

Frequently Asked Questions – V1.0

IEEE-CIS TECHNICAL CHALLENGE ON PREDICT+OPTIMIZE FOR RENEWABLE ENERGY SCHEDULING

September 18, 2021

1 Forecasting

1.1 **The load/production data contains several outliers due to missing sensor readings. Can we assume that there are no such outliers in the October and November data?**

Unfortunately, missing sensor readings are a reality of our real-world datasets. However, from the perspective of the evaluation, we ignore the time points with one or more missing values. In particular, for calculation of the MASE, the values are excluded, i.e., they add neither to the total amount of values nor to the error.

2 Optimisation

2.1 **What are the units in the load/production data? Is it all kW?**

All the load and solar production data are provided in kW.

2.2 **The linked file with electricity prices does not contain a value for 2020/10/01 00:00:00. What price should we assume for the first two time steps?**

The time stamps in the electricity price file are for the period until the time stamp. So the first time window beginning 2020/10/01 00:00:00 and ending 2020/10/01 00:00:30 has the price listed under the time stamp 2020/10/01 00:00:30.

2.3 **It is stated that the total load must not be negative. Since we do not know the real load/production, this should be hard to guarantee. Is the solution invalid if it results in a negative load on the real data?**

The schedule is *not* invalidated if a negative load occurs.

2.4 Is it actually important, which PV system and stationary battery is attached to which building?

How the buildings are connected is not actually important for the optimisation. We initially planned to have a per-building cap but this was deemed too difficult to work with.

2.5 It is stated that the start times of recurring activities should be in the week with the first Monday of the month. But we have to assume that the activities also take place on the days of the month before this week, right?

The activities only impact the load starting from the week with the first Monday. So if the month starts on a Thursday, the load from activities scheduled on the second Thursday *do not* get added to the load on the first day of the month.

2.6 The time steps are zero-indexed, meaning the first time step is 0, right?

Yes.

2.7 It is stated that for October 2020, the start times of recurring activities should be ≥ 288 . Since October 2020 starts with a Thursday, step 288 would be on Sunday. Should it not be 384 instead of 288?

Indeed it should be 384, apologies for the error.

2.8 Is it allowed to schedule activities on weekends?

Once-off yes, recurring no.

2.9 How to calculate the cumulative load?

Every time step, the cumulative load is the sum of the individual load values at that time. So base load at time t plus PV load at time t , plus any activities scheduled to overlap with time t (start time $\leq t < \text{start time} + \text{duration}$), plus the load from the battery (if it is charging or discharging in time slot t).

All the values are in kW, so the total cumulative load are also kW.

2.10 How can we calculate the energy cost?

Given a load value in time step t , it is then multiplied by the electricity price, after conversion from kW to MWh. The electricity prices are given by AEMO in the file PRICE_AND_DEMAND_202010_VIC1.csv (for October). The timestamps on this file indicate the end of the period, so the price for 2021-10-1 00:30 applies

to time slots 0 and 1. Furthermore, there is a peak tariff of $0.005 * \max_t(\text{load}[t])^2$, which is calculated over the cumulative loads during the entire month.

2.11 What are the office hours?

We compute office hours as follows: any period t during the month modulo 96 ($24*4$) gives the period during the day. If the activity start time and end time are both $\geq 9*4$ and $\leq 17*4$, the activity is scheduled within working hours.

2.12 How to deal with negative electricity prices?

If the price is negative, the optimal (myopic) decision is to schedule loads during that time to profit from it. This will be taken into account in the objective. However, keep in mind that the peak tariff will apply as usual (so if the maximum load falls in the time slot with the negative price, the peak tariff will still apply with the usual positive coefficient).

2.13 What is the peak tariff?

Peak tariff is one fixed value considered over the entire scheduling period, at $0.005 * \max_t(\text{load}[t])^2$.

2.14 What is the unit of the prices?

The unit of electricity prices is \$/MWh.

3 Phase 2 of the competition

3.1 How will the optimisation work in Phase 2?

At the start of Phase 2, we will release 10 new instances for the optimisation, together with the test data of Phase 1 for the forecasting.

3.2 What feedback will we get in Phase 2 of the competition?

The feedback will consist of whether the overall scheduling solution provided is valid or invalid, and whether the MASE and Energy Cost are greater or smaller than MASE and Energy Cost of the sample submission provided.

3.3 Which submission is used for the final evaluation in Phase 2?

It will be the last valid submission made.