



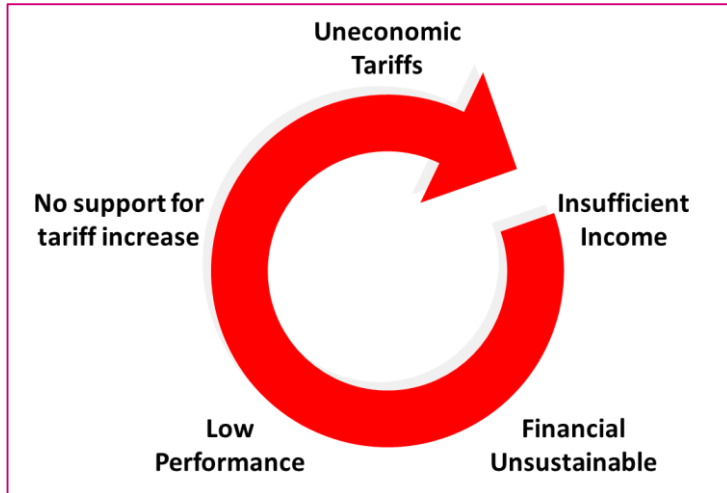
### 3.1. Price regulation in heating sector – principles, methods, responsibilities

Dr. Ilka Lewington, Dr. Oleksandr Rogozin

Modern heating sector - international trends and challenges for the Republic of Kazakhstan. Webinar Course in connection with the preparation of the “Law on Heating”

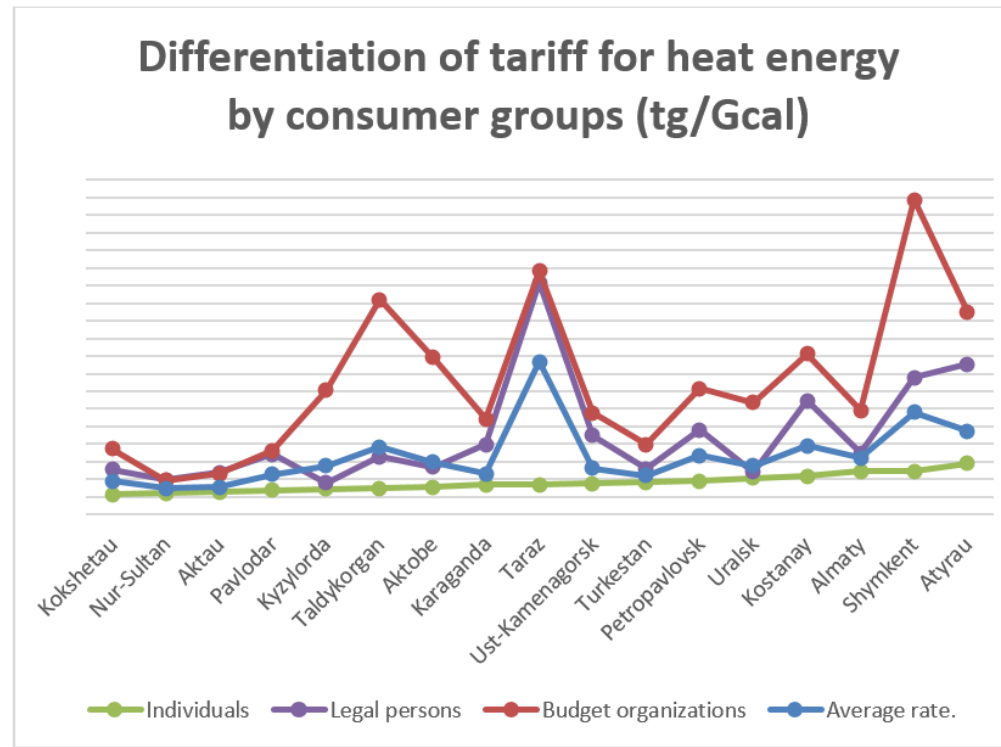
# The tariff problem – what is the task

«Tariff trap» low tariffs, low efficiency, low reliability



## Imbalances, cross subsidies

Differentiation of tariff for heat energy by consumer groups (tg/Gcal)

