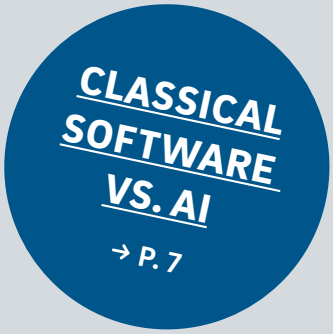
Think:Act

navigating complexity

March 2018

Artificial intelligence: A smart move for utilities

Roland Berger



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83%

of top European utilities executives consider artificial intelligence a high to medium priority for their business.

Page 5

43%

believe AI will enable new business models.

Page 8

>20%

efficiency gains from AI are expected in utilities in the next 1–5 years.

Page 13

Introduction:

With the energy sector undergoing a period of rapid transformation, artificial intelligence offers new solutions to manage the change.

The utilities industry is at a crossroads. Its traditional models, protected by tight regulation and anchored by low risks, safe returns, long investment cycles and above all predictability, are rapidly becoming outdated. In their place more complex, deregulated models are emerging, driven by real-time prices and smart technologies, and characterized by decarbonization, decentralization, digitalization and ongoing sector coupling. Take, for example, the offshore wind sector, where in just a few years the market has transformed from being strictly regulated with fixed feed-in tariffs to virtually free with zero feed-in tariffs, increased competition and heightened capabilities.

This new system will be a world of faster, smarter energy, with a high reliance on data and technology. Demand and supply, for example, will be managed autonomously by intelligent software that optimizes operations and decision making. To keep up, utilities will have to develop such technologies themselves. This they can do by either becoming innovators or sticking with the "configurator model" of adapting existing resources, a riskier path that could see firms lose their competitive edge in the mid to long term. Without such changes and a focus on data-driven approaches, the new, digital energy system will be difficult to manage. In short, companies will likely have to become smarter to survive.

Artificial intelligence will be an integral part of the solution. While all-seeing, all-knowing AI systems such as HAL from the film 2001: A Space Odyssey remain the

"We underrate the significance of AI, similar to photovoltaic a few years ago."

Company CIO

stuff of science fiction, the technology is rapidly finding its way into narrower, more focused business applications. In these, machines and operating systems are pre-programmed to use data and algorithms to not just undertake a specific job, but learn to do it better, essentially replacing human intelligence. Utilities are already waking up to the technology, as shown in our survey of top European utilities executives, a core part of this report.

ORIGINAL RESEARCH

Potential target applications for AI cover a vast range of business areas. A virtual customer service assistant, or "bot", that can learn to autonomously handle telephone inquiries about, say, billing or account issues is one example; a prescriptive maintenance system that can predict and address problems with industrial machines without human intervention, reducing repair costs by up to 50%, is another.

The technology is particularly suited to the data-intensive requirements of the new energy system. It is ideal for forecasting or balancing demand and supply, as well as processing the huge amount of data generated by a smart grid to optimize its operation. Google, for instance, uses AI to optimally balance workload in its server farms and reduce their energy usage, cutting cooling costs by up to 40%.

Some AI tools can be used largely off-the-shelf to make quick-win efficiency savings that can then be reinvested to build market strength and develop innovative new business models, such as will be required by the new energy system. This view of AI's potential is borne out by our survey, in which 83% of respondents said they consider AI a high to medium priority for their business, and 43% believe the technology will enable new business models. → A

However, pick-up of AI in the utilities industry has been slow. Only 23% of survey respondents said they have a clearly defined AI strategy, and just 17% describe their data availability as good.

SOUND ADVICE

This report aims to provide specific insights into AI for the utility sector with a focus on the tangible, near-term applications offered by the technology. In it, we decode AI, examine its use and potential in the European sector, including highlighting specific use cases, and provide clear recommendations for its exploitation. These are based on our survey, as well as market soundings and other external sources.

