# 28

# Visualization of energy losses due to faults and non-production

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## Description

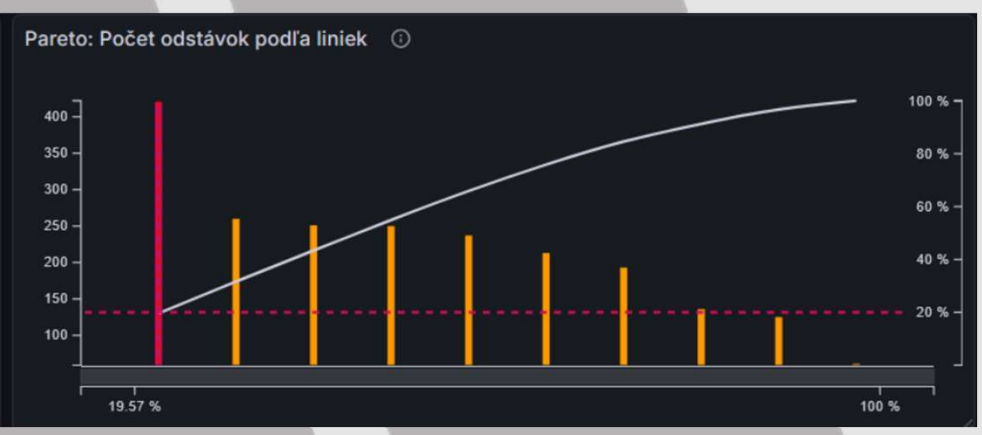
This project visualizes energy losses from faults and non-production in **SMT** manufacturing lines. It tracks whether each line is producing or in standby, measures electricity consumption during non-production, and calculates the resulting cost.

## Used technology

**Springboot** – Processes line status, energy data, and cost calculations
**Docker** – Runs services in isolated, reproducible containers
**MQTT** – Collects real-time production and energy data from SMT lines
**PostgreSQL** – Stores production states, energy usage, and costs
**Grafana** – Visualizes energy losses and non-production costs

## Implementation

The system collects real-time production status and energy consumption data from **SMT** lines via **MQTT**. A **Spring Boot** backend processes this data, determines production or standby states, and calculates energy losses and associated costs. The processed data is stored in **PostgreSQL** and visualized through **Grafana** dashboard, with all components deployed using **Docker** for reliable and scalable operation.


## Usage

By converting wasted energy into monetary losses and presenting it through clear visual dashboards, the project helps identify inefficiencies, quantify the financial impact of downtime, and support data-driven decisions to reduce energy waste and improve overall production efficiency.