

Nilar Hydride® battery technology

The ultimate sustainable energy storage solution

Game changer Nilar has developed a method for multiplying the lifetime of its Nilar Hydride® batteries

Customer news Storing DC energy at Amsterdam's ABN AMRO revolutionary Circl building

Product range Energy storage available with Nilar Hydride® battery technology

Discover our partner
Ferroamp Elektronik

Factory scale up Meeting growth in demand for energy storage

nilar Hydride®

The Nilar cells, energy storage and Battery Management System (BMS) are designed and manufactured in Sweden. The batteries harness the safer than "safe"¹⁾ Hydride chemistry in a bi-polar construction.

Act now!

2019 is proving to be another exciting year for Nilar. With our latest technological breakthrough, we will be able to offer customers the most long lived industrial battery available on the market.

We have already seen sales of Nilar batteries greatly increase - so much that we have now recently opened the first in a series of new automated production lines - and with this game-changing technology we expect the interest for our batteries to grow considerably.

Of course the timing couldn't be better, neither for us or the market. The explosion we are seeing in sustainable energy use and the growing movement to electric and hybrid vehicles, means more energy storage solutions than ever - and what better battery to use than the one that lasts the longest and is safer than "safe"?

Marcus Wigren
CEO Nilar

1) Nilar provides battery systems that are safer than many so called "safe" solutions available on the market. The Nilar battery system contains water based, non-flammable electrolyte. It does not generate short circuit failure even under low temperature charging. The electrodes cannot ignite spontaneously and will not cause heat propagation between modules. That's why we argue that we are safer than "safe".



We are nilar

We develop and manufacture powerful Nilar Hydride[®] energy storage solutions that support the transition from fossil fuels to renewable energy. Nilar has the optimal solution, whether it be to make your home more self-sufficient, regulate demand charges in industry applications or provide support for the growing smart grid infrastructures.

Safer than “safe” Nilar Hydride[®] chemistry

We believe that safety should not be a concern for homeowners or system providers. Nilar Hydride[®] batteries are therefore constructed with no risk of short circuit failure or uncontrolled heat propagations, even under low temperature operation. In addition, they can be safely transported en masse by road, rail, sea or air.

Environmentally conscious

Nilar batteries are fully recyclable. They are also cadmium, mercury and lead-free, and have a miniscule amount of hard to recover metals. When you choose Nilar batteries, you choose the most environmentally-conscious solution available.

Long-term power

The unique combination of Nilar Hydride[®] technology and our patented bi-polar construction provides a reliable source of power for more than 20 years. In addition, Nilar continues to innovate in the energy storage industry, and will in the future launch the game-changing method for multiplying the lifetime of the Nilar Hydride[®] batteries.

Whatever the weather

The weather can no longer be relied upon. One day it's warm and the next day it's freezing. For many battery suppliers this has always been a deal breaker, but that's not the case with Nilar batteries. The Nilar Hydride[®] design enables operations to run smoothly regardless if it's -20°C or +50°C.

Maintenance free

The Nilar Hydride[®] batteries have a sealed design that requires minimal maintenance during the service life of the batteries and for many applications no maintenance at all is required.

Quality assured - Manufactured in Sweden

Our batteries are designed, developed and manufactured in our state-of-the-art factory in Gävle, Sweden. With fewer battery parts than most manufacturers the build process is simplified and fully automated. Nothing leaves our factory until it has been approved at every stage of production.



The ideal home energy storage solution

Choosing an energy storage solution can be tricky. We believe that homeowners and residents should be able to sleep soundly at night knowing they have safe, environmentally conscious solutions that can be placed in their homes along with all their other appliances. Nilar home energy storage solutions are designed to be safer than “safe” and recyclable, making them the perfect solution to fit any home.



Industrial and commercial energy storage solutions

More and more businesses are investing in energy storage. It can be used to support renewables and to reduce peaks in power consumption, thus contributing to financial savings and making enterprises more sustainable. The modular Nilar Hydride[®] batteries support a range of scalable energy storage solutions to meet the needs of your business. For electric vehicle charging stations, industrial and commercial needs, our modular cabinet and rack solutions are ideal.