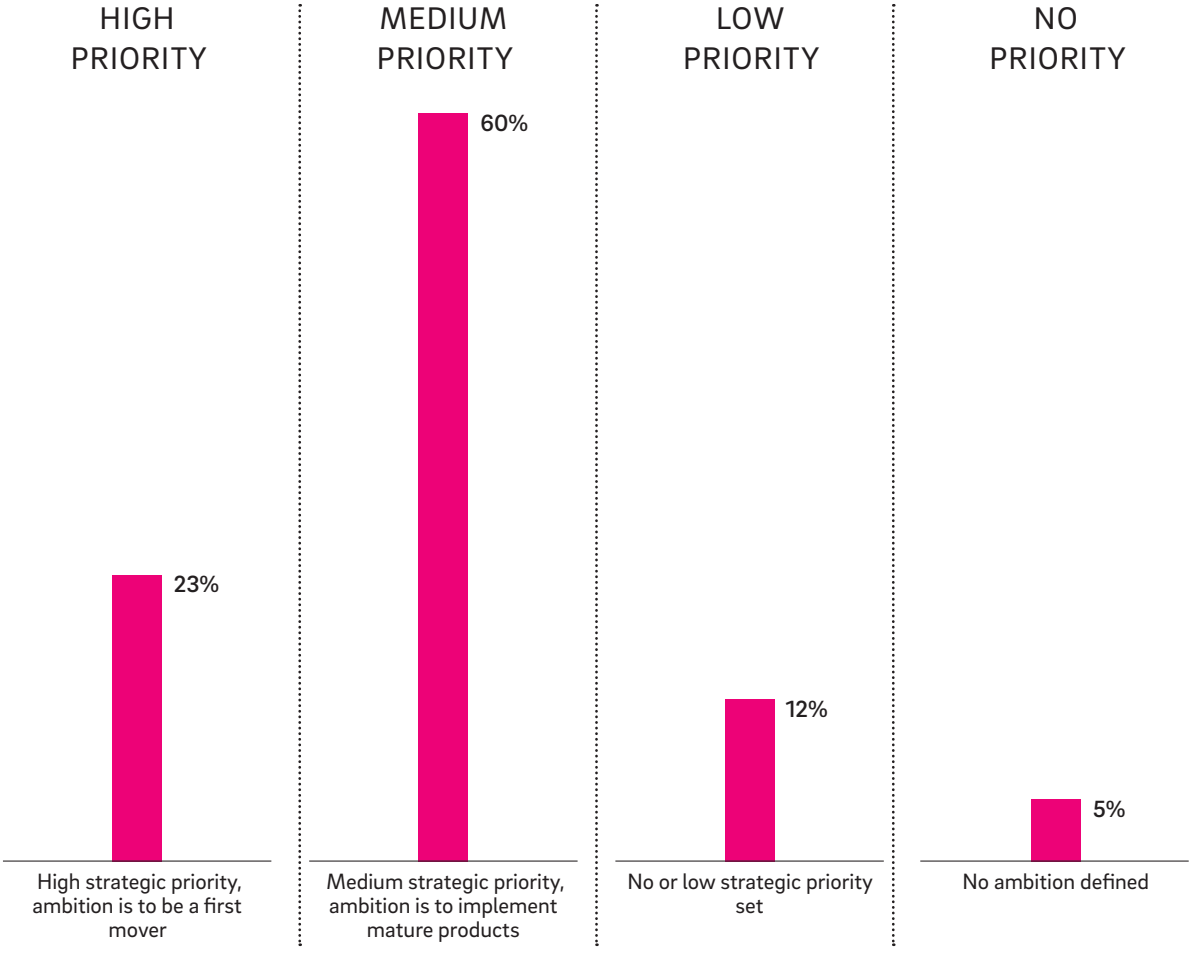
Our findings suggest AI will become a key enabler of the new, complex and data-reliant energy system, offering a key tool to improve operational efficiency in an increasingly cut-throat environment. As a result, utilities may need to put more focus on AI if they wish to remain competitive.

A

STRATEGIC PRIORITY OF AI OVER THE NEXT 1–5 YEARS

In general, the majority of respondents (60%) seem to take a follower approach when it comes to implementing AI.

"What is your strategic priority with regard to AI in the next five years?" n=51[1]



[1] Only complete data sets

Source: RB AI market sounding

Why AI?

What exactly is AI, how does it work and what can utilities companies use it for?

To fully understand the potential AI offers utilities, it is useful to explain the term's meaning, its importance and give use cases to demonstrate how the technology can be applied.

WHAT IS AI?

In a business context, AI's function is clear: the intelligent use of data and self-learning algorithms to increase automation and efficiency. It provides a toolbox of applications that machines were previously not able to perform, such as forecasting and decision-making support, and ultimately offers the promise of capabilities that will enable new long-term business models.

Classical software relies on rigid algorithms to tell it what to do with input data and thus create an output, for example it can be programmed to manage a company's payroll along clearly defined rules. AI software, however, feeds both input and output data to an algorithm which then learns to predict future outputs, for example a mailbot that can learn to respond to client emails by reviewing past human-sent emails. While both types of software offer efficiency savings, the potential provided by AI is largely untapped.

Because almost every task requires data, almost all data sets are a potential target for AI, from language processing to image recognition. Data may be derived from a multitude of sources, such as conversations, transaction records, measurements or photographs, and captured by devices including computers, telephones, sensors or cameras. → B

Most AI relies on so-called supervised learning, where error-free data is fed to the software to allow it to learn. DeepMind's AlphaGo program, which was fed thousands of moves by professional players of the Chinese boardgame Go in order to take on and beat world champions, is a classic example.

