



## Summary:

# Conditions for secure power transmission – Governance of Svenska Kraftnät in implementing the energy transition

## Summary and recommendations

The Swedish NAO has audited the governance by the Government and the commercial state agency<sup>1</sup> Svenska Kraftnät (the Swedish Transmission System Operator, the Swedish TSO) in relation to secure power transmission at an economically justified cost. The focus of the audit is the financial and operational governance of Svenska Kraftnät and the development of the national electricity grid, in light of the transition to more renewable energy forms.

## Background and reasons for the audit

The Swedish energy market is undergoing an extensive structural transformation that makes new demands on the electric power system. The system needs to be adapted to renewable energy forms that are produced in smaller and geographically scattered installations that are often weather-dependent and thus more difficult to plan than nuclear power, for example. The Swedish TSO, Svenska Kraftnät, is the agency responsible for the transmission system of electricity. The TSO also manages and develops the Swedish national electricity grid. Transmission capacity within Sweden and to its neighbours is of great importance for the function of the electricity market. A well-functioning national grid allows the possibility of electricity trading, both during normal operation and in strained situations.

---

<sup>1</sup> Svenska kraftnät is a [commercial state agency](#) and is therefore not an independent legal entity.

The major changes that are in progress in formulating energy policy imply some uncertainty concerning Svenska Kraftnät's future tasks in energy transition. Through more extensive EU collaboration in the energy area there is also pressure on the TSO to substantially extend the national grid. Svenska Kraftnät's investments have increased from about SEK 400 million per year in the 1990s to SEK 4–5 billion per year in the 2010s. At the same time there are the Riksdag's earlier statements that extension of the transmission system must be set in relation to what is justified on a cost-benefit basis, given the energy transition.

## The purpose and delimitations of the audit

The purpose is to audit the Government's governance of Svenska Kraftnät and how the TSO in turn manages operations towards secure power transmission at an economically justified cost, given the transition to more renewable energy. The Swedish NAO has not audited how the technical function of the Swedish electric power system is affected by an increased percentage of renewable energy.

## Audit findings

The audit shows that the Government's governance of Svenska Kraftnät needs to be developed and the role of the board in investment decisions is partially unclear. The deficiencies refer to the design of the funding model for the Swedish TSO Svenska Kraftnät, Svenska Kraftnät's remit, board work and the TSO's decision support data in the form of cost-benefit analyses etc. This risks having a negative impact on effectiveness and ultimately the deficiencies may lead to higher costs for customers of the Swedish electricity grid.

### *Svenska Kraftnät has economic degrees of freedom and little incentive to reduce costs or prioritise between investments*

Three different decisions lay down the financial framework for Svenska Kraftnät's activities. The Riksdag decides on investment and loan limits based on proposals from the Government. The Government decides on financial targets, dividends and debt to equity ratio. The Swedish Energy Markets Inspectorate decides on revenue frameworks in accordance with the revenue regulations.

The Swedish NAO's audit shows that the Government's documentation to the Riksdag does not provide sufficient information to assess the relevance of investment and funding plans. The Swedish Energy Markets Inspectorate has no authority to question whether

the investments are economically justified when considering revenue levels or when granting licences for building grid infrastructure. The Government in turn assumes that the board of Svenska Kraftnät has examined the scope and priorities of investments from a cost-benefit perspective. Some members of Svenska Kraftnät's board consider, however, that the board does not have sufficient reference material to evaluate whether the investments are economically effective. Some members of the board also consider that the board is brought in too late to be able to influence the decision-making process. The audit shows that in practice Svenska Kraftnät decides on investments without the Riksdag, the Government, the Swedish Energy Markets Inspectorate or the board having influenced the scope and priorities of investments in the national grid. The consequence is that it is the decisions of the TSO that steer funding approved by the Riksdag and Government and the estimated revenue framework from the Energy Markets Inspectorate.

### *Svenska Kraftnät exceeds the required return while debt increases and charges must be increased*

Svenska Kraftnät has exceeded the Government's required return by a good margin; for example it has never needed to use the entire revenue framework. During the period 2009–2015 the return target was exceeded by about 14 per cent or just under SEK 1 billion. Svenska Kraftnät annually pays 65 per cent of the result for the year in dividend to the treasury, which has made it difficult to finance investments with its own funds. This has increased indebtedness, which in the long term risks leading to an unsound financial situation. In combination, this means that electricity grid customers have to pay higher charges for the national grid than necessary.

