

Introduction to societal Levelized cost of energy tool

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Objective of session

The objective of this session is to:

- Introduce the societal LCOE tool
- Present how it is used in FIMO
- Provide examples of how it can be used
- Present exercises to get familiar with the tool

Agenda — Introduction to societal LCOE tool

- Intro to the tool
- Link to FIMO project
- Walk-through of the tool
 - Structure of tool
 - Data inputs
 - Calculations and results
- Summary of main features
- Exercise

Introduction to LCOE tool

- What is the purpose of the LCOE tool?
- How is it applied in the FIMO project?

Purpose of the tool

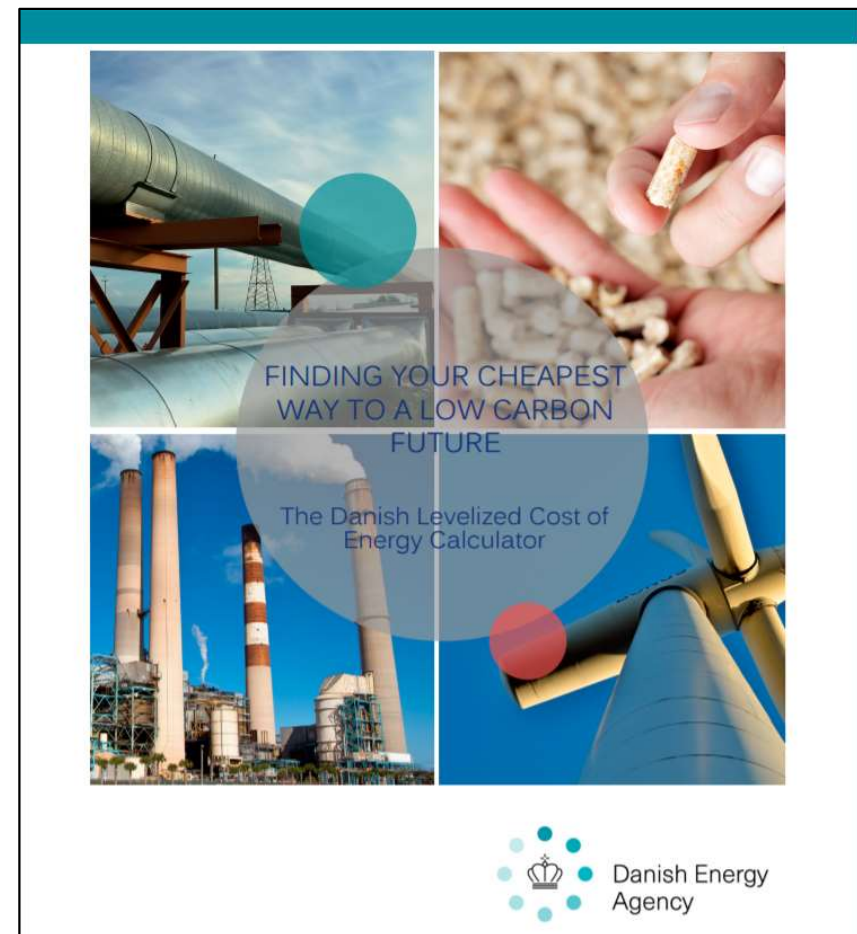
The LCOE Calculator is a tool to estimate and compare the socio-economic costs of electricity production

It has previously been used for LCOE assessments in Denmark and for comparison with other international organisations

It can be used for all technologies and allows for adding more technologies, if necessary

Possible to customize to any technology or country and to see all calculations for transparency