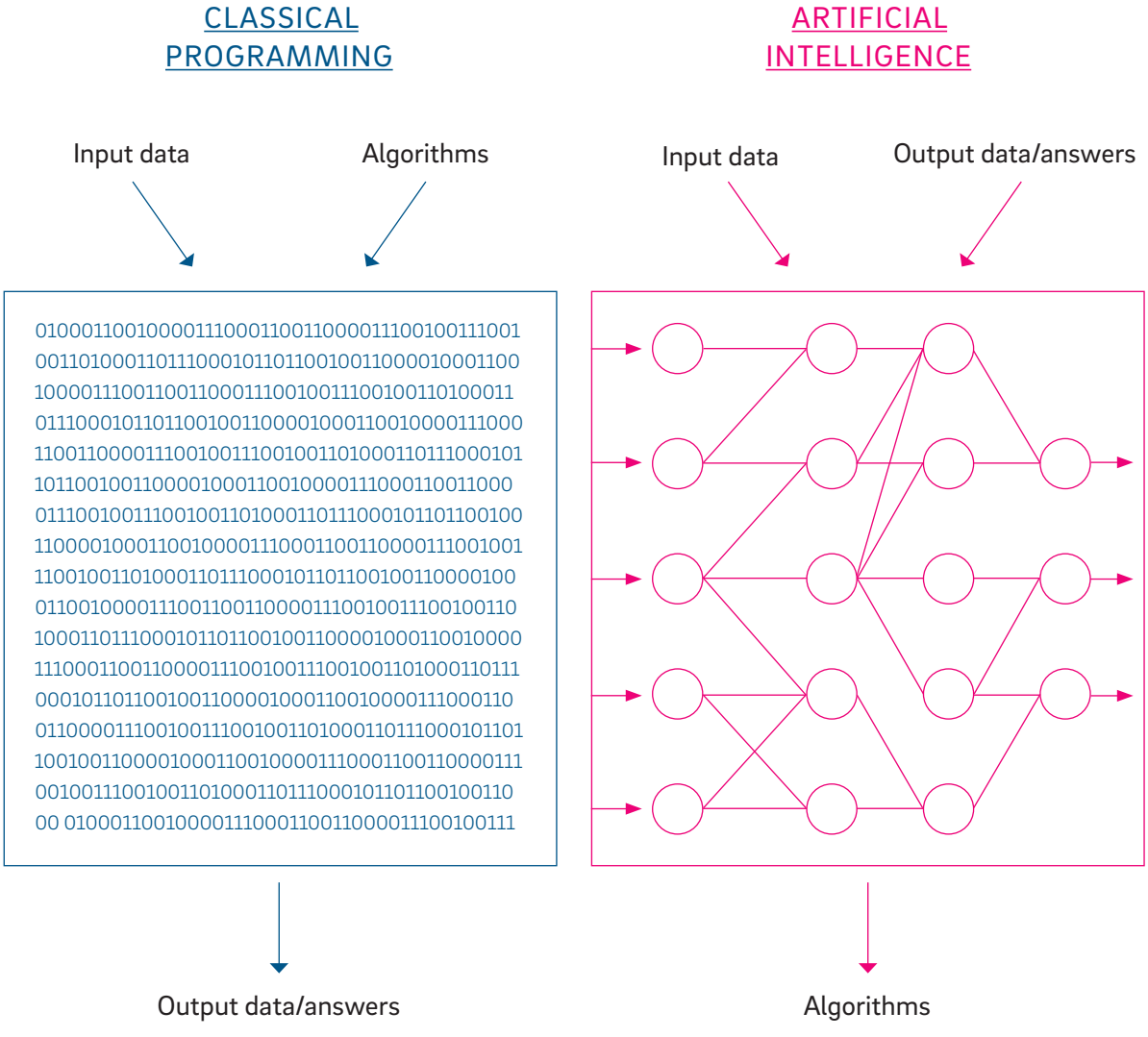
One of the great benefits of supervised learning is that predictions improve with data volume, provided the data is not too perfect and allows for variation. The more input data, the better the level of AI decision support and therefore the competitive edge. Google's search engine, which learns to perform better from the huge number of searches carried out each day, is a prime example.

But AI is not just about quantity – the technology is evolving beyond this. Next generation AI can be taught

B

COMPARISON OF CLASSICAL SOFTWARE AND AI

Deep neural networks, a type of AI, don't need a defined algorithm – they create one from huge amounts of data.



Source: Roland Berger

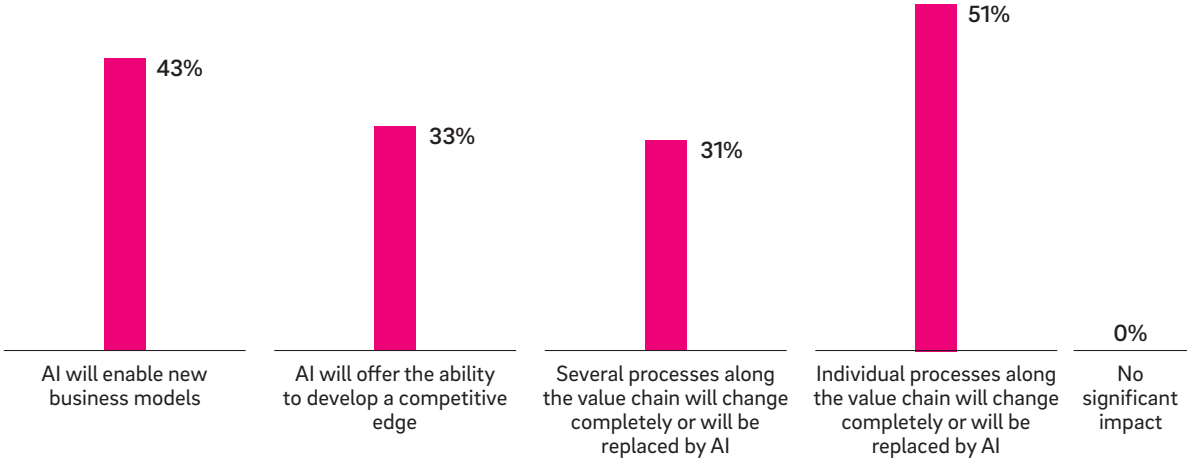
C

CREATING VALUE AND DEVELOPING STRATEGIES

Most utilities think AI will have a big impact on their business but are yet to integrate it in core plans.

