

Portuguese energy regulatory
framework
for
TSO allowed revenues

Portuguese energy regulatory framework for TSO allowed revenues

Agenda

1. Regulatory framework
2. Overview of allowed revenues
3. Portuguese specificities
 - A. WACC indexation
 - B. Smoothing of the demand volatility impact on tariffs

Annex: Overview of the Portuguese natural gas sector

Regulatory framework

Regulatory periods

- Regulatory period (3 years in Portugal). For each regulatory period ERSE sets:
 - Methodologies of regulation that will be applied to each regulated activity;
 - Parameters (WACC, efficiency targets, incentives, etc)
- Tariffs are applied on an annual basis.
- To avoid overlapping:
 - Electricity: tariffs are set for a calendar year - January to December of year t ;
 - **Gas: tariffs are set for a “gas year” – from July of “year t ” to June of “year $t+1$ ”.**

Regulatory framework

Regulated Activities – Natural GAS

- LNG Terminal**
(REN Atlântico)
- These activities take place in a LNG Terminal, the only one in the country is located in Sines.
 - After the liquid natural gas is unloaded from the LNG carriers, it is stored in tanks and later re-gasified according to the country's consumption needs.

- Transmission**
(REN Gasodutos)
- natural gas transmission in gaseous state, through High Pressure networks (higher than 20 bar) for reception and delivery to distributors, suppliers or large customers
 - **Global Technical Management of the System Activity**
 - **Transmission Activity**

- Underground Storage**
(Ren Armazengem)
- This activity is strongly related to the need to constitute and maintain the country's safety reserves, essential to promote conditions to guarantee the supply of natural gas to the country.
 - There is one underground storage complex in Portugal mainland located in Carriço.

- Distribution**
(11 DSO's)
- Natural gas distribution in gaseous state, in Medium and Low Pressure networks, reception and delivery to end users.
 - Also includes the reception, storage and re-gasification of natural gas in autonomous gas units and its delivery to supply points through the respective distribution networks.
 - **Access to the Transmission Network Function**
 - **Access to the Distribution Network Function**
 - **Distribution Activity**

- Last Resort Wholesale Supplier**
(Transgás)
- Natural Gas Trading function resulting from the acquisition of natural gas, directly or through auctions under the ToP contracts, to supply the Last Resort Suppliers.
 - Natural Gas Trading function in organized markets or through bilateral contracts, to supply the Last Resort Suppliers.

- Last Resort Suppliers**
(11 operators)
- Gas suppliers are responsible for managing relations with end customers.
 - **Network Access Trading Function during a transitional period.**
 - **Natural Gas Trading function during a transitional period.**
 - **Function of Supply of Natural Gas during a transitional period.**

Regulatory framework

Regulatory methodologies – Natural Gas

- During the current regulatory period (July 2016-June 2019):
 - Consolidation of incentive regulation methodologies (OPEX) in the following activities:
 - LNG Reception, Storage and Regasification;
 - Underground Storage activity
 - Transmission;
 - Distribution;
 - Supply.
 - WACC indexation
 - Creation of a mechanism for the smoothing of the impact of demand volatility in transmission and distribution activities.

Regulatory framework

Regulatory methodologies TSO – Natural Gas

Natural Gas Transmission regulatory scheme for allowed revenues:

- ✓ For Opex is based on an incentives scheme:
 - A *price cap* methodology is applied with a fixed part and a variable amount indexed to the evolution of physical variables (used exit capacity based on a daily maximum over a 12 month period).
- ✓ For Capex is the application of a rate of return methodology.

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Overview of allowed revenues

Allowed revenues

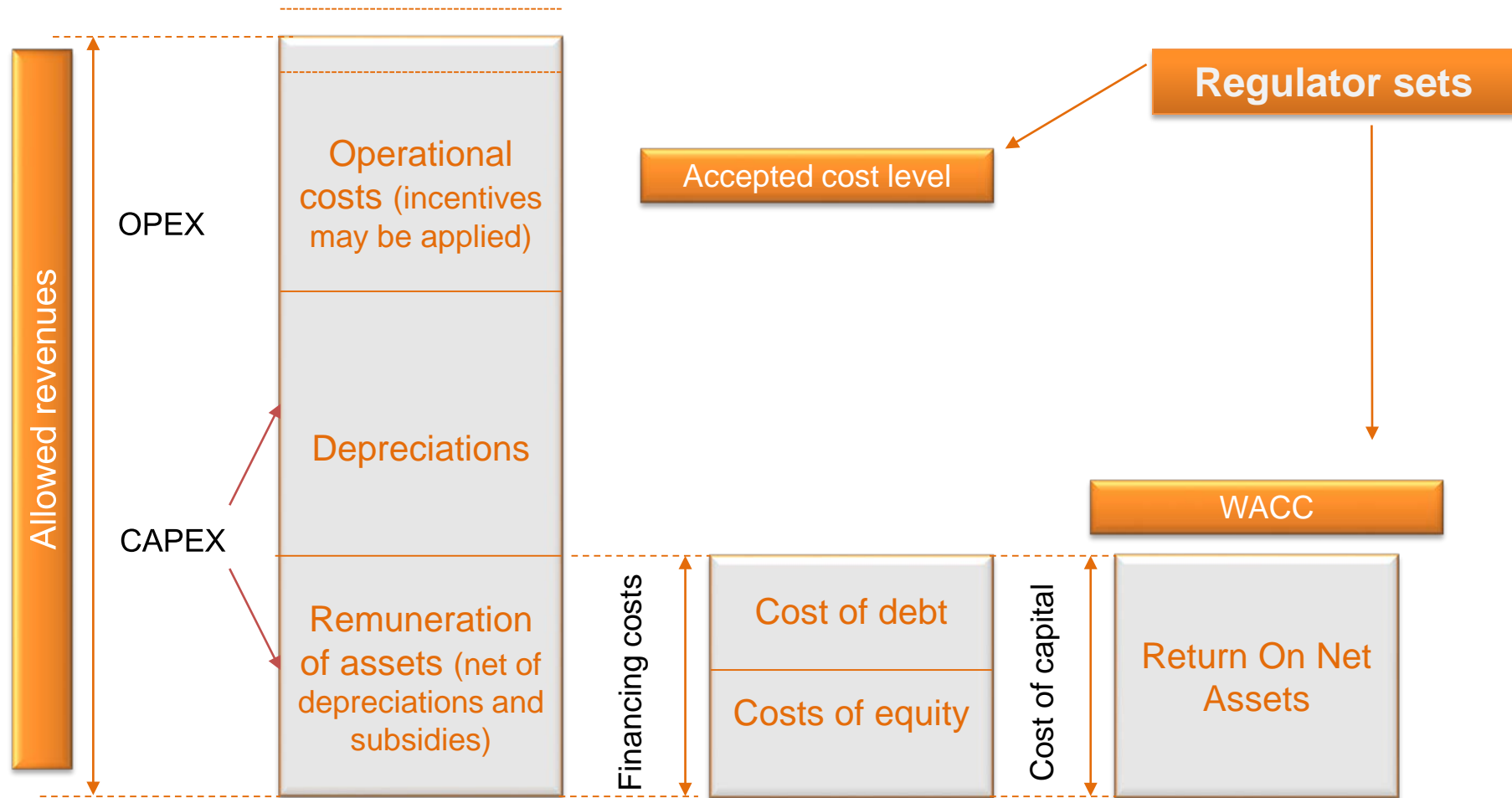
Allowed revenues to be recovered through tariffs set by the regulator must assure the economic and financial equilibrium of regulated companies that exhibit an efficient performance.

- ❖ **Operating expenditure** - this covers the day-to-day costs of running the network, such as staff costs, repairs and maintenance, overhead costs etc. An allowance is made to cover the amount of operating expenditure which an efficient company would be expected to incur over the regulatory period.

