

The background of the slide is a photograph of several offshore wind turbines in a field over the ocean. A large, semi-transparent graphic of binary code (0s and 1s) is overlaid on the image, appearing to flow from the top left towards the center. The Siemens logo is positioned in the top right corner.

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Ingenuity for life

Offshore Wind LCoE towards 2020 and beyond

Global Wind Day, Seoul, Korea

Siemens Wind Power Offshore – Facts at a glance

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Pioneered the offshore market and current market leader

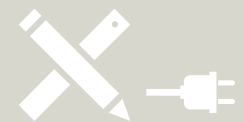
More than 25 years of offshore experience

Sold more than 3,100 offshore turbines

Installed base: >2000 turbines with >7 GW capacity

Known for robust design with innovative solutions

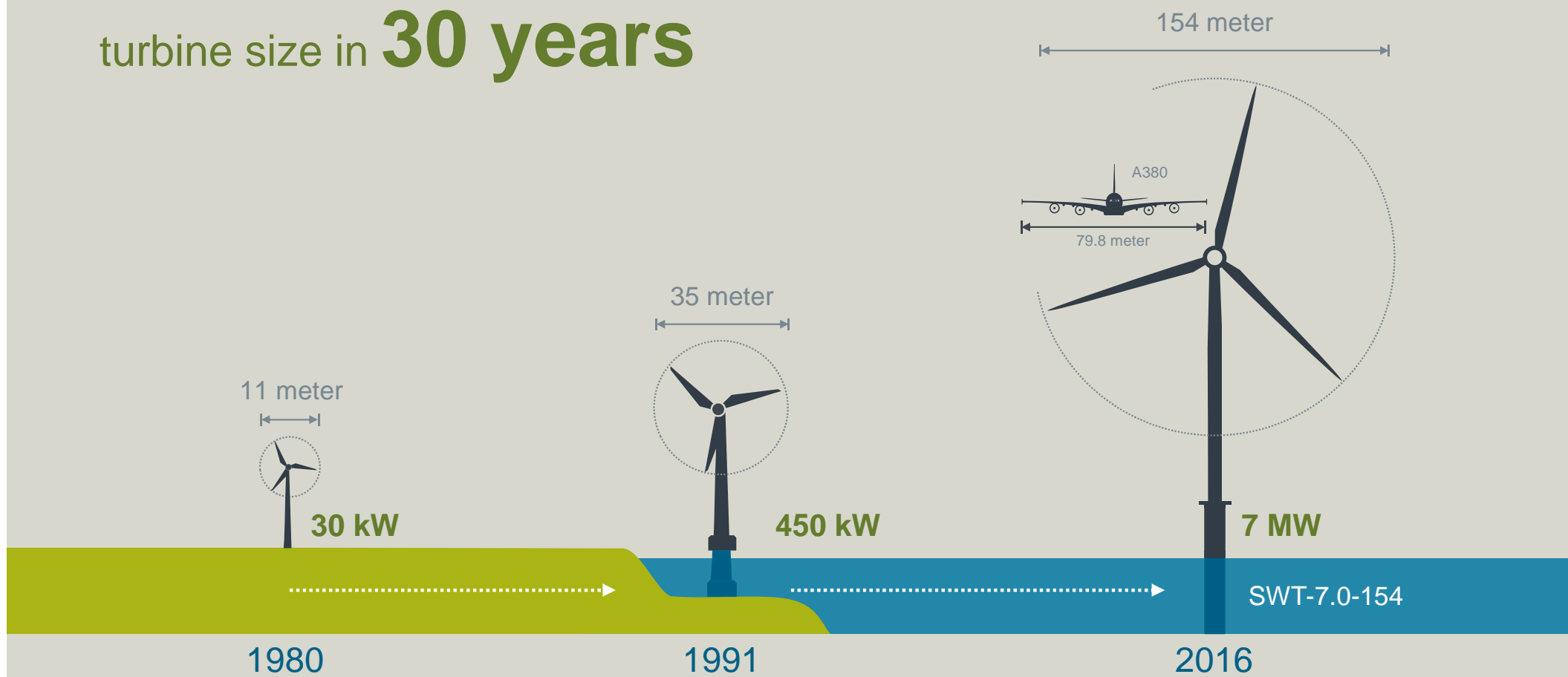
A proven 25+ year product lifetime and >95% real availability



Innovation – An amazing development!

