



TSO-based balancing system Case study: Greece

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Outline

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- ▶ Main features of the balancing regime
 - TSO competences
 - Planning procedure
 - Cost allocation mechanism
 - Balancing mechanics
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 - Statistics
- ▶ Way Forward - Conclusions



The regulatory context

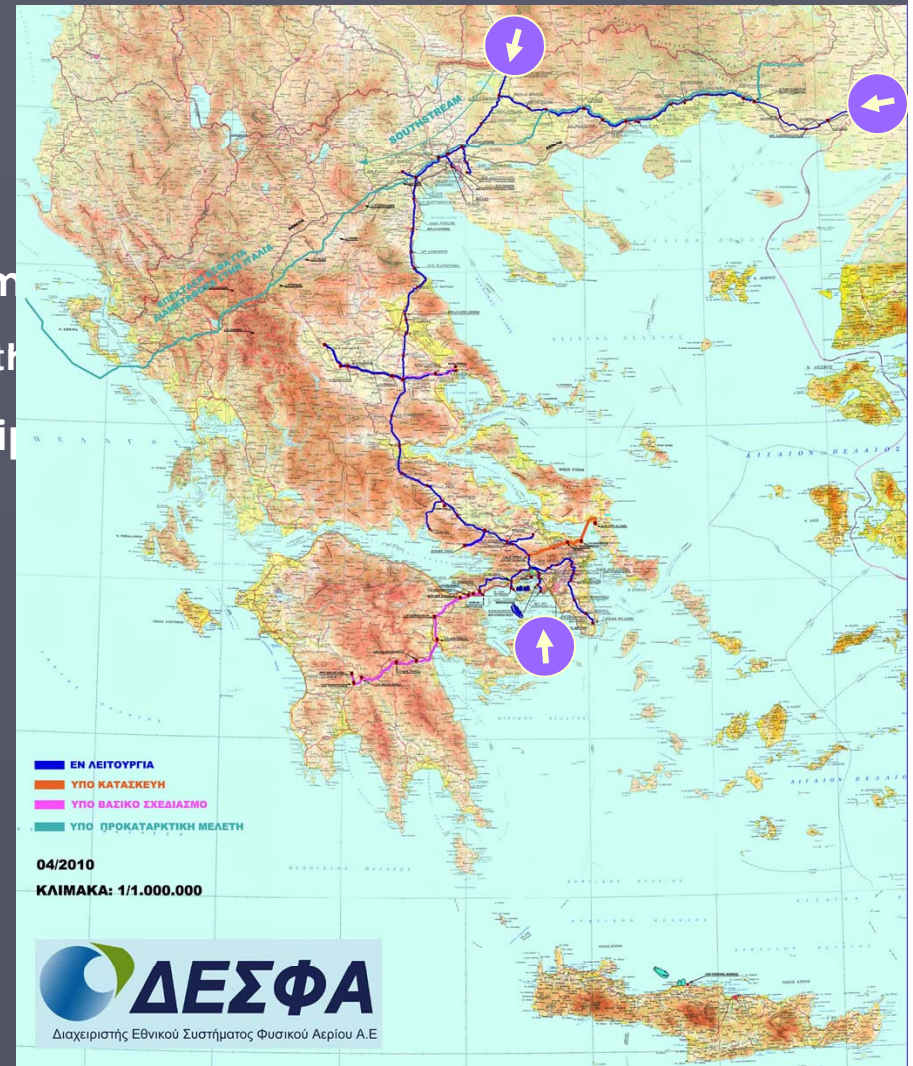
Historical background and main features of the market

- ▶ Natural gas has been introduced to the energy mix in 1996
- ▶ Derogation from EU Directive until 2006
- ▶ Establishment of the Gas System Operator (DESFA) in 2007
- ▶ 70% of demand power producers (IPPs + incumbent)
- ▶ Supply portfolio of the gas incumbent (DEPA):
 1. Two long-term gas supply contracts through pipelines
 - ▶ Usual (rather limited) "swing" possibilities
 2. A long-term LNG gas supply contract plus some spot cargoes
- ▶ Connection with one non-EU country (Turkey) and one EU country (Bulgaria) through a congested line
 - No link with gas hubs or mature competitive markets
- ▶ Incumbent (DEPA) had a 100% market-share until 1Q 2010