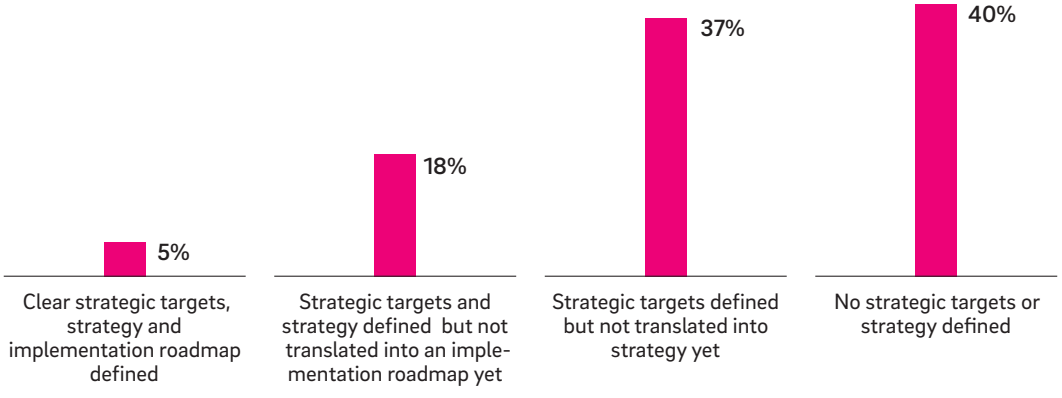
IMPACT ON VALUE CREATION

Current and mid-term potential of AI in utilities n=51[1]



STRATEGY DEFINITION STATUS QUO

"Do you have a strategy for incorporating AI in your company?" n=51[1]



[1] Only complete data sets

Source: RB AI market sounding

basic rules and then generate data itself, or extrapolate it from a small sample. For example, DeepMind's latest Go player, AlphaGo Zero, was only taught the rules of the game and then learned by playing against itself, quickly surpassing and defeating its predecessor.

Today, however, AI's value still depends largely on the amount and quality of internal and external data it can access – whether it comes from games, connected sensors or market sources – and the way in which it is stored, structured and processed. All it needs to carry out an ever-growing number of tasks is usable data, technological infrastructure such as computers and servers, and people to set it up. As such, AI can be considered a general purpose technology that could fundamentally change the way businesses operate.

> "Unstructured digital initiatives are a corporate illness."
>
> Company CIO

AI: THE KEY ENABLER FOR UTILITIES

The complexity of the new energy landscape presents significant challenges for utilities. Traditional business models, characterized by reliable regulation, assured long-term return on investment, vertical integration and conventional non-intermittent generating technologies, are being outpaced and overwhelmed. In their place are coming new technologies that are sustainable, digitized and autonomous, with all of these aspects necessitating new business models.

Data aggregation – such as that needed by a smart home system to learn when a homeowner prefers their heating to come on – is likely to become a core requirement and multiple generators will replace the relatively small number of central generating assets. For example, individual wind turbines and solar cells are already replacing large conventional coal and gas facilities, and these flexible decentralized systems will rely on smart grids (small, localized networks) and demand-side management to monitor them.

The resulting smart-power ecosystem will need to process huge amounts of data to ensure that infrastructure is optimally utilized to balance supply and demand. So to differentiate and compete, utilities will in all likelihood have to ditch their existing efficiency-focused configurator models and become digital innovators.

Such changes pose an existential threat, yet there is little intelligence or organization in the fledgling new energy system. This is where AI comes into play. It promises to help utilities navigate the new complexity by equipping them with tools that can autonomously optimize operations, forecast and make decisions. One recent pilot carried out in Amsterdam, for example, found that profits at a car sharing company increased by 7% when an AI algorithm was used to calculate the most cost-efficient times to charge its electric cars, taking into account factors that affect usage, such as weather and holidays, and periods of cheaper energy.

Yet despite its promise, our survey showed that only 5% of respondents have a clear AI strategy and implementation roadmap defined, and 39% say that technical complexity is the main roadblock. → C

AI's appeal from a business point of view is simple: short-term efficiency savings enabling longer-term innovation. To begin with, off-the-shelf AI products can help to optimize existing models by quickly delivering efficiencies, for example via predictive maintenance – when machines learn to monitor and maintain themselves, negating costly emergency repairs – or the introduction of automated customer service bots or energy trading. These bottom line savings can then be used to build headroom and invest in new top-line business models, such as smart markets or autonomous vehicles. This two-step pathway makes AI a key enabler of new business models, and therefore the new energy system itself.

Despite the lack of strategy, utilities firms are waking up to this potential, with 50% of survey respondents aware of at least 1–5 use cases of AI in a utilities setting and 15% of them having identified more than 10 cases. In addition, nearly 44% have started pilots or are testing an AI program.

Use cases

AI is not a technology of the future: it is ready to use. Opportunities for utilities are vast. Conventional and renewable generation: The predictive maintenance of infrastructure using infrared inspection, for example, offers huge savings as potential faults are addressed before they happen. Also, AI could optimize output (see use case below).

Use case 1

SELF-OPTIMIZING GAS TURBINE

Siemens' Gas Turbine Autonomous Control Optimizer uses real-time sensor data to continuously monitor conditions in a gas turbine. This allows AI to take over its operation, controlling the combustion process by learning to constantly adjust fuel valves according to internal and external factors. The result is enhanced performance, reduced wear/maintenance and lower emissions – tests have demonstrated an up to 20% reduction in nitrogen oxides.