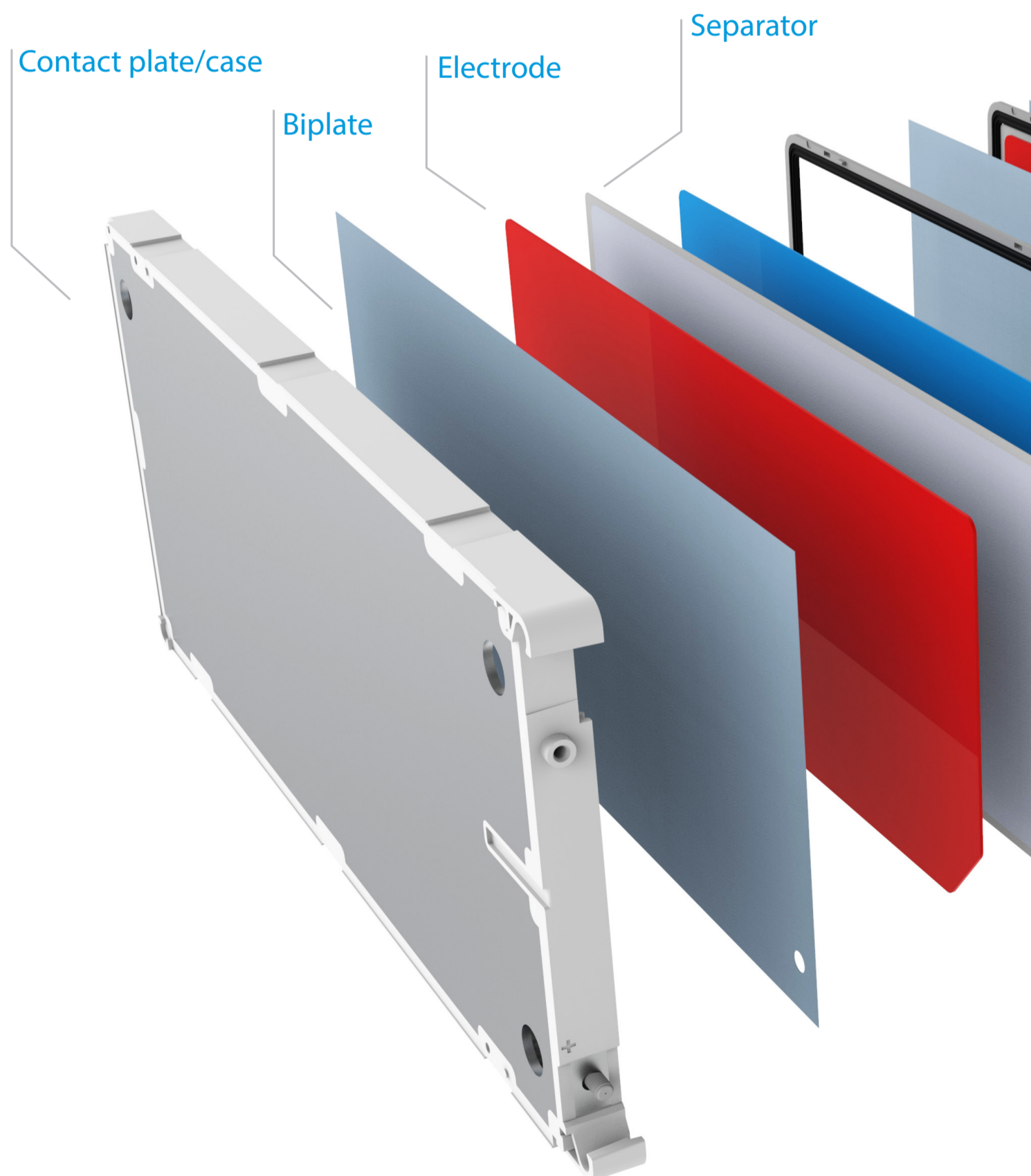
Safe, environmentally conscious energy storage solutions

