Background

Phoenix Contact's goal is to be carbon neutral by 2030. Therefore, we need to become 25% more energy efficient.

Energy consumption and its recording are becoming increasingly important in our production. Our mindset is to record, implement and track efficiency projects in office and production. Some of these efficiency projects are regarding to energy consumption.

In the Hackathon use case we are looking at one of our production lines. Here we would like to predict energy consumption based on upcoming workorders. This information can then be used for production planning. It will also be possible to use it for anomaly detection or smart alerting.

Data Collection

If it comes to data collection, we are using an infrastructure which is driven by the idea of microservice architecture. We are collecting the data with our own data collection box – PLCnext Control – and sending this data to an MQTT stream. There it is either used by other services and/or written to a (timeseries) database.

The PLCnext technology we are using is an inhouse product consist of the PLCnext control, the PLCnext Engineer, the PLCnext store and a user community.

The data we are collecting is than used for insights in our production.

Assembly Process

In the Hackathon task we are looking at one of our PCB production lines. PCB stands for printed circuit board and is an electronic component used for the further assembly of one of our products.

In the first step a board is printed with solder tin.

After that, all the components are placed at the board. Therefore, we have up to ten modules called pick-and-place modules. That machines are placing the components on the board. A machine can place several different components.

The assembled board is then brought into the oven. Here the tin which was printed in the first step is baked. This oven is the main point where we will have a look at in the Hackathon. In the oven there is between 200 and 250 degree Celsius. To get this high temperature the oven needs a lot of electrical energy but also nitrogen which is used to remove the CO2 inside the oven. We are collecting this two energy consumptions with our PLCnext Collection Box.

After the assembly process the components of the finished PCB are checked in an automated optical inspection.