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New tool for calculating Cost of Energy
Megavind LCoE model

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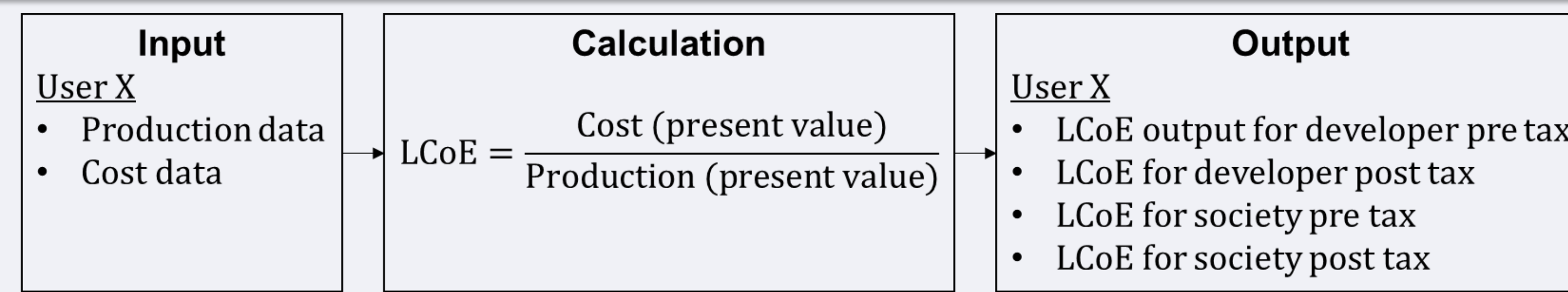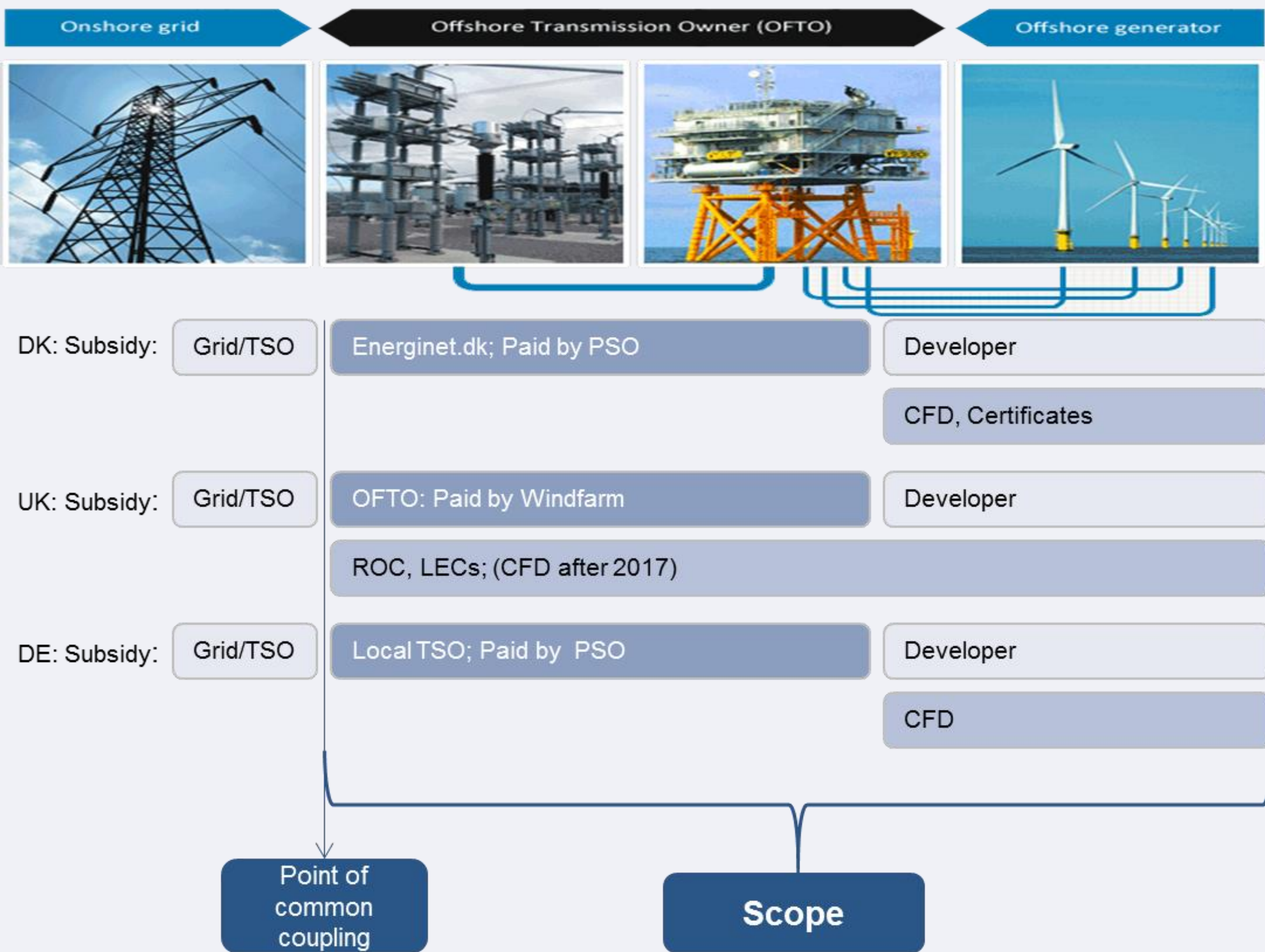Megavind

