

“TRANSFORMACIÓN DE LA DEMANDA”

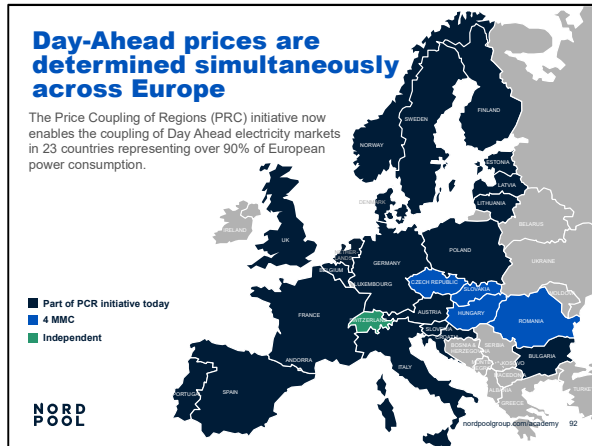
Nord Pool

Efficient, Simple and Secure
power trading across Europe

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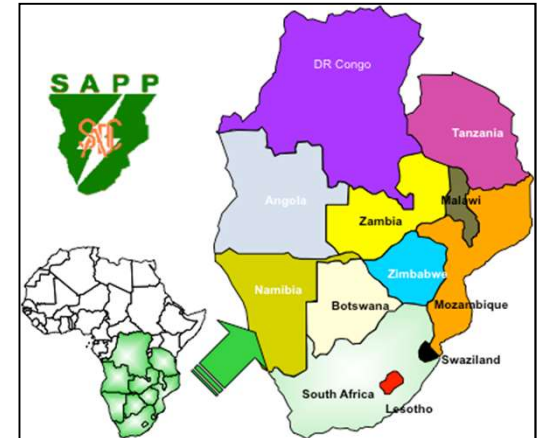
Some examples of our experiences from developing International Power Markets

European target model



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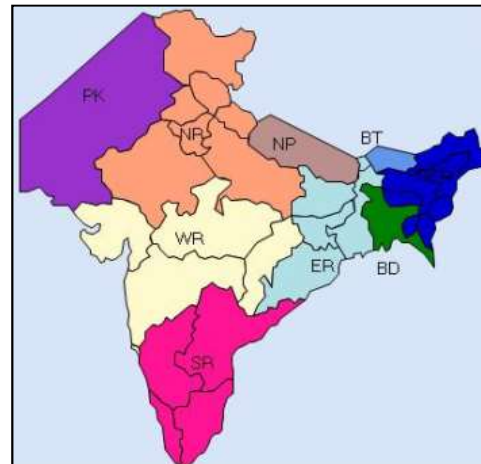
Southern African Power Pool



South-east Europe



India

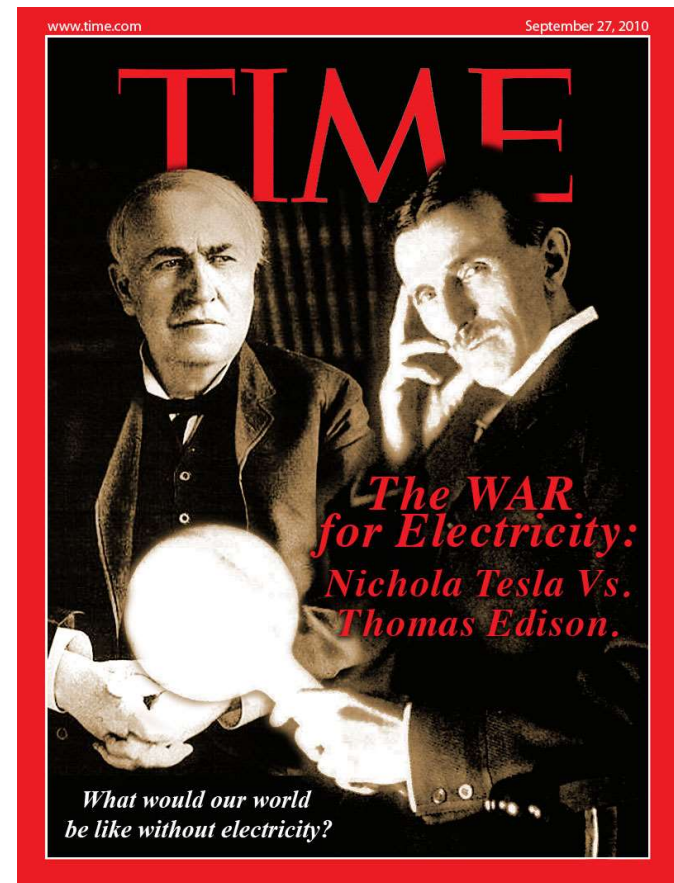
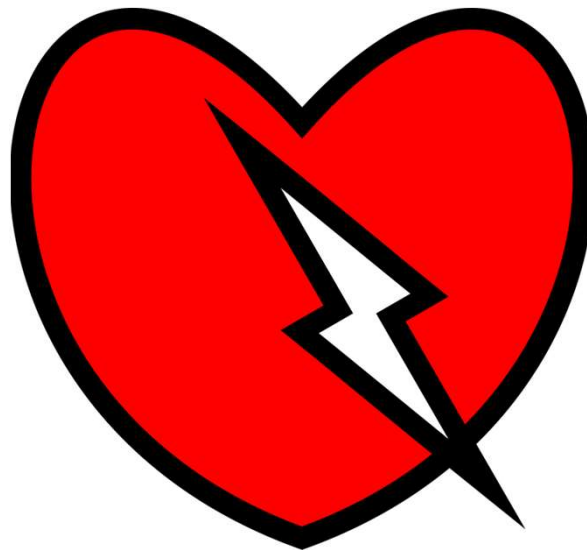
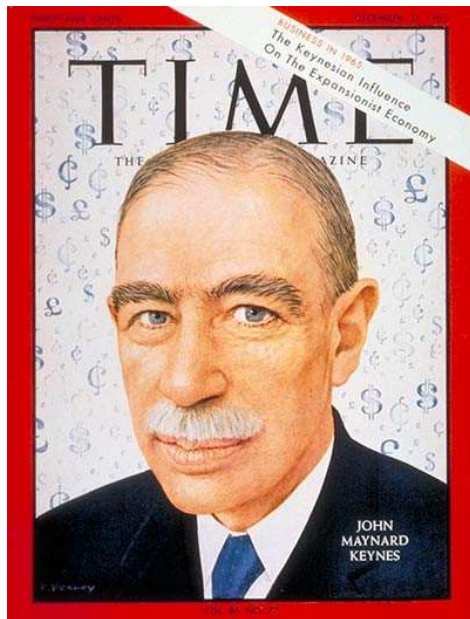


ASEAN



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The energy market: A happy marriage between engineers and economists



Energy Trilemma Index

Full Report 

The World Energy Council's Energy Trilemma Index tool, produced in partnership with Oliver Wyman, ranks countries on their ability to provide sustainable energy through 3 dimensions: Energy security, Energy equity (accessibility and affordability), Environmental sustainability. The ranking measures overall performance in achieving a sustainable mix of policies and the balance score highlights how well a country manages the trade-offs of the Trilemma with "A" being the best. Use this interactive Index to assess the sustainability of national energy policies.

Explore the Pathway Calculator to determine what it takes to improve your ranking and understand the impact of policymaking in achieving a sustainable energy future.

Country rankings

2017 

Index rank	Country	Balance score	Energy security	Energy equity	Enviromental sustainability
1	Denmark	AAA	1	12	4
2	Sweden	AAA	9	21	5
3	Switzerland	AAA	16	4	3
4	Netherlands	AAB	10	3	38
5	United Kingdom	AAA	26	15	9
6	Germany	AAB	12	17	32
7	Norway	BAA	32	23	8
8	France	AAA	25	13	6
9	New Zealand	AAB	15	19	42
10	Slovenia	AAB	2	31	43
11	Finland	AAB	3	27	67

Actions

New energy market design

Achieving the EU's Energy Union goals will require a fundamental transformation of Europe's electricity system, including the redesign of the European electricity market.



4.0M

are employed in / efficiency

ople work in the r, with potentially 2020

European Commission



EU's renewable e in 2014 an annua 143.6 billion EU

Empowering energy consumers

A new deal for energy consumers recognises the need for Europeans to be at the core of the Energy Union. It aims to help consumers save money and energy through better information, create a wider choice of energy providers, and maintain the highest level of consumer protection. Consumers need to have the chance to be just as well-informed and empowered as energy buyers and sellers. And they should be able to generate and consume their own energy under fair conditions - saving money and helping the environment.

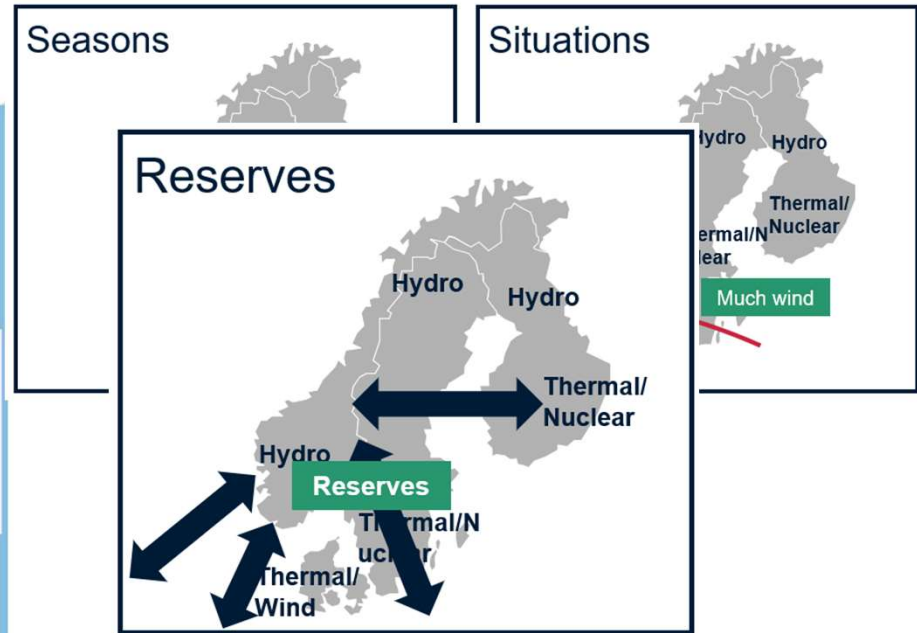
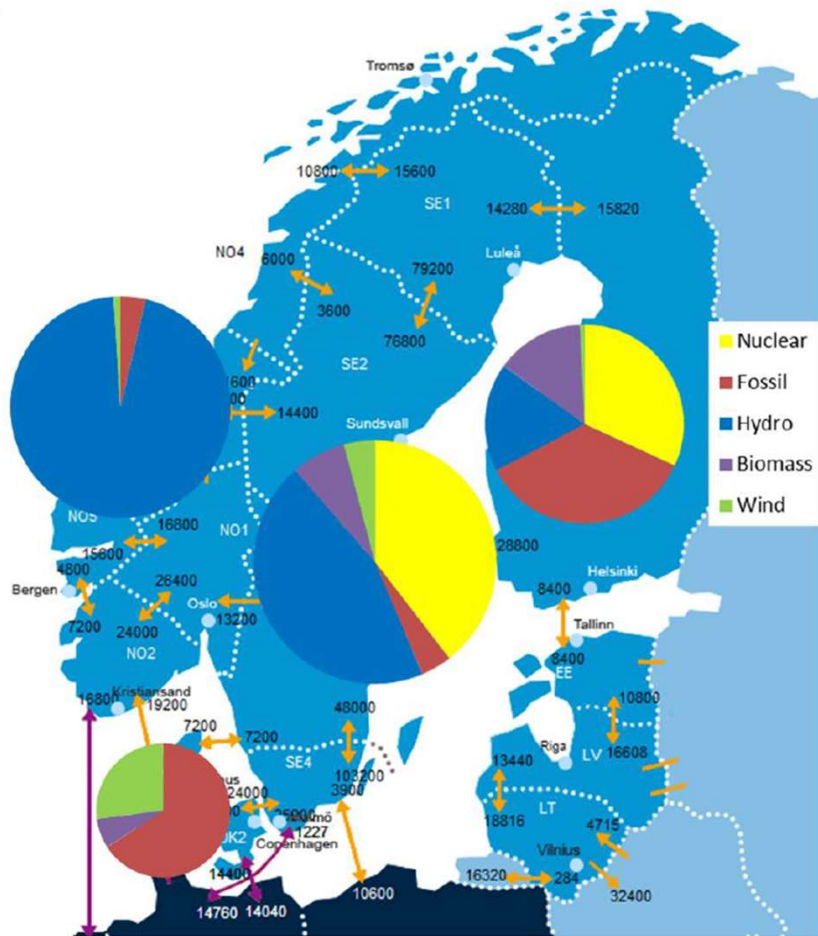
7 #Energy

