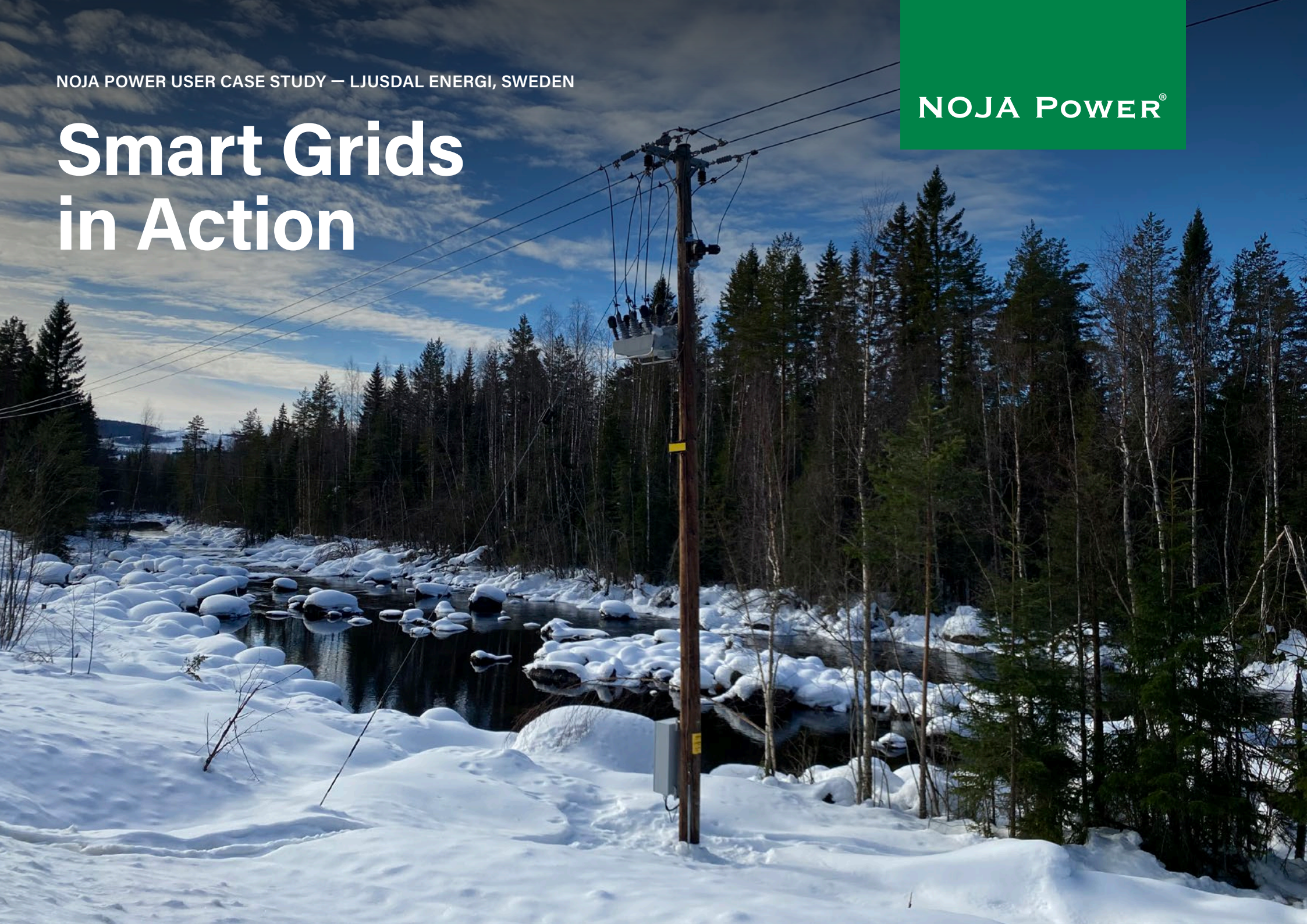


NOJA POWER USER CASE STUDY — LJUSDAL ENERGI, SWEDEN

Smart Grids in Action

NOJA POWER®



Ljusdal Energi, a utility situated 350 kilometres north of Stockholm, Sweden, is a beacon of innovation and resilience in the energy sector. Operating in a predominantly rural and forested area, the utility faces unique challenges that require innovative solutions. Michael Halvarsson, the Head of Electricity at Ljusdal Energi, has been at the forefront of these initiatives. Hannah Kneubuhler from NOJA Power sat down with Michael to discuss the utility's transformative journey in enhancing electricity network reliability and community well-being.

Hannah: Firstly Michael, could you tell me a little bit about Ljusdal Energi and your role as a Distribution System Operator?

