THE FINANCING, PRICING AND IMPACTS OF DISTRIBUTED TRANSFER FEES

Herlita Bobadilla Robles
Gävle Energi AB - Sweden
Herlita.bobadilla-robles@gavle.se

Abstract

The financing of the electricity industry is based on the revenues coming in from the customers who buy its services. The global demand on reliability with very few interruptions is resulting in an increase of investments by the industry for safer equipment and also turning the current radial network into a ring one. The growing costs of energy for power losses and the increases in administration caused by the deregulation together with the new requirements of the Electricity Act have resulted in a raise of the distribution transfer fees. The challenge to calculate the most correct tariff for each customer and for the electricity operators is complicated however, Gävle Energi’s plan is:

To have the fairest fee for the energy distributed, each customer shall only be charged for the amount that he/she consumes. It has to be simple to administrate and to be fair for the customer.

Today’s tariffs are classified by voltage levels and by fuse sizes. And sometimes they are also classified by the customers’ business e.g. a farmer, commercial businesses, etc.

All these classifications add enormous administrative work and these extra costs are also covered by the tariff. This paper shows that it is now time to change the current tariff to a more modern and correct fee. This way the distribution system operators and the customers will feel more satisfied with the arrangement.

Background

The EU is working for a common electricity market. The electricity industry is to be deregulated in most of the countries in EU. Nowadays the transmission and distribution of electricity is monitoring independently of generation and trade. As well the electricity industry has taken more consideration to the customers. Moreover, the regulator authority that works for energy efficient markets has impacts even on the way correct tariffs are created.

The update of the Electricity Act in Sweden created the opportunities for making new calculations of the tariff. The new law of monthly reading of meters, of customer information about the latest thirteen months of electricity consumption, the reporting of power outage from one hundred millisecond per customer in addition to the new technology which transforms the current grid to a smart one where customers are not only traditional consumers but also electricity producers. Taking into consideration all these factors, it is obvious that even the pricing of the distribution service has to be changed.

Introductory comments

The financing of the electricity industry is based on the revenue generated from the customers who buy their services. The global and national demand of a reliable network with very few interruptions, together with the growth of energy consumption has resulted in an increase of investments by the industry toward a reliable and robust network with better capacity for transmission of electricity.

The increase of energy costs, administration and from the new requirements from the deregulation has resulted in an increase of the distribution transfer fees.

The distribution system operators’ expenditures can be classified into different processes, those which are directly connected to the physical grid as investment, operation, maintenance of the grid; other connected to customers as metering, reporting, billing; other connected to the operators’ management as administration, also those related to the power loss and to the subscription to the transmission grid. From these expenditure posts and from the true consumption can new more suitable tariffs can be calculated.

At present, the tariffs are generally classified by voltage levels and by fuse sizes. And sometimes they are also classified by the nature of the customers’ business e.g. a farmer, commercial, etc.

Bigger customers such as factories and industries often have a tariff based on the subscription of the demand of maximum use of power (kW), which results in an additional invoice at the end of the year. All these classifications add more administration work, which is covered by the tariff too.

By analysing the current tariff, it is evident that customers are charged for a subscribed power consumption that usually is bigger than the real use. Large customers are charged for the subscription of demand (kW), regardless of the real power usage. And small customers are charged for the fuse size they are connecting to, not considering if they used the entire
fuse’s capacity or not. Although it is a complicated to calculate a correct tariff for each customer, the idea is to have a reasonable fee for the energy distributed and each customer will only be charged for the amount that he/she consumes. It has to be simple to administrate and reasonable for the customer.

The operators’ expenditure in Sweden

To run the electricity distribution grid in Sweden requires about 20 bn SEK (approx. 2 bn €), according to the operators’ annual report [1]. The expenditure can be allocated in three groups:

1. Subscription and purchasing power
2. Staff and extern cost
3. Depreciation and impairment

Subscription and purchasing powers are the next largest cost items with 37 % of the total expenditure. This includes the cost of subscription to the transmission grid, purchasing of power to cover the network’s power losses and the compensation to the local producers of electricity for decrease in power loss and in the subscription to the transmission grid.

The staff and extern cost is the biggest cost group and it is about 42 % of the total expenditure, this includes the costs of the operation and stand by organisation, preventive maintenance (the work which is done in order to reduce the equipments’ probability to failure or degradation), corrective maintenance (the work which is done when there is an outage) of the network, cost of metering, billing, customer services, administration and the like.

The depreciation and impairment cost is about 21 % of the total expenditure. See figure 1.

