Grid Enhancing Technologies (GETs)

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Joachim Andersen
Head of Sales, VP Sales
Heimdall Power

joachim@heimdallpower.com
+47 959 46 995

Heimdall Power AS

In Norse mythology Heimdall guarded Asgard, home of the Gods. He could hear the grass grow, see everything, and was the perfect watchman with the greatest integrity. Through our proven technology, we provide the tools & insights needed to maintain grid operations effectively and optimize performance.

This enables us to be the smart guardians of the grid.

- Founded 2016
- Offices in Stavanger and Oslo
- Production partner: Westcontrol / Stavanger
- Major owners:

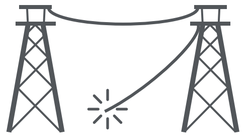
Solution to support data-driven decision-making for operations and planning of high-voltage power lines

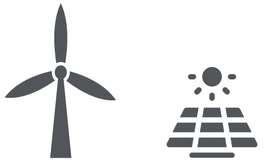
TSOs and DSOs in:

- Norway
- Sweden
- Finland
- France
- Austria
- Switzerland
- Slovenia
- Germany
- Italy

The power grid faces 21st century problems

Current challenges for the power grid

Extreme weather →  Failures → **Increasing failures and costly identification**

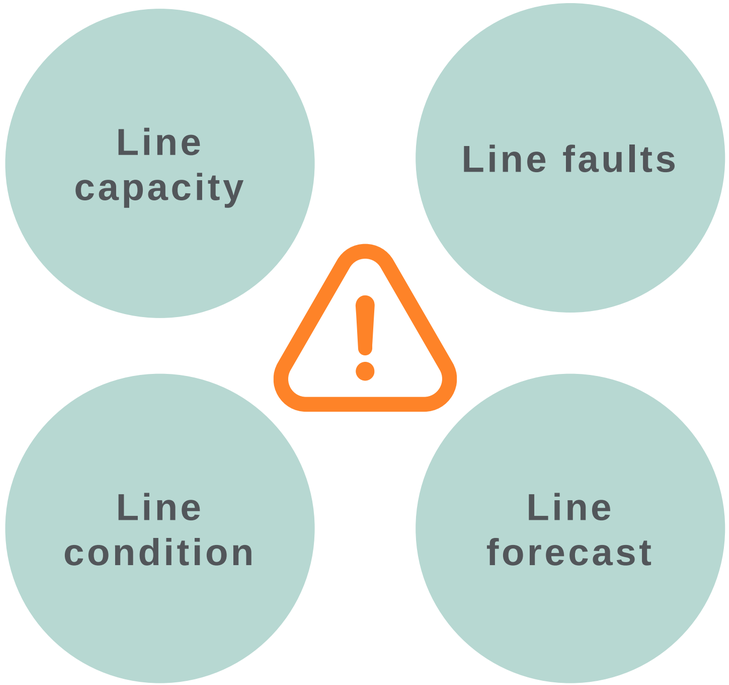


Renewables →  Fluctuations → **Assets are underutilized, creating artificial capacity constraints**

Electrification →  Bottlenecks → **Congestions and bottlenecks in the grid as a result of more complex systems and electrification of society**

Why is this an issue?

The grid operators have **no real-time data from the lines** about:



Manglende kapasitet hindrer elektrifisering

Elektrifisering er nøkkelen til både ny verdiskaping og kutt i klimagassutslippene frem til 2030 og 2050. Forslag: Vi bør lage en nasjonal strategi mens vi ennå har tid!

Vi ser landet rundt en rekke eksempler på at manglende forsyningskapasitet er til hinder for ønsket elektrifisering, skriver de ti lederne i norske nettselskaper i dette innlegget. (Foto: Heiko Junge, NTB)

TI LEDERE AV STORE NORSKE NETTSELSKAPER (SE FULLSTENDIG LISTE UNDER ARTIKKELEN) DEBATT 11. FEB. 2021 - 05:15

Fullstendig liste over artikkelforfatterne:
Kristin Lian (Elvia), Trygve Kvernland (Tensio),
Ketil Tømmernes (BKK Nett),
Håvard Tamburstuen (Lyse Elnett),
Jan Erik Eldor (Agder Energi Nett),
Eirin Kjølstad (Arva), Steinar Benum (Linea),
Mona Askmann (Norgesnett), Øivind Askvik (Lede),
Tore Morten Wetterhus (Glitre Energi Nett)

Rekordvarme sommere gir trøbbel for kraftlinjene

Sommeren 2018 måtte Statnett redusere kapasiteten på flere norske kraftlinjer, og på to av kablene til Danmark.

