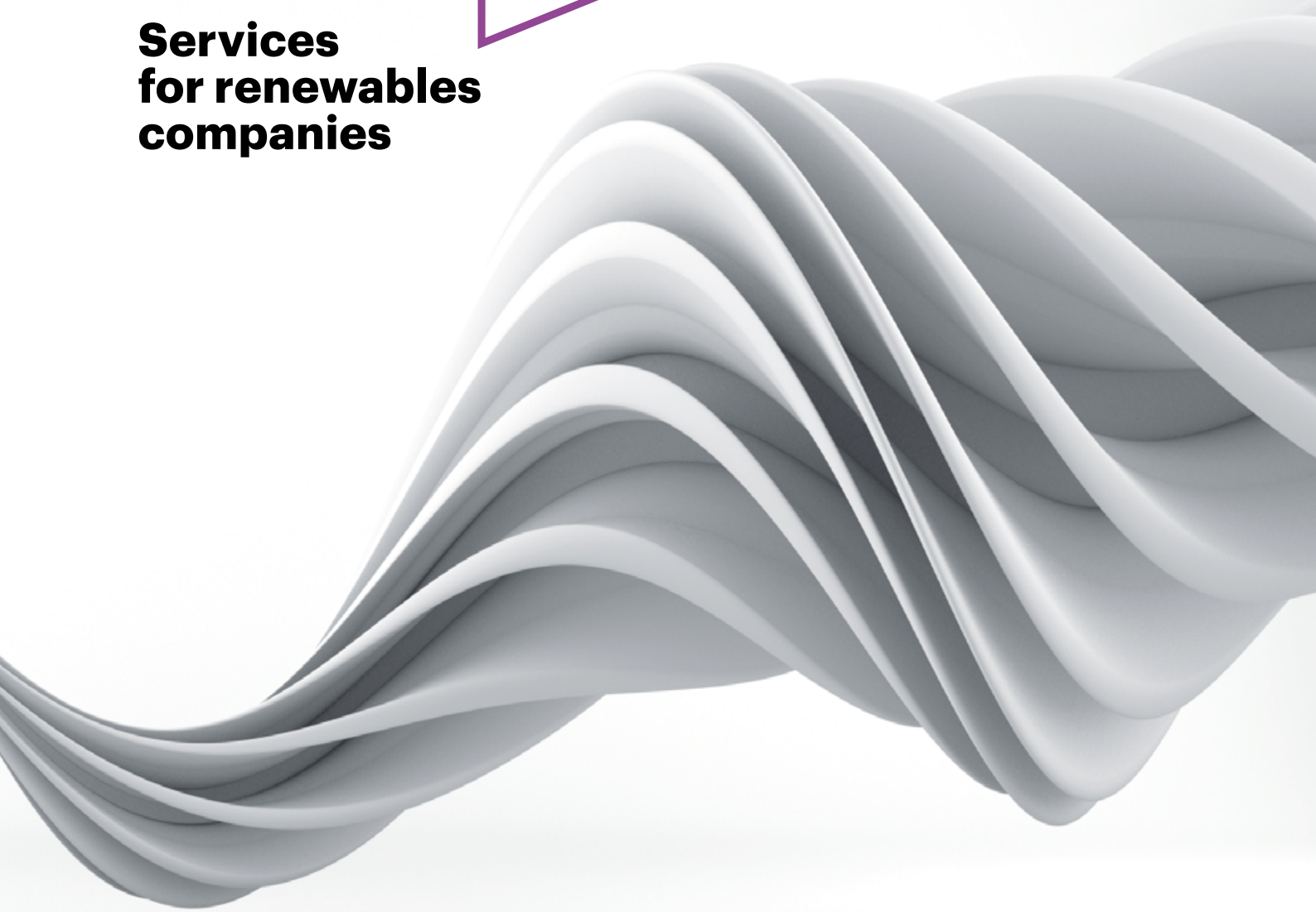
accenture

GENERATING VALUE

Services for renewables companies



RENEWABLES LANDSCAPE

We see the renewables landscape being shaped by five characteristics:

1

DISPATCHABLE

Renewables will become more dispatchable with digital, storage and hybrid plants, offering access to new value opportunities

