accenture

Role of digital technology in energy transition

Discussion with Case Study

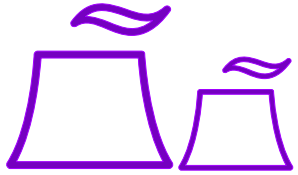
1ST OCTOBER 2020

SATOSHI YAMAZAKI

THREE STRATEGIC PLAYS PROVIDE NEW VALUE DRIVERS FOR THE ENERGY COMPANY OF TOMORROW

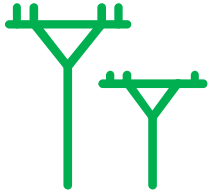
CURRENT

NEW



Conventional generator

- Large-scale renewables
- Seasonal storage
- Hydrogen
- Biofuels

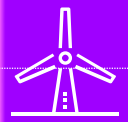


Grid operator (TSO/DSO)

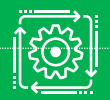
- Smart DSO – Manage congestion
- Accommodate DER in the grid
- Flex markets
- Data hub for market facilitation
- Biogas, Hydrogen distribution

Commodity-centric supplier

- Retail Energy Management Services (REMS)
- Decentralized Energy Resources (DER)
- Electric vehicles
- Flexibility services



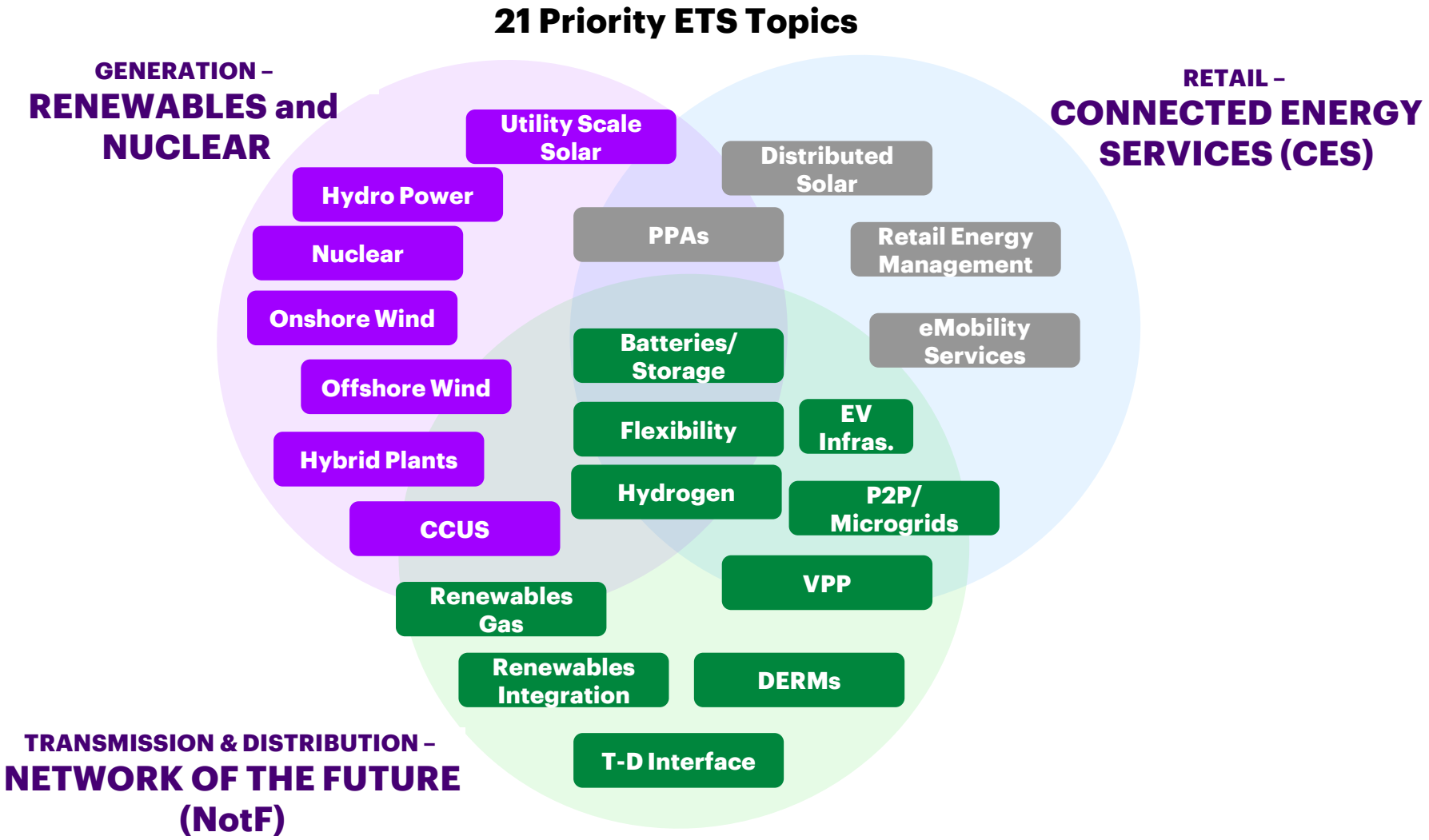
RENEWABLE GENERATION



NETWORK OF THE FUTURE

CONNECTED ENERGY SERVICES

THE ENERGY TRANSITION IS TRANSFORMING ALL SEGMENTS



UK OFFSHORE WIND IN NUMBERS

Case1

7.9GW/ 38 farms

