

## Case study for Lot 2

### **“Pre-selection, procurement and configuration of a market monitoring software tool for REMIT purposes”**

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## Glossary

AAC	Already Allocated Capacity
ATC	Available Transfer Capacity
AO	Allocation office
CDP	Commercial Data Provider
D	Day, Today
D+1	Day after day D
D-1	Day before day D
DSO	Distribution system operator
ENTSO-E	European Network of Transmission System Operators for Electricity
ENTSO-G	European Network of Transmission System Operators for Gas
GENCO	Generation company
GX	Gas Exchange
LNG	Liquefied natural gas
M	Month
MM	Market monitoring
MC	Marginal cost
NTC	Net Transfer Capacity
NWA	National Weather Agency
OTC	Over the counter
PP	Power plant
PTDF	Power Transfer Distribution Factors
PX	Power Exchange
T	Transparency
TC	Transmission capacity
TSO	Transmission System Operator
VPP	Virtual Power Plant
W	Week
Y	Year

## 1 Background information

The purpose of this case study is to allow tenderers to list possible activities and work required to complete a consultancy project for pre-selection and procurement of the market monitoring software tool best suited for REMIT implementation and for its configuration for the peculiar needs of the Agency and the national regulatory authorities (NRAs).

The tenders shall describe:

- the consultancy approach they intend to adopt considering the constraints given by the Regulation (EU) No 1227/2011<sup>1</sup> of the European Parliament and the Council on wholesale energy market integrity and transparency (hereafter: REMIT);
- the methodology they intend to use to define the requirements for the procurement tender;
- a detailed plan defining the outcomes expected in different phases and the resources required.

Main constraints for the case study to be deployed shall be drawn from a detailed analysis of REMIT and REMIT implementation documents already available, namely:

- Non-binding guidance published by the Agency on its website on the definitions;
- The registration format as proposed by the Agency on its website in a public consultation document that also gives some hints for controlling the corporate relationships among market participants which is an important factor for the effectiveness of market monitoring;
- Any further REMIT implementation document that shall be published on the Agency's website during the tender phase.

REMIT constitutes the legal basis for the case to be developed. The attention must be drawn, *inter alia*, on the following points that are possibly the most atypical in respect to ordinary instances of market monitoring tools:

- Data sharing with NRAs and other public authorities, according to article 10 of REMIT;
- IT security and reliability measures have to be implemented according to article 12 of REMIT in order to ensure confidentiality and integrity of data collected; access to data can be granted only to authorities which have set up systems;
- Market monitoring is not only based on transaction data collected under article 8(1) of REMIT but also on fundamental data collected under article 8(5) of REMIT; the structure of these data could be extremely complex;
- All formats and reporting rules for both transaction data and fundamental data are to be defined by the European Commission through implementing acts according to articles 8(2) and 8(5) of REMIT with the examination procedure referred to in article 21(2).
- Part of the collected data could be published in an anonymous way according to article 12 of REMIT provided that individual commercially sensitive information are not disclosed and cannot be inferred.

The contractor shall take into consideration that public procurement of the Agency follows the general Financial Regulation<sup>2</sup> applicable to the general budget of the European Union.

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<sup>1</sup> Regulation (EU) No 1227/2011 of the European Parliament and the Council on wholesale energy market integrity and transparency, OJ L 326, 08.12.2011, p.1

<sup>2</sup> Council Regulation (EC, Euratom) No 1605/2002 of 25 June 2002 on the Financial Regulation applicable to the general budget of the European Communities, as amended by Council Regulation (EC, Euratom) No 1995/2006 of 13 December 2006

## **2 Description of a scenario for a consultancy project for pre-selection, procurement and configuration of a market monitoring software tool**

The case study aims to assess the tenderers' responses to assist the Agency in the pre-selection, procurement and configuration of a market monitoring software tool for REMIT purposes. The tenderer may propose change(s) to the scenario if supported by relevant arguments.

The tenderer shall, on the basis of the case study, provide the following three (3) deliverables:

- A detailed technical proposal which shall include at least the following activities:
  - Identification of regulatory drivers and objective criteria reflecting REMIT peculiarities and the Agency's needs and methodology for the pre-selection of a subset of commercially available tools.
  - Identification of requirements to be included in the public procurement tender and technical assistance in drafting technical specifications.
  - Configuration activities of the market monitoring tool for adapting it to REMIT specific environment.
- A master plan for implementation which shall include:
  - Human resources needs and a plan with human resources allocation;
  - A detailed list of deliverables including a note per deliverable describing what the tenderer plans to do during the deliverable implementation;
  - A detailed time planning which is able to show on the time line all the deliverables, the deliverables which can be done in parallel and the foreseen milestones;
  - A detailed risk assessment plan;
  - A detailed quality plan.
- A financial proposal for the implementation which should take into account any direct and indirect cost which involves the production of software.

