

## CAPITAL COSTS IN NEW SWEDISH REVENUE REGULATION

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### ABSTRACT

*A new revenue regulation will be introduced in Sweden 2012. The scope of the paper is to describe how the regulation model works and the consequences for the distribution companies.*

*The aims of the regulation are to ensure that the customer will pay a reasonable price, the quality shall be improved or at least maintained and it shall be possible to attract investors.*

*The regulatory asset base will be based on existing assets and planned investments during the regulation period. The regulator determines which assets that shall be included in the asset base. This will not agree with each company's asset base. It will therefore be necessary to transfer costs between capital and operational costs.*

*In determining the value of the asset base the assets will be valued by a net replacement value and a real annuity will be used to calculate the capital costs.*

*The regulation will have impact on the distribution companies in several ways. To be able to calculate the allowed revenue a lot of data have to be prepared. For example it is mandatory to have a continually updated database with the data required to calculate the regulatory asset base.*

### INTRODUCTION

In order to fulfil the EU directive 2003/54/EG Sweden will introduce a new regulatory method. The former ex-post revenue regulation established 1996 will be changed to an ex-ante revenue regulation from 2012.

The objective of the regulation is to ensure that the network companies have reasonable prices and terms, as well as conditions for sustainable development of the networks. The regulation shall give stable conditions and be clear and predictable. It shall stimulate an efficient business as well as reliability of supply and development of the electricity market.

### ALLOWED REVENUE

In order to achieve this, the regulator must establish the allowed revenue for each DSO or network area. The allowed revenue is determined beforehand for a regulatory period of four years and is calculated from operational expenses and capital expenses. The allowed

revenue is adjusted with the quality of supply performance based on outages in the regulatory period compared to historical outages.

### OPERATIONAL EXPENSES

The operational expenses comprise of the actual transition costs and other operational costs built on historical costs with a general efficiency demand. A specific efficiency demand may also be imposed on certain DSOs. [3]

### REGULATORY ASSET BASE

The capital expenses are calculated with an annuity from a regulatory asset base. The asset base is based on existing assets and investments during the regulatory period.

Which assets that will be included in the asset base are determined by the regulator and will not agree with each company's asset base. [2] It will therefore be necessary to transfer costs between capital and operational costs.

Assets that shall be included in the asset base are lines, cables, substations, transformers, systems for operating distribution assets and meter reading systems. These assets shall be included in the asset base independent on the way of disposal, whether owned or rented.[2] Other assets, as network planning systems, administrative and economic systems, billing systems, vehicles and office buildings, shall be treated as operational expenses even if they are owned.

### VALUATION METHOD

The assets shall be valued with net replacement values. [1] Booked values cannot be used, because the booked values differ from zero up to almost the net replacement value for different companies, depending on historical accounting principles. There will be no reduction of the net replacement value due to the age of the grid. The age of each asset is very difficult to determine.

The main part of the assets will be valued by norm costs. Since the cost to build networks depends on the environment, norm costs are determined for different environmental areas. The areas are city, urban, rural and rough rural. [2] For assets where norm costs cannot be applied the original acquisition value shall be used. If the acquisition value cannot be determined the value of the asset shall be based on the booked value. In special cases

with extraordinary reasons, other methods to determine the replacement value can be used.[1]

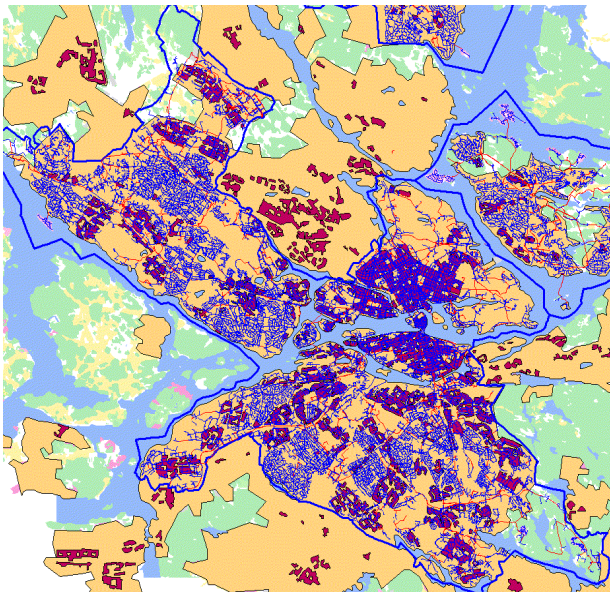


Figure 1, Example of environmental areas in Stockholm

The norm costs are set using actual costs for investment projects during the four year period 2006-2009. An index for buildings will be used to calculate the costs in the value of money for the right year.[1] For assets for distribution up to 24 kV the authority has reduced the norm costs calculated from real projects due to accounting principles that will reduce these values by approximately eight percent. In total the norm costs will be about 85 percent of the net replacement value.