Michael: Ljusdal Energi manages 7,000 connection points, 19,000 citizens and an area of about 935km². The network stretches from Edänge in the south to Hjärtvallen in the north, and is mostly woodland, making it a unique operational environment. There are approximately 100km of cable and 200km of overhead line in our 11 kV network, and our 0.4 kV network consists of approximately 115km of overhead cable and 354km of ground cable. In the grid area there are just over 250 grid stations, 70 sheet metal stations and about 30 other concrete stations.

We are part of a multi-functional municipality, and as the case with many other smaller utilities, my role is both technical and managerial. I manage all the field equipment, the automation schemes on the OSM Reclosers and the planning, documentation, customer service, and the usual array of engineering tasks. Given that we have a lean team of just eight people on the electricity side, I also find myself wearing the hat of a field engineer at times. No day is the same, which keeps things interesting for sure.



Typical installation design, OSM Recloser with RC Series Control



Achieve unmatched reliability while slashing your SAIDI and SAIFI by up to 80% with the NOJA Power OSM Recloser.

Hannah: What are some of the challenges you face on your network?

Michael: Our challenges are as diverse as the landscape we operate in. We have to deal with natural elements like wind, falling trees, lightning strikes, snows, and bears. Our town has the highest density of bears in Sweden, which brings extra challenges in accessing equipment and preventing bears from using poles as back scratchers. More relatedly, temperatures in Sweden can range from -53°C in the far northern Lappland region to +38°C in the South, which creates a harsh environment to operate reliably in. We are in the Gävleborgs Län region, which has a sub-Arctic climate where temperatures can drop to less than -30°C in winter and 60-80mm of rain in the summer months.

The distribution network in Sweden is of a high impedance compensated type. About 75% of all faults in our overhead network are earth faults, typically caused by a tree or a branch hanging on one of the phases. Given our network is also in a rural and forested area, these challenges are compounded as it takes a significant amount of time and money to travel to the rural area to address the fault.

Hannah: Working reliably in harsh environments is a challenge faced by many of our customers globally, but the bears are different! How did you make the decision to trial NOJA Power equipment on Ljusdal Energi's network?

Michael: We were actually the first utility in Sweden to adopt NOJA Power equipment. I was in search of remote control isolated switches around 2011-2012 to address the challenges we were facing on our network. We discovered NOJA Power through the local distributor, Technova, and as they say, the

rest is history. The OSM Recloser's advanced remote control capabilities, detection of low value earth faults and full industrial environmental range were the perfect solution for Ljusdal Energi's network.

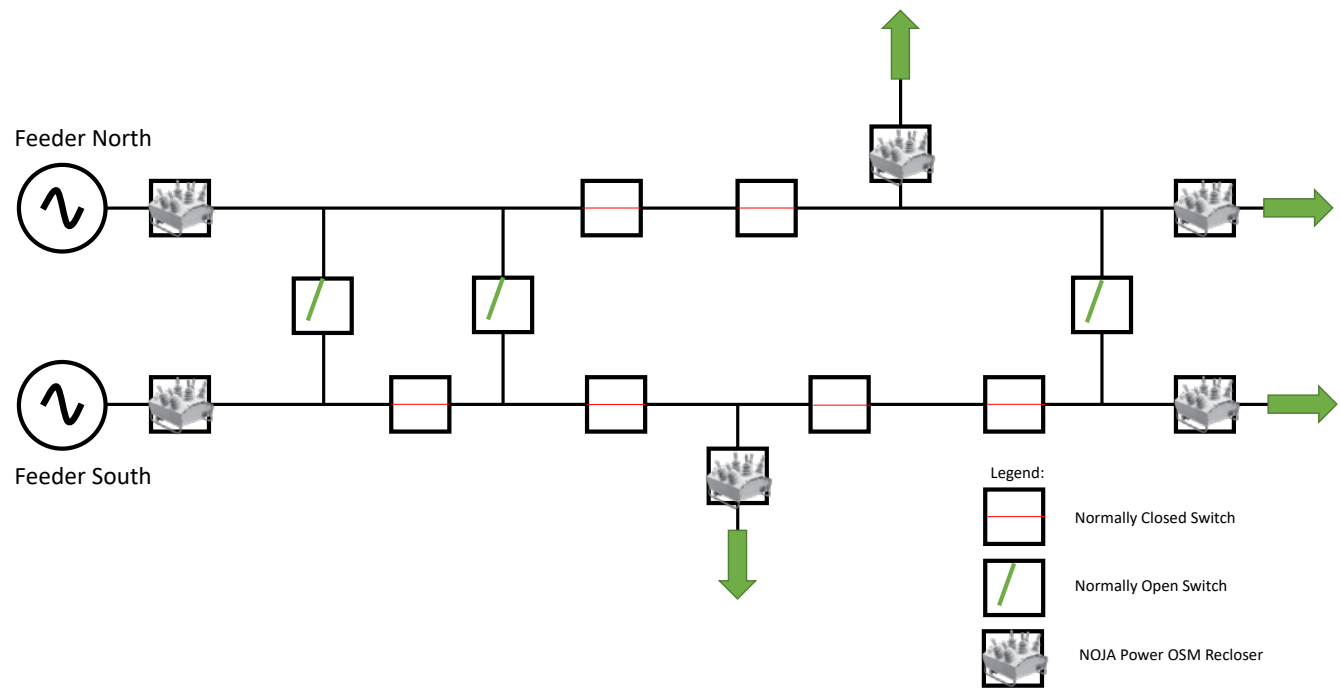
i Designed for service across the full industrial environment range from up to -40°C to +55°C, with options to -60°C, the NOJA Power OSM Recloser works in even the harshest of conditions.