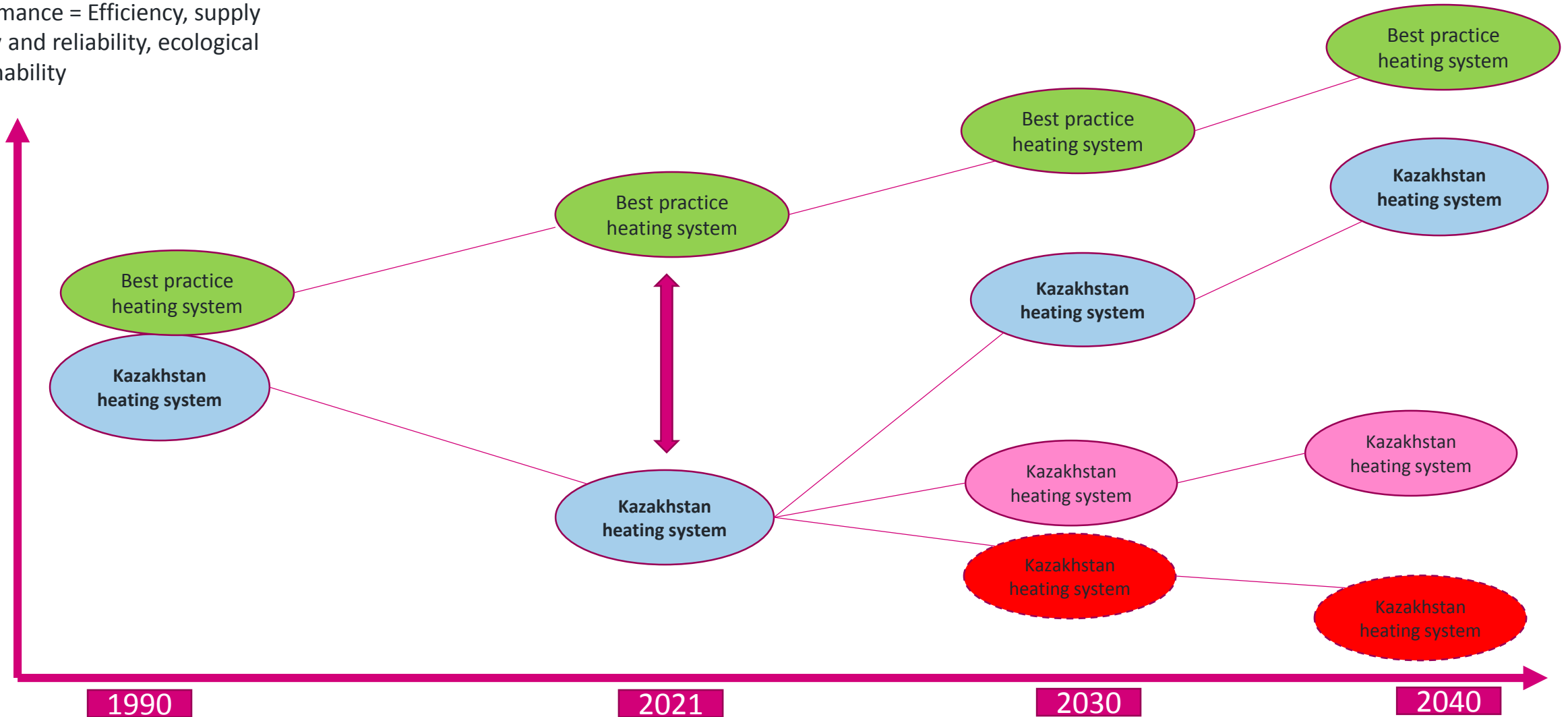


Prices for household customers are held low through cross subsidisation by other customers, particularly the budget sphere.

Country	Tariff in national currency	Tariff in EURO/ kcal (Euro/Gjoule)
Kazakhstan	3482,39 tg	7,0 (1,7)
Belarus	24,75 bel. Roubles	8,3 (2)
Kyrgystan	1270.93 com	12,8 (3)
Russia	2442,0 Roubles	28 (6,7)

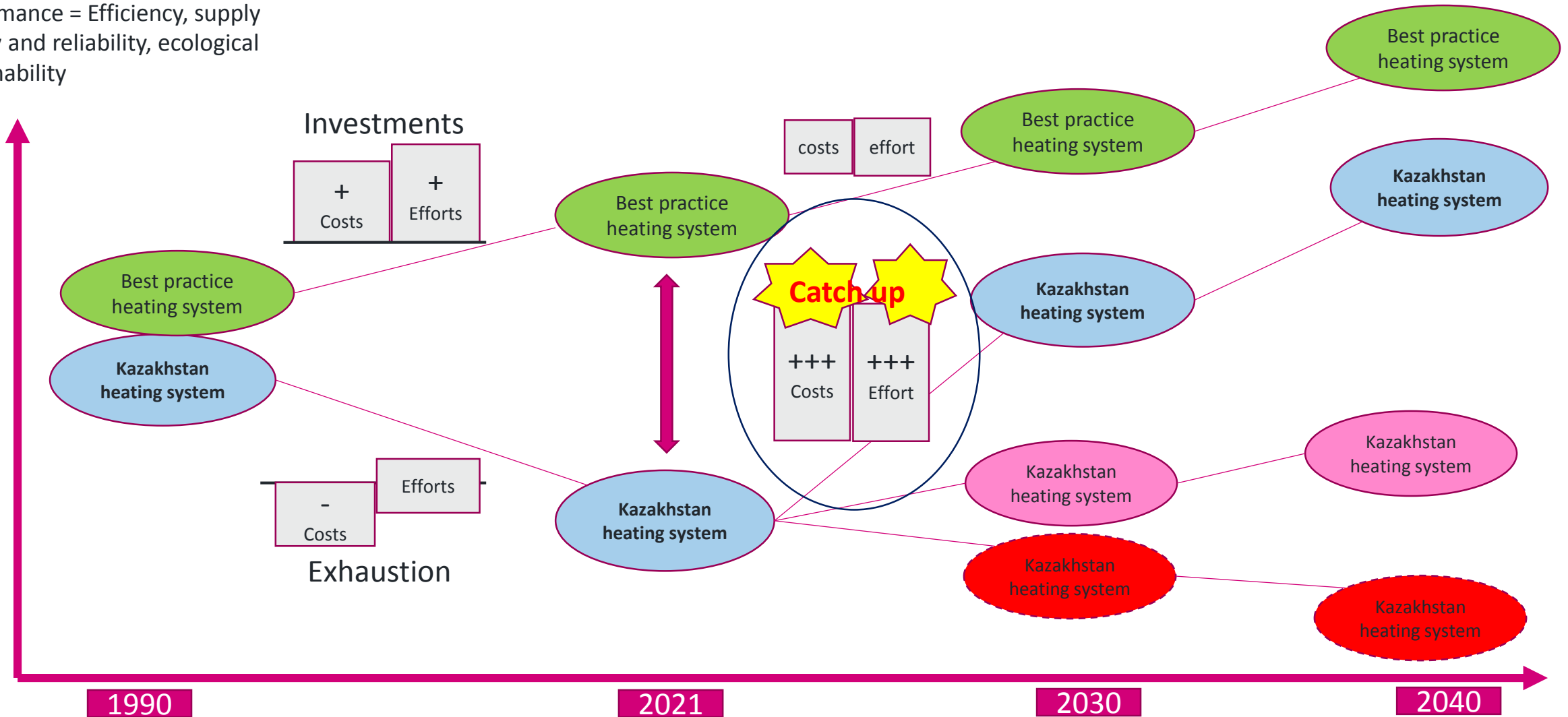
# The tariff problem – the Task for the future

Performance = Efficiency, supply quality and reliability, ecological sustainability



# The tariff problem – the Task for the future

Performance = Efficiency, supply quality and reliability, ecological sustainability



## The regulatory framework for prices in the heating sector needs to be renewed

- What? Which tariffs need to be regulated
- How? What methods should be used
- Who? What regulatory body should regulate the prices