2

DIGITAL

Digital will continue to drive down the cost of all renewable generation technologies, but in particular, wind O&M and the development and construction of utility-scale solar

3

DIVIDED

The digital divide driving the operational performance gap between the large renewables companies and smaller renewable players will get bigger

4

DIVERSE

Diverse players, including deep-pocketed new entrants, such as oil companies, traders, automotive, and possibly even technology players, will compete with renewable generators for the same value pools

5

DEMAND

Consumer demand for renewables, particularly the increase in renewable power purchase agreements (PPAs) by commercial and industrial (C&I) companies and the aggregation of demand, is changing the way renewable demand is met

1. DISPATCHABLE

Renewables will become more dispatchable with digital, storage and hybrid plants, offering access to new value opportunities

Digital and storage will make renewable generation more dispatchable. A few leading large wind generators are already implementing digital wind hubs that support a portfolio approach and optimization of generation from multiple wind farms to improve production forecasting and better match supply to grid requirements.

When storage is added to wind or solar, we see additional refinement and accuracy of the production forecast to "nowcasting." In one proof-of-concept integrating storage to wind production in the forecasting analytics, we saw up to a 50 percent reduction in error of the short-term production forecast. In the United States, much of the utility-scale solar is now being developed with storage, which helps improve the control of solar output. Many utility-scale batteries next to wind farms currently operate as standalone assets. They share the grid connection and balance of plant activities but are not integrated as a single plant. This will change.

Renewable wind generators with digital platforms will be able to integrate and optimize this storage with their generation assets, as well as combine different renewable technologies with different generation profiles (e.g., wind and solar) into hybrid plants further increasing dispatchability.

Increased control and more dispatchable renewables open up potential additional revenue from grid services that already exists for renewable generators. For example, delivering commitments collectively from multiple wind farms already enables the provision of services such as reactive power, frequency control and grid tripping in some markets. And we expect this opportunity to grow.

2. DIGITAL

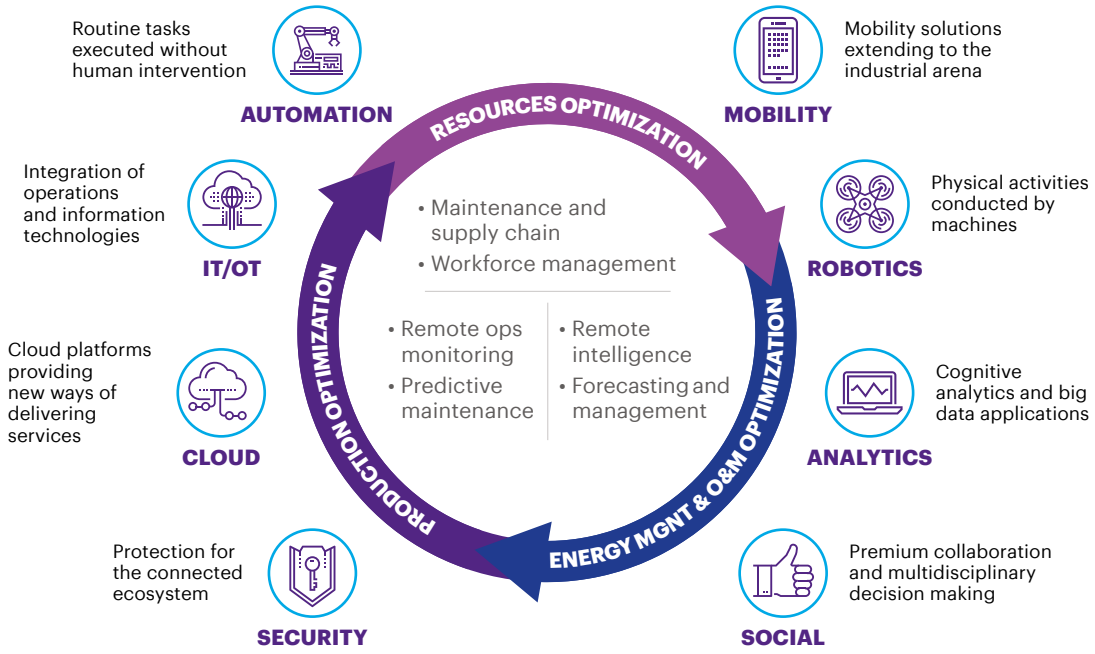
Digital will continue to drive down the cost of all renewable generation technologies, but in particular, wind O&M and the development and construction of utility-scale solar

