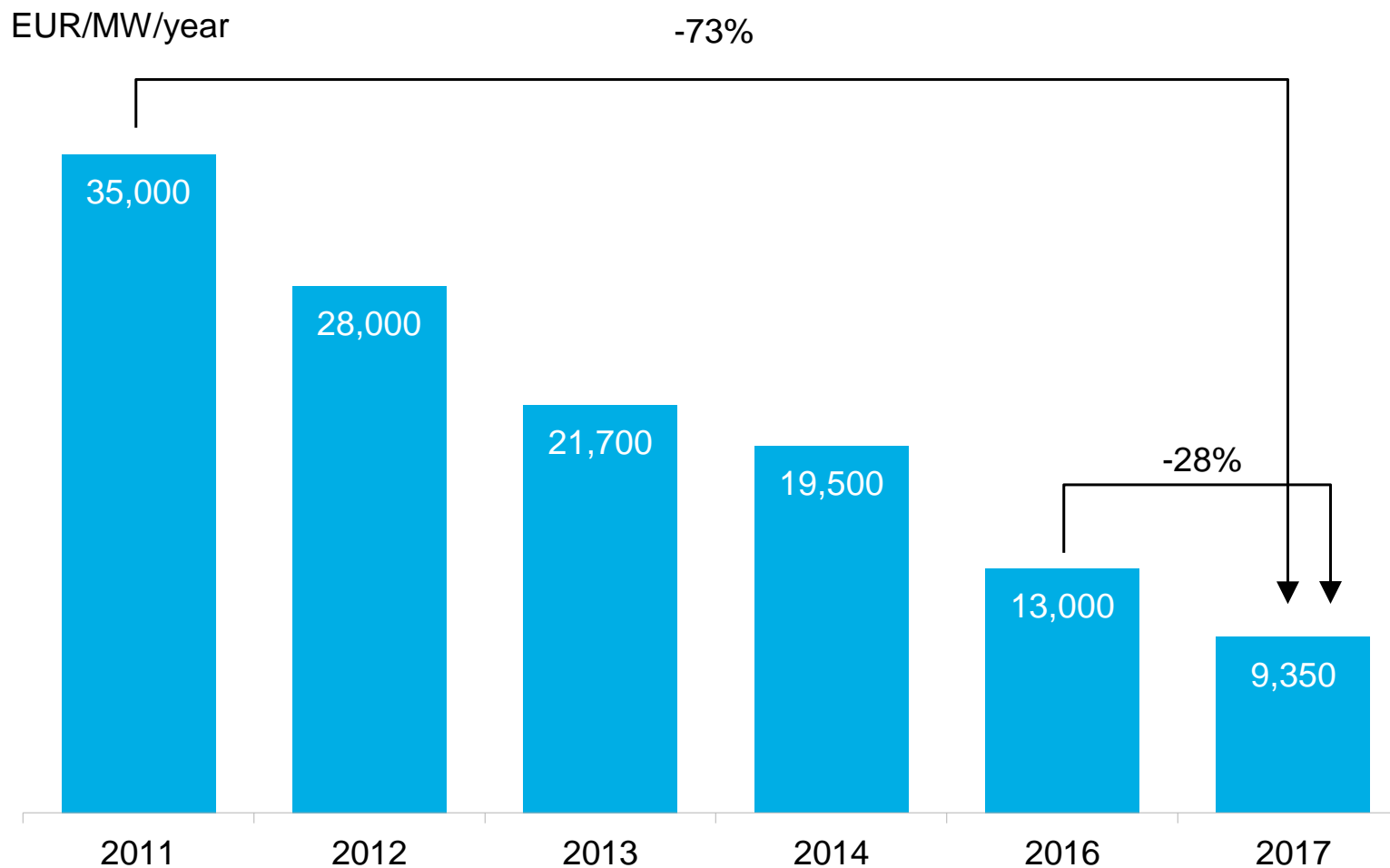


# Trends in PV O&M pricing

Jenny Chase

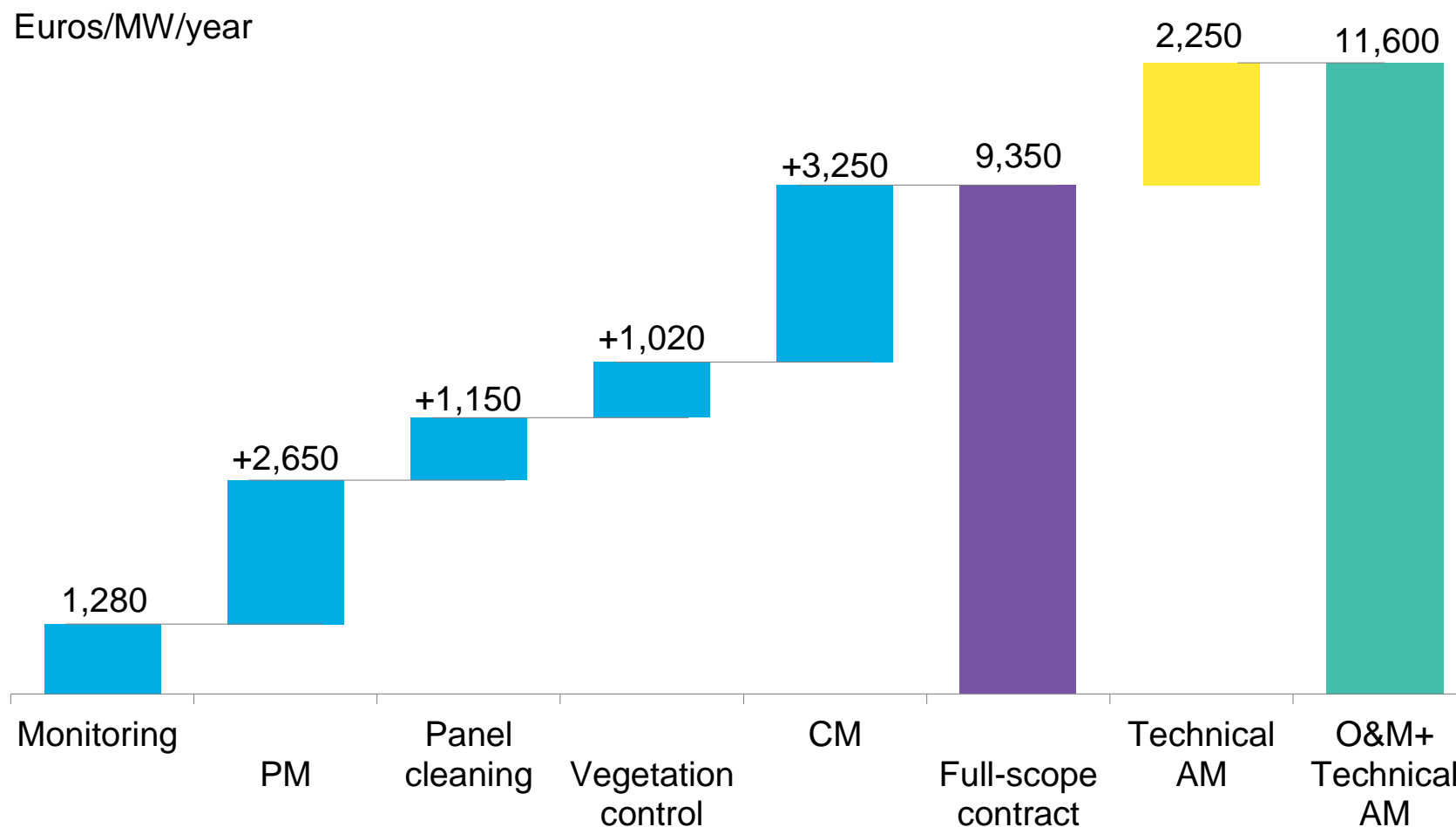
December 6, 2018

# Average price for full-scope PV O&M in Europe for a fixed-axis system



Source: BloombergNEF. Note: Full-scope O&M contract includes monitoring, periodical maintenance, panel cleaning (once a year), vegetation control (once a year) and corrective maintenance.

