Study on Methodologies for Gas Transmission Network Tariffs and Gas Balancing Fees in Europe

- Annex -

Tender No.: TREN/C2/240-241-2008

Submitted to:

The European Commission, Directorate-General Energy and Transport

Submitted by: KEMA International B.V.

Arnhem, December 2009

Country fact sheets

Table of Contents

Introduction

The following fact sheets provide a structured summary of the main principles and arrangements with regards to the structure and regulation of transmission tariffs, procurement of residual balancing gas and imbalance settlement. The information has been collected based on publicly available sources. Subsequently the fact sheets were made available to the national regulatory authorities for review. All comments received from the regulators have been used to correct and/or complete the information as applicable.

The information presented in these fact sheets has been collected and summarised with as much care as possible and the fact sheets are correct to the best of our knowledge, however, no responsibility can be taken for the correctness of this information.

The information provided in this document basically reflects the situation as of April 2009.

1. Austria

Tariff structure and methodology
The Austrian gas market is divided into three balancing zones (East, Tirol and Vorarlberg). The Eastern Control Zone represents approx. 95% of Austrian gas consumption and covers seven of the nine federal states. Tirol and Vorarlberg are neither connected with the Eastern zone nor with each other, but supplied via Germany. Therefore Tirol and Vorarlberg are disregarded in the following fact sheet. For domestic use, principally a regulated entry-exit tariff system applies. However, the TSOs of the Eastern zone (OMV, Begas, GSG, OÖFG, EVN) do not separately charge shippers for transport. Instead, the costs of transport are passed on to distribution grid operators (on the basis of transported load and energy at a ratio of 70% to 30%) and are then included into the distribution tariffs which vary by region. All customers have guaranteed access to the network, which is ensured through the 'backpack principle' (exit capacity is automatically transferred to the new supplier) and the right of suppliers / distribution companies to apply for network expansions. A separate system of point-to-point tariffs applies for exports from domestic entry point (production, storage) and selected cross-border entry points. Transit on designated transit pipelines are subject to a regulated distance-based point-to-point tariff. There are three transit owners (BOG, TAG and OMV). OMV is the network operator for all of them. Transit capacity is at least partly allocated via auctions. Wheeling is offered on an unregulated basis by the Central European Gas Hub (CEGH) at the Baumgarten hub.

Tariff	**Firm**	**Interruptible**	**Tariff basis**			**Notes**
			Distance	**Capacity**	**Energy**	
Transport						
Consumers	✓	✓	-	kWh/h	kWh	(1)
Exports and 'other' transit	-	✓	-	kWh/h	kWh	(2)
Transit pipeline	✓	✓	m³/h/km	m3/h	-	(3)
Backhaul (transit)						
Physical	✓	✓	m³/h/km	m3/h	-	(4)
Non-physical	-	✓	m³/h/km	m3/h		(4)

(1) Costs of transport are recovered via distribution tariffs for consumers. Interruptible capacity may be provided to large customers and for storage. Normal tariffs apply, but network users are reimbursed in case of congestion (25% of original capacity charge in case of short-notice

interruption on the day ahead, and 100% otherwise).

(2) Applies to exports from inland storage or production sites as well as 'other' transits within the control area East that are not directly registered on a transit pipeline;
Differentiated by transport distance (up to / more than 150 km), proportional refund of capacity charge in case of interruptions

(3) For **transit pipelines**, only the tariff methodologies are regulated by E-Control, tariffs can then be set freely by the transit pipeline owners (subject to price benchmarking)

(4) **Backhaul** is available for transit only. Physical backhaul capacity is only available for shippers who have contracted firm capacity into the original direction at 35% of the original price. Non-physical backhaul capacity is available for 50% of the original price on an interruptible basis.

Other notes:

- The basic contract **duration** for transit tariffs is 20 years. In addition, annual, monthly and daily contract durations are offered. For each year less than 20, a 0.5% increase applies with a one-year contract costing 10% more than 1/20 of a 20 year contract. For shorter contracts an additional increase applies with a one-month contract being 200% of 1/12 of a one-year contract. There is no further price increases for shorter contract durations.
- When transit entry or exit capacity is exceeding contracted capacity by more than 2%, an ex-post fine applies. If a 5% margin is exceeded, a second, higher fine applies.
- Unused capacity has to be offered on the secondary market via a central trading platform provided by OMV. If unused capacity is not offered the UIOLI principle applies.

Other services and charges:

- OMV as the largest network owner and the network for all transit pipelines offers to organise cross-border transit on more than one pipeline system according to the one-stop-shop principle.
- Title transfer services are available at CEGH AG for all cross-border interconnection points and are not part of regulation.
- All balance responsible parties (see 'Imbalance settlement' below) have to pay a separate tariff (pro rata gross consumption and trading turnover) to compensate for the costs of the settlement administrator AGCS.

Regulation		
Regulation is different for domestic transport and transit, and for transport and distribution companies, respectively. The costs of pure transport companies are directly derived from a company's financial accounts and are subject to rate-of-return regulation. In contrast, those part of the transport network that are owned and operated by distribution companies are subject to revenue cap regulation (1). For **domestic transport**, tariffs are directly set by the regulator on an annual basis. Conversely, for **transit pipelines**, only the methodology needs ex ante approval of the regulator, but network operators have to prove that their tariffs are comparable to the tariffs for similar services in similar systems. Following approval of the tariff methodology, tariffs can then be calculated by the network operators. The tariff methodologies for all three transit operators are almost identical. In contrast to domestic tariffs, transit tariffs are levelised for a 20 – 22 year period but are reviewed against and adjusted to actual costs every four years.		
CAPEX		
Determination of RAB	**Existing assets**	• The determination of capital costs is based on historic costs, which are directly retrieved from the financial accounts of each company.
	Replacement / Extension	• <u>Domestic network:</u> Application of an annual 'investment factor', which aims at compensating for potentially higher capital costs of new investments (differentiated for replacements and extensions, see "Incentives to Invest" below) • <u>Transit pipelines:</u> Planned investments are considered when setting the tariffs for the next regulatory period (subject to an ex-post monitoring and compensation where applicable)
Depreciation	**Method** **Grid assets** **Other assets**	Linear depreciation 50 years 30 years
Cost of capital (WACC)	**Domestic** **Transport**	6.97% (pre-tax) (2) ≤ 8.3% (post-tax) (3)

(1) For distribution companies, the general x-factor is 1.95%, individual x-factors are capped at 2.9%, cost increases are considered with a network price index.

