IEA Workshop on Energy Management Systems and Digital Technologies

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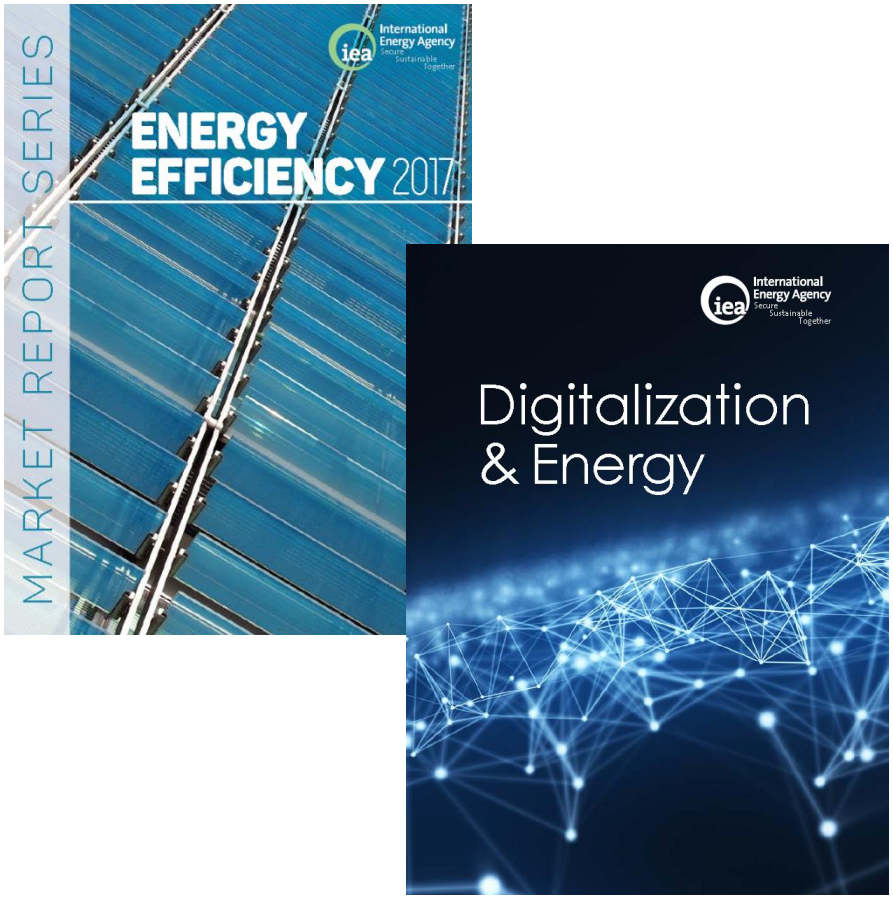
IEA

Energy efficiency and digitalization



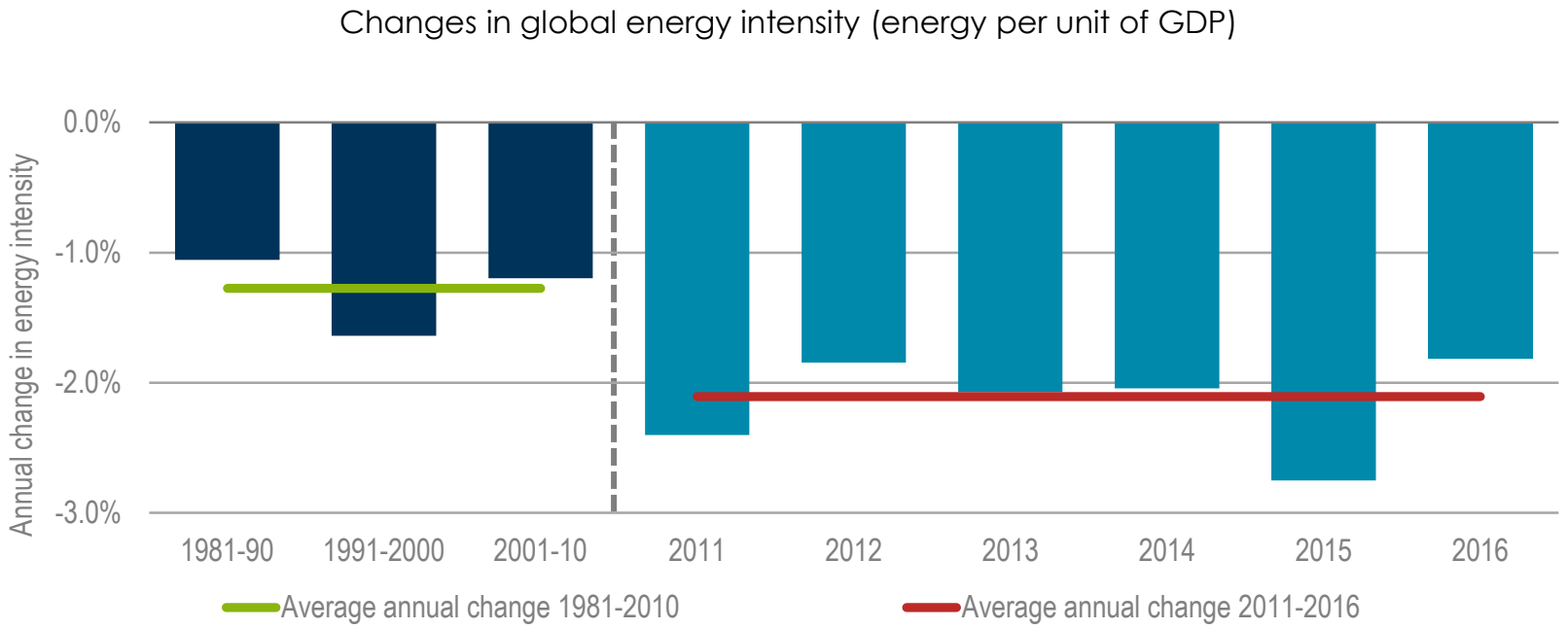
- Recent IEA publications have examined industrial energy efficiency and digitalization trends.
- Both are evolving and expanding areas of work for the IEA
- Digitalization is and will continue to have a major impact on the global energy system.
- This is a challenge and opportunity for policy makers

