

# OPEX REVIEW TECHNIQUES IN TÜRKİYE

AHMET DOĞAN  
EMRA



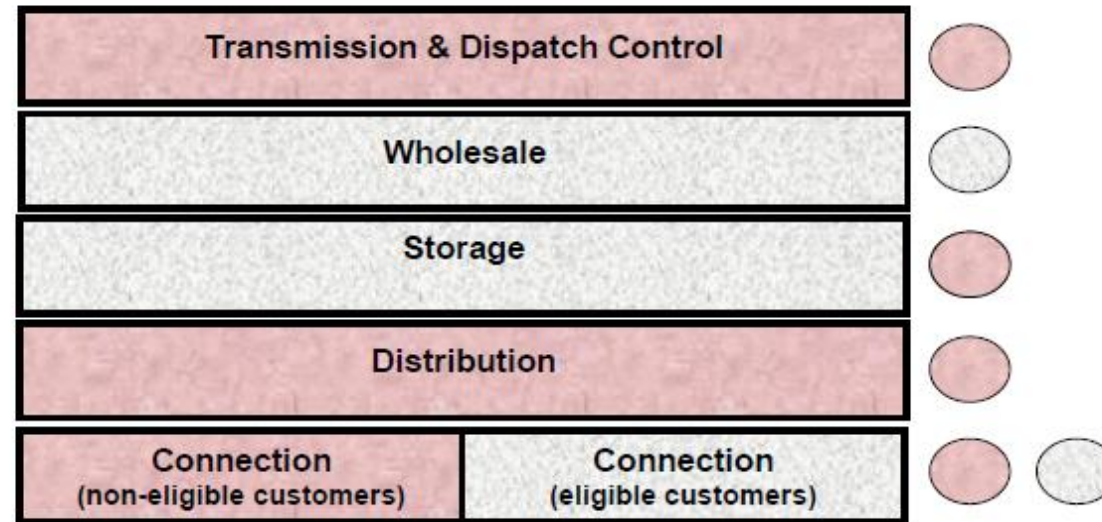
# OUTLINE

- i. Tariff Regulations in Turkish Gas Market**
- ii. Revenue Requirement Components**
- iii. OPEX Analysis**
  - ✓ Base Opex Calculations**
  - ✓ Defining of Physical Variables**
  - ✓ Clustering**
  - ✓ Benchmark Calculations**
- iv. Efficiency Analysis**
- v. Other Opex Components**

# Tariff Regulations in Turkish Gas Market

## Regulated/Unregulated Prices

- Tariffs are determined according to **article 11 of Natural Gas Market Law No: 4646** by EMRA.