Cost recovery,  
including  
investments



Incentives for  
efficiency



Efficient price  
structure



Transparency



Social  
fairness

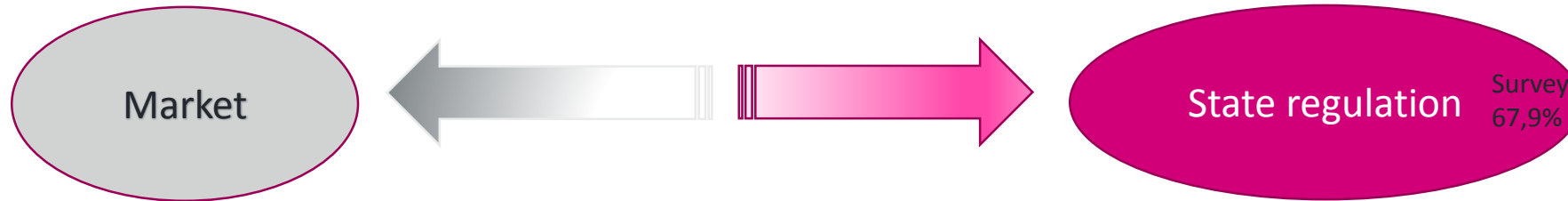


Simplicity



Legitimacy  
Predictability

# Which prices should be regulated (1)



## Specifics of the heating sector

- Technological complexity – requires professional, safe, reliable operation and interaction between entities and actors along the value chain of heat generation, transport and consumption
- Limited range for economically viable transport of heat generated
- Capital intensive sector, long-term lock-in following investment decisions
- Substantial influence of local factors – climate, levels and ground characteristics of local area
- Close connection with the construction/building sector
- Variety of acceptable organisational approaches and business structures
- Social importance
- Impact on the environment

**However, according to regulatory theory, only the existence of natural monopoly or dominant position would unambiguously mandate state regulation of tariffs**

**In many countries heat prices are not regulated, even in the centralised district heating systems**



# Which prices should be regulated (2)

District heating systems with public networks – local natural monopoly



Houses, commercial and budget customers connected to DH

Segment of individual heating



Segment of local centralised heating



# Which prices should be regulated (3)

All prices in the public access central heating are regulated

Under certain conditions, prices in the local centralised systems are also regulated