(2) Based on with 4.21% risk free rate, 0.60% debt premium, 5% market risk premium, asset beta

0.325, equity beta 0.651, gearing 60% and tax rate 25%

(3) Interest rate for debt is capped at 6.5%; Debt to equity ratio is set at 60/40

OPEX

Operating costs are directly retrieved from each company's financial accounts and checked whether they are reasonably justified. These costs include:

- Operation and maintenance of the network;
- Monitoring of gas quality; and
- General administrative costs.

Domestic tariffs for consumers furthermore include the costs of fuel gas and the costs of the system operator AGGM.

For transit pipelines, OPEX furthermore includes the costs of linepack management, whilst fuel gas is either charged separately on actual cost basis or may be provided by shippers in kind.

Incentives to Invest

Similar to the general differentiation between domestic transport and international transit, different mechanisms apply.

- For **domestic transport** the Austrian Gas Act requires a long term planning with a horizon of at least 3 years, which has to be submitted to the regulator by the system operator AGGM each year for approval. All market players are obliged to provide the required data to AGGM. If network access is denied to a user due to capacity shortages, this constrained user can apply for an expansion investment which is then included in the long term investment plan. Projects included in the long term development plan are granted a higher rate of return for a limited number of years and can be compensated for the costs of pre-financing during construction.
- All other investments are subject to a so-called "investment factor", which has been set to a minimum of 1.5 % of the investment. For investments into network expansions, which are limited to 70 % of total investments, the investment factor is set as follows:
  - The financing costs (6.97 % of the book value) and the depreciation will be considered in addition to the cost basis. For re-investments – min. 30 % of total investments – only the financing costs (1.5 % of the book value) are considered.
- In the case of extraordinary investments the additional compensation of costs are the same as for new investments.
- Operators of **transit pipelines** are allowed to retain the revenues from capacity auctions, overrun fees and interruptible contracts. These can be used for additional investment measures. If no investment takes place the retained sum has to be returned to shippers through a reduction of fu-

ture tariffs. In addition, cross-border infrastructure may be exempted from normal tariff regulation; with only one exemption granted so far (Nabucco).

- The allowed WACC for transit is deliberately higher than for inland transport so that it is internationally comparable.

Balancing

Procurement of Ancillary Balancing Services

For **domestic transport**, the system operator AGGM is responsible for maintaining the system balance of the Eastern control zone. Besides the use of linepack, residual balancing gas is provided by a balancing market operated by the settlement administrator AGCS. As a general rule, linepack is used in the first instance to compensate for imbalances. Only if the imbalance persists or becomes too big, will the system operator (AGGM) call off physical balancing gas from the balancing market.

Several companies offer balancing gas on the balancing market on the day-ahead, either based on storage capacities or interruptible load. Bids have a minimum duration of one hour and are remunerated at the offered price (pay-as-bid). The use of linepack is compensated at the volume weighted average market price in each hour.

Settlement of imbalances

For **domestic transport** Austria uses a balancing group model, with suppliers and customers aggregated into balancing groups. Each group is lead by a balancing responsible party (BRP) which is the representative of the group towards the system operator AGGM and the settlement administrator AGCS. The BRP is responsible for achieving an equilibrium of use and supply in its balance group and is liable for any resulting imbalances towards the settlement administrator.

Imbalance settlement is carried out at hourly intervals. Imbalance prices are equal to the volume-weighted average costs of residual balancing gas in each hour.

The costs for AGCS as settlement operator and AGGM as network operator are borne separately by network operators (AGGM) and balancing groups (AGCS).

For **transit**, shippers have to balance their injection and offtake (minus fuel gas) on a daily basis. If the unbalance persists for more than a day, they have to compensate the network operator in kind within 48 hours. If the absolute imbalance is larger than 2% (on a daily basis) of committed flow rates, or if the shipper fails to compensate the imbalance in kind, shippers are subject to a penalty of 1 €/MWh. If the cumulative unbalance also exceeds 2% a fine of 10 €/MWh applies.

2. Belgium

Tariff structure and methodology

The Belgian TSO Fluxys operates an entry/exit transport model, although each transport contract stipulates a link between the supply point (=exit) and the entry zone from which that point is supplied. When nominating gas flows shippers are free to nominate outside the stipulated contractual link, however during exceptional cases of congestion, the TSO can require shippers to re-nominate according to the contractual link. The allocation of transport and transit capacity is according to the first-come-first-served principle (new allocation rules based on an open subscription window were published in late 2009). Transport and transit tariffs are charged on subscribed capacities.

Following a long dispute on the future tariffs, Fluxys and the regulator CREG agreed to new multi-annual tariffs for the transport, transit and storage of natural gas on 30 October 2009. The new tariffs will be capacity based and will apply from 1 January 2010 until the end of the regulatory period. A small commodity fee for transport and transit will be invoiced separately.

In the near future transit tariffs will also be based on the entry-exit model.

Tariff	Firm	Interruptible	Tariff basis			Notes
			Distance	Capacity	Commodity	
Domestic transport						
Entry	✓	✓	-	m3/h	-	(1)
Exit	✓	✓	-	m3/h	m3	(2)
Transit	✓	✓	km/m3/h	m3/h	Gas in kind	(3)

(1) **Entry** points are grouped in eight entry zones in Belgium.

