Energy Value Stream Mapping

**Motivation and Objectives**
- Analyze energy flows of a production site
- Identify the factory’s key energy consumers and where the greatest amount of energy is wasted
- Improve energy efficiency in total

**System Elements**
- Technology & System
- Organization & Management
- Human & Behavior

**Framework**

**Energy Value Stream Analysis**
- **System Elements**
  - Producer price index crude oil
  - Consumer price index fossil fuels
- **Types of Energy Waste**
  - Measure
  - Visualize
  - Analyze

**Energy Value Stream Design**
- **Scope of Action**
- **Design Kit**
- **Source:** iwb, Lernfabrik für Energieproduktivität

**Types of Waste**
- Overproduction, e.g. use of surplus energy by an inefficient manufacturing system
- Waiting, e.g. energy used while production is down
- Transportation, e.g. inefficient transportation of compressed air
- Inventory, e.g. storing energy in batteries
- Defects, e.g. the energy which was used to manufacture a defective product is wasted
- Motion, e.g. inefficient transportation of goods
- Unused human talent, e.g. failure to integrate employees when defining energy efficient processes

**Energy Value Stream Analysis**
- **Measure**
  - Collecting data on process parameters, power, temperature, compressed air
- **Visualize**
  - Drawing and visualizing the energy value stream
- **Analyze**
  - Evaluation of the energy value stream using analysis methods

**Drawing an Energy Value Stream Map**
- The energy value stream map consists of different modules representing the different manufacturing processes, transportation processes and supply units.

**Energy Value Stream Design**
- **Source:** iwb, Lernfabrik für Energieproduktivität

**Summary and Future Work**
- Structured and methodological approach
- Tool for energy visualization
- Similarity to Lean Production profits from existing knowledge

**Application**
- Apply method in different production environments and improve each step

**Legend**
- **Process Module**
  - Detailed information
  - Basic information
  - Cause
  - Influence
  - Measure
  - Analyze
  - Visualize
  - Prioritize
  - Derive measures
  - Identify reciprocal effects
  - Waste heat
  - Bar length: Amount of waste heat
  - Color: Type of energy
  - Bar length: Amount of energy
  - Type of Consumption
  - State-dependent

**Source:** iwb, Lernfabrik für Energieproduktivität