Note that roughly 47 % of the subscription and purchasing power cost is relating to the energy (kWh) cost. That means that only 17 % of the total operators’ expenditure goes to cover the energy cost, while the remaining 83 % goes to cover fixed cost and capacity cost. See figure 2.

The operators’ incomes in Sweden

During 2007 the income from the tariff was nearly 21 bn SEK (approx. 2.1 bn €). A suitable allocation of the income into the tariff’s fee should be proportional to the percent allocated from expenditure between energy (kWh), demand (kW) and fixed cost.

The operators’ income is reported from the connection voltage level. Connections points below 1 kV is called Low Voltage (LV), and above that Medium Voltage (MV). The tariff income from the MV connection is only 14 % of the total income in Sweden. The main income comes from LV tariff’s fee, and it is 86 % of the total income [1]. See figure 3.

A closer analysis of the income from the LV tariff shows that 65 % comes from energy fee (see figure 4), while the operators’ energy cost is only 17 % (see figure 2).

Figure 1. The allocation of distribution system operators’ expenditure by the annual economical report – Sweden 2007

Figure 2. The allocation of distribution system operators’ expenditure by cost type

Figure 3. The electricity distribution system operators’ income

Figure 4. Allocation of LV income
The consequences of the current tariff

The MV tariff is rather correctly related to the cost parameters. The customers are charged a fixed fee, a unit charge of electricity delivered, peak demand capacity charge, off peak demand capacity and even a charge fee for the above of the free reactive power level. The problem here is: the majority of operators continue to apply the subscription to demand capacity.

The LV tariff is more simplified. It is based only in a fixed fee which depends on the fuse size and an energy fee (a unit charge of electricity delivered).

Analysing the electricity of LV customers' consumption [2] notes that most of customers are charged incorrectly. A big group are charged for using a capacity (fuse) they do not use. The cost for the demand/capacity is included in the fix fee (SEK/year) or/and in the energy fee (cent/kWh). Even in some case, part of the fixed cost allocated to the energy cost which implies a high energy fee.

All this implies that some customers are subsiding others consumption. See figure 5, 6, 7

**Figure 5. Consumption in the different fuses’ group**

![Graph showing consumption in different fuses' group](image)

**Figure 6. Consumption of 16A fuse**

![Graph showing consumption of 16A fuse](image)

**Figure 7. Consumption of 20A fuse**

![Graph showing consumption of 20A fuse](image)

Gävle Energi, future development of the tariff

In order to decrees the peak demand of power and to reduce the administrative management of billing, Gävle Energi is working with demand tariff.

The tariff for MV customer is based in the real power usage, which is charged monthly and the used power is the average of the three highest from different days of the month, but is based even in the reactive power. Here is a charge fee (SEK/kVar) for the above of the free reactive power. The free reactive power here is 40% of the active power.

The tariff for LV is divided in three groups:

- **Demand tariff**, supply from 80 A. It is similar to MV tariff; the difference is in the size of the fees and in the free reactive power (for this customer is 50% of the active power).
- **Demand direct tariff**, supply for 63A. It is similar to demand tariff, the difference is in the size of the fees and no fee for reactive power (because of there is no possible to meter it).
- **Fuse Tariff** below 63A and flat tariff. It consists of a fixed fee and a unit charge of electricity delivered.

A new tariff construction is going to be applied in Gävle Energi. The AMR (automatic meter reading) gives the possibility to have hourly measuring of the consumption i.e. of the capacity use.

The LV customers are going to be classified into three groups:

1. From 16A to 25A (16A is the smallest fuse size Gävle uses).
2. From 35A to 63A.
3. Above 63A

The 16 to 25 A is in one group because fuses bigger than 25A cannot be place into a supplying metering box for 16-25A. See figure 8. Another even more important reason is that the normally used connection cable is dimensioned for 25A.

Above 63A is possible to meter the reactive power.
The idea is that customers in the same group will have the same tariff and they will be charged for the amount of power usage and not for the fuse size. But a more deeply analyse of the flats consumption has to be done to calculate a more correct tariff even for them (that because of lack of data).

![Figure 8. Fuse holders for fuse 16-25A (left) and 35-63A (right).](image)

**Conclusion**

Basically, an update of the current tariff is needed. It is unacceptable to continue charge customer by en old method when the operators here in Sweden could use the latest technology to calculate a more correct tariff and at the same time decrease the administration cost. The solution is a power/capacity tariff even for consumers who nowadays are charged after a fuse size, and for the customers who have a tariff based on the power subscription, can be charge monthly for the real use of power.

**References**