(2) For **exit** or supply capacity tariffs, a distinction is made between end customers directly connected to the transport grid and those connected to the distribution grid. Further distinction is made between SLP and non-SLP customers.

In addition, for supply to non daily metered (NDM) end customers a specific higher capacity tariff applies since they are not submitted to the balancing tolerance regime.
For main base load transport (MBT – end customers with high but constant load profile) a discount on the firm non-SLP tariff applies. The discount is 25%, 40%, 55% or 70% for sub-

scribed capacity of < 5000, 5000 – 15000, 15000 – 30000, or > 30000 m3/h, respectively.

(3) The tariff regime for transit will be fundamentally changed in 2010. Fluxys already presented the new transit model to the shippers at the end of 2008 (presentations are available on Fluxys' website) and intend to start at the beginning of 2010. Transit contracts will be included into the entry/exit model and include the cash-out of fuel gas.

Other notes:

- The basic contract **duration** for transport capacity tariffs is one year. A seasonal tariff applies among others for monthly contracts for firm non-SLP, conditional and interruptible exit capacity. The capacity tariff is 1/365 of the annual tariff, multiplied by the number of days and a monthly factor (which is higher in winter months than in summer months). For daily contracts, this tariff is multiplied by 1.2. An additional commodity tariff of 0.2% of actually transported gas applies to both monthly and daily contracts.
- In case of **excess utilisation** of transport capacities (subscribed capacities +/- 10% rate flexibility for supply points) a tariff supplement for peak and non-peak exceeding apply. Excess capacity of a shipper at an exit or entry point is determined both on an hourly and a daily level.
- There are clear distinctions between **local vs. cross-border** entry/exit points. This relates to the four balancing zones distinguished, to the transmission/transit distinction and to the location and characteristics of end consumer supplied.
- **Backhaul** is not offered as a service.
- **Interruptible entry** is divided into 5 different products (conditional, level 1 and level 2 interruptible, operational and day-ahead interruptible), which are all charged on a capacity base; an additional subscription fee applies for day-ahead interruptible capacity.
  - Conditional capacity can only be interrupted under agreed, well-defined conditions (defined in the contract).
  - Level 1 interruptible capacity are offered per entry point in two subscription rounds and determined by the capacity utilisation in the preceding gas year. In the first round grid users can subscribe for the full next calendar year, up to a maximum which is calculated pro rata of their market share. Unsubscribed capacities in the first round are offered in the second round on a first come first served basis and can be for shorter periods, but always with an end date of 31 December.
  - Level 2 interruptible capacity is offered if Level 1 capacity is no longer available and is interrupted before level 1 capacity.
  - Interruption of operational interruptible capacity depends on the utilisation of capacity by Fluxys for its own operational needs.

- Day-ahead interruptible capacity is offered for the next day, based on nominations for the entry point concerned. A notification delay of 2 hours applies for interruption of these interruptible capacities.

- **Interruption of exit** capacity is only available as conditional and interruptible capacity. In case of conditional capacity, interruption only occurs in predefined low-temperature situations. The other interruptible capacity is the more general service. Both are charged with a capacity and commodity fee.

Other services:

- An additional transit/transport service allows for transit capacity to be converted into transport entry capacity, i.e. to transfer nominations from a transit delivery point to a transport exit point to supply end-consumers.
- With the ZEE platform capacity service the shippers are flexible to transfer gas between the several Zeebrugge entry points, include the Hub. The tariff consists of a monthly membership fee, a utilisation fee per MWh transferred and a commodity fee (a percentage of actual energy transported).
- Additional cumulative or daily imbalance tolerance for exit capacity.
- Pressure reduction at the supply point, if the pressure reducing station at the supply point is operated by Fluxys.
- Odorisation.
- Quality conversion.
- Direct line capacity for end customers that are connected through a direct line for which Fluxys has responsibility. For these end customers, no separate entry and exit capacities have to be subscribed. This capacity service does not contain any flexibility service.

Regulation		
Belgium transport tariffs are subject to a modified version of revenue cap regulation, with a regulatory period of 4 years. The resulting tariffs approved ex-ante by the regulator CREG, based on a proposal by the TSO and the regulatory and tariff principles defined in secondary legislation. Tariffs for transport capacity services are based on estimated costs of service and are further split into controllable and non-controllable costs. Controllable costs for the regulatory period are indexed to the consumer price index (CPI) and may additionally be subject to an efficiency factor (X-factor). Final tariffs are set based on the estimated development of overall costs, with a constant tariff applying for the entire regulatory period.		
CAPEX		
RAB	**Existing assets**	Historic costs (net replacement value used for the opening account from 31 December 2002) (1)
	Replacements / Extensions	Extension investments are fully added to the RAB, whilst replacement investments may be fully or partially added.
Depreciation	**Method**	Linear depreciation
	Grid assets, buildings	33 - 50 years
	Other assets	5 - 10 years
Cost of capital (WACC)		6.21% (pre-tax) (2)

(1) Determined by Royal Decree of 8 June 2007. This value is based on the net active value of € 130.1 million and an additional value of € 753.5 million.

(2) Based on a risk-free rate for OLO-bonds ("Obligations Linéaires") with a maturity of 10 years, a risk premium of 3.5% weighted by a beta-coefficient of 0.65, and a sector-specific credit risk of 0.7%. The ex-ante OLO for the regulatory period is based on the average OLO over the previous four years (i.e. the average over 2004-2007 for the regulation period 2008-2011 was 3.93%). Ex-post, the realised OLO per year is used. The share of equity is capped to 33%.

