Unregulated Nordic power producers well positioned to capitalise on higher prices

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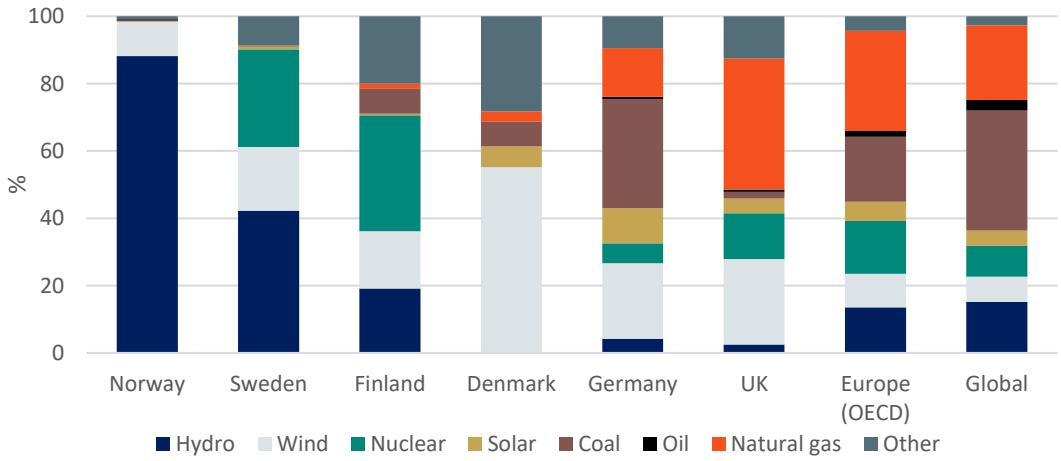
Nordic Credit Rating (NCR) anticipates that unregulated Nordic utility companies will maintain their strength over the next three years, propelled by elevated system prices and a rise in electricity demand due to industrial initiatives and increasing electrification. Our credit outlook for the sector is favourable, backed by a significant presence of cost-competitive generation technologies and projections of prices that surpass historical levels. However, we are cautious about the industry's susceptibility to price volatility, which we identify as the primary risk factor.

INCREASED ELECTRIFICATION AND INTERCONNECTEDNESS WITH EUROPEAN MARKETS

The Nordic power market is volatile, with significant fluctuations in prices and generation. The Nordic countries have substantial levels of intermittent renewables in their energy mix, which amplifies the sensitivity of generation and prices to weather and hydrological conditions. In instances where electricity is required, demand is met through imports from other countries.

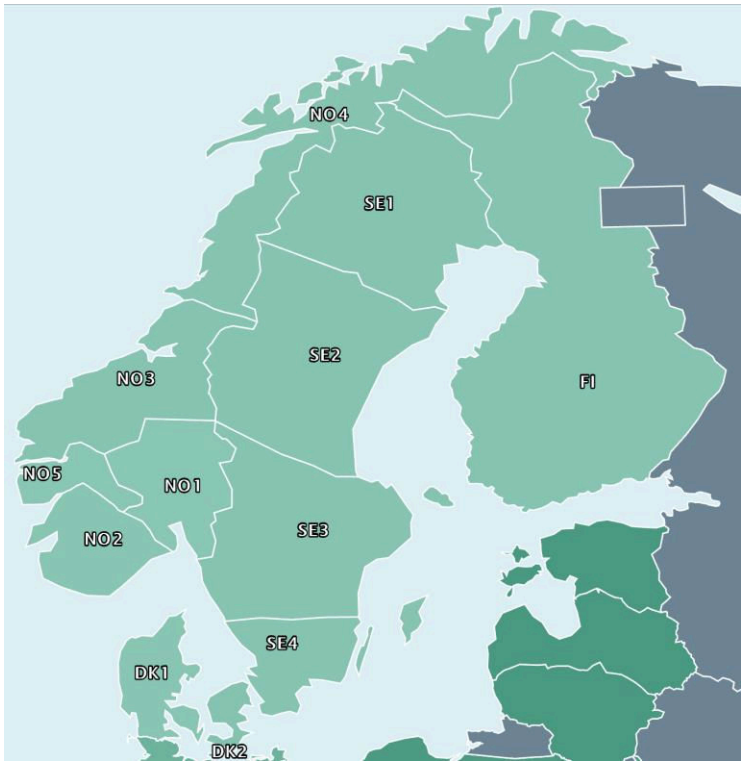
Figure 1. North European power generation mix by country, 2022