## District heating systems with public networks – local natural monopoly

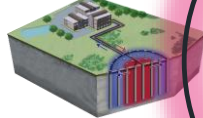
CHP



Large Heat pumps



Heat storage



DH HOB



Biomass Plant



Houses, commercial and budget customers connected to DH

Segment of individual heating

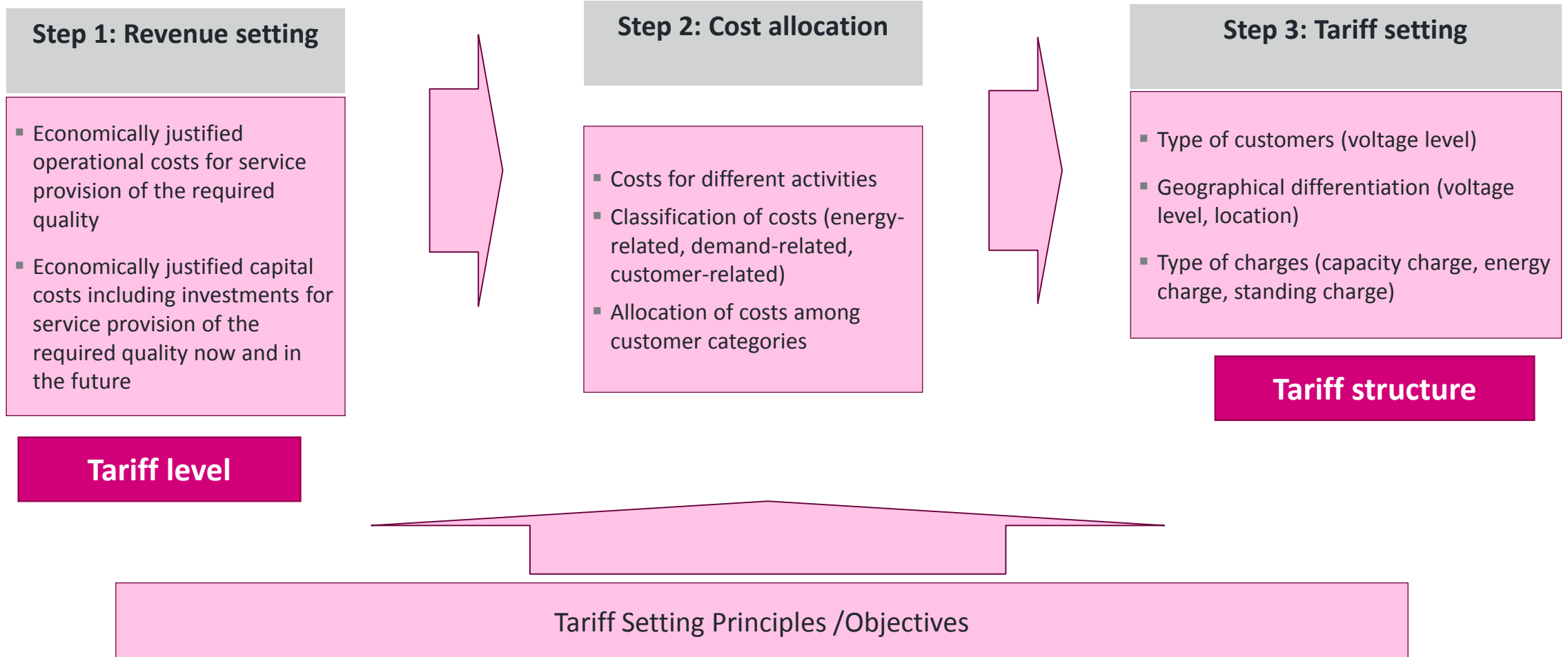


Segment of local centralised heating



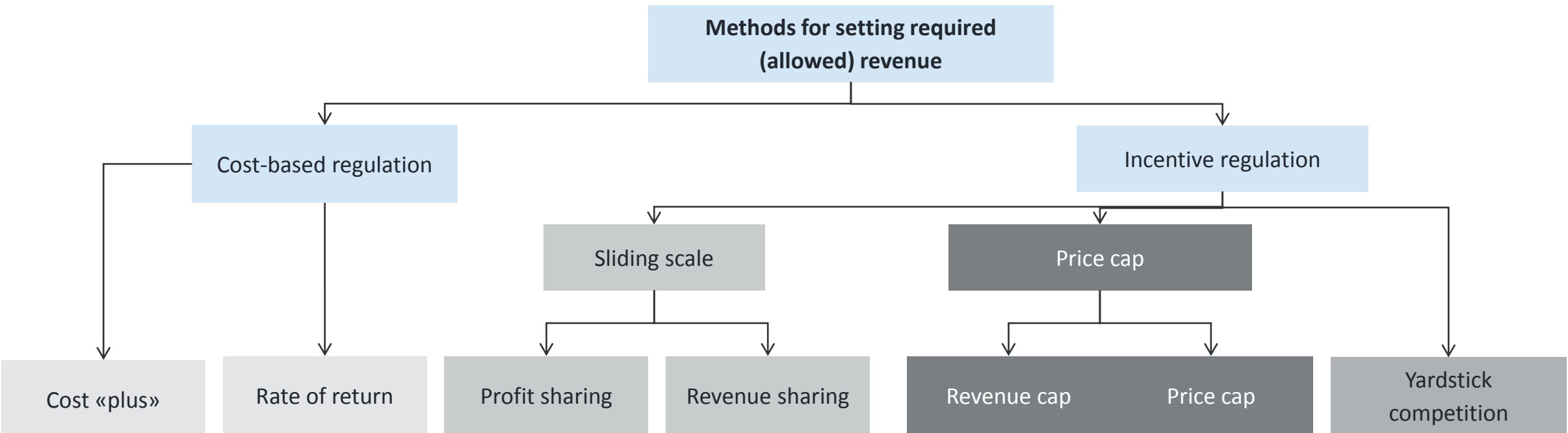


# How should the prices be regulated (1)



# How should the prices be regulated (2)

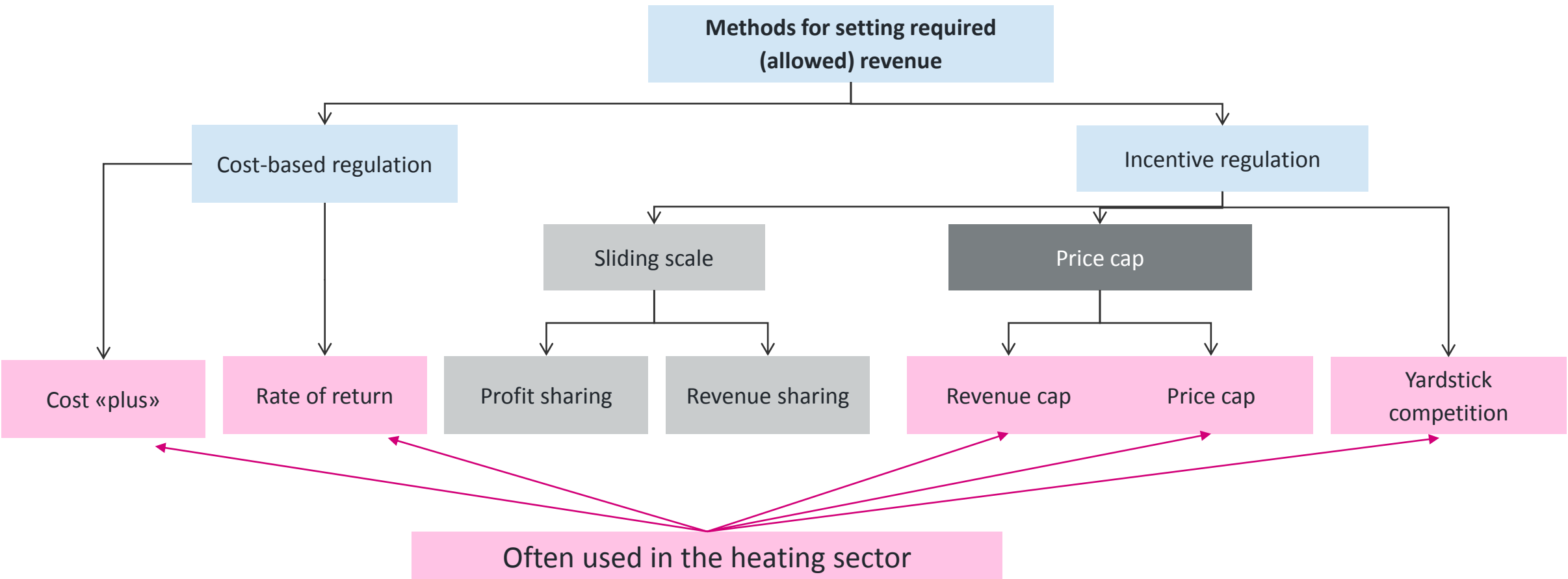
Step 1 –Revenue setting – required revenue for the entity or the activity. Main methods –»Regulatory Regime«



- In practice, the difference between these regimes is not strict. Depending on the detailed characteristics, only the name may differ.
- Hybrid forms are often used in practice (combinations of regimes)
- Nearly all methods require detailed calculation of costs and tariff levels