Does not replace a full energy system analysis



Purpose of the tool

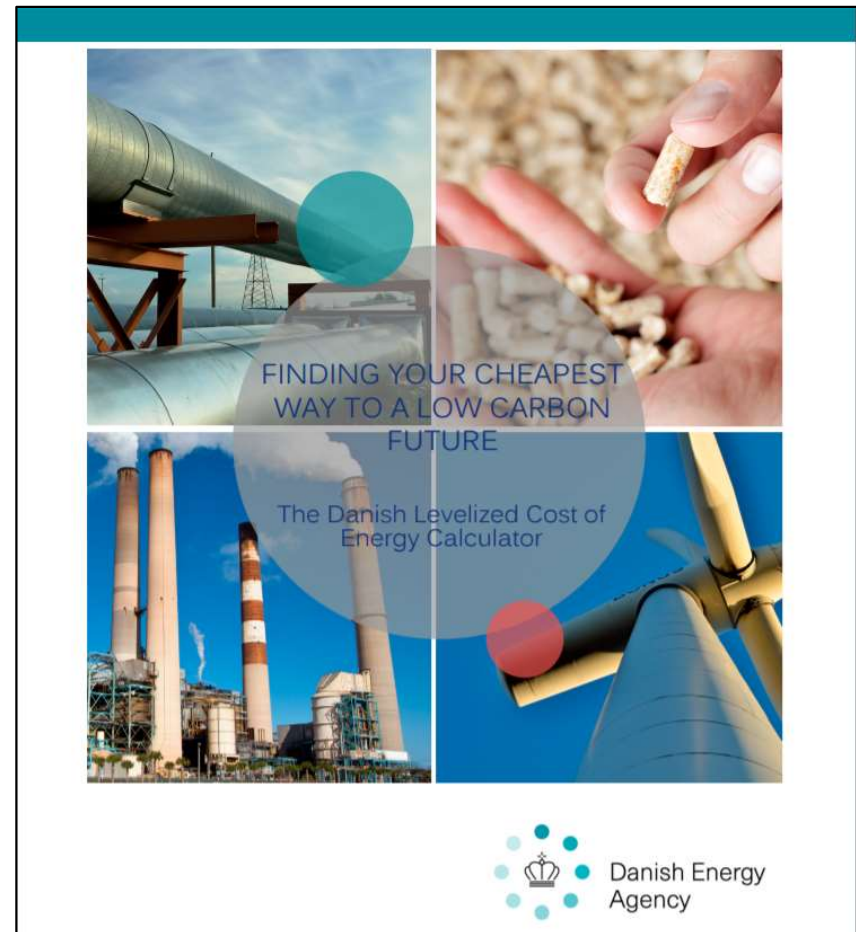
Freely available on the DEA website along with a guide for using it and the details on the assumptions

It is based in Excel and data inputs are updated for Denmark every time new technology catalogues are published

The cost elements comprising the LCoE include:

- investment costs,
- fuel costs,
- operation and maintenance costs,
- environmental externalities,
- system costs,
- and heat revenue for combined heat and power plants.

Also an Energy efficiency module has been added.



Societal approach

Socio-economic perspective

- no taxes and subsidies, return on equity, financing costs
- Inclusion of environmental externalities, system costs, societal discount rate

