



# DIGITALIZATION AND THE FUTURE OF ENERGY MANAGEMENT

# 01

## INTRODUCTION

Our global energy system is changing. Achieving a zero-carbon future will rely on a diverse combination of measures, from extraordinary growth in solar and wind power to the wide-spread roll-out of electric vehicles, associated batteries and charging infrastructure. Our power grids will need to be modernized and we'll need to embrace new fuel sources like hydrogen and new technologies to capture value from surplus renewables.

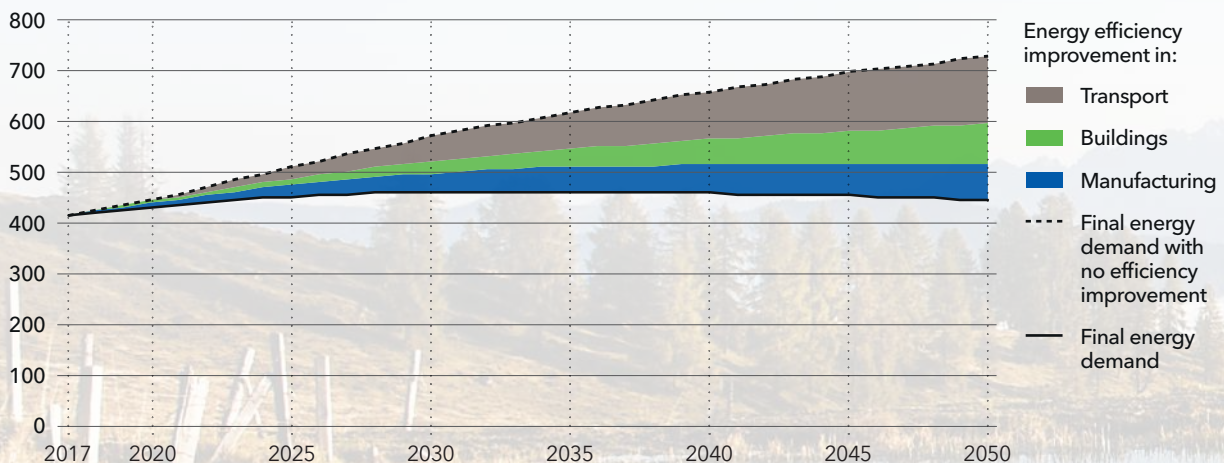
One area which has a large role to play and is a "hero" of the energy transition but often overlooked is energy efficiency. In DNV GL's analysis of emissions to 2050, energy efficiency helps reduce total energy demand

by almost 300 EJ/year from 2017 levels. Energy efficiency is a low-cost, readily available way to cut carbon emissions, but is implemented far less than available financial returns would merit.

DNV GL's Energy Transition Outlook (ETO) sees a world where energy demand will peak in 2033, due to energy efficiency gains that outpace economic and population growth. Our ETO highlights the continued need for energy users to strive for more energy efficient and low-carbon options and this is true for each of the most highly intensive energy use sectors: buildings, manufacturing and transport.

### The effect of the sectoral energy efficiency improvements on final energy demand

Units: EJ/yr



## Global energy use in 2050 by industry

### BUILDINGS



**29%**

of global energy use  
in 2050

Increasing deployment of energy efficiency products and controls, decarbonization of gas-uses, and transformation of buildings into grid flexible assets.

### INDUSTRY



**30%**

of global energy use  
in 2050

Electrification of heat and transport end-uses and transformation of carbon-intensive supply chains.

### TRANSPORT



**28%**

of global energy use  
in 2050

Rapid adoption of electric vehicles in residential, light and medium duty uses, and transformation of EV charging and road infrastructure.



Greater electrification will be one solution to achieving net-zero carbon targets for buildings and manufacturing. An increasing number of technical solutions are becoming available, such as heat pumps for low temperature heating, and electric arc furnaces for manufacturing.

Greater electrical demand from energy users, combined with growing variable generation from renewables, creates opportunities to provide greater value to power markets through demand-side management, allowing businesses to be rewarded for being flexible with their use of electricity by shifting or reducing demand, or by making capacity available through onsite generation, when needed.

In a rapidly shifting energy landscape, one thing is clear, energy demand reduction can be accelerated in each area through greater understanding and use of digital approaches.

Our research of almost 2,000 stakeholders within the energy industry reveals that 44% of respondents working within the energy efficiency sector have digitalization as a core part of their publicly stated strategy. However, just 24% of energy efficiency professionals feel more advanced than the wider energy industry in their application of digital technology.