OPEX

Operating costs are based on the company's financial accounts and include the costs of fuel gas. For the purpose of incentive regulation, OPEX are furthermore divided into controllable and non-controllable costs, with only the former subject to efficiency targets. Controllable OPEX include for instance the costs of labour, goods and services, rental and leasing, insurance.

Balancing

Belgium is divided in four balancing zones (three for H-gas and one for L-gas). Shippers are responsible for keeping the balance on a daily basis per balancing zone. Each shipper's imbalance (in kWh) is subject to hourly, cumulated and daily tolerances. Basic tolerance levels for daily, hourly and cumulative imbalances are provided to shippers when they buy capacity and come at no extra charge. Additional tolerance margins are available from Fluxys or on the secondary market.

Limits are directly related to subscribed exit capacities for firm non-SLP and SLP supply, conditional and interruptible supply, and QC.

Ex-ante transfer of imbalances between balancing zones is done automatically by the TSO via subscribed transfer rights, which are free of charge. Moreover, all flexibility services are tradable on the secondary market, charged by a fixed fee per transaction.

Cumulated and daily shortages (surpluses) are charged on the basis of a reference price which is the maximum (minimum) of three market prices. Commodity is also settled at this reference price.

Ex-post trading of imbalances is not an option.

Procurement of Ancillary Balancing Services

No specific information provided

Settlement of imbalances

Imbalances in the **domestic market** are subject to a scheme of different tolerances, penalties and indexed cash-out prices as further described below.

Transit capacity services do not include any flexibility services. Fluxys resolves any imbalances in real-time by adjusting hourly exports in proportion to any deviations at the entry (import) point.

Imbalance		Tolerance level	Penalty	Cash-out price
Basic rate	✓	10%	-	-
Hourly	✓	50% or 16.67% (1)	1/365 of the annual capacity tariff for firm non-SLP exit capacity multiplied by the hourly imbalance volume for a deficit. There is no penalty for a surplus.	-
Cumulative	✓	50% (2)	40% (60% or 80%) (3) of the reference price (4) for cumulative shortage or surplus	-

Daily	✓	16.67%	40% (60% or 80%) of the reference price (4) for surpluses and deficits above the daily tolerance limit but below twice the limit (between twice and triple the limits, or above the triple limit).	100% of the reference price

(1) Hourly tolerance levels are differentiated by supply characteristics, see below on tolerance levels.

(2) One hour of subscribed capacity, with upper and lower limits at 50% of this.

(3) The penalty level is differentiated for three ranges of shortages (surpluses):

- 40% for the range between the cumulative limit and the sum of the cumulative and daily limit
- 60% for the range between the sum of the cumulative and daily limit and the sum of the cumulative limit and twice the daily limit
- 80% for imbalances above the sum of the cumulative limit and twice the daily limit
- For the last hour of the gas day only the amount (in €) higher than the penalty for the daily imbalance is applied

(4) Cumulated and daily shortages (surpluses) are charged on the basis of a **reference price** which is the maximum (minimum) between:

- Day-ahead Dow Jones index for Zeebrugge (ZIG-index)
- SMP buy (sell) price on the OCM market (published by Energy Argus Daily)
- Price at which Fluxys bought (sold) the gas when the gas purchasing (sales) mechanism was made operational (=Dow Jones publications for the Zeebrugge market)

The **basic rate flexibility** level is 10% of subscribed exit capacity. Additional rate flexibility of 5% for firm SLP (or 20% for firm non-SLP, conditional, interruptible and QC) can be subscribed.

The tolerance is assigned for both firm and interruptible exit capacities. Hourly **tolerance levels** for firm non-SLP supply, conditional, interruptible, and QC supply are 50% for subscribed exit capacities below 20000 m3/h and 16.67% (1/6) for the part above 20,000 m3/h. For firm SLP supply it is always 16.67% of subscribed capacity.

Imbalances of the grid user are settled on a monthly basis by Fluxys.

Transit capacity services do not include any flexibility services; transit customers make a commitment to balance incoming and outgoing natural gas flows on an hourly basis on a route.

Special services:

- Apart from additional rate flexibility, Fluxys also offers additional cumulative SLP and non-SLP and daily imbalance tolerance capacity.
- In order to encourage shippers to nominate daily capacities at entry points and hourly capacities at exit points as precisely as possible, Fluxys charges **scheduling fees**. Entry scheduling fees are charged if quantities allocated deviate from nominations by more than 10% (re-nominations are excluded). Supply (exit) scheduling fees are charged if quantities allocated deviate from nominations by more than 10% and when the difference is higher than 30000 kWh. An additional scheduling fee applies to encourage renomination.

Financial neutrality of TSO: No information available

3. Bulgaria

Tariff structure and methodology
The Bulgarian gas TSO Bulgartransgaz has recently been unbundled from gas distribution company Bulgargaz; both companies are owned by BEH EAD. The Bulgarian market is heavily monopolized, with Bulgargaz having a share of 98.74% in 2007. Tariffs for the transmission system are regulated, but the details are not published. The only shipping customer of Bulgartransgaz is Bulgargaz. There is a separate pipeline system for transit, also owned and operated by Bulgartransgaz. Transit tariffs are not subject to regulation but are freely negotiated bilaterally. The transmission charge is uniform for all customers (postage stamp). Standard contracts generally do not have a specified duration. There are no contracts with a duration of less then one year. Each year annual volumes are settled for the next year.