Overview of allowed revenues

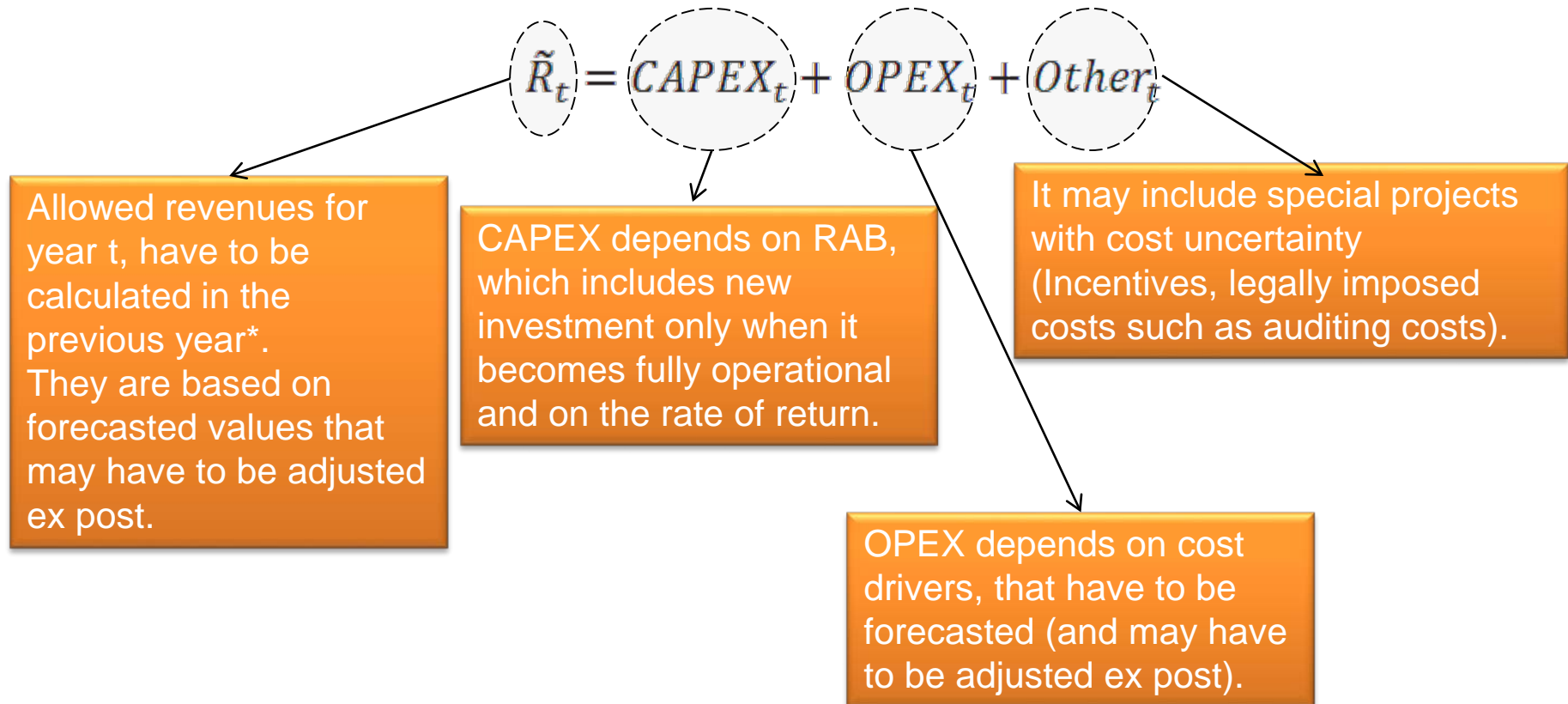
Allowed revenues

- ❖ **Capital expenditure** - this covers spending on assets, such as pipelines, storage facilities, gas control, measurement and safety systems (GRMS). The benefits of capital expenditure are expected to last over several years so companies recover these costs over the assumed life of the asset.
- ❖ **Financing costs** (via CAPEX) - this covers the costs an efficient company may be expected to incur in providing a reasonable return to the investors who provide the capital and other financial facilities it requires.
- ❖ **Taxation** (via CAPEX) - the allowed revenues must provide sufficient cash flow to cover the tax liabilities that an efficient company may be expected to incur, taking into account, for example, the current rate of corporation tax (therefore, a pre-tax WACC is defined).



Overview of allowed revenues

Credible and stable regulation - Low regulatory risk

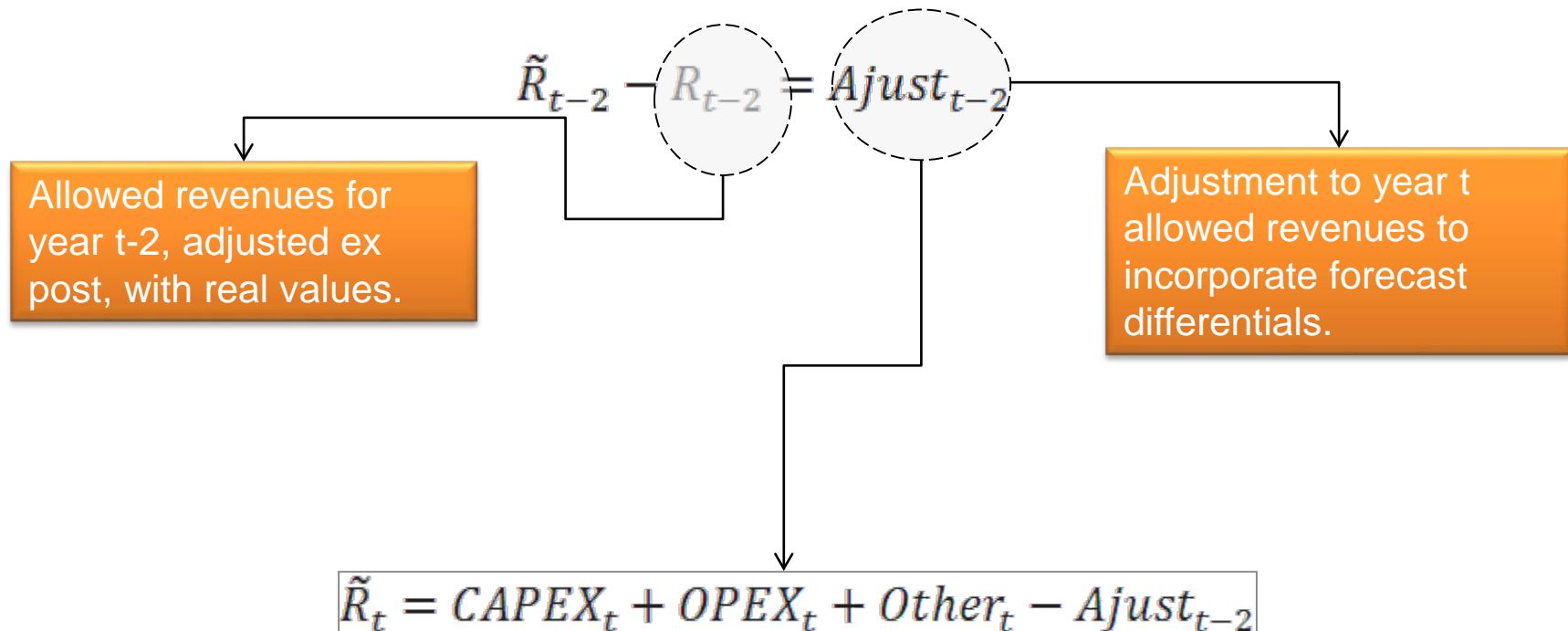


* The same rationale is applicable for quarter, month or any other tariff review periodicity.

Overview of allowed revenues

Credible and stable regulation - Forecast and revenue adjustment

A company might have allowed revenues lower (or higher) than expected due to forecast errors.