Main features of the gas system

- ▶ No gas production
- ▶ No underground gas storage
- ▶ Limited storage capacity in the LNG term
 - Suitable only for “temporary storage” in the
- ▶ Approx. 1000 km of high pressure pipeline
 - Limited linepack variation capability

LNG is, naturally, the
“flexible gas”



Regulatory challenges in the transition phase

- ▶ Balancing was an indistinctive part of the overall supply portfolio management of the vertically integrated company
 - Need to reveal actual balancing needs:
 - ▶ Mass-balance (?)
 - ▶ System operation needs (?)
 - ▶ Economic portfolio management (?)
 - Need to reveal the cost of balancing services
 - ▶ Procurement of the gas
 - ▶ Cost for the use of infrastructure
- ▶ Only the incumbent had access to flexible gas
 - Access of all players to flexible gas on equal and transparent terms a must
- ▶ Technical superiority of the incumbent compared to new players
 - TSO has the knowledge of the system and the obligation of objectivity
 - Provides a safety net for new entrants



Main features of the balancing regime

Main TSO competences

- ▶ TSO is responsible for balancing the system, including the gas “shrinkage” (own gas consumption + natural losses), in an efficient way
- ▶ To perform its tasks, TSO has the right to:
 - Contract for balancing and shrinkage gas
 - Reserve capacity in the gas system (LNG, transmission) for balancing purposes
- ▶ TSO recovers all its cost related to balancing and keeps a special balancing account, cleared annually
- ▶ Transparency requirements: As in 1775/2005/EC

Planning procedure

- ▶ TSO submits to RAE for approval an Annual Balancing Plan, that includes:
 - Review of last year's performance
 - Gas demand forecast by sector (monthly and annually)
 - Balancing gas demand forecast (monthly and annually)
 - ▶ Total demand
 - ▶ Peak demand
 - Proposal for the:
 - ▶ Characteristics of next year's balancing gas contract(s)
 - ▶ Balancing gas procurement mechanism
 - ▶ Capacity reserved in the system by the TSO for balancing purposes

Planning procedure (II)

- ▶ On the basis of the approved Balancing Plan, the TSO procures balancing gas, under one or a combination of the following options:
 - Directly from the LT LNG contract of the incumbent
 - Through a tender procedure
- ▶ The price terms of the contract and the cost allocation mechanism are approved by the regulator
- ▶ An identical planning procedure is followed for “Shrinkage Gas” procurement
 - Shrinkage gas can be procured under the same contract as balancing gas. In this case, shrinkage gas quantities and prices must be stated separately in the contract

Cost allocation mechanism

- ▶ Balancing cost items:
 - Variable
 - ▶ LNG procurement cost (FOB)
 - ▶ Commodity part of the LNG TPA tariffs (for use of terminal by the TSO)
 - Fixed:
 - ▶ Annual LNG transportation cost
 - ▶ Capacity part of the LNG TPA tariffs (for use of terminal by the TSO)
- ▶ Commoditization of all fixed costs and allocation in a pre-determined way, subject to periodical review:
 - 50% electricity generators (70% of demand-more predictable behavior)
 - 50% all other consumers (30% of demand, more fluctuating behavior)
- ▶ Commoditization of costs provided certainty and facilitated competition in the electricity market

Balancing mechanics

- ▶ Balancing Zones: 1 (whole country)
- ▶ Balancing Period: 1 Day
- ▶ Trading of imbalances
 - Currently possible only ex-post
- ▶ Imbalance calculation
 - Shipper's Imbalance = $(\text{Input} - \text{Output}) - \text{UFG}$
 - Input, Output: Aggregated for all shipper's entry/exit points, based on final allocation and after any ex-post imbalance trading
 - UFG: Unaccounted-For Gas, calculated daily by the TSO as the residual of the mass balance equation and allocated to shippers pro-rata to their output
 - Adjusted formula for the "shrinkage provider"