Much effort to date in both onshore wind and offshore wind has been on technology advances (i.e., bigger turbines) and reducing development and installation costs. According to our experience, O&M can make up 20 to 30 percent of the LCOE, ranging from $15,000/MW (low-end onshore) to $50,000/MW (high-end offshore). Digital can increase the value of O&M through production optimization, energy management and production forecasting, moving to predictive maintenance, enabling more competitive contracting models, optimizing the spare parts supply chain and improving the effectiveness of the workforce. At approximately $4,000/MW, O&M is not as significant in solar as it is in wind.

However, at 3,000 to 4,000 panels/MW, a 700 MW solar farm would need 2 to 3 million panels. That's millions of material and people movements to be managed during construction. In addition, there is also huge variability in output given productivity, technology and location. Given the scale of development, particularly in utility-scale solar projects i.e., 100 MW or greater, digital technologies can significantly improve the conceptual design, as well as detailed engineering and construction of these plants.

The characteristics of wind O&M and solar construction are well-suited to digital transformation (see Figure 1).

Figure 1. The digital elements of renewables transformation.



Source: Accenture analysis

3. DIVIDED

The digital divide driving the operational performance gap between the large renewable companies and smaller renewable players will get bigger

According to our analysis, the largest renewable players (>3 GW) are better performers than the smaller ones (<1 GW) and are all investing in digital. They leverage data from multiple farms to benchmark alarms, service performance and move to condition-based or even predictive maintenance. Some of the most advanced optimize their portfolios to maximize profit from the market, even delivering aggregated commitments cooperatively. Leading companies have integrated their transaction systems (systems of record) to their user interfaces and dashboards (systems of engagement), so insights are translated, at pace, into instructions to the field and process changes are rolled out fast and at scale.

In contrast, most smaller players have lacked the scale required to invest in developing mature technology or digital capabilities. That means they tend to be highly dependent on OEMs, for services related to production, operations and maintenance activities. And given the deal structure required by some investment funds in the sector, they are locked into long-term OEM contracts (even longer than five years to meet some financing requirements) and are unable to make the long-term investments required to develop the capabilities and technology infrastructures that are needed to drive higher performance across O&M.