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From **30 kW** to **7 MW**
turbine size in **30 years**



Size of wind power plants – From few turbines to huge offshore wind power plants

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1991

Vindeby

World's 1st
offshore wind
power plant

5 MW



2000

**Middel-
grunden**

World's 1st
offshore wind
power plant
w/MW turbines

40 MW



2003

Nysted

World's largest
offshore wind
power plant in
operation

166 MW



2012

**Greater
Gabbard**

World's largest
offshore wind
power plant in
operation

504 MW



2013

**London
Array**

World's largest
offshore wind
power plant in
operation

630 MW



2016

**Gode
Wind**

Next big power
plant based on
the D6 platform
in operation

582 MW

The yardstick to measure cost of energy progress – LCoE

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Levelized
Cost of
Energy
(LCoE)

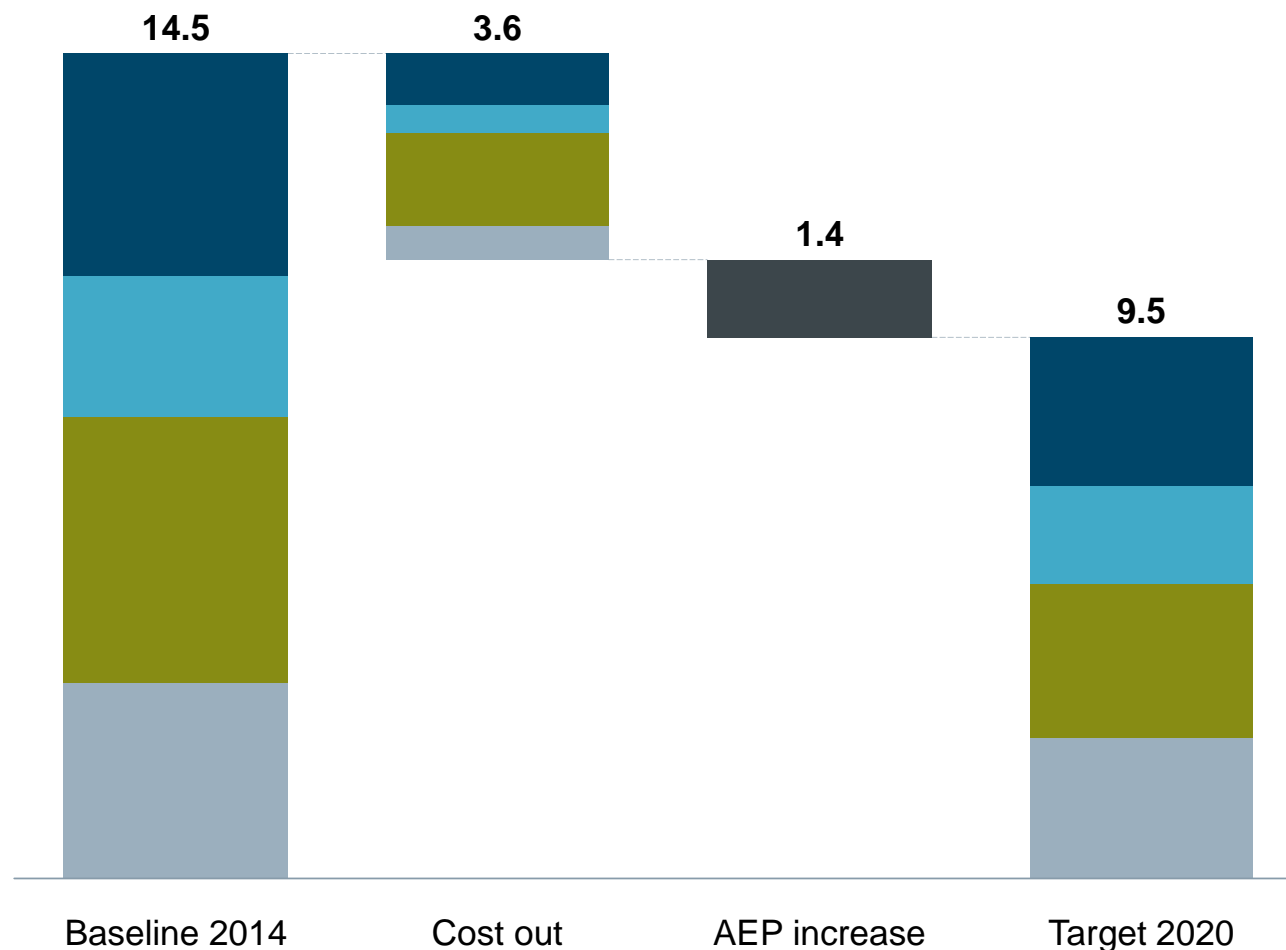