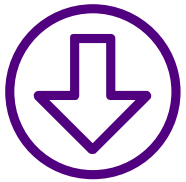
Offshore Wind Installed Capacity (largest in the world, 43% of Europe)

>8% generation

Offshore wind supplied 8% of the UK's total estimated electricity generation in 2018. It was higher in 2019 and increasing

£39/MWh

UK 3rd round cfd auction £39.65 ($50.05)



30GW

Target capacity by 2030 with 5.8GW financing secured or under construction

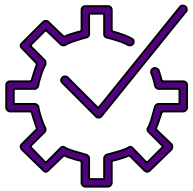
40%

Average offshore wind capacity factor

40%

LCOE in the Operations phase (and 70% of the time)

12MW



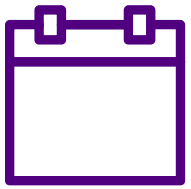
Size of the largest fixed offshore wind turbines, to be installed at SSE's and Equinor's Dogger Bank development (largest is 8.8 GW)

659MW

World's largest offshore wind farm- Walney Extension completed in 2018

>30 years

Some new projects estimate potential asset life

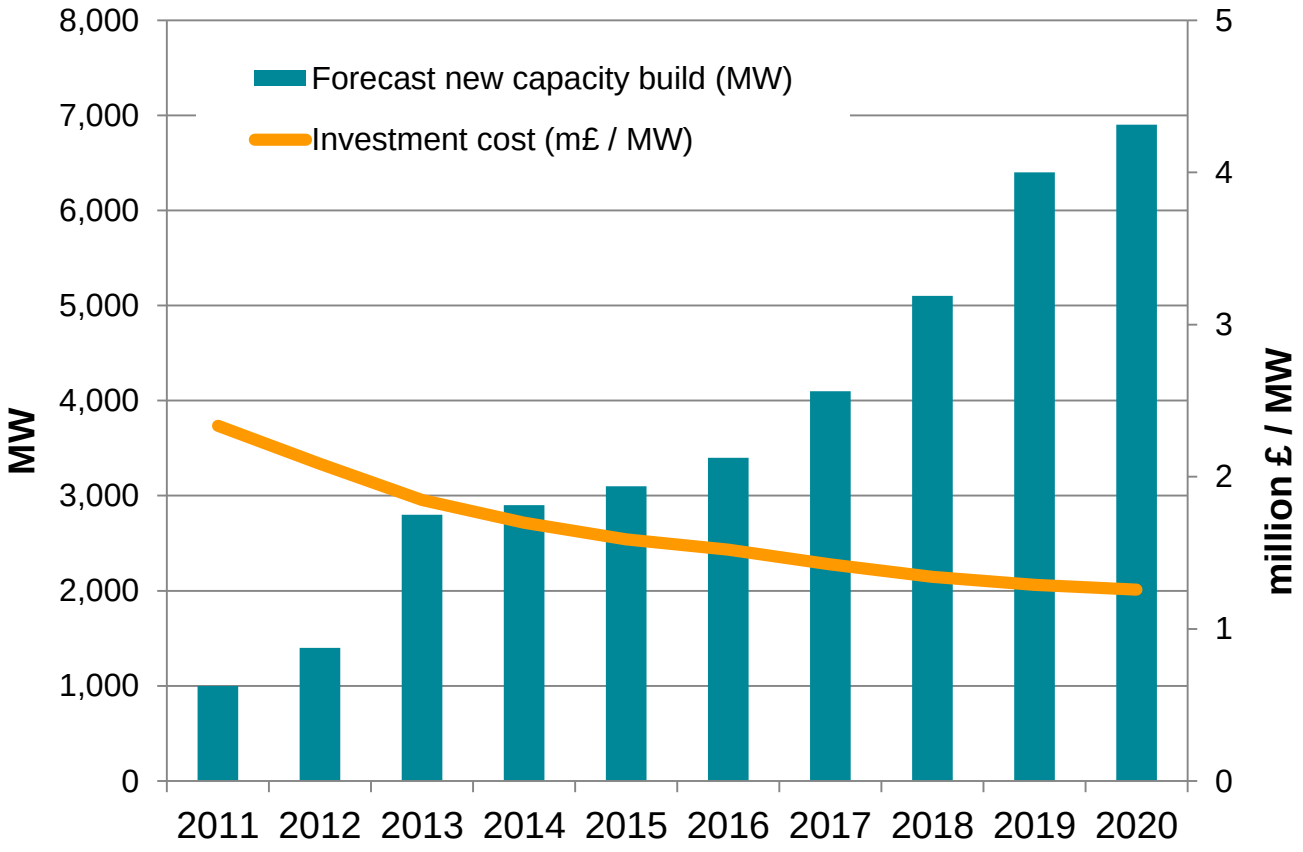


Sources: Accenture research and analysis, Crown Estate, Offshore Wind Operational Report , Company websites. As of Mar 2020

