EEE 102 Basic Electrical Engineering

Lecture 5: Efficiency & Load

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System Efficiency or Serial Efficiency

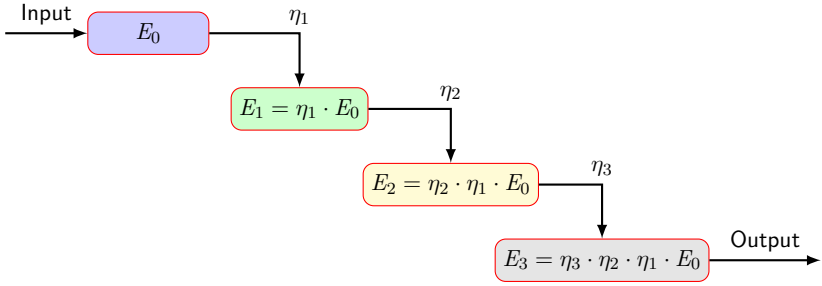
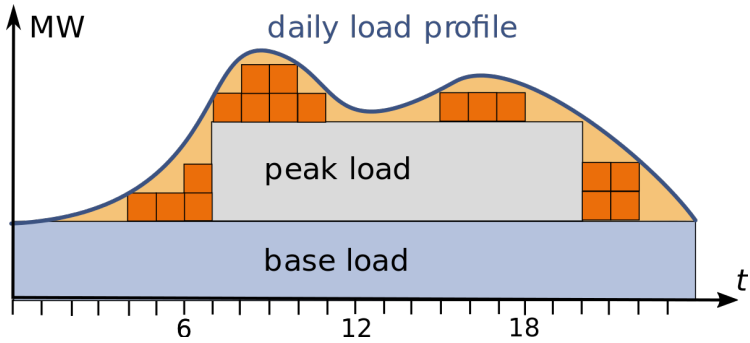


Figure: Effect of multiple conversion processes on overall conversion efficiency.

Types of Load

- Domestic Load
- Industrial Load
- Commercial Load
- Municipal Load
- Traction Load
- Irrigation Load

Load Curve: Base Load & Peak Load



Different power generation plants operate at various different parts of this curve.

Source: Internet

Factors

– The factors characterize `effectiveness of using power system.`

- Capacity Factor

$$\frac{\text{Annual Generation}\,\mathrm{MW.h}}{365\,\text{Days}\times 24\,\text{Hours}\times \text{Nameplate Capacity}\mathrm{MW}}$$

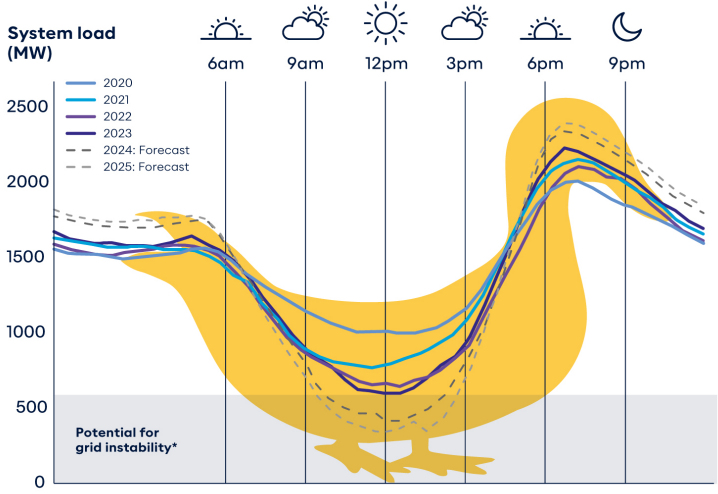
- Plant Utilization Factor

$$\frac{\text{Maximum Demand of Power Plant}}{\text{Rated Capacity of Power Plant}}$$

- Load Factor

$$\frac{\text{Average Load}}{\text{Maximum Load during that Period}}$$

Duck Curve and Consequences



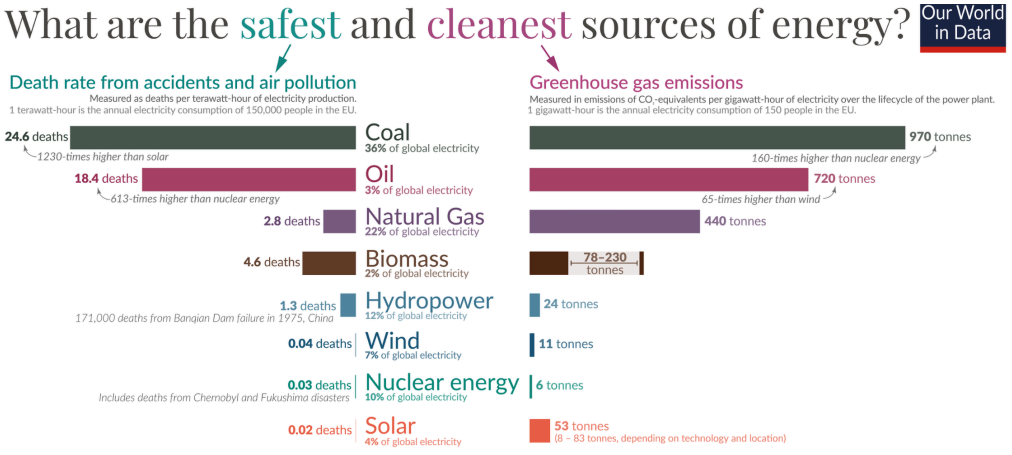
Safe and Clean

Question

What do you think is the SAFEST and CLEANEST source of energy?

Source: https://ourworldindata.org/safest-sources-of-energy

Safe and Clean



Source: https://ourworldindata.org/safest-sources-of-energy

Additional- Not Part of Syllabus

Want to play with some ML models[1]: https://github.com/dafrie/lstm-load-forecasting

Unofficial Project

1. Develop a `Python` package to compare different ML architectures for load forecasting.

[1] Demo project for electricity load forecasting with a Long Term Short Term Memory– a Recurrent Neural Network, with data for Switzerland