

# Renewables Market Outlook and Potential Solutions

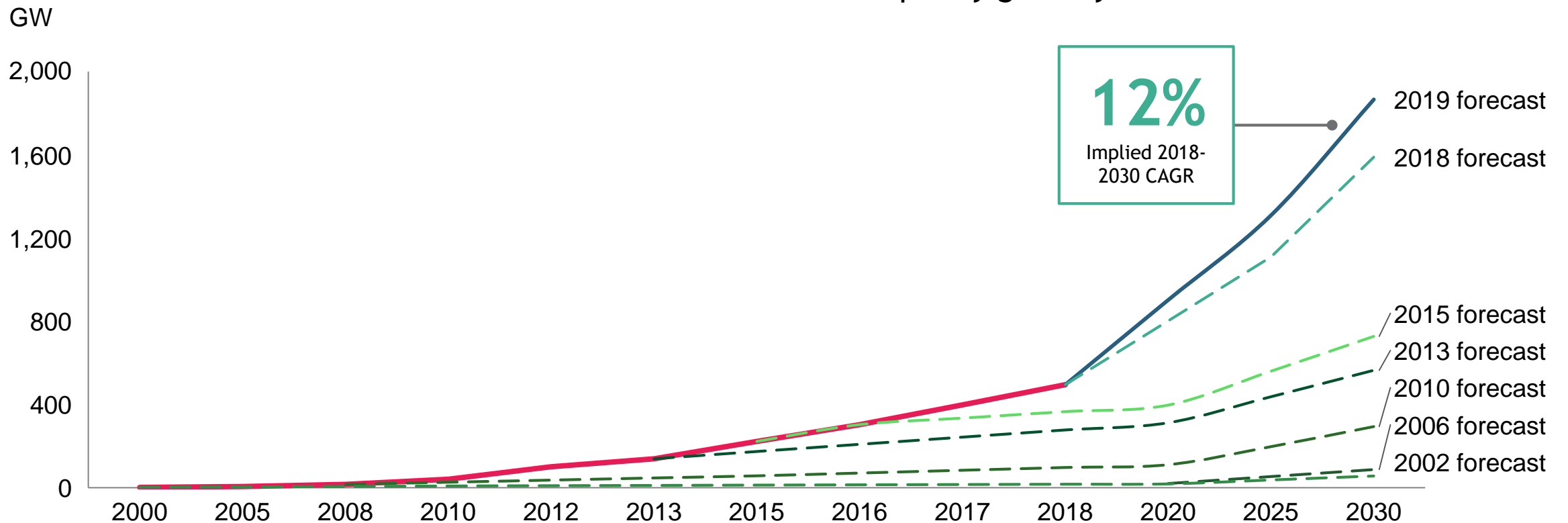
First IRENA-IEF seminar on renewables and clean energy technology outlooks - Session II

