The Costs of Clean Power Plants

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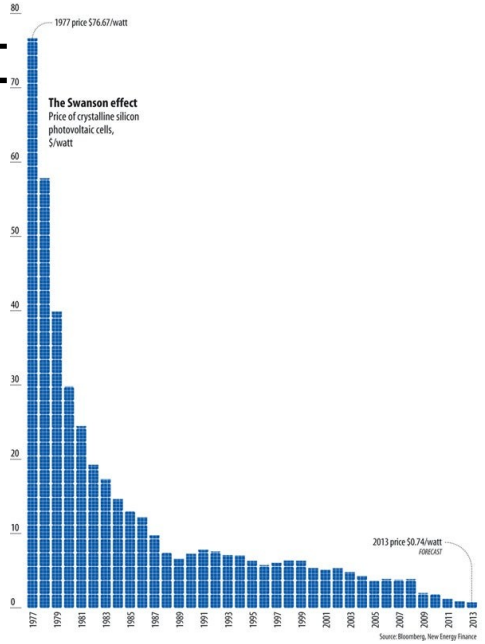
Clean power plants

- Power plants with minimal impact on the environment
- Not all renewables are considered clean and not all clean power stations are renewable (for example nuclear)
- In recent years clean power plant mainly solar and wind, have experienced a major boom due to large investments and lower costs.



Types of clean power plants

Photo voltaics	Solar thermal	Onshore wind	Offshore wind	Hydro electric	Geo thermal	Nuclear	USC coal
1,331/kW	7,191/kW	1,319/kW	4,356/kW	2,752/kW	2,680/kW	6,016/kW	3,661/kW (for comparison)

Solar power plants - photovoltaics

- Capital cost: $1,331/kW (tracking PV)
- Lead time: 2 years
- Capacity factor: 26.1%
- Advantages:
  - They require almost no maintenance.
- Disadvantages:
  - Solar panels must be built in sunny location.
  - The power generation fluctuate drastically.
  - Only active during daytime

Solar power plants – thermal

- Capital cost: $7,191/kW
- Lead time: 3 years
- Capacity factor: 20-80% (depends on storage)
- New technology – expected to improve in near future.
- Advantages:
  - With enough storage they can be stable
- Disadvantages:
  - Must be built in sunny location

Onshore wind power plants

- Capital cost: $1,319/kW
- Lead time: 3 years
- Capacity factor: 34.7%
- Advantages:
  - Very low impact on the environment.
- Disadvantages:
  - Only effective in specific locations.
  - They can have very bad visual impact

Offshore wind power plants

- Capital cost: $4,356/kW
- Lead time: 4 years
- Capacity factor: 40.6%
- Advantages:
  - Very low impact on the environment.
  - More powerful than onshore wind power plants.
- Disadvantages:
  - Bad accessibility

Hydroelectric power plants

- Capital cost: >$2,752/kW
- Lead time: >4 years
- Capacity factor: 36%
- Advantages:
  - Very flexible
- Disadvantages:
  - The dams take a lot of land and entire villages need to be relocated.
  - Failures can be very dangerous

Geothermal power plants

- Capital cost: $2,680/kW
- Lead time: 4 years
- Capacity factor: 73%
- Advantages:
  - Reliable and cost-effective
- Disadvantages:
  - Can be only built in specific locations.

Advanced nuclear power plants

- Capital cost: $6,016/kW
- Lead time: 6 years
- Capacity factor: 92.6%
- Advantages:
  - They can last for 100+ years.
  - They are very stable and run constantly.
- Disadvantages:
  - They are not renewable.
  - Radioactive waste is very hard to dispose.
  - Political issues.

Sources

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