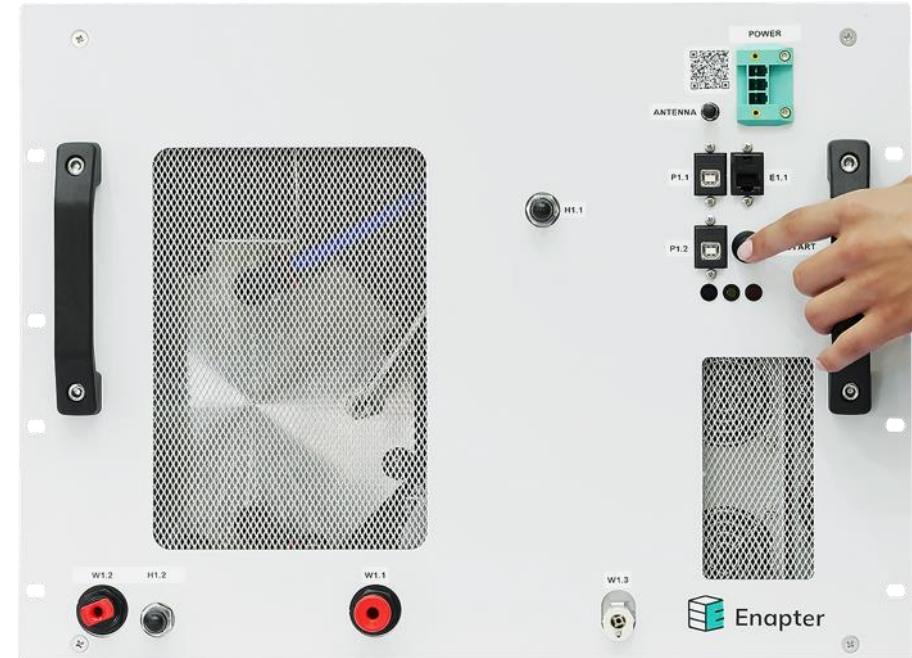# Enapter Technology Roadmap

Q1 2021

Enapter Technology Roadmap

1st Quarter, 2021

≡ We decided to send you quarterly updates on Enapter's products and technology to provide visibility on upcoming product releases / updates as well as new software features that our teams are working on. As valued Customers and Partners, we hope that these updates will allow you to account for our upcoming developments with regard to your projects.

≡ In the first quarter of 2021 we will be releasing two new variants of the EL 2.1 (DC powered and liquid cooled), a new Water Tank, testing an outdoor cabinet, as well as adding new software features such as a Dryer Control Network for Dryers, Blueprints for simpler integration of your energy devices in our EMS and Offline Mode.

≡ The next slides will dive deeper into these developments, take a look to see how they can benefit your integration activities. Detailed documentation of each development will become available on the Enapter Handbook as we progress. In the meantime feel free to reach out to us for any clarifications!

Hardware Developments (1/2)

What	Why	When
Electrolyser EL 2.1 DC DC powered variant of the EL2.1 with 48-60 V input.	▪ Allows, for example, direct integration with 48 V battery bus in microgrid. ▪ Can eliminate the need for DC-AC transformers in projects with DC renewable energy sources like solar, which also often involve other DC energy components like batteries and fuel cells; reducing project cost and complexity. Draft data sheet available here: www.enapter.com/el21adc	March 2021 (prototype, without CE certification)
Electrolyser EL 2.1 LC (liquid cooled) Liquid cooled variant of the EL2.1. Ports for cooling liquid in/out are added, allowing heat extraction directly from the electrolysis process.	▪ Allows operation in up to 50°C ambient temperatures (air cooled ELs can operate in up to 45°C); reducing the cooling requirement for the electrolyser installation space. ▪ Allows use of thermal waste energy, increasing overall efficiency. ▪ Simplifies heat removal for larger scale installations with multiple electrolysers; allows new larger scale projects/ applications (refuelling, district heating, etc.) to be addressed better. Draft data sheet available here: www.enapter.com/el21alc	**March 2021**
Water Tank 2.1 This update will incorporate a conductivity sensor and communication with the Enapter EMS.	▪ Constant conductivity monitoring of water supplied to electrolysers, also rejecting poor quality water; eliminates the risk of poor-quality water flowing into the electrolyser and affecting lifetime. ▪ Connected to the Enapter EMS, allowing direct monitoring of the Water Tank over the Mobile App or Cloud. Draft data sheet available here: www.enapter.com/wt21	**February 2021**

