Web consultation – 2050 Scenarios: summary of the received feedbacks

Feedback was received from the following experts:
- Federico Silvestro (UniGE)
- Paul Hines (Packetized Energy)
- Mark Norton (Smart Wires)
- Emil Hillberg (RISE)
- Lukas Groterhorst (Amprion)
- Tim Schittekatte (FSR)
- Stamatios Chondrogiannis (JRC)
- Michel Noussan (FEEM)
- Evangelos Vrettos (SwissGrid)
- Qian Dai (China Electrical Power Research Institute)

Question 1 - Which relevant studies can be used as data sources to characterize costs (CAPEX and OPEX) required to evaluate flexibility candidates (including DR, RES curtailment, battery storage, and others) at European level?

Summary of received feedbacks: in general, experts indicated that there is not a single source that could be checked for the required data for CAPAX and OPEX costs for flexibility candidates. Nonetheless, some indicative reports/documents were indicated. In summary these belong to four different sources:
- Energy associations (ENTSO-E, IRENA, IEA, etc),
- previous research projects (e.g. RealiseGrid),
- specific ancillary services / flexibility markets operated by TSOS in Europe (e.g. EirGrid),
- literature review papers (different studies from Germany and a review paper).

Experts also agreed that although these data sources can be used for the short term analysis (i.e. for 2030), it is highly unpredictable that they can provide reasonable data sources for 2040 and 2050.

Critical analysis: The team will look in more detail at the different documents shared by experts that answered this question and will try to make a collection of data for 2030, based on obtained data. Values for 2040 and 2050 can be extrapolated from the existing ones assuming a linear increase in price, which would correspond to a higher valorisation of flexibility in the different years or assumed to be the same (this question will be further discussed in WP5 meetings).

Question 2 - Particularly for DR, which studies contain operational level data or at least highly reliable research level data for technical characterization (max amount of load shift, typical period of the day when the action is allowed, flexibility deactivation maximum period)?

Summary of received feedbacks: Experts indicated that there are some studies that contain either operational level data or highly reliable simulation data for the technical characterization of demand response. However, it was stated that on one side these data is very specific to the devices studied (e.g. some smart appliances) and on the other hand that it will be very hard to characterize DR in 2050. Studies provided by experts include (as examples) demand response characteristics for industrial facilities, home appliances and office buildings. Some ongoing H2020 projects are also linked to DR characterization and can be a good source of data (e.g. DELTA project).

Critical analysis: the studies provided by the experts would theoretically allow to characterize different types of DR (industrial, residential and tertiary sectors). However, in the scope of FlexPlan, and since load (and DR) will be aggregated at the first level of distribution (MV/HV side) it is very hard to make a clear separation of these sectors. Nonetheless, them team will look into the provided reports and try to formulate average values that could be used for most of the DR characterization needs. Additionally, a dedicated communication channel will be started with H2020 DELTA project, in order to evaluate possible synergies in this topic.

Question 3 - Which relevant studies can be used as data sources including CAPEX+OPEX costs related to typical grid expansion measures at European level? This is particularly relevant for our long-time scenarios (2050) for which TYNDP2020 does not contain any data.

Summary of received feedbacks: Experts indicated different data sources for the CAPEX-OPEX costs of grid expansion, including some reports (e.g. Electricity Transmission Costing Study from IET 2012) and available research papers that provide forecast for costs data. Additionally, it was also indicated that since the TYNDP contains costs data for PCI projects, these can provide a solid basis for creating "average costs" (although the evolution for 2050 is not directly extractable from this).

Critical analysis: taking into consideration the provided answers, the team will look into TYNDP2020 costs for PCI projects. If these are not very different from those indicated in a review paper given by an expert, then the costs present in this paper will be sued, as it already includes a forecast for costs up to 2050. Furthermore, this paper will be analyised in detail as it also provides other costs (e.g. flexibility and fuel costs) which can complement as well other existing data gaps.

Question 4 - Should the regional cases follow a common approach using EU level averaged costs or should there be an effort to adapt these costs to national level ones? If yes, which other parameters are required and should be used as main inputs for this adaptation?

Summary of received feedbacks: In general, experts agree that these is no need to adapt the EU level average costs to national ones. Even if enough data is available, this would result in a complex activity which could also result in a disproportional investment level which would difficult the simulations and analysis of results. Experts claimed that geography plays a major role (e.g. construction of a line in a mountain vs flat area) and that should be taken into consideration more than the actual political borders between countries.

Critical analysis: We fully agree and will follow the advise of experts in using EU level average costs. This allows having a direct comparison between the regional cases and even inside each regional case, where using national level costs could result in a disproportional investment level in some countries, resulting in system unbalances that are not realistic. Regarding some comments provided by external experts regarding the consideration of geographical aspects (e.g. mountain vs flat land) it is important to mention that this is already considered in the scope of the project.

Question 5 - What locational constraints should be considered in constructing BESS systems, hydrogen, pumped hydro and other storage systems?

Summary of received feedbacks: answers provided by experts indicate a large spectrum of possible locational constraints, depending on the storage system considered. In summary, the most important ones are indicated below.
- Pumped Hydro – geographical, landscape and water inflow (or proximity to already existing reservoirs)
- BESS – most experts did not indicate specific constrains for BESS installation, other than the existence of physical space (probably harder in highly urban density areas).one expert indicated the fire hazard as well (for urban areas).
- Hydrogen – hydrogen seem to include a lot of constraints following the experts answers. The most important ones include: special availability and proximity to gas network facilities (not only grid but also storage caverns), proximity to industrial clusters (load areas)

Critical analysis: received experts feedback allow to contribute to the already existing list of locational constraints or simplify the existing ones. The received feedback will be taken into consideration for the selection of constrains for flexibility related candidates.