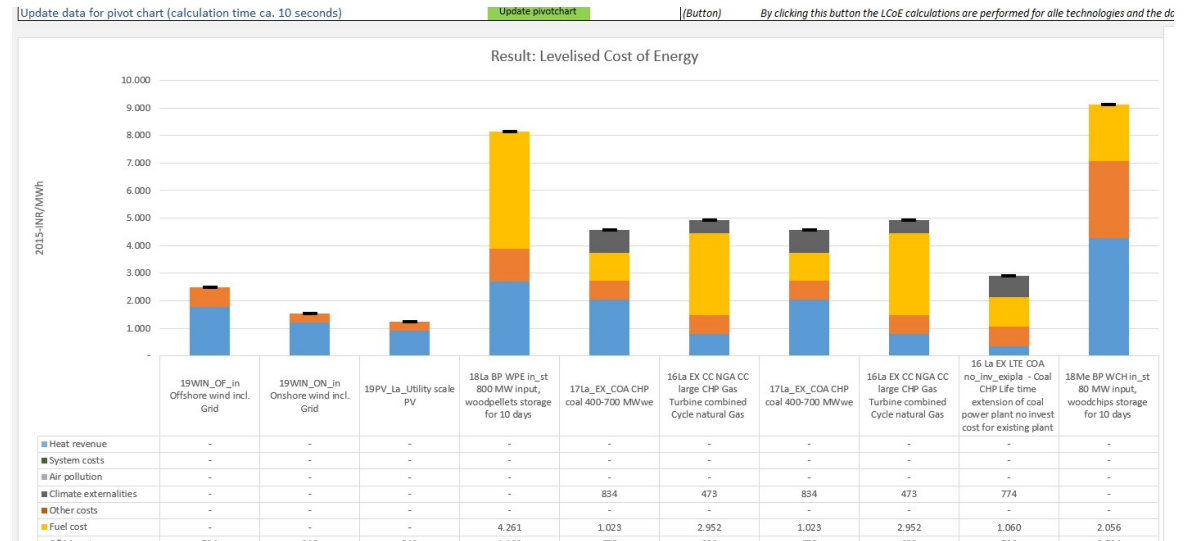
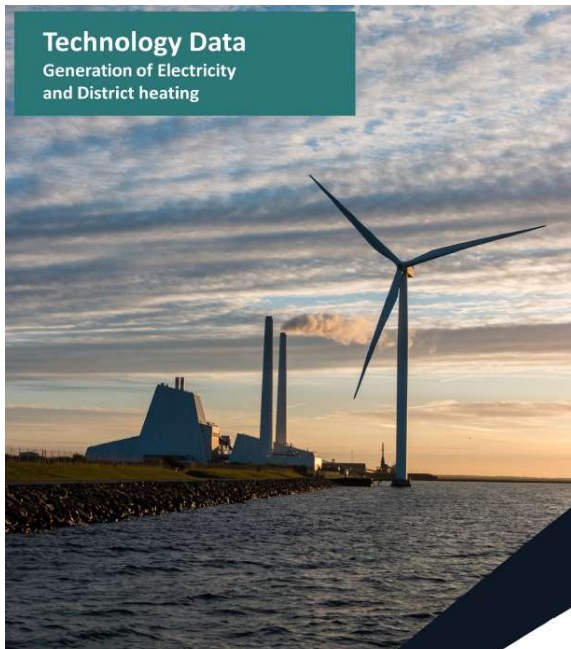
Inputs are aggregated (e.g. investment) rather than a detailed break-down

No project specific costs, i.e. cannot be used for business case studies for concrete projects

Results are highly influenced by the data inputs

Cost elements in the calculation of the levelized cost of energy		
	Economic analysis (public sector)	Financial analysis (private sector)
Viewpoint	Overall society	Investor / Developer
Decision criteria	Positive net present value	Payback or internal rate of return
Timeframe	Life cycle (technical life)	Often shorter term
Discount rate	Reflects social preferences and other factors	Reflects costs of borrowing, desired returns (normally higher than the economic discount rate)
Energy prices (benefits)	Social values reflect willingness to pay; alternative uses	Prevailing market prices
Costs	Overall costs to society	Private, prevailing market prices
Taxes and subsidies	Ignored	Considered
Social infrastructure (e.g. roads)	Considered	Ignored, if not part of investment
External impacts	Analysed as much as possible	Ignored

How to get the data inputs?



