

# CALCULATION INSTRUCTIONS

## Calculation Instructions for the Determination of the Energy Costs Baseline, the Annual Amounts of Savings and the Remuneration

### 1 Basics

All prices and costs applied, including the energy costs baseline, are stated exclusively as net amounts. Changes in the amount of the statutory value-added tax are therefore not included in the calculation of the annual savings.

The CL has adjusted the reference prices taking account of the price trends as they are currently foreseen<sup>1</sup>. The prices are valid for the entire duration of the contract and form the basis of the baseline and the savings to be determined on an annual basis. Thus the CL bears the risk of changes in prices and tariffs.

The reference price for any meter is the tariff valid for that meter including the discounts granted to the CL plus all energy-related taxes.

The relevant period for the calculation of the baseline is the period from 1 January 20?? to 31 December 20??. Accordingly, settlements during the contract period are to be referred to full calendar years.

Short settlement years are to be delimited in accordance with the calculation instructions set out below.

### 2 Energy Costs Baseline

#### 2.1 Energy Supplies Invoiced on a Lump-sum Basis (independent of weather and settlement period)

In the case of energy supplies invoiced on a lump-sum basis independent of weather or using fixed annual lump-sums the unadjusted annual lump-sum value is used for calculation of the energy costs baseline.

This includes among other things:

- Contractually agreed district heating demand rate values and costs
- Lump-sum invoicing of district heating, lump-sum costs

#### 2.2 Energy Supplies Invoiced on a Period Basis (depending on the settlement period)

Energy supplies registered by meters and invoiced by the supplier on a period basis which as a rule are regarded as being independent of the weather are used as basis for the year under review on a per-day basis.

This includes among other things:

- Low-voltage supplies and base prices
- Demand rate supplies
- Medium-voltage supplies (details see section 5.2)

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<sup>1</sup> Reference prices are usually the tariffs valid at the end of the baseline year. If the baseline period lies far in the past, then current tariffs may be used. Strategic reference price determination is also possible (e.g. if considerable price changes are to be expected).

- Gas metering prices and base prices

In the case of invoices reaching beyond the year under review the energy supplies and energy supply costs are used as a basis for the year under review on a per-day basis separated by kilowatt hour and demand rate components. Heating day adjustment is not made:

$$EB_0 = EB_A \cdot \frac{d'_0}{d_A} + EB_B \cdot \frac{d''_0}{d_B}$$

$$L_0 = L_A \cdot \frac{d'_0}{d_0} + L_B \cdot \frac{d''_0}{d_0}$$

$EB_0$  : Energy supply (kilowatt hours) for the year under review

$EB_A$  : Energy supply (kilowatt hours) of accounts reaching into the preceding year

$EB_B$  : Energy supply (kilowatt hours) of accounts reaching into the subsequent year

$L_0$  : Demand invoiced for the year under review

$L_A$  : Demand invoiced of accounts reaching into the preceding year

$L_B$  : Demand invoiced of accounts reaching into the subsequent year

$d_0$  : Number of days in the year under review (365 or 366)

$$d_0 = d'_0 + d''_0$$

$d'_0$  : Number of accounting days in the year under review of accounts reaching into the preceding year

$d''_0$  : Number of accounting days in the year under review of accounts reaching into the subsequent year

$d_A$  : Number of accounting days of accounts reaching into the preceding year

$d_B$  : Number of accounting days of accounts reaching into the subsequent year

In the case of monthly invoices the invoices completely falling into the year under review are to be taken into account in addition to those reaching beyond the year under review.

The energy supply costs of the year under review are determined from the energy supply determined in the way described by applying the respective reference price.

### 2.3 Energy Supplies Invoiced on a Consumption Basis (depending on weather and settlement period)

Energy supplies registered by meters and subject to weather effects are regarded as being dependent on the weather (90%)<sup>2</sup> and the settlement period (10%)<sup>2</sup>. The allocation specified (90/10) excludes the climatic boundary conditions for part of the energy supplies (e.g. hot water consumption).