Since 2009 electricity grid charges have been significantly increased due to extensive investments in the grid. Svenska Kraftnät predict that the costs of operating and building the national grid in the coming ten-year period (2016–2025) will increase by about 100 per cent, which entails increases in the grid charges of about the same proportion. If the increase is 100 per cent this may mean that the charge for an average electrically heated house will increase by about SEK 600 per year. For a small industry the equivalent increase will be about SEK 10 000 per year.

### *The valuation of Svenska Kraftnät's fixed assets risks leading to economic inefficiency in the electricity market*

In accordance with the authorities' accounting rules the assets are valued at cost of acquisition. However, Svenska Kraftnät's current grid charges do not correspond to the required return on the assets' replacement cost. There is a risk that the difference will be

passed on to future generations, who will thus have to pay more when the national grid needs to be renewed.

Moreover the electricity producers' current costs for connecting new generating installations will be lower than they should be from a cost-benefit perspective. Consequently there is a risk of overinvestment in electricity generation and that other alternatives, such as energy storage, will not be sufficiently considered. Current costs that do not reflect the replacement cost may also mean that the grid charges will be too low and less differentiated and thus do not steer the location of new electricity generation to where demand is greatest and most beneficial for the economy. The final result may be greater extension of the grid than is necessary, to the detriment of electricity grid customers.

An EU Regulation sets a ceiling for increasing charges to electricity producers, but not to network companies. Hence, in future (2016-2025) Svenska Kraftnät may be forced to change the allocation of charges between electricity producers and network companies. A cost increase in the electricity networks is largely passed on to the end customer. Consequently there is a risk that industrial customers and consumers will have to pay a higher electricity grid price.

### *The Government has not developed Svenska Kraftnät's remit to manage the energy transition effectively*

There are several potential solutions to manage the long-term capacity demand and reduce the risk of blackouts. The expected low electricity price does not provide any incentives for market actors to invest in the capacity necessary to manage the systemic challenges in the electricity grid that follow from more renewable energy. In that the strategic capacity reserve is to be phased out in 2025 it is important to decide on any amendment to the regulations for the functioning of the market, and whether Svenska Kraftnät is to play a role in long-term responsibility for the capacity balance between power production and consumption.

There are no targets for security of supply in the national, regional and local grids or at the electrical production stage. Consequently, planning of grid expansion by Svenska Kraftnät and other network owners is more difficult, both in Sweden and in relation to neighbouring countries. From the point of view of the national economy, the absence of targets entails a risk of overcapacity or undercapacity in relation to what is most profitable from a cost-benefit perspective. Transmission capacity to other countries is higher than the EU requires and there is a risk of overdimensioning of the national grid

resulting in end customers having to pay higher network charges than are economically justified.

There is no explicit responsibility for implementing broad power system analyses of the need for network extension compared with other measures that affect transmission capacity. Instructing Svenska Kraftnät to extend its power system analyses to cover the entire electricity network and take into account alternative measures could increase transparency and insight. In that way Swedish network owners could consider alternative measures to a greater extent, such as storage technologies and demand flexibility, when developing their own networks. This would increase the possibilities of ensuring that network extension is not overdimensioned.

*Svenska Kraftnät has not prepared sufficient decision-making data to be able to make its operations more effective*

Secure power transmission at economically justified costs requires the choice of the most effective measure. This may be through network investments or alternative measures. Effective decisions require decision-making data that includes a power system analysis for the entire electricity network and cost-benefit analyses. In addition there must be a transparent decision-making process with early insight by independent parties and stakeholders. Regular follow-up of investment projects and research funding can also contribute to making the future process more effective.

Svenska Kraftnät is responsible for carrying out cost-benefit assessments ahead of investments in the national grid, but no independent third party is tasked with examining the analyses. The TSO does not conduct any cost-benefit analyses when connecting new electricity production to the national grid, when reinvesting or when investment is needed to meet the operational reliability criterion. In the few analyses that are made by Svenska Kraftnät, the TSO mainly evaluates the benefits and costs for the electricity market. This means that important aspects for the rest of society are not taken into account or evaluated in a relevant way. The analyses are often not comparable and alternative routes or technology choices are not reported to the board and stakeholders. All in all, this means that the data is not sufficient to show that the investments are the most effective from a societal point of view and there is a risk of incorrect investments.