Some definitions

- Energy management system:
  - The structures and processes to monitor energy consumption and improve energy efficiency in an industrial or commercial firm.
  - Global standard is ISO 50001

- Digitalization:
  - The growing application of information, communication and telecommunications (ICT) technology across the economy, including energy systems
  - Three fundamental elements:
  1. Data
  2. Analytics
  3. Connectivity

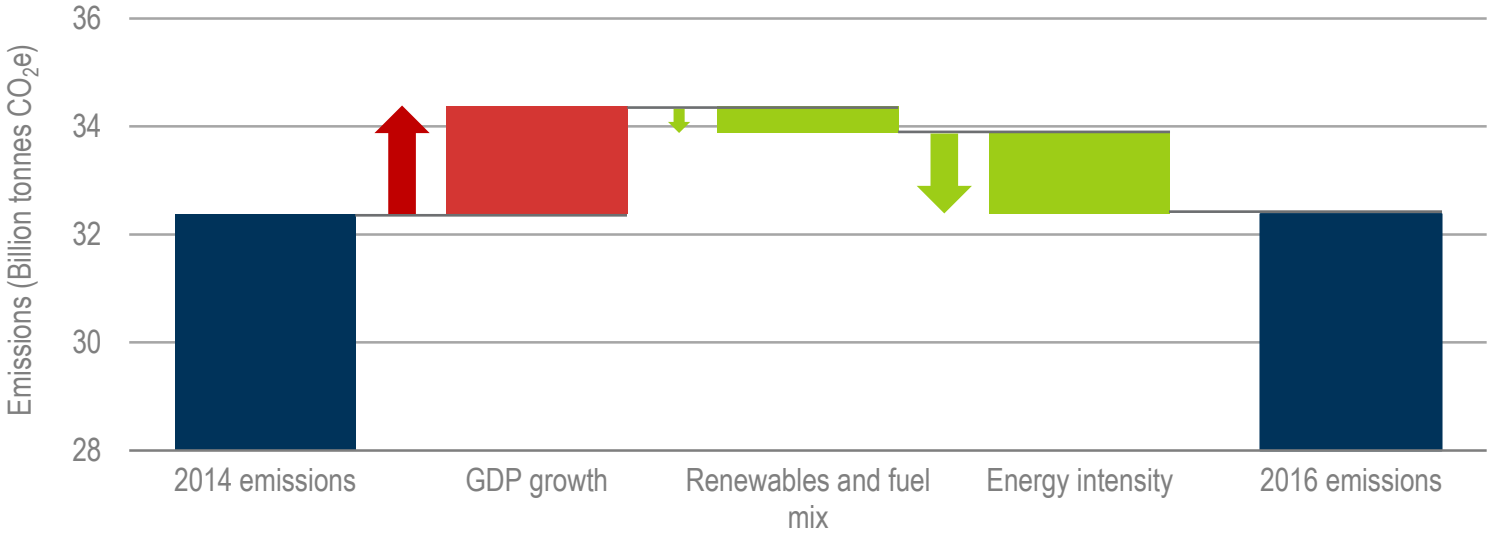
The global economy is becoming less energy intensive



This decade has seen intensity improvement rates at almost double the historic average, suggesting that the world has entered a new era of faster intensity gains.

