



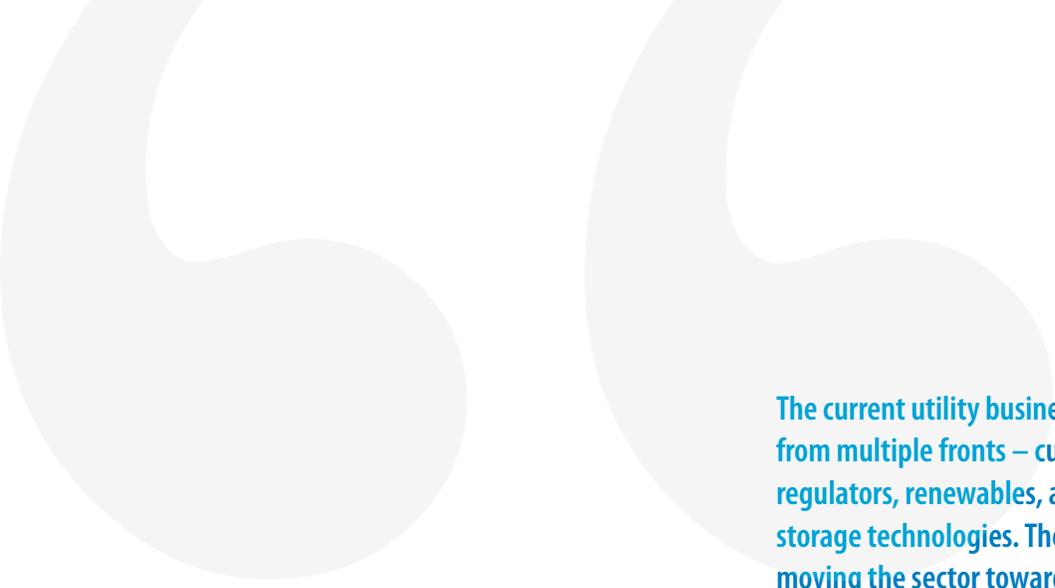
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MORE POWER TO THE ENERGY AND UTILITIES BUSINESS, FROM AI



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The current utility business model is under pressure from multiple fronts – customers, prices, competitors, regulators, renewables, and the rapid evolution of energy storage technologies. The confluence of these forces is moving the sector towards a more data-driven model where the focus is on delivering customized energy management solutions as opposed to merely providing access to electricity. But data-driven competence is an easily replicable, and hence temporary, advantage. The future leaders of the utility business will be distinguished by their ability to apply the unique power of human insights to their processes and business models. New concepts, such as Design Thinking, will enable them to gain a deeper understanding of customer needs and the new capabilities required to fulfill the same. And deep digitization, especially adoption of advanced technologies like Artificial Intelligence and smart automation, will create the productivity advantage for leaders to then channel their energy into innovation and the business of reimagining the business.

– An Infosys viewpoint

INTRODUCTION



The energy sector is one of the many that are experiencing deep and lasting changes to business models and operations due to digitization. From oil and gas providers to power and electric grids, the industry looks nothing like it did 100, 50, or even 10 years ago. Yet, the foreseeable future may hold just as much change as the past several decades as new technologies, applications and business demands emerge and enterprises rely even more on software and IT platforms to create efficiencies. Much of the disruption will come in the form of Artificial Intelligence (AI) and automation, and in fact, these technologies are already at play within energy firms.

As part of its study *Amplifying Human Potential: Towards Purposeful Artificial Intelligence*, Infosys

commissioned independent research to investigate the approach and attitudes that senior decision-makers in large organizations have towards AI technology and how they see the future application and development of AI in their industries. As part of the research, 10 industries were surveyed, including Retail, Fast Moving Consumer Goods (FMCG), Utilities, Financial Services, Healthcare, Pharmaceuticals and Life Sciences, Manufacturing, Telecoms, Automotive and Aerospace, and the Public Sector.

The following offers a closer view of the findings specific to the energy, oil and gas, and utilities sector.

MOVING AHEAD ON AI



The popular perception of utilities as massive infrastructures based mainly in the physical realm is somewhat dated. Today, the energy sector is proving to be one of the most innovative in its use of emerging technologies like AI, automation and advanced analytics. Big data and digital technologies are driving new efficiencies and opening up possibilities, playing a pivotal role in the industry’s future relevance and impact on people, economies and the environment.

Our research corroborates this. 48 percent of the respondents from the energy, oil, gas and utilities industries agree that AI is fundamental to their organizations’ success, and 46 percent say their organizations are “building AI into the company ethos”.

In many categories globally, the energy sector is ahead of the curve in the adoption and application of AI. 29 percent of the energy, oil and gas, and utilities company executives cite that AI technologies are fully deployed and working as expected, above the 25 percent average across the 10 industries surveyed. Another 23 percent of the energy sector executives mention they have partially deployed AI technologies and those were working as expected. The main drivers of these deployments were automating IT processes (62 percent), automating business processes (61 percent) and increasing innovation (60 percent).

How would you rate your organization’s current experience in terms of its implementation and use of AI technologies?

AI technologies fully deployed and they are working as expected	29%	Limited deployment of AI technologies, results unknown	7%
AI technologies partially deployed and they are working as expected	23%	No deployment of AI technologies but we plan to in the future	7%
AI technologies fully deployed but they are not delivering to expectations	20%	No plans to deploy AI technologies	4%
AI technologies partially deployed but they are not delivering to expectations	9%		

The sector reported an average investment of approximately US\$5.3 million in AI in the past year with the majority of utilities companies (39 percent) investing US\$4 to US\$6 million. The good news is that it is already achieving early returns on investment in

the form of automation of processes and tasks (46 percent), employment of prescriptive or predictive analytics (45 percent), and increased productivity among staff (43 percent).

