



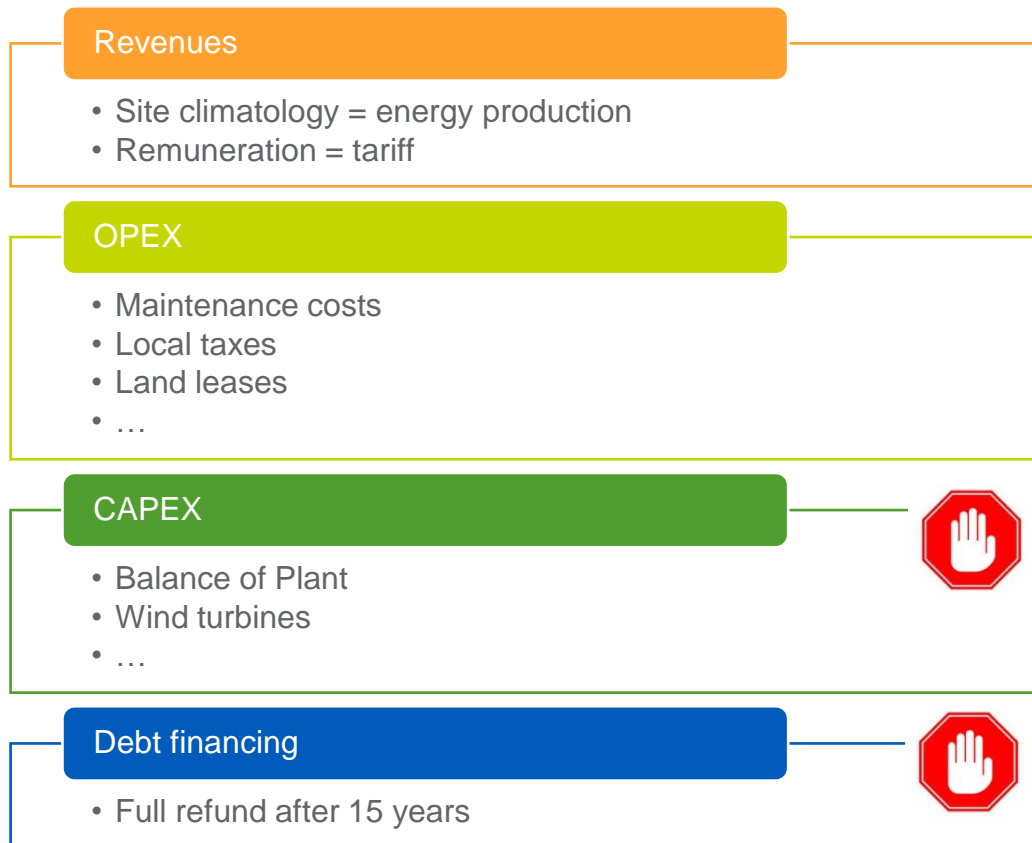
Business models and challenges for continued operation in France

Webinar - OFATE - 2 March 2021

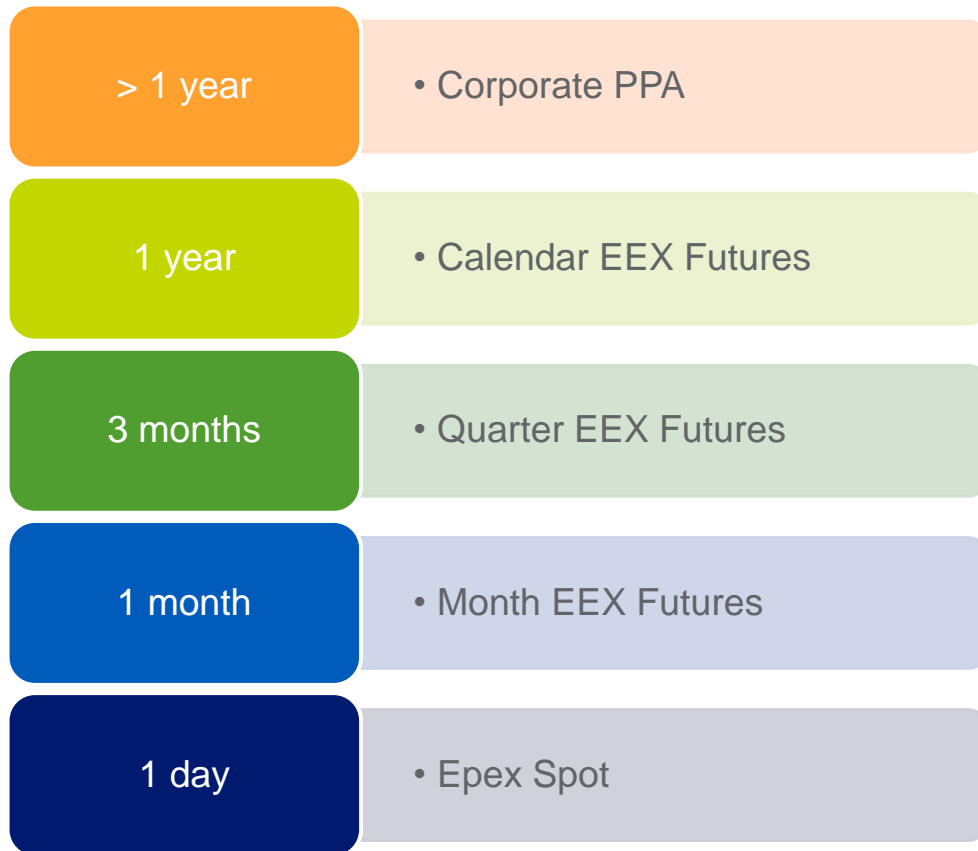
**Perrine Bugeat – Head of Business Development –
Asset Management EDF Re**