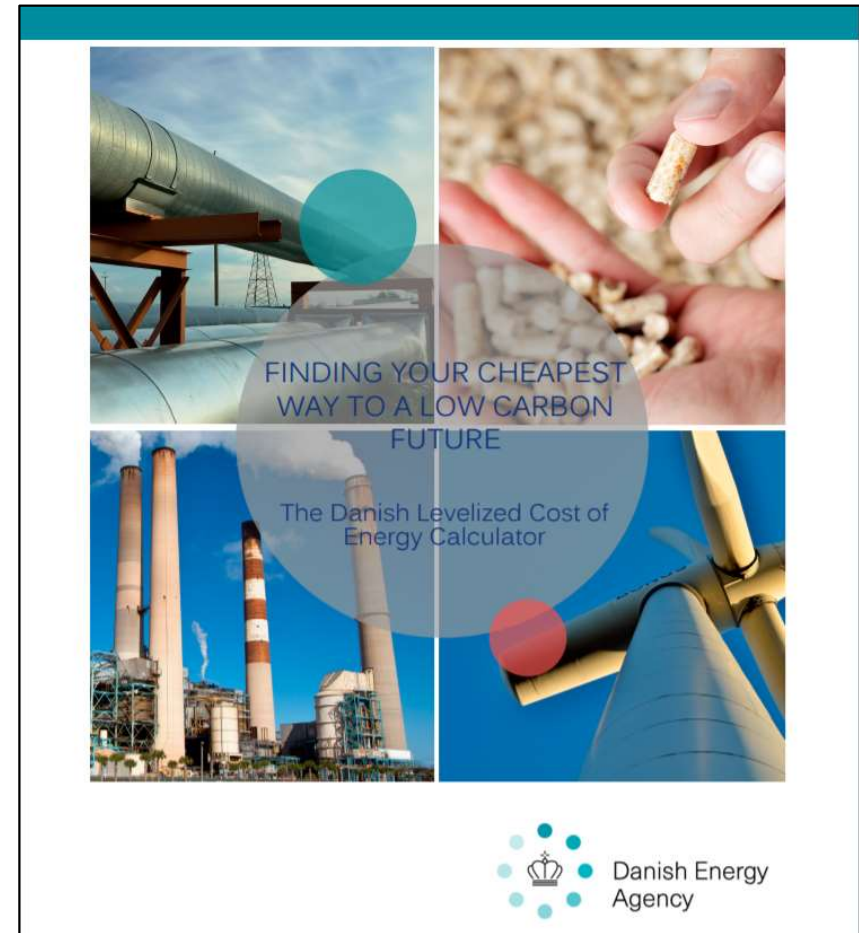
Application of the tool in the FIMO project

In the FIMO project the tool is used for assessing societal costs of offshore wind power

The benefits of the tool are that many calculations and scenarios can be developed quickly

Evaluate the most important factors for LCOE costs

Comparison with other technologies today and in the future



Walk-through of the tool

- What is the overall structure?
- Which data inputs are required?
- How are calculations performed?
- Which results (and interpretations) does the tool provide?
- How can more studies be carried out?