Energy efficiency is helping to keep emissions down

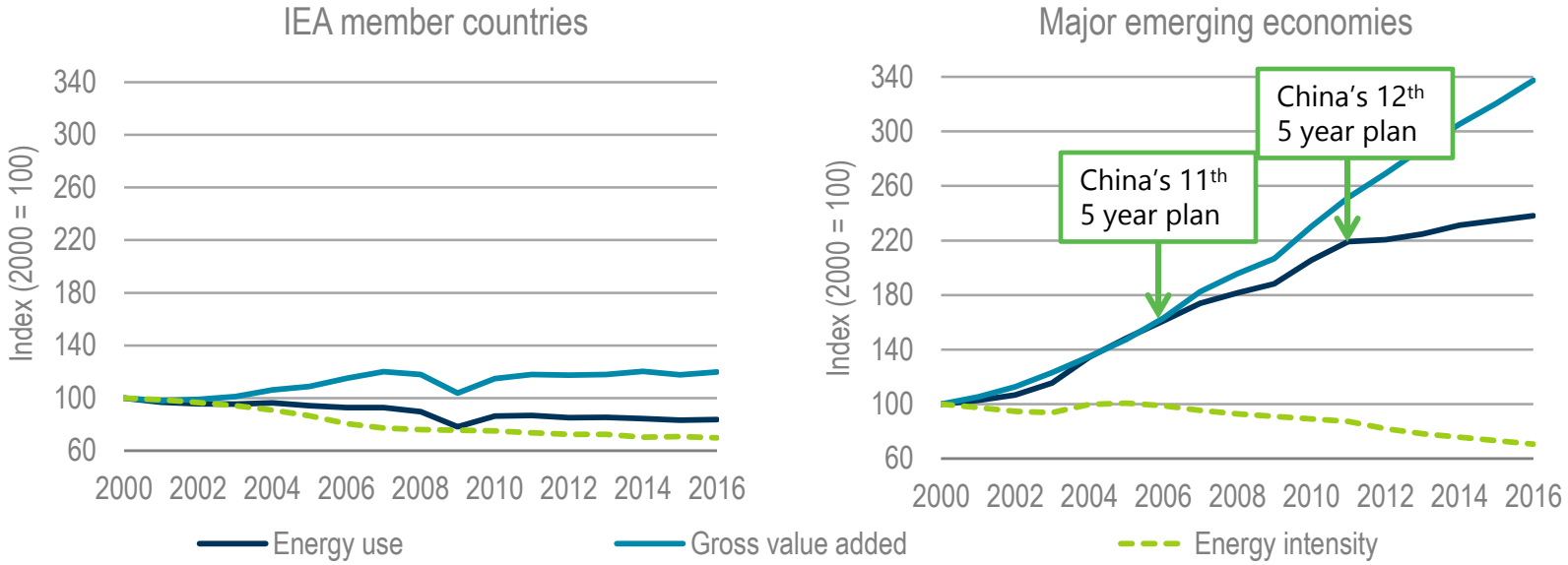
Factors influencing greenhouse gas emissions, 2014-16



Emissions would have been 2 billion tonnes higher in 2016 if it had not been for energy efficiency improvements and the move towards renewables and cleaner fuels

Industrial energy intensity is falling

Industry energy intensity and productivity trends in IEA member countries and major emerging economies, 2000-16