Income statement model for wind farms after year 15



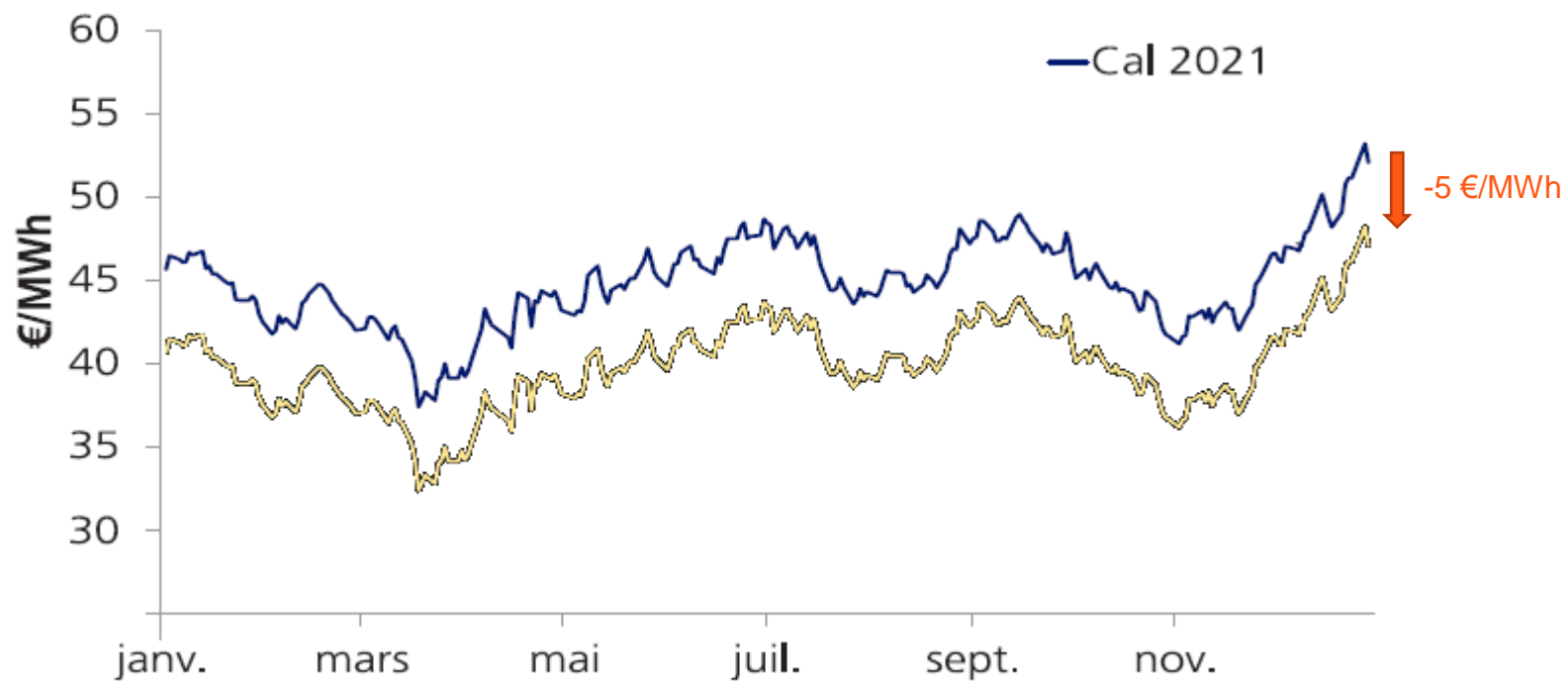
Revenues : market products after the end of feed-in tariff