Transmission and distribution: Grids can be better controlled and made more efficient. AI offers the possibility of predicting demand and supply, for example allowing the world's largest thermal solar farm in California to save millions of dollars in penalties for mismatching predicted and actual output. And by connecting small, localized networks (micro-grids) to the cloud, it enables them to share and build data on, say, consumption, and so better predict loads.
→ D

Energy trading: Trading functions can be fully automated using AI-based algorithms to drive down management costs. For example, hedge funds are now able to run without human intervention (see use case below).

Use case 2

AI-BASED TRADING SYSTEMS

AI has been used in financial services since the 1980s. Today, hedge funds use cutting-edge techniques to predict market trends, sometimes outperforming conventional funds. AI firm Sentient, for example, is trialing an autonomous trading algorithm that can scour billions of bits of data, spot trends, adapt and make money. While such ideas can already be used for quick-win efficiency gains in conventional energy trading, AI will really take off in future markets. These will involve billions or even trillions of micro trades between millions of generating units and consumers, with AI balancing this so-called smart market using intelligent trading.

Business support and customer service: AI assistants can be helpful for a multitude of back-office administrative functions. For example Amy, developed by X.ai, has proved so effective at scheduling meetings that "she" has been sent gifts by attendees. The technology can also run IT helpdesks, handling and resolving problems without intervention from IT staff – success rates of 60% have already been achieved. In addition, image recognition allows AI to draw up legal contracts, help filter resumes or manage book-keeping tasks.

Sales: AI offers the promise of several new business models. Market intelligence derived from customer

data can, for example, be used to predict churn, and demand-side management can be more efficiently met through the use of smart meters and reward schemes. AI has also blown open the potential of smart home energy systems (see use case below). Development opportunities are also rife: Amazon, the biggest player in cloud-based AI, sells its AI technology, for example software that can transcribe and analyze customer phone calls to autonomously learn their preferences.

Use case 3

SMART HOME ENERGY

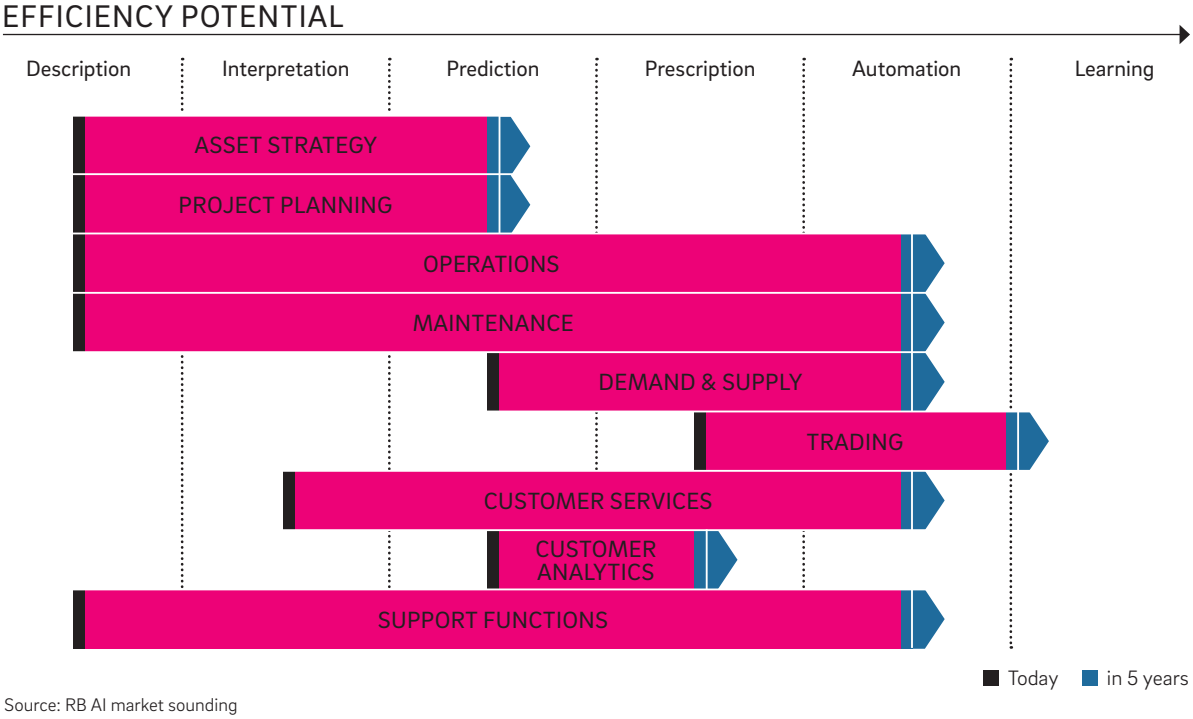
Smart home systems use intelligent energy-saving technology to cut costs, reduce wastage and improve convenience. From rooftop solar cells to wirelessly controlled washing machines and heating that adapts to users' needs, they touch on many aspects of domestic life. By adding AI into the mix, systems can learn to optimize energy usage based on preferences (when householders like the heating to be on), and by exploiting real-time electricity prices (buying in extra power at times of lower market prices). All of this takes place in the background, and the knowledge the system builds can be used to offer other timely services, for example weather reports before users leave for work.

So the potential of AI is already being harnessed by first movers in the industry, and our survey shows that almost half (51%) of respondents believe the technology will fundamentally change or replace most processes along the value chain. A key question mark, however, remains over industry's readiness to implement them.