MEGAVIND

Abstract

A new and accurate tool for calculating Levelised Cost of Energy (LCoE) has been developed by Megavind, Denmark's national partnership for wind energy.
A collaborative effort to cut 40% of the cost from offshore wind energy by 2020 is the promise made by a broad wind industry platform. To fulfil that promise without endless arguments about which members of the supply chain save how much and where, development of an agreed methodology for how to calculate each element of the cost was seen as an essential first step. Therefore, Megavind has guided the birth of an offshore wind cost calculator.
The calculator, a mathematical formula, allows users to type a variety of standardised data into the model and calculate the levelised cost of energy (LCoE) in a method that the industry can agree on.

Structure of the model

Input
User X
• Production data
• Cost data

Calculation
$$LCoE = \frac{Cost\ (present\ value)}{Production\ (present\ value)}$$

Output
User X
• LCoE output for developer pre tax
• LCoE for developer post tax
• LCoE for society pre tax
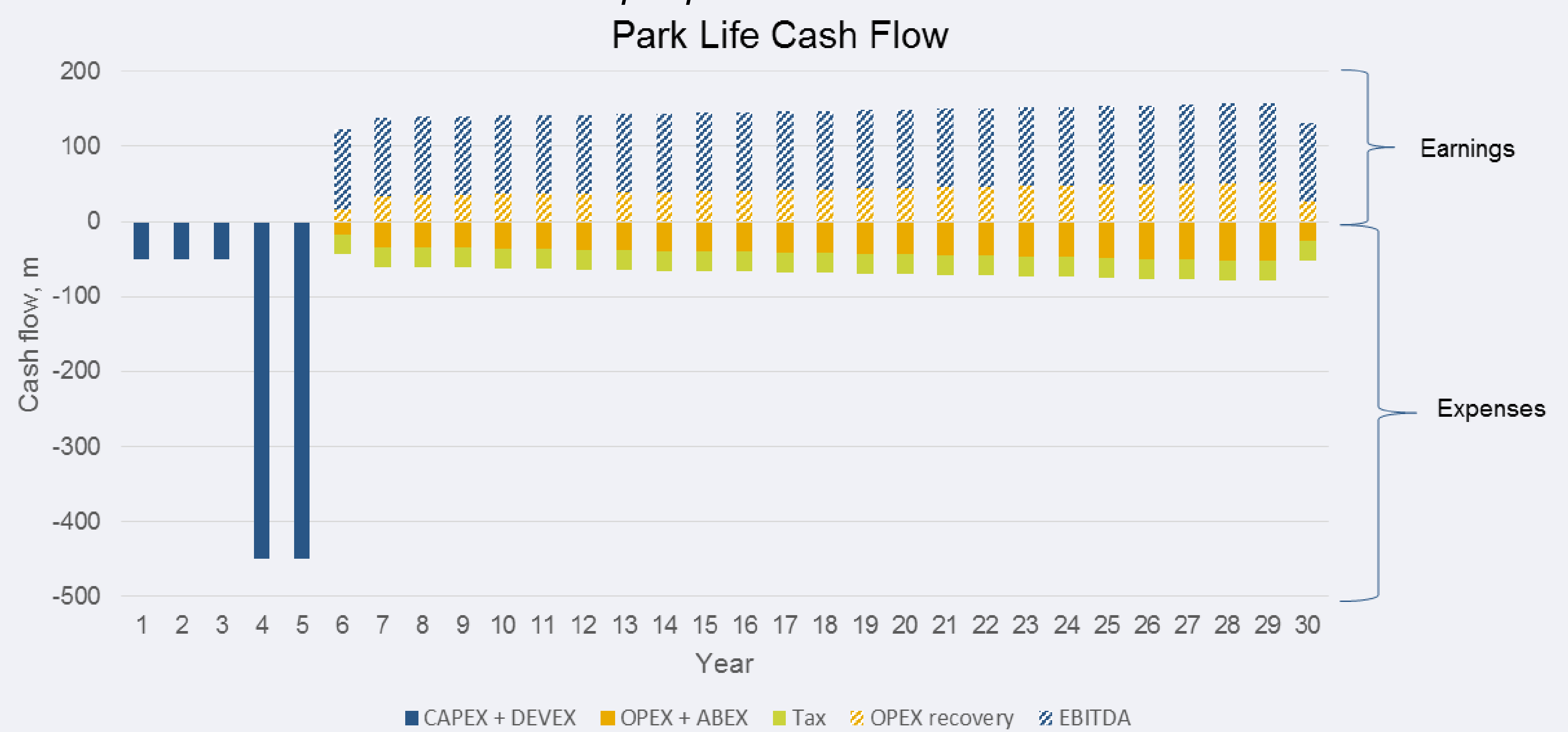• LCoE for society post tax