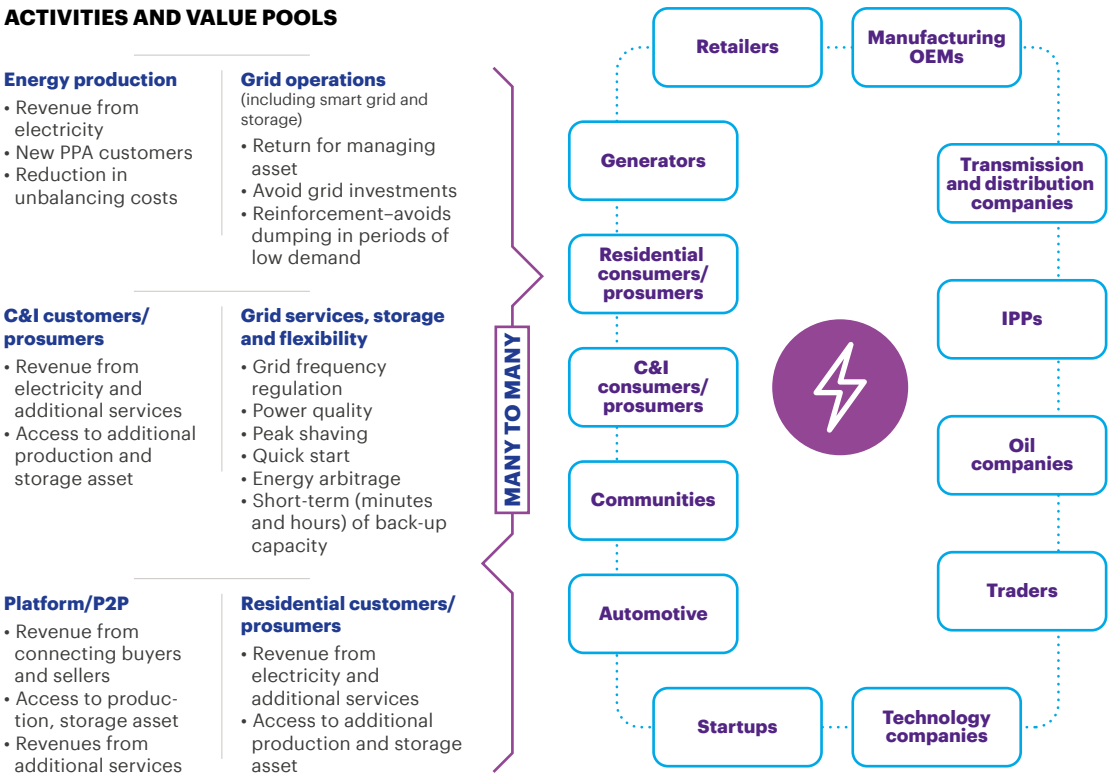
4. DIVERSE

Diverse players, including deep-pocketed new entrants, such as oil companies, traders, automotive, and possibly even technology players, will compete with renewable generators for the same value pools

Historically, renewable players were a mixture of traditional utilities and financial investors. We have also seen many digital startups providing services or platforms to support renewables and renewable customers.

Now, renewable generators have to compete in an enhanced ecosystem with traders, large oil and gas and automotive companies, and even technology players (see Figure 2).

Figure 2. Renewables market ecosystem: Diverse players.



Source: Accenture analysis

5. DEMAND

Consumer demand for renewables, particularly the increase in renewable PPAs by C&I companies and the aggregation of demand, is changing the way renewable demand is met

There is a growing consumer group including large corporates that, in addition to being prosumers and/or self-generating electricity themselves, are making significant renewables purchasing commitments. These new types of consumers, with their long-term PPAs, are driving market growth. This segment is growing significantly, with new companies signing up to the RE 100 every day.

PPA aggregators are also emerging that want to make the renewable PPA markets accessible to smaller industrial companies and to bundle smaller PPAs together to support financing of new projects. Additionally, communities such as the community choice aggregation (CCA) in the United States are aggregating demand for renewables.

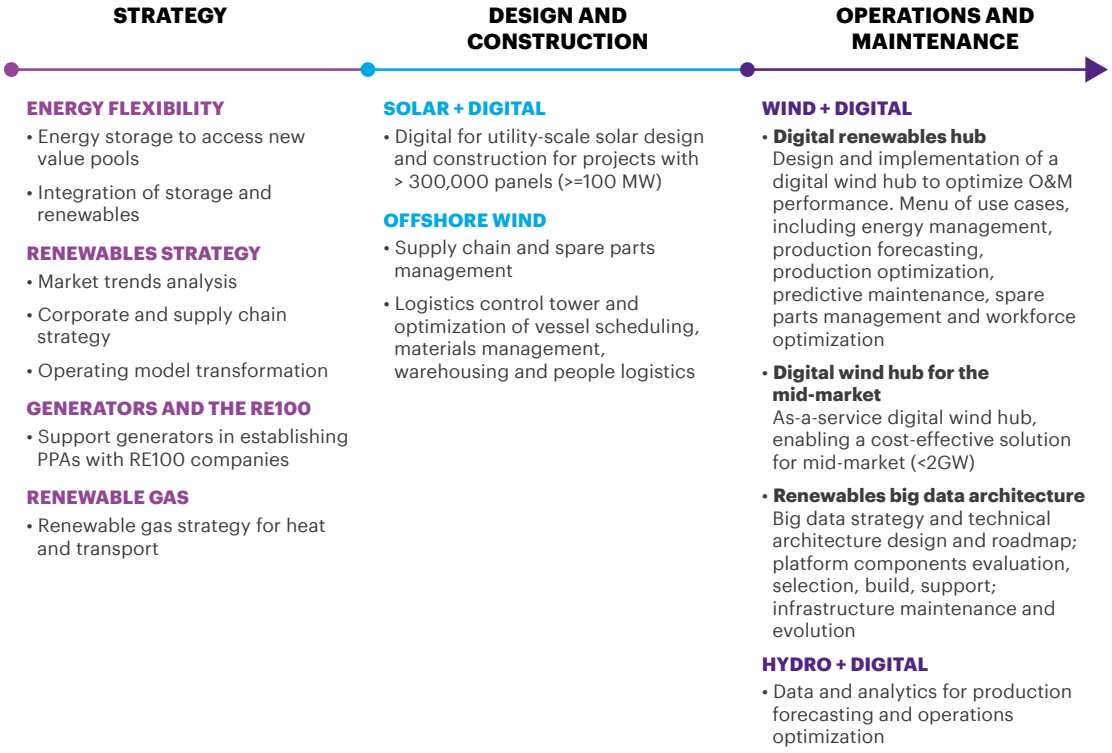
Success in capitalizing on current market trends, further industrializing the installed base will depend on renewable companies' ability to manage a variety of complex dimensions and develop the newly required commercial and digital capabilities.