**Regulated tariffs**



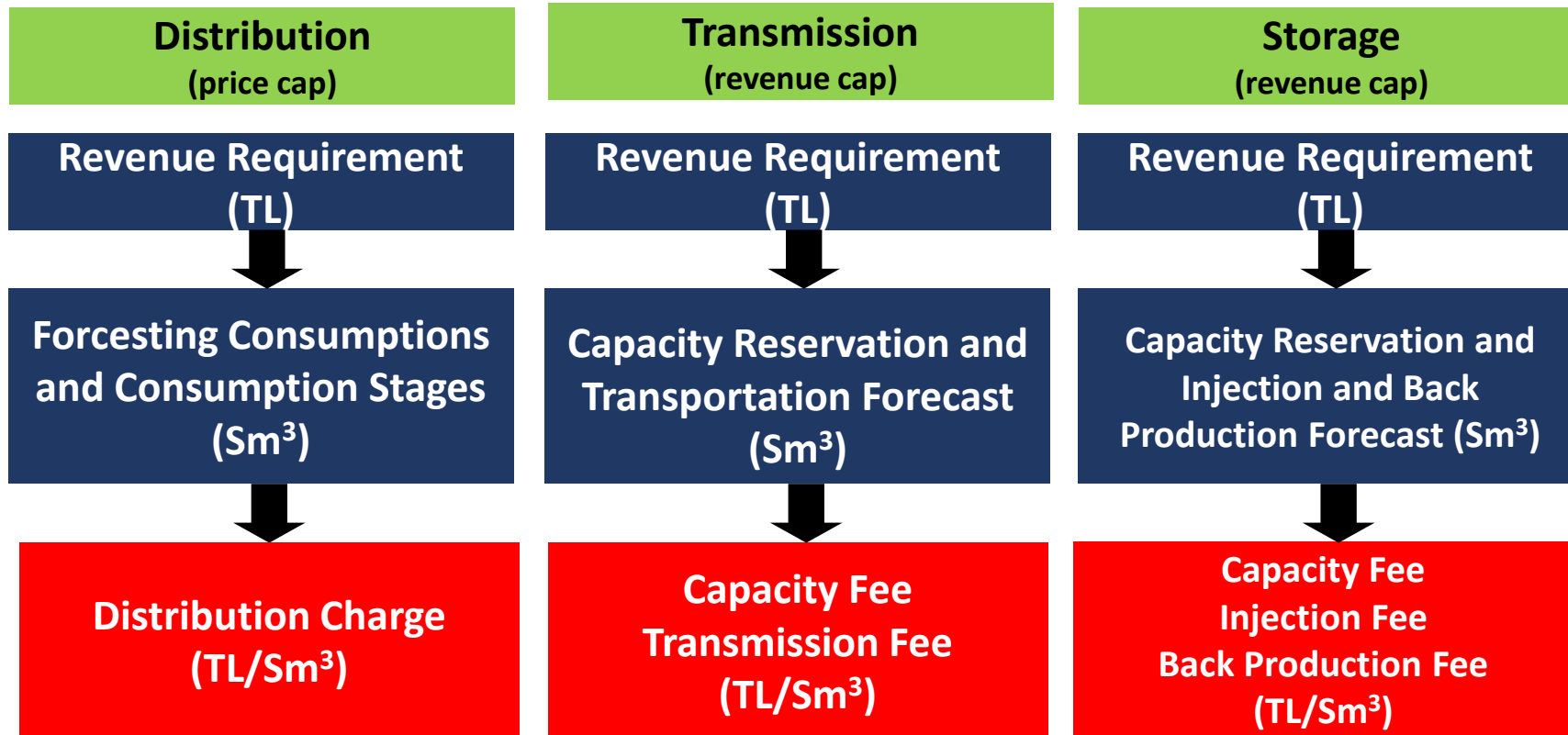
**Price is determined by the parties**

*(wholesale and storage tariffs are regulated temporarily - provisional article of law)*

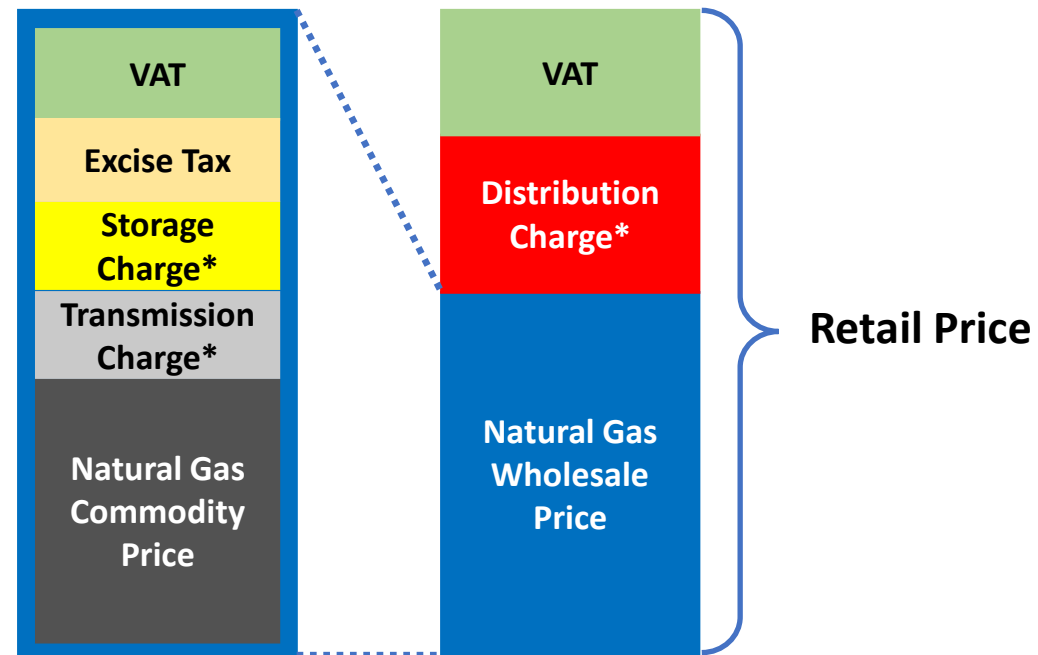
*wholesale -> competition ✓*

*storage -> enough capacity*

# Tariff Setting Process in Turkish Gas Market



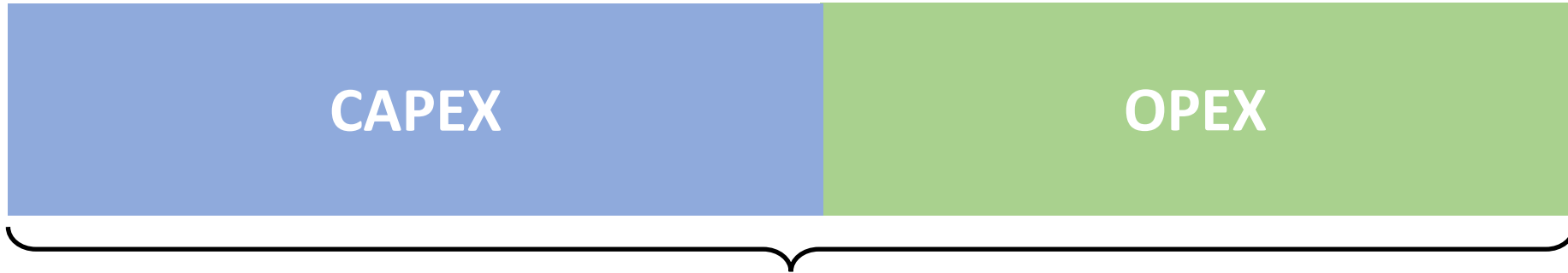
# Regulated Tariffs in Natural Gas Market