Hannah: Can you tell me about the applications that the NOJA Power OSM Recloser has fulfilled on your network?

Michael: The OSM Recloser has been a game-changer for us. It has replaced traditional fuses, significantly reducing the time required to restore power after incidents like lightning strikes. NOJA Power's OSM Reclosers excel in detecting these low-value earth faults and perform subsequent reclosing operations efficiently. This has been particularly beneficial in remote areas, where the time (and cost) to restore power has been cut from hours to mere seconds. The NOJA Power OSM Recloser's ease of operation and remote management capabilities have allowed me and my team to focus on other critical tasks.

Hannah: It's great to hear that the OSM Recloser has made your team's workload lighter and more efficient. Could you share an example of a successful project that NOJA Power's equipment has played an instrumental role in?

Network Design Diagram



Michael: Because of the advanced capabilities, we have been able to implement the most advanced self-healing grid systems in Sweden. The OSM Recloser's automation capabilities have been crucial in achieving this. One of our most successful projects involves the implementation of a self-healing system. We have around 10 OSM Reclosers that

i Protection, SCADA Communications and Smart Grid Automation in a Single Integrated System.



Typical installation design, OSM Recloser with RC Series Control

have significantly improved the reliability and efficiency of our network. The result has been a drastic reduction in power outages and quicker restoration times.

Hannah: *What future applications do you have planned for the OSM Recloser System?*

Michael: In terms of future applications for the OSM Recloser System, our focus is on enhancing our automation schemes and extending the use of NOJA Power OSM Reclosers to underground connections. We see a significant opportunity for connection to underground cables, ideally one that could fit into an outgoing compartment in urban or densely populated areas. This would be a highly valuable addition to the Swedish market.



Learn more about connecting NOJA Power equipment to underground cables [here](#).

Hannah: *We've touched on this already, but I'd love to know what you think about the reliability of NOJA Power equipment in the field?*

Michael: The equipment has proven to be highly reliable. Once we got the settings right, we haven't had any issues in the 12 years they've been in service. The OSM Reclosers have performed exceptionally well during our summer lightning storms and winter snowfalls. We take care of our community, and shorter power outages have undoubtedly improved the quality of life of our 19,000 customers.

Hannah: *Based on the results that you have seen from using NOJA Power's products, do you have any advice for other organizations or utilities considering introducing NOJA Power's products to their network?*

Michael: My advice is to just try it. The equipment is reliable and has significantly improved our operations. It's a great investment for any utility looking to modernize its infrastructure. We've found tremendous value using NOJA Power equipment.

Conclusion

Ljusdal Energi's advanced self-healing system are a benchmark for rural electricity distribution, setting a high standard for reliability and efficiency, and NOJA Power's OSM Reclosers have been central to this success. With NOJA Power's reliable and efficient solutions, the future of energy distribution looks brighter than ever.

NOJA POWER AUSTRALIA CORPORATE OFFICE & FACTORY

NOJA Power Switchgear Pty Ltd
16 Archimedes Place, Murarrie
Brisbane Qld 4172
Australia

Phone: +61 (7) 3907 8777
Email: sales@nojapower.com.au
Web: www.nojapower.com.au

NOJA POWER BRAZIL OFFICE & FACTORY

NOJA Power do Brasil Ltda
Avenida Pierre Simon de Laplace,
965A Techno Park – Campinas – SP
Brasil

Phone: +55 (19) 3283 0041
Fax: +55 (19) 3283 0041
Email: vendas@nojapower.com.br
Web: www.nojapower.com.br

NOJA POWER UK SALES OFFICE

NOJA Power Limited
Unit 2C,
Whitebeam Court,
Ty Du,
Nelson,
South Wales,
CF46 6PQ

Phone: +44 7487 557 599
Email: sales@nojapower.co.uk
Web: www.nojapower.co.uk

NOJA POWER USA SALES OFFICE

NOJA Power, LLC
Office: 333 SE 2nd Ave.
Suite 2053, Miami, FL 33131
United States of America

Email: sales@nojapower.com
Web: www.nojapower.com

Ljusdal Energi

Ljusdal Energi
Björkhamrevägen 2 A
827 35 Ljusdal
info@ljusdalenergi.se