Source: IEA and Ember. OECD–Organisation for Economic Co-operation and Development.

The energy mix in the Nordic region varies significantly, with Norway relying heavily on flexible hydropower, while Denmark relies on intermittent wind power. The presence of intermittent technologies in the energy mix highlights the importance of transmission capacity within domestic markets and between countries, as there can be periods when supply is insufficient to meet demand. In addition, the location of generation assets plays a crucial role in pricing dynamics within domestic markets, as they are typically divided into different pricing regions. The Norwegian (NO), Swedish (SE), and Danish (DK) power markets are divided into pricing regions, while Finland (FI) operates as a single market.

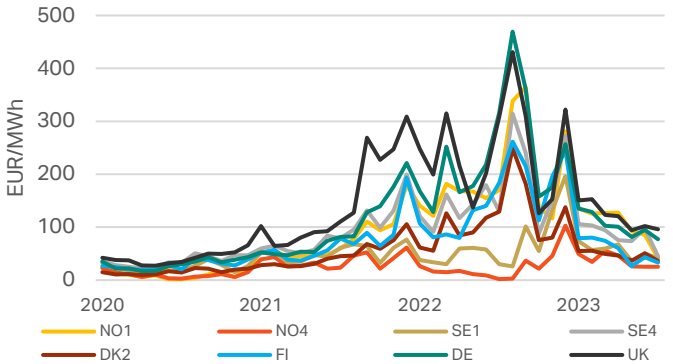
Figure 2. Pricing regions in the Nordic region, 2023



Source: Nord Pool.

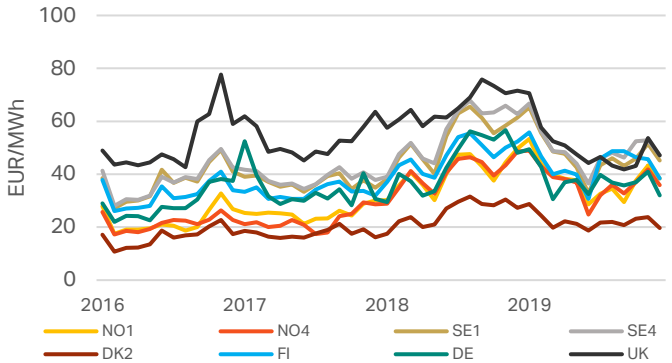
The historical price difference between pricing regions in Norway and Sweden has been insignificant. Nevertheless, in 2021 and 2022, prices increased significantly in the southern pricing regions of Sweden (SE3 and SE4) and Norway (NO1, NO2, and NO5), while prices in the northern regions, where demand is lower, remained more stable. In contrast, Denmark maintained a minimal price difference between its pricing regions (DK1 and DK2) during the same period. Despite the variations in pricing regions and energy mixes among the Nordic countries, they all experienced similar price spikes due to their connections with the broader European energy market.

Figure 3. Spot prices in selected pricing regions in the Nordic region, UK and Germany, 2020–Jul. 2023*



Source: Vattenfall, Nord Pool, Ember and Ofgem. *Currencies are translated using monthly average prices in local currencies. MWh–Megawatt hours.

Figure 4. Spot prices in selected pricing regions in the Nordic region, UK and Germany, 2016–Dec. 2020*



Source: Vattenfall, Nord Pool, Ember and Ofgem. *Currencies are translated using monthly average prices in local currencies. Mwh–Megawatt hours.