D

AI'S GROWING SOPHISTICATION

Respondents see the highest potential for AI in trading, and the largest jump in operations and support functions.



Source: RB AI market sounding

What utilities think about AI

Our survey results show that utilities have understood the potential of AI, but that they seem content to take a follower approach. This lack of innovation could prove costly.

FINDINGS

It is clear from the results that utilities have seen through the hype of AI. Some 64% of respondents believe it will improve efficiencies by at least 10–30% in the next five years, while 31% believe that most or several processes will change or be completely replaced by AI. → C

These positive perceptions are being acted on. The survey shows that 69% of respondents have made cautious first steps into piloting, testing or assessing AI, while more than 18% have implemented the technology or made firm plans to do so.

When it comes to specific business areas, respondents believe trading holds the most promise. It is expected to reach the highest level of AI sophistication (the ability to learn) in 5 years, the only business area expected to do so. Respondents believe the biggest leap in sophistication by 2022 will come in operations, maintenance and support functions.

The perceived lack of AI products in the utilities sector – compared to the financial or telecoms sectors, for example – is clear, with more than 70% of executives saying they intend to take a follower approach and adopt mature products from elsewhere rather than develop them in-house → E Just 18% of respondents want to develop their own AI solutions.

The potential of harvestable data has not been fully recognized, with 73% of respondents saying it is not collected or unknown. In addition, only 17% rate their data quality and availability as good. → E

IMPLICATIONS

Our findings show utilities have realized the potential of AI, but are being over-cautious. The belief that they must take a follower approach to AI and learn from others is false, as there are already many ready-to-use solutions available. Also, while the follower approach is low risk, it may not be the right move given evidence of first mover success in balancing AI opportunities and risk elsewhere, such as in FinTechs.

It is noteworthy that the business areas with the most sophisticated levels of AI (trading, demand and supply) are heavily analytical and so have been able to largely borrow AI technologies such as algorithmic trading from investment banking. Establishing a competitive edge in more specialist areas of utilities' business will require internal solutions, however, meaning longer development times.

Both of these points demonstrate the likelihood that more emphasis needs to be put on the new innovator model rather than the old configurator one if utilities are to gain an advantage over rivals.

The results also suggest data – a key driver of AI – is being overlooked. It seems companies have failed to fully grasp and exploit the huge amount of useful data they generate, an asset that offers a strategic edge in the new energy system. This is of concern because data harvesting requirements need to be identified early in the strategic process.

E

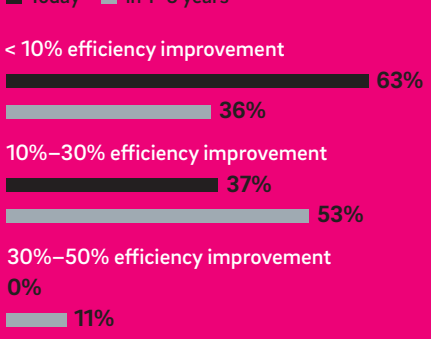
IMPACT AND READINESS

Most survey respondents think AI will improve efficiency but many are yet to take concrete action.

(n=51)[1]

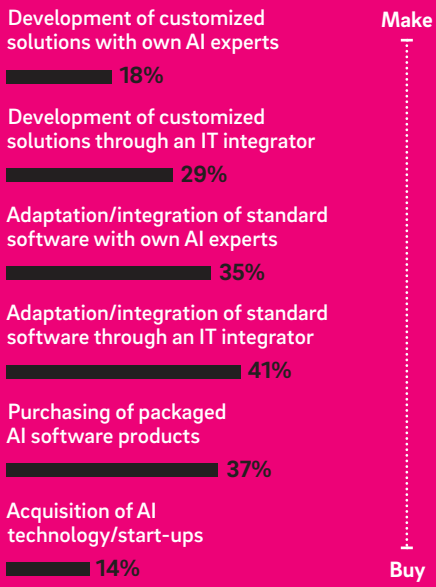
EXPECTED BUSINESS IMPACT

Current and mid-term potential of AI in Energy



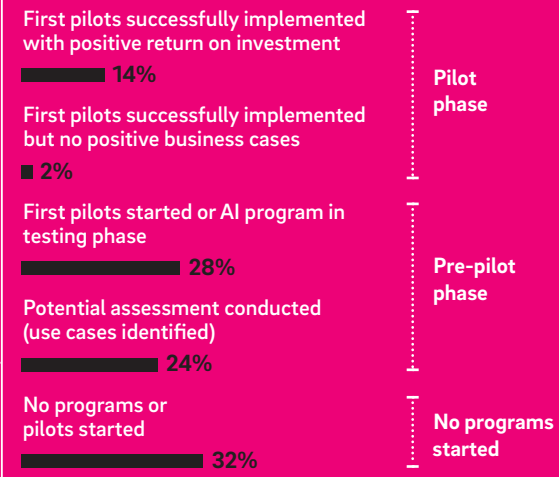
MAKE OR BUY

"Do you plan to invest in AI in the next five years?"