Regulation		
Transmission tariffs are derived from a cost based regulatory approach, using rate of return regulation. Prices are established on the basis of the approved revenue, including a forecast of justified costs and the allowed rate of return. The regulatory period is one year. The Rate of return (RoR_e) for the equity is fixed and is post taxes (corporation tax of currently 10 %) The Rate of return (RoR_d) for the debt is on the base of the loan agreement, but not more than the average interest rate in country. The Rate of return (RoR) is determined as a real pre-tax rate.		
CAPEX		
RAB	**Asset Valuation Concept**	Approved by the commission RAB is calculated using the following formula: RAB = A – F – D + WC

		where: RAB = regulatory asset base; A = recognised value of used and useful assets, based on the price of acquisition; F = Financing – book value of assets being acquired gratuitously; D = depreciation of assets used for licensing activities; WC = working capital;
Depreciation	**Method** **Grid assets** **Other assets**	Linear depreciation over the expected economic life-time: • Pipelines – 25 years • Automatic gas pressure regulating station – 25 years • Buildings – up to 50 years, but not less than 25 years • Machinery and equipment – up to 45 years
Cost of capital (WACC)	**Domestic** **Transit**	RoR is real pre-taxes • The RoRd is 4.23% • The RoRe is 5.00%

Balancing
The TSO is primarily responsible for keeping the national gas system in balance. Balancing gas is purchased from Bulgargaz; for seasonal balancing an underground storage (Chiren) is operated by the TSO. As there is only one shipping customer, Bulgargaz, no imbalance settlement is applied. However, an imbalance settlement with a daily balancing and a weekly settlement are in preparation.
Physical balancing is conducted by the TSO relying on two instruments to maintain system stability: • Linepack of the transmission system • Storage capacity – The capacity storage is around 1.1 bcm, but a large part of the storage space is for so-called buffering natural gas, balancing and storage account only for 0.5 bcm. In the summer the storage offers free capacity to customers who want to store natural gas for the autumn or winter.

4. Czech Republic

Tariff structure and methodology

The TSO RWE Transgas Net applies different tariff regimes for domestic and transit transmission. For domestic transport a uniform entry-exit tariff system with rates for entry and exit points is used. Entry and exit tariffs are differentiated for border points, points at virtual gas storage facility and domestic points. Transmission capacity (firm and interruptible) can be booked daily, monthly and yearly, multi-annual contracts are also allowed. There are 8 zones (only 6 zones from 10/2009) for booking capacity, from 2010 (third regulation period) capacity bookings for domestic supply will be obsolete, payments will be rolled into distribution tariffs.

Transit tariffs are point-to-point tariffs for specified pairs of border points.

Market rules differ between cross-border and domestic capacity allocation. The local transmission fees are regulated once a year, transit fees are negotiated (published for couples of entry + exit points, usually once a year). Short term contracts are more expensive than yearly based contracts.

Tariff	Firm	Interruptible	Tariff basis			Notes
			Fixed	Capacity	Energy	
Transmission	✓	✓		1.000 m3/day	-	(1)
Transit	✓	✓		1.000 m3/day	Fuel gas in kind	(2)
Wheeling (transit)	✓	-		1.000 m3/a	-	(3)
Backhaul (transit)	✓	-		1.000 m3/day	Fuel gas in kind	(4)

(1) Payment is for booked capacity only

(2) Transit tariffs also include a separate shorthaul tariff. Fuel gas for compressor stations has to be provided by shippers, normally 0.77% of transported volumes, less (up to zero) for backhaul, zero for shorthaul.

(3) Wheeling is only available for transit at border points Lanzhot and Waidhaus

(4) Backhaul is only available for transit at prices ranging from 0.8 to 0.829 of the original price. A bundled product of both directions is available at 1.35 of the original price.

Basic contract duration is one year. Monthly tariffs are derived from the annual tariff, the factor depending on the month, ranging from 0.083 to 0.4. Daily tariffs are 0.2 * the monthly tariff. Short term transit contracts are available at a factor of 0.2 + (m/12), with m being the number of months of contract duration. Daily contracts are available for 1.415% of the annual contract. For transit, contracts longer than one year are available but without a discount compared to annual contracts.

The discount for domestic interruptible tariffs depends on the negotiated (in advance) number of days with delivery interruption. For transit, prices are the same as for firm capacity but shippers are reimbursed for each interruption.

The capacity charge without relation to utilisation of the transmission system (one component tariff) is under discussion. From 2010 the regulator is considering the implementation of a variable component.

Other services:

- **Transit:** Capacity shift from one route to another

Regulation

The regulator sets the **revenue cap** for the gas transmission activity of RWE Transgas Net for the five year regulatory period (2005-2009). Transit transmission tariffs are unregulated.

The gas transmission system consists of a part used exclusively for inland transmission, and a transit part used primarily for transit transmission to foreign countries and, to a lesser degree, for domestic transmission for customers in the Czech Republic. This is why it was necessary to determine the portion of the transit part's costs, depreciation and amortisation, and assets relevant for domestic transmission. Based on the data provided by RWE Transgas Net on the gas quantities transported, capacities, and distances between transfer stations, **18.72 per cent** of the transit part's costs, depreciation, amortisation and assets were set as the relevant portion attributable to inland gas transmission for the second regulatory period.

Allowed costs of the regulated entity do not include:

- costs not allowable against tax,
- interest on loans and lease margins,
- costs of setting aside and releasing reserves,
- lease payments, other financial and extraordinary costs.

CAPEX	
RAB	The initial value of the RAB for the second regulatory period (2005-2009) was determined using scaled-up cost data of 2003. During the regulatory period the basic RAB value will be adjusted by changes in the regulatory asset base considering new investment.
Depreciation	The regulator has decided that during the second regulatory period it will adjust depreciation by changes in the value of depreciation, whereby the formula will at all times include its actual value. The company will be motivated to invest in equipment to maintain the value of its operating assets (and, in turn, its profitability), which will ensure the quality and reliability of the services provided to the final customers.