The price surge in the Nordic region was a result of improved interconnectors and increased transmission capacity with other parts of Europe, along with bottlenecks in the domestic transmission systems. This led to a convergence of historically low Nordic electricity prices with prices elsewhere in continental Europe and the UK, which experienced a significant increase due to a reduction in the supply of Russian gas following the invasion of Ukraine.

The southern regions of Norway and Sweden were more affected than other pricing regions in those countries because they rely more on imports from elsewhere in continental Europe and the UK. In contrast, the northern pricing regions have surplus generation. Consequently, prices in the southern

pricing regions of Norway and Sweden correlate more closely with prices in Germany and the UK, rather than with prices in northern domestic pricing areas.

Figure 5. Price correlation of Nordic pricing regions, 2016-Jul. 2023

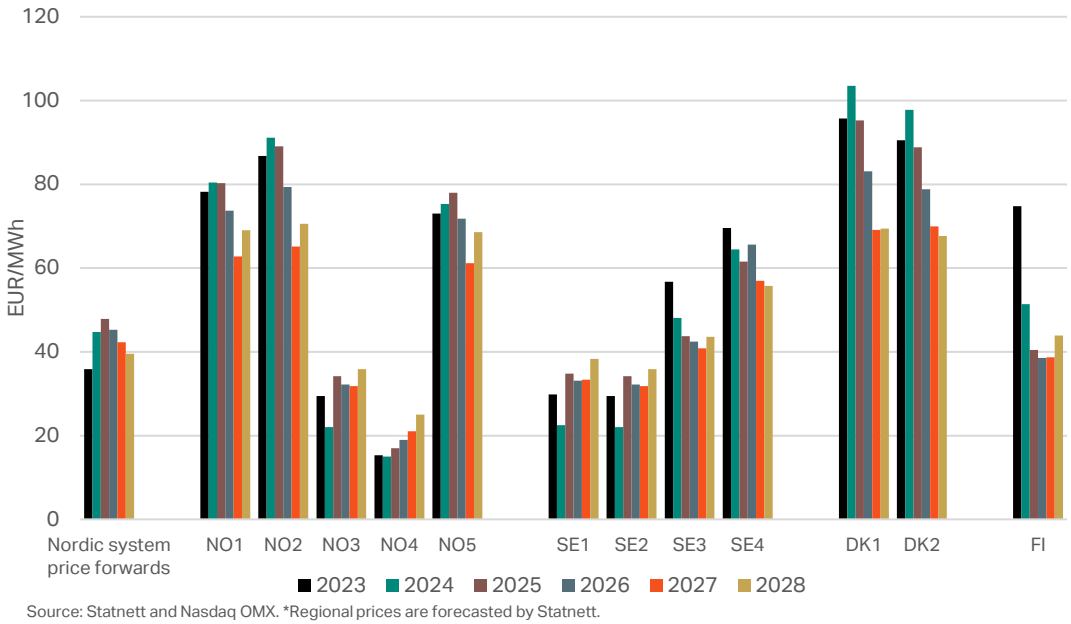
	NO1	NO2	NO3	NO4	NO5	SE1	SE2	SE3	SE4	DK1	DK2	FI	DE
NO2	98%												
NO3	50%	41%											
NO4	27%	19%	90%										
NO5	100%	98%	50%	27%									
SE1	56%	48%	91%	80%	56%								
SE2	62%	56%	91%	78%	62%	99%							
SE3	94%	91%	61%	42%	94%	70%	76%						
SE4	95%	95%	50%	30%	95%	60%	67%	98%					
DK1	96%	98%	32%	10%	96%	42%	50%	90%	95%				
DK2	96%	98%	33%	11%	96%	44%	52%	92%	96%	100%			
FI	91%	92%	49%	29%	91%	64%	70%	95%	95%	92%	93%		
DE	95%	98%	31%	9%	95%	42%	49%	90%	95%	99%	99%	92%	
UK	91%	92%	37%	20%	91%	43%	49%	89%	93%	94%	93%	87%	95%

Based on data from Vattenfall, Nord Pool, Ember and Ofgem.