$$\text{Fixed price} = a * P + b$$

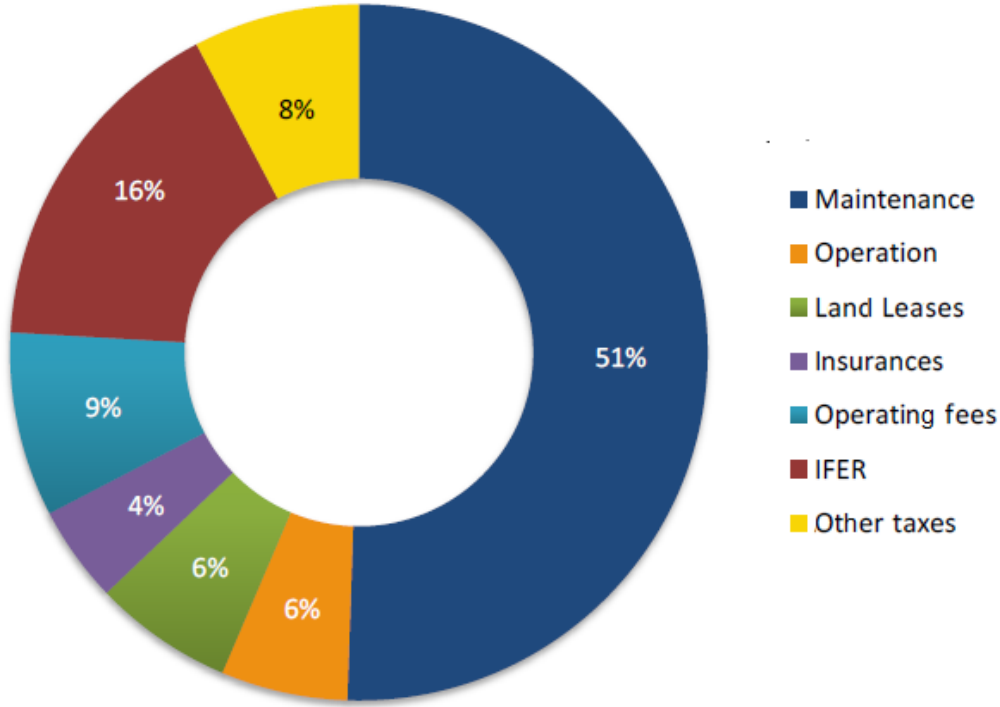
- Fixed price = Power revenue after fixing in EUR/MWh
- a = Energy source-specific profile factor
- P = Power price at EEX power exchange at the time of fixing (annual baseload price for the respective delivery year) in EUR/MWh
- b = Park-specific adjustment value and revenues for :
 - (i) Guarantees of Origin
 - (ii) Capacity Guarantees,
 - (iii) premium in case of PPA in EUR/MWh

