Ocean Energy Europe

LCOE – Establishing a common framework

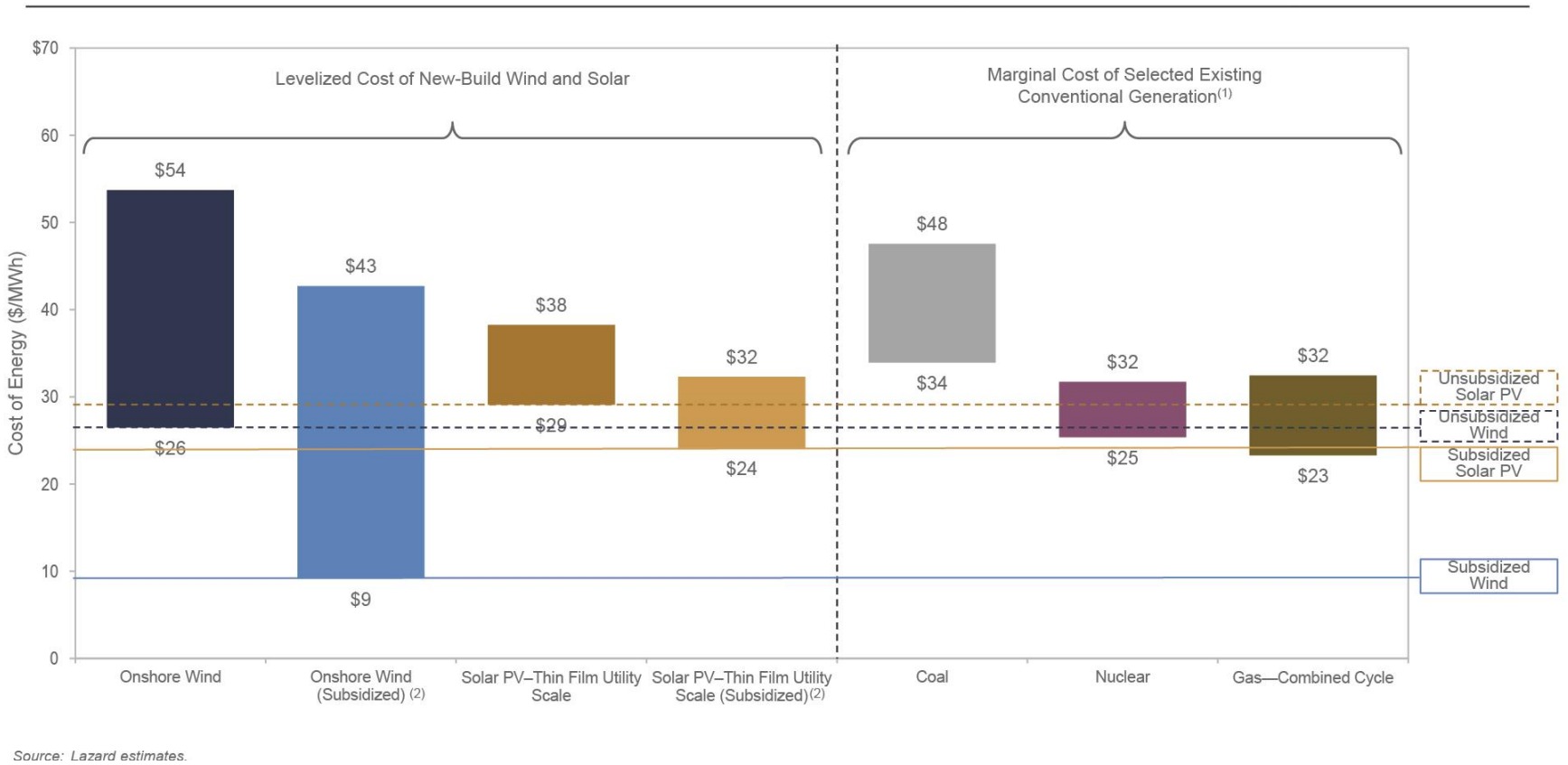
OEE Strategy Days – Rémi Gruet

Ocean Energy Europe

LCOE - The N°1 question

- What is the cost of Ocean Energy?
- When will be be competitive?
- When will you stop needing subsidies?