Balancing mechanics

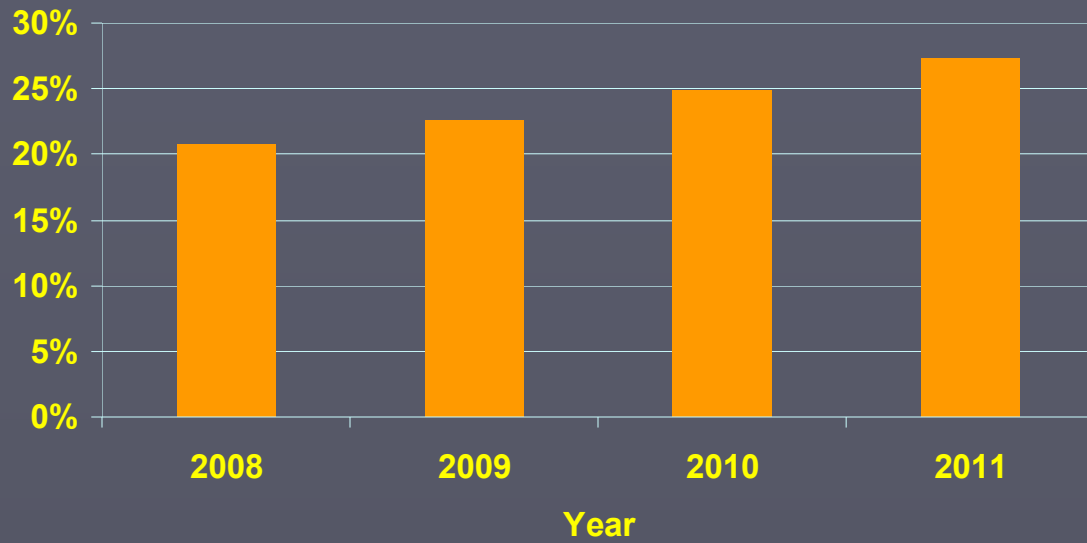
- ▶ Tolerance levels
 - Currently $\pm 10\%$, reviewed biannually
- ▶ Penalties for exceeding tolerance levels
 - +5% on the cash-out price for negative imbalances
 - -5% on the cash-out price for positive imbalances
- ▶ Cash-out Price:
 - LNG FOB price + Commodity Charge of LNG TPA tariffs + levies and taxes
- ▶ Sustained shipper's imbalance
 - After 5 days, tolerance levels set to zero for that shipper
 - Possibility of interruption if LNG stock levels too low

Transparency

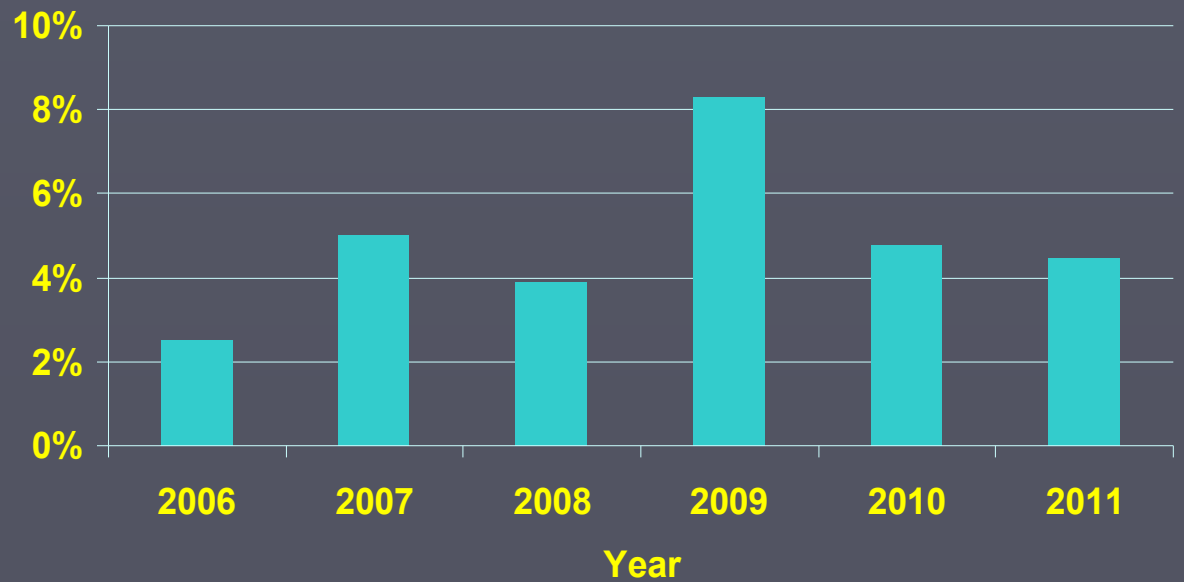
- ▶ The annual balancing plan, cost allocation methodology and actual cash-out prices have to be published in TSO's website
- ▶ TSO has to keep record of and notify shippers and the regulator for all "balancing actions" taken
- ▶ TSO is obliged to notify shippers on their imbalance position at the end of each day
- ▶ Imbalance charges are cleared monthly for each Shipper