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Helping energy cross borders

Investing in infrastructure that connects countries will make energy flow,

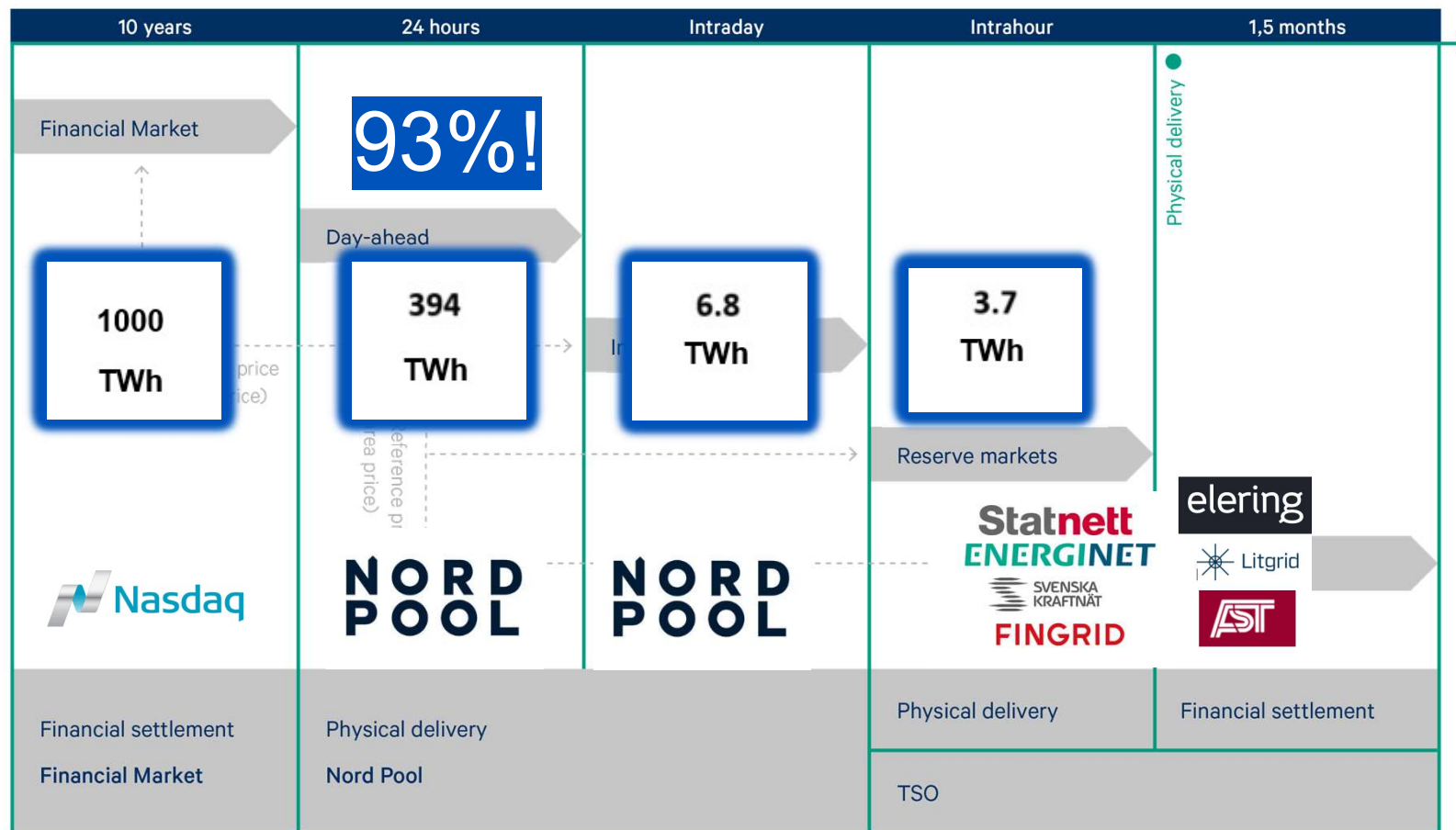
Why cooperate?



- ➔ SOS: Security of Supply
- ➔ Security of Demand
- ➔ Complementary production
- ➔ Climate change

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Supply and Demand response in all parts of the market



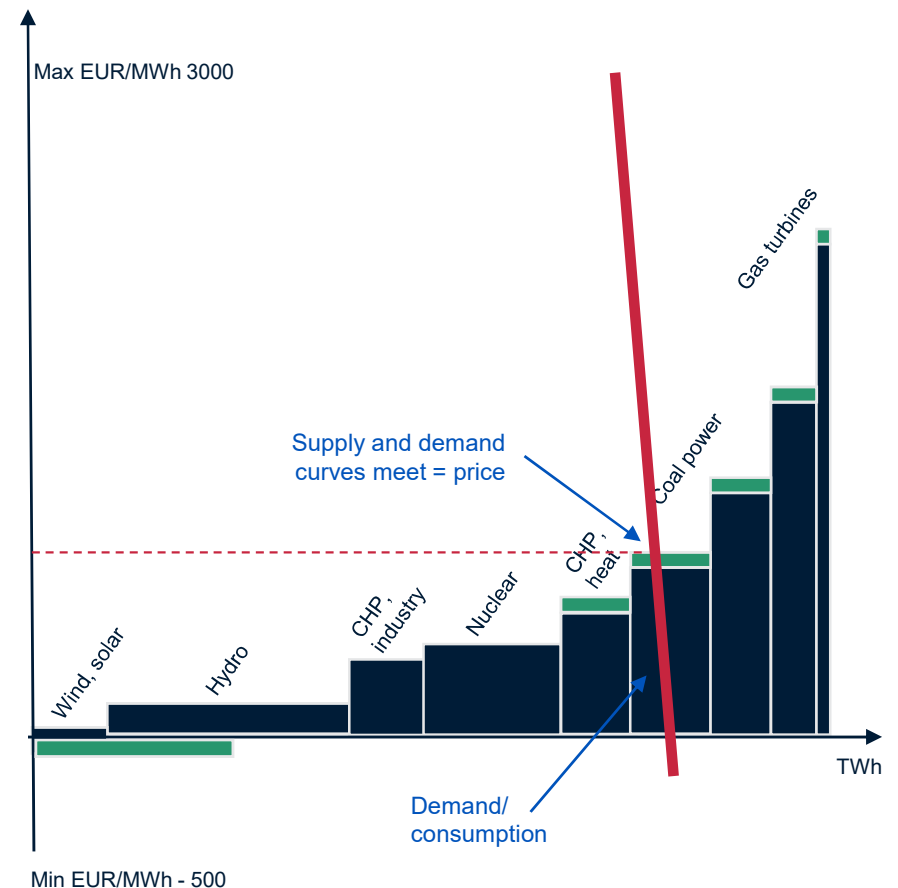
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Day-Ahead merit order

- ▶ From supply focus to include demand response: “**TRANSFORMACIÓN DE LA DEMANDA**”
- ▶ 2.000-2.500 Day-ahead orders every day for almost 400 customers across Europe
- ▶ 2/3 of all orders are price independent: Demand is almost inelastic!
- ▶ Optimization goal is to maximise social economical welfare for the whole society
- ▶ Last activated order sets the price for all production needed to meet demand: a good reason for consumers to be more active in the energy market



The electricity bill has 3 parts

- Electricity
- Tax
- Transmission



My energy consumption last week: Monday 22. October 2018 in Oslo

Preface

Oslo will cut greenhouse gas emissions in half by 2020. That's good news for the climate and for everyone who lives and works in the city.

The climate target gives us an opportunity to make Oslo a more modern city. Oslo is taking the lead. It's about making the city better. That's why we are not talking about transformation. We're talking about the city – the capital becoming a better version of itself.

To get where we want to, a collaboration between the municipality, business community, organizations, the state and other public entities. Transformation will not only reduce gas emissions. The air will be cleaner, public transport will become easier to ride your bicycle, green and car-free spaces in the city will become more vibrant. Quality of life will increase, a thriving business community and public health.

In December 2015, a new agreement was adopted at the Paris Conference. The goal is to limit global warming to a maximum of 1.5 degrees.

Currently, about half the population lives in cities, and the urban

area will continue to grow. Climate and environmentally friendly urban development will therefore determine whether we reach the target or not. Being a city rich in resources, in a country with abundant access to renewable energy, gives Oslo



Lan Marie Nguyen Berg,
Vice Mayor for Environment
and Transport



Raymond Johansen,
Governing Mayor

we must undergo to avoid dramatic climate change give us a golden opportunity to create the liveable city.

Let's upgrade Oslo together!



The green transformation will not only reduce greenhouse gas emissions. The air will become cleaner, public transport will become even better, it will be easier to ride your bicycle, there will be more green and car-free spaces in the city and street life will become more vibrant.

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The price drivers Monday 22. October: More wind than increased demand

LATEST 13:18 Spain to receive 16.4 TWh of LNG in November – Enagas
13:06 APX Base Saturday EUR 54.12/MWh (-4.49)

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Energetika
E&M
SMHI

All languages
X
+ Add filter

News Search

Search

Energetika (1 hidden)
X
+ Add filter

Editor's Choice

English
X

UK, northwest Europe to see cold winter – forecaster 25 Oct

(Montel) Northwest Europe and the UK will turn chilly in November and with colder than normal weather set to last until January, the Weather Company said late on Wednesday.

France set to push nuclear closures beyond 2029 – NGOs 24 Oct

(Montel) Environmental campaigners fear the French government will not close any nuclear reactors before 2029, apart from those already slated for the axe at Fessenheim, in line with demands by EDF, they said on Wednesday.

Most Read

All languages
X

Monday 22 October 2018

END OF DAY – Carbon slides on energy complex, data issues 16:13

"Sverige kan nå 70 TWh vindkraft utan ytterligare stöd" 14:25

Fortum slår ihop Göta Energi och Sveriges Energi 09:35

No change in open interest reporting despite criticism – EEX 18:34

NORDIC – November falls over EUR 1 on mild forecasts 11:18

UK may see end of coal-fired power by 2022 – study 09:56

Previous | Next

German vs Nordic Power - X

Nasdaq Nordic Power Fut...

Delayed. For real-time, use support link

Product	Last	Chg	Close
FRONT-MONTH	46.90	-0.05	46.95
FRONT-QUARTER	47.95	0.10	47.85
FRONT-YEAR	38.05	-0.05	38.10

ICE Crude Oil USD/bbl

Delayed. For real-time, use support link

Product	Last	Chg	Close
WTI Front Month	66.47	-0.86	67.33
WTI Jan19	66.61	-0.83	67.44
Brent Front Month	76.15	-0.74	76.89
Brent Jan19	76.16	-0.72	76.88

ICE EUA €/t

Delayed. For real-time, use support link

Product	Last	Chg	Close
Dec18	18.96	-0.12	19.08
Dec19	19.35	-0.12	19.47
Dec20	19.68	-0.11	19.79

ICE Coal API2 USD/t

Delayed. For real-time, use support link

Product	Last	Chg
Nov18	99.30	-0.70
Dec18	-	-
Q119	98.00	-1.00
Q219	-	-
Cal19	95.40	-1.04
Cal20	92.00	-0.51

ICAP UK NBP Gas pence/th

You do not have access to this exchange.
[Click if you wish to have access](#)

Nasdaq Nordic Power €/M...