This in particular concerns heat consumption and costs:

- Gas consumption and costs
- Oil consumption and costs
- District heating consumption and costs
- Solid fuel consumption and costs

Invoices reaching beyond the year under review are used as basis for the year under review proportionately by days and heating degree days and converted using the following formula:

<sup>2</sup> Allocation to be chosen in acc. with the proportion of weather-independent heat consumers to total heat consumption

$$EB_0 = EB_A \cdot \left( 0,1 \cdot \frac{d'_0}{d_A} + 0,9 \cdot \frac{G'_{15,A}}{G_{15,A}} \right) + EB_B \cdot \left( 0,1 \cdot \frac{d''_0}{d_B} + 0,9 \cdot \frac{G''_{15,B}}{G_{15,B}} \right)$$

$EB_0$  : Energy supply (kilowatt hours) for the year under review

$EB_A$  : Energy supply (kilowatt hours) of accounts reaching into the preceding year

$EB_B$  : Energy supply (kilowatt hours) of accounts reaching into the subsequent year

$G_{15,A}$  : Heating degree days of accounts reaching into the preceding year

$G_{15,B}$  : Heating degree days of accounts reaching into the subsequent year

$G'_{15,A}$  : Heating degree days for the accounting days in the year under review of accounts reaching into the preceding year

$G''_{15,B}$  : Heating degree days for the accounting days in the year under review of accounts reaching into the subsequent year

In the case of monthly invoices the invoices completely falling into the year under review are to be taken into account in addition to those reaching beyond the year under review.

To calculate the heating degree days in accordance with VDI 3807, the  $G_{15}$  values of *Deutscher Wetterdienst* for the measuring station closest to the place of performance are added up over the respective accounting period.

The energy supply costs of the year under review are determined from the energy supply determined in the way described by applying the respective reference price.

### 3 Amount of Savings

#### 3.1 Principles

The Energy Saving Guarantee Contract aims at reducing the energy supply costs for the contractual objects. The electricity and heat supply costs are reduced by the following mechanisms:

- Reduction of kilowatt hour rate delivery [kWh]
  - will be 100% effective for the CN's remuneration
- Reduction of demand rate delivery [kW]
  - will be 100% effective for the CN's remuneration
- Tariff changes
  - will not be effective for the CN's remuneration

Thus, tariff changes during the contract period and the associated price risk will basically be completely to the benefit/detriment of the CL.

The calculation method ensures that the CN can achieve energy cost savings effective with regard to his remuneration under the contract only by the first two measures stated above.

#### **Exceptions**

Exceptions from these rules are set out in section 7. They concern the treatment of

- energy source conversions
- changes in the tariff structure
- changes in the tariff due to technical measures

#### 3.2 Determination of the Unadjusted Energy Supplies and Costs in the Settlement Year According to § 9.2

The unadjusted energy supplies and costs are determined in accordance with the calculations set out in section 2.

### 3.3 Weather Adjustment of the Unadjusted Energy Supplies in the Settlement Year According to § 9.3.3.

Energy supplies and supply costs which are invoiced on a lump-sum basis (as 2.1) or exclusively on a period basis (as 2.2) are as a rule not weather-adjusted.

Weather-dependent consumption (as 2.3) is weather-adjusted in accordance with the following method:

$$EB_{AJ}^* = EB_{AJ} \cdot \left( 0,1 + 0,9 \cdot \frac{G_{15,Ref}}{G_{15,AJ}} \right)$$

$EB_{AJ}^*$ : Weather-adjusted energy supply (kilowatt hours) in the settlement year

$EB_{AJ}$ : Actual energy supply (kilowatt hours) in the settlement year

$G_{15,Ref}$ : Heating degree days in the reference year (baseline year)

$G_{15,AJ}$ : Heating degree days in the settlement year

The adjustment regulation takes account of the fact that hot-water consumption is practically independent of the climatic boundary conditions. Only the energy consumed for heating, which is estimated at 90% of the total heat consumption, is linearly adjusted by the heating degree days in the periods to be compared.

### 3.4 Usage Adjustment According to § 9.3.2.

Usage adjustment of consumption and supplies of electricity and heat and the energy consumption costs is effected in accordance with the contents of the contract.

