



# CleanerGrid Competition

Extra Information Document

1<sup>st</sup> of November 2023



## What to do

SONI invites you to use data from the [Smart Grid Dashboard](#) and Single Electricity Market Operator ([SEMO](#)) website to create a digital prototype of a website, application or dashboard to encourage citizens to be more mindful of their energy use at times of peak demand and encourage them to flexibly adapt their electricity use. You are free to create any working digital prototype to achieve this objective. This could be a website, application, or dashboard. Your working prototype could involve text messages, notifications, or automatically switching off appliances.

## Things to Consider

Things to consider in your prototype include:

- The accessibility for all energy users.
- The geographical location of the energy user, for example rural or urban, or network congestion in different geographical areas.
- The effectiveness of your prototype for raising energy awareness – what would be the energy market impact of widespread deployment of your prototype?
- The level of innovation that is applied to your approach, the complexity of the technology used and the maturity of the technology.
- The scalability of the prototype – how many users could utilise your solution?
- The compatibility of your prototype with different web browsers or different phone operating systems, if needed.
- The ease with which you can pitch your solution. For example, are you creating a standalone webpage or application, or do you need to prepare a demonstration video?
- Whether data cleaning or manipulation is necessary. For example, ensuring there are no outliers that skew the analysis and interpretation of results, or ensuring missing values are dealt with properly.
- Whether it is necessary to supplement the data feeds from the SmartGrid Dashboards and SEMO websites. Supplementing data is acceptable, but please ensure that this is clear in your document and that you name the source of the data.
- The fact that the data feeds provided by EirGrid and SONI are complex and the publication of these relies on the successful running of market systems on a daily basis. Certain feeds/reports may not always run successfully. Therefore, consider if your prototype can be resilient and that error handling is carried out effectively if a certain feed(s)/report(s) is not available.
- The necessity to carry out code testing such as boundary value testing, static code analysis, data-flow analysis, metrics analysis, peer code reviews, code coverage analysis and other software testing practices.

When applying the judging criteria (outlined in the Terms & Conditions document on the webpage), EirGrid and SONI will have regard to the above considerations.

## Useful Links

- [Shaping Our Electricity Future](#)
- [Generation Capacity statement \(GCS\)](#)
- [The Grid](#)
- [How the Grid Works](#)
- [Transmission Map](#)
- [DS3 Programme](#)
- [Market Generators \(Appendix D\)](#)

## [Smart Grid Dashboard](#)

SONI uses the dashboard to publish key operational data across 7 key categories:

- System demand → How demand is predicted, to ensure production levels meet electricity consumption.
- System generation → Data about the total energy production on the system.
- Wind generation → An estimate of the total electrical output of all wind farms on the system. There is data for actual wind output and for forecast wind output (note actual can be less than forecast due to forecasting error and/or dispatch down of wind).
- Interconnection → This data represents the estimated current net electricity transfer in MW on the East West and Moyle Interconnector.
- Imbalance Price/Volume → This data shows the time weighted average Imbalance Price and Net Imbalance Volume for each 30-minute Trading Period.
- Frequency → This data shows the frequency over 5 second intervals. When supply and demand are in balance, the frequency will be 50Hz.
- CO<sub>2</sub> → This data shows the average CO<sub>2</sub> emissions per unit of electricity generation output at 15-minute intervals.

The dashboard allows users to:

- Switch between all island, Ireland, and Northern Ireland power system data
- Customise graphs by date
- Compare and download data to the filetype “.csv”.

The Smart Grid Dashboard contains an API which can be used to obtain the data. For example, to access the API from Chrome:

- Go to the webpage that contains the data you would like to extract
- Hit F12 for Developer Tools in Chrome
- Select the “Network Column”
- Refresh the page – the API call will then display
- Select the API calls starting with the phrase “data” and open them into a new tab.
- The data will look like:
  - `{"ErrorMessage": null, "LastUpdated": "29-Aug-2023 14:52:16", "Rows": [{"EffectiveTime": "29-Aug-2023 00:00:00","FieldName": "SYSTEM DEMAND", "Region": "ALL", "value": 3672}, {"EffectiveTime": "29-Aug-2023 00:15:00", "FieldName": "SYSTEM DEMAND"00:30:00", "FieldName": "SYSTEM DEMAND""Region":"ALL""Region":"ALL""value": 3634} , {"EffectiveTime": "29-Aug-2023`
- Extract or copy and paste the data into the format that you seem fit and use it accordingly.

## [SEMO website](#)

The market data on the SEMO website can be viewed as:

- Static Reports - these allow you to access libraries of flat file outputs.
- Dynamic Reports – these allow you to view market data in online charts and permits you to download the data.

Examples of the datasets which are available on the SEMO website include:

- Forecast demand
- Forecast renewable (wind and solar) production
- Forecast renewable dispatch down (due to excess wind and solar)
- Scheduled interconnector flows
- Forecast market price on a 30 min basis
- Forecast output on a per unit basis.

## Submission of your prototype

The method of submission will be via email and GitHub.

While you will have creative freedom with your prototype, we strongly encourage you to also consider the following for your submission:

### **(1) Prototype**

- If you are submitting a source code as part of your entry, please only submit this via **GitHub**. You must include a **link** to your GitHub in your email submission. We would advise you to include a README for your code to the GitHub repository.
- For all prototypes, please provide any source code and clear documentation on what the code does and how to run it in the report.
- If your prototype is not applicable to be submitted via GitHub or if you have supporting files that need to be submitted, please attach an **unzipped** file to the email submission.

### **(2) Report**

The report document needs to be submitted to [Research@soni.ltd.uk](mailto:Research@soni.ltd.uk)

#### Specifications

- The report should be between 5 and 10 pages.
- The report should be a MS Word or PDF document.

The layout of your report should consist of:

- **Introduction** – briefly describe the concept for your prototype.
- **Development/Methodology** – explain the development of your prototype.
- **How** – explain how the code/prototype works.
- **User Experience** – outline how the end user interacts with your prototype.
- **Conclusion**

### **(3) Demonstration Video**

A demonstration video of your prototype isn't mandatory but is recommended to support your concept. Screencast-O-Matic or similar can be utilised to help to demonstrate your code and prototype. Please upload as an unlisted video to YouTube and **include a link in your email submission.**

## Software suggestions

The following are examples of software you could use to build your prototype. You are not limited to this list.

- Apache Spark
- JavaScript
- Kibana
- Power BI (used along with power automate or power apps)
- Python (Python libraries e.g., BeautifulSoup – for web scraping html or for xml files)
- R Studio
- Scala
- Selenium Web Driver – for scraping and web automation
- Tableau

**We will not accept any MS Excel Spreadsheets as part of your submission.**