\* Subject to price regulation

# Distribution Tariffs

## Revenue Requirement Components (1)



Revenue Requirement (TL)



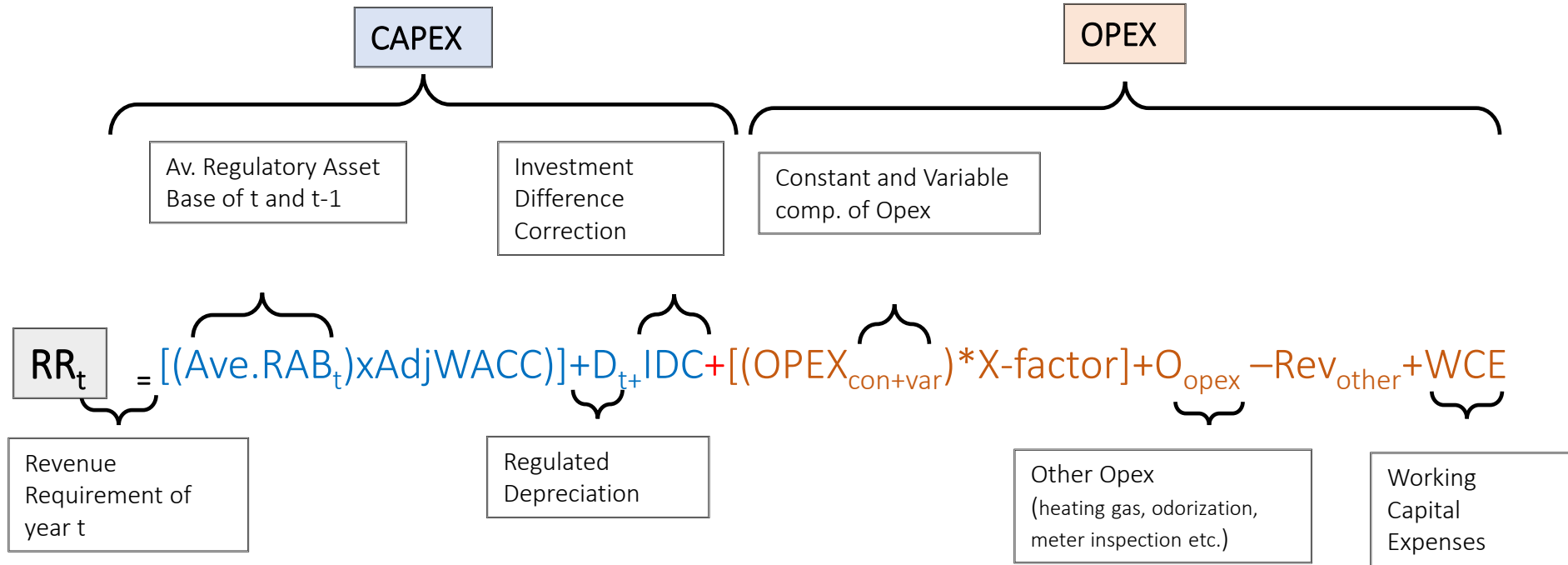
Consumption Forecast (Sm<sup>3</sup>)



Distribution Charges (TL/SM<sup>3</sup>)