The higher proportion of gas and coal power prevalent in the European energy mix outside the Nordic countries impacts the price at which electricity can be imported in periods of deficit. Prices have decreased from their peaks in 2022, and intensified efforts to reduce dependence on Russian gas elsewhere in continental Europe, which has a higher marginal cost of production, are likely to result in lower energy prices in the Nordic countries than in 2022. However, we expect the structural difference between pricing regions to remain.

Over the past three years, electricity prices have been both higher and more volatile than historically. We expect prices to remain highly volatile due to increased electrification and limited capacity for storing energy generated from intermittent renewables. On 29 Sep. 2023, Nordic system price forward contracts indicated prices between EUR 36–48 per MWh through 2028. The lowest contract pricing point is about EUR 6 higher than historical averages.

Figure 6. Nordic system forward and regional electricity prices*, 2023-2028



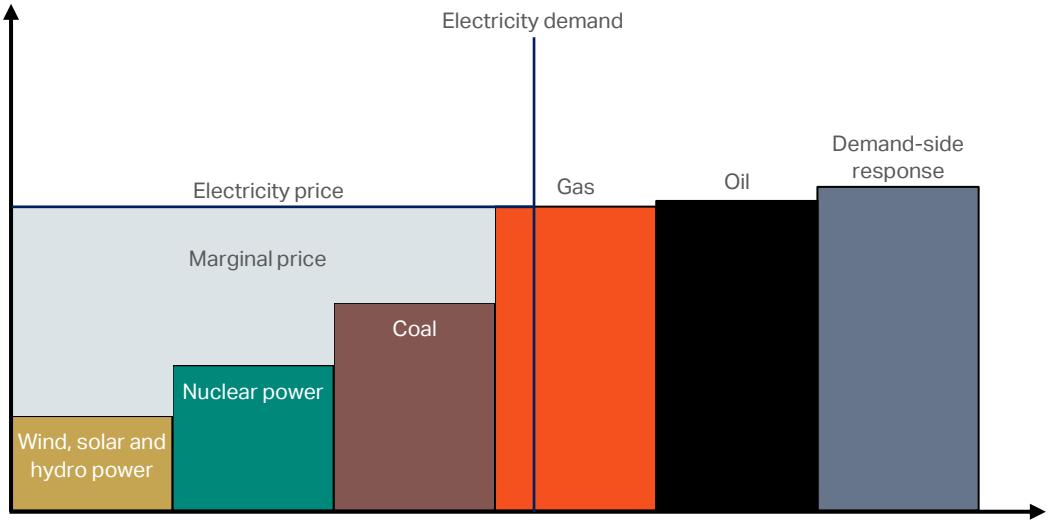
Source: Statnett and Nasdaq OMX. *Regional prices are forecasted by Statnett.

NORDIC POWER PRODUCERS FAVOURABLY POSITIONED TO CAPITALISE ON HIGHER PRICES

In the European energy market, prices are determined based on a merit order system, where the most expensive power plants required to meet demand in a pricing region determines the prices for all suppliers providing electricity to the region. New capacity is based on the cost competitiveness of the energy source, with the capacity from sources that have the lowest marginal cost of generation added first. This means that hydro, wind, and solar power, which are abundant in the Nordic countries, have an advantageous position in the merit order system due to their low marginal cost of production. This

resulted in increased profits for Nordic power producers during the price spike in 2022, when marginal prices were set by imports with higher marginal costs of production. In addition, renewable generation technologies remain cost competitive even during periods of low market prices.

Figure 7. Marginal pricing dynamics



Based on data from the European Commission.