Delayed. For real-time, use support link

Product	A-B	High	Low	Last	Chg	Close
FRONT-MONTH	-	-	-	-	-	-
FRONT-QUARTER	-	-	-	-	-	-
FRONT-YEAR	-	-	-	-	-	-

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Market Insights Madrid

15 November

When it is sunny, we quantify

Nord Pool REMIT Compliance Course

1 November

Elsertifikat-konferansen 2019

Gardermoen, 24. januar

11 Market Insights

NORD POOL

Sunday 21 October 2018

See what Nord Pool can offer you

Trade power in 13 markets as well as adding specific related services such as compliance, data or courses.

Use the map to find what we offer in our markets or click on the country you are interested in.

- INTRADAY
- DAYAHEAD
- SEE SERVICES



Simple, efficient & secure

Nord Pool runs the leading power market in Europe, and we offer day-ahead and intraday markets to our customers. The day-ahead market is the main arena for trading power, and the intraday market supplements the day-ahead market and ensures balance between supply and demand. We offer products and services that are simple, and secure is at the centre of what we do.

21 Oct 22 Oct 23 Oct

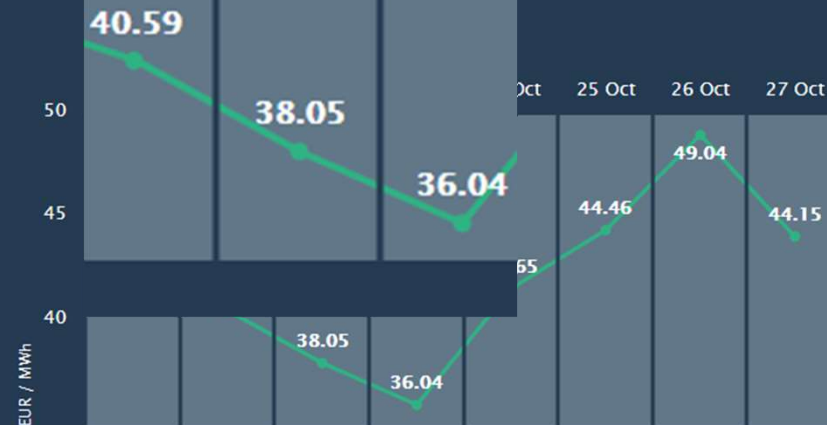


Price Development

Nordic system price / MWh
44,15 EUR

UK day base / MWh
62,01 GBP

Delivery date 27 October 2018



Contact us

SELECT ALL SYS SE SE1 SE2 SE3 SE4 FI DK1 DK2 **OSLO** KR.SAND BERGEN MOLDE TR.HEIM TROMSØ KT EE ELE LV LT FRE

FURTHER DETAILS ▾

TABLE CHART

HOURLY DAILY WEEKLY MONTHLY YEARLY 22 OCT 2018 EUR ▾

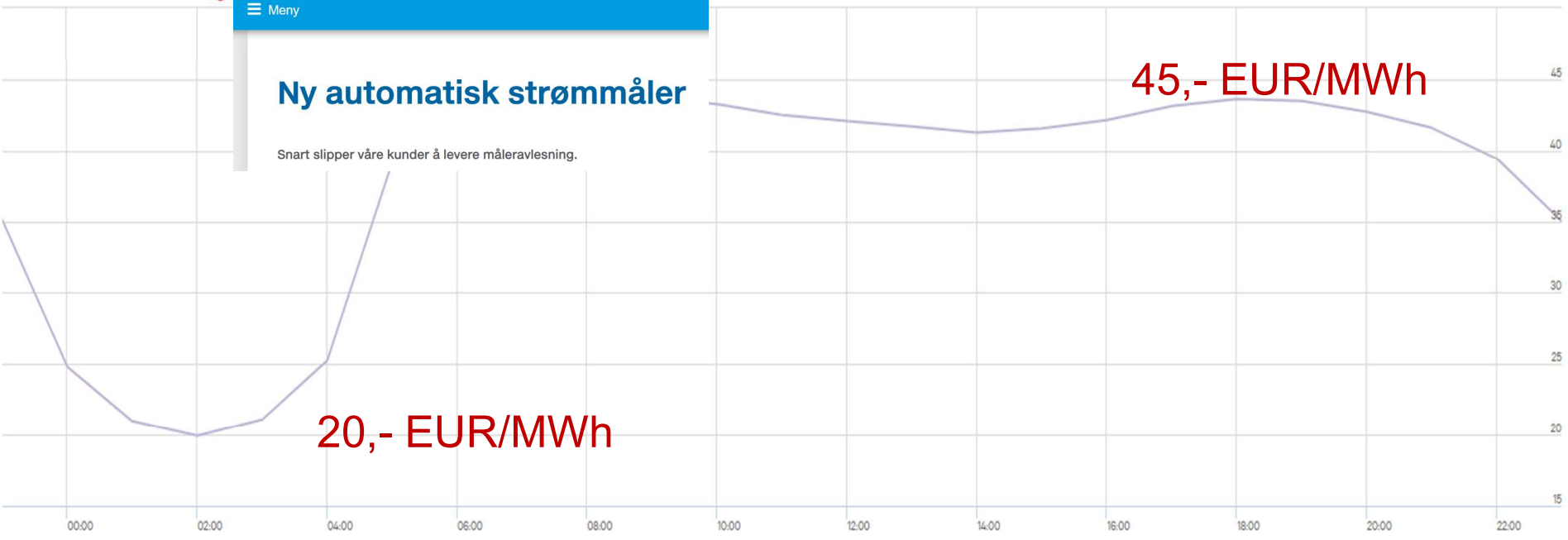
DAY WEEK

Hafslund
Nett

☰ Meny

Ny automatisk strømmåler

Snart slipper våre kunder å levere måleravlesning.



Oslo



Haakon Reiersen Leknes | 3346796

Thurmanns gate 13B | Målernummer: 7359992895644389 | Målepunkt-ID: 707057500052369910



Forsiden



Forbruk



Faktura



Plusskunde

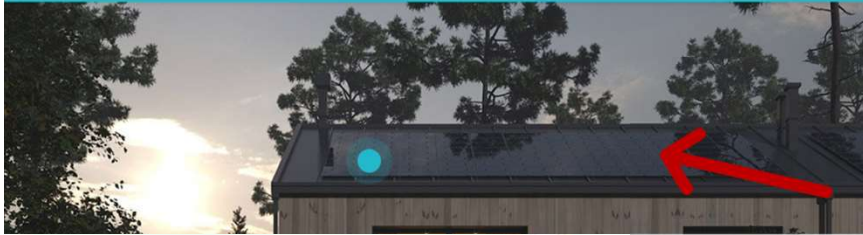


Profil

Du kan trykke på søylene for å få mer detaljer.

Dagsvisning





Den billigste strømmen er den du ikke bruker

Replace the energy company with our app



Charge your car when prices are low



- Works with:
- ✓ Tesla
 - ✓ BMW
 - ✓ Volvo
 - ✓ Volkswagen

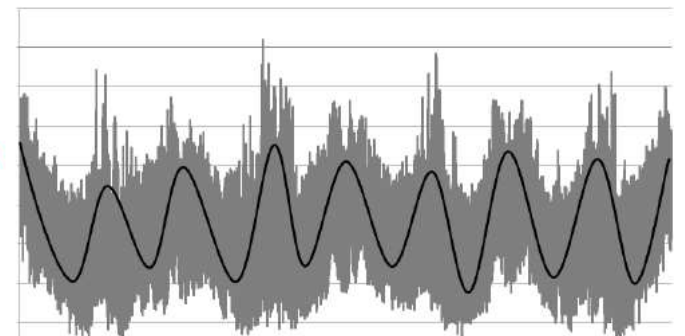
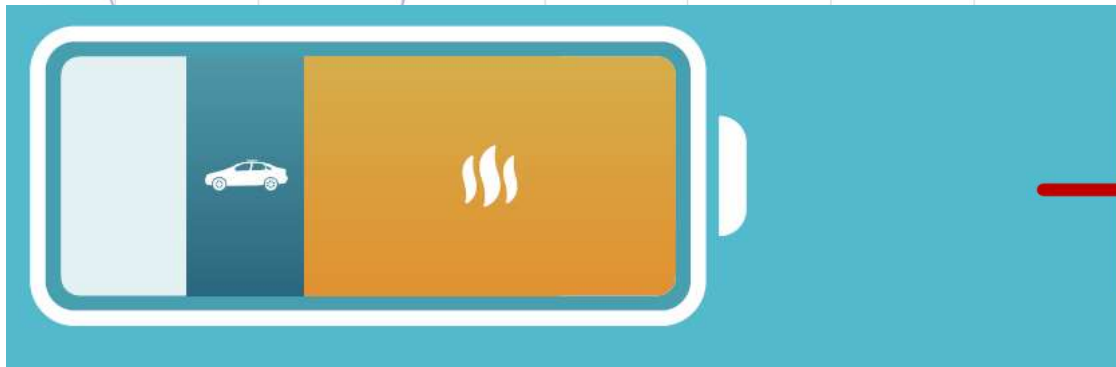
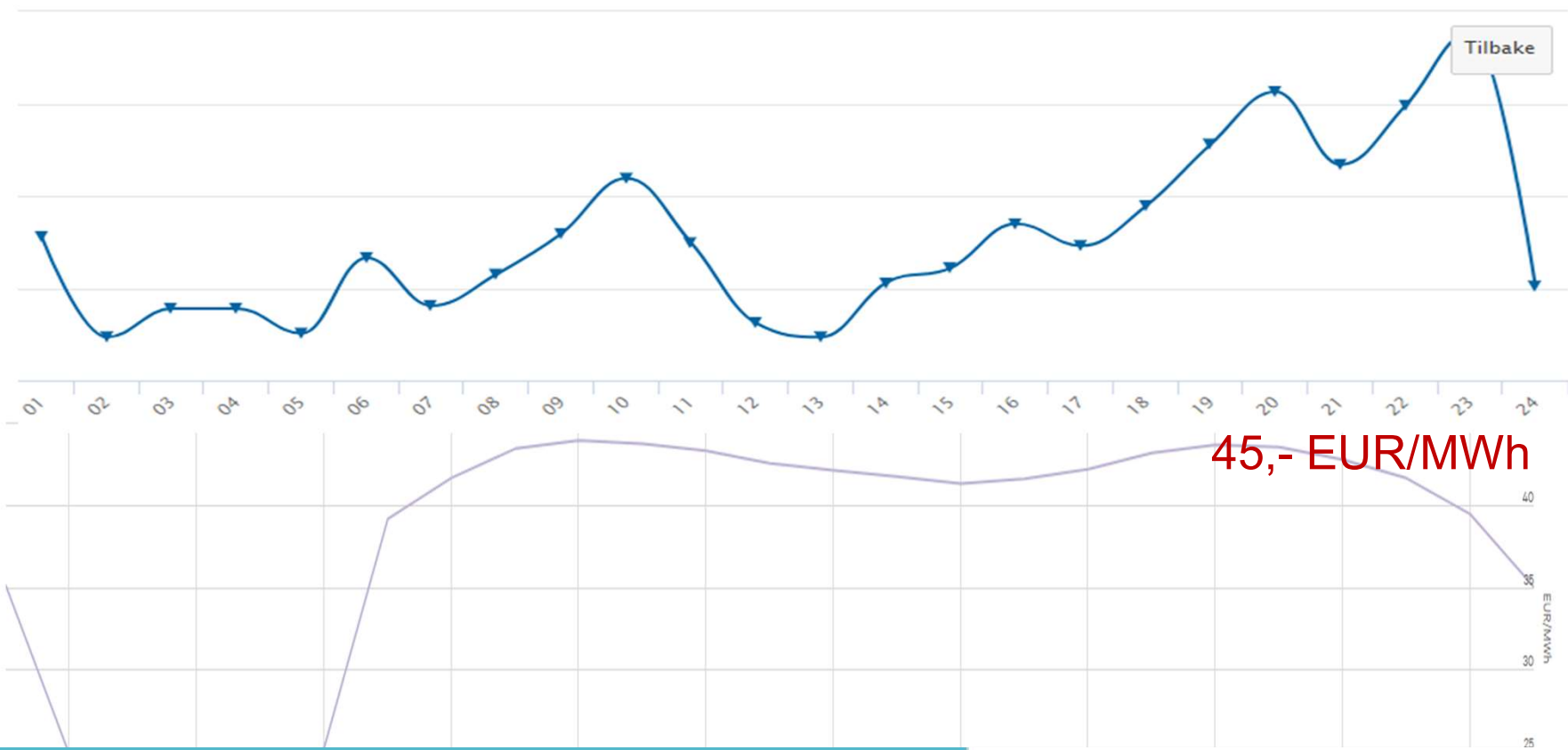
Get awesome energy prices