Cost of capital (WACC)	• WACC is 6.134% (post tax, nominal), that corresponds with 8.289 (pre tax, nominal) considering corporate income tax of 26%
	• The main components of WACC are set as follows:
	  • The cost of debt has been expressed as the sum of a risk-free rate of return (rf) of 4.18% and a credit spread (CS) of 0.5%. The credit spread expresses the interest premium that reflects the rate of risk inherent in the investment.
	  • The risk-free rate of return has been calculated on the basis of five-year bonds (2005 – 2009), in view of using the nominal value of WACC throughout the five-year regulatory period. The risk free rate is 4.18%
	  • Market risk premium: 6.32%
	  • Gearing: 20%.

OPEX	
Energy (fuel) costs and other operational costs	• Fuel gas is taken into account as a part of the local transmission fee; • OPEX components (wages) are escalated for every year of the regulatory period using wage index and PPI.
Tariffs are set by the regulator ex-ante. For the difference between allowed revenue and actual revenue of the network operator the regulatory formula contains a correction factor. The correction may have a positive or negative direction, and in both cases the time value of money is the same. The efficiency increase requirement for the TSO is set to 10% over the five year regulatory period. This leads to an annual efficiency factor of 2.085%. The market Rules and the Price List are adjusted each year. However, the stability and flexibility of the regulation rules (principles) is secured. The rules for the third regulatory period (2010-2014) are currently under discussion.	

Balancing

In the Czech Republic a daily balancing is applied. The TSO is responsible for balancing the gas system in cooperation with the DSOs. The TSO is authorised to buy the balancing gas for the balancing of the system. Penalties of the shipper imbalances are paid only if the system is in imbalance and the system deviation has the same direction as a deviation caused by shippers. Imbalance prices are set by the regulator with reference to the price of imported gas. They are paid only if the shipper does not include the deviation in the (re-)nomination for the next day.

Possible tools which can be used by the TSO are set by the regulator without a clear priority. However, it is expected that firstly linepack of the TSO and the DSO´s systems is used. If it is not sufficient, the TSO is authorised to buy gas. The TSO also has a “flexibility contract” for balancing the system. Basic tool is linepack of the TSO and the DSO´s, because capacity of the Transgas Net (TSO) transmission system is high (linepack of the transit system + the domestic transmission system) and not fully utilised. The linepack capacity is sufficient to cover the operational difficulties under normal conditions.

Shipper’s imbalance is calculated separately for each entry and exit point. Total daily deviation represents the sum of deviations on entry and exit points, corrected for tolerances sold or bought on the unused tolerance market minus the shipper’s tolerance.

Settlement of imbalances (Domestic)				
Imbalance		**Tolerance level**	**Penalty**	**Cashout price**
Daily	✓	(1)	Applies only if system imbalance is in the same direction as the shipper (2)	40% / 160% of reference price (3)

(1) The tolerance level depends on the difference between daily contracted capacity and gas nominated for each day. The higher the difference between capacity and nomination, the higher the level of tolerance. In practise it usually represents something like a seasonal or temperature tolerance level.

(2) If system imbalance is lower or equal 42,970 MWh, fixed off-tolerance charge is (0.0032*SO+10) CZK/MWh (with SO being system imbalance); ranging from 10 to 147.5 CZK/MWh
If SO is between 42,970 MWh and 110,695 MWh, fixed off-tolerance charge is (0.0000013726*SO²-0.115*|SO|+2554.7) CZK/MWh; ranging from 147.5 to 6,634.8 CZK/MWh
If SO is greater than 110,695 MWh, fixed off-tolerance charge is 6,644 CZK/MWh

(3) 2 prices system for imbalance charges: if there is a lack of gas in the system, the price is 60% higher than the reference price. This price is paid only if the imbalance is not compensated in kind within two days. If there is a surplus of gas in the system, the price is substantially lower (40%). The reference price is derived from the ICE Brent Index in US Dollar according to the following formula:
Reference price = (2.5 + 0.36 * Rbrent) * ERp ; with
Rbrent = unweighted average of the monthly average ICE Brent Index values of the last nine months
ERp = arithmetic average of the exchange rates US Dollar to CZK listed at Czech National Bank for the last month.

- Recovery of balancing costs in principle is done through the imbalance charges. The difference between actual balance costs and the imbalance charges at the end of the year is taken into consideration by the regulator and included into the transmission fees for the next year.
- For **transit** daily balancing applies, the tolerance level is 2% of contracted capacity, fixed out-of-tolerance imbalance price (penalty) is 202 CZK/MWh, balancing gas prices are based on oil prices as described above for domestic transport.

5. Denmark

Tariff structure and methodology

TSO Energinet.dk is using a regulated **entry-exit** tariff system for gas transmission. As Denmark has substantial indigenous gas production, the Danish transmission system facilitates only export, no physical import or transit is possible. Import capacity is available on a non-physical interruptible basis, (as backhaul flows). The allocation of transmission capacity is according to the first-come-first-served principle. The transmission tariffs are comprised of a capacity and a commodity charge, with the capacity charge making up for 75% of the TSO's costs. The commodity charge further applies only for flows at the exit zone or cross-border exit. Theoretically the UIOLI principle applies, but so far it has not been put to use. There is a secondary capacity market which is only rarely used.

Shipper's commodity charges and fees in the transmission system are based on allocated gas quantities. At entry and cross-border exit points allocated quantities correspond with accepted nominations, for the exit zone allocation is based on metered values.

Tariff	Firm	Interruptible	Tariff basis			Notes
			Fixed	Capacity	Energy	
Transport	✓	✓	-	kWh/h/year	kWh	

Interruptible capacity is offered if insufficient firm capacity is available. Interruptible capacity is further differentiated between capacity which will become available as expected due to backhaul flows (level 1) and capacity which would require extraordinary backhaul flows or non-usage of level 1 interruptible capacity. For entry at Dragor (from Sweden) there is no interruptible level 1 capacity available.
The following prices apply for interruptible capacity:

Level 1 – exit Dragør	97.5% of the normal capacity charge
Level 1 – entry and exit Ellund	95% of the normal capacity charge
Level 2 – exit Ellund and exit Dragør	85% of the normal capacity charge
Level 2 – entry Ellund and entry Dragør	70% of the normal capacity charge

Backhaul flows are only available on an interruptible basis.