STRUCTURALLY INCREASED DEMAND FOR ELECTRICITY SET TO IMPACT ENERGY PRICES

We anticipate that large new industrial projects and the continuing electrification of existing industries in both northern Norway and Sweden could lead to higher electricity prices in the respective pricing regions. This expectation is partly due to an increase in regional consumption, resulting in generally higher energy prices across all pricing regions. As consumption within the northern pricing regions rises, transmissions to the southern pricing regions will decrease, leading to greater reliance on imports from other parts of continental Europe and the UK.

Currently, Germany is priced as a single region despite bottlenecks between the north and south of the country. However, the European Union is examining the possibility of dividing Europe into smaller pricing regions. If Germany were split into two or more pricing regions, we would expect exports from the prospective northern region to be priced at lower levels than currently. This is due to the larger proportion of wind farms located in northern Germany.

Figure 8. Larger industrial projects in northern Norway and Sweden by pricing region

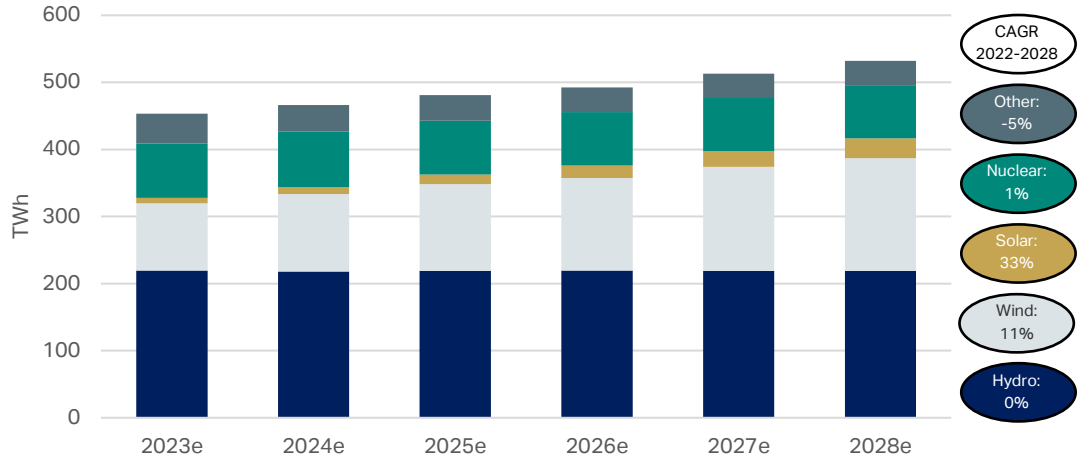
Company	Industry	Pricing region	Estimated TWh	Estimated completion
Hybrit	Green steel production	SE1	15-20	2026
Equinor	Green LNG production	NO4	3.2	2028*
Freyr	Battery production	NO4	3	2024
Northvolt	Battery production	SE2	2	2026**
H2 Green Steel	Green steel production	SE1	2	2025

Source: companies. *Plant electrification expected to be completed by 2030. **Started commercial deliveries from the first stage of the project in 2022.

Bottlenecks in transmission capacity between pricing regions could lead to higher prices and inadequate domestic generation to meet demand at peak hours. This could result in increased prices and greater price volatility than at present. Higher and more volatile prices could stimulate investments in energy efficiency and encourage consumption during low-price periods, which in turn could have a negative impact on pricing. However, we consider this outcome unlikely in view of plans by state owned Swedish iron mining company LKAB to switch production to sponge iron after the completion of Hybrit, a green steel project. The transition to sponge iron is estimated to require 55 TWh of energy annually (corresponding to 28% of Sweden's current electricity generation), which is more than the committed domestic new generation capacity through 2028. This would increase the

need for imports from other countries. We anticipate that more projects will be initiated to meet growing demand, possibly supported by industries with high energy requirements.

