PERSPECTIVES ON TRANSFORMING UTILITY BUSINESS MODELS

Toward Net Zero

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The energy system is in the early stages of a profound transformation on its journey to a decarbonized future. Energy utilities will play a key role in ensuring that good climate, economic and social outcomes are achieved as this journey progresses. The future may see the boundaries of the utility redrawn, innovative technologies deployed, new players delivering new services, and the competitive landscape altered. In this context, one key area that utilities must consider is the impact on current business models and how these may change as they respond to the challenges and opportunities that the transformation presents.

POSSIBLE FUTURES

The Electric Power Research Institute (EPRI) recently completed a project exploring future utility business models by reviewing the landscape and identifying potential future scenarios. It published its findings – Towards Net Zero: The Evolving Utility Business Model and Possible Future Scenarios (epri.com) – with the objective of enabling discussion and debate between utilities and other stakeholders. In addition, EPRI has convened a utility business model interest group to share perspectives on emerging business model themes.[1]

The future scenarios that could unfold acknowledge that utilities will not be immune to the impact of change; in fact, they can play a critical and central role in delivering it. The nature and pace of change will be driven by several competing and complementary factors, meaning that utilities will have choices and can engage actively so that their future is shaped by design, not by accident or omission.

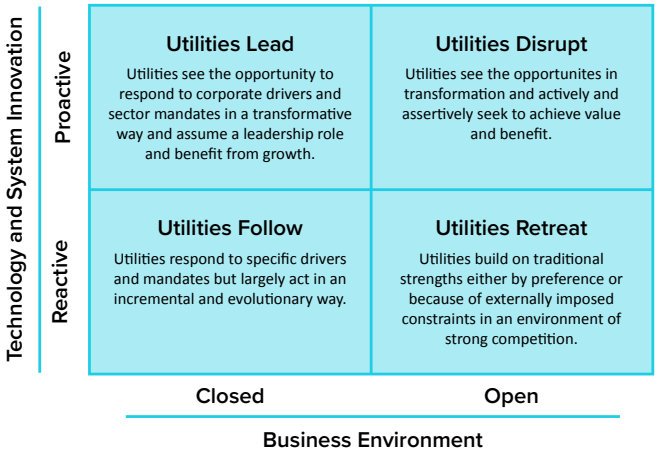

Figure 1. *Possible future scenarios for utilities*

Possible futures for utilities from the first phase of this work are illustrated in Figure 1.

It is likely that individual utilities will see aspects of more than one of these scenarios in their business or will find that they migrate from one to another over time and in response to a changing environment. This presents not only threats but also opportunities for those willing to pursue them.

New ways of working might be needed. This means looking beyond the traditional boundaries of the business or relying

1 A portfolio has been undertaken by the Utility Business Model (UBM) Working Group. In 2020, four organizations joined to sponsor the UBM Working Group—The Smart Electric Power Alliance, EPRI, Gridwise Alliance, and Grid Forward (The Working Group Collaborative). The group is attended by utility members across the world and holds monthly virtual sessions to discuss important energy innovations that have demonstrated the potential for success in integrating new technology into utility operational processes, planning, and designing a model for prudent investment, enabling revenue generation, and meeting policy directives for new utility constructs.

on traditional business models. Utilities will be required to provide services and resources that ensure the availability of energy even where markets, competition, regulation, technology, and customer choice put pressure on revenue streams. There are lessons that can be taken from other sectors, such as telecommunications, where optimization of markets for consumers through extensive competition has led to a significant reforming of the value chain.

Understanding something of the landscape and how utilities might frame their response leads to further questions about important aspects of business models and how they might change. These questions address ways in which utilities can ensure their sustainability and ongoing contribution to the communities they serve. They suggest the need to undertake review of strategic purpose, direction, and aspirations; their resources to deliver their preferred strategy; the environment in which they operate; and their ability to effect change. Current offerings might be sustainable, but they need to be placed in the context of the changing environment. Utilities can decide what role they want to play and what markets they want to serve and focus on, and, if appropriate, develop new offerings that could displace or enhance existing ones.

DRIVERS AND INFLUENCES

There are some key drivers which are important as utilities look forward and which frame consideration of future business models:

- **Decarbonization** to contribute to the deep reduction of greenhouse gas emissions as expressed in political and social commitments, not only in the energy system but in sectors coupled to it, such as heating and transportation.
- **Energy security** considering geopolitical uncertainty and potential vulnerabilities due to dependencies on primary fuel sources and critical international supply chains.
- **Reliability and resilience** of energy supply in the face of increased economic and societal dependence on energy and the increasing risks arising from climate change.
- **Technology**-enabled opportunities to provide new services and reduce costs, particularly opportunities arising from digitalization.
- **Consumer and citizen expectations** that are reflected in affordability and availability of energy for all and supported by a desire for high-quality customer service.
- **Finance and investment requirements** to achieve revenues and profits that can sustain viable returns in an uncertain and complex environment.
- **Policy and regulation** that interpret global, national, and local interests and set the direction, framing, and rules that describe the transformation that is expected and establishes the context for change.