The basic contract **duration** for transmission tariffs is one calendar year. In addition, monthly, weekly and daily contract durations are considered. The tariffs for periods of less than a year are differentiated for every month, considering peak/off-peak times seasons.

For the exit zone shippers have a free balance margin of 5% by default. This margin can be de-/increased by balancing service agreements between shippers and Energienet.dk.

For overrun a fee based on kWh/h applies. The overrun fee applies if the shippers' offtake in a specific hour exceeds 102% of shipper's total pooled capacity. If actual withdrawal deviates more than 20% from accepted nominations an additional nomination fee applies, based on kWh. If Energinet.dk is not able to deliver nominated quantities an underrun fee might apply, which is paid to the shipper by Energinet.dk based on kWh.

There is no distinction made between **local vs. cross-border** entry/exit points, except that the free balance margin only applies for the inland exit zone.

Fuel gas is included in transport tariffs.

Other services:

- Gas transfer, capacity transfer and balance transfer facilities are offered by Energinet.dk and are free of charge.
- In case of a Force Majeure event significantly affecting gas supply Energinet.dk ensures gas to the Danish market in up to 60 days of normal winter offtake and 3 days of extreme winter temperatures. The costs associated with ensuring gas from alternative sources are covered via a special **emergency supply** tariff. This emergency tariff charged per kWh applies for all quantities delivered to the exit zone. For quantities provided by shippers or storage operators at an entry point, storage or GTF to Energinet.dk as well as for quantities withdrawn by shippers without covering by injections at an entry point, storage or GTF the neutral gas price (see balancing) applies.

Regulation		
Cost-plus (rate-of-return) regulation is applied for the Danish gas transport network. Tariffs are **cost based**, reflecting full costs on an overall level, but with different accounts for Energiet.dk's gas and electricity networks. The costs also include a return deemed necessary to maintain the real value of the net assets as these appeared in the opening balance 2005. Only Energinet.dk's tariff methodology has to be approved ex ante by the regulator DERA, but DERA must also be fully informed ex ante about prices and tariffs, and DERA has the right to ask for amendments to prices/tariffs, if these are deemed not to be according to legislation. Each year actual revenues are reviewed by DERA and any revenue exceeding (or falling below) the allowed revenue is settled over tariffs during the next year. During this process the occurred costs are also checked for necessity. So far there is no detailed process but for future use international benchmarking is considered.		
CAPEX		
RAB	**Historic cost**	RAB is based on the real value of net assets in the opening balance from 1.1.2005. These values are indexed with an index comprised by DERA of wage and material cost changes.
Depreciation	**Method**	Linear over the expected useful asset life
OPEX		
Necessary costs of operation are purchase of energy, wages, services, administration, maintenance and other operating expenses such as the dismantling and disposal of obsolete technical networks or cables and expenses due to requirements imposed by public authorities.		
At the moment the application of an international benchmarking is being considered, to check whether costs are reasonably justified by height and cause.		

Balancing

The TSO Energinet.dk is responsible for the physical balancing of the Danish transmission grid. Energinet.dk itself owns one of the two large underground storages in Denmark and has also a contractual agreement with the largest gas company DONG Energy which enables Energinet.dk to sell gas to or to procure gas from DONG at all times.

Balancing is on a daily basis. Renominations are possible until 3:00 a.m. on the gas day. Denmark makes no use of a balancing group model, imbalances are settled individually with the shippers, but shippers are allowed to pool imbalances of their portfolios between deliveries and offtake. The right to pool imbalances can be restricted due to physical factors by Energinet.dk.

For exit zone capacity contracts shippers have a free balance margin of 5% of their maximum daily quantity. This free balance margin can be reduced or further increased by Balancing Service Agreements with Energinet.dk or transfer of balance margin between shippers on the Balance Transfer Facility, a secondary market for balance margins run by Energinet.dk. Balance margin is capped at a maximum level of plus/minus 24 times the shipper's total hourly capacity in the exit zone and transit points or total capacity at entry points. The balancing charge for imbalances applies only for the daily accumulated imbalance exceeding the individual balance margin.

Settlement of imbalances

Imbalance		Tolerance level	Penalty	Cashout price
Daily	✓	(1)	N/A	Energinet.dk is buying at 50% (25%) and selling at 150% (200%) of the neutral gas price (2)

(1) Increased cash-out price for total monthly volumes outside the balance margin

(2) Neutral gas price is derived from the monthly average of daily quoted TTF day-ahead prices (Zeebrugge, The Netherlands); numbers in parentheses refer to price for cash-out once the monthly balance margin has been exceeded

Special services:

New market participants can apply for a free balancing service agreement for the first 2 months.

6. Estonia

Tariff structure and methodology

TSO EG Võrguteenus is operating a regulated **postage-stamp tariff** system for gas transmission. Depending on the type of contract, charges are either based on contracted capacity at exit points or actual withdrawal. The tariff system is uniform and contains no locational elements. The allocation of transmission capacity formally is according to the first-come-first-served principle, although no capacity allocation is needed in practice.

Whereas normal transmission tariffs are set by the regulator (Estonian Competition Authority) ex ante, for transit tariffs only an ex post supervision applies.

Tariff	Firm	Interruptible	Tariff basis			Notes
			Fixed	Capacity	Energy	
Transport	✓		-	-	m³	(1)

(1) Transport is charged per 1000m³ transported/contracted volume.

Interruptible, backhaul and shorthaul products are not offered.

