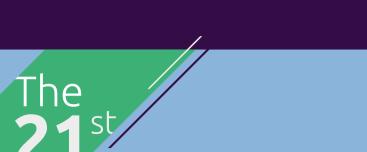


World Energy Markets Observatory

Climate goals at risk as global energy demand rises





Capgemini

annual World Energy Markets Observatory (WEMO) reveals a world struggling to balance the the desire for continued economic growth with

the need to take deliberate and drastic steps against climate change.





Global Consumption

growth since 2010

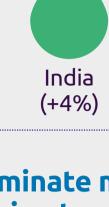
Energy demand by 2040



Global Consumption

growth by country

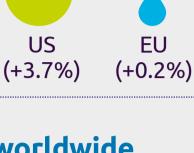
Consumption



(+3.5%)Fossil fuels still dominate much of the worldwide energy mix, hampering transition efforts

of energy demand growth

China





Oil, gas and coal 75%



42% coal

power capacity



Coal mining capacity



India

59%

of power



generation capacity fueled by coal (in 2017)

under construction (outside China

Bangladesh, Indonesia, Pakistan,

Philippines, and Vietnam



Global GHG emissions

despite significant reductions in EU



2050 goals

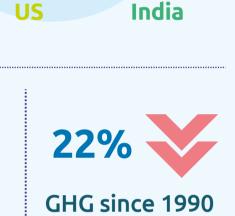


still falls short of 2030 &

CO₂ in 2018

China

2.5%





Renewables are the fastest growing energy source, but momentum has dipped—threatening long-term climate goals and mass transition

14.5%

Global renewables growth



-4% -39% China



14% to \$217B

Q1-2 2019 global clean energy investments







Onshore wind

-13%



Offshore wind

-1%







Bioenergy -14%



hydropower

-11%

Solar PV -13%



34% China 1.28M **EU 410K**

78%

China

4.4%

Intelligent automation holds enormous potential

for the utility industry, though few organizations

24 months by companies under study

Energy as a service

Comfort as a service

Flexibility as a service

Energy marketplace

Global Electric Vehicle (EV) adoption

Sales by country:



EV market share of sales:

the energy sector

Continuous advancement in existing technology will drive incremental gains over the next two decades in 5G network | Smart grid | AI, ML & Robotics |

EU

3%

Carbon Capture & Storage

US

2%

79%

US 358K

Norway

32%

\$237 - \$813B savings opportunity

have deployed the technology at scale At-scale deployment in energy and utilities by country: **US: 23%** France: 16%

India: 16%

Traditional business models in the energy sector are

under pressure, spurring a global shift to services

Business models deployed or planning to be deployed within

93% 92% 76% 63%

56%

56%

44%

38%

30%

UK: 8%

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Generation and storage @home Wholesale energy trading services Microgrid as a service EV services / infrastructure Local P2P energy exchange platform

Geopolitical considerations are increasing global



aggressive international policy Middle East: ongoing instability affecting oil exports

Sources: IDC for Capgemini, 2019

and global supply

production due to sanctions and regional instabilities China: may use supply of rare earth materials during trade negotiations,

Iran & Venezuela: decreased oil

energy market volatility US: oil independence prompted

About WEMO The World Energy Markets Observatory (WEMO) is Capgemini's annual thought leadership and research report that tracks the development and transformation of electricity and gas markets in Europe, North America, Australia, Southeast Asia, India and China. Now in its 21st year, WEMO examines the following topics: climate change & regulatory policies; energy transition; infrastructure & adequacy of supply; supply & final customer; transformation; and financials.