Statistics

Capacity reserved by TSO
in the LNG terminal (% of total)



Balancing Gas needs
(% of total gas demand)





Conclusions
Way Forward

New market conditions

- ▶ From Q2 2010, three large new players in the gas market through LNG cargoes, with very competitive prices
- ▶ Recourse to balancing gas in few occasions of planning failure from the side of new entrants
- ▶ Cash-out price has served as the marginal gas price in the country and a benchmark for bilateral gas transactions between all gas players (including the new entrants and the incumbent)
- ▶ The TSO is about to launch the first tender for balancing and shrinkage gas procurement (LNG)
 - It is expected that this will push balancing gas prices down significantly
- ▶ Installation of a compressor station in the trunk line in 1st half of 2011 is expected to eliminate the injection of LNG for hydraulic stability reasons and to reveal more clearly the balancing needs

Prices

Balancing Gas price compared to average import prices



Conclusions

- ▶ The TSO-based (and cost-based) balancing model has contributed critically in the transition to an open market by:
 - Revealing the actual balancing needs and balancing costs and unbundling those services from the monopolistic “gas supply” package
 - Allocating in a transparent and simple way those costs to shippers/customers, allowing them to “unbundle” the elements of their total gas supply price
 - Allocating flexibility, historically available only to the incumbent, to shippers/customers
 - Facilitating new entrants, by providing a “safety net” and reducing the uncertainty of a new entrant without a diversified gas portfolio
 - In the absence of a gas hub, cash-out price served as a benchmark for the marginal gas price in the country

Way forward

- ▶ Review of the whole system in light of:
 - Framework Guideline and respective Network Code
 - New market conditions
- ▶ Intra-day trading of imbalances between shippers
- ▶ Possible introduction of more balancing zones upon operation of new interconnections
- ▶ Publication of weighted average Greek Import Price
- ▶ Operation by the TSO of the electronic platform with continuous Shippers' access to their balancing position

Thank you for your attention!

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Regulatory objectives

- ▶ Transition of a gas supply portfolio management “monopoly-style” to a competitive market:
 - Need to reveal actual balancing needs
 - ▶ System operation needs (?)
 - ▶ Mass-balance (?)
 - ▶ Economic portfolio management (?)
 - And related costs
 - Unbundle the services offered by the TSO
- ▶ To facilitate new entrants by:
 - Allocating the flexibility of the incumbents’s LNG contract to all players
 - Provide for a transparent and simple cost-allocation mechanism
 - Using the technical expertise of the TSO in facing the market
- ▶ To reveal the actual balancing needs of the market, in terms of volumes and distribution in time
- ▶ Access to flexibility on non-discriminatory terms
- ▶ Promoting efficient operation of the system
- ▶ Cost-based model