$$\begin{array}{c} \text{= } \frac{\begin{array}{ccc} \begin{array}{c} \text{CAPEX} \\ \text{Wind turbine} \end{array} & + & \begin{array}{c} \text{CAPEX} \\ \text{BoP} \end{array} & + & \text{OPEX} \end{array}}{\text{Lifecycle Energy Output}} \end{array}$$
A blue icon of a lightbulb with rays emanating from it, representing energy output.

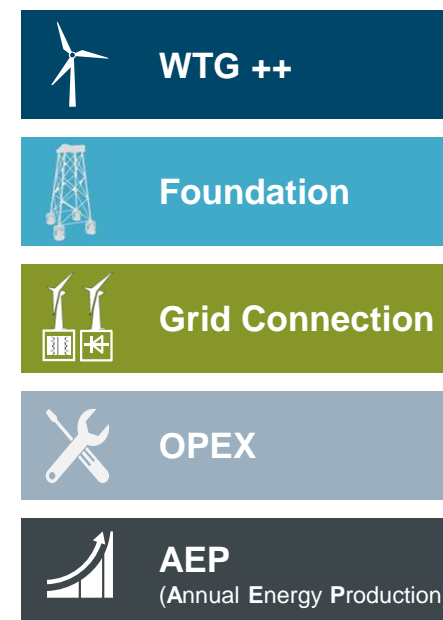
Siemens defined clear targets – Reaching LCoE below 10 ct €/kWh by 2020

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ct.€/kWh



2014 Targets setting



Based on the SWT-6.0-154 turbine; Offshore project 1 GW, 50m water depth, 114 km from shore

Unrestricted @ Siemens AG 2016

2016 – LCoE Status Key Achievements

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SWT-7.0-154



- 10% increased AEP
- Improved electrical system
- Less positions needed on park level
→ less BoP/CAPEX

Radical solutions:
No platform



HVAC



40%
Lower costs

OPEX/Services:
Innovation



Logistics



Optimization

Long-term frame agreements

Efficient Operations

Optimization of Processes

Towards 2020

Key Next steps

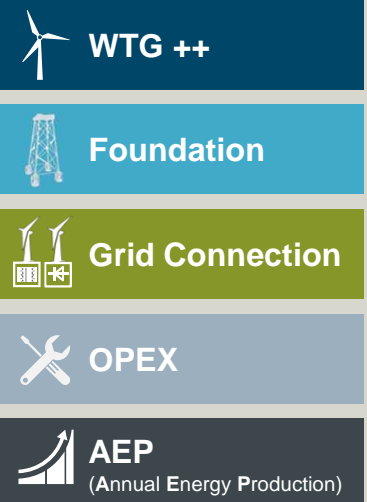
Cost reduction through Wind turbine innovation