Dr Ivan Marten  
BCG Senior Partner Emeritus. IEF Knowledge Partner

February 20, 2020

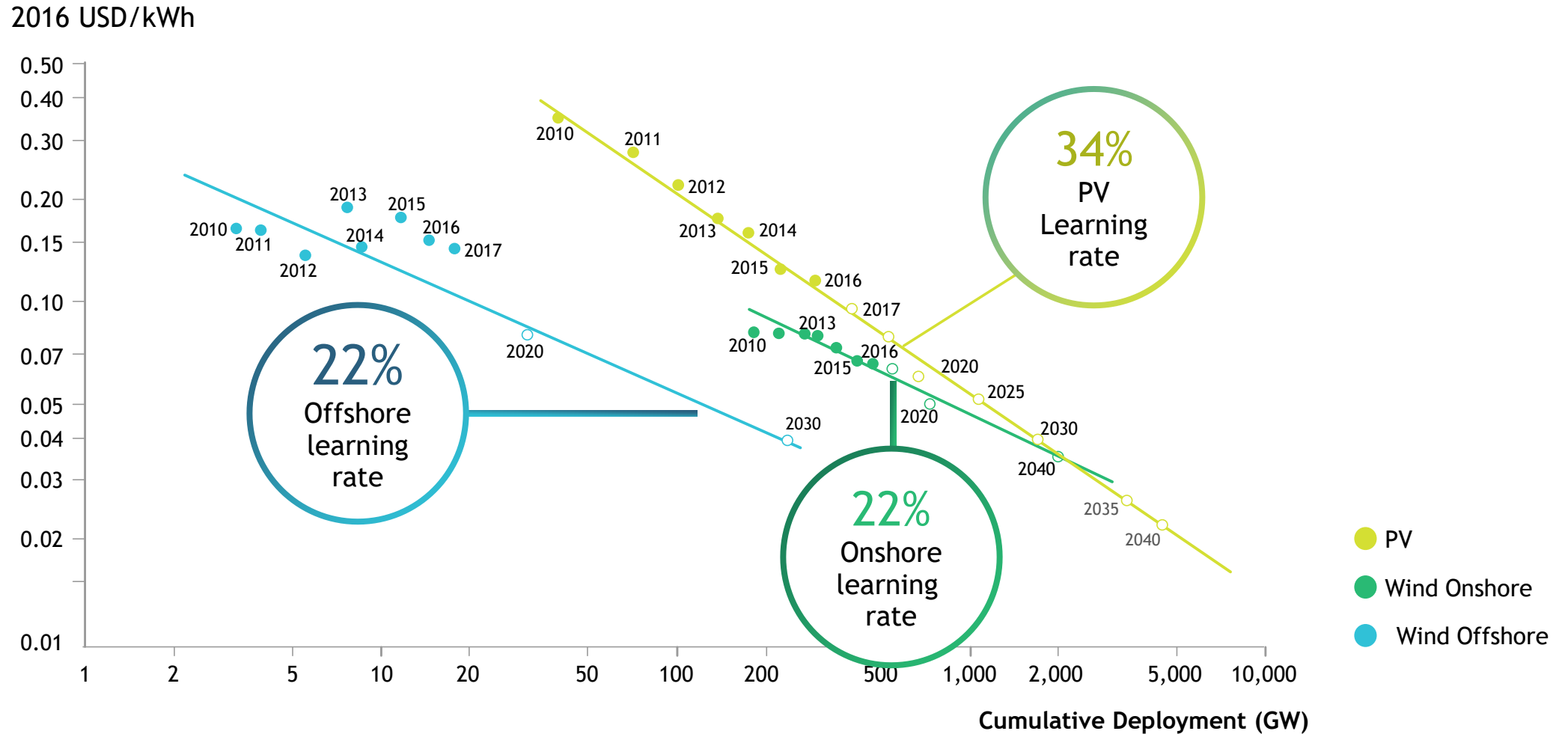
# Renewable energy deployment has consistently exceeded forecasts

Forecast and installed solar PV capacity globally



Note: CAGR - compound annual growth rate  
Source: International Energy Agency; IRENA; BCG analysis

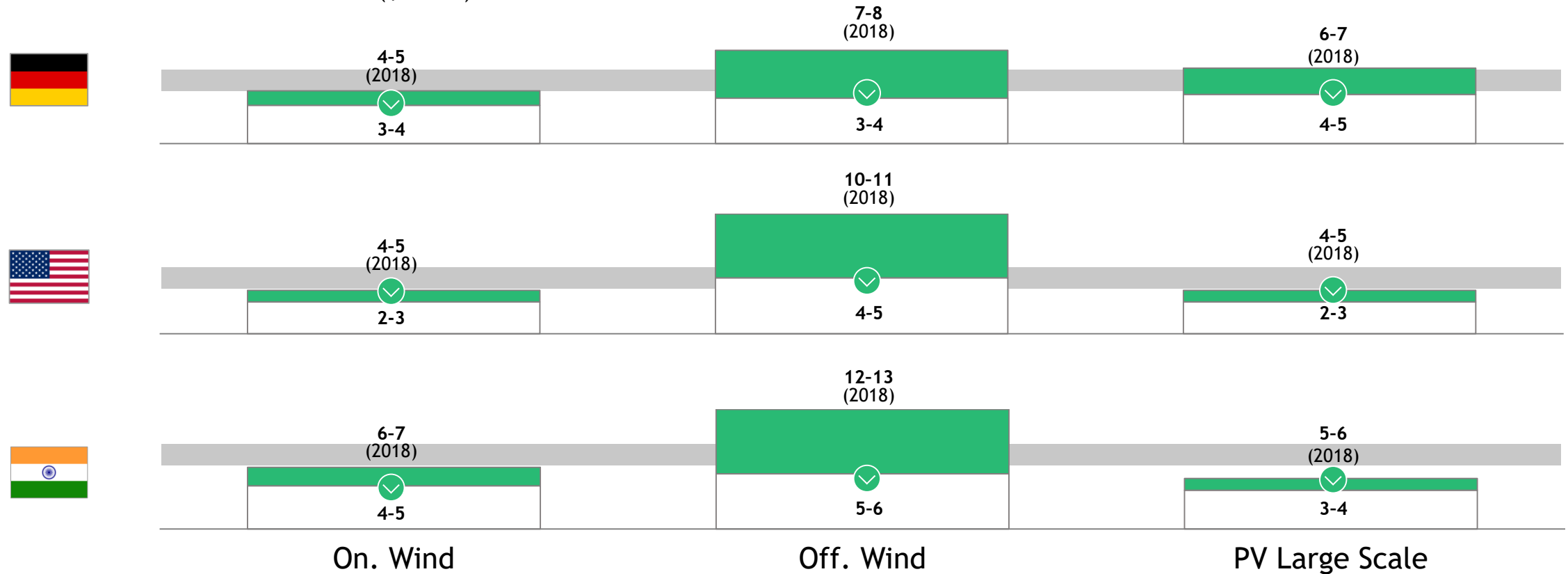
# ...Due to technology improvement and cumulative experience