Connect your smart home and save

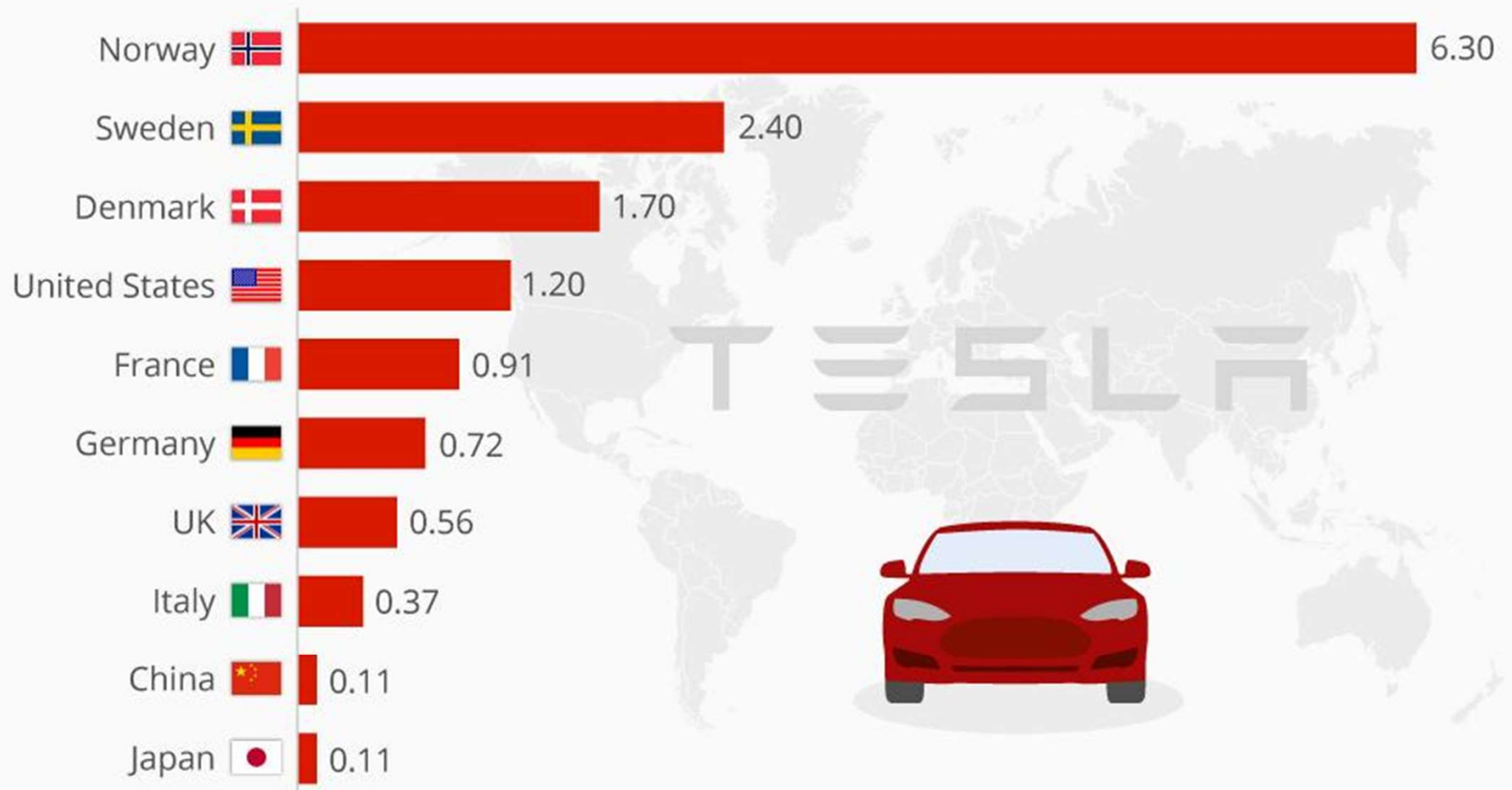


My consumption vs the prices each hour



Tesla: Norway Is Leading The Charge

Tesla superchargers per million inhabitants in 2017 (selected countries)



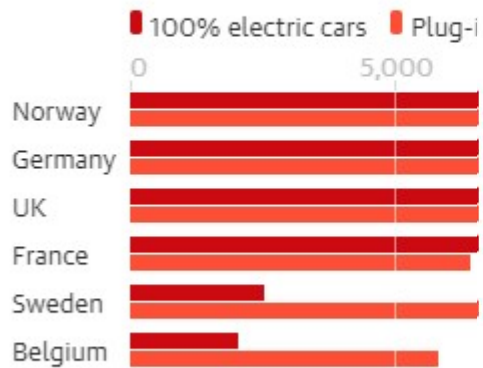
@StatistaCharts Source: Supercharge.info

Forbes **statista**

1.000.000 electric cars in Europe

Norway is still leading elect

Plug-in car registrations, first half 2



Guardian Graphic | Source: EV-Volumes

Electric, hybrid and low-emission cars

Adam Vaughan

@adamvaughan_uk

Sun 26 Aug 2018 12.50 BST



4

Electric cars exceed 1m in Europe as sales soar by more than 40%

Milestone reached nearly a year after China but ahead of the US



▲ Between January and June around 195,000 plug-in cars were sold across the EU, Iceland, Liechtenstein, Norway and Switzerland. Photograph: Miles Willis/Getty Images for Go Ultra Low

There are now more than a million electric cars in [Europe](#) after sales soared by more than 40% in the first half of the year, new figures reveal.

Europe hit the milestone nearly a year after China, which has a much larger car market, but ahead of the US, which is expected to reach the landmark later this year driven by the appetite for [Tesla's latest model](#).

Between January and June around 195,000 plug-in cars were sold across the EU, Iceland, Liechtenstein, Norway and Switzerland, a 42% increase on the same period a year before.

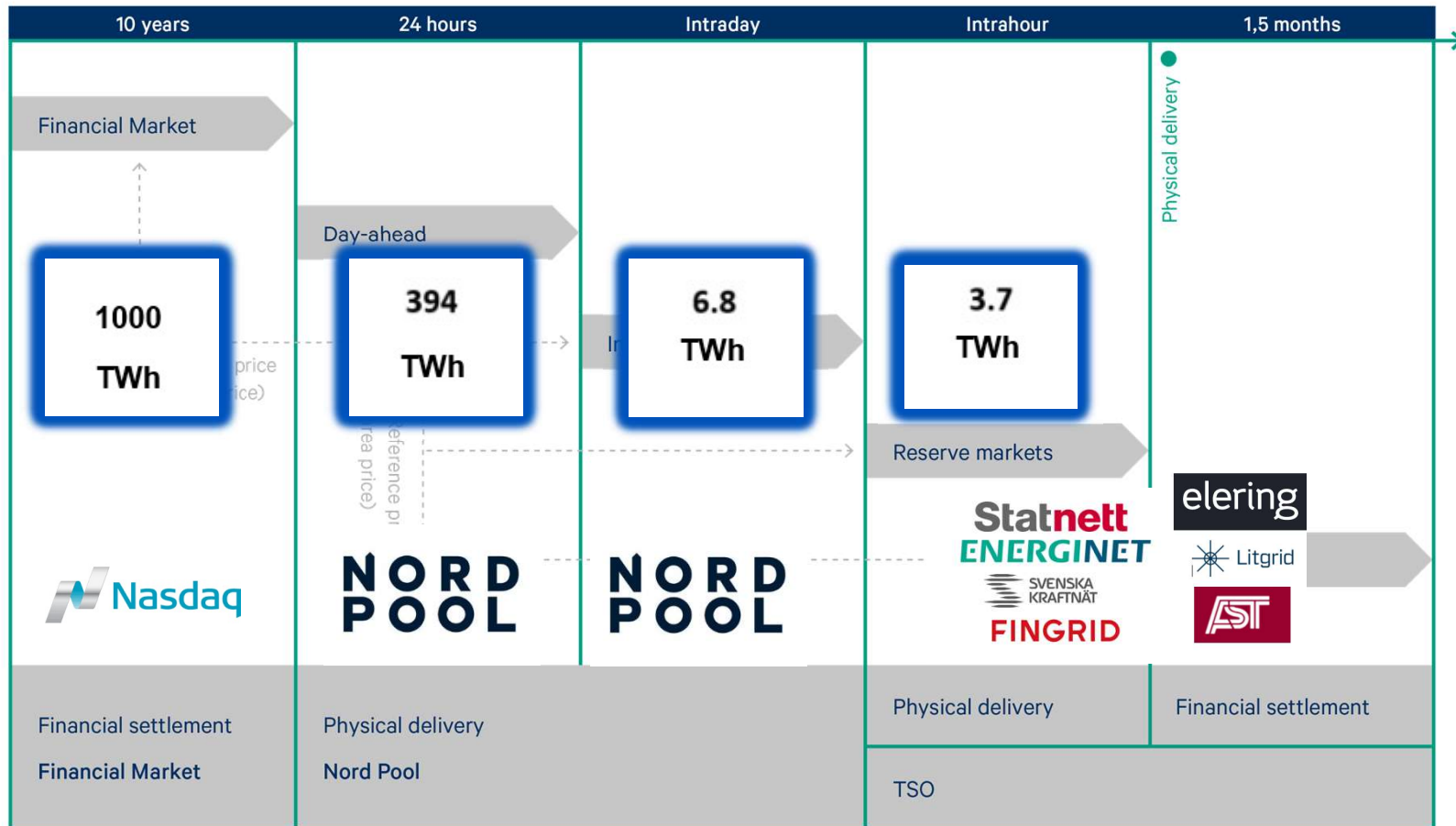
With growth speeding up, the cumulative total is expected to hit 1.35m by the end of the year, [according to industry analysts EV-Volumes](#).