In addition to these key drivers, other highly influential factors might guide the nature and pace of energy sector transformation:

- Transformation of the energy system to a decarbonized future should be fair and equitable; no one should be excluded or left behind. This requires an understanding of diverse needs and a commitment from all stakeholders to the **principle of a just transition**.
- The impact of decarbonization is not limited to reduction in greenhouse gas emissions; there are also **significant co-benefits** that can be achieved if interventions are well executed. These benefits are particularly valued by citizens and governments, for example improved air quality.
- Transformation of the energy system is seen as a **source of economic growth**. The benefits can be measured in both economic and social terms as jobs are created and communities grow and prosper.
- **Energy price increases and volatility arising from geopolitical dependencies and dynamics** are creating demand for change in the energy system and exerting strong influence over thinking on transformation. This emphasizes the matters of affordability and security of supply and could affect risk-based choices.
- **Social awareness** of energy and energy transformation will grow. Consumers and individuals might demand action and reflect this in their political capacity.
- Increasing awareness that energy strategy needs to be based on **whole system thinking** which accommodates interdependencies between related sectors and maximizes opportunities arising from synergetic interactions between energy vectors.

Utilities should explicitly account for these drivers and influences in establishing their view of future purpose and direction.

PERSPECTIVES TO INFORM PROGRESS

EPRI recognizes that it is vitally important to get business models right. Technology cannot effect needed change on its own; neither can policy or regulation. It must be possible for utilities to build sustainable financial structures that enable customers to be well served and investors and shareholders to receive a fair return. The original EPRI report provides a foundation for looking further at aspects of utility business models that could be helpful in illuminating opportunities and enabling and encouraging discussion amongst key stakeholders aimed at achieving shared objectives. In doing this, it is important to look across the whole energy system and consider aspects such as the implications of the electrification of transport and heating, the role of flexibility, the materiality of consumer owned generation, the impact of efficiency measures and the value of digitalization amongst others.

EPRI will explore twelve perspectives on energy system transformation and the relationship with business models. These will be organized around four themes, with each topic being considered as appropriate in a whole energy system context and focusing on a central question. They will be presented in twelve briefing papers to be published over the next 12 months. Each will consider a specific topic, but all will share the objective of being informative for those charged with making change happen effectively and/or helping utilities develop their corporate strategy.

BUSINESS MODEL DEVELOPMENT

- **Multi-Vector Business Models** – Energy is increasingly seen as an integrated system, with delivery of energy through electricity, natural gas and a number of liquid fuels. The interaction between these vectors is becoming more complex and each currently has its their own business models. As these vectors become more integrated, business models may align further, what opportunities are created through these multi-vector interactions and dependencies?
- **Information Inputs for Decision Making** – Good decision making depends on having access to good information at the right time, and on information flowing between key stakeholders on a timely basis. There is a broad spectrum of different information sources that could inform business model development; such sources could provide for example, information on customer trends, political winds, societal goals, technology development, financial markets, competitor activity, regulatory pressures and geopolitical direction. These all come with uncertainty and the challenge is to account for those uncertainties and extract usable insights. Learning techniques from AI and ML may be able to help by reviewing past trends, analyzing uncertainties and predicting future potential. What approach is best suited to ensuring that decision making is well supported by the right information?
- **Horizon Scanning and Forecasting** – Good insights into future opportunities and the associated benefits and risks depend on being well-informed on a sustained basis. This requires use of different approaches to keep a watching brief on sources of disruption, including where to look, how often to look, what to use tools for assessment and how to gauge potential levels of impact. Particularly given the required scale and pace of energy transition from fossil fuels to renewables and carbon-free sources of energy, and current uncertainty over the ultimate destination of alternative transition pathways and which will ultimately prevail, horizon scanning will become an increasingly important 'front-end' to scenario modelling, forecasting, strategic planning, and the ability of utilities to be agile in responding to emerging threats and opportunities. What horizon scanning and forecasting techniques are needed and how are these best applied?

BUSINESS MODEL CASE STUDIES

- **Telecoms Sector** – The telecommunications sector offers a strong example of transformational change. Key aspects of how business models in the telecoms sector have evolved over the past 20 years in the face of significant technology disruption from deregulation, new technologies, new customer demands, competition, and new entrants many provide helpful insight that will inform thinking on achieving success and avoiding failure. Going forward, the changing geopolitical landscape will give rise to uncertainties around the supply chain for an increasingly digitally enabled energy system and a consequent need for built-in cyber-security. What can be learnt from the telecoms sector that could be helpful in energy utility business model development?
- **Adjacent Sectors** – Some new technologies have created 'mini-sectors' within the energy sector in which new business models have evolved. Examples of this

include offshore networks in Europe, large scale energy storage for system stability, and EV charging infrastructure. Energy communities based on distributed onshore wind and solar PV generation are emerging, supported by local community shareholders, and encouraged by the prospect of lower energy charges and benefits from providing system balancing and ancillary services. Some regions have taken a highly competitive approach to these new sectors whilst others have taken a more hybrid approach. There are several alternative business models that are in operation for these new energy sector developments, each offering benefits and risks. How might these alternative business models be applied to good effect?

