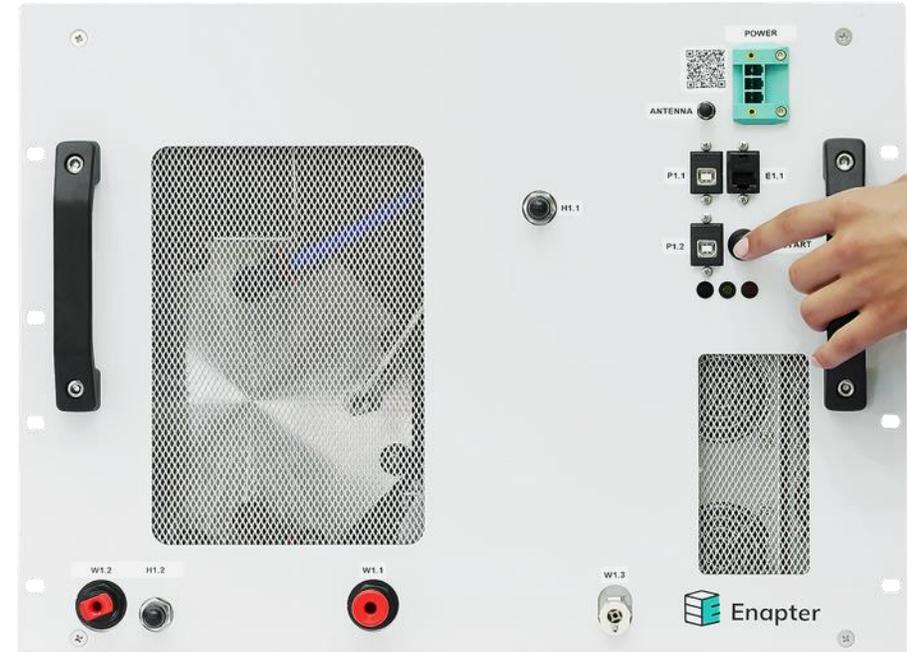




Enapter

Enapter Technology Roadmap

Q3 2021



Enapter Technology Roadmap

3rd Quarter, 2021

- ≡ Our quarterly updates on Enapter's products and technology development 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.
- ≡ We have released FW 1.6.0 which includes the Web GUI (Graphical User Interface) for the EL 2.1 and we continue working on Virtual UCMs as well as making the Gateway (Version 1.9.0) a stand-alone application in Linux-based OS. On the hardware side we continue development of the EL 4.0 - the next generation of the flagship Enapter electrolyser as well as our megawatt scale [AEM Multicore](#).
- ≡ Detailed documentation of developments will become available on the [Enapter Handbook](#) as we progress. For more information on any of these developments feel free to reach out to us!
- ≡ You can find our previous technology roadmaps in the Handbook [here](#).

Software Developments (1/1)

What	Why	When
<p>Virtual Universal Communication Modules</p> <p>Virtual UCM is a 100% software implementation of the Enapter UCMs, which up to this point were represented by a wide range of hardware devices.</p>	<ul style="list-style-type: none">▪ Virtual UCMs allow you to efficiently work with any protocols running on top of TCP/IP, and its support introduced in the alpha version of Enapter Gateway 1.9.0. As an example, it can be used to implement integration of a wide range of Modbus TCP 3rd party devices such as solar inverters, hydrogen compressors, air handling units, etc.▪ After installing the new version of the Enapter Gateway (to be released in July), it is automatically possible to create an unlimited number of Virtual UCMs via the Enapter Cloud Web interface and use Enapter Blueprints (Lua Scripts, Web IDE) to implement integration with a third-party device. To understand Enapter Blueprints, you can take a look at more detailed descriptions in our first quarterly update for 2021 here. <p>Virtual UCM documentation can be found in the Handbook here and at the Enapter developer's portal here.</p>	<p>July</p>

Software updates from the previous quarter

What	Why	When
<p>Graphical User Interface for the EL 2.1</p> <p>Firmware version 1.6.0. for EL 2.1 introduces a local web interface for EL commissioning and monitoring of individual ELs directly via an ethernet connection.</p>	<p>This feature simplifies commissioning and monitoring for many use cases, especially for operation in Offline Mode i.e. without the need for a Gateway, Mobile App or Cloud/internet connection. The EL 2.1 Web UI will allow:</p> <ul style="list-style-type: none">▪ Real-time monitoring of parameters/states like production, temperatures pressure, safety heartbeat.▪ Setting up the IP address of each EL used for Modbus TCP integration, for example, with your own energy management system.▪ Review of any errors and warnings with explanations.▪ Switching to Maintenance Mode for initial refilling / electrolyte replacement and commissioning of the system. <p>You can find more information on the Web GUI in our handbook here.</p>	<p>Available now as part of FW 1.6.0</p>
<p>Software Gateway as an application for Linux-based operating systems</p> <p>The Gateway (Version 1.9.0) will become available as a stand-alone application for Ubuntu / Cent OS / Red Hat.</p>	<p>This application will allow your software teams to easily tailor your electrolyser installations for existing infrastructure, servers and networks using the commonly used Linux operating systems. You will be able to use this Gateway Web Interface to oversee parameters of connected devices and execute commands.</p>	<p>July</p>

Hardware updates from the previous quarter

What	Why	When
<p>Electrolyser EL 4.0</p> <p>The next generation of our flagship electrolyser, providing the familiar modularity of 0.5 Nm³/h production, now designed according to ISO 22734 and reduced requirements on installation space.</p>	<ul style="list-style-type: none">▪ We expect that customer requests for compliance with ISO 22734 will become more common since AEM technology has been covered in this standard. Thus, the next generation of our electrolyser will be designed according to ISO 22734.▪ We will keep the design as close as possible to the connections, interfaces and functionality of the EL 2.1, allowing you to quickly understand and begin integration into your projects as well as easily upgrade existing EL 2.1 installations to the EL 4.0.	<p>Development progresses; first prototypes for internal testing are planned to be ready in Q4 2021</p>
<p>Development AEM Multicore</p> <p>The AEM Multicore is a megawatt electrolyser featuring several hundred AEM stack modules and a common, yet redundant, balance of plant.</p>	<p>The AEM Multicore will create new opportunities for partners looking to expand into hydrogen applications which demand production rates of 210 Nm³/h or higher, using the tried and tested Enapter AEM stack.</p> <p>The German Government has acknowledged the innovative potential of the AEM Multicore, awarding € 5.6 Million in funding to Enapter and Münster University of Applied Sciences (FH Münster) for its final development. Read more about it here.</p> <p>Take a look at the AEM Multicore datasheet and brochure in our handbook here and here.</p>	<p>Commercially available in 2022</p>



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