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New market developed for demand response: NODES

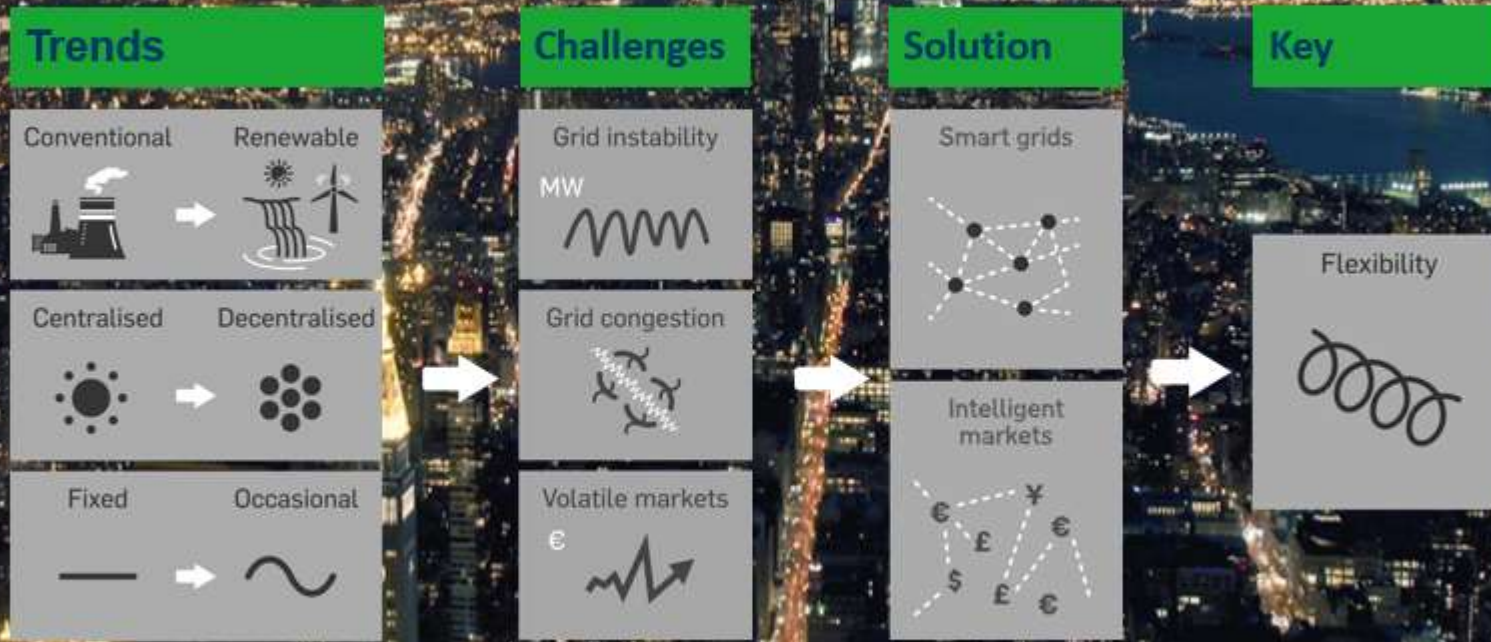


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A New Reality requires a new market: **NODES**



The Changing Role of DSO

- Facilitate competition
in supply, generation and flexibility services
- Neutral markets
for more efficient energy system operation
- Promote innovation, flexibility and non-network solution
- Managing the coordination
of services at the local level
- Maximizing utilization
of the electrical and communication network for the customers
- Tipping point
20-40% Renewable share
- Fundamental changes
in current market design required

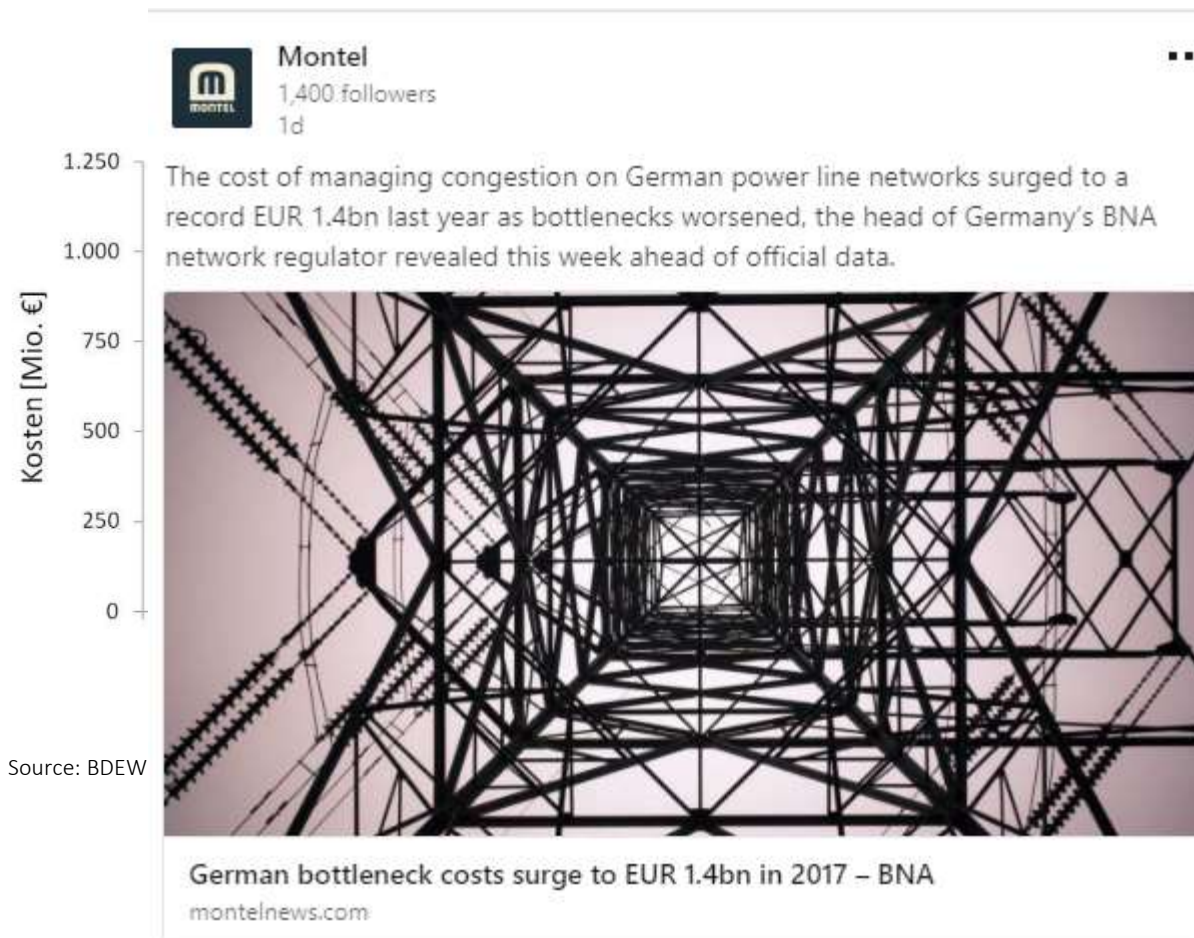
Our approach



Bottom Up!
Distributed energy
resources,
integrated market
available to both
DSO & TSO
– let the market do
the job!

The costs of grid congestions are rising...

- 95% of RES are connected to the DSO grid



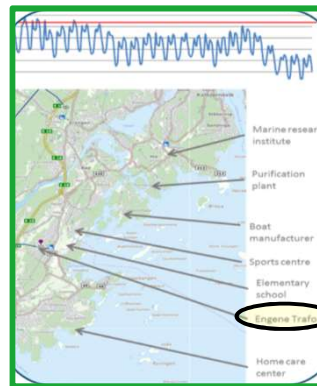
Live proof of concept demonstrated investment deferral at Engene substation in Norway

Phase 1



Alternative to grid investment

- Developed a cloud based solution to avoid overload in short periods
- Accessed available flexibility in distribution grid
- Optimised load based on available flexibility, price weather data and production in the area
- All data delivered in real time by use of advanced analytics and machine learning



Phase 2



Develop a marketplace concept

- Prototype for a marketplace for decentral flexibility
- Developed concept for business models and roles for the flexibility market
- Alignment to EU winter package and dialog with Norwegian regulator
- Deferred grid investment of approx. EUR 4,5 M



Nos vemos en Bogotá 14.-16. Nov 2018



International Centre
for Hydropower

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courses

members

conference

about us



2018 International Course
Programme

How We Work

The Process of Social Impact
Assessment in Hydropower Projects

Futuros mercados eléctricos y
nuevas tecnologías (ES)

Hydropower Financing and Risk
Management II - Nepal

Futuros mercados eléctricos y nuevas tecnologías (ES)

28.10.2018 Laura Bull

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y futuros líderes del sector eléctrico

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Embajada de Noruega

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acolgen



ACOPE



Statkraft

epm

ice

BID | Invest

Aprende de los precursores en el mercado mundial de la energía

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Thank you for
your attention!



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Facts & Figures

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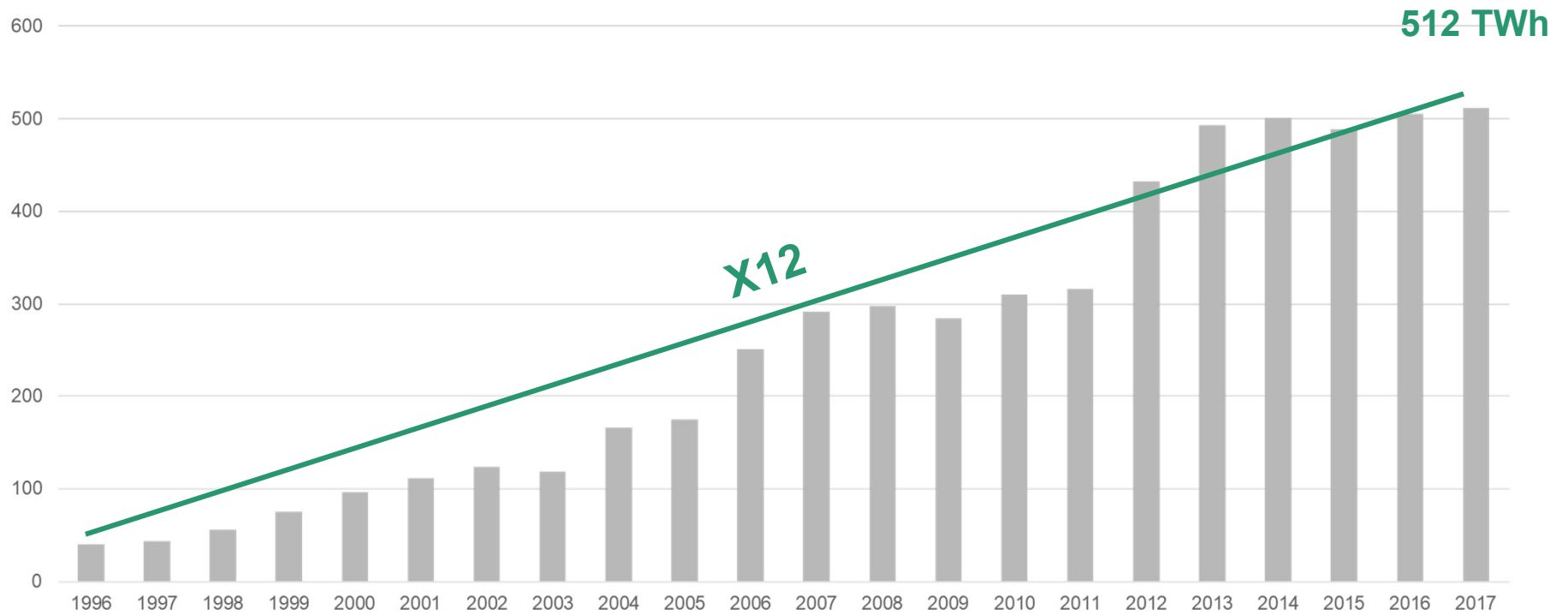
Total traded volume in 2017

512 TWh

European intraday:	7 TWh
UK day-ahead:	111 TWh
Nordic Baltic day-ahead:	391 TWh

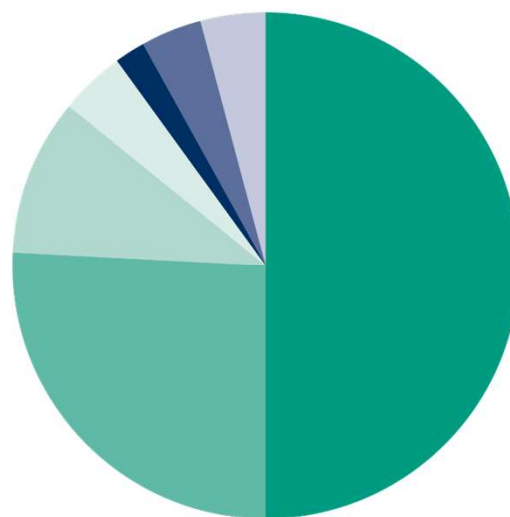
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We continue to see steady growth