Prices exchanged on the EEX Calendar 2021 in 2020

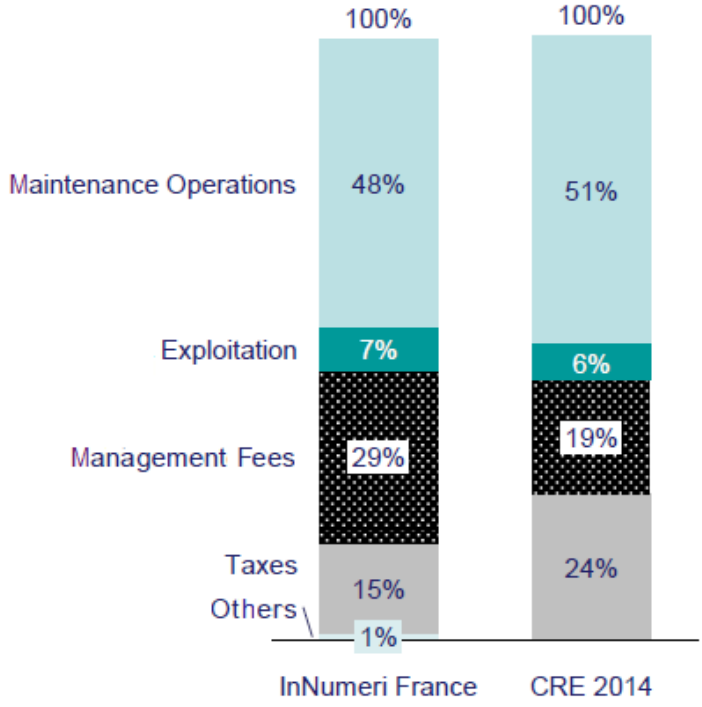


EEX Baseload – 5€/MWh < Fixed price < EEX Baseload + 2€/MWh

OPEX distribution for onshore wind energy



Source : Energy costs and profitability of renewable energies in metropolitan France, CRE, 2014



Source : French wind sector analysis Situation, Prospective, Strategy, ADEME, 2017

OPEX evaluation for years 15 to 20

Over a 20-year period, OPEX are calculated at **46 k€/MW/year** on average

Data analysis from 39 wind farms in operation, In Numeri survey 2016

➤ For wind farms with a capacity factor of 25% :
➤ Total OPEX = **21 €/MWh**

➤ 50% of these costs are dedicated to maintenance :
➤ **10 €/MWh**

This cost may vary from **6 to 14 €/MWh** depending on the scope of services

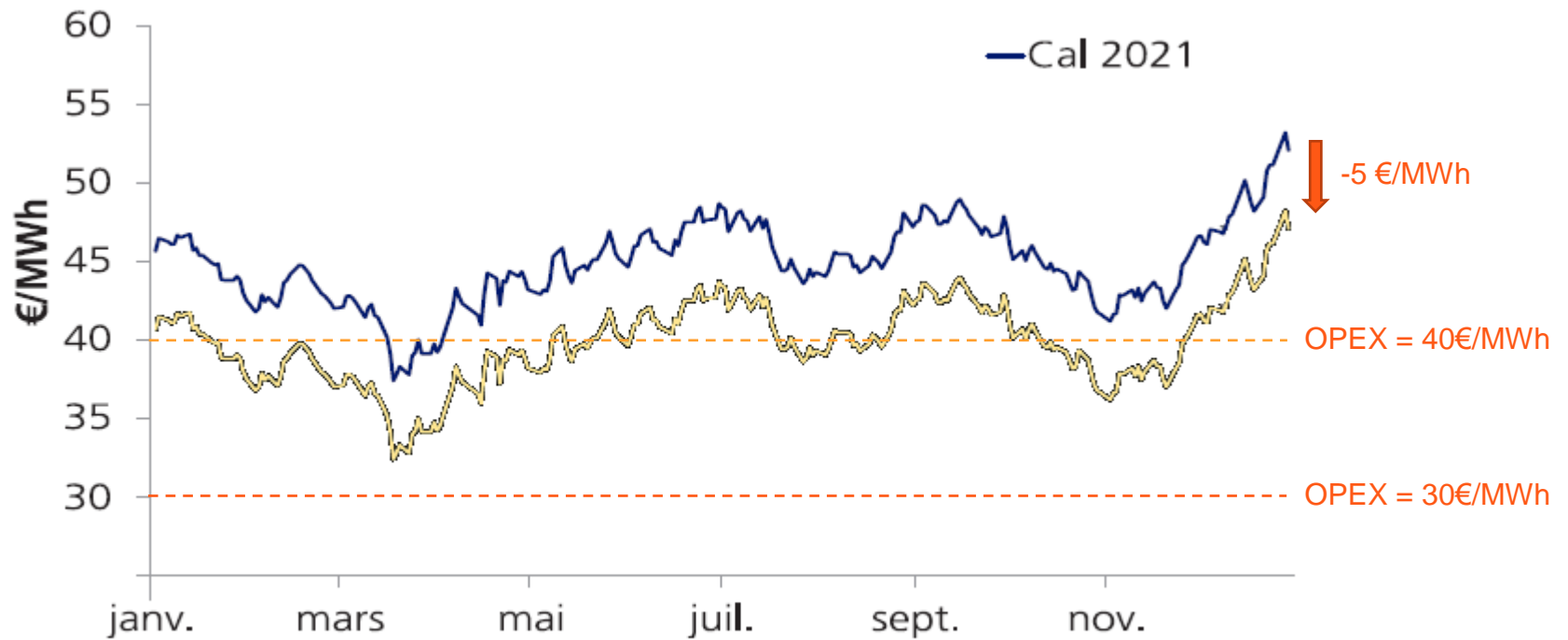
Pöyry study for the FEE, Observatory of onshore wind energy costs, 2016