# Distribution Tariffs

## Revenue Requirement Components (2)



## ❖ General Principles:

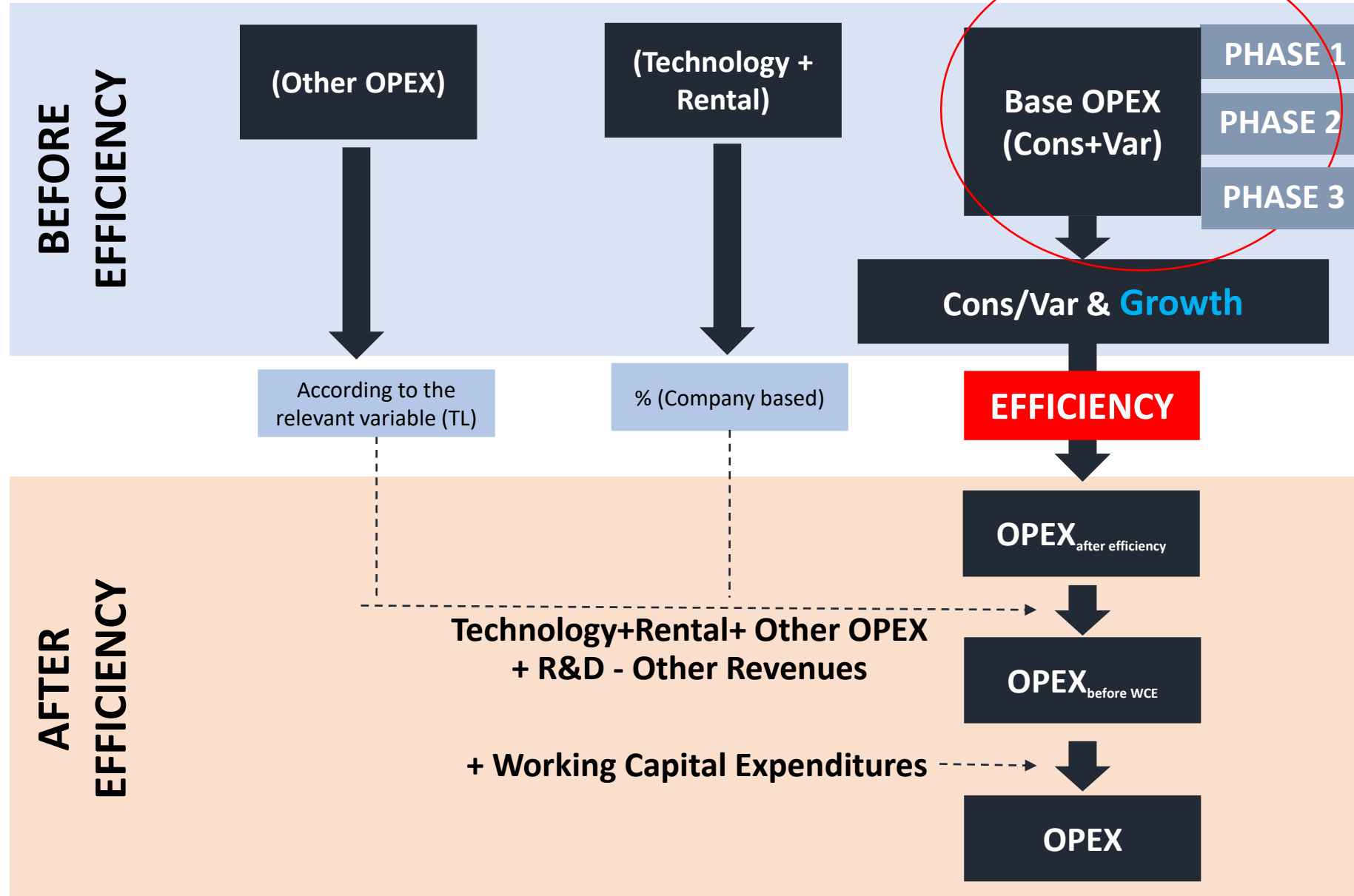
- Obligatory expenditures for the DSO to carry out its distribution activities.
- In calculation;
  - i. data from previous years,
  - ii. data belonging to other domestic and/or foreign companies engaged in the same activity,
  - iii. econometric models,
  - iv. reference company modelingcan be used.
- Normalization can be used in calculations.
  - i. Removing unreasonable increases in cost items compared to previous years,
  - ii. Removal of incidental items that have occurred before but will not occur in the future,
  - iii. Addition of expenses that have not occurred in previous years but are likely to occur in the future.



# OPEX

- Efficiency analysis is done.
- Clustering analysis may be used.
  
- Items that are not considered as operating expenses in the tariff calculations:
  - Depreciation expenses,
  - Financial expenses related to the deposits,
  - Expenses in the nature of financial expenses,
  - VAT, Corporate Tax, Banking and Insurance Transactions Tax,
  - Tax penalties, expenses that are not legally accepted, and court, enforcement, arbitration, mediation and attorneyship expenses.

