SUCCESS CASE 37.2025

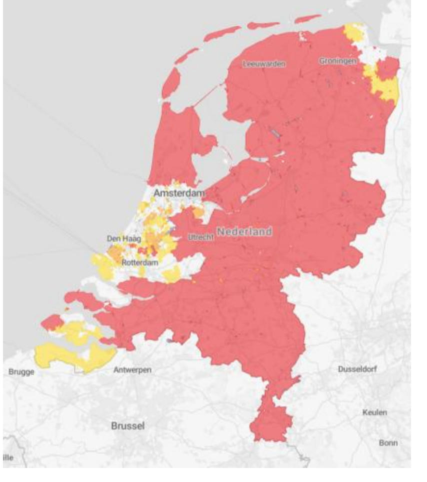
Realtime Interface

DUTCH NATIONAL STANDARD FOR COMMUNICATING OPERATIONAL BOUNDARIES

RealtimeInterface

THE CHALLENGE

In the Netherlands, grid investments are unable to meet the pace of new transport capacity requests from grid users. This results in **severe congestion** and a **long waiting list for transport capacity**. Almost the entire country is affected by scarcity or unavailability of transport capacity for new generators and loads on the medium voltage grid, calling for urgent measures.



Infeed congestion in the Netherlands.

According to the European Network Code on *Requirements for Generators* and the Dutch Grid Code, grid users owning energy production and storage units should **provide an interface to the grid operator to communicate about grid usage**. Such an interface could support avoiding overloads and facilitate a more dynamic use of existing grid capacity.

THE SOLUTION

In 2024, the Dutch DSOs and TSO published the *Realtime Interface* specification as a **national standard for communication between grid operators and customers** on allowed transport capacity usage on the point of common coupling (e.g. the point of active power infeed). This specification has been developed by the association of the Dutch network operators Netbeheer Nederland in collaboration with knowledge institutes and representatives of customers owning distributed energy resources (DERs).

Thanks to the developed Realtime Interface (RTI), **the grid operator can send setpoints** (defining the maximum allowed production) **and receive grid usage measurements from the grid user**.

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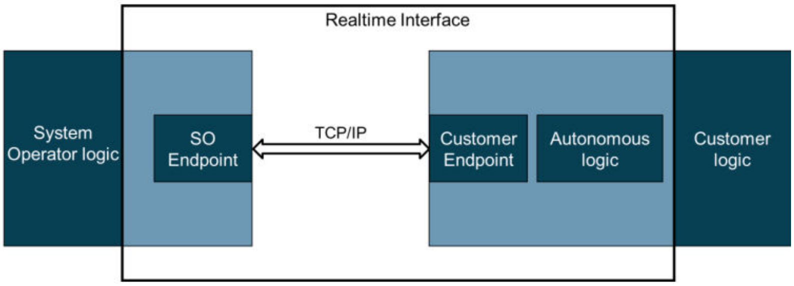
The system consists of an *end point grid operator* and an *end point grid user*, which are connected via an Ethernet cable. The setpoints sent by the grid operator can be regarded as “boundaries”, within which the grid user can operate and participate in the energy market. Technically, the RTI can be used to communicate boundaries for both infeed and consumption, although it is currently only applied to customers with contracted capacity for infeed.



Scope and positioning of the RTI.

MAIN ACHIEVEMENTS

Multiple vendors contributed to the project and developed a product implementation of the *end point grid operator* and/or the *end point grid user*. All product implementations have been tested by an **independent test facility** to guarantee compliance with the Realtime Interface specification. Both the grid operator and grid user can now **choose from a range of Realtime Interface products** to use.

Since 2024**, the Dutch DSOs require the Realtime Interface to be installed** if customers request transportation capacity for an infeed of 1 MW or above. The RTI is also mandatory for existing connections where a contractual increase of capacity for infeed is requested. The DSOs also **harmonised RTI-related communication and documentation**, such as the information on their website and the related contractual documents.

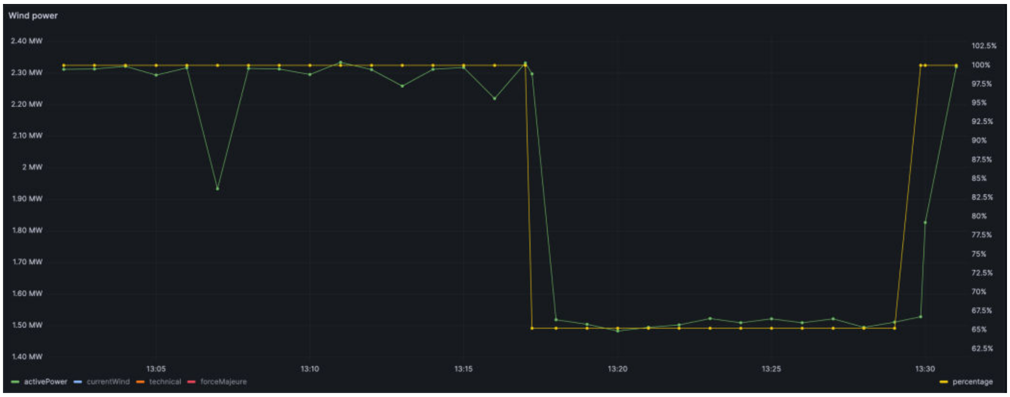
The application of the Realtime Interface has been proven successful in practice in around ten different locations.

KEY SUCCESS FACTORS

The **RTI distinguishes between the technical product, its application** (i.e., its use cases) **and rules concerning the applications** (i.e., the use case frameworks). The great advantage of this distinction lies in enabling a different pace for the development of technical products, use cases and use case frameworks. This means that, for instance, use cases can be added later on, as long as the required functions are present in the specification of the technical product. Moreover, when sending a setpoint, the interface also sends a reason that refers to a use case and a use case framework. Thanks to this, **the business context of a communicated setpoint is always known to the grid user**.

Before the development of the RTI, grid operators tended to introduce a series of requirements on grid user devices to ensure compliance with grid capacity usage at the grid user's site, resulting in a complex installation process. Moreover, these requirements would involve a good understanding of the grid user's site, which should formally not be a grid operator's concern, since their responsibility ends at the point of common coupling. In this context, a crucial decision in the development of the RTI specification was to let **setpoints determine the allowed bandwidth behaviour at the point of common coupling**. This allows for additional **flexibility for the grid user** and results in **lower complexity for the grid operator**.

Lastly, the RTI specification describes requirements on a functional level and only a few hardware requirements were included. Because of this, **vendors can make their own implementation decisions in developing RTI products** and are allowed to choose how to fit their product implementation within their product portfolio, e.g., by developing an "RTI-only" product or products offering other services (such as energy management).



Example of a real-life emergency curtailment. *The grid user reduced its infeed in just 1 minute (see communicated setpoint in yellow and real infeed measurement in green).*

WAY FORWARD

The RTI is being further developed to support an additional implementation which uses an **internet-based data connection instead of a local physical data connection**. Moreover, other additional functions are foreseen, such as the communication of **time-ahead constraints**, the **aggregation of setpoints** for groups of grid users, the authorisation of third parties to access published boundaries, and the addition of **reactive power and voltage boundaries**.

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