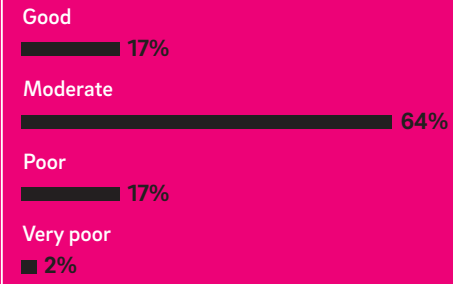
CURRENT AI PROGRAMS AND PILOTS

"To what extent are you already testing or implementing AI today?"



DATA QUALITY

"Do you believe your company has the appropriate data?"



[1] Only complete data sets

Source: RB AI market sounding

What utilities are doing about AI

Our survey found that utilities lack readiness for AI. Few have strategies to implement the technology and investment plans are cautious. They need to be less risk averse.

FINDINGS

Our survey found many gaps in preparedness for AI. Most notably, 40% have neither an AI strategy nor defined targets. → C

Perhaps as a result, companies seem reluctant to invest in the technology, with just 20% of respondents saying they have a clear investment strategy.

When it comes to roadblocks to implementation, technical complexity/fear of a longer than expected implementation period topped the list.

The people and skills assessment section of the survey also highlighted human resource concerns, finding, for example, that only 2% of respondents think they have the right people to develop new AI algorithms. But there are clear signs that investment is taking place to address gaps in capabilities. → F

IMPLICATIONS

Utilities are taking cautious first steps into AI, but are very much at the start of the learning curve. Beginners' errors are apparent as strategies are being formulated and tested, and there is little evidence of risk taking. Several core elements are missing, namely management focus, know-how, strategy, technological base, investment and skills.

Primarily, the evidence of ad hoc implementation suggests a lack of coordination. Positive experiences in the proof-of-concept phase have given rise to a zoo of small, unconnected projects that lack an overall strategy.

While small, coordinated projects can be used to harvest data and make efficiency savings to support innovative new business models, isolated, uncoordinated projects are usually dead ends that lack scalability, even if they do raise funds. Successful AI models (Google, Facebook, etc.) rely on new business models and scale.

The results also suggest that utilities are happy to rely on external sources to manage AI implementation. This is fine if firms want to make short-term improvements to existing configurator models, but will be insufficient in the long term if they want to build their own know-how and become innovators.

In summary, utilities need to shake off their traditional risk averse nature as it will be detrimental to developing the new technologies needed in the new energy system.

F

PLANS AND CAPABILITIES

Most survey respondents plan to invest in AI but many believe they lack know-how and use cases.

(n=51)[1]

INVESTMENT PLANS

"Do you plan to invest in AI in the next five years?"

- Clear investment plan for the future: 8%
- Further investments depend on outcomes of ongoing investments: 12%
- Investments planned but not further specified: 60%
- No investment planned: 20%

PEOPLE AND SKILLS ASSESSMENT

"Do you believe your company has the appropriate people?"

- People with skills to develop new algorithms (develop new AI software): 2%
- People with skills to implement AI (adapt existing software): 14%
- Data scientists to prepare data sets for AI tools (train existing software): 16%

Technical roles

- Appropriate people to define the AI strategy: 33%
- Right people to identify use cases: 51%

Strategic roles

- No: 29%

KEY ROADBLOCKS

"What are the roadblocks that might complicate the implementation of AI?"

- Technical complexity/longer than expected implementation time: 39%
- Lack of suitable AI solutions: 20%
- Lack of suitable use cases: 18%

Technical roadblocks

- No holistic roadmap: 24%

Strategic roadblocks

- Lack of people with the right skills: 33%
- Resistance of employees: 31%

HR roadblocks

- Other: 6%

INVESTMENT IN CAPABILITIES

"Where do you invest in AI capabilities?"

- Technology scouting: 35%
- Cooperation partners for AI development: 33%
- Service providers for AI solutions: 35%

External capability sourcing

- AI training for IT department key users: 31%
- AI training for managers/executives: 12%
- Headhunting to recruit people with the right skills: 10%

Internal capability building

- Other: 8%

[1] Only complete data sets

Source: RB AI market sounding

How to get AI right?

Our five-point, step-by-step framework for the successful adoption of AI, from managing change to expanding capabilities and creating new, innovative models.

Our survey findings give an excellent overview of the current state of AI planning and use in utilities. They reveal that while companies have seen the potential of AI, they are underprepared and unsure how to fully exploit it. From a lack of data availability and risk-taking in the past, to a lack of strategic prioritization and capability building today, firms lack focus and direction.

To help tackle these stumbling blocks, we have developed a five-point, step-by-step framework for the adoption of AI, with an emphasis on our short-term efficiencies/long-term innovator pathway outlined in chapter 2.

1. Accept change

EMBRACE AI AND THE NEW ENERGY SYSTEM

By 2030, the energy system will be almost unrecognizable from today's. Operations, for example, will not only comprise single sectors such as gas or electricity, but also hybrids where electricity is used to produce gas and vice versa, increasing complexity and requiring new technologies and business models. AI will be a key enabler.

The starting point of your AI journey should be to accept and embrace this change. Develop a clear vision of the new energy system and recognize AI's role in it. Leveraging its efficiency potential and later developing future value propositions based on the technology will be key to positioning your company.

Begin by identifying business areas. Do you want to become a coordinator of gas/electricity coupling, or a provider of charging infrastructure? Or do you want to embark on innovator models, such as using electric vehicle data to manage city traffic? At this stage, it's not about specific business cases, rather a strategic framework. But it is about not falling behind, so act fast.