- **Britain's RIIO Regulatory Mode** – When introduced 10 years ago, the RIIO model was hailed as a paradigm shift in regulatory strategy by focusing away from a utility's cost base towards measured delivery and incentivization of network performance, customer service and good asset stewardship, and shared cost savings delivered through innovation. RIIO has delivered some key benefits but there are areas where expectations have not been met and questions over whether the framework will deliver the anticipated need for infrastructure investment to support decarbonization of energy supply and usage. How can the direction of RIIO's evolution inform or be informed by the relationship with business models that utilities can develop?

BUSINESS MODELS FOR INNOVATION

- **Innovation Models** – Innovation can be pursued in a number of ways: speculatively, business case driven, in response to corporate responsibility requirements, regulation driven and/or to meet a policy directive. Many models are in operation, each with its own strengths and weakness. There is value in exploring what examples have emerged that have sought to align innovation priorities with national and business strategic objectives, whilst also ensuring a balanced innovation portfolio of high-risk/high-reward and low risk/low reward projects across a spectrum of technology-readiness levels, from proof of concept to a system proven in an operational environment. How might innovation strategies be developed to respond to a changing landscape and reflect the needs of system transformation?
- **Trials, Demonstrators and Pathfinders** – The real test of innovation is putting it into practice in a live environment. This might be a new technology or a new experimental business model. This can often be difficult in the energy sector due to regularity limitations, funding constraints, security concerns, risk avoidance, prohibitive cost and misaligned incentives. A critical stage in the process is for new technologies and innovations to be commercialized and deployed at scale, which generally requires significant funding to achieve commercialization and/or changes in business processes. What is the role of business models in supporting trailing activity, and subsequently incorporating the learning in the deployment of new technologies and in embedding new processes as 'business as usual'?

BUSINESS MODELS THAT ALIGN WITH CUSTOMER AND POLICY DRIVERS

- **Customer Driven Models** – Increasingly pressure is being applied to place the customer at the center of the energy system, as a result both of competition and/or regulatory incentives and as part of the energy transition where facilitating customer interaction with the energy system is growing in importance. Business models are not typically orientated around this premise and tend to be traditionally supply or system driven rather than service or decarbonization driven. What changes would be needed to achieve the required reorientation and how would the traditional business model be affected?
- **Business Models for Resilience** – Resilience is becoming a more valued component in the energy system in the face of extreme weather events, more system participants, greater cyber security concerns, volatility in supply chains and more complex interactions and dependencies. Business models are yet to adapt to focusing on delivery of resilience. It is not clear how system resilience needs will be determined given the evolving but uncertain scale and pace of climate change and what value will be placed on system resilience relative to other business drivers for investment? How could business models evolve to address resilience explicitly?
- **Business Models for Net Zero** – Achieving Net Zero challenges the status quo of existing business models and regulatory models which are primarily designed to reward shareholders/owners for customer service and asset stewardship and maintain security and reliability of supply whilst protecting customers from excessive profiteering. Net Zero draws these together adding the need to adopt low carbon technologies and processes in an accelerated way whilst introducing new complex

trade-offs and interdependencies. How will business models evolve and continue to meet current economic and customer service objectives whilst also accommodating the Net Zero goal and supporting its delivery?

- **Just Transition** – Energy equity is often cited as a societal goal; however, it is uncertain if this is truly reflected in how the energy sector operates. Delivering a just transition requires that many questions be answered. What is the correct balance between government social services and utilities having the responsibility to protect vulnerable and fuel-poor customers? What additional, and potentially more effective ways, of protecting customers might there be if utilities had greater responsibilities and/or the necessary scope within their licensed activities? How will customers with lower disposable incomes be supported in making investments that enable them to benefit from improved building thermal efficiency, more efficient appliances, time-of-use tariff incentives, and smart home energy management systems? How will less knowledgeable or intellectually less capable customers be informed and educated regarding the opportunities available to them? Failure to make such provisions might result in benefits being enjoyed by only those with the knowledge and financial means to do so. This is a substantial and complex subject. What are the key features of a just energy transition and how can they be adequately reflected in evolving business models?

The findings presented in each of the papers will be brought together in a summary paper at the end of the series. This summary paper will seek to provide insights that will both support and enable discussion on how to drive success through well-conceived, well-implemented business models that underpin energy system transformation.

About EPRI

Founded in 1972, EPRI is the world's preeminent independent, non-profit energy research and development organization, with offices around the world. EPRI's trusted experts collaborate with more than 450 companies in 45 countries, driving innovation to ensure the public has clean, safe, reliable, affordable, and equitable access to electricity across the globe. Together, we are shaping the future of energy.

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