Asset type and area	Technical specification	Voltage [kV]	Norm cost (kSEK)	Unit
Cable City	N1XV(E) 4x150 mm <sup>2</sup>	0,4	809	km
Cable Urban	N1XV(E) 4x150 mm <sup>2</sup>	0,4	603	km
Cable Rural	N1XV(E) 4x150 mm <sup>2</sup>	0,4	220	km
Cable Rough rural	N1XV(E) 4x150 mm <sup>2</sup>	0,4	286	km
Cable City	PEX 3x1x150 mm <sup>2</sup>	12	929	km
Overhead line	Insulated line 3x99 mm <sup>2</sup>	24	249	km
Sub station	315 kVA, iron sheeted	24/0,4	139	units

Table 1, Examples of norm costs

## CAPITAL COSTS

The method for calculating the return of capital will be a real annuity method, which means that a capacity preserving approach will be used. The regulator has determined the depreciation times that will be used.

The interest is calculated using the WACC method. There will be different WACCs for each year in the regulatory period, which will be given by the authority prior to each year.

## QUALITY OF SUPPLY

During the first regulatory period the number and lengths of outages are used as indicators of the quality of supply. Each DSO is measured against its own historical data. If the quality is improved the allowed revenue is increased, if it gets worse the allowed revenue is decreased.

## DOCUMENTATION

It is mandatory to have a continually updated database with the data required to calculate the regulatory asset base. All assets should be included per reporting area, in which type of environment they are situated, when investments, reinvestments and discards have been done, which calculation method that has been used for the valuation of the assets, if the assets are owned or rented and if they are spare material.[1]

## CONSEQUENCES

The directives have impact on the distribution companies in several ways.

### Administrative consequences

To be able to calculate the allowed revenue a lot of data have to be prepared and reported to the regulator. The allowed revenue has to be considered, when making budget plans and pricing plans.

### Changes in tariff level shall be motivated

Each DSO shall request allowed revenue. The regulator has published a method for calculation of the allowed revenue, which is briefly described in this paper. If the requested amount differs substantially from today's revenue the DSO shall motivate the requested level. This shall be done even if the requested value is calculated using the regulator's method.

### Incentives for investments

The fact that the norm costs are lower than the acquisition costs will counteract the willingness to make investments. Reinvestments will, independent of the level on the norm costs, not give a higher regulatory asset base, as the asset base is already valued as being new. The method used to calculate the capital costs will give low incentives for investments. The quality part of the regulation shall

counteract this and give incentives for investments. There are other regulations regarding outages besides the revenue regulation. For example outages longer than 24 hours are not allowed and the DSOs have to pay high compensation fees to customers with outages longer than 12 hours.

### **Ex-ante, but also ex-post**

The DSOs apply for allowed revenue in SEK and the regulator decides on the amount before the regulatory period. [2] The allowed revenue will, however, be adjusted with the actual transition costs, with the decided WACC rate for each year, with an index that considers the inflation for each year and with the actual quality costs. If the actual investments during the period differ from the prognosis, that will also adjust the allowed revenue. Each distribution company will have to follow the actual outcome during the period to be able to predict the final allowed revenue.

### **Consequences for different stakeholders**

Investors will see a more stable and predictable regulation. This will decrease the uncertainties and make investment decisions easier.

The society will have better possibilities to encourage investments in the electricity grids and market. This includes incentives for development of smart grids.

One aim of the regulation is to improve the quality of supply, from which the customers will benefit. The customers' costs will be more predictable.

## **CONCLUSIONS**

The new Swedish revenue regulation will give more predictable conditions than the previous regulation method. It is however too early to judge the method yet, since important input data has not been determined. Especially how the WACC is calculated has great impact on the allowed revenues.

## **REFERENCES**

- [1] Ordinance on determination of allowed revenues according to the Electricity Act (1997:857), SFS 2010:304 (in Swedish).
- [2] Directives on proposed allowed revenues and data collection required for setting reasonable allowed revenues, EIFS 2010:6 (in Swedish).
- [3] Energy Markets Inspectorate's report on ex-ante regulation of network tariffs, EI R2010:24 (in Swedish).