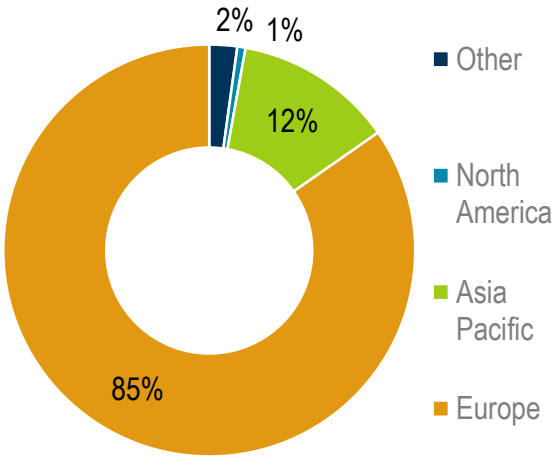


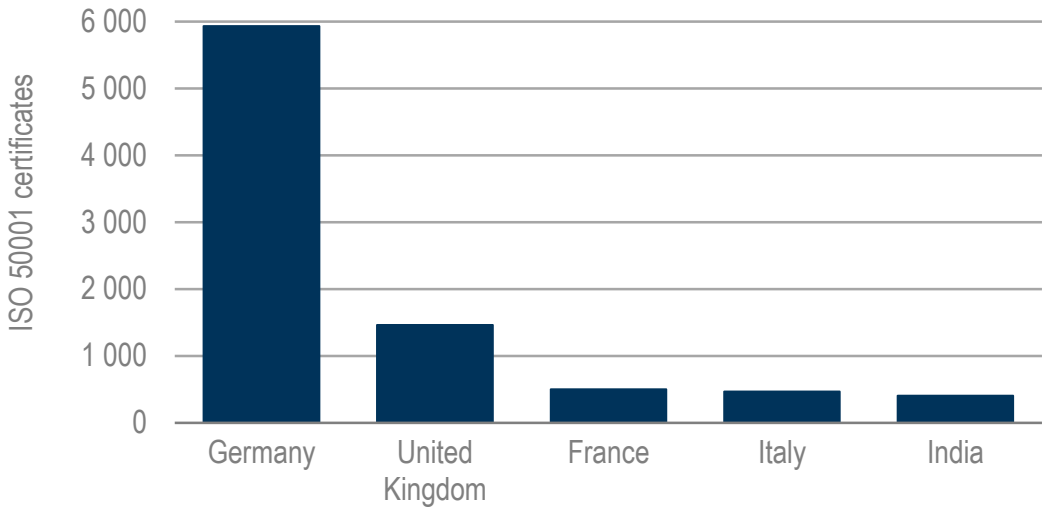
Major emerging economies are the People's Republic of China, India, Mexico, Brazil, Indonesia and the Russian Federation

Between 2000 and 2016, energy intensity in the industry sector decreased by 30% in both IEA countries and emerging economies

Energy management systems are growing

ISO 50001 certifications by region and country, 2011-15

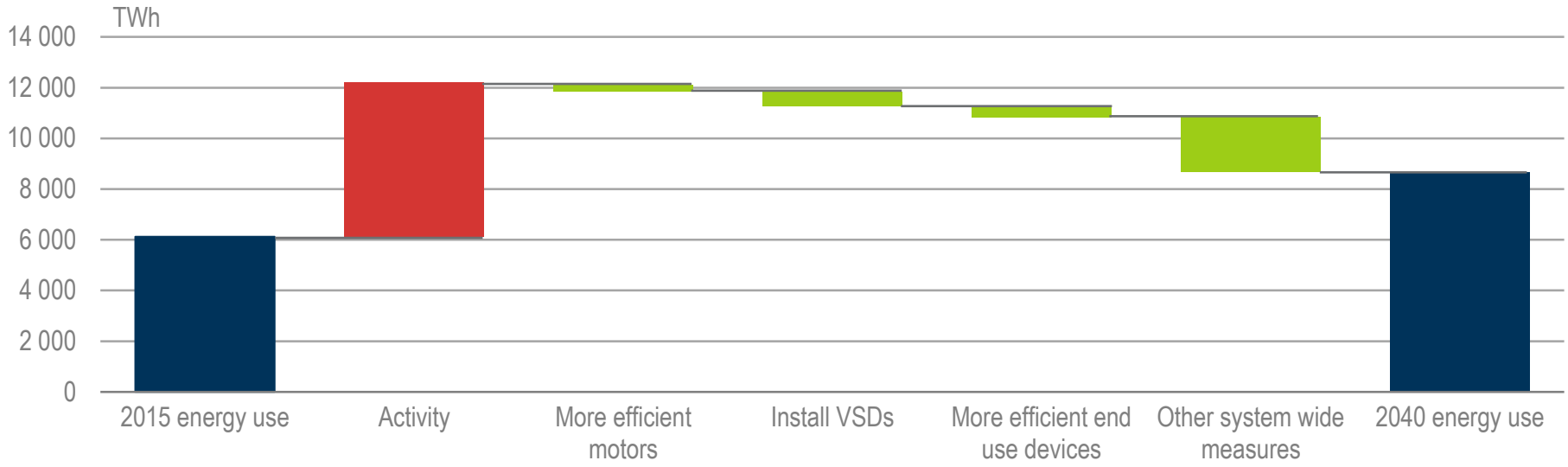




By the end of 2015, there were nearly 12 000 ISO 50001 certifications globally, the vast majority of which were in Europe. Chinese companies favour a different energy management system (GB/T 23331)

Energy management must increase to meet climate targets

Change in global demand in industrial electric motor-driven systems to meet IEA 450 scenario, 2015-40



Source: World Energy Outlook, 2016, 450 scenario

Energy use of motor-driven systems will need to be 17% less than current projections to meet climate targets. Efficiency gains are driven mainly by other system-wide measures