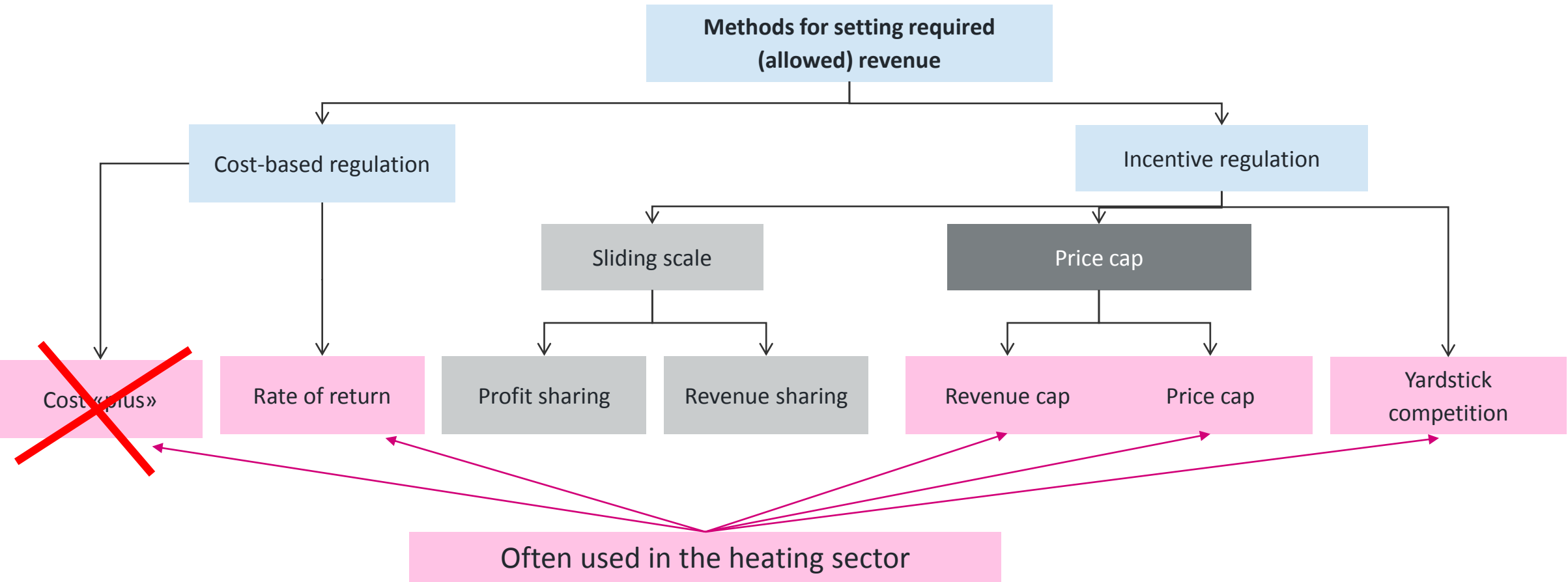
# How should the prices be regulated (3)

Step 1 –Revenue setting – required revenue for the entity or the activity. Main methods –»Regulatory Regime«



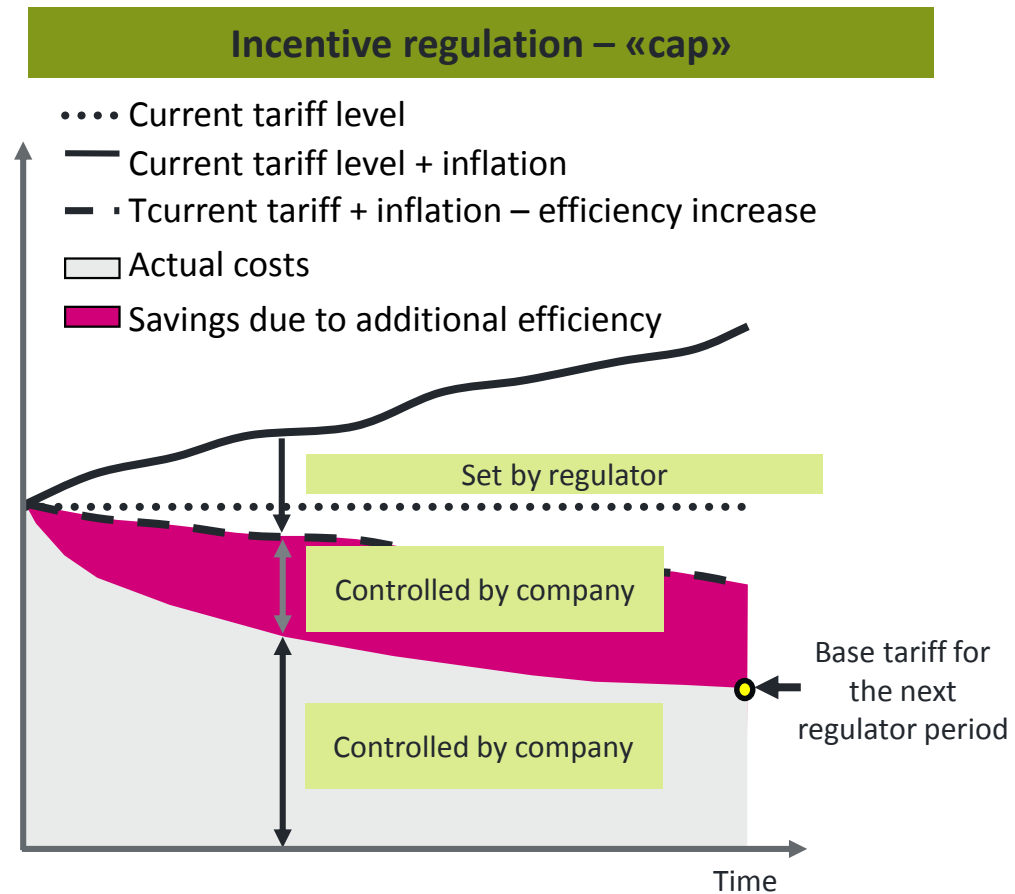
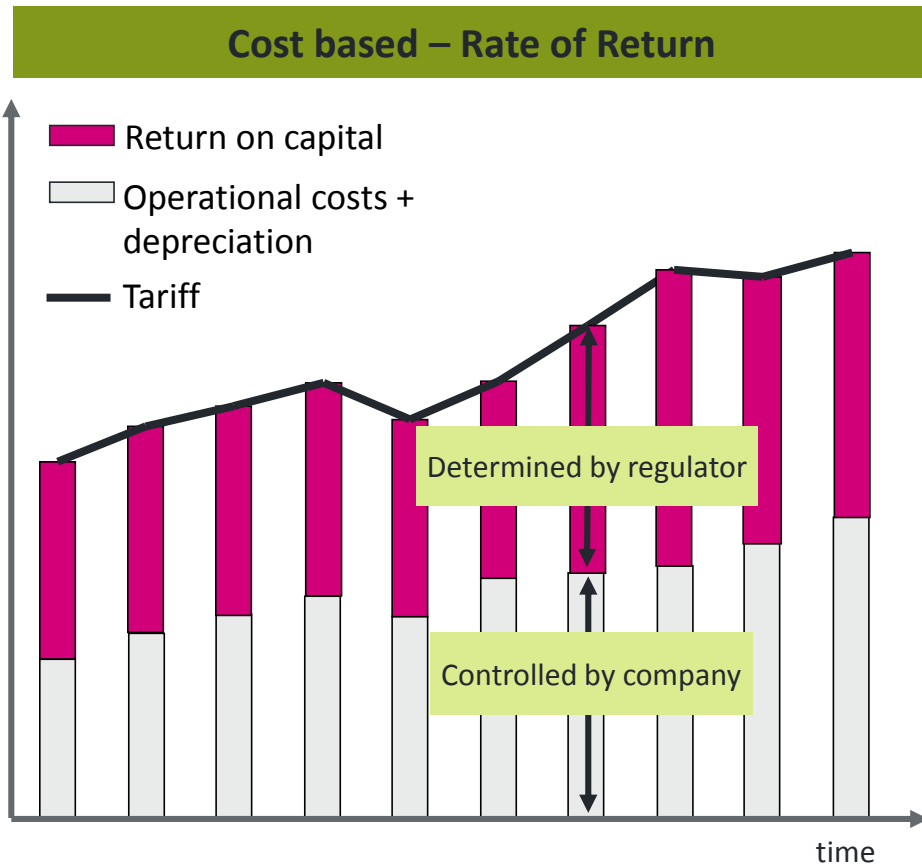
# How should the prices be regulated (4)