To achieve its full potential, the sector needs to find ways to enable new performance and growth.

HOW WE CAN HELP

Accenture helps renewable companies leverage innovative business solutions to generate new value and performance. We help our clients deploy digital technologies to manage and optimize asset portfolios and implement leading practices across projects, O&M and energy management (see Figure 3). We bring deep industry experience along with advanced accelerators and digital assets to provide comprehensive end-to-end services, bringing the best of Accenture to renewable companies.

Figure 3. Renewables services overview.



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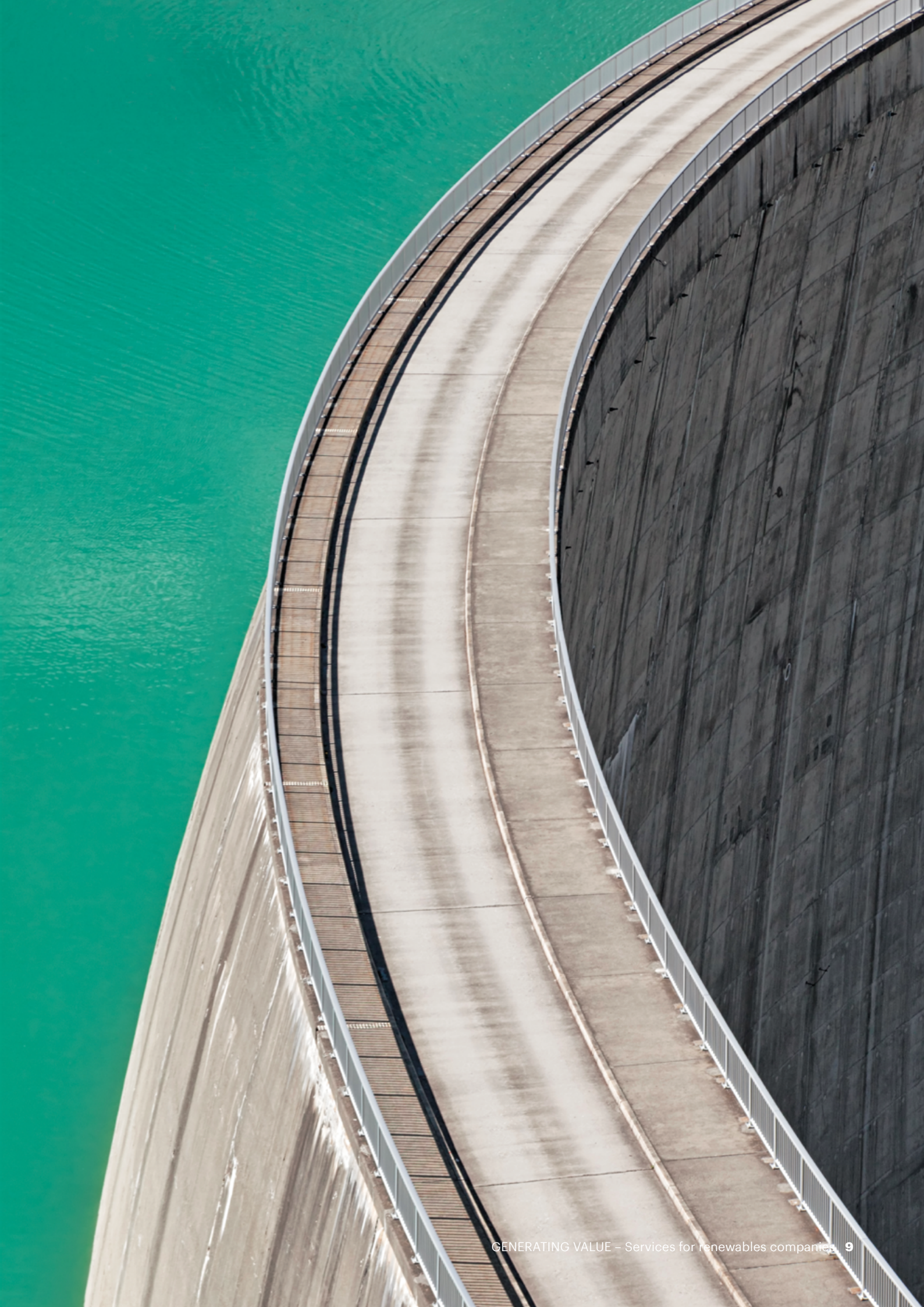