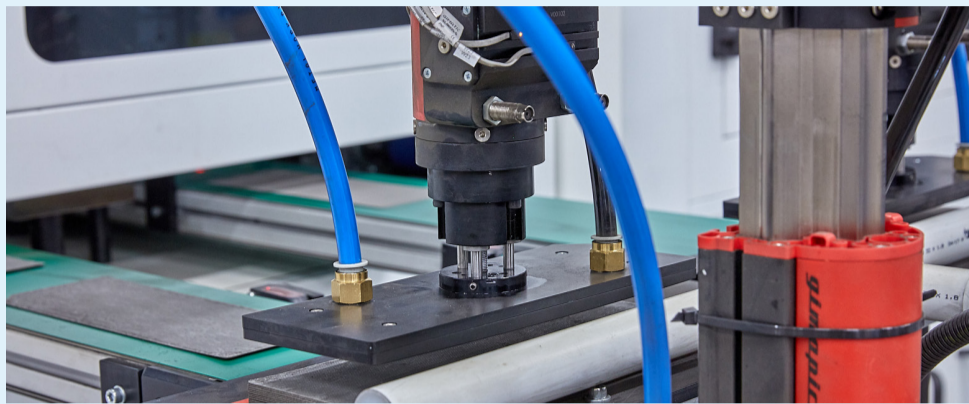
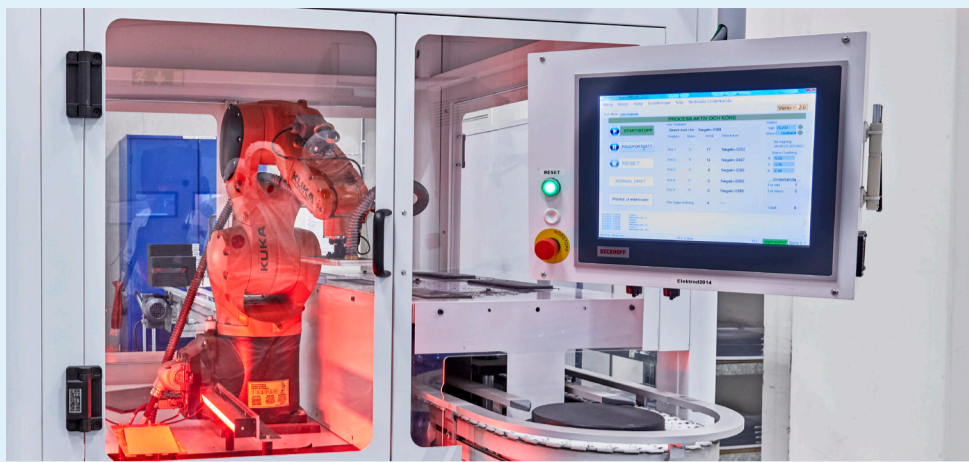
Today's grid cannot handle the new demands from mass electric vehicle charging and overall increased electrification. Without substantial investments into power line upgrades from utility companies and governments, energy storage will prove to be an important part of the electrical infrastructure of the future. A solution powered by Nilar is the most effective way to tackle these coming challenges.

Nilar Hydride[®] bi-polar modular design

The unique and patented Nilar Hydride[®] battery is based on a bi-polar design, where cells are laid horizontally and stacked on top of one another to gain maximum space efficiency. This also contributes to easy assembly and disassembly.

The outer contact plates act as current collectors for all cells in the module, thus reducing the volumetric overhead and inherently results in a uniform current flow across the cell. As a result of this, the bi-polar design has great advantages compared to the cylindrical and prismatic technologies in terms of volumetric overhead. The uniform current and resistance paths promote uniform heat generation, which enables even ageing of the cells and ensures longer cell life.