Ved kun 30° Celsius

Mange gamle [illegible] slappe når utetemperaturen nærmer seg 30 grader. Statnett har flere av dette. Bildet er fra en spenningsoppgradering ved Froland kraftlinje, og er ikke relatert til saken. (

Skjermbilde

Høyspentmaster revet over ende ved Rjukan: – Det er særdeles viktig at folk holder seg unna

Minst 16 høyspentmaster er revet over ende ved Rjukan i Tinn kommune. Et Statkraft-anlegg og et Avinor-anlegg drives nå med aggregat.

Slik ser det ut, etter at flere høyspentmaster er revet over ende i Tinn.
FOTO: STANNUM

Nils Fridtjof Skumsvoll
Journalist

NTB
Journalist

Publisert 13. des. 2020 kl. 11:41
Oppdatert 13. des. 2020 kl. 13:40

– Det er særdeles viktig at folk holder seg unna. Dette er uforutsigbart og ukontrollert, sier ansvarshavende ved Stannum AS, selskapet ansvarlig for mastene, Stein Øyvind Bystrøm til NTB søndag formiddag.

Mankind’s largest machine faces 21st century challenges

Norge trenger en strategi for elektrifiseringen

enerwe.no • 2 min. lesetid

Kraftdirektør slår alarm: Straumnettet taklar ikkje elektrifiseringa av Noreg

e24.no • 1 min. lesetid

Mankind’s largest machine faces 21st century challenges

Press Release

Study: Climate targets can only be achieved with sufficient investment in electricity grids

- Study by RWTH Aachen University and Frontier Economics quantifies the economic value of energy networks for the first time
- Restraint in grid expansion causes long-term additional costs of up to €4.2 billion per year
- Politics and regulation must now set the course for growth in the networks

E.ON SE
Brüsseler Platz 1
45131 Essen
Germany
www.eon.com

For information
please contact:

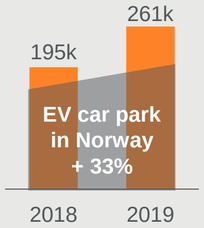
Alexander Ihl
T +49 1 71 566 22 45
alexander.ihl@eon.com

October 29, 2020

Forces driving digitization of the grid

The Green Shift

Electrification of society



Extreme weather

Renewable production

Public opinion

Public objection towards building new high-voltage power lines

More complex networks

More dynamic and integrated energy flow inter-company and international

Aging infrastructure

Old grids need to prolong life time:
In Norway, 40% of all new grid investments are due to aging infrastructure

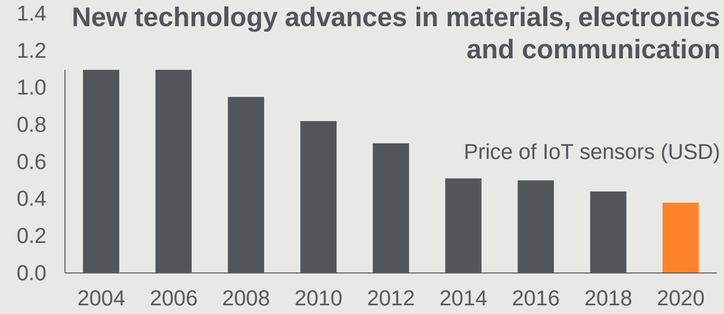
Regulatory landscape

ACER (EU) and FERC (US) regulations

ACER
European Union Agency for the Cooperation of Energy Regulators

Technology advancement

New technology advances in materials, electronics and communication



Source: SSB; Statista; ENTSO-E; Energi Norge

The Grid must be digitized...