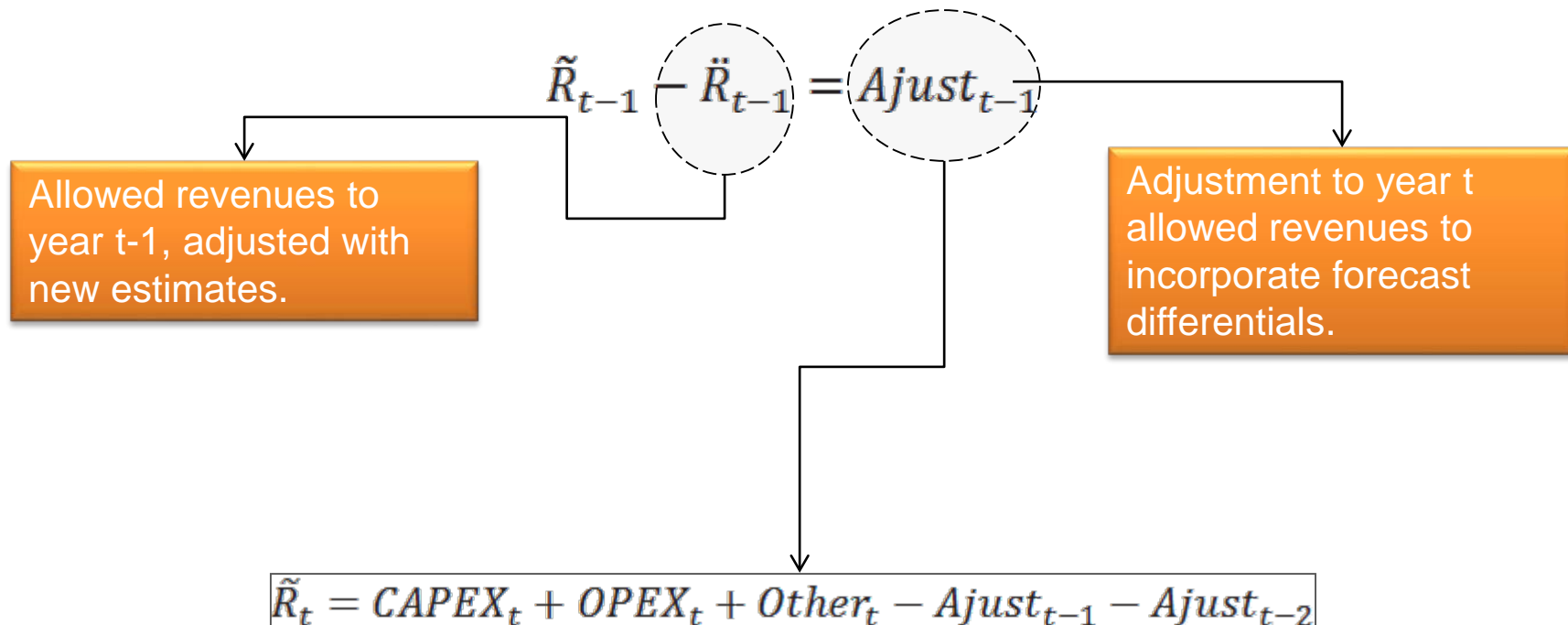


When setting year t tariffs, in year $t-1$, it is possible to have the final year $t-2$ numbers.

Overview of allowed revenues

Credible and stable regulation - Forecast and revenue adjustment

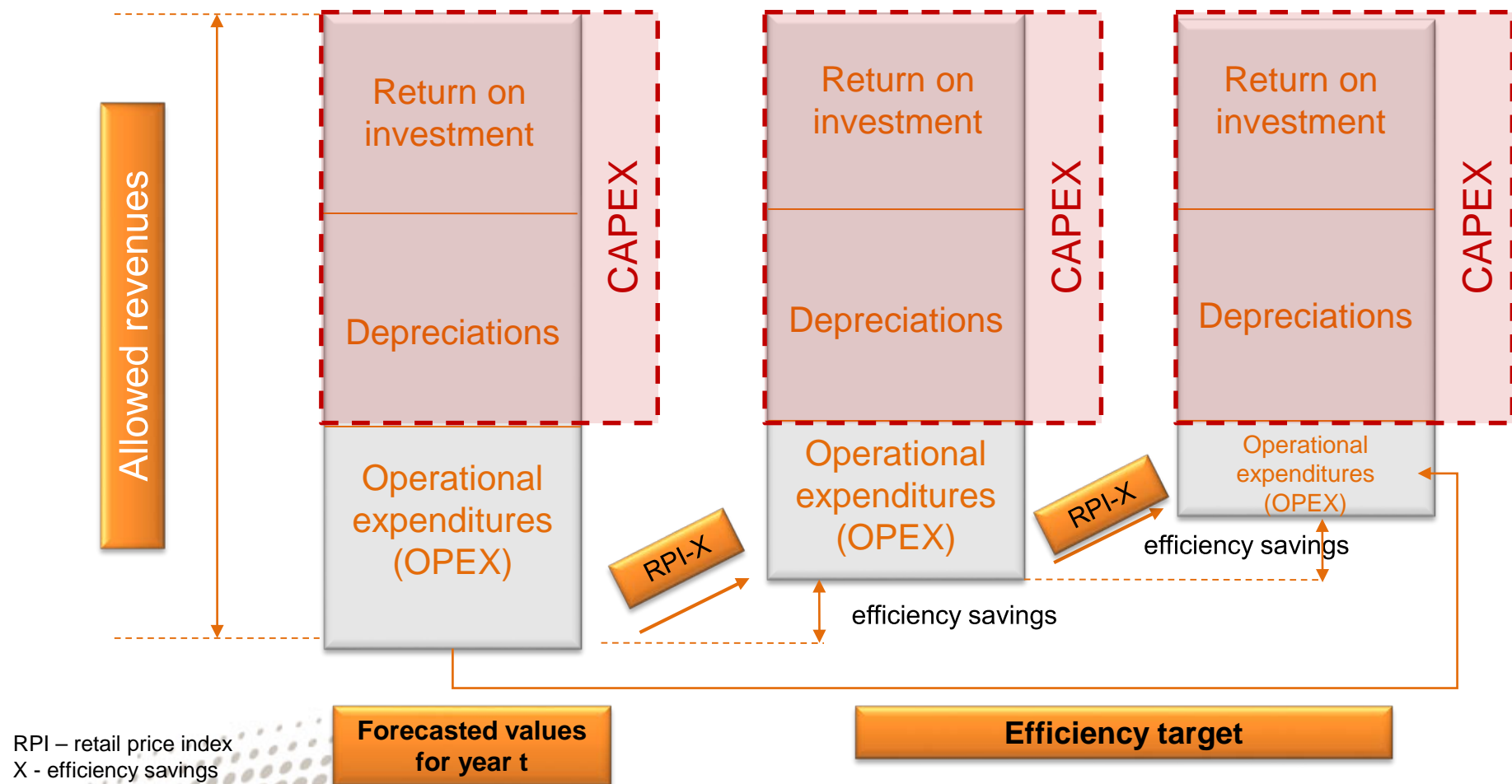
This exercise can be improved by including adjustments to year t-1



When setting year t tariffs, in year t-1, it is possible to have new estimates for the current year

Overview of allowed revenues

Efficiency level



Portuguese energy regulatory framework for TSO allowed revenues

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1. Framework and principles
2. Overview of allowed revenues
3. **Portuguese specificities**
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Annex: Overview of the Portuguese natural gas sector

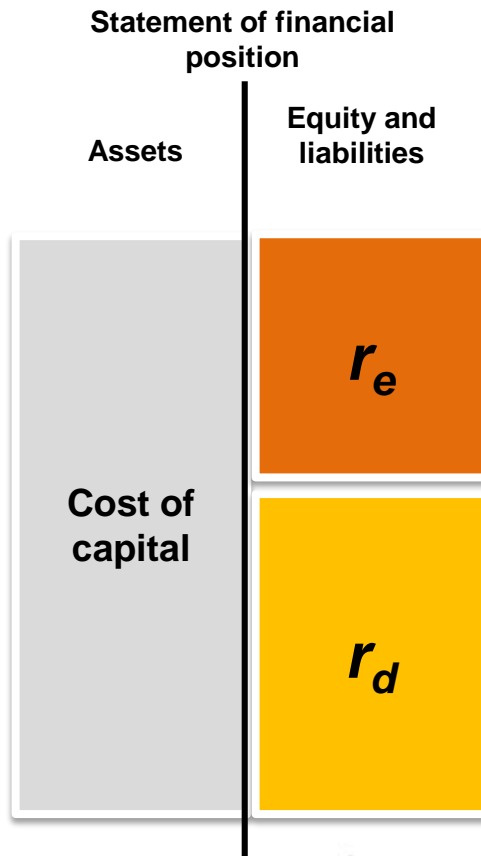
Portuguese specificities

Current regulatory scheme tackles two issues that can jeopardize system stability:

1. National financial instability between 2010-2014:
 - A fixed RAB's RoR for a regulatory period is not adequate during unstable periods;
 - Due to the Portuguese financial crisis a variable RoR was set;
 - Even though the situation tends to normalize, it still requires some prudence.
2. Natural gas consumption volatility at the high pressure level:
 - The weight of natural gas consumption by combined cycle power plant is very important in Portugal;
 - The consumption of natural gas by combined cycle power plant varies a lot due to weather conditions (hydro and wind)

Portuguese specificities_A: WACC indexation

Cost of capital – The required shareholder's rate of return according to business risk.