Hardware Developments (2/2)

What	Why	When
Outdoor Cabinet Testing and integration of a liquid cooled EL2.1 with a 5 kW Fuel Cell from Power Cell in an outdoor setting.	▪ We will share our learnings from building and testing an outdoor/liquid cooled cabinet and chillers with you. These results should help you get an understanding of integrating our liquid cooled EL with other liquid cooled energy components in an outdoor environment. ▪ This will not become a product offering from Enapter. We do this to support and encourage your integrations activities. ▪ For an example of the kind of information we may share, take a look at our previous Forum post about our experience with the Intelligent Energy FCM-802 [here](#).	March / April 2021

Software Developments (1/3)

What	Why	When
Dryer Control Network A peer-to-peer wireless mesh network between a single dryer and up to 5 electrolysers for device interoperability and peer monitoring.	▪ It will be possible to set up and commission the dryer and electrolysers for device interoperability, without the need of an external controller such as the Enapter Gateway or PLC. Configuring the Dryer Control Network is fully automated with the Enapter Mobile App and can be accomplished within minutes. ▪ All connected electrolysers will communicate their state and sensors data with the selected dryer directly in real time; this direct communication ensures proper integration and smoother operation of the devices. ▪ Each electrolyser connected to a Dryer Control Network can provide dryer sensor data, state and alerts over a Modbus interface, allowing you to monitor the dryer along with electrolysers.	**February 2021**
Blueprints Enapter Blueprints is a technology that supports integration of 3rd party energy devices into our EMS. Blueprints will work with our Universal Communication Modules (UCMs) to control and monitor these energy devices.	▪ We noticed simple yet powerful patterns and functionality when setting up different energy devices such as hydrogen sensors, irradiance sensors, fuel cells, etc., irrespective of the supplier or model. Understanding and extracting these patterns to create Blueprints allows us to apply these common functions/ commands to various energy devices without having to create new control and monitoring mechanisms for different device suppliers or models every time. ▪ Each energy device will have an individual Blueprint consisting of a few core concepts (patterns we have recognized) such as device properties, telemetry and supported commands.	**March / April 2021**

Software Developments (2/3)

What	Why	When
Blueprints (cont'd from previous page)	▪ You can build upon these Blueprints to have your energy device transmit telemetry and execute commands/logic in a manner of your choosing - for example, decide what charts you want displayed on a telemetry dashboard, what commands could be executed, and how a device can interact with other parties of an energy system. ▪ We believe these Blueprints will primarily allow Partners to integrate and customize different energy devices without requiring an expert level understanding of the software programming that is often necessary to effectively integrate these devices; allowing you to focus on the "big picture". ▪ We aim to let you implement your preferred functionality for devices and develop an energy management platform that is tailored to your projects and installations without having to deep-dive into the properties and functionalities of every device, every time.	
Offline Mode and the Gateway Web User Interface (WUI) We will be working on developing an Offline Mode to allow set up and commissioning for projects with poor or no access to internet. Over the course of the next quarters, we will continuously add various features and functionality that can be used in Offline Mode.	▪ The first offline feature to be rolled out will be a Web User Interface for setting up the Gateway over a local network, without the need for an internet connection (for example where only a Wi-Fi router is available). ▪ Once the Gateway is set up on a local network, the Gateway WUI can be used to setup and configure the Enapter electrolysers and dryers without the Enapter Mobile App or Enapter Cloud connection, which is sometimes the only option available. Providing a temporary internet connection (for example via cellular data) for system commissioning in remote areas is no longer necessary.	**April 2021**

Software Developments (3/3)

What	Why	When
Offline Mode and the Gateway Web User Interface (WUI) (cont'd from previous page)	▪ Telemetry data from the Enapter modules will be stored on the Gateway and limited only by the storage capacity, allowing you to access this during any on-site visits. ▪ Some functionality can also be implemented via the Gateway WUI, allowing basic on-site control and monitoring of the Enapter modules only within a local network.	
Additional Offline features we will be working on…	▪ Dryer control network setup in offline mode will be introduced. ▪ An offline mode for accessing of the Gateway Command Line Interface, which will allow full system control setup in a disconnected or remote location. ▪ Offline configuration for UCMs as well as a Log-Viewer and firmware updates through the Gateway WUI.	**Q2 2021**
Updates to the Cloud and a new User Interface	▪ A new Cloud web interface is under development; we aim to improve user experience and make it more interactive, informative, and easier to work with.	**April 2021**