Method

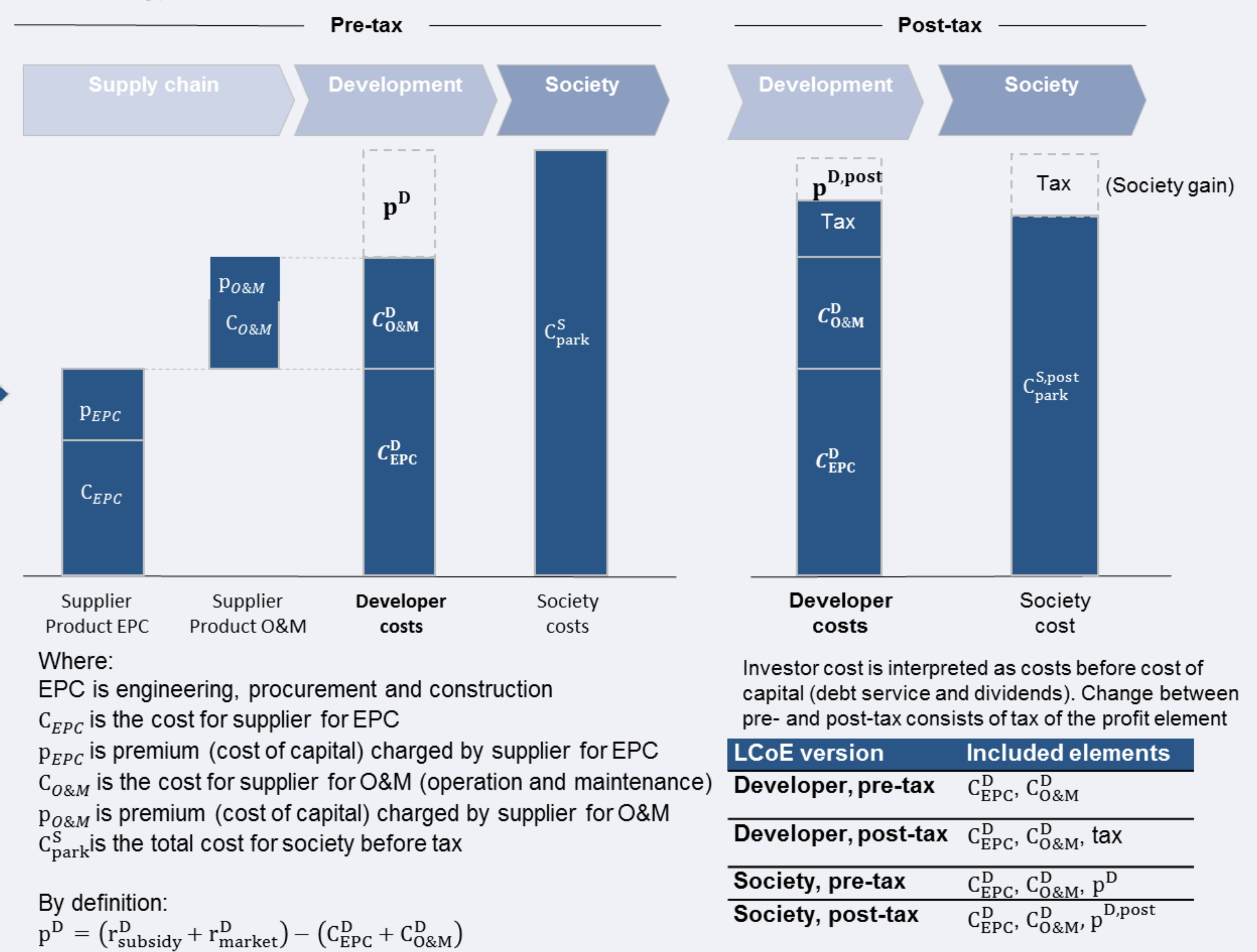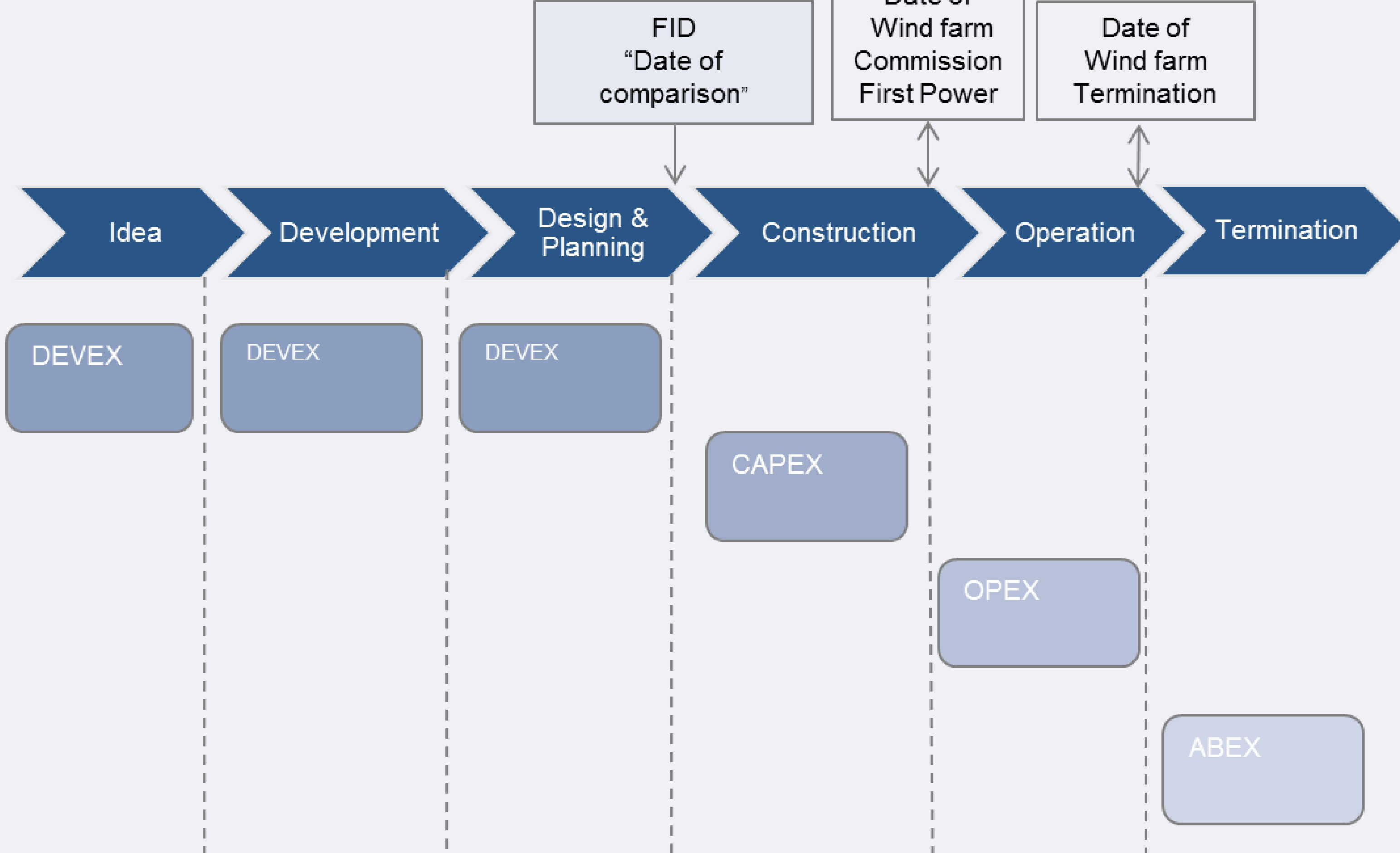*The LCoE model applies to all offshore wind farms regardless of regulatory differences*