# OPEX Analysis – Main Structure – Base OPEX

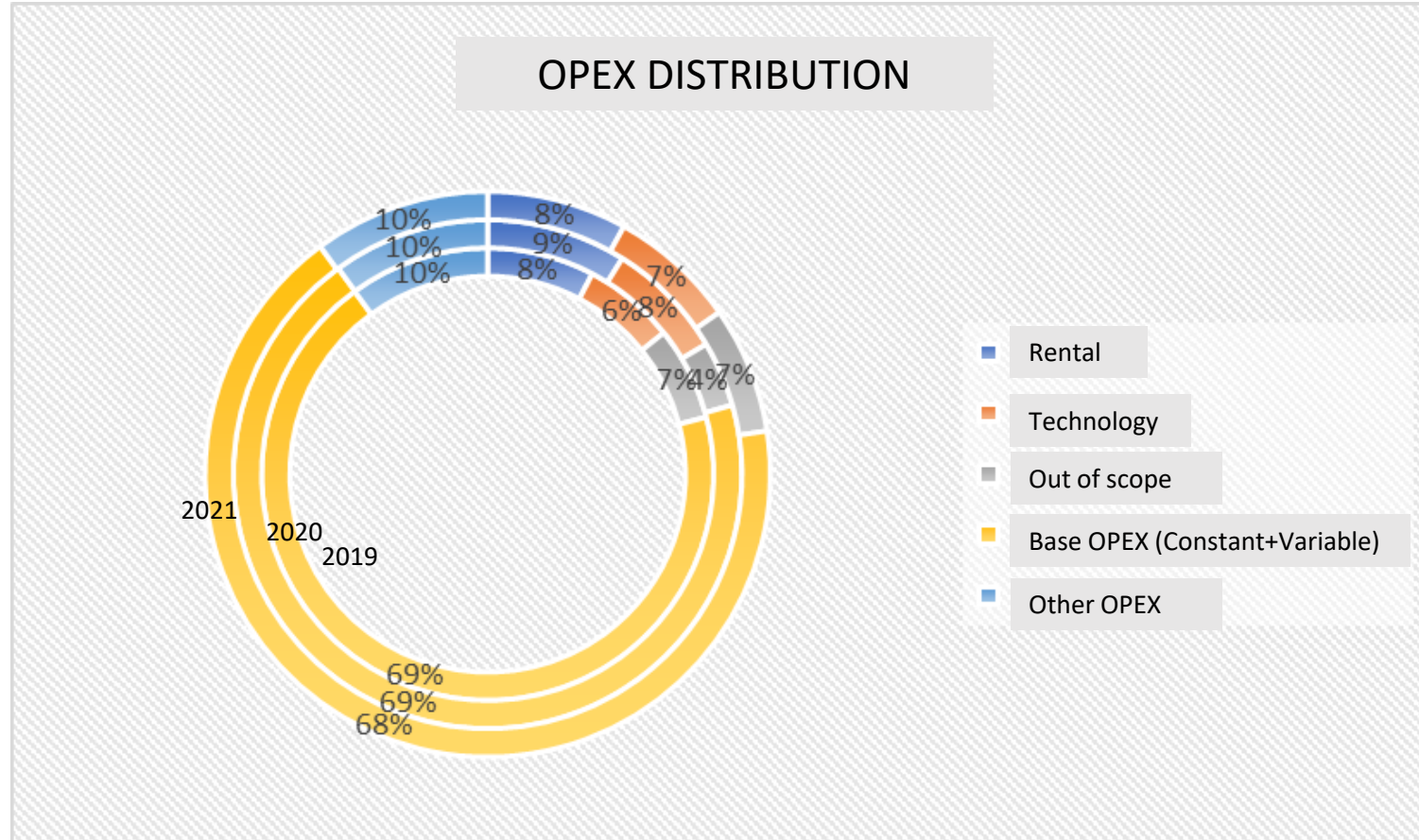


# OPEX Analysis – PHASE 1

- (1) Defining of analysis period (last 3 years: 2019, 2020, 2021)
- (2) Elimination of unreasonable increases in cost items compared to previous years
- (3) Removal of incidental cost items and those that have occurred before but will not occur in the future.
- (4) Cost classification

After the classification, all expense/cost items to be considered in the calculations are updated with the inflation rate, and the **BASE OPEX** value after PHASE-1 is obtained.

# OPEX Analysis – Cost Classification



# OPEX Analysis – Phase 2

## Conversion of Base OPEX to Benchmark Units

Base operating expenses are compared on cluster, benchmark unit and year basis.

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Personnel/General Management/Others: Personnel expenses, general administrative expenses, etc.

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Network Maintenance: Pipeline maintenance and first material expenses.