For the purpose of this scenario, the tenderer shall take into account that at least a number of NRAs can have access to the Agency's system or can even choose to develop their own instance of the same market monitoring tool.

The case study developed by the tenderer will be evaluated under the perspective of the following insights:

- a pilot project has been developed by CEER (Council of European Energy Regulators) and a proof-of-concept has been realised under limited conditions; a public report on the pilot project is available on the website [www.energy-regulators.eu](http://www.energy-regulators.eu). Nonetheless, further complexities (e.g. a number of different products considered, volumes and variety of data collected, a number of different sources, reporting channels and standards, timescale and synchronisation among different areas, etc.) will arise in respect of this proof-of-concept in a full-scale solution and will need to be properly addressed in the design phase;
- the cross-market monitoring is rare, i.e. monitoring abuse conducted between an equity or commodity and its derivatives, therefore it needs to be verified if and to what extent the available IT solutions for market monitoring already have alerts designed for such a complex relationship;
- data collection include not only transactional data pursuant to article 8(1) of REMIT, but also fundamental data pursuant to article 8(5) of REMIT. In the section below a sample of possible fundamental data are listed, although the final list of fundamental data to be collected by the Agency will be defined only through REMIT implementing acts. In

addition, fundamental data will arrive from multiple sources and will have a large degree of diversity as for entities, attributes and frequency. Therefore the market monitoring tool best suited for the Agency should be able to cope with this variety and complexity of collected data in order to produce alerts for suspicious events to be further investigated.

### 3 Fundamental data

In this section a brief list of possible fundamental data is given. This list is non-binding and is given only for the purpose of completeness of the scenario for the case study.

#### 3.1 Electricity system data

The data listed in Forecasts

Table 1 are mainly collected by national TSOs and are usually available in the TSOs databases. Therefore, the data could be provided from that database by the national TSOs or through ENTSO-E databases.

The database should contain the following system data:

- System operational data
- Generation data
- Consumption data
- Outages information
- Forecasts

Table 1: Fundamental electricity system data

Field name	Explanation
Day-ahead nominations per balance responsible entity	The market participants report the nominations to TSOs. TSOs aggregate for calculating appropriate balancing summary.
VPP usage	Individual PP owners, whose plants are a part of a VPP, do not need to directly report their profile. TSOs provide this service. Data provided: - VPP auction results - Actual VPP output
Implicit auctions: available national transmission capacity	Data: - NTC (D-1) - Indicative - ATC for allocation (IntraDay, Daily, Month, Yearly) - ATC forecast (Day-Ahead, Week-ahead, Month-ahead, Year-ahead) - AAC (Week-ahead, Month-ahead, Year-ahead)
Explicit auctions: available national transmission cap.	Data: - NTC (D-1) - Indicative - ATC for allocation (IntraDay, Daily, Month, Yearly) - ATC forecast (Day-Ahead, Week-ahead, Month-ahead, Year-ahead) - AAC (Week-ahead, Month-ahead, Year-ahead)
Cross border load flows	Actual flow of electrical energy in the system: - Interconnections

Field name	Explanation
	- Control (TSO) areas
Power plants installed capacity data	A detailed installed power data table of power plants connected to the transmission grid (Units >100 MW) (defined by the % of $P_{total}$ ) Differentiation between unit types: <ul style="list-style-type: none"> <li>- Thermal</li> <li>- Hydro</li> <li>- Nuclear</li> <li>- Wind</li> <li>- Solar</li> <li>- Pumped storage hydro</li> <li>- Other</li> </ul>
Actual generation	Generation injected in the transmission network. Per unit and aggregated.
Generation mix	Actual generation mix of units connected to the transmission network and >100 MW (defined by the % of $P_{total}$ ) Differentiation between unit groups: <ul style="list-style-type: none"> <li>- Thermal</li> <li>- Nuclear</li> <li>- Renewable (according to ENTSO-E)</li> <li>- Wind</li> </ul> (updated every year or at major events)
Consumption data - annual	Actual annual consumption in control area of TSO
Outages	Generation unavailability >x MW: <ul style="list-style-type: none"> <li>- Unplanned</li> <li>- Planned</li> </ul> Load unavailability > x MW: <ul style="list-style-type: none"> <li>- Unplanned</li> <li>- Planned</li> </ul> Transmission outages > y kV: <ul style="list-style-type: none"> <li>- Unplanned</li> <li>- Planned (defined by the % of <math>P_{total}</math>)</li> </ul>
Load forecasts Short Term	Per TSO (M). Load forecasts: <ul style="list-style-type: none"> <li>- D+1</li> </ul>
Load forecasts Long Term	Per TSO (N). Load forecasts: <ul style="list-style-type: none"> <li>- W+1</li> <li>- M+1</li> <li>- Y+1</li> </ul>
Actual load	Actual hourly load profile.
Load flow forecasts	Load flow forecast between the: Interconnections Control (TSO) areas PTDFs. (D+1) forecast, estimated physical margins (MW), allocated capacity to critical branches.
System generation forecasts Short Term	Generation forecasts: <ul style="list-style-type: none"> <li>- D+1</li> </ul>
System generation forecasts Long Term	Generation forecasts: <ul style="list-style-type: none"> <li>- W+1</li> <li>- M+1</li> <li>- Y+1</li> </ul>
Differentiated system generation forecasts (D+1)	Differentiation between units: <ul style="list-style-type: none"> <li>- Thermal</li> <li>- Hydro</li> </ul>