LCOE – Even more important in context of dropping cost of RES



Source: Lazard, 2020, US LCOE for renewables

Why this question/workshop?

- Some announcements can be politically damaging
  - Need for consistency and realism
- Some announcements are necessary from a business perspective
- Methodologies diverge sometimes significantly
- Experts/investors will ask the painful questions
  - “Creative calculations” will be exposed…
  - Need for a common, sensible framework ?

Objectives of this session:

- We want to:
  - Brainstorm on how LCOEs should be communicated
  - Discuss possible orientations when communicating LCOE
  - Discuss which calculation criteria could be ‘standardised’
  - Interactive session with several polls
- In an ideal world we could also…
  - Propose a range for those criteria to be used by OEE
- What are **not** objectives:
  - Agreeing on an average LCOE for the sector
  - Defining what other companies can say or not say

Ambitious or realistic ?

- Ambitious - stimulating political support
  - What's wrong with being visionary?
  - Wind did it, why not OE?
  - Does the level already matter, if the support isn't there? How ambitious do we need to be to win support?

- Realistic - being credible
  - Able to disclose/prove some assumptions
  - Being able to deliver – e.g. against revenue support scheme

Per technology or for all OE?

- Wave
- Tidal
- OTEC/SWAC
- Salinity Gradient
- Tidal Range

- Different stage of development
- Different financing needs

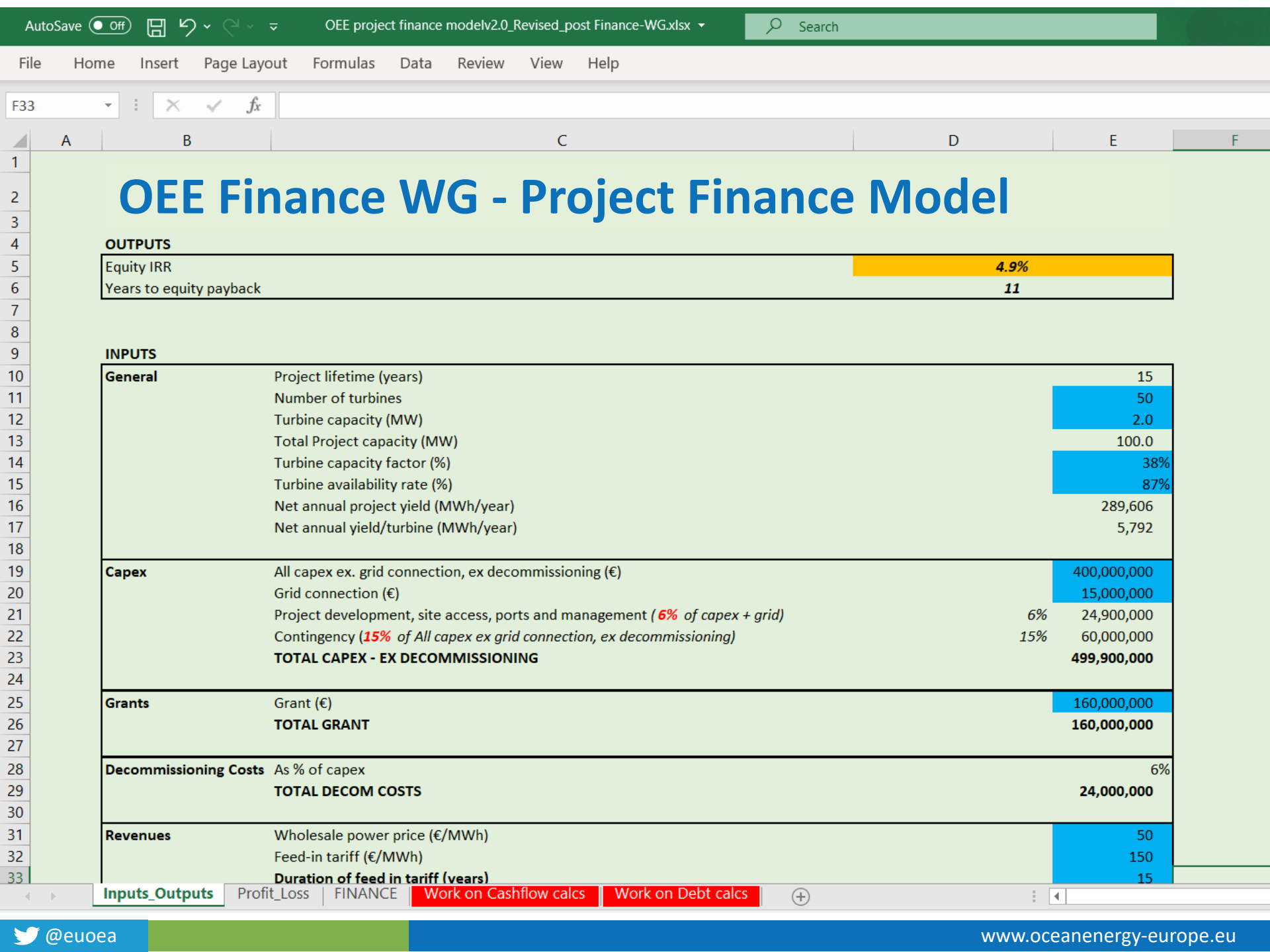
=> Different LCOE communication needs

In the future or right now?

In the future or right now?

- Current LCOEs
  - OE = more expensive than all other power technologies
  - Already relatively low given the few machines in the water
  - Include by-products?
  - Can be used for comparison with early-stage wind?

- Using future LCOEs
  - Technology will change – which assumptions?
  - Costs will come down – good politically