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### Base OPEX

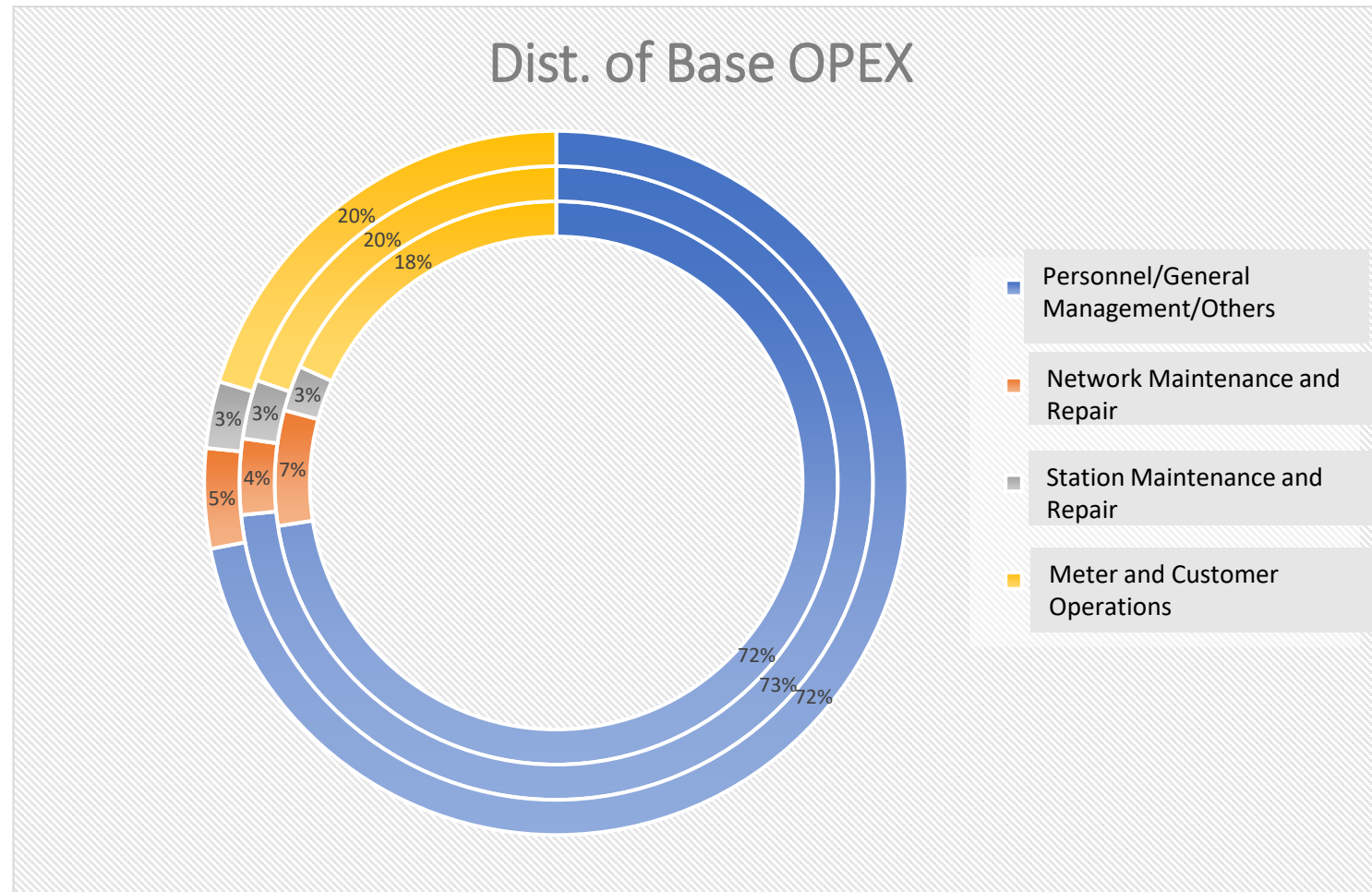
Station Maintenance: Station maintenance and repair expenses.

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Meter and Customer Operations: Meter maintenance and repair expenses, meter reading and billing expenses, meter opening and closing expenses, call center expenses, etc.

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# OPEX Analysis – Dist. of Base OPEX



## Physical Variables Affecting Base Opex

- Physical Variables affecting the base Opex need to be identified.
- Many physical variables such as length of pipeline, number of consumers, HDD, amount of consumption etc., which are thought to affect the base Opex, were included in the panel data analysis.
- As a result of panel data analysis that we made, physical variables and ratios affecting the base opex were obtained as follows (variables that were not significant as a results of the analysis were not taken into account):

Physical Variables and Ratios	<ul style="list-style-type: none"><li>• Length of Pipeline (%34,12)</li><li>• Number of Customer (%62,45)</li><li>• Number of Station (%1,74)</li><li>• Number of Districts (%1,69)</li></ul>
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## Clustering Analysis

### Selection of Method

- Clustering aims to classify observation values that are similar to each other and **k- means algorithm** is used.
- In the application of the k-means method, all observations are placed in the determined number of clusters in such a way that the within-group squares are minimum.