### 3.5 Determination of the Reduction of the Energy Supplies in the Settlement Year

The weather and usage adjusted energy supplies and the demand rate consumption are broken down by building and energy source and compared to the consumption and demand rate consumption in the baseline year:

$$\Delta L_{AJ} = L_{Ref} - L_{AJ}^*$$

$\Delta L_{AJ}$ : Reduction of demand rate consumption in the settlement year

$L_{Ref}$ : Actual demand rate consumption in the baseline year

$L_{AJ}^*$ : Usage-adjusted demand rate consumption in the settlement year

$$\Delta EB_{AJ} = EB_{Ref} - EB_{AJ}^*$$

$\Delta EB_{AJ}$ : Reduction of energy supply (kilowatt hours) in the settlement year

$EB_{Ref}$ : Energy supply (kilowatt hours) in the baseline year

The reduction of the energy supplies determined in this way allows determination of the reduction of CO<sub>2</sub> emissions by applying the appropriate emission factors.

### 3.6 Calculation of the Savings in the Settlement Year

Reductions of kilowatt hour or demand rate supplies realised in the settlement year are rated with the kilowatt hour or demand reference prices, after weather and usage adjustment. This procedure ensures a clear differentiation of the causes of energy cost reductions. The CN can only claim actual reductions in the amount of kilowatt hour and demand rate consumption. The reference prices and the energy supplies determined for the reference year (kilowatt hours and demand) result from Appendix 7 (Energy Consumptions and Prices) of the contract, separately for each individual meter.

The energy cost savings achieved in the settlement year are calculated using the following formula:

$$\Delta EBK_{AJ} = \Delta EB_{AJ} \cdot RP_A + \Delta L_{AJ} \cdot RP_L$$

$\Delta EBK_{AJ}$ : Reduction of energy supply costs in the settlement year

RP<sub>A</sub> : Kilowatt hour reference price

RP<sub>L</sub> : Demand reference price

## 4 Remuneration

### 4.1 Basic Remuneration

If in the settlement year the savings do not exceed the monetary value of the saving guarantee, then the CN's remuneration is calculated as shown below:

$$GVA_{AJ} = \Delta EBK_{AJ} - HE$$

GVA<sub>AJ</sub> : Basic remuneration in the settlement year in EUR

HE : Guaranteed budgetary relief of the CL in EUR

### 4.2 Remuneration for Achievements Exceeding the Obligation

If in the settlement year the savings exceed the monetary value of the saving guarantee, then the CN's remuneration for the savings exceeding the saving guarantee is calculated as shown below:

$$\ddot{U}VA_{AJ} = (\Delta EBK_{AJ} - ESG) \cdot A_{\ddot{U}}$$

$\ddot{U}VA_{AJ}$  : Remuneration for achievements exceeding the obligation in the settlement year in EUR

ESG : Saving guarantee according to § 6.2. in EUR

A <sub>$\ddot{U}$</sub>  : CN's share in the excess savings according to § 9.5.4. in %

### 4.3 Total Remuneration of the CN in the Settlement Year

The CN's remuneration in the settlement year is:

$$VA_{AJ} = GVA_{AJ} + \ddot{U}VA_{AJ}$$

VA<sub>AJ</sub> : Total remuneration in the settlement year in EUR

## 5 Peculiarities Regarding Electricity

### 5.1 Low Voltage

#### ***Conversion to Invoicing Based on Consumption Only***

When converting a meter from invoicing based on consumption and demand to invoicing based on consumption only, the kilowatt hour and demand rate costs of the baseline year are added up and the sum is referred to the invoiced kilowatt hour consumption. The resulting kilowatt hour rate is used as the reference price.

#### ***Conversion to Invoicing Based on Consumption and Demand***

When converting a meter during the baseline year from invoicing based on consumption only to invoicing based on consumption and demand, the kilowatt hour consumption invoiced for the entire year and the per-day averaged demand rate supplies from the time of conversion until the end of the baseline year are used as reference. The reference prices defined for kilowatt hour and demand consumption are applied to these supplies.

If conversion takes place during the contract period, only the kilowatt hour consumption in the settlement year is to be applied. The demand rate consumption invoiced is neglected, because it cannot be compared with the baseline year.

## 5.2 Medium Voltage

### **Kilowatt hours**

The medium-voltage kilowatt hours supplied are calculated separated by low and high tariff areas. To determine the consumption costs, the consumption invoiced for each tariff area is rated with the respective reference price. Wattless work is not taken into account.