Assuming an overall cost variation of +10% leads to an OPEX calculation of **30 €/MWh**

For wind farms with a capacity factor of 18%, OPEX can reach **40 €/MWh**

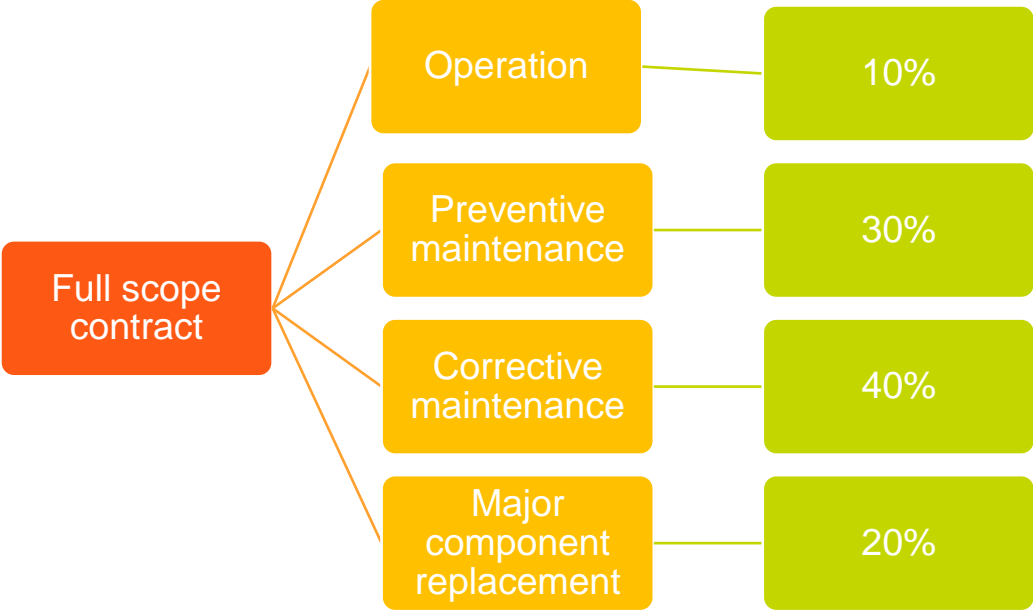
With an increase of 10% per 5 years the last 5 years may cost **16 €/MWh**
Total OPEX = **27 €/MWh**

OPEX Vs. market prices



Maintenance cost distribution after year 15

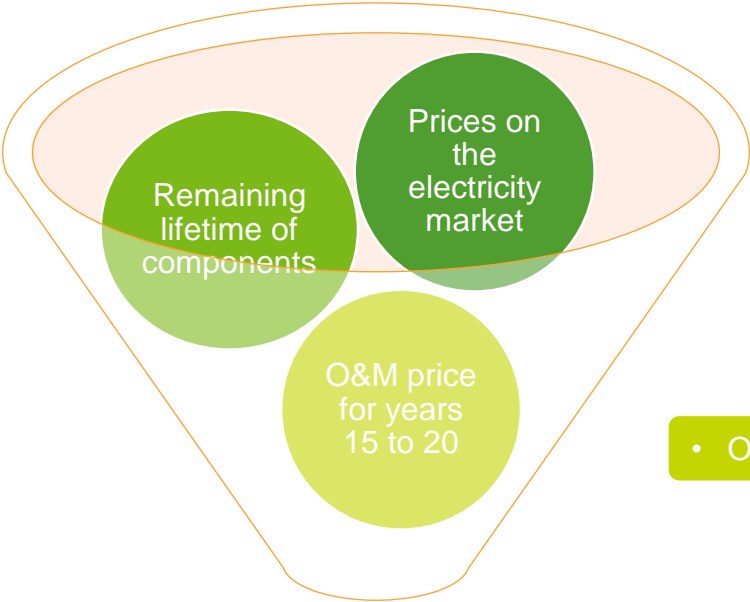
After year 15, more than 50% of OPEX costs are dedicated to maintenance operations in full scope scenario



Decision parameters for continued operation

When? 2 years before end of feed-in tariff

- Duration
- MCR budget



- Revenues

- OPEX

1. O&M full scope + CPPA
2. O&M light (w/o. MCR) + short-term fixed price



**Thank you for
your attention**