Number of customers

 **x380**

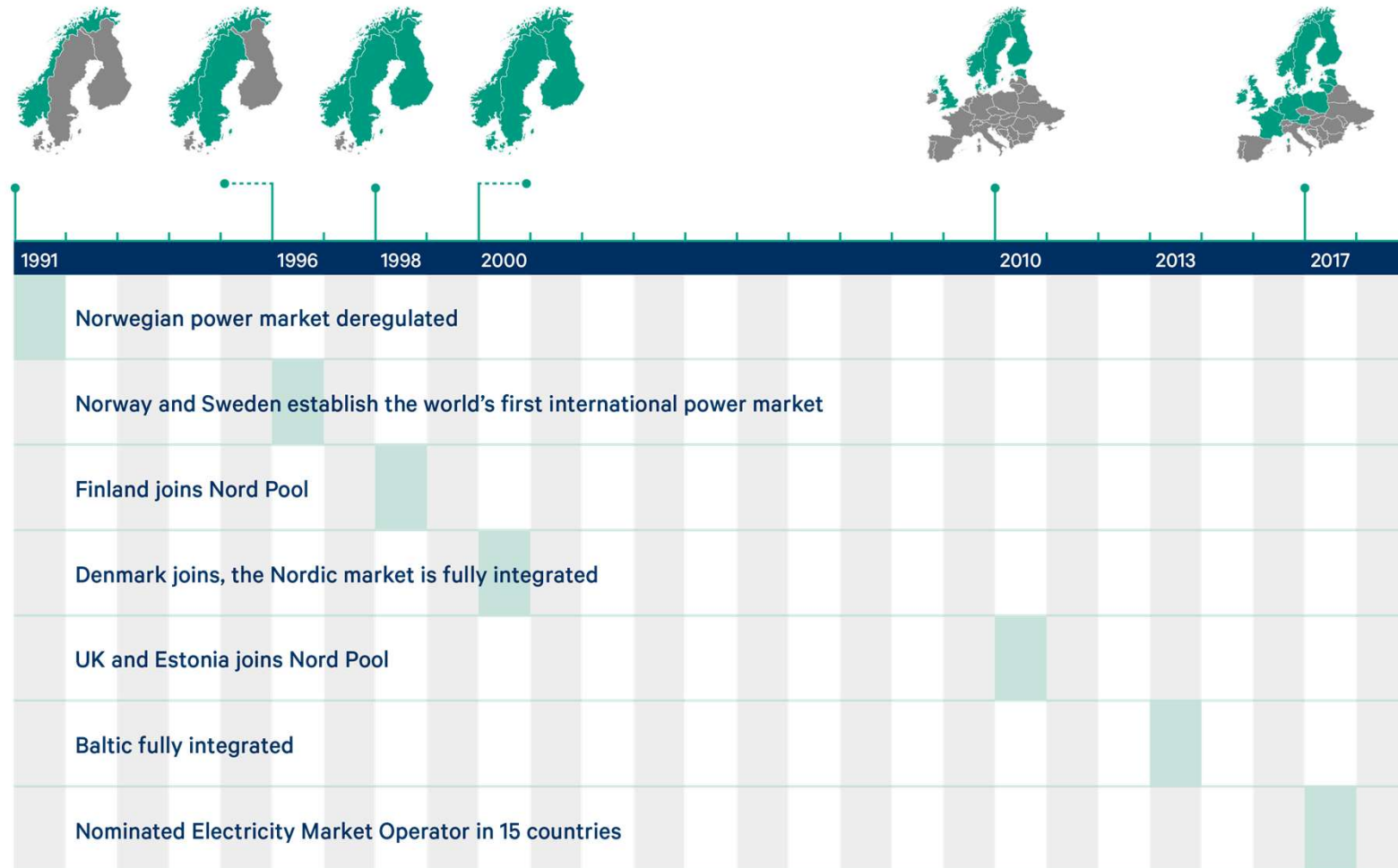


- Local energy company
- Industry
- Large utility
- TSO
- Clearing representatives
- Traders
- Other

History

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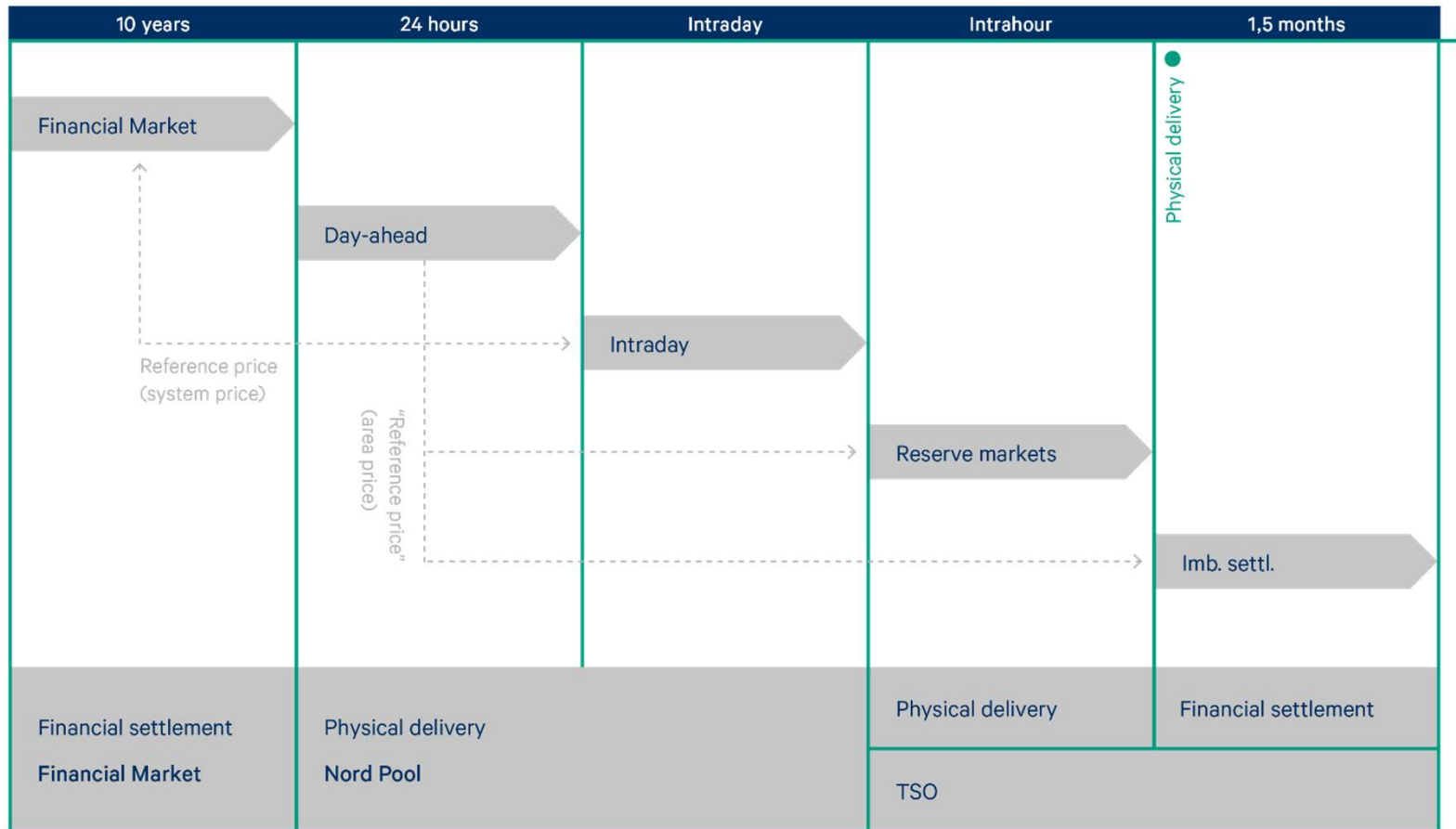
Expansion since the 1990s



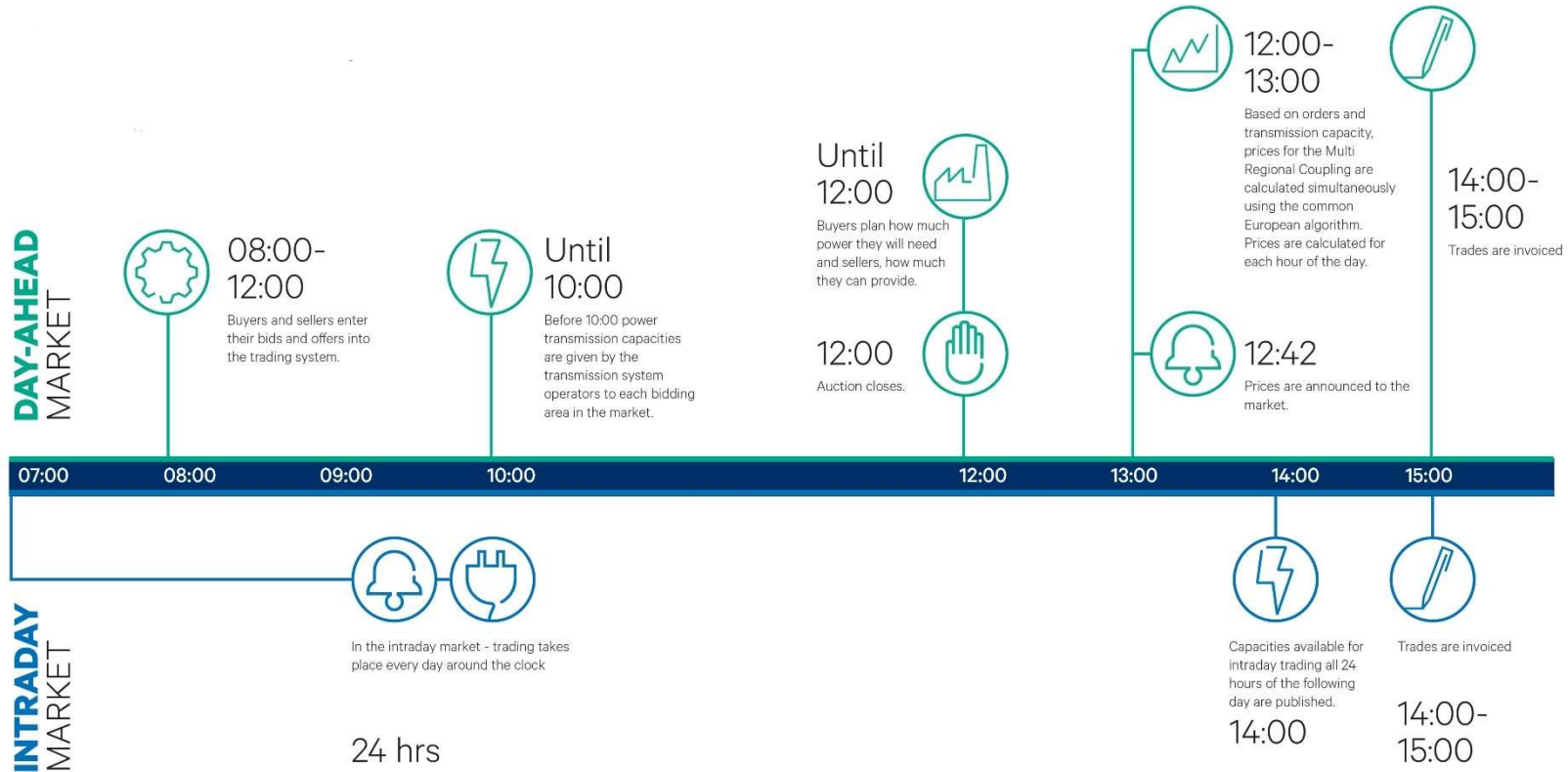
The Power Market

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How the power markets fit together



The day-ahead and intraday markets



A Common European Power Market

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A common European power market

- ▶ The European Commission has a stated goal of harmonising European power markets. The aim is to create a pan-European market with closer connecting of power markets to improve the efficient use of energy across national borders, the European Target Model for electricity market integration.
- ▶ The concept of market coupling and cross border trading was originally developed by Nord Pool and we are a driver in the European market coupling initiatives
- ▶ Close cooperation between TSOs, Power Exchanges and National Regulators across Europe