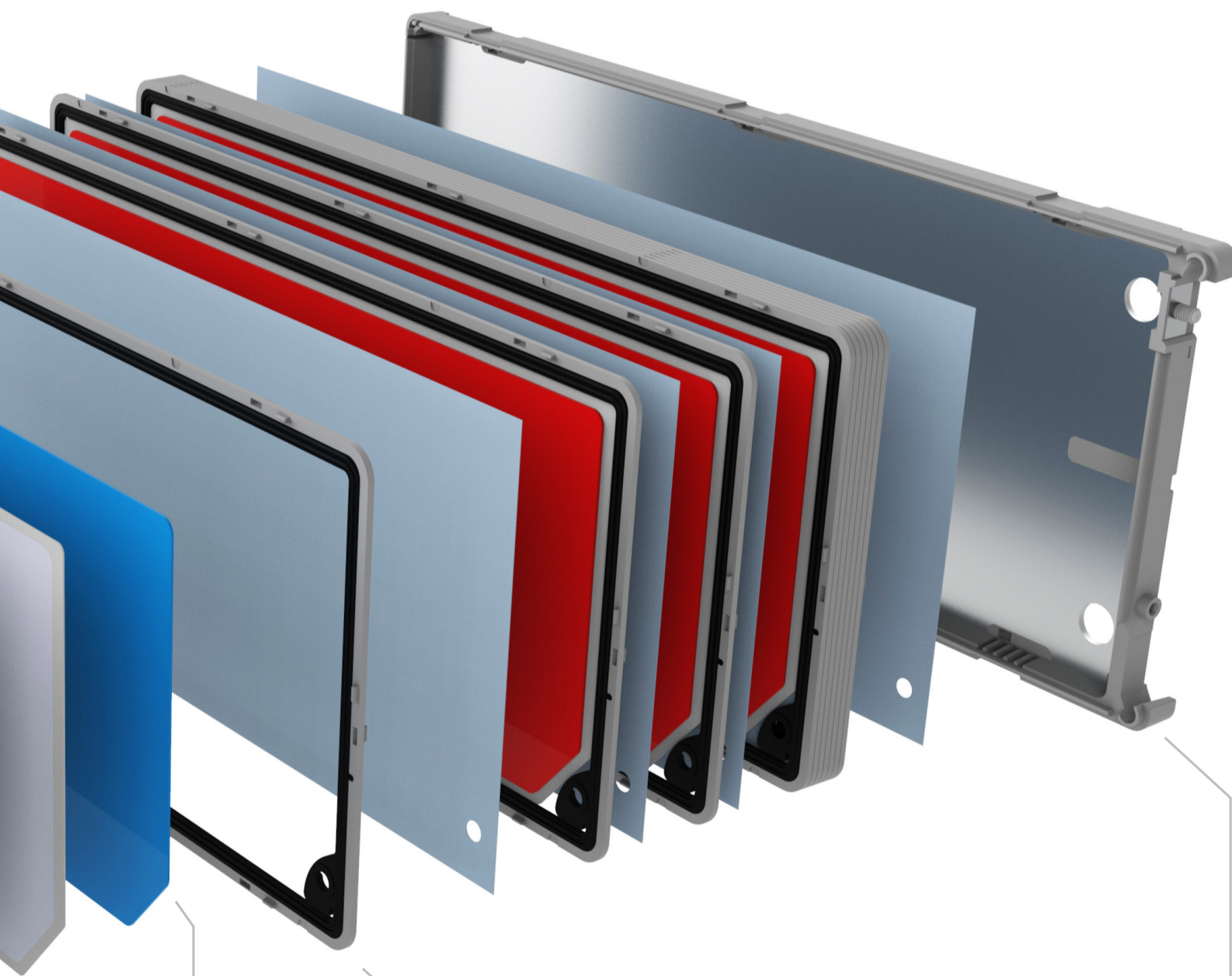




Factory scale-up to meet growth in demand for battery storage

To meet the demand for new batteries we have added the first of multiple new production lines at our factory in Gävle, Sweden. The automated production process ensures quality is never compromised, even when production is running 24/5.

As part of our environmental drive we also recycle within the production process. Any excess electrodes from the production process are reused where possible in the next battery batch. This reduces our environmental impact and cuts down on unnecessary use of valuable resources.



Electrode
Sealing

Contact plate/case

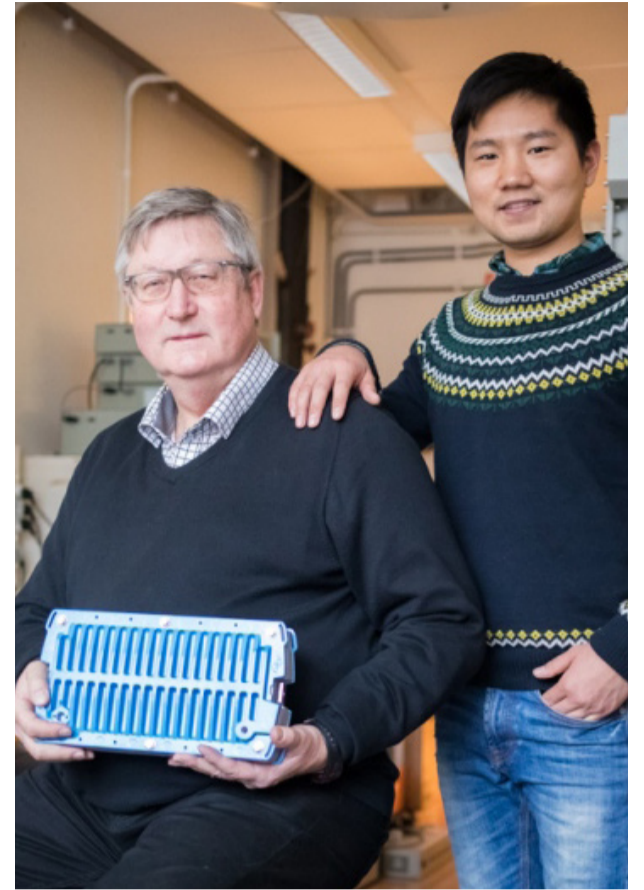
Revolutionary Nilar Hydride® battery technology will deliver unparalleled energy storage life