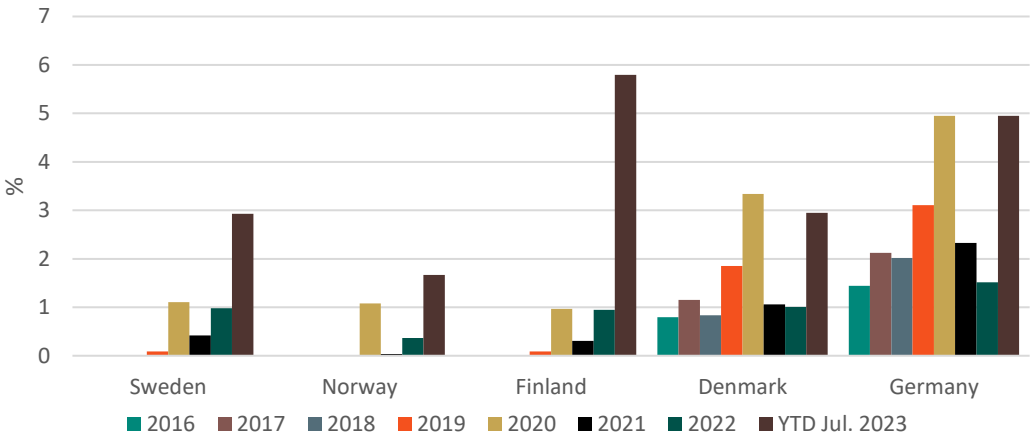
Figure 9. Projected Nordic generation mix based on current investment plans, 2023-2028e*



Based on data from Statnett and IEA. *Forecast by Statnett. e-estimate. CAGR–Compound annual growth rate.

Investment plans across the unregulated European power sector point to a rapid expansion of solar and wind power. This could lead to an increase in periods of oversupply and low or even negative electricity prices, which could put pressure on the profits of less efficient generating assets with weak positions in the merit order system. As intermittent renewable generation grows, it is likely to amplify the seasonality of prices as energy generation moves in the opposite direction of demand. However, we believe that such expansion could also drive investments in storage capacity to manage generation and consumption mismatches. Currently, storage technology is unviable and prohibitively costly.

Figure 10. Percentage of hours with energy prices below EUR 1 per MWh by country, 2016-Jul. 2023



Based on data from IEA. YTD–Year to date.

Sweden is the only Nordic country that does not currently face the risk of an energy deficit on a national level until 2028. We expect Finland to continue to face energy deficits as a net importer, despite the recent launch of the Olkiluoto 3 nuclear energy plant, which generates about 12 TWh annually (equivalent to about 15% of domestic energy consumption). In addition, Finland's limited capability to transmit from other countries results in high levels of pricing correlation with the southern Swedish pricing regions. We project that Norway will achieve a balance between consumption and generation at a national level by 2028, as demand from energy-intensive industries surpasses planned expansion of generation. Denmark could face a deficit in 2026-2027 unless new projects can be completed on time to meet increasing demand.

Figure 11. Expected energy balance in the Nordic countries, 2023e-2028e*

Source: Statnett. *Forecast by Statnett.

NCR-RATED UNREGULATED UTILITY COMPANIES

The following table summarises NCR's ratings on unregulated Nordic utility companies as of 2 Oct. 2023. In addition, NCR maintains a database of credit assessments of key Nordic players.

Figure 12. NCR ratings on unregulated utility companies

	Småkraft AS
Long-term issuer rating	BB
Outlook	Stable
Senior secured bond rating	BBB-
Subfactors:	
Operating environment (20%)	bb
Market position (10%)	bb+
Size and diversification (10%)	bb+
Operating efficiency (10%)	a
Business risk assessment (50%)	bbb-
Financial risk assessment (50%)	b+
Ownership adjustment	0

See NCR's company rating reports for details.

RECENT RATING ACTIONS

(i) Småkraft AS assigned 'BB' long-term issuer rating; Outlook stable, publ. 31 Aug. 2023.

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NORDIC CREDIT RATING AS

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