Cost of capital \Rightarrow **Pre-tax WACC** (Weighted Average Cost of Capital)

$$\text{Cost of capital} = r_d \times \frac{D}{D + E} + \frac{r_e}{1 - t} \times \frac{E}{D + E}$$

r_d – debt interest rate

D – Debt capital

E – Equity

r_e – equity interest rate

t – tax rate

r_d : Default spread model (risk free rate + default spread)

r_e : **CAPM** (Capital Asset Pricing Model)

$$r_i = r_f + \beta(r_m - r_f)$$

r_i – return on the capital asset

r_f – risk-free rate of interest

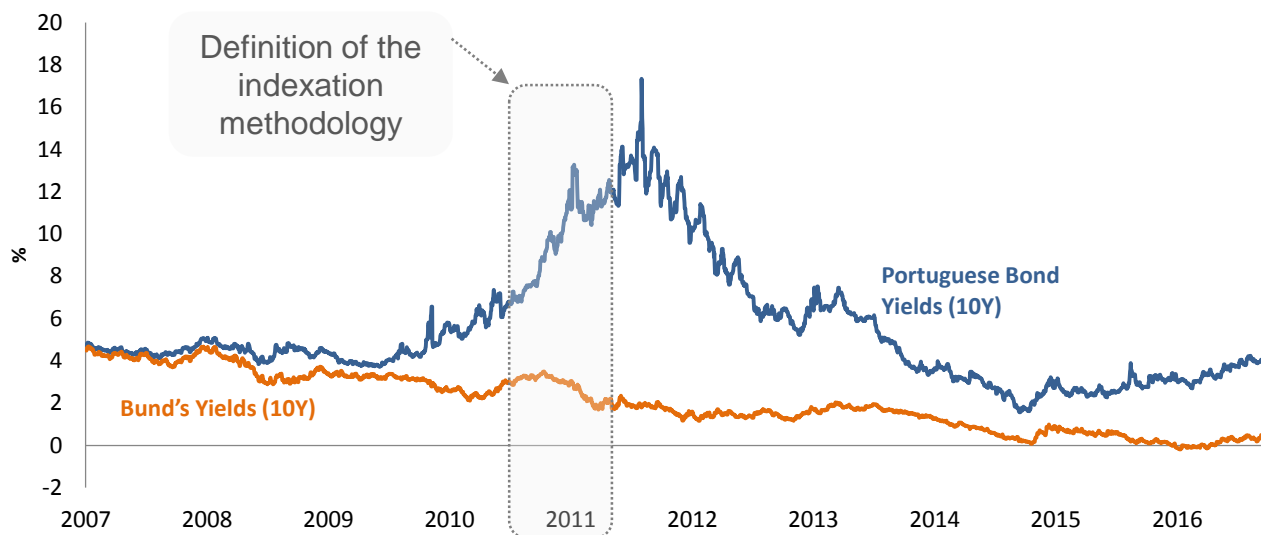
β – Equity beta

r_m – market rate of return

Portuguese specificities_A: WACC indexation

Framework

- Between May 2011 and June 2014, Portugal was under the framework of the Economic and Financial Assistance Program;
- Given the very high volatility and levels of Portuguese bond yields, an indexation methodology was established in 2011 and began to be applied in 2013 (2012 in electricity) in order to provide a balance between:
 - Economic signals provided by the high rates;
 - The need for regulatory stability.



Portuguese specificities_A: WACC indexation

Framework

- This indexation implied one other main change to the definition of the nominal risk free rate:
 - No longer based on long-term Portuguese Government Bonds' yields, but on the yields of long-term Euro Zone Government bonds with AAA rating;
- In the regulatory periods that followed and for both the electricity sector and the natural gas sector, ERSE decided to maintain the indexation methodology due to the maintenance of some economic uncertainty and financial volatility.

Portuguese specificities_A: WACC indexation

Indexation mechanism definition

- The indexation mechanism includes a set of parameters that are defined *ex-ante* and that are fixed for the regulatory period:
 - A. An initial estimated WACC value for the first year of the regulatory period;
 - B. Cap and floor values for the maximum and minimum values of the allowed rate of return (RoR);
 - C. An initial estimated value for the indexation variable defined for the first year of the regulatory period. The indexation variable is, currently, the Portuguese 10 year bond yield;
 - D. The ratio between the incremental variation of the RoR and the incremental variation of the index variable (the slope of the line in the indexation mechanism).
- The rate of return is updated ex-post each year in order to reflect the evolution of financial market conditions, through the index variation.

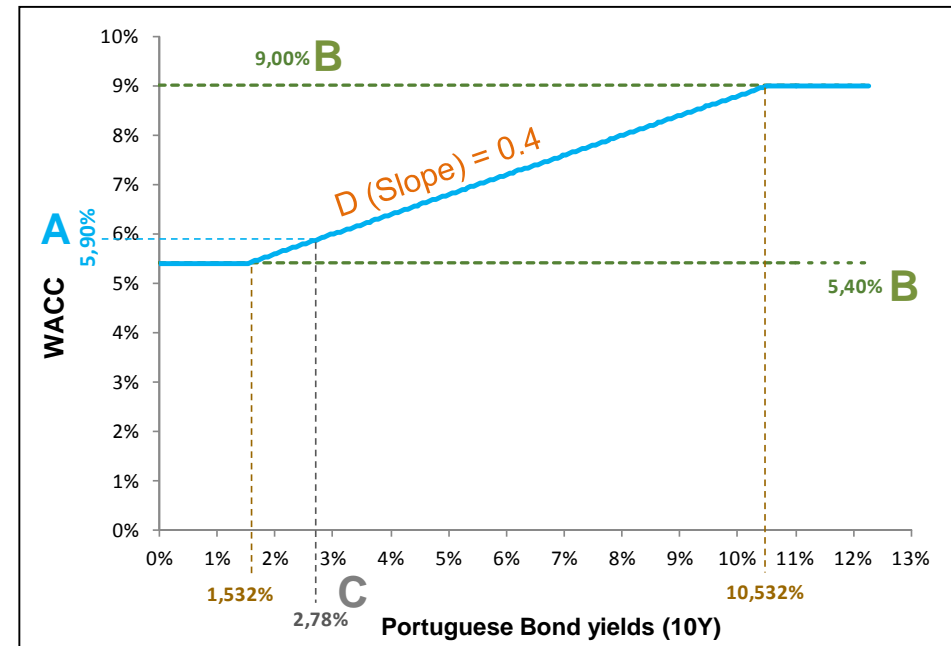
Portuguese specificities_A: WACC indexation