Digitalization trends are truly astounding

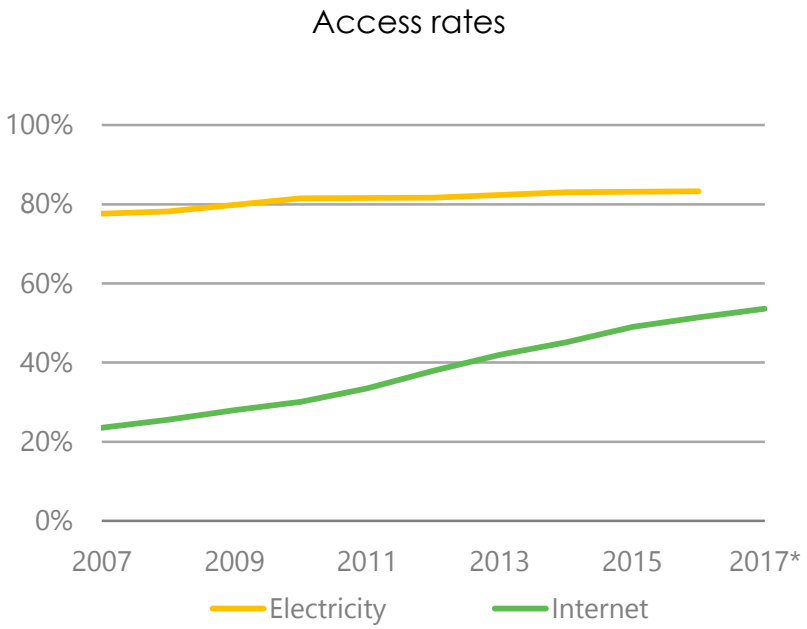
KB	kilobyte	10^3 bytes
MB	megabyte	10^6 bytes
GB	gigabyte	10^9 bytes
TB	terabyte	10^{12} bytes
PB	petabyte	10^{15} bytes
EB	exabyte	10^{18} bytes
ZB	zettabyte	10^{21} bytes
YB	yottabyte	10^{24} bytes

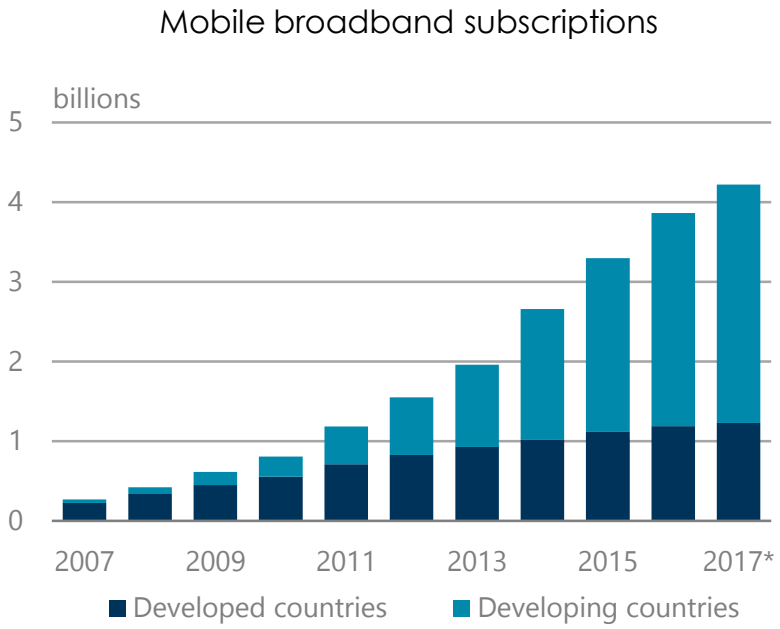
Annual internet data traffic

Sources: Cisco (2017). The Zettabyte Era: Trends and Analysis June 2017; Cisco (2015). The History and Future of Internet Traffic.

Internet data traffic is growing exponentially, tripling over the past five years