Source: IRENA Renewable Power Generation Costs in 2017, BCG Analysis

# Renewables production costs already competitive and decreasing

LCOE for new assets (\$/kWh)

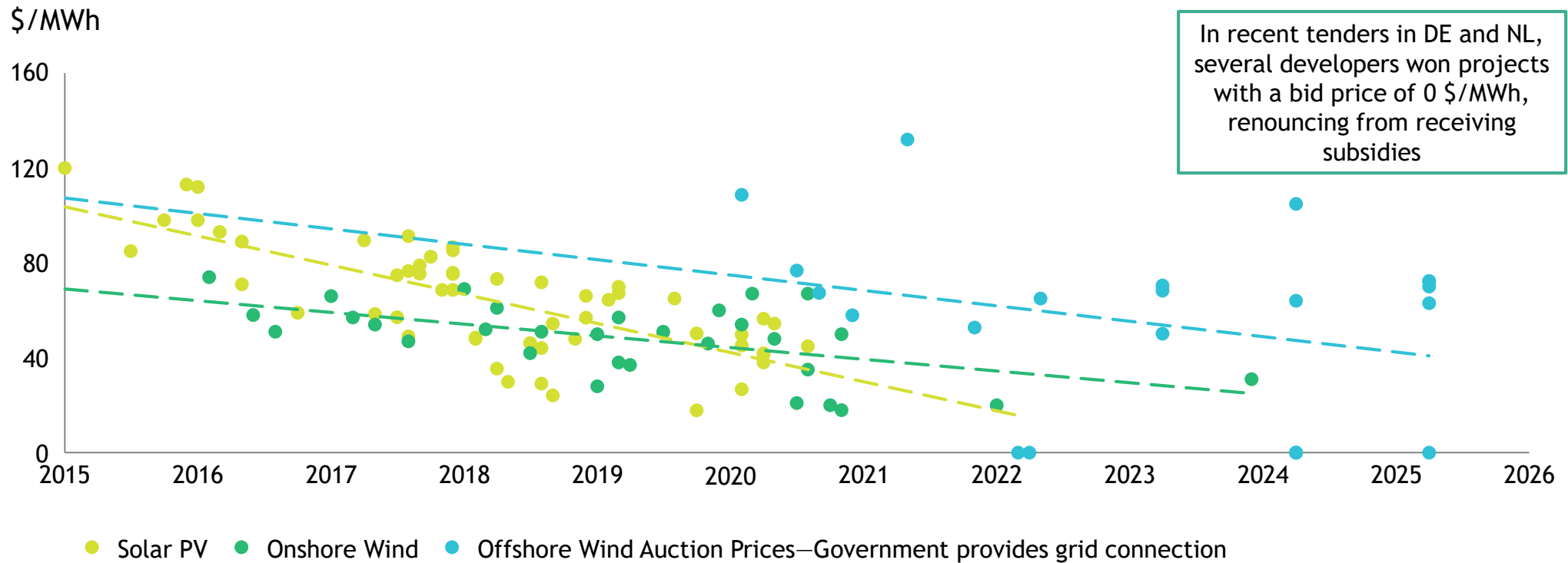


✓ LCOE evolution 2018-2030    Wholesale electricity price 2018

1. LCOE CAGR 2016-2020  
 Prices reflect global weighted-averages of LCOE for each respective technology in each respective year  
 Source: IRENA Renewable Power Generation Costs in 2017, BCG Analysis

# Incentives in Renewables are going down...

... with most auctions closing around 60 \$/MWh (well below past feed-in tariffs)