Indexation mechanism definition

➤ How the indexation mechanism applies to the natural gas TSO

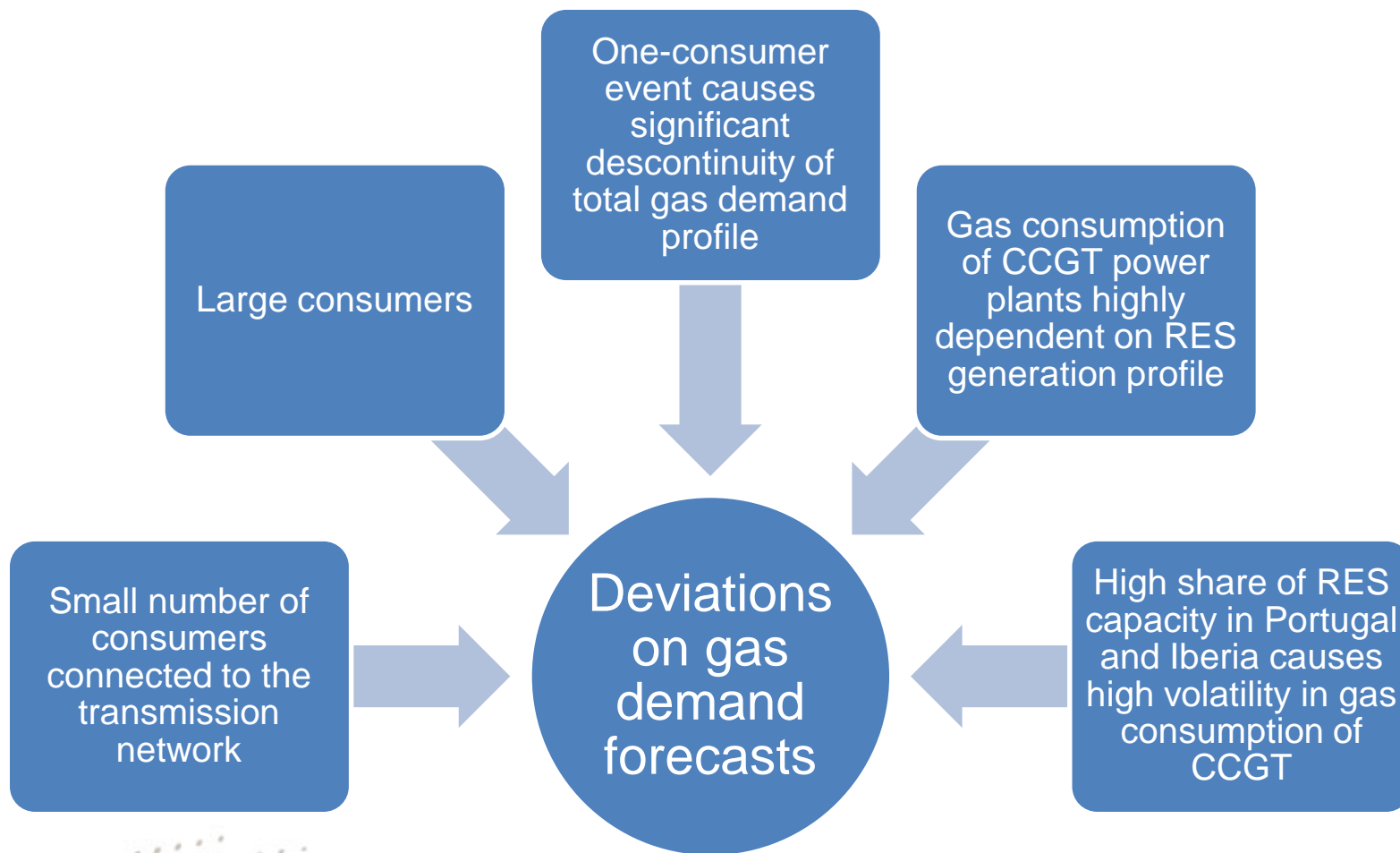
- A. Initial estimated WACC value for the first year of the regulatory period: **5.9%** (bond yields= **2.78%**)
- B. Cap value for the maximum value of the RoR: **9.00%** (where bond yields \geq **10.532%: $Yield_H$**) and the floor value for the minimum value of the RoR: **5.40%** (where bond yields \leq **1.532%: $Yield_L$**)
- C. Initial estimated value for the indexation variable defined for the first year of the regulatory period: **2.78%** (WACC= **5.9%**)
- D. Rule for the incremental variation of the RoR (the slope of the line), a 1pp change in the bond yields implies a **0.4pp** change in the RoR:

$$SLOPE = \frac{CAP - Floor}{Yield_H - Yield_L} = \frac{9.00 - 5.40}{10.532 - 1.532} = \frac{3.6}{9.0} = 0.4$$



Portuguese specificities_B: Smoothing of the impact of demand volatility on tariffs

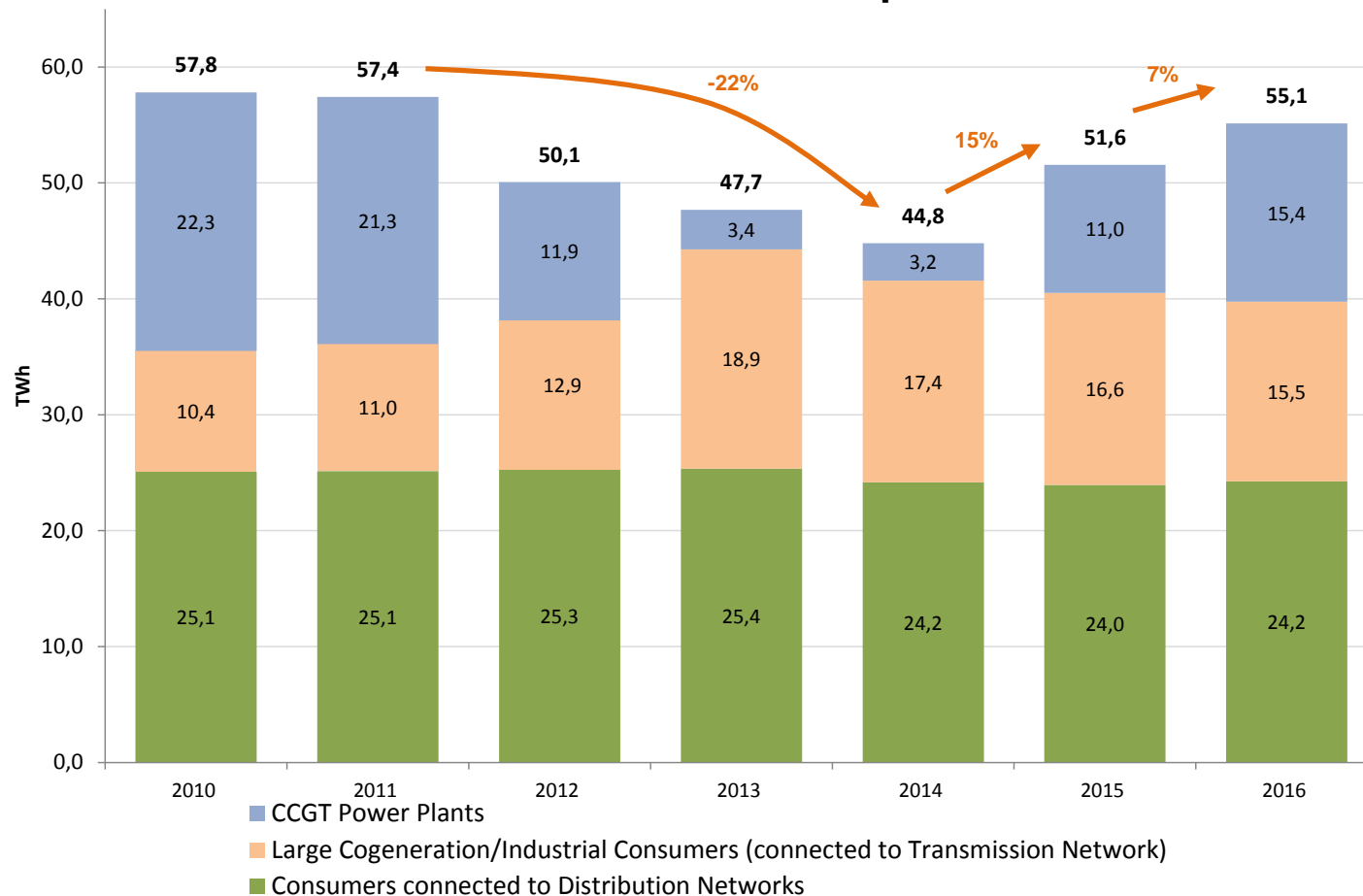
Background



Portuguese specificities_B: Smoothing of the impact of demand volatility on tariffs

Background

Natural Gas Consumption



Portuguese specificities_B: Smoothing of the impact of demand volatility on tariffs