The LCoE model takes account of the cash flow for the full lifetime of a wind farm and EBITDA is used to calculate developer profit

The model provides both a developer and a societal perspective on the levelised cost of energy and shows LCoE both before and after tax.

Costs are defined in four different overall categories: DEVEX, CAPEX, OPEX and ABEX

Where:
EPC is engineering, procurement and construction
C_{EPC} is the cost for supplier for EPC
p_{EPC} is premium (cost of capital) charged by supplier for EPC
$C_{O\&M}$ is the cost for supplier for O&M (operation and maintenance)
$p_{O\&M}$ is premium (cost of capital) charged by supplier for O&M
C^S_{park} is the total cost for society before tax

By definition:
$$p^D = (r^D_{subsidy} + r^D_{market}) - (C^D_{EPC} + C^D_{O\&M})$$
$$p^{D.post} = p^D - tax$$

Investor cost is interpreted as costs before cost of capital (debt service and dividends). Change between pre- and post-tax consists of tax of the profit element

LCoE version	Included elements
Developer, pre-tax	C^D_{EPC}, $C^D_{O\&M}$
Developer, post-tax	C^D_{EPC}, $C^D_{O\&M}$, tax
Society, pre-tax	C^D_{EPC}, $C^D_{O\&M}$, p^D
Society, post-tax	C^D_{EPC}, $C^D_{O\&M}$, $p^{D.post}$

Conclusions

The LCoE model will in particular:

• Develop a industry-wide agreed and accepted method for calculating cost of energy from offshore wind energy
• Create a common tool for dialogue across the wind industry

The LCoE model provides the possibility to compare costs of offshore wind farms and, if data is available, also the possibility to produce a benchmark on the progress towards reducing LCoE for offshore wind. Hopefully in the long run this will help to identify main cost drivers and their relative potential for future LCoE reductions.

Acknowledgements

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