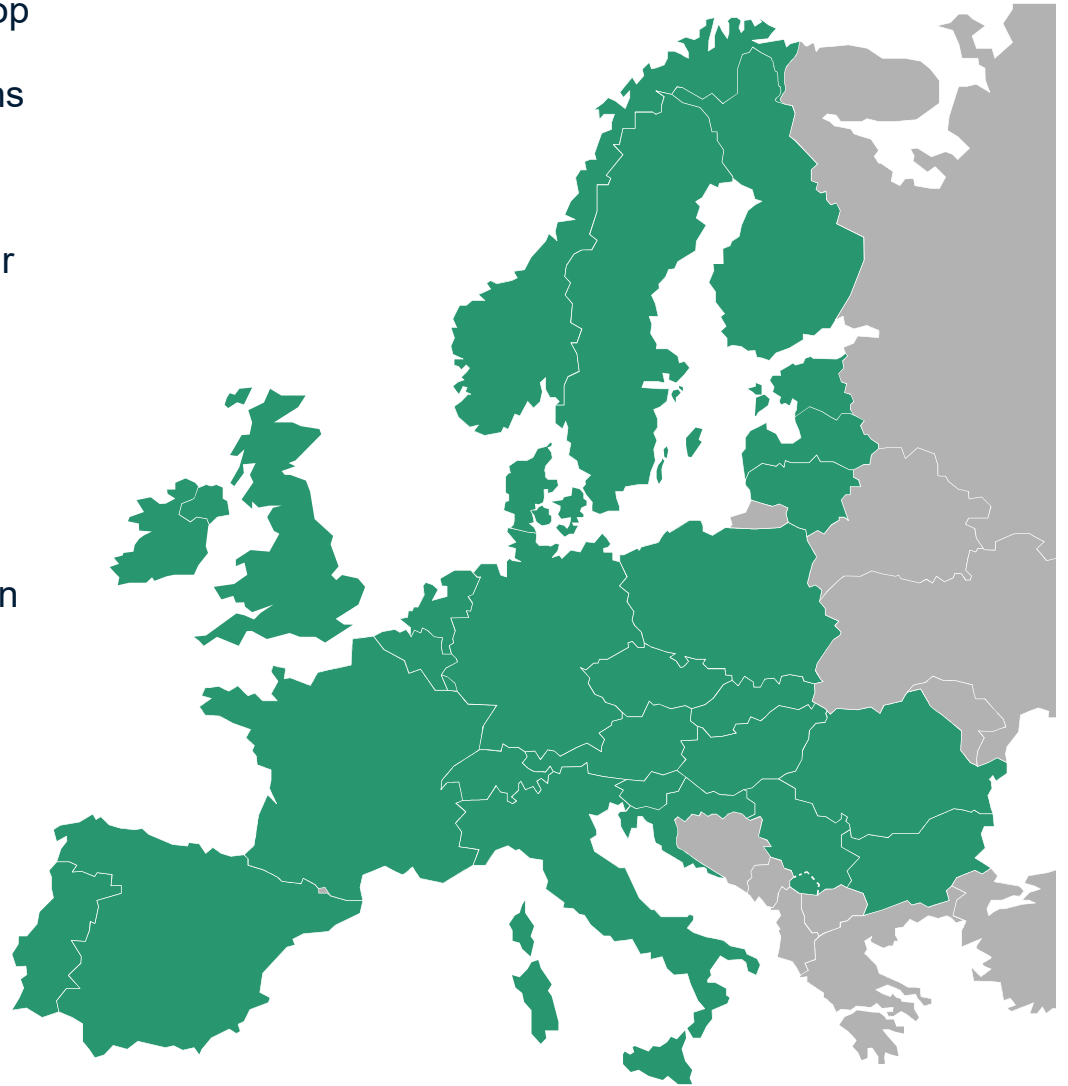
Why?

- ▶ Efficient use of transmission capacity by trading energy across borders
- ▶ A coordinated market development
- ▶ Level out electricity prices

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A European market

- ▶ 2011: Power Exchanges cooperate to develop a common European day-ahead price calculation through Price Coupling of Regions (PCR)
- ▶ 2012: The Cross-Border Intraday initiative, XBID Project, is a joint initiative by the Power Exchanges and TSOs to create a integrated intraday cross-border market
- ▶ 2014: A common algorithm (Euphemia) and system design (PMB) through PCR is launched in North West Europe
- ▶ 2014/15: PCR is launching in more European countries – today covering the green area.
- ▶ 2015: Capacity Allocation and Capacity Management (CACM) adopted in EU
- ▶ 2015/16: NEMO licenses granted
- ▶ 2018: XBID launched 12. June
- ▶ 2018: Nord Pool will offer day-ahead trading across 15 European countries



**NORD
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A large, white, stylized logo consisting of a vertical bar on the left and a large, blocky letter 'N' on the right, set against a dark blue background.

**Thank you for your
attention!**

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Extra slides

Stakeholders

- ▶ Owned by Nordic and Baltic transmission system operators
- ▶ Regulated in Norway by Norwegian Water Resources and Energy Directorate (NVE)
- ▶ Nominated NEMO in Austria, Belgium, Denmark, Estonia, Finland, France, Germany, Great Britain, Ireland, Poland, Latvia, Lithuania, Luxembourg, the Netherlands and Sweden

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Statnett SF (Norway) 28.2%

Elering AS (Estonia) 2%

Svenska kraftnät (Sweden)
28.2%

Litgrid AB (Lithuania) 2%

Energinet.dk (Denmark)
18.8%

Augstsprieguma tīkls AS
(Latvia) 2%

Fingrid Oyj (Finland) 18.8%

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Products and Services

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Application Programming Interface - APIs

APIs integrate Nord Pool markets with internal systems to facilitate easy trading