### **Demand**

Settlement is in accordance with the procedure stated in the energy supplier's invoices. Should that procedure change during the contract period, then the demand rate supply will continue to be determined using the invoicing procedure on which the baseline is based.

## 6 Peculiarities Regarding Heat

### 6.1 Natural Gas

#### **Energy Supplies / Conversion**

To determine the heat supply in kWh or MWh, the conversion factors for m<sup>3</sup> into kWh stated in the energy supplier's invoices are used. Reference value for consumption is the calorific value H<sub>o</sub>.

#### **Very Small Consumers**

Consumption, costs (and thus invoices) of very small consumers (Bunsen burners, small kitchens) are as a rule neglected and are therefore not a subject matter of energy cost accounting. Should they have to be taken into account in the baseline for reasons of accounting (no separate invoice item) they will be included in the settlement also in the following years.

### 6.2 District Heating

#### **Connected Wattage**

To determine the baseline, the connected wattage effective at the time the invitation to tender has begun is used.<sup>3</sup>

If the connected wattage changes during the contract period, the new value will become effective with regard to settlement only from the date specified in the energy supplier's invoice. District heating costs are thus determined on a pro rata per-day basis for the respective periods.

### 6.3 Fuel Oil / Diesel Fuel

#### **Energy Supplies / Conversion**

*If tank level readings are missing for the beginning and end of the year under review, costs and work in the baseline year are estimated (example: mean of quantities supplied over several years).*

*In the case of invoicing by volume (litres or m<sup>3</sup>) a gross calorific value of 10.57 kWh/litre is used for conversion into MWh.*

#### **CHP**

*Fuel oil or diesel fuel for testing emergency power generating units are neglected in the baseline and the annual invoices, provided that consumption is negligible.*

## 7 Exceptions

### 7.1 Energy Source Conversion

*If the energy source for heating is converted, the savings are calculated as in the normal case*

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<sup>3</sup> The CN should be informed about changes in the connected wattage without delay, as this means a change in the calculation basis.

*described in section 5.1 via the weather and usage adjusted reductions rated with the reference prices.*

*In the year of conversion and the following years, the baseline reference price of the new source (according to the respective tariff incl. all discounts granted to the CL plus all energy-related taxes) will be used as reference price.*

## **7.2 Changes in the Tariff Structure**

Should due to a considerable change in the tariff structure a comparison of the energy costs between baseline year and settlement year be impossible, the calculation in accordance with the principles set out above shall be adjusted by mutual agreement among the contract partners.

Considerable change means:

- Transition to a more complex tariff structure (e.g. conversion of district heating lump-sum invoices)
- Change in the measured values (e.g. change in consumption registration: 30-minute means / 15-minute means)

## **7.3 Tariff Changes Due to Technical Measures Taken by the CN**

Tariff changes effected due to technical measures taken by the CN (e.g. peak-load management, CHP operation, cancellable gas supply contract) resulting in a reduction of the energy supply costs are desirable and will be taken account of in the CN's remuneration on the following conditions:

- Announcement stating the technical measure and the intended change in tariff
- Provision of calculational proof
- Tariff change after implementation of the measure
- Consideration of the tariff change in the calculation of the savings by means of an appropriate calculation procedure<sup>4</sup>

If prior to the start of the measure the CL has not received such announcement and calculational proof, the savings achieved through the change in tariff will not be taken into account as energy cost savings in the settlement.

## **7.4 Reference Periods Not Identical With the Baseline Year**

If in justified cases a deviation should be made from the intended period (1 January 20?? – 31 December 20??) for the determination of the baseline (e.g. medium-voltage accounting with demand rate consumption adjustment in the 10th month of the year), then the deviating period must be clearly identified. The settlements during the contract period are likewise to be drawn up for the different period.

If for individual meters a deviation is made from the baseline period, because energy supplier's invoices are not available, this must be clearly identified. However, the settlements during the contract period must still be drawn up for full calendar years.

- End of calculation instructions -

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<sup>4</sup> An appropriate calculation procedure shall be agreed beforehand by the contract partners.