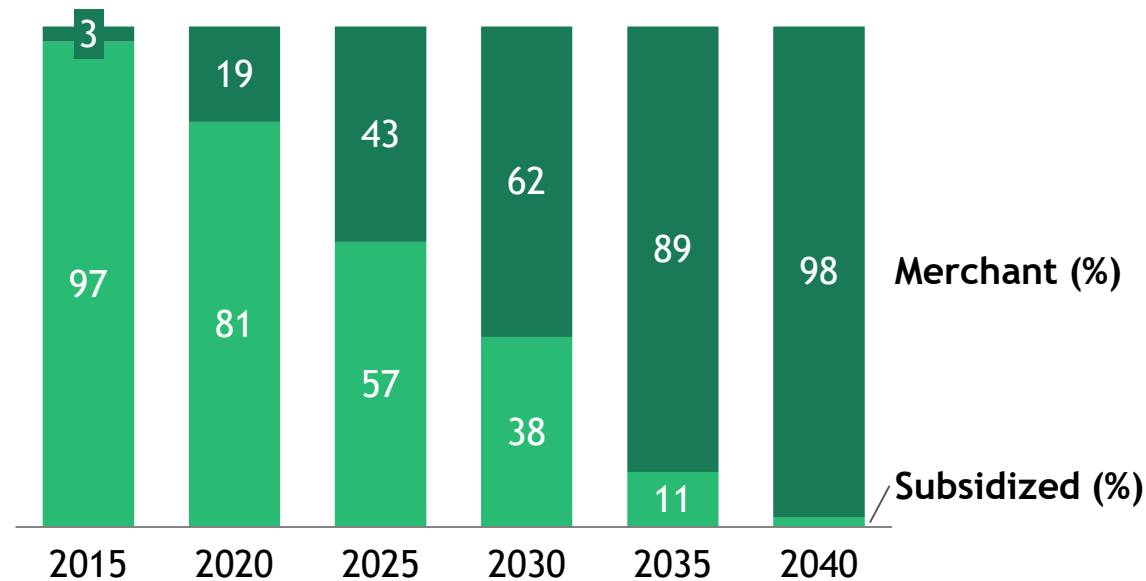
From ~9 to ~16% yearly reduction in auction results<sup>1</sup>

1. CAGR 2016-2020  
Source: REN21, BCG analysis

# ... as well as remuneration on existing parks, with increasing risks

Share of merchant plants will be predominant in the future

EU—PV + Wind capacity split



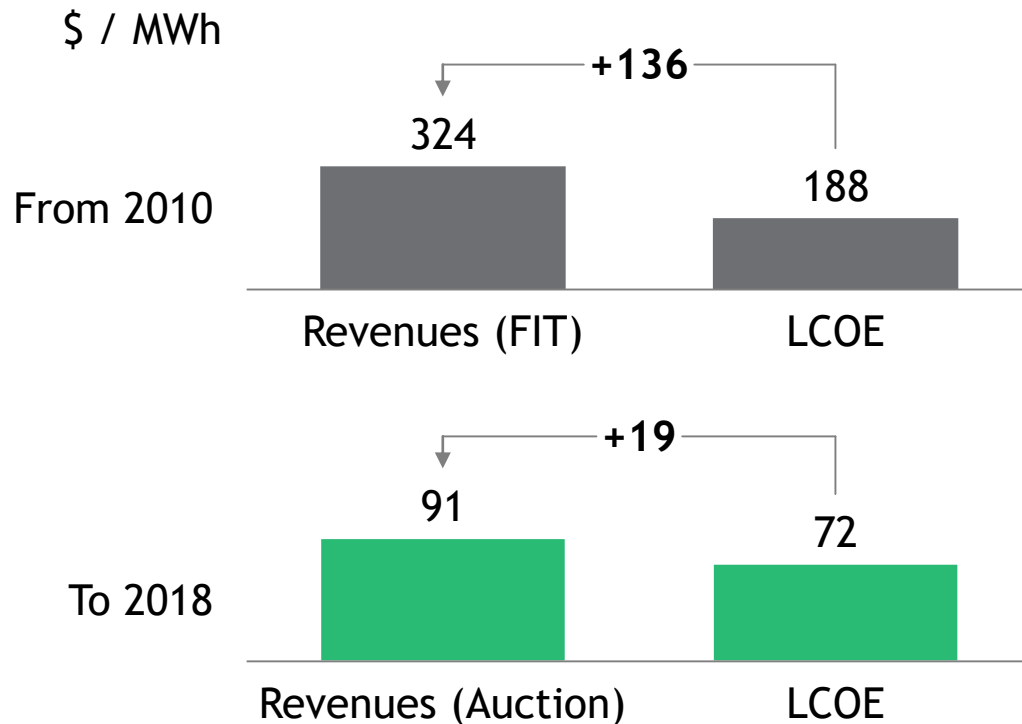
## Merchant production has intrinsic risks