What are the key drivers for your organization in implementing (or planning to implement) AI technologies?

Automate IT processes	62%	Improve decision making	47%
Automate business processes	61%	Increase revenues	46%
Increase innovation	60%	Cost savings	44%
Augment employee knowledge and skills	54%	Improve go-to-market time	38%
Boost employee productivity	52%	Improve customer experience	35%

AI FOR MATCHING SUPPLY AND DEMAND



The current AI deployment is largely data-oriented. Utilities companies are implementing AI technologies around big data automation (71 percent), predictive or prescriptive analytics (57 percent) and machine learning (52 percent). Currently, the IT department

is the leading user of AI technologies (60 percent), followed by operations (39 percent) and business development (33 percent).

Which type of AI technology has your organization deployed or is planning to deploy?

Big data automation (collecting, processing, storing)	71%	Interactive voice response technologies (IVR)	27%
Predictive/prescriptive analytics	57%	Avatar technologies (chatbots)	24%
Machine learning (smart technology)	52%	We have not deployed any AI technology and do not plan to	4%
Expert systems (databases of expert knowledge)	42%	Other	1%
Neural networks (deep learning)	36%		

Data, leveraged in advanced ways by AI technologies, will be a fundamental driver of a future sustainable energy ecosystem that includes an appropriate mix of fossil fuels and renewables. However, renewable energy sources, being weather dependent, are quite unpredictable, making it a challenge to match supply and demand. Individual houses and businesses with solar panels, which add power as well as draw it from the grid, complicate matters further. AI offers a solution to the demand management problem by

using predictive algorithms to decide when to store or release energy to balance grids and to also accurately estimate the production and consumption of small-scale producer-consumers. Already a number of pilot projects are underway where AI works on data from wind turbines and solar panel sensors and combines it with atmospheric data to improve renewables forecasting and equipment efficiency.

AI FOR EFFICIENCY AND RELIABILITY



AI will also help to improve the economic efficiency of energy, which is another crucial element of sustainability. Some examples: Siemens is using AI to change fuel distribution in turbine burners to improve their efficiency. AI is also making homes energy efficient. Startup firm Bidgely uses machine learning algorithms to analyse the energy consumed by individual domestic appliances and produces detailed insights to tell consumers how they are using energy and where they can save.

AI technologies, such as predictive analytics and machine learning, can monitor various parameters to detect anomalies and automatically heal systems. Tokyo Electric Power Company, Japan's largest utilities provider, is commissioning a predictive maintenance pilot which will use weather, sensor and temperature data among others to detect and prevent failure of its infrastructure.

AI FOR OPTIMIZING PRODUCTION



AI is also impacting traditional energy production in several ways. Pioneer Natural Resources from Texas believes AI could help in identifying the right location for drilling. BP is investing in AI so it can take

data, such as flow rate, pressure, and vibration, and combine that with environmental information to optimize drilling operations.

AI AND THE CONSUMER



Interestingly, though current AI deployments are mainly intended to improve production and distribution operations, a whopping 81 percent of the respondents say they believe AI will have the greatest impact in business-to-consumer engagement.

A preview of things to come may be seen in Chicago and New York where “Miles”, an interactive pump with personality, is using AI to entertain customers with Pandora music, trivia and shareable photos as they fill up.

How is your organization preparing for AI deployment and use?

Investing in supporting IT infrastructure	67%	Using external support for knowledge gathering	43%
Using external support to assist with planning	50%	Gathering feedback from customers	30%
Developing knowledge/skills	47%	Assessing competitor/industry approach	29%
Building AI into company ethos	46%	We are not preparing for AI	4%

ETHICS AND AI



The conversation around AI is usually accompanied by a debate on its ethics — the implications of allowing machines to take decisions, the impact of AI-led automation on the human workforce, the threat to data privacy, and so on. While the ethical implications of using AI in this industry might not be as evocative as say in automotive or healthcare, they must be addressed nonetheless. Encouragingly, 40 percent of the energy and utilities respondents – four percent above the overall average – say their organizations have considered all the ethical implications of AI.

However, the respondents also confirm that ethical and other issues are indeed hindering the adoption of AI. Employees’ fear of change was the second

largest barrier behind the lack of new technologies adoption. Other obstacles include lack of in-house skills to implement AI, ethical concerns and cultural acceptance.

On the positive side, organizations are taking steps to set up the right conditions for AI deployment. 67 percent are investing in supporting IT infrastructure, 50 percent say they are seeking external support to assist with planning, and 47 percent are developing knowledge and skills in workers.

Remarkably, half of the organizations in the sector are already training employees in the benefits and use of AI, a full seven percentage points more than the average of all 10 industries.



CONCLUSION



The energy and utilities sector clearly understands the importance and transformative nature of AI. Nearly one in three companies in the industry report that they have already deployed AI technologies, and the sector is in the top half of the field in terms of AI maturity. It is also obvious that expectations of returns by way of improvement in staff productivity, efficiency and cheaper ways of operating are firm in executives' minds as they fund and deploy modern AI platforms. All these expectations are linked to the automation of human roles using AI. But AI has much more to offer. For instance, it can work along with people, offering valuable support to enhance their performance – think of a predictive analytics system providing insights to help a human worker take better decisions. And even when AI takes over roles performed by human beings, it should be seen as an opportunity to redeploy the concerned personnel in more purposeful, innately human pursuits that are currently outside the capability of AI – pursuits such as solving the biggest problems afflicting mankind, thinking creatively, and innovating with abstract ideas and concepts. So, even as energy and utilities companies take AI to IT and operations, it is up to their leadership to create a culture and mindset that welcome the technology as an amplifier of human abilities.

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