HISTORY OF OFFSHORE WIND IN THE UK

Case1

FORECAST in 2011



Source: 2011 Accenture offshore wind report

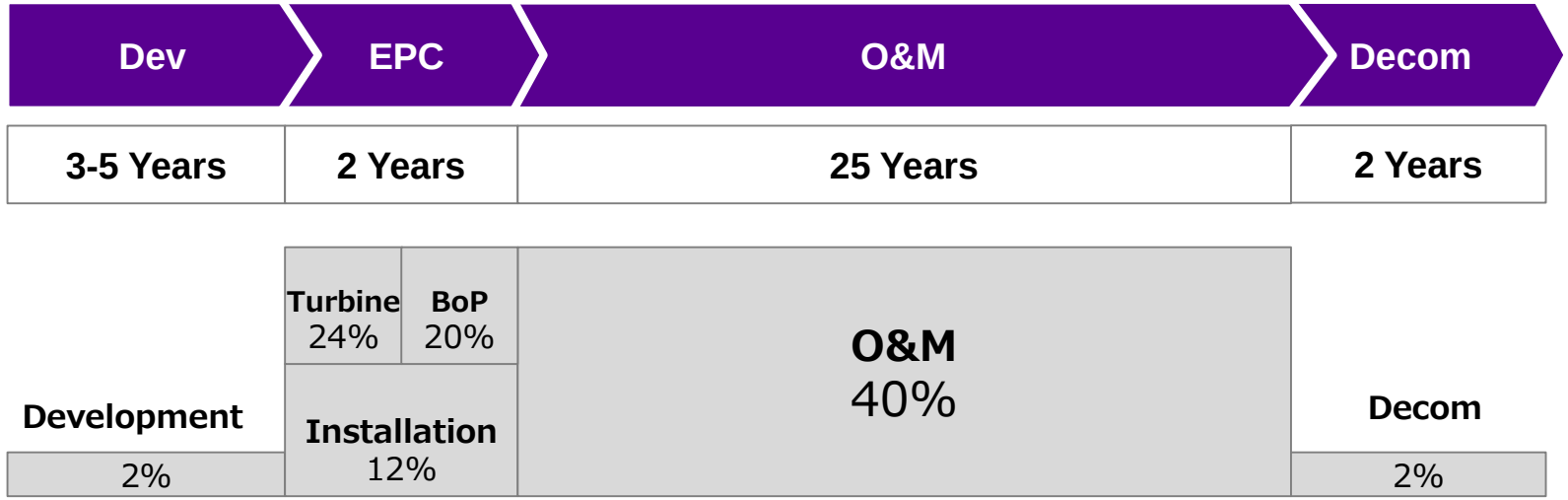
It actually happened. How?

- LCOE change, from >£150/MWh to est. 3rd round auction of <£40
- Turbine size, from <2MW to 8.25MW to 12MW
- Offshore visits cut in ½ over the last 4 years
- From 30% capacity factor in 2005 to 40% in 2018. Some newer sites can achieve 50%
- Turbine supply chain and development of other local supply chains
- Purpose built vessels

OFFSHORE WIND COST STRUCTURE

Case1

40% OF COSTS, AND 70% OF TIME SPENT NOW IN OPERATIONAL PHASE



Source: Offshore Wind Catapult

KEY CHANGE FROM 2011 TO 2020

- In-house EPC capability enabling decisions that will reduce LCOE (e.g**. invest in CBM to save on O&M**)
- More O&M control post warranty, and renegotiating/ restructuring full-service O&M contracts
- **Investing in digital and automation given largely manual processes** where problems repeated over 100x
- Increased focus on the basics: logistics, maintenance, materials supply chain, workforce processes

ENERGY IOT PLATFORM

Case2

COMMERCIAL ENERGY IOT PLATFORM IS ALREADY AVAILABLE AND STRONGLY SUPPORT "CARBON ZERO WORLD".

- ✓ Envision Energy is founded in 2007. Now Top 5 in world wind turbine.
- ✓ Envision Digital provides comprehensive Energy IoT platform, EnOS™ . Big data and advanced analytics

90+ GW

16+ GW

Thank you all for listening.

accenture