  - Gives a lot of freedom in modelling… and results
  - Which methodology? Limits of the cost curve methodology?



OEE Finance WG - Project Finance Model

OUTPUTS

Equity IRR	***4.9%***
Years to equity payback	***11***

INPUTS

General	Project lifetime (years)		15
	Number of turbines		50
	Turbine capacity (MW)		2.0
	Total Project capacity (MW)		100.0
	Turbine capacity factor (%)		38%
	Turbine availability rate (%)		87%
	Net annual project yield (MWh/year)		289,606
	Net annual yield/turbine (MWh/year)		5,792
Capex	All capex ex. grid connection, ex decommissioning (€)		400,000,000
	Grid connection (€)		15,000,000
	Project development, site access, ports and management *(**6%** of capex + grid)*	*6%*	24,900,000
	Contingency (***15%*** *of All capex ex grid connection, ex decommissioning)*	*15%*	60,000,000
	TOTAL CAPEX - EX DECOMMISSIONING		**499,900,000**
Grants	Grant (€)		160,000,000
	TOTAL GRANT		**160,000,000**
Decommissioning Costs	As % of capex		6%
	TOTAL DECOM COSTS		**24,000,000**
Revenues	Wholesale power price (€/MWh)		50
	Feed-in tariff (€/MWh)		150
	Duration of feed in tariff (years)		15

Which criteria to be normalised/standardised?

- Go beyond pure LCOE towards project finance
- Which elements are common to all project carriers?
  - Access to finance
  - Cost of finance
- Do we include some political elements
  - Revenue schemes?
- Do we fully ignore project-specific information?
  - CAPEX – total or per MWh – technology dependent
  - Resource - site dependent…

Which criteria to be normalised/standardised?

- Device capacity factor (different for each OE technology)
- Turbine availability rate
- Total cost of grid connection
- Decommissioning costs as percentage – e.g. 6% of CAPEX
- Duration of a revenue support scheme
- Level of a revenue support scheme
- OPEX – O&M – e.g. 3% of CAPEX
- OPEX – Insurance costs – e.g. 2% of CAPEX
- OPEX – Other overheads – e.g. 2% of CAPEX
- Debt interest rate
- Return on equity