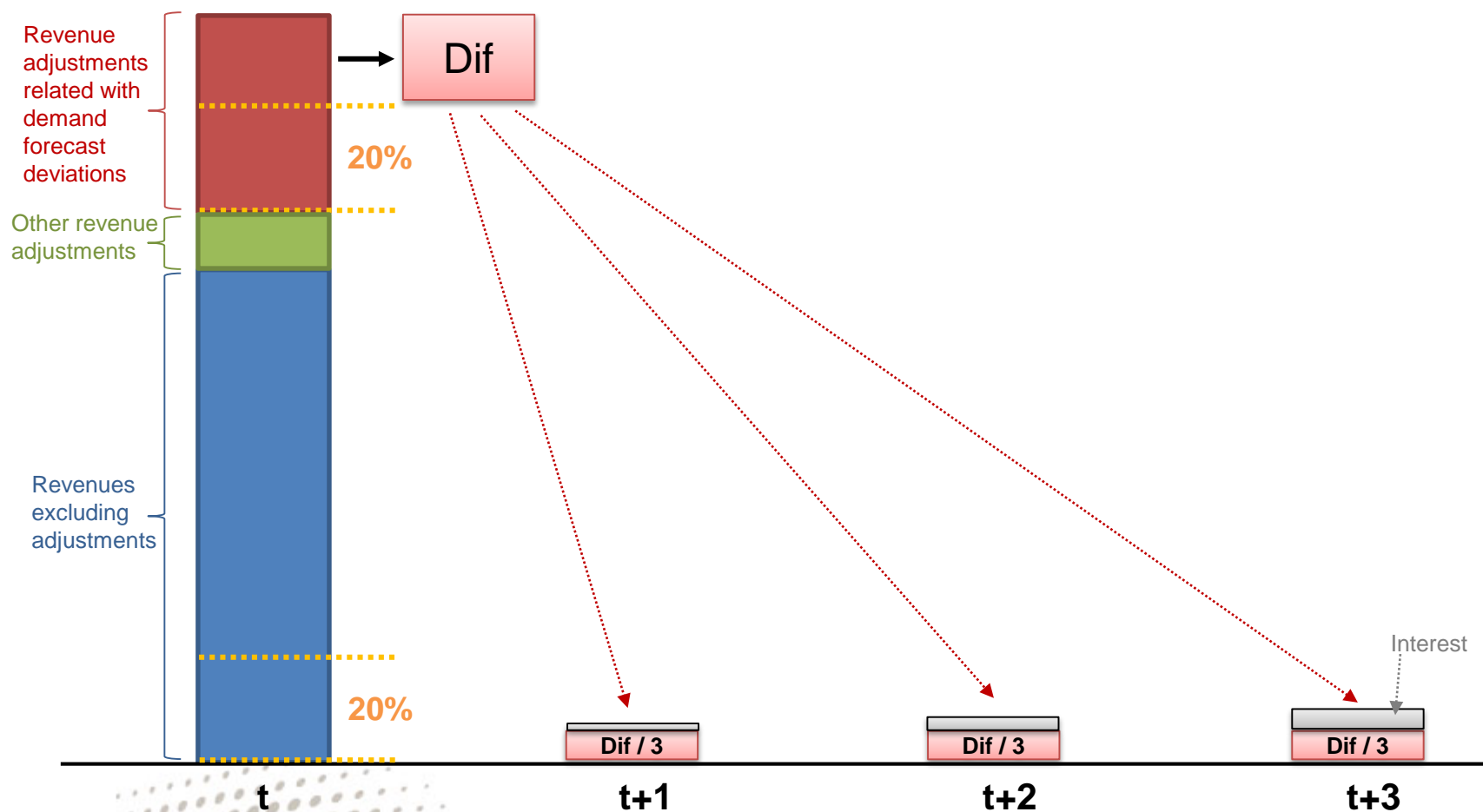
How to smooth the effects in TSO's allowed revenues of volatility in gas demand?

- Introduce a mechanism to defer the adjustments of revenues related with demand forecast deviations.
- The mechanism is symmetrical (applied both for positive or negative effects) and is triggered when the %⁽¹⁾ of revenue adjustments related with demand forecast deviations exceeds a pre-defined limit (20%).
- The amount of such adjustments to be deferred is:
 - The difference below the limit for a negative or positive deviation (actual-forecast<0 or >0), which reduces or increases the total amount of TSO allowed revenues.
- The revenues (positive or negative) which have been deferred due to this mechanism are recovered in the following 3 years, including interest.

(1) This percentage is calculated with respect to the total amount of allowed revenues excluding adjustments.

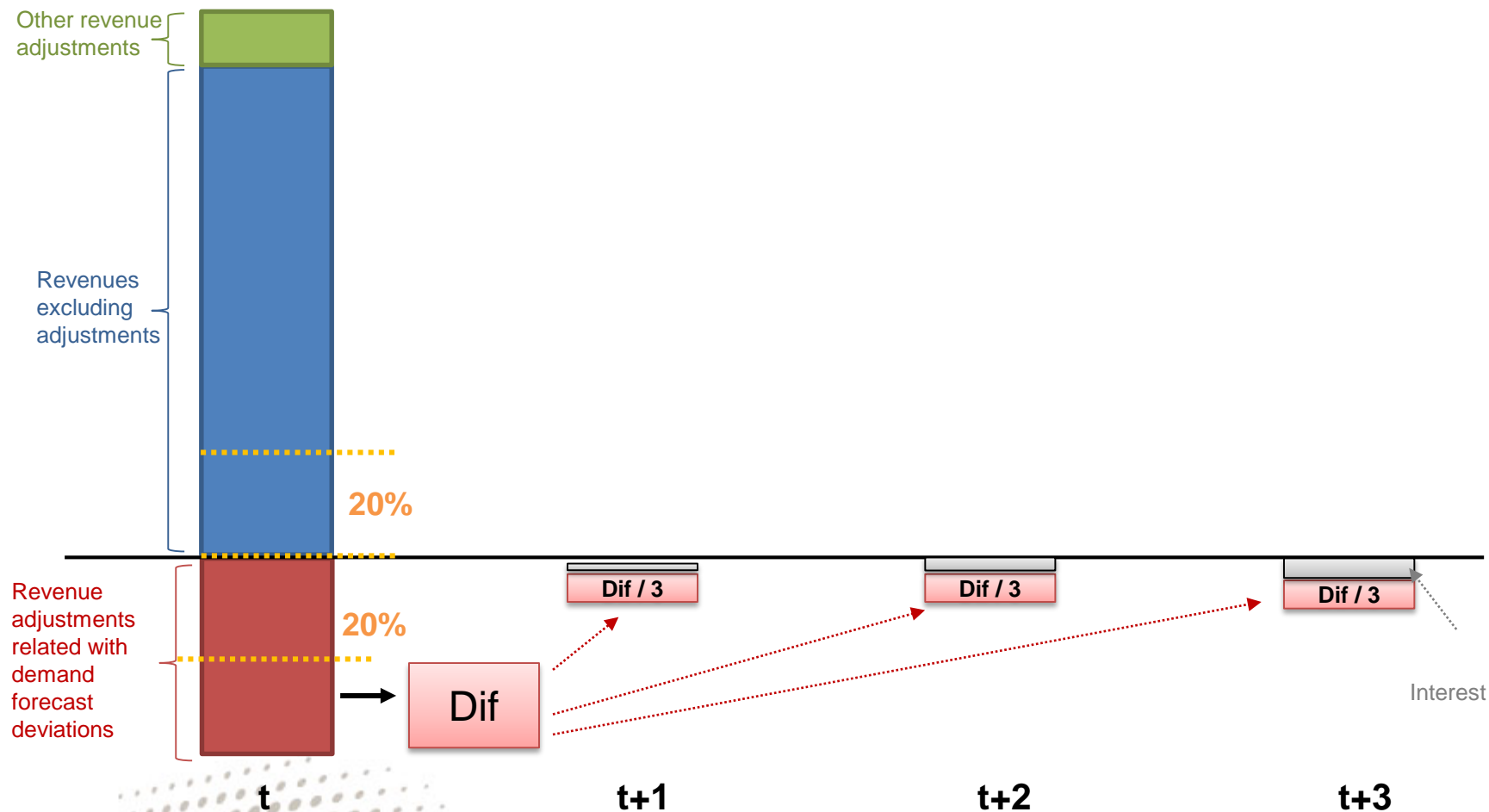
Portuguese specificities_B: Smoothing of the impact of demand volatility on tariffs

How to smooth the effects in TSO's allowed revenues of volatility in gas demand with incremental effect?