### Selection of Variable

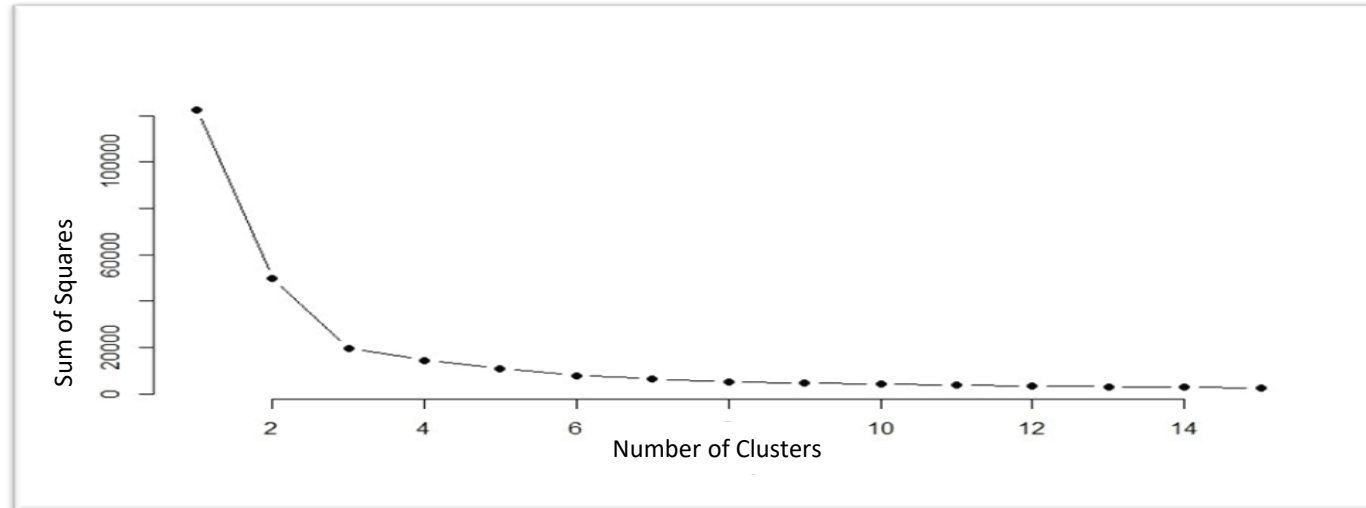
- In the analysis, the number of customers, the length of the pipeline, the number of existing stations and the number of districts were used. These variables were determined after the econometric analysis applied to the base opex.



## Clustering Analysis

### Selection of Number of Clusters

- Intracluster sum of squares is expected to become more stable after a significant decrease.
- As it seen in the graph below, the sum of squares does not change much after the number of clusters exceeds 4.



- As a result of the analysis, the number of clusters was determined as 4.

Cluster-1 (large scale DSOs): 12 DSOs

Cluster-2: 27 DSOs

Cluster-3: 14 DSOs

Cluster-4 (small scale DSOs): 15 DSOs

## Benchmark Calculations

Reference unit values (RUV) are obtained on a cluster basis by dividing the BUs into the relevant PVs.



DSO values and RUVs are compared.



Values above and below the RUV are approximated by 20%.



The values obtained on the basis of BU are summed to obtain the post benchmark OPEX for each DSO.

## Adjustment Procedure

- BU values for 2019 and 2020 are adjusted according to the change in physical variables at the end of 2021.

## Additional Operating Expenses Forecast for Expenses Not Occurred in the Past But Possible to Occur in the Future Period

- 5% of OPEX is added for unforeseen expenses to all DSOs.
- The basis value for the calculations of the operating expenses to which the Efficiency Parameter will be applied:

- **Adjusted OPEX \* (1 + %5)**

## Opex growth based on physical variable predictions

- 50% of opex is considered variable.
- The variable part of Opex is augmented using the change in Length of Pipeline, Number of Customers, Number of Stations, Number of Districts and the weight ratios of these variables.
- **Forecast-realization differences in the variables based on augmentation are subject to adjustment.**

# OPEX Analysis – Efficiency

- ❑ Efficiency parameters (X) are calculated by using the OPEX values brought to the beginning of 2022.
- ❑ The efficiency parameter is based on the calculation of the multipliers that provide a gradual decrease in OPEX on a yearly basis.
- ❑ Efficiency analysis was done with DEA technique.