The audit shows that there are few follow-ups and evaluations of investments made. This reduces the opportunities for the TSO to learn lessons with a view to being able to implement future investments in time, on budget and at a high level of quality. Thus it is also difficult for the board to gain an insight into the organisation. The lack of systematic reporting that includes analysis of project deviations also makes it more difficult for the

board to make strategic decisions to improve the effectiveness of the investment process. Moreover, there is a risk that Svenska Kraftnät's research funding is not at the level or the focus needed to make its own operations more effective and facilitate the transition to more renewable energy.

*The Government's governance does not provide sufficient incentives for effectiveness*

Svenska Kraftnät is an agency that is to conduct its activities effectively on commercial principles. The Government's financial governance does not, however, provide incentives for internal effectiveness or correct pricing in relation to the electricity market actors. Economically incorrect pricing increases the risk of ineffective allocation of resources in the electricity generation market.

Moreover there is no critical examination of investment volumes and priorities between investments. At the same time there are good prospects for Svenska Kraftnät to loan-finance investments and to increase the grid charges to the detriment of the end customer.

Since Svenska Kraftnät carries out incomplete cost-benefit analyses it is not possible to determine whether account is taken of the Riksdag's statements that extension of the transmission system must be justified on a cost-benefit basis, given the energy transition. At the same time Sweden exceeds the EU target for cross-border transmission capacity by a good margin. Continued extension should therefore be reviewed on the basis of the effects it will have on the economy as a whole.

Moreover, the Government has not developed Svenska Kraftnät's remit as regards possible responsibility for the long-term capacity balance between production and consumption, a target for security of supply or power system analyses for the entire electricity network. This must be made clear to enable the TSO to conduct its activities effectively and for a well-functioning market.

*The Government and Svenska Kraftnät have not clearly directed their governance towards secure power transmission at an economically justified cost.*

The Government governs Svenska Kraftnät mainly by means of instructions, appropriation directions, remit and financial targets. The Government also appoints the Director-General and members of the board. The board is the Government's most important tool for governing the TSO, but the board has not taken the initiatives required for effective governance. This is linked to the fact that the Government has not

clarified sufficiently the board's responsibility and role, while the board as a whole has not sufficiently understood its remit on the basis of the Government Offices' guidance for effective board work.

## Recommendations

### *To the Government*

- Review Svenska Kraftnät's capital structure and financial targets so that the financial management provides incentives for internal effectiveness and pricing that contributes to economically effective location of electricity generation.
- Consider adjusting the dividend target downwards in view of Svenska Kraftnät's major investment needs.
- Ensure that Svenska Kraftnät presents adequate investment and financing documentation to the Riksdag and Government. The Government should
  - establish guidelines for cost-benefit analyses in the area of electricity.
  - consider whether an independent party, at an early stage of the process, should review Svenska Kraftnät's cost-benefit analyses and issue an independent opinion on which the Government can base its assessments and the Riksdag its decisions.
  - allow relevant stakeholders insight into the decision-making process at an earlier stage.
- Clarify Svenska Kraftnät's remit so that the TSO can respond to energy transition effectively. The Government should
  - commission a report on Svenska Kraftnät's share of responsibility for the long-term capacity balance between power production and consumption.
  - commission a report on whether a target for security of supply for the entire electricity grid or the entire electricity power system could counteract grid overcapacity or undercapacity.
  - Give Svenska Kraftnät responsibility for regularly implementing power system analyses for the entire electricity network to assess the need for extending the network compared with other measures that affect security of supply.
- Clarify the responsibility and role of the board as well as the intentions of Svenska Kraftnät's activities so that the board works to a greater extent towards achievement of objectives. Clarify how Svenska Kraftnät is to weigh up the electricity grid cost for extending the transmission system against the benefit of an effective electricity market.

### *To the board of Svenska Kraftnät*

- Implement follow-ups and evaluations of investment projects carried out to a greater extent and use the results to develop and improve the effectiveness of the activities. In

addition, focus internal audit so as to increase the board's opportunities of evaluating Svenska Kraftnät's conduct of operations.

- Require systematic reporting and analysis of deviations in investment projects. This documentation is necessary to make operations more effective.
  
- Develop Svenska Kraftnät's expertise in cost-benefit analysis and
  - require reporting of more comparable alternatives ahead of investment decisions
  - analyse and document the cases where exemption from cost-benefit analysis is justified
  - ensure that cost-benefit analyses are clear and used to make the consultation process more effective.
  
- Develop a commissioning organisation so that research funding is at a relevant level and focus to contribute to improving effectiveness of Svenska Kraftnät's own operations and facilitate transition to renewable energy.