Portuguese specificities_B: Smoothing of the impact of demand volatility on tariffs

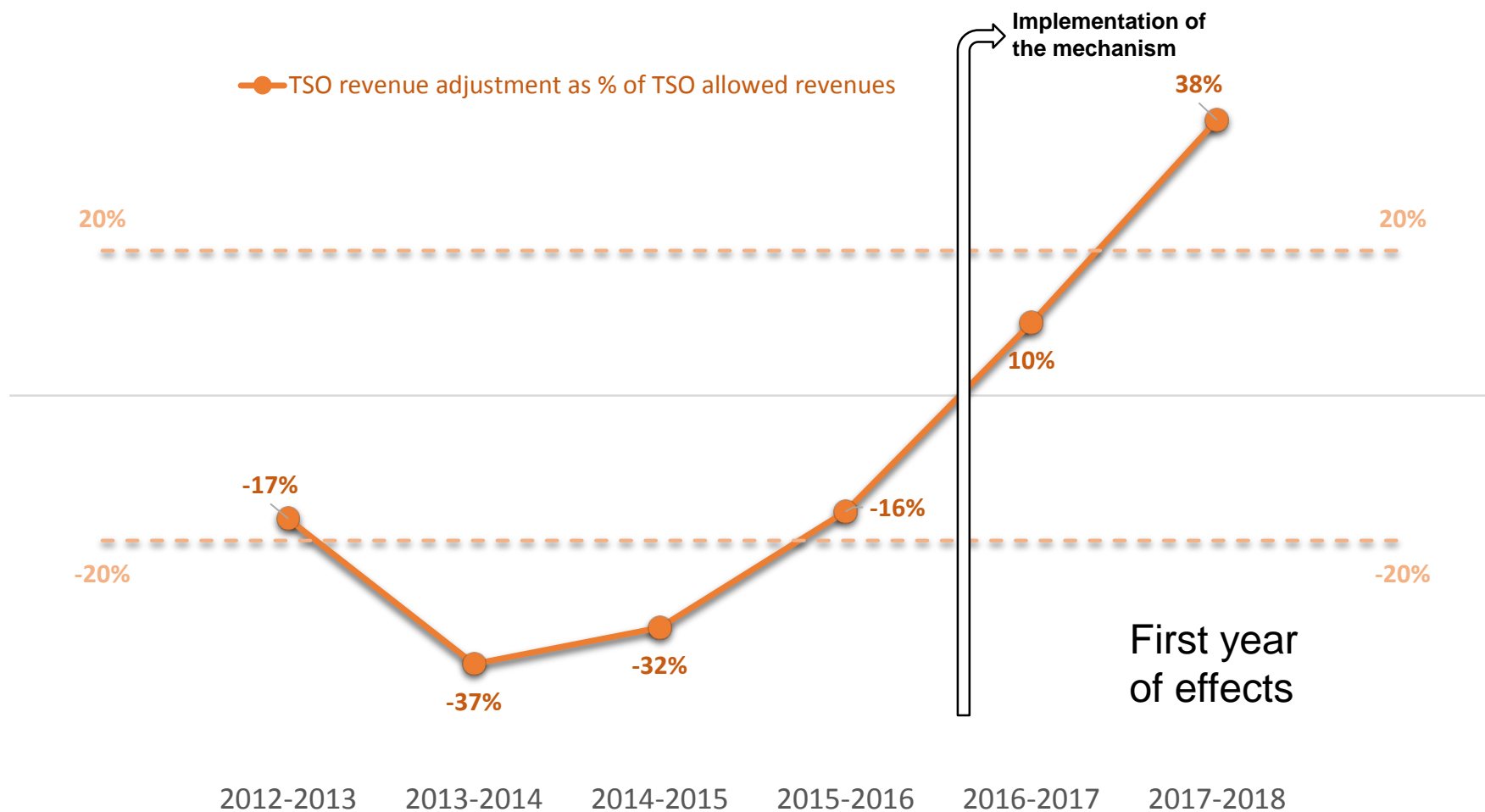
How to smooth the effects in TSO's allowed revenues of volatility in gas demand with decremental effect?



Portuguese specificities_B: Smoothing of the impact of demand volatility on tariffs

Evolution of revenue adjustments related with demand forecast deviations

(negative values are amount to be added to the tariffs, positive values are amount to be reduced from the tariffs)



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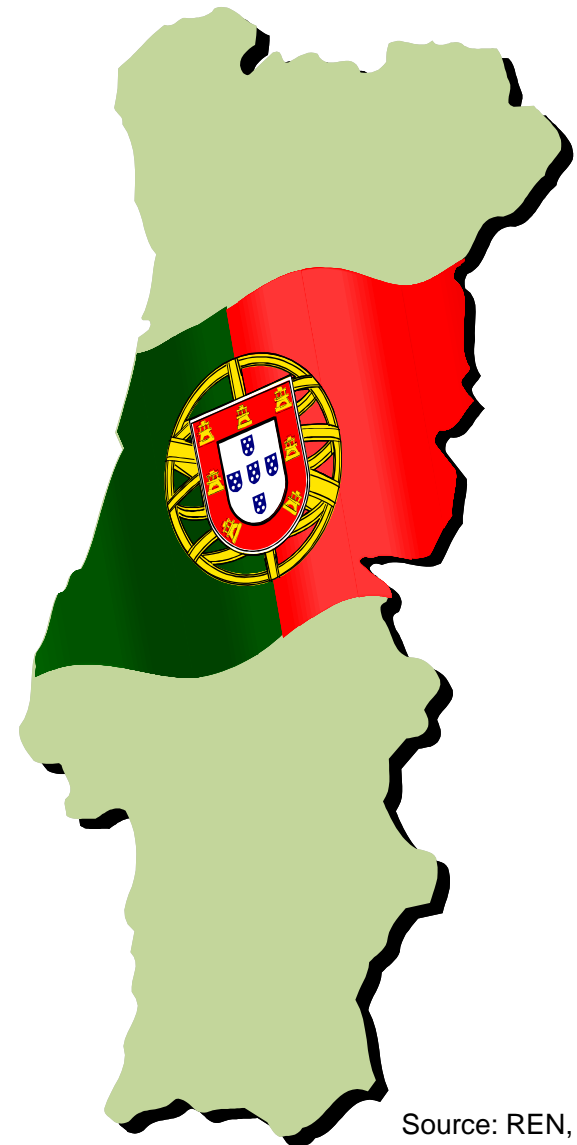
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Annex Overview of the Portuguese Natural Gas sector

Portugal

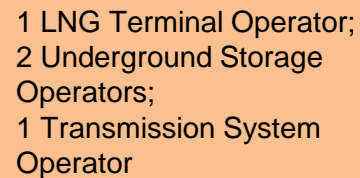
2016

	Electricity	Natural Gas
Total Demand	49 269 GWh	55 848 GWh
Customers	6 Million	1,4 Million



Source: REN, ERSE

DSO – concession areas



1 Wholesale Market Supplier
11 Suppliers of Last Resort ^[1]
10 Market Suppliers

Fonte: Transgás

29-11-2017

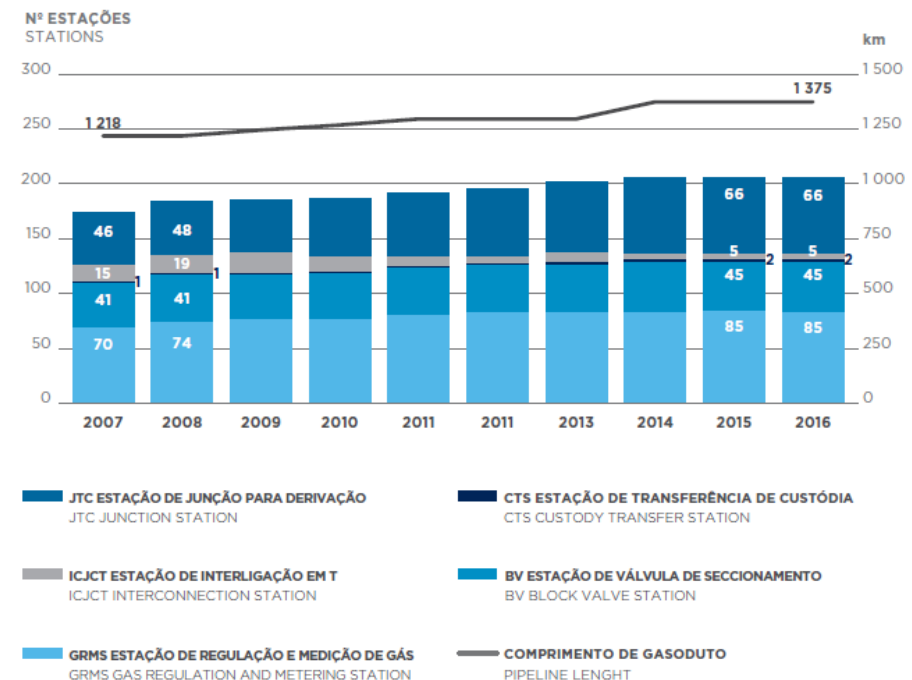
Portuguese natural gas network infrastructure