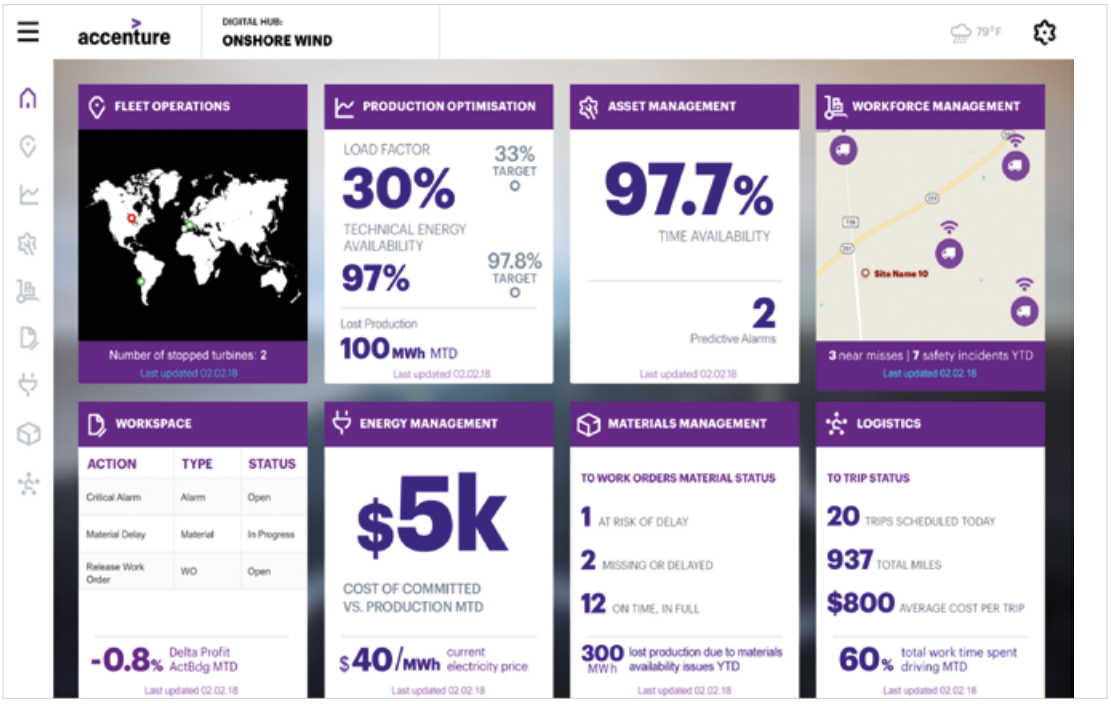
FOCUS AREA

Digital renewables hub

Big data, analytics and other digital technologies can deliver a step change in the approach to production and resource optimization, and O&M/energy management optimization. For wind, we have identified seven capability areas focused on improving the value and reducing the cost of operations: remote operations monitoring/control room, production optimization, predictive maintenance, maintenance and supply chain, workforce, production forecasting and energy management, and remote intelligence. For solar, we focus on the impact of digital on business development, engineering and construction, project and contract management.