...to enable this:

Management

- Real-time asset monitoring
- Physical asset modelling
- Predictive algorithms
- Artificial intelligence

Investment

- Optimize investments in the grid

Reliability

- Improve security of the supply to critical customers

Error detection

- Detect, predict and locate errors in the grid

Efficiency

- Support and augment people and work processes

Norway can unlock 125 MEUR in annual cost reductions

Relevant technologies

- **Software robotics / Robotic process automation (RPA)**
- **Artificial intelligence and ‘big data’**
- **Instrumentation (sensors, remote management, protection)**
- **Communication and ICT-security**
- **Transportation and drones**

Different applications of use

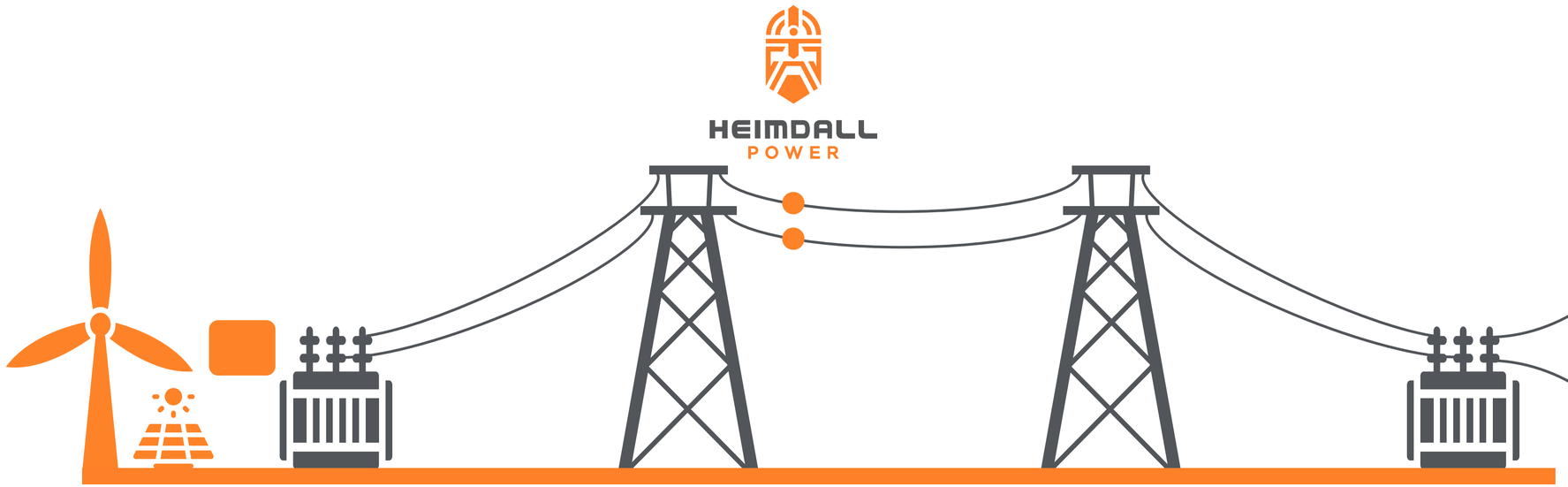
- **Predictive maintenance:** Utilizing machine-based monitoring/surveillance and ‘big data’ in maintenance operations
- **Automatic voltage regulation:** Sensor technology and regulation instruments for automatic management of transformer substations and reactive resources
- **Dynamic capacity determination:** Instrumentation and communication for dynamic capacity determination
- **Leverage consumption flexibility** (‘Demand response’): Instrumentation and communication to leverage smaller loads for more optimal operations
- **Line surveillance with drones:** Instrumentation and communication to monitor the state of lines and pylons
- **Automating work processes:** Automate repetitive tasks

Potential benefits

- Reduced operations and maintenance costs **10-30%**
- Reduced KILE costs **50-60%**
- Reduced cost based on losses in the grid **5-10%**
- Reduced or postponed investments **Not estimated**

Sources: NVE; McKinsey; Accenture; Industrial Internet Consortium; Hafslund; Energi Norge; THEMA analysis