Nilar has developed a method for multiplying the life of its Nilar Hydride® batteries. After years of research at its Swedish and US R&D centers, and in close collaboration with leading researchers from Stockholm University, the company made the game-changing announcement in December 2018.

The limited lifetime of batteries is an issue for users. Thanks to the new patented process, the Nilar Hydride® batteries will be able to handle considerably more charging cycles – and thus store and deliver far more energy throughout their lifetime – than other industrial battery technologies. **This equates to a significantly reduced cost per kWh, providing the lowest total cost of energy storage available on the global market.** The robust, safe and environmentally-friendly characteristics of the battery are unaffected by this breakthrough.

“With this technology breakthrough we have found a way to re-condition a battery,” says Professor Dag Noréus from

Stockholm University. “Typically, in Hydride batteries, the metal hydride in one of the electrodes slowly consumes the water-based electrolyte, which connects the plus and minus poles. However, the unique design of Nilar batteries makes it possible to counteract this aging process of the metal hydride. Adding oxygen causes new water-based electrolyte to form in the battery. This replaces the lost electrolyte and restores the internal electrode balance. With the right balance of oxygen and hydrogen, Nilar batteries can reach a lifetime that surpasses other corresponding battery technologies.”



PROFESSOR DAG NORÉUS AND DOCTOR YANG SHEN.
PHOTO: NIKLAS BJÖRLING.

Discover our partner:

Ferroamp Elektronik



BJÖRN JERNSTRÖM, FOUNDER. PHOTO: FERROAMP ELEKTRONIK.

The company's range of products/services:

The EnergyHub System. An Eco system of products allowing for integration of PV production, energy storage management and control, and EV charging solutions in one cohesive system with single system control. The system is based on a bidirectional inverter and multiple DC/DC converters with dedicated functions for each application and a DC grid topology making it possible to utilize the combined benefits from all of these applications in a scalable and modular system.

Markets you perform business in (countries or regions):

Sweden, Norway, Finland and Holland. Further expansion is under consideration.

Can you describe your company, what products you offer and/or what problems your products solve?

The Mega trends in the Energy market are; rapid changes in electrical grids with new weather dependent energy production, bidirectional energy flow and ever changing power and energy demands for electrification of transport. Electric grids have to accommodate rapid growth with power demands in new areas in the grid, challenges in maintaining frequency control and changes in revenue streams from the market. Additionally, PV systems are being installed on facility roof tops and EV's have to be charged.

Today's business models are typically based on selling these products from different vendors based on individual specifications for each application. Facility owners have to manage even more products and balance electric consumption

patterns and changing tariff structures.

The EnergyHub system manages all these new technologies in one system, giving smaller customers a worry-free integration of PV, The EnergyHub is positioned at the facility grid connection and controls the system based on the combined consumption and production patterns by integrating energy storage and EV charging in a single system. The EnergyHub system is the ideal tool for our integrator partners to offer cost effective energy and power optimization services. They can offer long term service contracts with a variety of business offerings including the combined benefit of PV, storage and charge infrastructure in an easy to manage system topology.

What are your thoughts regarding the current/coming development of the energy storage market?

There will be an increased demand for power management in facilities, and an increased need for cost effective backup solutions where PV and Energy storage is combined with a focus on using the battery for both power and energy applications. With power management and integrated grid support services (VPP), facilities will be an asset for the energy providers instead of a load point in the grid.

Are you working on any new products/new projects at the moment?

Yes, several products and applications are in progress.