Step 1 –Revenue setting – required revenue for the entity or the activity. Main methods –»Regulatory Regime«



# How should the prices be regulated (5)

Step 1 –Revenue setting – required revenue for the entity or the activity. Main methods –»Regulatory Regime«





# How should the prices be regulated (6)

## Step 1: Characteristics of Rate of Return regulation

- Tariffs/Allowed revenue set based on operation costs and «fair» return on invested capital.
- Main aims: cost recovery / recovery of all economically justified costs and low investment risk
- Frequent regulatory reviews (to prevent discrepancy between actual costs and allowed revenues)
- Short regulatory periods, for example 1 year
- This is the traditional regulatory regime and it is widely used
  - At the initial stages, when economic regulation is first introduced,
  - At the beginning of complex sector reforms,
  - When it is necessary to establish a base line of data,
  - When it is necessary to restore quality and reliability of supply,
  - When it is necessary to incentivise investments

## Step 1: Features of incentive regulation

- Determines an upper limit for tariffs or revenues, for separate tariffs/services or for a basket or average tariff
- Main aim: to limit the tariffs, not the profit.
- It **ONLY** works if regulated companies are allowed to keep the profit they might earn from „overfulfilling“ the expected efficiency targets
- Works with longer regulatory periods (pre-determined regulatory periods of 3-5 years are common)
- Requires that companies make additional efficiency gains compared to the presumed tariff formula (X- factor)
- Tariffs and revenues stop being cost-tracking
- The incentives for efficiency increases might cause cost cutting measures which endanger quality of supply – consequently quality and reliability need to be explicitly regulated
- Increased investment risks
- Is mainly used once the regulator has a sure basis of data, allowing the prediction of possible efficiency gains

# How should the prices be regulated (8)

## Step 1: Features of Yardstick competition as regulatory regime

- Prices and revenues are determined on the basis of costs of a group of similar companies
- Companies cannot increase tariffs beyond average costs of the group of similar companies
- Sometimes yardstick competition is based on sector average efficiency improvement predictions
- It is used rarely, only in conjunction with other regulatory regimes

# How should the prices be regulated (9)

## Step 1: Illustrative regulatory formulas of the common regulatory regimes

### Rate of return

$$R_t = C_t + D_t + T_t + RAB_t * r_t$$

Allowed revenue in year t = OPEX in year t + Depreciation in year t + Taxes in year t + Regulatory Asset Base in year t \* Allowed rate of return in year t

### Price cap

$$P_t = (1 + RPI - X) * P_{t-1}$$

Price in year t = (1 + Retail Price Index - Increase of efficiency) \* Price in previous year