Field name	Explanation
	<ul style="list-style-type: none"> <li>- Nuclear</li> <li>- Wind</li> <li>- Solar</li> <li>- Pumped storage hydro</li> <li>- Other</li> </ul>
Balancing market data	Technical conditions of balancing market offer: <ul style="list-style-type: none"> <li>- Capacity of activated balancing reserves</li> <li>- Price of activated balancing reserves</li> <li>- Capacity of offered balancing reserves</li> <li>- Price of offered balancing reserves</li> </ul> Cross border balancing TSO-TSO <ul style="list-style-type: none"> <li>- Exchange bids volumes</li> <li>- Min and max prices</li> <li>- Volume of balancing energy activated</li> </ul>

### 3.2 Electricity GENCO data

The data listed in

Table 1 can be provided only by the individual GENCO. Some data, i.e. the system marginal cost, might also be gathered by GENCOs but are then usually calculated by other entities (e.g. TSOs, ENTSO-E, NRAs, etc.).

The database should contain the following system data:

- Marginal costs
- Technical constraints

Table 1: Fundamental electricity GENCO data

Field name	Explanation
Marginal costs of generation units	Marginal costs of generation units > 100 MW
System marginal cost	Marginal costs of each regional market
Technical constraints	<ul style="list-style-type: none"> <li>• Thermal PPs (Pmax, Pmin, Ram up, Ram down, Min down/up time, Initial startup time)</li> <li>• Hydro PPs (Pmax, Pmin, Ram up, Ram down, Water reservoir levels)</li> <li>• Other PPs</li> </ul>

### 3.3 Gas TSO data

The data listed in Table 3 is already being collected by all individual gas TSOs and is available in the gas TSOs databases. The data could therefore be provided from that database by the individual gas TSO or through ENTSO-G transparency platform.

The database should contain the following data:

- System operational data
- Consumption data
- Outages information
- Forecasts

Table 3: Fundamental gas data

Field name	Explanation
Installed Technical capacity	Installed capacity of the pipeline system C - capacity, t - time (day), M - TSO
Technical physical capacity	Real physical capacity available for transport C - capacity, t - time (day), M – TSO
Gas storage capacity	Information on gas storage capacity facilities in EU C - storage capacity, M – TSO
Operating pressure	Real measurement of pressure in the pipes PR - pressure, t - time granularity (daily), M – TSO
Firm capacity	Chartered capacity (intraday, D+1, D+2, D+3) Available capacity (intraday, D+1, D+2, D+3) C - capacity, t - time (day), M – TSO
Interruptible capacity	Chartered capacity (intraday, D+1, D+2, D+3) Available capacity (intraday, D+1, D+2, D+3) C - capacity, t - time (day), M – TSO
Interruption of interruptible capacity	Planned Realized C - capacity, t - time (day), M – TSO
Daily forecast of transport	Entry (intraday, D+1, D+2, D+3) Exit (intraday, D+1, D+2, D+3) C - capacity, t - time (day), N - border, M – TSO
The forecast of maximum calorific value	Forecast of maximum calorific value (intraday, D+1, D+2, D+3) Cal - caloric value, t - time (day), M – TSO
Actual realised transport	Actual realised transport in one TSO area C - transport, t - time (day), N - pipeline, M – TSO
Actual maximum caloric value	Actual maximum calorific value Cal - caloric value, t - time (day), M - TSO/Hub
Forecast of balancing	The projected total balance at the end of the of transport day of TSO area C - capacity, t - time (day), M – TSO
Offers of secondary capacity	Offers of secondary capacity: P - Provider V - Validity E - Exit points C - Capacity % - The ratio at border points (%) M – TSO
Asks for secondary capacity	Asks of secondary capacity: P - Provider V - Validity E - Exit points C - Capacity % The ratio at border points (%)
Maintenance periods	Storage unavailability : - Unplanned - Planned Load unavailability - Unplanned - Planned Transmission unavailability - Unplanned - Planned