2. Make the call

COMMIT TO AI'S MONEY-MAKING POTENTIAL

Now, commit. Utilities need to accept that bold moves into AI are needed to gain an edge. Identify use cases and prioritize them based on three factors: Core or non-core business, complexity of implementation (is software available or does it need developing?) and efficiency gains (according to the short-term/long-term pathway).

Next, start to build capabilities. At this stage, the minimum level of in-house skills include data science knowledge to prepare data sets and product implementation expertise. Remember, AI is just another technology so these can be taught or bought in at the beginning. But bear in mind that relying on existing skills in the longer-term will only enable you to tweak configurator models for efficiency gains, not develop new business models.

Then think data. Approach the subject with a sound strategy: data availability and accessibility should be carefully considered when deciding where to build AI into systems. Relevant data pools should also now be secured. This may mean strategically investing in data collection from assets that are not primary AI targets. Bear in mind, AI may become a forcing function of your data strategy.

3. Get going, now

IMPLEMENT QUICK-WIN AI PROJECTS

Small, quick-win AI projects are a good way to learn about the technology "on the job", while also laying the foundations for longer-term models. First, consider simple, narrow use cases such as automating the sorting of incoming mail, then, with experience under your belt, move on to more ambitious targets.

Retail or back-office functions such as customer service bots and automated IT helpline ticketing are good options, as is autonomous trading. All have the added bonus of making you more competitive. In all cases, use ready-made, off-the-shelf AI solutions to quickly deliver results, and move fast to secure a head start over rivals. Celebrate first successes to build momentum and confidence.

But while doing this, don't lose sight of bigger strategic goals: Follow a clear technology and product strategy to avoid building a mishmash of incompatible software programs across different business areas of your company. And avoid "proof-of-conceptionism" at all costs.

4. Build strength

EXPAND YOUR AI CAPABILITIES

After success with quick wins, the aim is to build resources for the development of longer-term, more innovative and holistic AI models.

Capability building should center on people. This is where AI expertise does matter: AI is software after all and cannot be fully exploited without capable operators. Training or finding people with the skills to develop in-house algorithms, a key source of competitive edge, will be especially important if you want your company to move from being a configurator to an innovator.

Change management, strong communications and training will be needed to support the shift to more developed AI approaches. To underscore their importance, think back to the 1990s and the introduction of brand new SAP systems, which often remained underused for years because of poor holistic support.

Also, by now your data operations should be running smoothly, so it might be time to consider using or developing cutting-edge technologies such as evolutionary AI, which thrive on small data.

5. Think big

SCALE UP AND INNOVATE TO DEFEND YOUR AI EDGE

With successful AI projects under your belt and key people and infrastructure in place, it's time to scale up. Whole network effects are a crucial success factor for AI: solutions without scale will not be competitive over time, so act fast.

It's likely that by now you're on top of small and large AI projects in your chosen focus areas. So now work on rolling out AI in non-core areas. Follow the tried-and-tested method, using coordinated quick-win projects to get the ball rolling. Find new use cases, tap new data pools and leverage previous experience to develop more complex models. Then scale them and repeat again to begin a virtuous circle of continuously improving skills, efficiency and innovation.

Ultimately, this means letting AI take control of entire operations, whether they be existing configurator models such as central power generation, or new innovator models such as management of decentralized smart grids.

Quality data is the key to both, with judicious use of the right data meaning better training and accuracy and therefore better products. This will help to maintain your competitive edge and effectively exclude rivals from market entry, as Google has done with its search engine. It's winner takes all.

CONCLUSION

For utilities, the good old days are drawing to a close. The industry is shifting from a regulation-driven, reliable, low-risk environment to a technology-driven, uncertain and more sophisticated marketplace. This will necessitate change, as well as new technologies and business models. Failure to recognize this could threaten companies' survival.

Our survey and analysis make clear that AI can play a key part in navigating and managing this new energy system. Indeed, it will likely be a key enabler of it. Yet because of fear of risk and the unknown, firms seem hesitant to introduce this already available resource. We believe this is a mistake.

As such, our recommendations demonstrate how utilities can relatively easily seize the opportunities that AI holds and stay ahead of the AI curve. But to do this they must get smart and act fast: it's time to move or be moved. ◆

ABOUT US

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Navigating Complexity

Roland Berger has been helping its clients to manage change for half a century. Looking forward to the next 50 years, we are committed to supporting our clients as they face the next frontier. To us, this means navigating the complexities that define our times. We help our clients devise and implement responsive strategies essential to lasting success.

FURTHER READING

THINK:ACT MAGAZINE
AI think, therefore AI am

Everybody is talking about how artificial intelligence will change the world. Find out what AI means in 2018 and beyond for your business in our Think:Act. The magazines mission is to demystify all things AI and to present this fairly complex topic in an accessible way. The issues the magazine explores range from the 'what, why and how' of AI to China's rise in AI, how to regulate AI, how AI is changing journalism and creative industries like music, and whether AI will displace humans in the workplace.

POWER TO THE PEOPLE
Flipping the switch on centralized power

The EU has set ambitious targets for the energy transition. Decentralized energy systems are playing an ever-increasing role. Yet there are still obstacles on the path to an energy revolution – such as the lack of standardized regulation in the European energy market. We asked 50 experts to identify key factors influencing the development of European energy systems through 2035. One thing is certain: Policymakers and market players must act to make decentralized energy in Europe a success.

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