- Exposure to **commodity price evolution**
- Exposure to **wholesale electricity markets volatility** (day-ahead, intraday)
- Exposure to **regulation evolution on market design** (e.g., balancing costs, creation of capacity market, eligibility / obligation to provide ancillary services)

Note. Assuming end of EU subsidies starting from 2023  
Source: European Commission—EUCO33+ scenario, BNEF, BCG Analysis

# Most players are struggling to keep margins stable and high

Example - In Germany delta between Solar PV LCOE and revenue decreased by > 100 \$/MWh

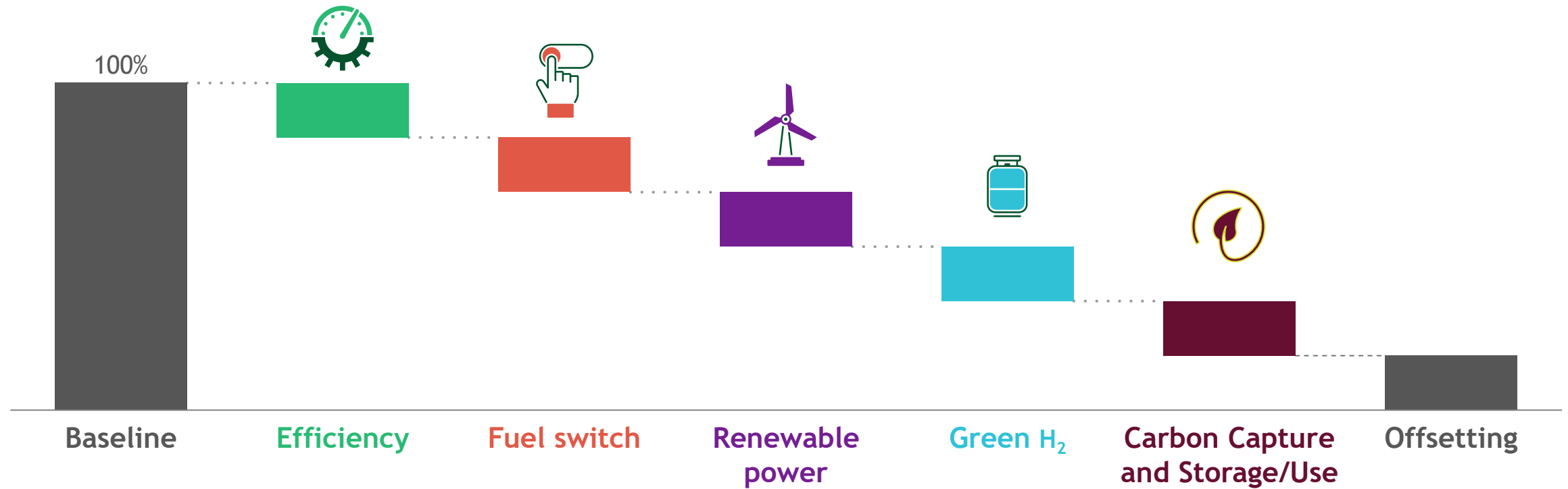


## Key areas to address to preserve/increase margins

- 1 Stabilize revenues**
  - Leverage of PPAs / other contracting solutions
  - Advanced energy management
- 2 Capture more value**
  - Installing storage in the short term and looking at P2X / Green H2 in the long-term
- 3 Minimize costs**
  - Cost cash out on E&C and O&M
  - Opportunities from digital transformation
- 4 Optimizing financing structure**

# Renewables play a role in reducing emissions in the Oil & Gas sector

Potential levers for reducing emissions in a refinery





## In summary

Renewables development consistently exceeding forecasts

Continuous technology improvements in wind and solar PV, making these technologies competitive against conventional generation

Renewables incentives and remuneration going down sharply: margins shrinking

Main actions to preserve and increase value in Renewables

- 1) Stabilize the revenues
- 2) Capture more value from Renewables production
- 3) Minimize EPC and O&M costs
- 4) Optimize financial structure

# Renewables Market Outlook and Potential Solutions

First IRENA-IEF seminar on renewables and clean energy technology outlooks - Session II

Dr Ivan Marten  
BCG Senior Partner Emeritus. IEF Knowledge Partner

February 20, 2020