The world is becoming more connected

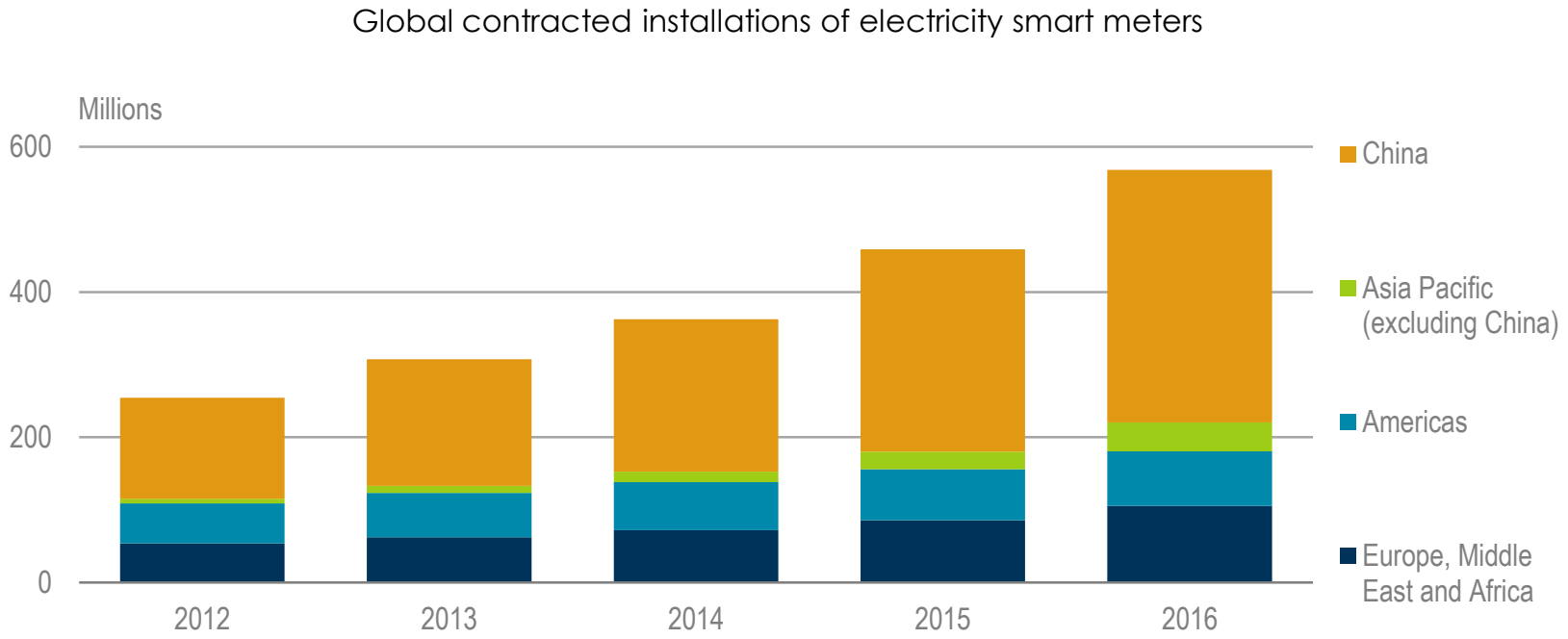




Sources: ITU (2017), ICT Facts and Figures 2017; IEA (2017), Energy Access Outlook: From Poverty to Prosperity.
*Note: * denotes estimate for 2017; "Internet access" is defined as households with internet access at home; developed/developing country classifications are based on the UN M49.*

About half the global population are now using the Internet, up from only 8% in 2001 (ITU, 2017)

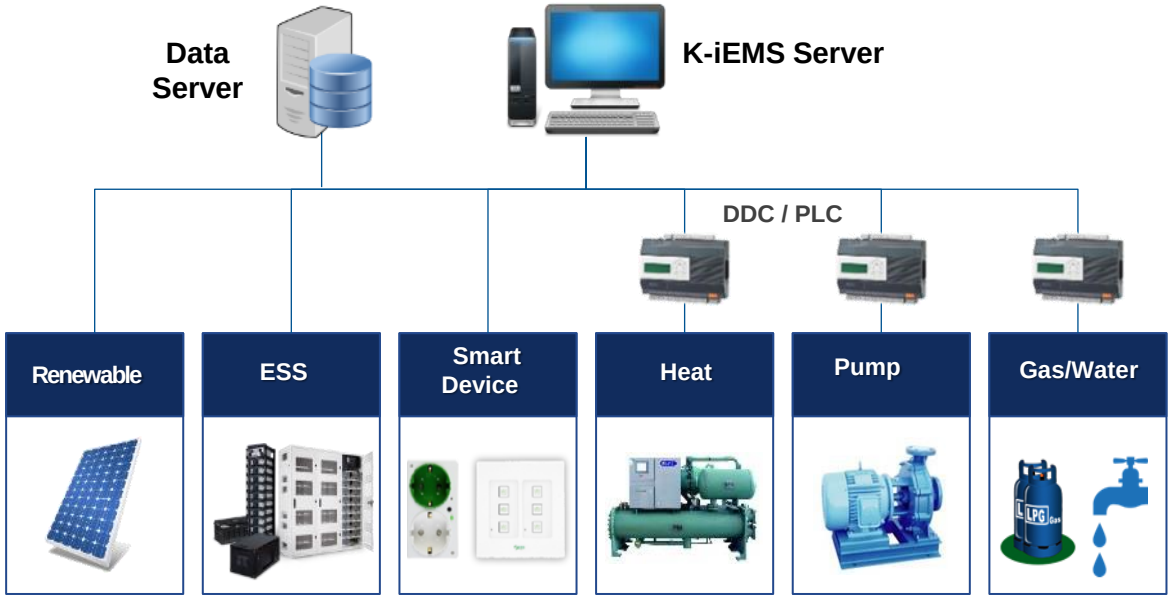
Smart meters installations are quickly accelerating



Source: Bloomberg New Energy Finance (2016), *Smart-meter factpack 2016;* US ITC (2014), *Global Market for Smart Electricity Meters: Government Policies Driving Strong Growth,* www.usitc.gov/publications/332/id-037smart_meters_final.pdf