When it comes to the perceived benefits of digitalization, energy efficiency professionals consider improving operational efficiency (55%), improving cost efficiency (40%) and improving decision making as the biggest advantages of digitalization.

**About the research:**

This report is based on a global survey<sup>1</sup> of 1,919 energy industry professionals. The respondents represent a range of business sizes from start-ups to large corporates and a range of functions within the industry, from board-level executives to senior engineers, developers and financiers.

---

<sup>1</sup> Conducted by Foresight Factory in December 2018 and January 2019



# 02

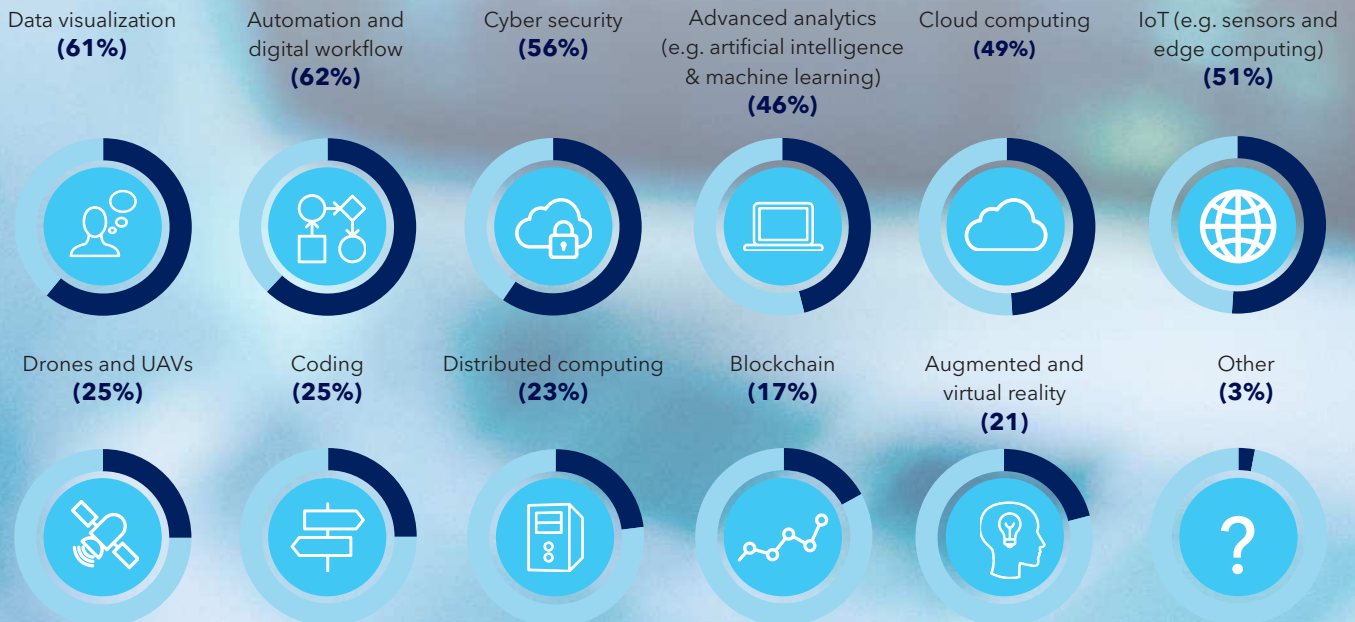
## DIGITALIZATION CAN DRIVE ENERGY EFFICIENCY FASTER

Much of the energy use in large buildings and in industry is administered using energy management systems and controls. Using more sophisticated digital tools, data analytics and visualization software will drive even better management. This includes replacing traditional metering with smart meter technology that is combined with machine learning capabilities, to enable organisations to analyse, understand and predict their energy use.

IoT, Data Visualization and Automation are also critical to support energy efficiency. Today's energy efficiency

industry has access to vast amounts of customer and product data. This data can be utilized and analyzed with increasing granularity opening up a range of services and solutions to help customers act. The challenge comes in supporting energy users to access this data. These barriers were clear in our survey, with 41% of respondents stating that a lack of digital technology skills is a barrier to digitalization within their organisation. A lack of digital mindset by staff was also considered a barrier by 41% of respondents. Concerns about data sharing and their internal organisation, including a focus on other priorities, was also stated as significant barriers.