### Yardstick competition

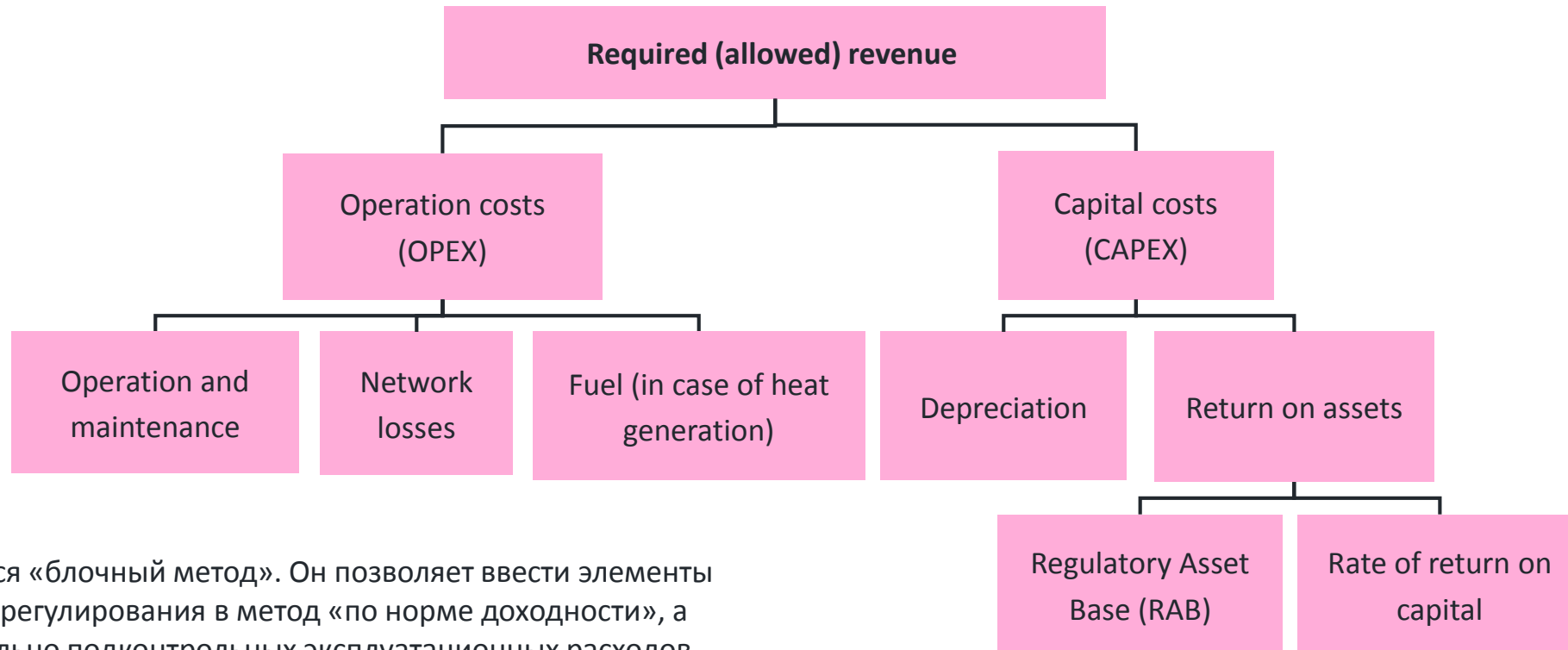
$$AC_i = \sum_{j \neq i} (AC_j) / (n-1)$$

Average costs of the company j = Sum of average costs of all other companies / Number of companies in the group - 1

# How should the prices be regulated (10)

## Step 1: Rate of return regulation – Required (allowed) revenues

**Required revenues = OPEX + Depreciation + (RAB x rate of return)**



Часто используется «блочный метод». Он позволяет ввести элементы стимулирующего регулирования в метод «по норме доходности», а именно относительно подконтрольных эксплуатационных расходов



## Step 1: Rate of return regulation – Return on assets

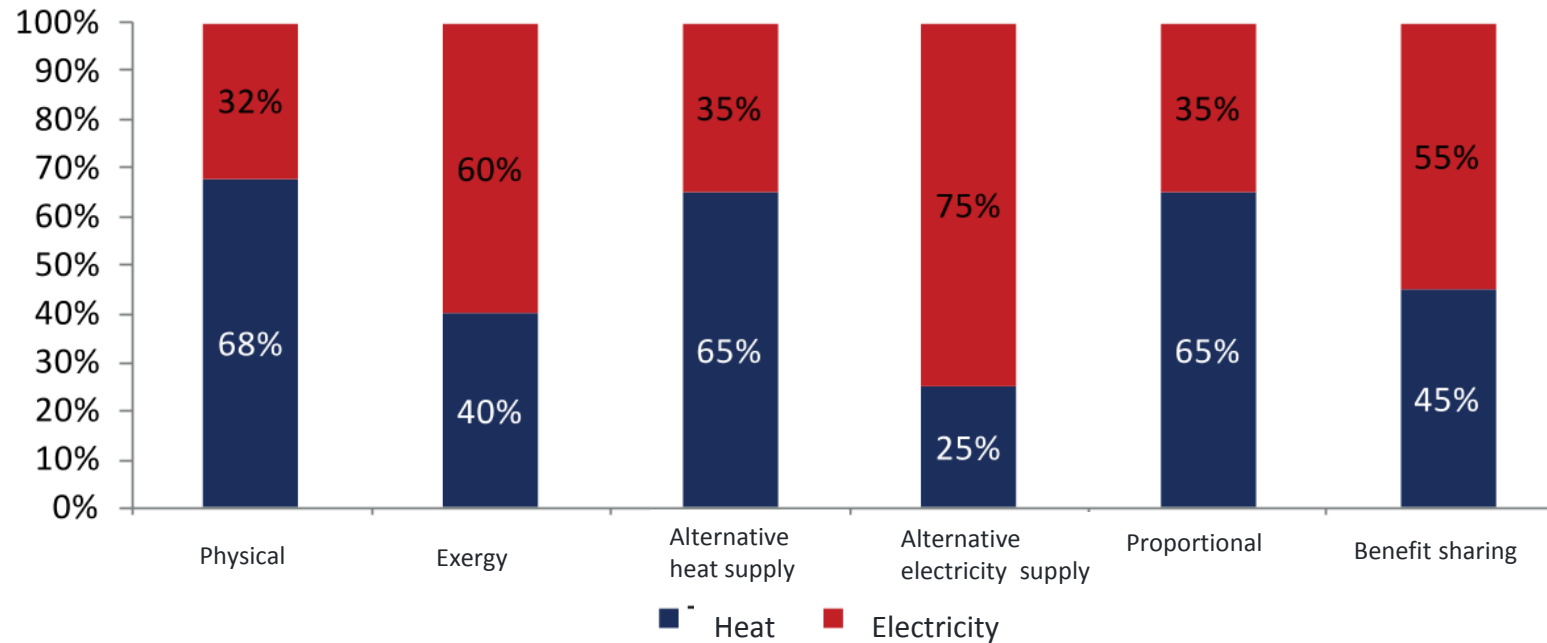
- **Regulatory Asset Base (RAB)** is the value of assets used and useful for the provision of the regulated service
- Regulators usually employ the following principles regarding RAB:
  - The RAB should cover only those assets involved in the provision of regulated services
  - RAB is based on the residual (amortized) cost of capital assets
  - The RAB may include a permitted level of net working capital
  - The RAB should not include capital contributions (external financing, subsidies) to fixed assets from consumers, the state or third parties
- The rate of return is the return that the regulated company is allowed to earn (also known as the opportunity cost of investment capital)
- Based on the weighted average cost of debt and equity (WACC)
- There are several methods for calculating the rate of return
- The most common model used by regulators for the practical calculation of the rate of return is the Capital Asset Pricing Model (CAPM)
- CAPM takes into account the need to compensate the investor for the time value of money, which is represented by the risk-free rate, as well as the premium for taking on additional risk.

