Some states have enacted privacy standards for utilities that help ensure customer anonymity when energy data is released to third parties in the absence of customer consent. Originated in California, one oft-cited standard is referred to as the "15/15 Rule." This standard requires that each data point be aggregated across a minimum of 15 customers, with no one customer's load exceeding 15% of the total observation. The 15/15 Rule defined by the Illinois Commerce Commission (ICC) applies only to the access of anonymous, distinct energy use data.[8]

The electric co-op community may want to unlock the substantial value of co-op data, with cautious contracting with third parties and ensuring the value accrues to co-ops and their consumers.

Other states have specified different aggregation thresholds: ComEd and other Illinois utilities continue to provide data using a 4/80 Rule, meaning that utilities can sum energy data from a minimum of four customers, as long as no one customer's load exceeds 80% of each observation (a less stringent standard than the 15/15 Rule). This rule still ensures customer privacy while reducing the 15-account minimum, which prevents benchmarking the large share of multi-family buildings that have fewer than 15 tenants.

Each data sharing entity must secure, produce, gain approval for, publish, and abide by their own privacy policy regardless of their data-sharing practices and governing regulations. We further encourage co-ops to perform periodic privacy audits to help establish if their policies are sound and effective, and that all users of their data are known and authorized.

As mentioned earlier, there is also a need for consumers to understand the commitment that they are making to sharing their data when they enroll in utility programs, such as Smart Demand Response. For maintaining consumer relations and avoiding negative feedback on such programs, the original contract and program collateral materials should specify the data that will be collected, with whom and the circumstances in which it will be shared, and the purpose of the data use. As many such programs are only activated with a trigger events, such as storms or high energy use seasons, consumers may forget their original commitment due to being 'out of sight; out of mind.' Reminders and consumer support for questions can help to alleviate consumer concerns and instill trust in the ways cooperatives are protecting consumer data with privacy policies.

Conclusion

This article presents several considerations around utility data valuation, offers methods of valuing said data, and seeks to encourage co-ops and other utilities to more critically examine the value of their data—and who reaps those benefits. As the grid changes and its operation becomes more complex and digitized, utilities could get squeezed by third parties if they fail to retain control over who accesses, utilizes, and sells their data in the market.

Some third parties offering data-intensive services, including DR administrators, offer real and substantial value to their utility partners. That said, when contracting with third parties, utilities should remain cautious about who is authorized to use their data and what they are allowed to do with it. This includes considerations around both data privacy and data ownership.

Based on an estimated commercial price tag of $1 billion per year, electric co-op data has substantial value and the co-op community may want to seek to not only unlock that value but, in the process, ensure that the value of that data accrues primarily to co-ops and their consumers.

7 **https://www.greenbuttondata.org/cmd.html**

8 **https://www.elevatenp.org/wp-content/uploads/1515-Rule-Factsheet-FINAL.pdf**

As noted, there are legal considerations to monetizing utility data. Co-ops are encouraged to work with legal counsel to determine the legal considerations applicable to the co-op's circumstances. Co-ops are also encouraged to work with a tax professional regarding potential tax implications to receiving income from data sales.

Finally, this article is intended to describe a potential future business model that NRECA is actively researching. We welcome the opportunity to engage with co-ops and other third parties interested in discussing the observations and ideas presented in this paper. Those interested, please contact Emma Stewart, NRECA Chief Scientist, at **Emma.Stewart@nreca.coop**.

Additional information on cooperative data and analytics topics being researched by NRECA may be found on **https://www.cooperative.com**. ■

ABOUT THE AUTHORS

Emma Stewart is the Chief Scientist of the National Rural Electric Cooperative Association. She oversees the broad federal research portfolio and personally leads a number of projects, including cybersecurity, distributed resource integration, data analytics and advanced microgrid architecture. Emma's current focus is implementation of cybersecurity for operational networks, restoration and resilience in a distributed and decentralized environment. She holds a Ph.D. in Electrical Engineering from the University of Strathclyde and close to two decades of experience in the industry, having led research teams at two national laboratories, and as a consulting engineer.

David Pinney is NRECA's Principal for Analytical Tools & Software Products within the Business and Technology Strategies department, and lead of the Analytics, Resiliency and Reliability work group. He designs and builds mathematical models of grid technology with an emphasis on cost-effectiveness of smart grid investments. Prior to joining NRECA, David led consulting engagements for software and data mining company MicroStrategy and built biological models at the UCLA Institute for Pure and Applied Mathematics. David holds a degree in mathematics from Cornell University.

ADL Ventures focuses on developing and deploying new services and products on behalf of legacy-sector corporations. The firm is described as a do-tank, not a think-tank, and its deliverables as outcomes instead of reports. The ADL team has start-up and venture fund experience. Collectively the team has cross-cutting experience spanning key sectors such as start-ups, major corporations, professional services (investment banking/consulting/PE/VC), and public sector work.

QUESTIONS OR COMMENTS

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- To find more resources on business and technology issues for cooperatives, visit our **website**.

ANALYTICS, RESILIENCY AND RELIABILITY WORKGROUP

The Analytics, Resiliency and Reliability (ARR) Work Group, part of NRECA's Business and Technology Strategies department, is focused on on current and future data and research required to provide prompt technical and economic support to the NRECA membership. Specifically focused toward the electric co-op community, ARR products and services include: development and maintenance of a portfolio of energy analytics products and services; collection and analysis of data; and provision of additional products and services in the areas of the data collection, IT architecture, sensors, and energy markets. For more information, please visit **www.cooperative.com**, and for the current work by the Business and Technology Strategies department of NRECA, please see our **Portfolio**.

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