Building on this, Accenture has defined the concept of a "digital hub," (see Figure 4) which drives a further step change in the industrialization of renewables, unlocking optimization across the portfolio while offering a real-time work environment. This step change requires a transformation away from the use of local control rooms, ERP and legacy systems toward a new digital architecture that integrates a variety of external and internal factors to drive asset value maximization.

Figure 4. Digital hub: Illustration of a wind hub.

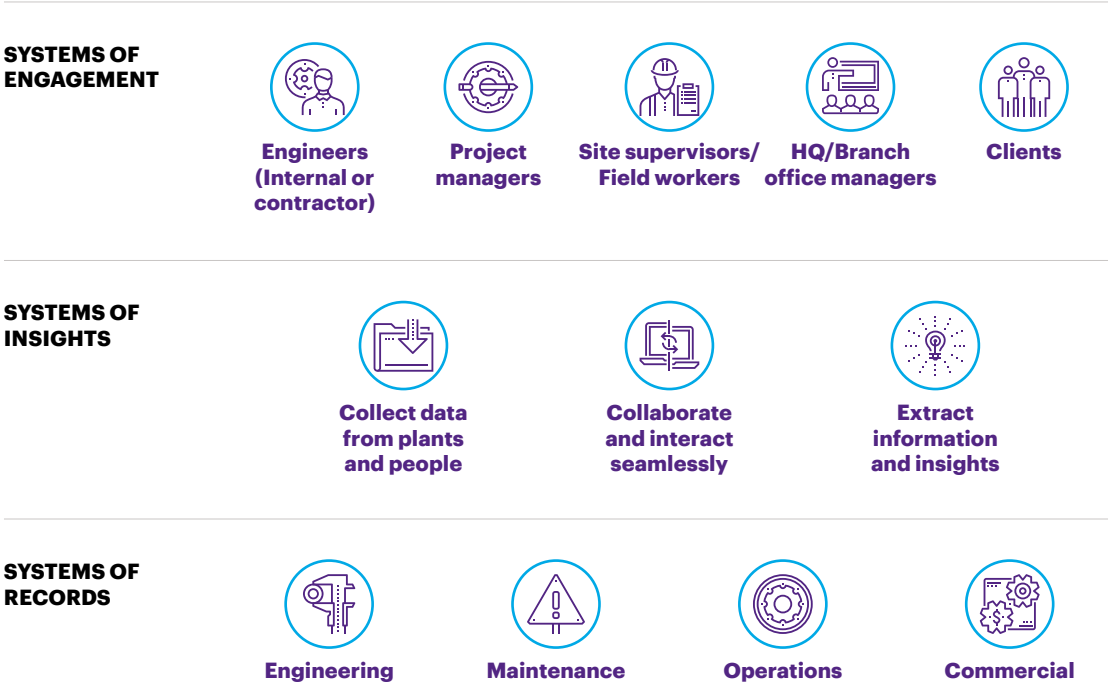


Source: Accenture

We work with clients to develop and implement use cases in a number of areas including predictive maintenance, energy forecasting, unbalancing level, lost production, wear rate, energy unavailability, failure detection, failure localization, operational intelligence, and investment analysis. We have even developed analytical models to integrate batteries with wind and solar plants. We have invested in prototypes that can be used as part of the design process, data and process models, KPIs, and tools for specific topics such as spare parts optimization. We also support clients to develop, source from other service providers, or provide as-a-service, fit-for-purpose technical architecture platform solutions that support the ongoing development and implementation of use cases.

Our approach separates the system of engagement from the systems of insight and record (see Figure 5). This allows for the front line to have an integrated and end-to-end view of the most relevant data, enabling an open environment where multiple personas can exploit data and insights, operate and collaborate, being engaged in the integrated business process.

Figure 5. Digital hub: Data centricity.



Source: Accenture

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ABOUT ACCENTURE

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