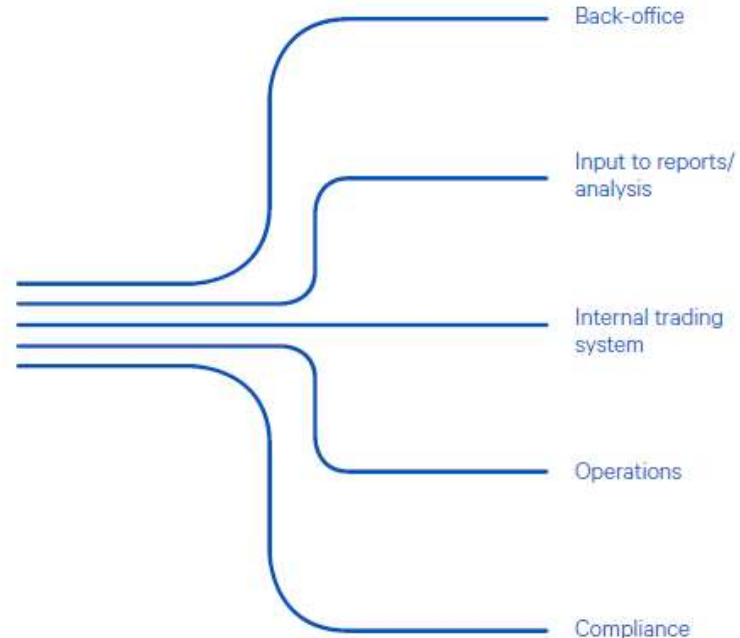


Markets

Nord Pool



API

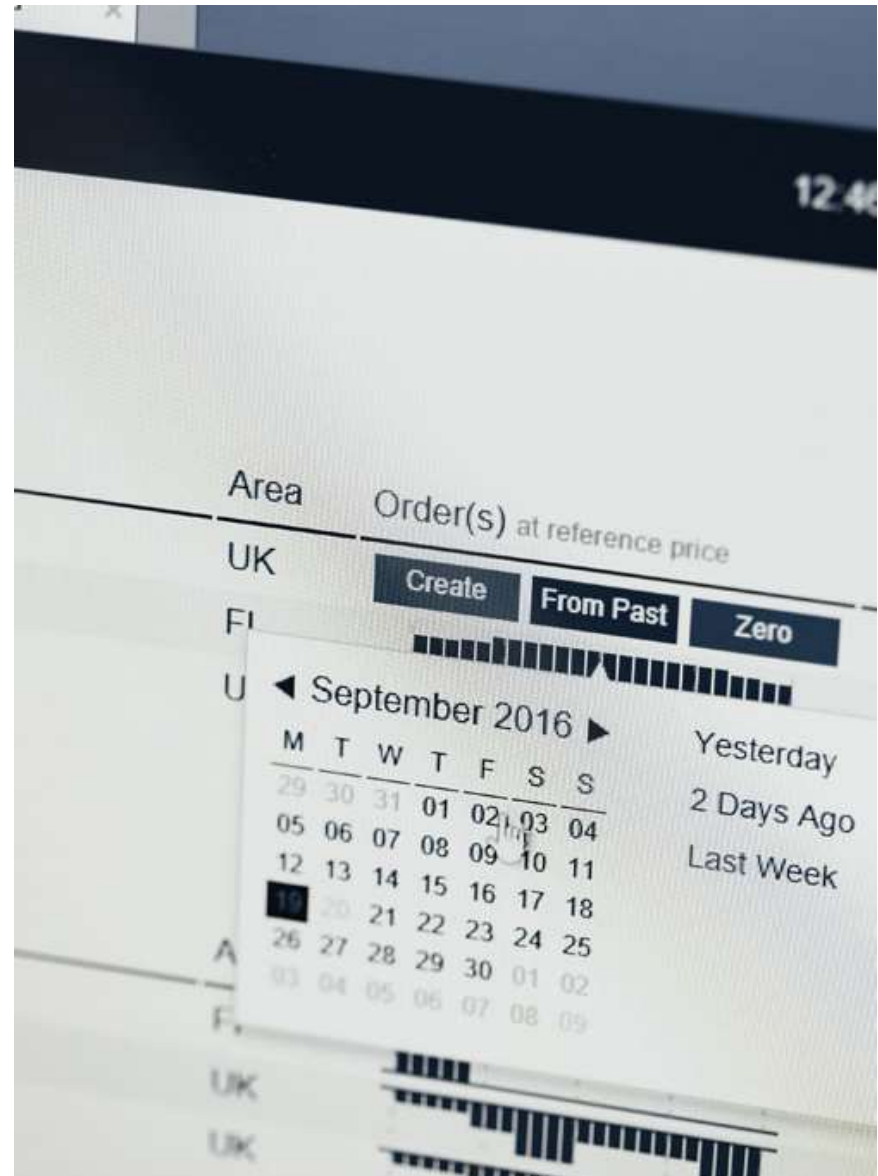


Customer

Day Ahead Web

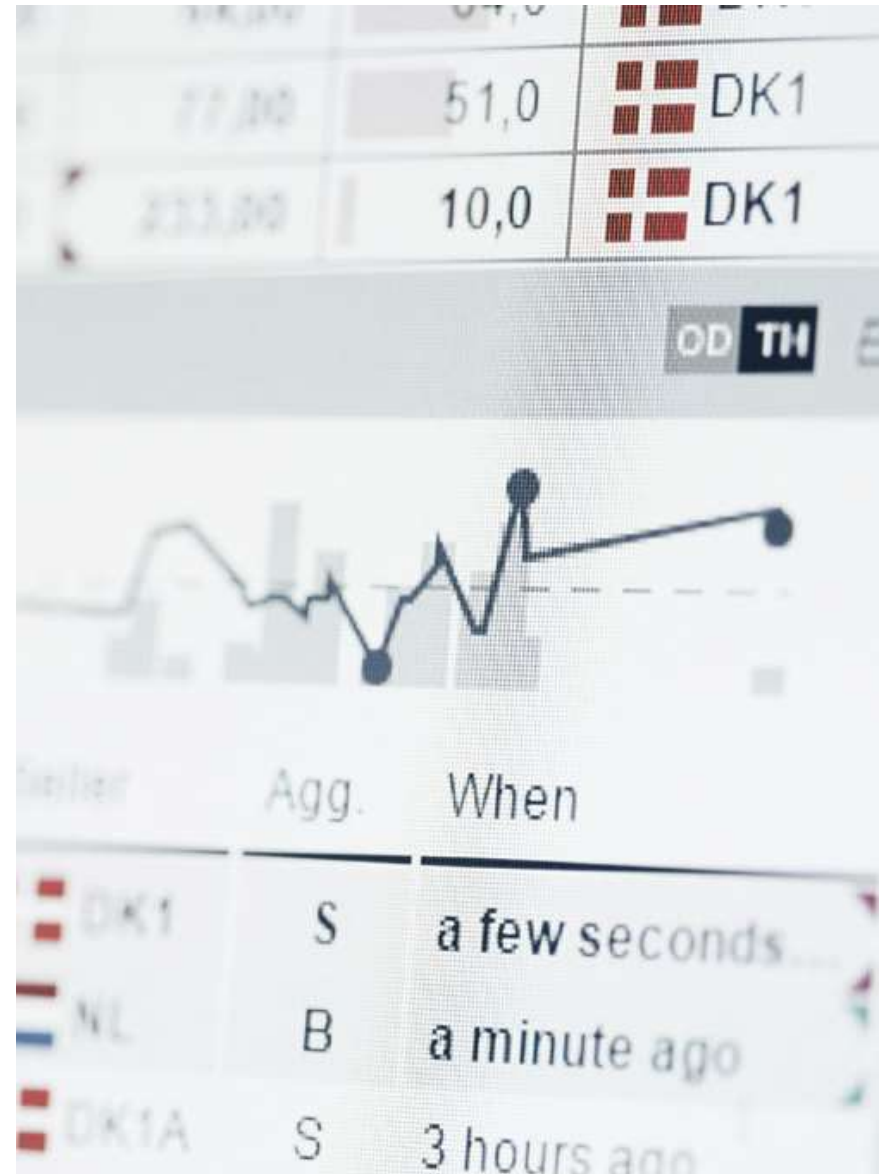
- ▶ Access to all Nord Pool day-ahead markets through a simple-to-use web-based interface
- ▶ Free connected API allows seamless and fully automated trading
- ▶ Complete European product offerings
- ▶ Set the preferred bid ranges by engaging the adjustable bid parameters
- ▶ Records of all trades and volumes quickly and efficiently
- ▶ Flexible and customisable interface to suit your preferences

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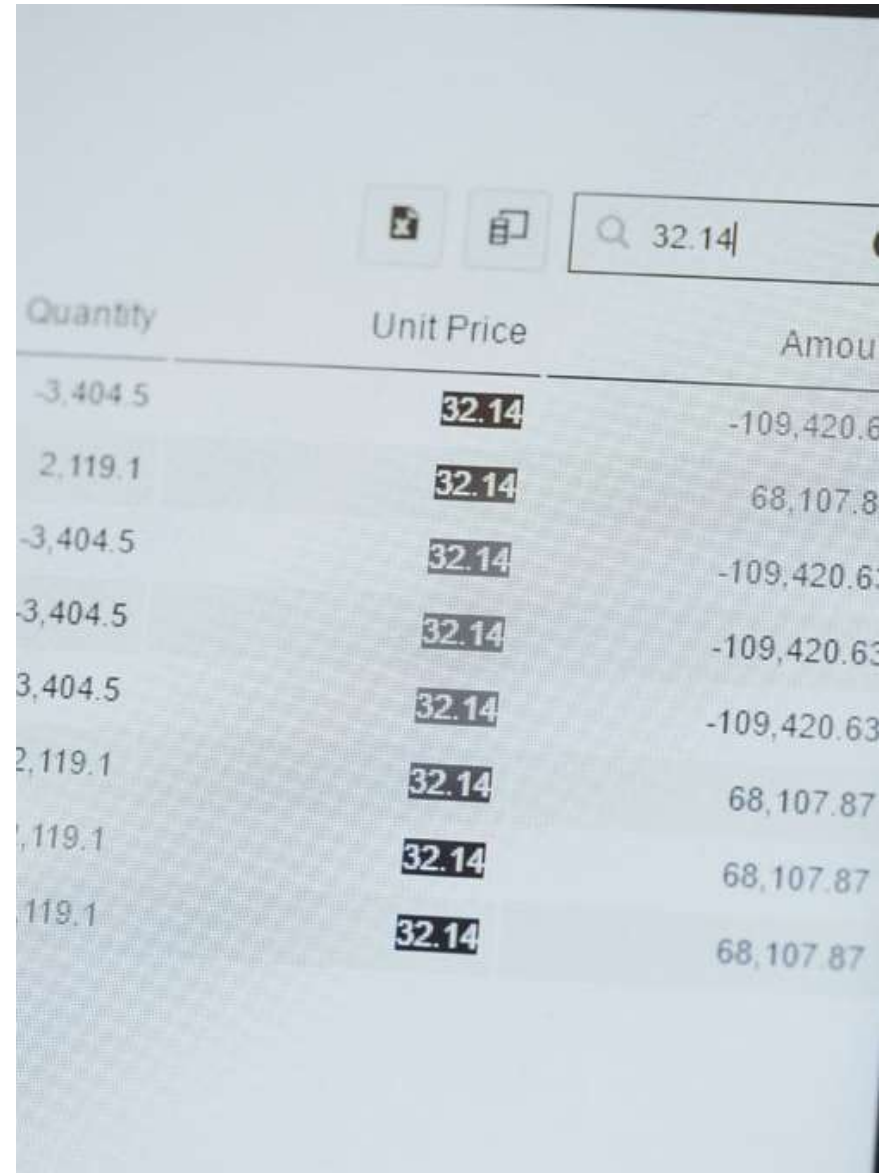
Intraday Web

- ▶ Unlimited access to all Nord Pool intraday markets through a web-based interface
- ▶ Free connected API integrates your systems with Intraday Web, allowing seamless and fully automated trading
- ▶ Complete access to the European product offerings (including 15, 30 and 60 minute, block and iceberg products)
- ▶ Import orders quickly and easily direct from Excel
- ▶ Flexible and customisable interface to suit your preferences, with unique features for specific markets
- ▶ Specifically developed for cross-border coupling



Clearing Web

- ▶ Clearing Web is a one-stop-shop for accessing cleared trades, settlements, invoices and collateral information
- ▶ It is web-based and simple-to-use featuring an interactive user interface that can be customised to suit your preferences
- ▶ Modern REST-based Trade Capture API integrates your systems with the clearing platform, allowing seamless and fully automated trade capture
- ▶ Compatible with all Nord Pool markets, across geographies and trading systems



The screenshot displays a web-based interface for trade clearing. At the top right, there is a search bar containing the text '32.14'. Below this, a table lists trade data with three columns: 'Quantity', 'Unit Price', and 'Amount'. The 'Unit Price' column consistently shows the value '32.14' for each row. The 'Quantity' and 'Amount' columns show varying values, including negative and positive quantities and their corresponding amounts.

Quantity	Unit Price	Amount
-3,404.5	32.14	-109,420.6
2,119.1	32.14	68,107.8
-3,404.5	32.14	-109,420.6
-3,404.5	32.14	-109,420.63
3,404.5	32.14	-109,420.63
2,119.1	32.14	68,107.87
1,119.1	32.14	68,107.87
119.1	32.14	68,107.87

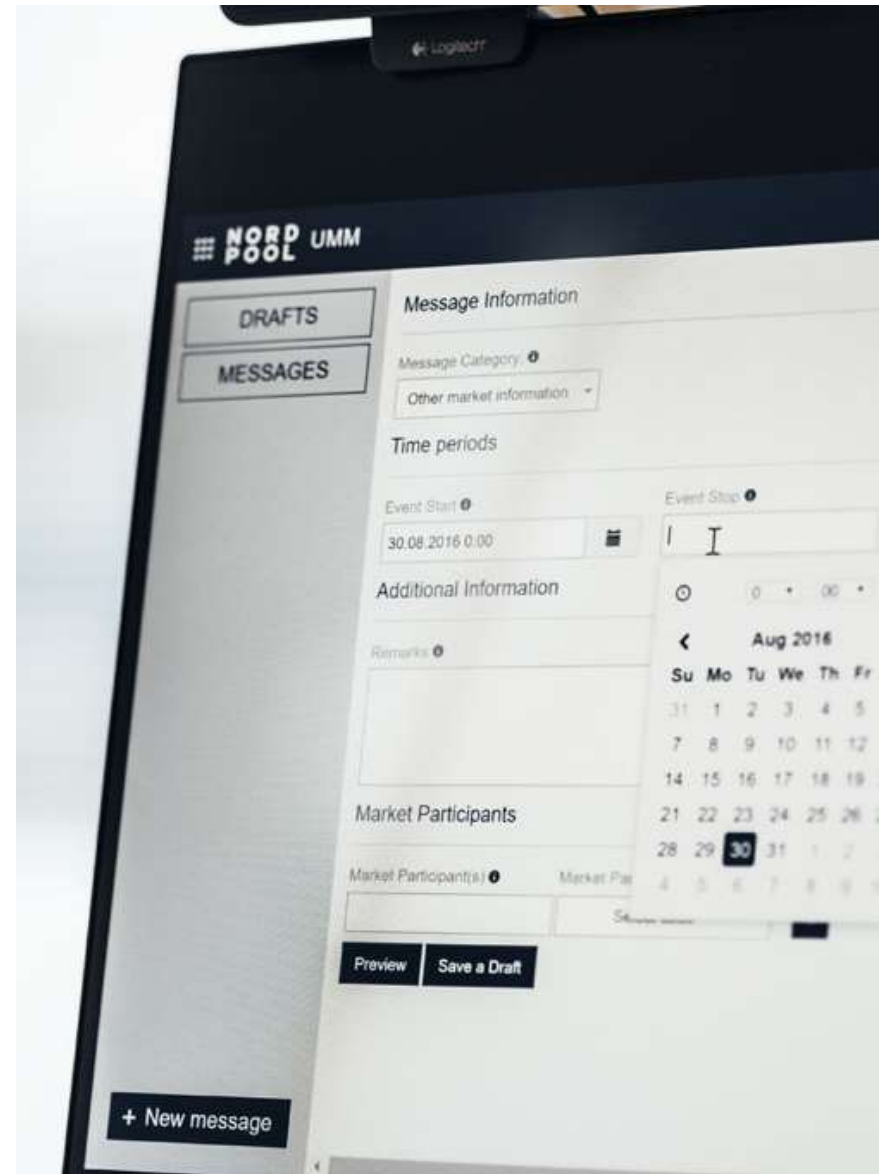
Compliance REMIT Reporting

- ▶ Nord Pool's REMIT Reporting make compliance simple and straightforward
- ▶ Flexible and automated reporting
- ▶ Options to use Nord Pool as your Registered Reporting Mechanism (RRM), use a third party RRM and for reporting of bilateral contracts
- ▶ Simple overviews and detailed reports through the Nord Pool REMIT Portal for a clear and concise record of your compliance
- ▶ Connected API integrates your systems with our REMIT Reporting, allowing seamless, simple and secure reporting



Compliance REMIT UMM

- ▶ Notify the market about planned or unexpected changes to generation, consumption and transmission
- ▶ Comply with European energy market regulations on information disclosure with automatic forwarding of data direct to the ACER REMIT platform and optional reporting to ENTSO-E Transparency Platform
- ▶ Connected API integrates your systems with UMM, enabling seamless information transfers between you and the market
- ▶ View real time notifications of events, disturbances and price impacts on short and long term markets
- ▶ Available in European markets and accessible alongside all Nord Pool applications via a single, web-based interface



The App - FREE

- ▶ Access to day-ahead prices with optimal push notifications when prices are published
- ▶ Graphs – information at a glance with highlighted max, min and average prices
- ▶ Drill down in hourly price table
- ▶ Check prices in the currency of your choice

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