Smart meters enhance data availability for electricity use fast enough for household occupants (or devices) to respond in real time

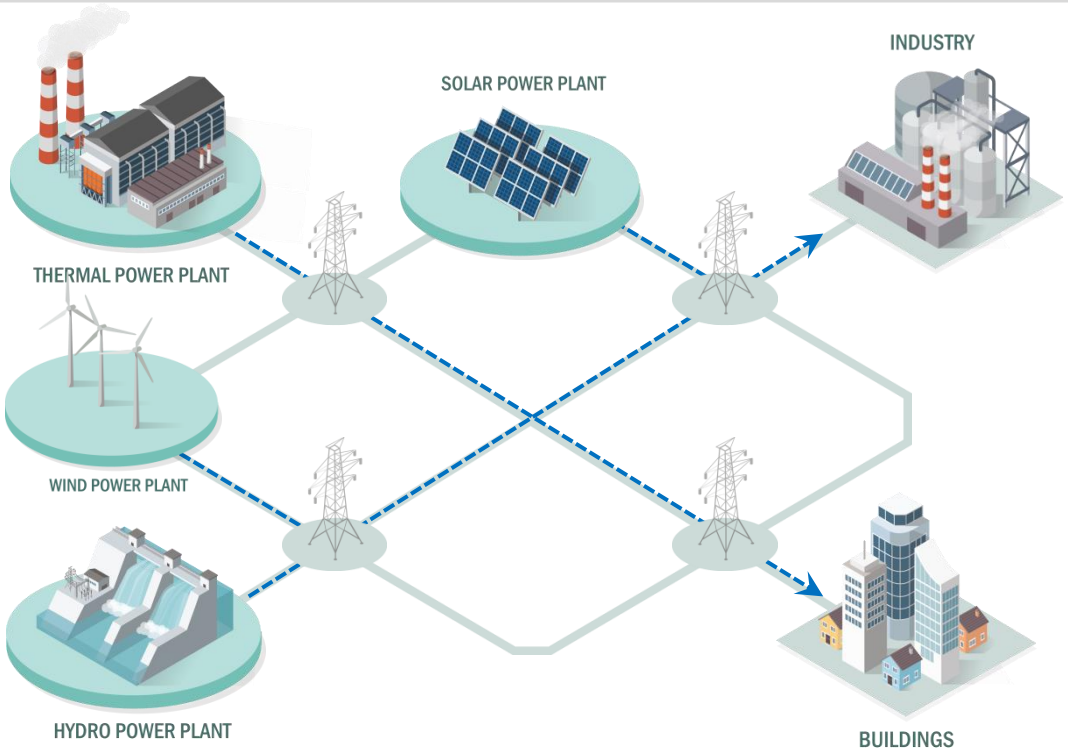
Future technologies will improve data capture and analysis



Source: Tae-Il (2017)

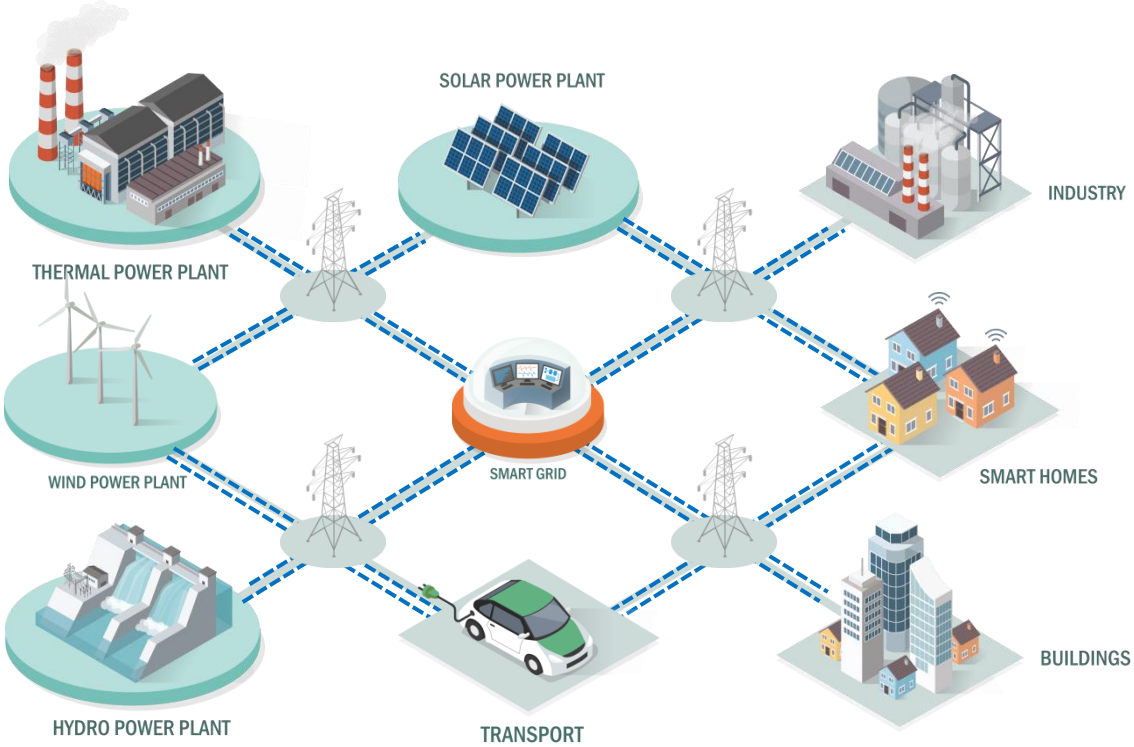
Integrated data collection and control systems can improve understanding of energy use and the ability to optimise performance