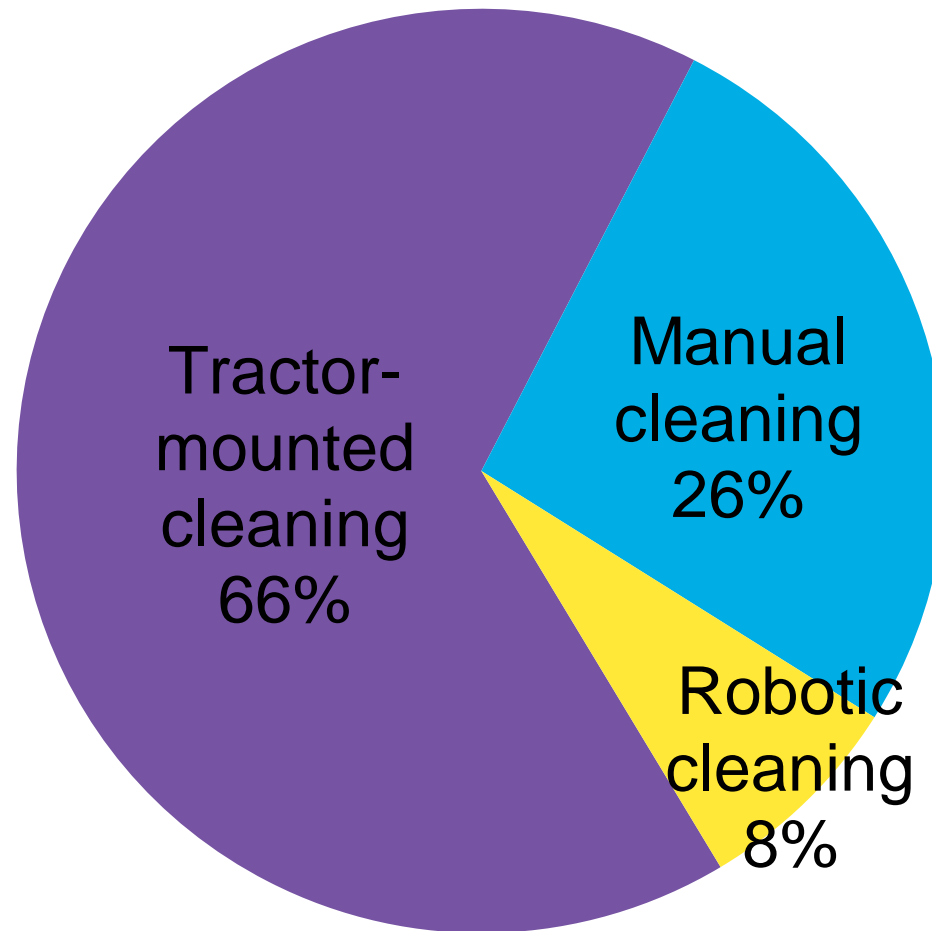
# Average full-scope O&M price build up in Europe in 2017 for a fixed-axis PV system



Source: BloombergNEF. . Note: PM – Periodical maintenance; CM – Corrective maintenance, AM – Asset management. Assumes once-a-year cleaning and vegetation control. Technical asset management includes reporting on plant performance and the management of warranties, regulatory compliance, insurance claims and contract management.



# Percentage of surveyed portfolio by different cleaning methods



Source: BloombergNEF

# Our research shows...

- O&M contracts have got cheaper due to competition, consolidation of providers and a reduction in willingness to pay due to lower power prices
- Corrective and periodic maintenance are the largest components of cost
- There is still considerable variation in the prices of contracts between European countries
- There is considerable cost reduction potential in O&M. Predictive maintenance and monitoring are relatively early stage, and robotic cleaning used in only about 8% of projects.

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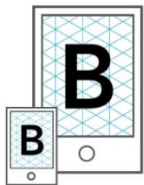
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