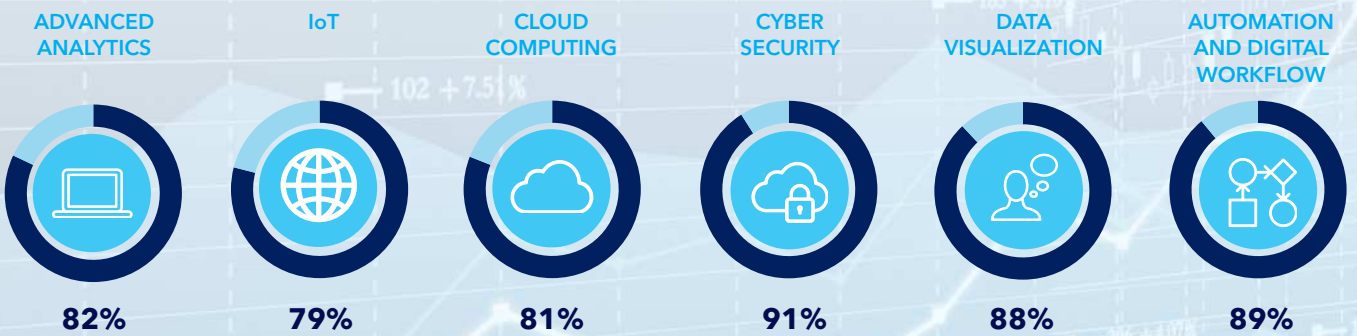
### Which technologies are impacting the energy efficiency sector?



# 03

## WHICH TECHNOLOGIES ARE CONSIDERED IMPORTANT FOR INVESTMENT?

A key challenge with digitalization is keeping pace with technological change and user adoption rates. The following technologies were identified by the energy efficiency sector as being important for their organization to invest in.



When it comes to putting these technologies into practice, the energy efficiency sector respondents believe that the impact of digitalization will be felt over the whole life cycle of a project from development to construction and operations. Today, the use of these digitalization technologies is mainly for product improvement and operational optimization using IoT, data visualization and automation as well as cyber security for compliance purposes.

### Organizational goals for digitalization

The key drivers for the energy efficiency respondents regarding their digitalization strategy are improving business efficiency (89%), reducing costs (72%), and creating new products and services (56%).

# 04

## INVESTING IN THE FUTURE

Globally, energy efficiency is being addressed by long- and short-term strategies and policies. Energy efficiency is acknowledged as having a fundamental role to play in helping to meet climate targets. Many countries are taking steps to progressively decrease energy consumption by 2030, with a focus on buildings, industry, and transport. It's unsurprising then that our research reveals unanimous recognition that digital skills training is needed within the energy efficiency industry, to enable it to keep pace with the strategic priorities of organisations, governments and societies.

92% of participants stated that digital skills training is fundamental for their organization to invest in. When questioned about which skillset would be most important for the energy efficiency sector to have in its workforce, the following three stood out as priorities:

Artificial intelligence  
and machine learning

**40%**

Big data analytics

**37%**

Creativity

**33%**

Employees with  
sufficient combined data  
and domain expertise

**31%**

As investments in renewable energy and new technologies soar, being smarter about how and when we use our energy is essential. We need to recognize that we all have a part to play whether that is within industry, buildings or as consumers, and that energy efficiency has an essential role to play in lowering carbon emissions, as our secret weapon in the fight against climate change.



**DNV GL - Energy**

Utrechtseweg 310-B50  
6812 AR Arnhem  
The Netherlands  
Tel: +31 26 356 9111  
Email: [contact.energy@dnvgl.com](mailto:contact.energy@dnvgl.com)  
[www.dnvgl.com](http://www.dnvgl.com)

**DNV GL**

DNV GL is a global quality assurance and risk management company. Driven by our purpose of safeguarding life, property and the environment, we enable our customers to advance the safety and sustainability of their business. We provide classification, technical assurance, software and independent expert advisory services to the maritime, oil and gas, power and renewables industries. We also provide certification and supply chain services to customers across a wide range of industries. Operating in more than 100 countries, our experts are dedicated to helping customers make the world safer, smarter and greener.

**In the power and renewables industry**

DNV GL delivers world-renowned testing and advisory services to the energy value chain including renewables and energy efficiency. Our expertise spans onshore and offshore wind power, solar, conventional generation, transmission and distribution, smart grids, and sustainable energy use, as well as energy markets and regulations. Our experts support customers around the globe in delivering a safe, reliable, efficient, and sustainable energy supply.

The trademarks DNV GL and the Horizon Graphic are the property of DNV GL AS. All rights reserved.  
This publication or parts thereof may not be reproduced or transmitted in any form or by any means, including photocopying or recording, without the prior written consent of DNV GL.