Field name	Explanation
	C - capacity outage, t - time stamp, M – TSO
Consumption – TSO	Clients, connected to the transmission system C - consumption, t - time, M - TSO
Consumption - between T&D	Consumption per shipper at each interface point between T&D connection C - consumption, t - time, S - shipper, M - TSO, D - DSO
Imports/exports	Per shipper C - import, t - time, S - shipper, M – TSO
Imports/exports	Per interconnection C - import, t - time, S - shipper, M – TSO
Flows - balancing zones	Flows between balancing zones F - flow, t - time, M1 - Zone1, M2 - Zone2
Flows – markets	Flows resulting from organized gas markets F - flow, t - time, M1 - Market1, M2 - Market2
In/out storage per shipper	Storage Shipper C - storage, t - time, S - shipper, M – TSO
Flows from LNG terminals	Per shipper F - flow, t - time, S - shipper, M – TSO
Production	Per production facility P - production, t - time, N - production facility ID, M – TSO
Allocated capacity per interface point	Interconnection points -Storages -Inter balancing zone links -LNG terminals C - capacity, t - time, N - interface point

### 3.4 Weather data

Weather is one of the most important factors influencing the energy market, especially for forecasting load and generation of electricity and demand for gas. Therefore it is crucial to monitor the following weather factors:

- Wind;
- Hydrology;
- Solar irradiation;
- Temperature;
- Snow depth.

The data is presented in Table 4. All these data are already collected by various national organisations/agencies. There is no European organisation that would gather all the data from each national provider, therefore it is necessary to collect them from different sources. A lot of organisations/agencies (e.g. national weather agencies) are charging a provision for the measurement data.

Table 4: Fundamental weather data

Field name	Explanation
Wind forecast	D-1 forecast of: Wind speed Wind probability V - wind velocity, t - time, M - location ID
Wind - actual	Actual data of: Wind speed V - wind velocity, t - time, M - location ID

Field name	Explanation
Hydrology forecast	Forecast of: - River hydrology - Dam level (water reservoir) F - flow, L - water level, N = plant ID, t - time (hour)
Hydrology - actual	Actual data: - River hydrology - Dam level (water reservoir) F - flow, L - water level, N = plant ID, t - time (hour)
Solar irradiation forecast	Forecast of: Irradiance (W/m <sup>2</sup> ) I - irradiance, t - time (hour), M - location ID
Solar irradiation - actual	Actual data: Irradiance (W/m <sup>2</sup> ) I - irradiance, t - time (hour), M - location ID
Temperature forecast	Forecast of: Temperature (°C) T - temperature, t - time (hour), M - location ID
Temperature - actual	Actual data of: Temperature (°C) T - temperature, t - time (hour), M - location ID
Snow depth - actual	Actual data of: Snow depth D - depth, t - time (hour), M - location ID

### 3.5 Other fundamental data

As the market for electricity and gas is also affected by other energy products as well as global developments, it is necessary to monitor also the following:

- Electricity and gas markets indexes;
- LNG market development;
- Transmission prices;
- Oil market;
- Coal market;
- Aluminium market;
- Currency market;
- Emission market;
- External market information;
- Holidays.

These data are presented in Table 5.

Table 5: Other fundamental data

Field name	Explanation
Electricity markets indexes (PXs)	Prices for all relevant products related to electricity, traded on EXs (based on EX Registry) I - index, t -time, N - venue
Gas markets indexes (GXs)	Prices for all relevant products related to gas, traded on EXs (based on EX Registry) I - index, t -time, N – venue
LNG market	LNG prices development
Trans. capacity prices (electricity)	Transmission capacity prices P - product, t - time, N - border, Price
Gas transmission tariffs	Gas transmission tariffs P - product, t - time, N - venue, Price

Field name	Explanation
Oil market indexes	Information about oil prices development I - index or product, N - border, Price
Coal market indexes	Information about coal prices development e.g. ARA Coal RB Coal Futures I - index, t -time, N – venue
Aluminium market indexes	Information about aluminium prices development e.g. Aluminium price (US\$/t) at LME hub I - index, t -time, N – venue
Currency markets	Information about the currency markets e.g. EUR/USD EUR/RUB EUR/YMB EUR/CHF I - exchange rate, t -time, N – currency
CO2 market indexes	Information about CO2 prices development I - index, t -time, N - venue
External market information	External market information feed (e.g. political issues, regulatory developments, various influential events, etc.)
Holidays	List of all national holidays since they affect the profile of consumption H - holiday, t - date, N – nation