Characteristics

	2016	2015
RNTGN RNTGN		
km de gasodutos km of gas pipelines	1 375	1 375
TERMINAL DE GNL LNG TERMINAL		
Nº de tanques Nº of tanks	3	3
Capacidade de armazenamento GNL [m³] LNG storage capacity [m³]	390 000	390 000
Capacidade de regaseificação [m³(n)/h] Regasification capacity [m³(n)/h]	1 350 000	1 350 000
Capacidade máxima de navios GNL [m³] LNG maximum capacity of tankers [m³]	216 000	216 000
Enchimento de cisternas GNL [m³(n)/h] LNG tanker trucks filling station capacity [m³(n)/h]	175	175
ARMAZENAMENTO SUBTERRÂNEO UNDERGROUND STORAGE		
Nº de cavernas Nº of salt caverns	6	6
Capacidade de armazenamento GN [Mm³] NG storage capacity [Mm³]	333	333
Capacidade de extração [Mm³(n)/dia] Withdrawal capacity [Mm³(n)/dia]	7,2	7,2
Capacidade de injeção [Mm³(n)/dia] Injection capacity [Mm³(n)/dia]	2	2
1m³(n) -11.9 kWh (PCS/GCV) 1m³[GNL/LNG] - 6800 kWh (PCS/GCV)		

Source: REN

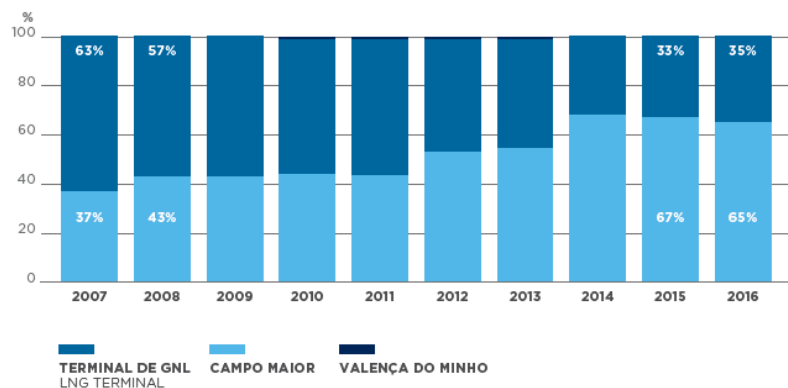
TSO' gas stations and pipeline length



Source: REN

Supply and demand

Supply growth

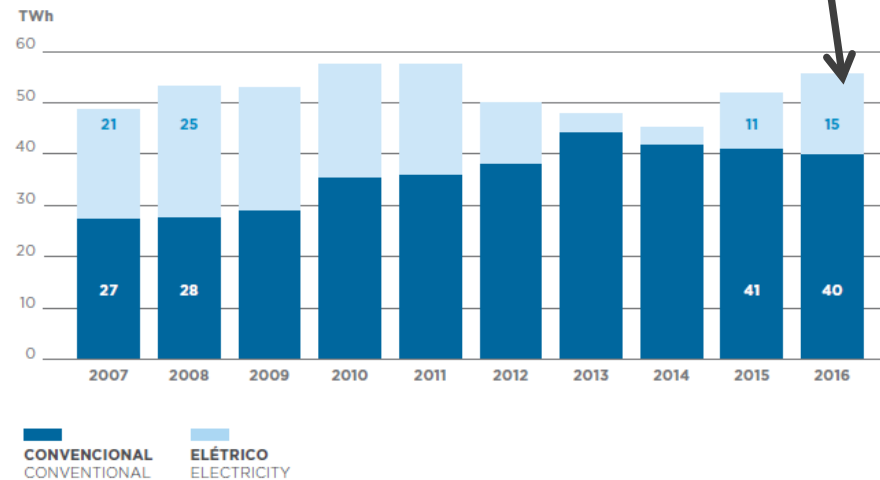


Source: REN



- Between 2007 and 2011 the Sines LNG Terminal was the main point of entry of natural gas supplied to Portugal.
- In 2016 the LNG Terminal supplied around 35% of the gas, with an increase over the previous year.

Demand growth



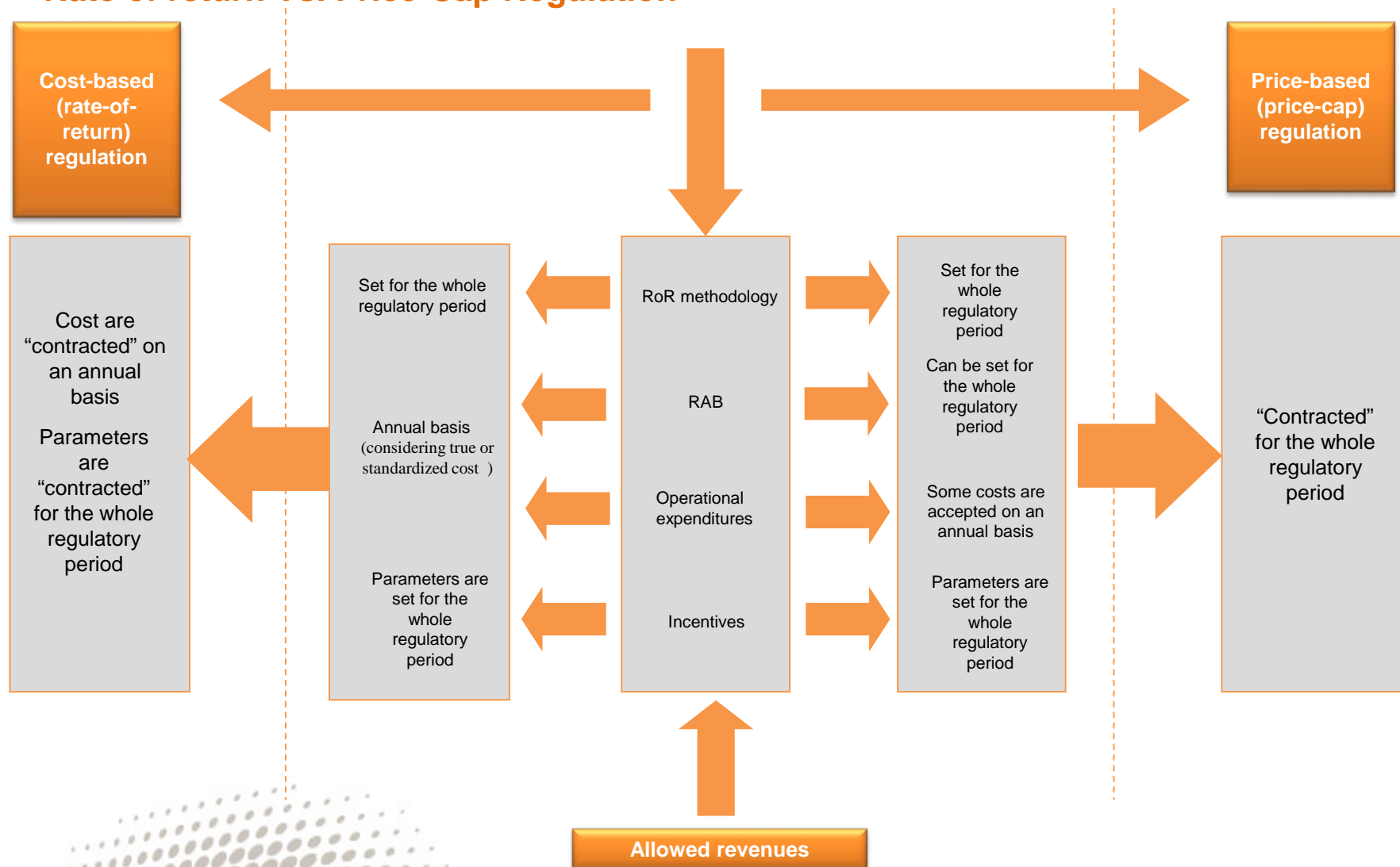
Source: REN



- In 2016 natural gas consumption grew 6,9% from the previous year and was 3,4% below the all-time high recorded in 2010.
- Production of electricity under the ordinary regime recorded the highest consumption since 2011, while demand from the conventional market segment decreased 1,8% from the previous year.

Overview of allowed revenues

Rate of return Vs. Price-Cap Regulation



Thank you!!!

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