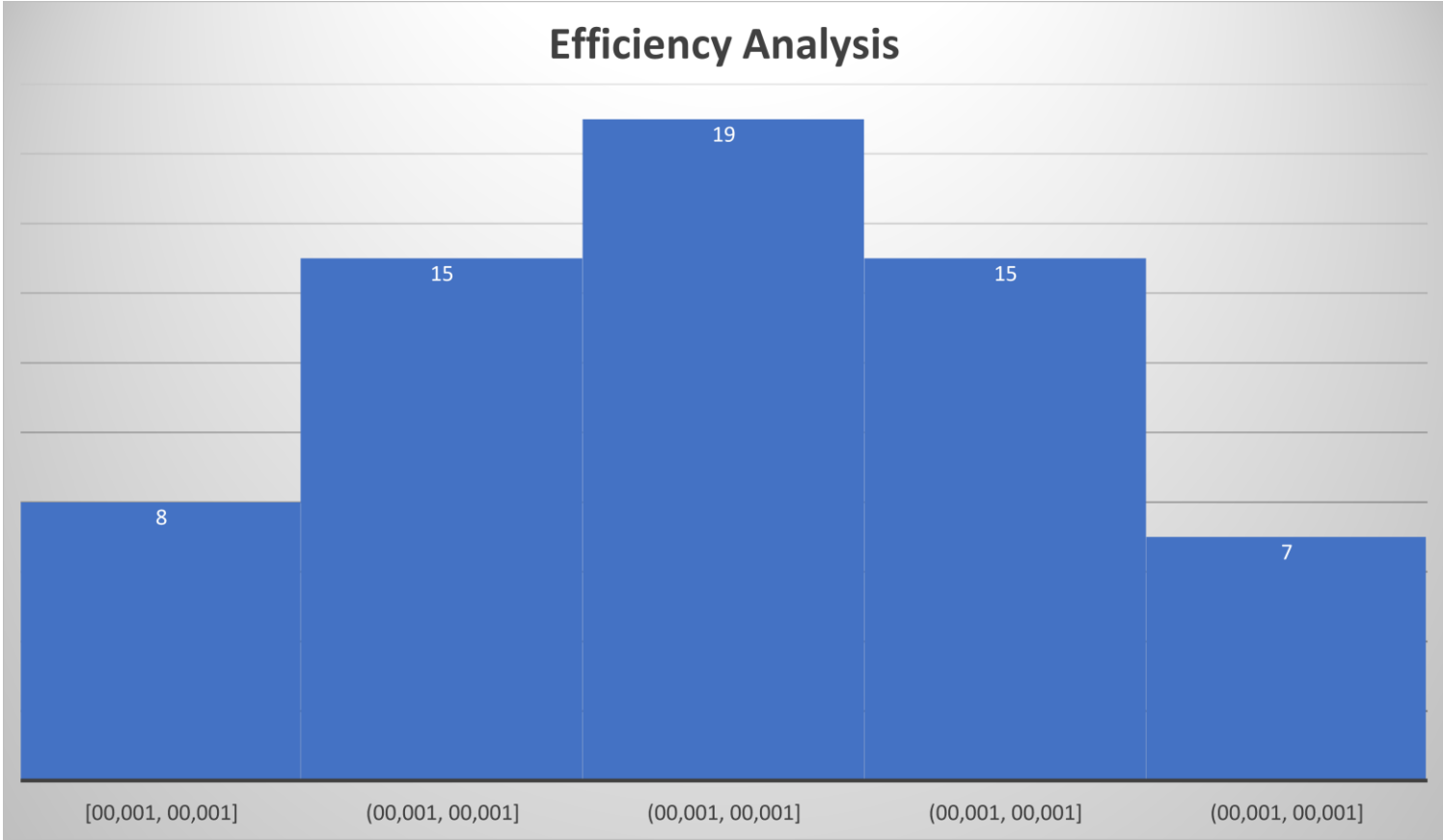
## ❑ Variables:

➤ **Input:** OPEX

➤ **Outputs:**

- ✓ **Length of Pipeline**
  - ✓ **Number of Customer**
  - ✓ **Number of Station**
  - ✓ **Number of Districts**
- 
- ❑ The programs DEAP and GAMS are used in the efficiency analysis. Weights are taken into account in GAMS.
  - ❑ As a result  $(\text{GAMS} + \text{DEAP})/2$  has been taken into account.

# OPEX Analysis – Efficiency



# OPEX Analysis – Calculations After Efficiency

OPEX<sub>VS</sub>



Effect of District Expansion



(OPEX<sub>other</sub>)

(Technology and Rental)

(R&D)

according to the relevant variable (TL)

% (DSO based)

% 1 (on demand)

Other Revenues



OPEX<sub>before WCE</sub>



WCE

OPEX



## Other OPEX

- Periodic inspection and meter calibration expenses,
- Heating gas expenses,
- Other taxes, duties and fees excluding VAT and Corporate tax,
- Annual license and participation fees accrued within the scope of the legislation,
- Odorization,
- Insurance.



## Technology and Rental

As a result of cluster-based analysis of companies' technology (software, hardware, etc.) and rental (vehicle, building) expenses, the ratio found specific to the relevant company is applied to the opex after efficiency and a prediction is made for these items.

## Other Revenues

Other revenues of DSO's are taken into account in tariff calculations. Some of these revenues are listed below:

- Indoor installation control revenues,
- Meter opening-closing revenues,
- Calibration revenues,
- Rental income (50%),
- Damage revenues,
- Irregular gas usage revenues,
- Insurance compensation income,
- Connection line control revenues,
- Advertising revenues (50%),
- Income generated within the scope of R&D (50%),
- Training service revenues within the scope of distribution activity (50%)  
etc.

# OPEX Analysis – Quality Factor

Under the name of corporate performance incentives, the incentives are provided to companies according to the following situations:

- i. Opening to the stock market,
- ii. Performing various services with its own payroll personnel.

For each condition, 1% of Opex is given as incentive.

## Quality Factor:

There is a formula for the application of the quality factor in the tariff methodology, but the process of determining KPIs continues. Afterwards, the quality factor will be actively used in the tariffs.



**THANK YOU  
FOR YOUR ATTENTION!**

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