The digital transformation of the energy system



Pre-digital energy systems are defined by unidirectional flows and distinct roles

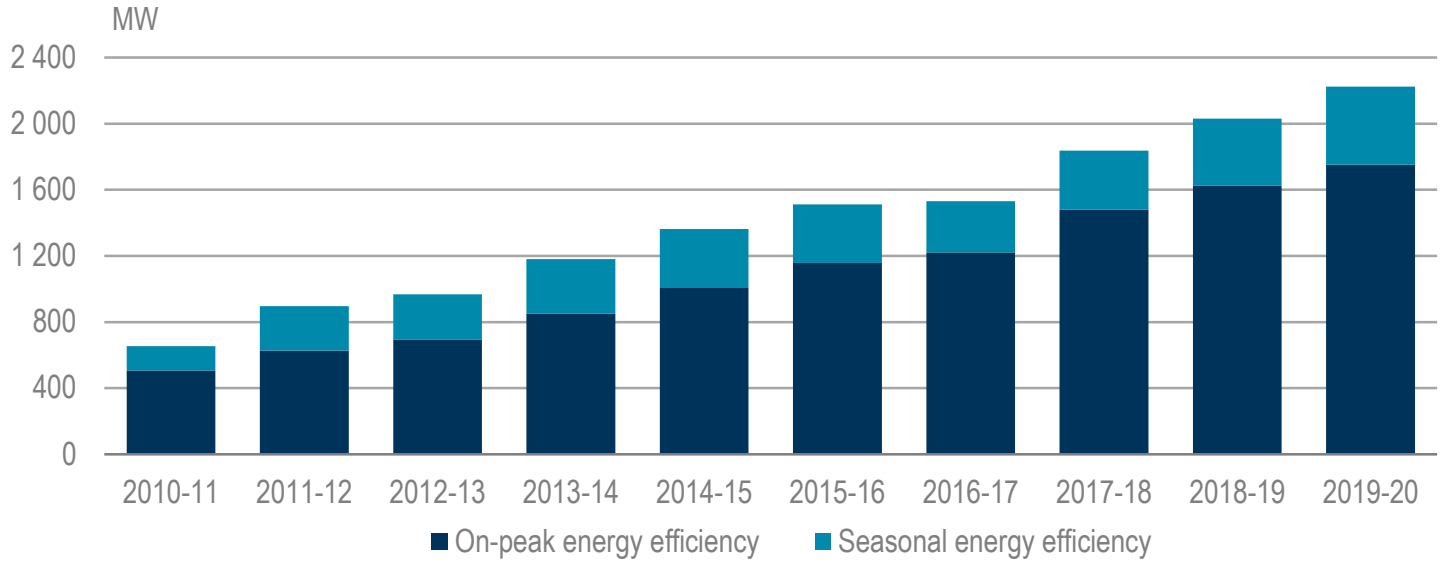
Smart demand response



Demand response programs – in buildings, industry and transport - could provide 185 GW of flexibility, and avoid USD 270 billion of investment in new electricity infrastructure

More efficiency is being accepted in capacity auctions

Energy efficiency savings accepted in the ISO-New England(NE) capacity market



In the ISO-NE capacity market, over 2 200 MW of efficiency resources cleared the recent auction, more than triple the amount cleared for delivery in 2010/11 and represented 6% of the total capacity cleared.

The workshop

- Three key focus areas:
  1. The impact and drivers of energy management systems
  2. The impact of digital technologies within industry
  3. The role of government policy and measures in driving uptake and improving effectiveness

- Interventions and questions welcomed throughout the workshop

- Want to capture discussions and identify areas for potential further work and collaboration

- Workshop is being livestreamed: http://www.iea.org/workshops/iea-industrial-energy-efficiency-workshop.html

Session 1

Energy Management Systems – Impacts, policies and incentives

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