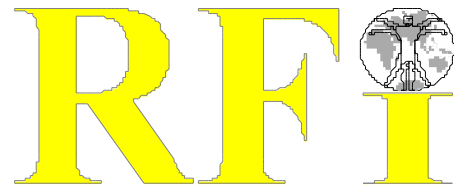


# LCOE and LACE



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# Levelized cost of electricity (LCOE)

- Cost of energy production remains perhaps the single most important factor in determining whether an energy technology can reach commercialization.
- Levelized cost of electricity (LCOE) is a convenient measure of the overall competitiveness of different generating technologies. It represents the per-kilowatt-hour cost (in real dollars) of building and operating a generating plant over an assumed financial life and duty cycle. Key inputs to calculating LCOE include capital costs, fuel costs, fixed and variable operations and maintenance (O&M) costs, financing costs, and an assumed utilization rate for each plant type.

# Calculating LCOE

- To calculate LCOE the following assumptions are made:
  - (n) - the plant life in years
  - (d) - discount rate
  - (I) - capital cost measured in dollars,
  - (O&M) - Fixed Operation and Maintenance costs
  - (F) - variable costs like fuel F in dollars
  - (E) – The amount of energy generated, is expressed in MWh.
- \* - If there is a degradation of the output over time, this should be accounted into the amount of the energy generated.

# Formulae

$$\text{LCOE} = \frac{\text{(sum of costs over lifetime)}}{\text{(sum of energy generated over lifetime)}}$$

$$\text{LCOE} = \frac{\sum (I + O \& M + F) \times \frac{1}{(1+d)^n}}{\sum E \times \frac{1}{(1+d)^n}}$$

# LCOE

- As a financial tool, LCOE is valuable for the comparison of various generation options. A relatively low LCOE means that electricity is being produced at a low cost, with higher likely returns for the investor.

# Levelized Avoided Cost of Electricity

## LACE

- Another way to assess the economic competitiveness of a project is through consideration of avoided cost, a measure of what it would cost the grid to generate the electricity that is otherwise displaced by a new generation project, as well as its levelized cost
- The avoided cost is divided by average annual output of the project to develop the "levelized" avoided cost of electricity (LACE) for the project. The LACE value may then be compared with the LCOE value for the candidate project to provide an indication of whether or not the project's value exceeds its cost.
- When the LACE of a particular technology exceeds its LCOE at a given time and place, that technology would generally be economically attractive to build.