GETs in Rogaland



CLEVAIR

Big consumers

Private consumers

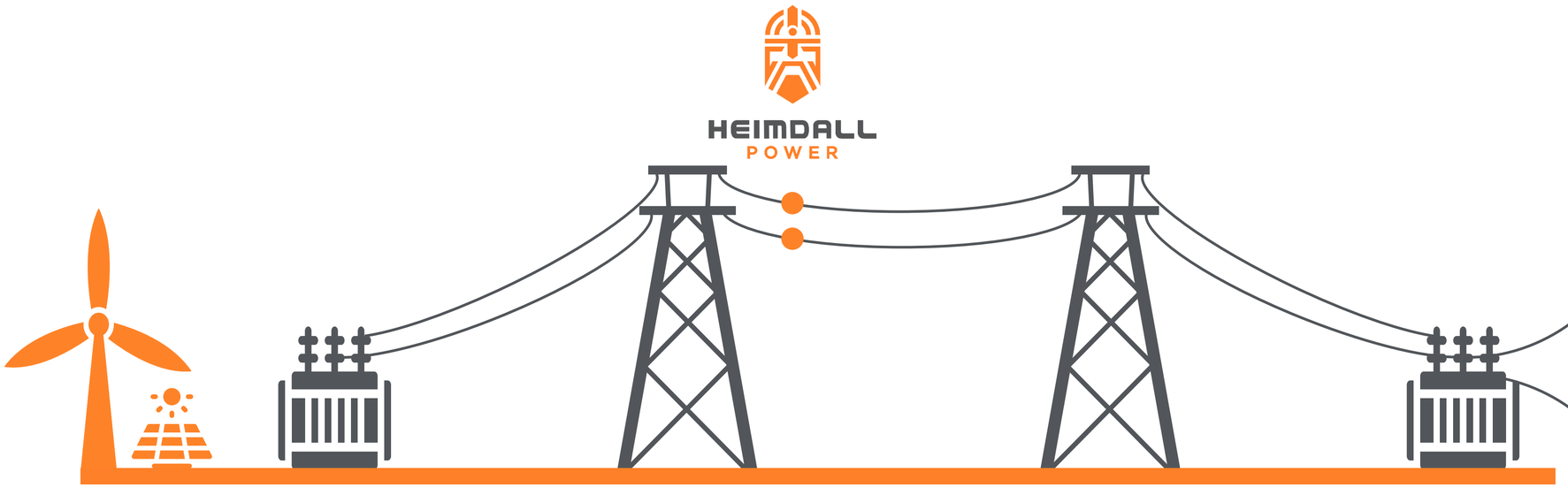
BEYONDER™ batteries

futurehome

ZAPTEC

easee

Value creation: Who will benefit?



Producers

- Less stranded energy
- Reduced investments

Grid owners

- Capacity increase
- Saved investments
- Op & Maintenance reduction
- Increased safety and security

Government

- Balanced and robust grid
- Green Shift enabler
- Electrification of cars, ferries, etc.
- Reduced area needed for new lines

Big consumers

- Increased reliability
- Reduced costs
- Better quality

Private consumers

- Reduced blackouts/faults
- Reduced grid tariffs

GETs play a key role in decarbonization

Key enabler for the energy transition

7 AFFORDABLE AND CLEAN ENERGY

- Accurate diagnosis and instant response to building more green energy
- Increasing reliability and robust grid to handle dynamic loads from renewable power
- Postponing or cancelling expensive investments

11 SUSTAINABLE CITIES AND COMMUNITIES

- Electrification of society is dependent on effective and optimized green power distribution
- Microgrids are dependent on an effective, affordable back-up system: the digitized grid

13 CLIMATE ACTION

- 1 GWh more green energy in the grid reduces 960 tons of CO_2 from coal plants
- Neuron installations are insignificant compared to CO_2 emissions of building new power lines

15 LIFE ON LAND

- Optimizing powerlines reduces need for new power lines, thus preserving nature
- Installations of neurons do not interfere with nature and wildlife the way large machines do

A digitized grid optimizes investments, saves nature and is needed to succeed with the Green Shift

In the scope of green regulations

Heimdall Power aligns perfectly to EU taxonomy and helps Utilities to contribute:

Climate change mitigation

+

Climate change adaption

Source: MIT 2007; EU Commission


the Power of Knowing

What we all want

max power | max control | max uptime

min investments

Contact: joachim@heimdallpower.com