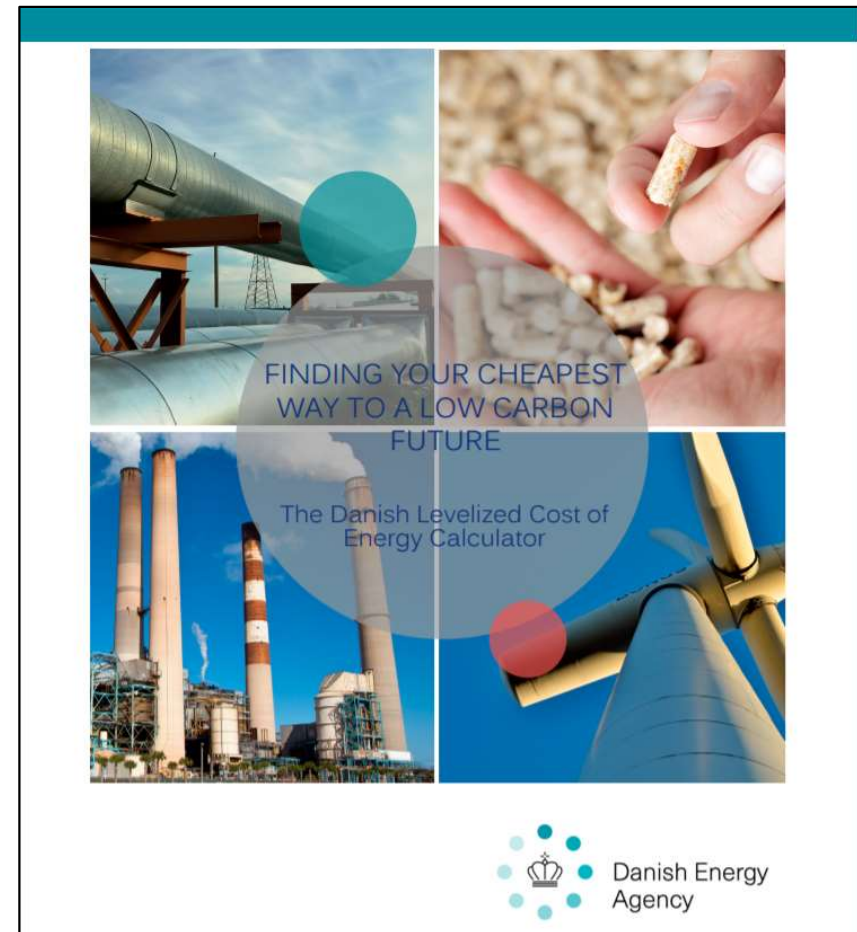
Adapting the tool to your country

The tool can be adapted to any system or country

The main adaptation is to collect local data

- Technology data
- Fuel prices
- CO2 prices and air pollution costs
- CO2 emission factors

See also Chapter 6 in guideline

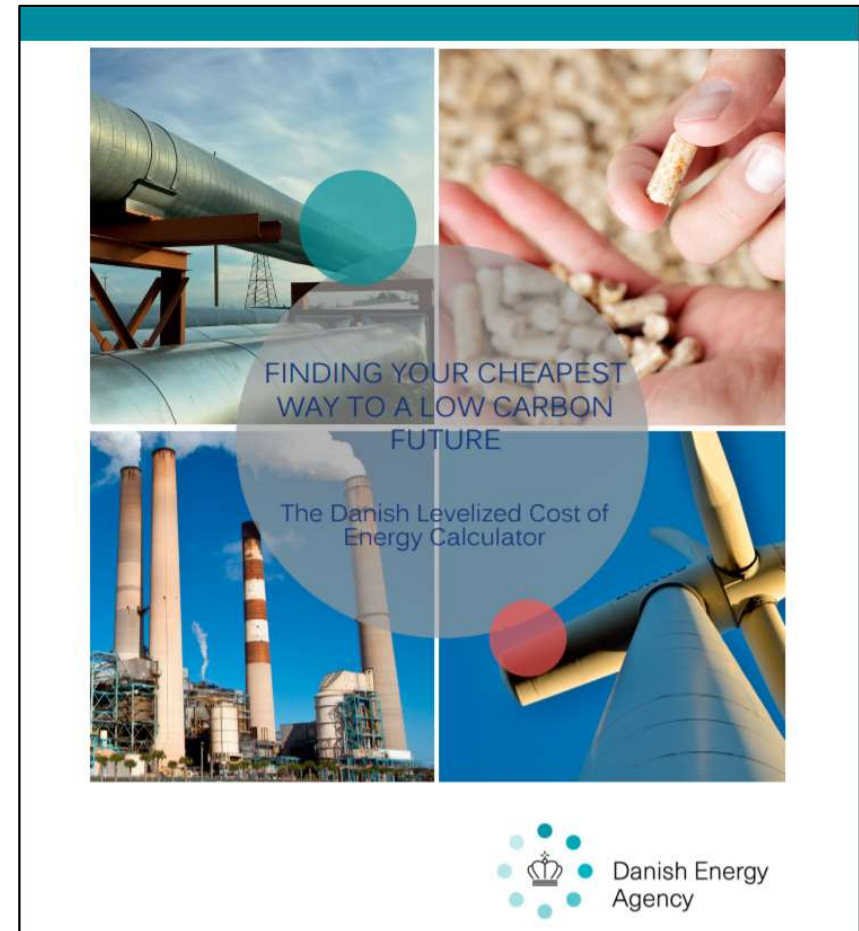


LCOE tool

Primary focus on costs while other factors could also be important for decision making:

- Primary energy
- Resource availability
- Fuel independence
- Job creation

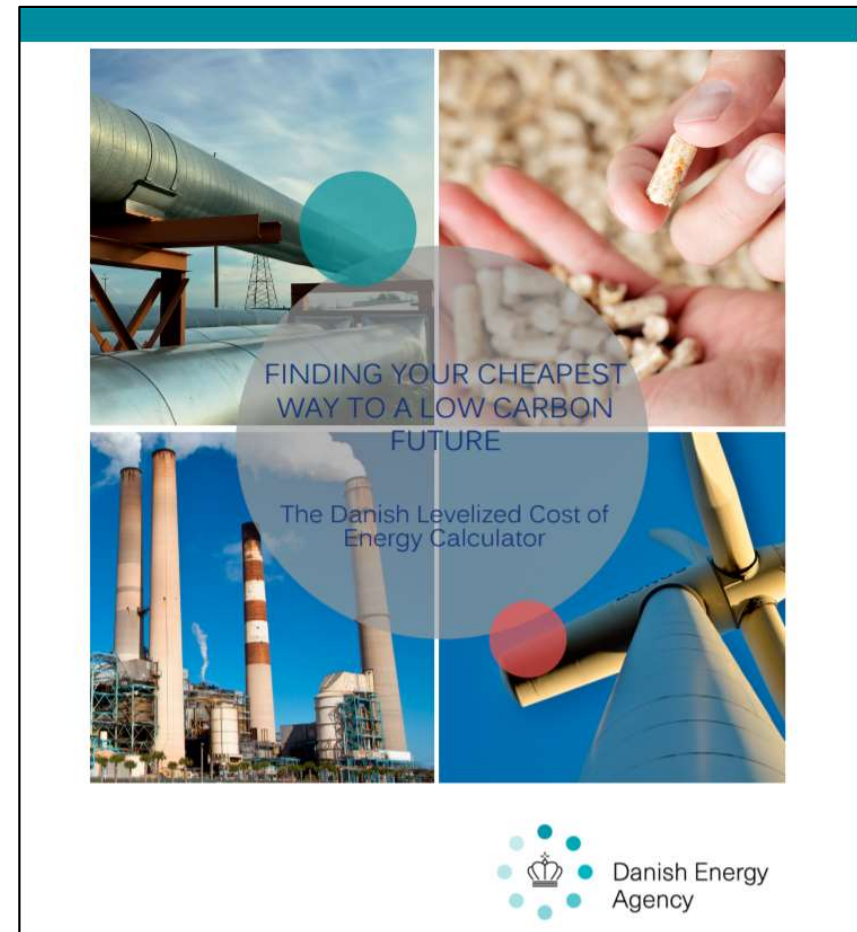
Site specific conditions (e.g. for wind and solar) are generalized for the entire country



Summary of societal LCOE tool

The main features of the tool relevant for the FIMOI project and the Indian context are:

- Analysis of socio-economic costs for various technologies (incl. wind power)
- Analysis and evaluation of main cost parameters for LCOE costs
- Sensitivity analysis of the main factors and how LCOE cost reductions could possibly be achieved



Q&A Session on Monday, June 15

Live online Q&A session discussing:

- Possible questions from presentations and the project
- The exercises
- Brief evaluation

If you have any questions or points that are worth discussing, please send the questions in advance to keha@ens.dk

They will be aggregated and answered by the DEA!

Exercise

Question 1:

Use the LCOE tool to analyse which of the following parameters has the largest impact on the overall offshore wind power LCOE:

- Investment costs
- O&M costs
- Capacity factor/Full load hours
- Discount rate
- Lifetime

Question 2:

Which factors are most important for competitiveness of wind power compared to fossil fuel technologies in a socio-economic perspective?

Thank you for listening!

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