NILAR PRODUCTS ARE COMPLIANT WITH THE FOLLOWING DIRECTIVES AND REGULATIONS:

- EU-directive 2006/66/EC ('Battery Directive'). The batteries do not contain the heavy metals mercury or cadmium.
- Waste Electrical and Electronic Equipment (WEEE) Directive 2012/19/EU.
- Restrictions of certain hazardous substances according to RoHS Directive 2011/65/EU.
- Nilar products are in compliance with Regulation (EC) No. 1907/2006 concerning the Registration, Evaluation, Authorization and the Restriction of Chemicals (REACH).





Storing DC energy at Amsterdam's revolutionary Circl building

CUSTOMER: ABN AMRO

APPLICATION: DC grid

COUNTRY: Netherlands

ABOUT: ABN AMRO is a leading Dutch bank, with over 100,000 employees and 3,500 offices in over 60 countries.



As part of the groundbreaking design of its new circular pavilion, ABN AMRO wanted to create the world's first DC grid-powered building.

Indutecc supplies Nilar EC batteries for the world's first DC-net building.

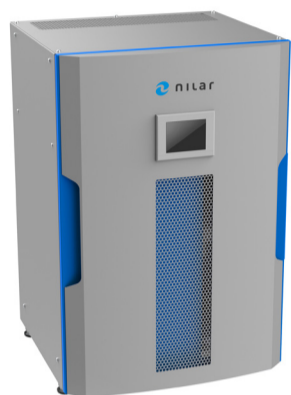
As part of the ground-breaking design of its new circular pavilion, ABN AMRO wanted to create the world's first DC grid-powered building. The new building is called Circl, due to its use of circular thinking throughout. For instance, 16 000 pairs of old jeans from its employees are incorporated into the ceiling and serve as insulation material, while the window frames in the conference rooms come from demolished office buildings. With components from Direct Current BV, a DC infrastructure was created that could store sustainable energy from more than 500 solar panels located on the building, while meeting the company's stringent safety and environmental demands.

Constructing a circular building means recycling and reusing material where possible. The fact that Nilar batteries are fully recyclable, and have no hard to recover metals, makes them an obvious choice for such a project. According to Rob Kuipers, Product & Contract Manager Facility Management at the bank, "The innovative DC system installed at Circl opens up a new market within sustainable, direct-current offices. When compared to existing AC installations, DC offers considerable amount of savings when it comes to raw materials and energy. Additionally, the way the solution allows for fewer inverters really fits to our circular idea."

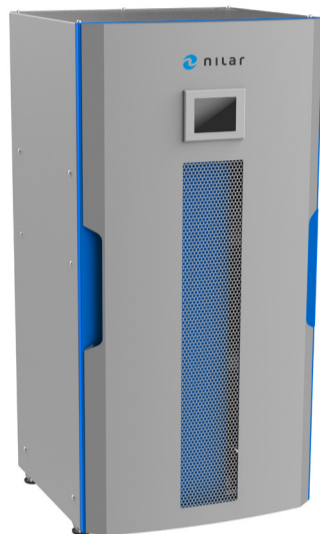
Energy storage with Nilar hydride[®] battery technology

Nilar offers the ultimate sustainable energy storage solution. One that is robust with no transport restrictions, and has a much smaller environmental footprint than other solutions in its class.