Cost reduction through Industrialization

Cost reduction through optimized Projects execution

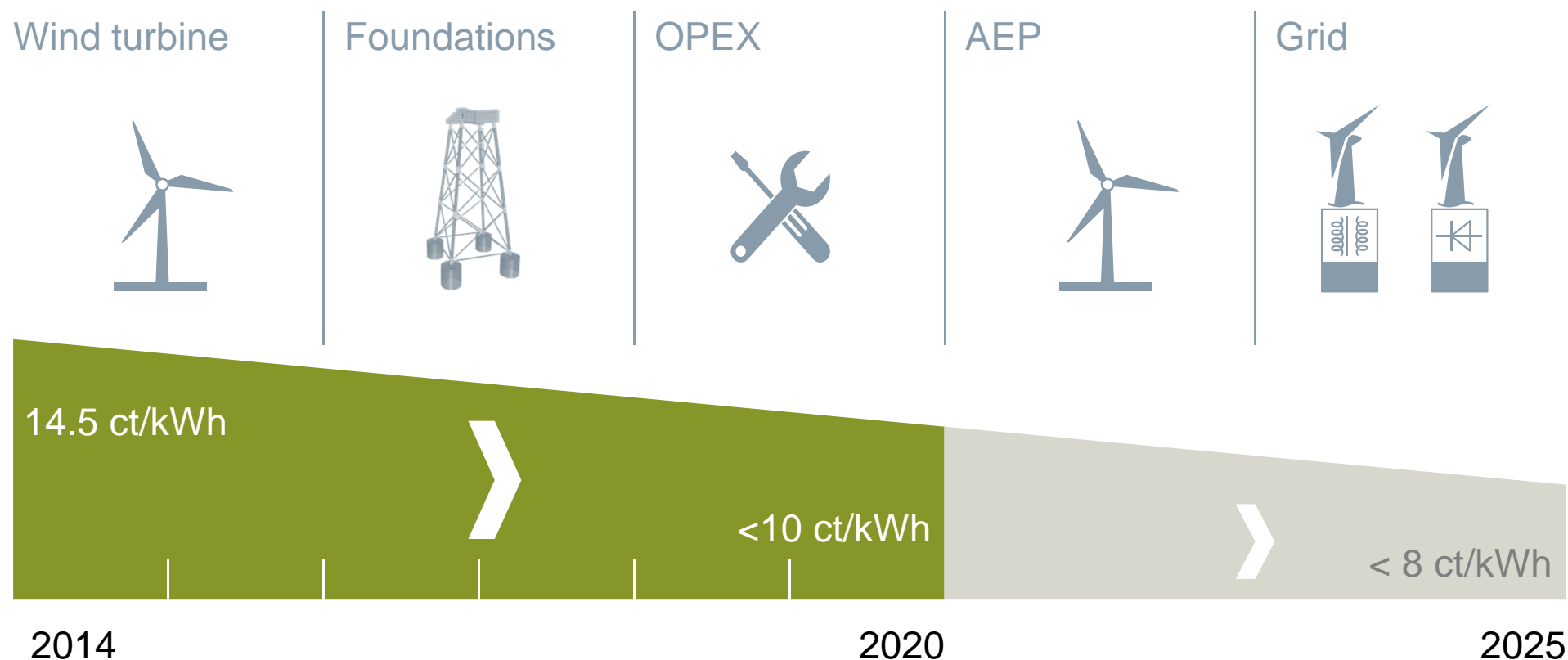
Cost reduction through Foundations concept

Cost reduction through a new Grid innovative concept



Beyond 2020

Continuous LCoE reductions beyond 2020



The background image shows a close-up of a wind turbine's hub and blades in the foreground, with several other turbines visible in the distance over a dark sea under a cloudy sky. Overlaid on the image are various digital elements: a stream of binary code (0s and 1s) flowing diagonally across the center, a network of yellow lines connecting the turbines, and some faint circular radar-like patterns. The Siemens logo is in the top right corner.

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