## Step 1: Special case – Required (allowed) revenue for heat producers in cogeneration mode

- The main principle is that the total income for the installation must meet the criteria for good tariff regulation.
- This means that income from the sale of electricity must be taken into account when determining the necessary income from the sale of heat - and vice versa.
- At the same time, it is important that the socially beneficial effect of joint production be
  - On the one hand, implemented in favor of consumers of electricity, heat, or both products
  - On the other hand, turned into an incentive for highly efficient cogeneration
- Different situations depending on whether or not electricity tariffs are regulated or competition is in place
- Regulatory influence can be exercised through the choice of cost sharing method
- However, the choice of method depends on the situation on the electricity and heat market - and it is different for different cogeneration plants.
- In European countries with free electricity prices, it is possible to receive surcharges for the price of electricity produced by high-efficiency cogeneration, under the Feed-in-Premium type. This approach was also proposed for the Republic of Kazakhstan. But for this you need to determine the source of funding. In addition, then changes in the rules of the electricity market are required.

# How should the prices be regulated (13)

## Step 1: Special case - Required (allowed) revenue for heat producers in cogeneration mode



In the West, the approach is often like this:

1. The “permissible” price of heat from a centralized system based on alternative individual heating is determined
2. A regulated - according to good principles - fair price for heat transportation is determined
3. 1. minus 2. = "permissible" price of heat from a combined source.
4. The rest is the price of electricity
5. It is checked whether it is enough to sell electricity in a competitive market.
6. In case of shortage - the possibility of subsidies (more often according to the Feed-in-Premium scheme)

All steps are carried out with iterations - see Workshop 2.5.

Source: Regulation of Heat and Power in CHP, The World Bank 2003

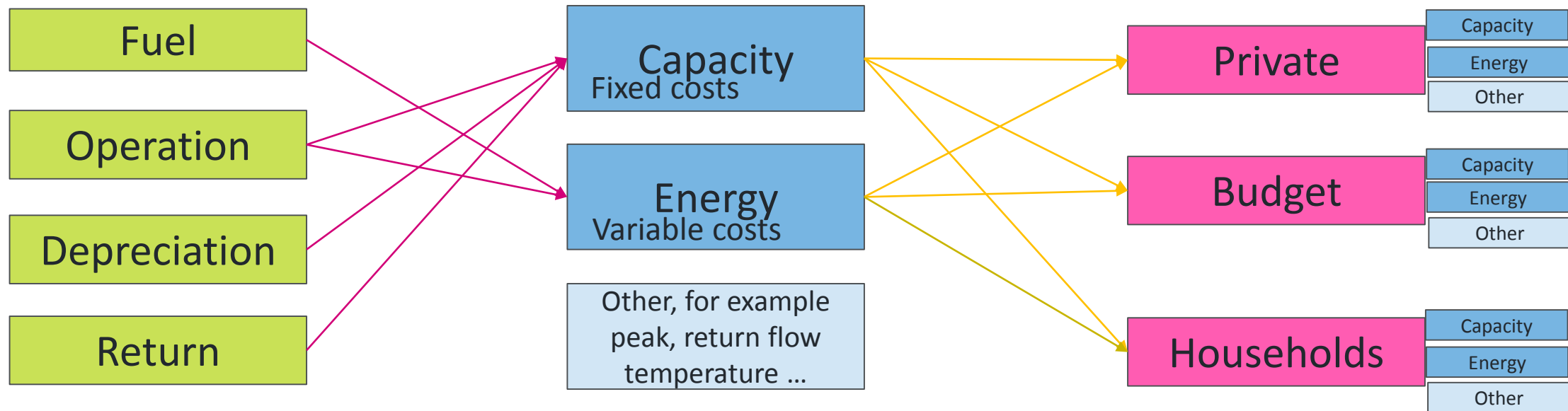
Source: Kazenergy National Energy Report, 2019, p. 187

Figure 5.26 – Comparison of benefit allocation for different cost allocation methods at CHP



# How should the prices be regulated (14)

## Step 2: Allocation of costs to cost drivers (cost categories)



**Required (allowed) revenue**

This is schematic. It will be explained in detail in seminar 3.2.

**Income to be collected from customers's tariffs**

## Step 3: Setting of tariffs in the appropriate structure

### Features of appropriate tariff structure

<b>Financially sound</b>	<b>Cost reflective</b>	<b>Socially acceptable</b>
Income collected from tariffs equals Allowed Revenue	Customers tariffs for each group reflect the different system costs caused by them as closely as possible, thereby providing incentives for efficient level and profile of consumption	Tariffs need to be affordable and all customers, even those on low incomes, should be able to afford a basic service



# Who should regulate prices (2)

	Approval of Tariff Methodology	Setting tariffs for heat from CHP	Setting all other heat related tariffs
Currently	CRNM	CRNM (no coordination with MoE)	CRNM ( central office with local branches)
Option 1 *	CRNM (improved)	CRNM (coordinated with MoE)	CRNM ( central office with local branches)
Option 2	CRNM (improved)	MoE	CRNM ( central office with local branches)
Option 3	CRNM (improved)	MoE	Local authorities
Option 4 **	CRNM (improved)	Local authorities	Local authorities
Option 5	MoE „Sector Regulator“	MoE „Sector Regulator“	MoE „Sector Regulator“
Option 6	MoE (new department)	MoE (new department)	CRNM ( central office with local branches)

**\* Supported by ADB**

**\*\* At this stage proposed by the draft law „On Heating“**

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Independence

Accountability

Transparency

Predictability

Capacity

Regulatory results





**Thank you for attention**

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