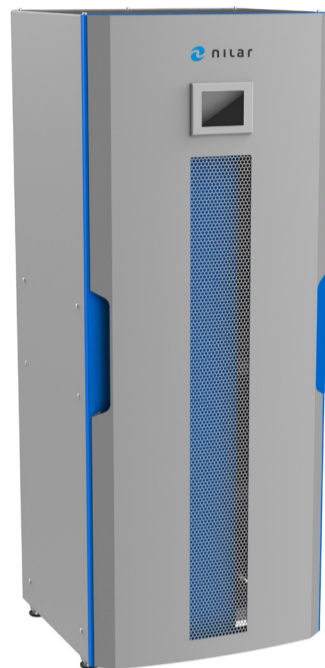
Cabinets



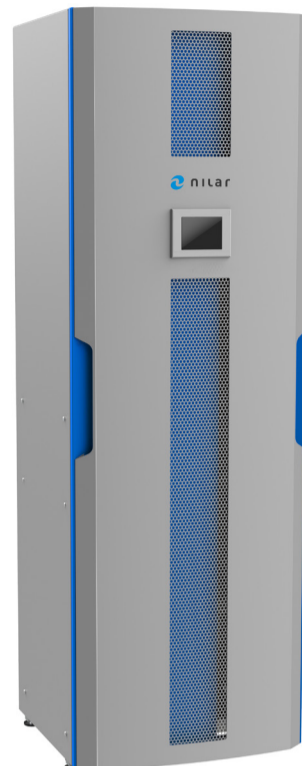
Cabinet 11,5 kWh



Cabinet 17,2 kWh



Cabinet 23 kWh

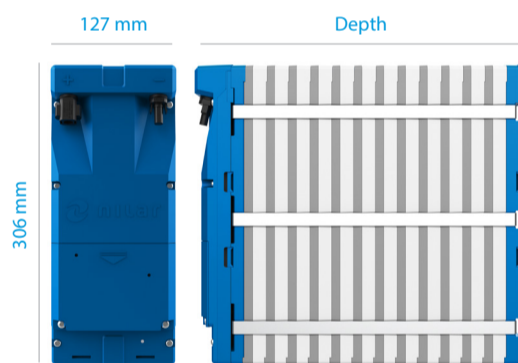


Cabinet 28,8 kWh

Racks



Rack 48 kWh and Rack 57,6 kWh



Configuration	Depth, mm
EC-96V-10Ah	248
EC-108V-10Ah	273
EC-120V-10Ah	293
EC-144V-10Ah	337

BATTERY PACK	Art. nr.	Product description	No. of battery modules	Pack voltage (V)	System voltage (V)	Rated capacity (Ah)	Energy (kWh)	Weight (kg)	Depth (mm)	Height (mm)	Width (mm)
EC-96V-10Ah	20-0010	Battery pack 96V +IMU	8	96	96	10	0,96	23,6	248	306	127
EC-108V-10Ah	20-0011	Battery pack 108V +IMU	9	108	108	10	1,08	26,2	273	306	127
EC-120V-10Ah	20-0012	Battery pack 120V +IMU	10	120	120	10	1,2	28,8	293	306	127
EC-144V-10Ah	20-0013	Battery pack 144V +IMU	12	144	144	10	1,44	34	337	306	127

CABINET	Art. nr.	Product description	No. of battery packs	Pack voltage (V)	System voltage (V)	Rated capacity (Ah)	Energy (kWh)	Weight (kg)	Depth (mm)	Height (mm)	Width (mm)
ECH-576V-11,5kWh	20-0020	Cabinet 11,5 kWh	8	144	576	20	11,5	352	655	1033	701
ECH-576V-17,2kWh	20-0021	Cabinet 17,2 kWh	12	144	576	30	17,2	518	655	1388	701
ECH-576V-23kWh	20-0022	Cabinet 23 kWh	16	144	576	40	23	684	655	1743	701
ECH-576V-28,8kWh	20-0023	Cabinet 28,8 kWh	20	144	576	50	28,8	850	655	2098	701

RACK	Art. nr.	Product description	No. of battery packs	Pack voltage (V)	System voltage (V)	Rated capacity (Ah)	Energy (kWh)	Weight (kg)	Depth (mm)	Height (mm)	Width (mm)
ECI-600V-48kWh-M	20-0024	Rack 48 kWh Master	40	120	600	80	48	1402	615	1996	1509
ECI-600V-48kWh-S	20-0026	Rack 48 kWh Servant	40	120	600	80	48	1402	615	1996	1509
ECI-576V-57,6kWh-M	20-0025	Rack 57,6 kWh Master	40	144	576	100	57,6	1610	615	1996	1509
ECI-576V-57,6kWh-S	20-0027	Rack 57,6 kWh Servant	40	144	576	100	57,6	1610	615	1996	1509

BENEFITS IN BRIEF

- Safer than "safe"¹⁾ Nilar Hydride[®] chemistry
- Environmentally conscious
- Long-term power
- Whatever the weather
- Maintenance free
- Quality assured - Manufactured in Sweden

NILAR AB
 Headquarters and Sales
 Stockholmsvägen 116 B
 187 30 Täby, Sweden
 Phone: +46 (0)8 768 00 00
 Email: sales.europe@nilar.com

NILAR AB
 R&D and Production
 Bönavägen 55, Box 8020
 805 95 Gävle, Sweden
 Phone: +46 (0)26 960 90
 Email: production@nilar.com

NILAR INC.
 R&D and Sales
 10800 E. Bethany Drive, Suite 525
 Aurora, CO 80014, USA
 Phone: +1 720 446 0169
 Email: sales.america@nilar.com