The basic contract **duration** for transmission tariffs is one calendar year. Shorter contract durations are not offered, for multi-annual contracts no discount applies.

Other services:

- Separate fees apply for gas transmission suspension and resumption

Regulation

Estonia applies an ex ante **incentive based RPI-X** type of regulation for domestic transmission charges. Transit charges are only subject to ex post price monitoring.

The duration of the regulatory period is chosen as requested by the company. The X-factor for 2009 was 1.5% but reduced to -5% due to the economic crisis.

The justified return is calculated through the WACC method, for the gas TSO it is 7.60%.

CAPEX		
RAB	**Asset Valuation Concept:**	The RAB is based on initial book value with adjustments for new investments and depreciation.
Depreciation	**Method**	Linear • 30 years for new and ~15 years for old assets • Depreciation rates are differentiated for old and new assets (since 2003)
Cost of capital (WACC)	7.60%	• Consists of a risk-free rate of return derived from 5 year average of 10-year German government bonds and the Estonian state risk. • Debt cost is based on WIBOR 3M
OPEX		
Labour costs		Labour costs are subject to a benchmarking and adjusted for inflation.
Energy (fuel) costs and other operational costs		Fuel costs are subject to benchmarking, given positive results actual contracts/costs are allowed for.

Balancing

The TSO is primarily responsible for the residual balancing of the national gas system. Estonia applies a balancing group model; every market participant is responsible for its own balance or can contract this responsibility to its supplier. For household customers the supplier is generally responsible. Except for one large industrial gas user, all gas consumed is imported by a single supplier (Eesti Gaas), who is also the balance provider for all its customers. For these customers, balancing service costs are included in the sale tariffs.

System balancing is achieved through the use of linepack and there currently is no price for imbalances, although a methodology for calculating the balancing price exists.

Physical balancing is conducted by the TSO relying on balance providers:

- Linepack of the transmission system
- Balance provided by single balance provider (Eesti Gaas)

7. Finland

Tariff structure and methodology

The Finnish gas sector is exempted from legal and operational unbundling of transmission network operations and market opening as long as Finland does not have a direct connection to the natural gas network of another EU member state and has mainly one gas supplier (Russia).

The TSO Gasum uses a **postage-stamp** tariff system for gas transmission. All gas available in Finland is supplied from Russia via a single pipeline, up to now no other international connections exist, neither does storage. Gasum is not only the TSO but also the single importer and supplier for gas, therefore there is no need for management of interconnection capacity and congestion. The transmission tariffs are charged based on contracted capacities, differentiated for annual gas volumes, number of hours of usage and peak capacity.

Tariff	Firm	Inter ruptible	Tariff basis			Notes
			Fixed	Capacity	Energy	
Transport	✓		-	MW	-	

The basic contract **duration** for transmission tariffs is one calendar year. Additional capacity in excess of already booked annual capacity is available subject to free transmission capacity.

Gasum is operating a secondary gas market which can be used to balance gas demand day-ahead.

Regulation		
Tariffs are set by the TSO Gasum based on the approved tariff methodology for the regulatory period. The regulator formally applies an incentive-based regulation method including the possibility to set efficiency targets for regulatory periods of four years each (2006-2009). The regulator monitors the development of the profits of Gasum and the quality provided. If the TSO earns more than approved via the methodology, Gasum is allowed to keep the profits during the regulatory period. At the end of the regulatory period these extra profits will be checked and it will be decided if these profits are considered to decrease tariffs for the next period. Profits falling behind planning are treated correspondingly.		
CAPEX		
RAB	**Replacement cost**	RAB is adjusted annually regarding depreciation and investment
Depreciation		no information available
Cost of capital (WACC)	**Method**	9-10% (nominal, pre-tax) • Additional risk premium of 3% for expansion investment

Balancing

A secondary market can be used to balance gas demand in a day-ahead market.

Deliveries of natural gas in excess of the annual transfer capacity are possible as additional transfers within the constraints of the transfer capacity of the network as maintained by the network operator. The buyers of natural gas will be charged an additional transfer charge for additional transfers. These additional transfers are used to balance demand.

Additional transfer charges are used to cover the average costs of stepped-up transfer pipe network use and supervision caused by deliveries in excess of the annually confirmed delivery capacities. The additional transfer charge is of the same magnitude for all buyers resorting to additional transfers. Where necessary, the price of the additional transfer of natural gas can be changed if the transfer capacity maintained by the network system operator requires such a change.

Changes in the price of additional transfer shall be announced at least two hours before the commencement of balance clarification period. The announcements concerning the changes in the price of additional transfer contain a point in time when the change took place, and additionally, closing and new prices of additional transfer. The price of the additional transfer during the computation period is computed as the arithmetic average of the prices of the balance clarification periods. The balancing interval is one hour. Imbalances are defined on contractual level.

The balancing period applied to natural gas trading on the Gas Exchange Ltd – the natural gas exchange – was changed from six hours to one hour as of 1 January 2007.

8. France

Tariff structure and methodology
The TSOs GRTgaz and TIGF operate a three-zone transmission system with **entry-exit tariffs** for gas transmission. Tariffs are solely based on capacity, no commodity charge applies. Transits are covered by normal transmission tariffs as well. GRTgaz uses an 'Open Subscription Period' where all users can apply for capacity; if capacity is insufficient the available capacity is distributed on a pro rata basis, whereas TIGF applies the first-come-first-served principle. The transmission tariffs structure is charged on subscribed capacities. The following fact sheet considers mainly the larger TSO (GRTgaz).

Tariff	Firm	Releas-able	Inter-ruptible	Tariff basis			Notes
				Fixed	Capacity	Energy	
Transport	✓	✓	✓	-	MWh/day/year	-	
Backhaul			✓	-	MWh/day/year	-	(1)

(1) **Backhaul** capacities are offered only at Taisnières H, Obergailbach, Oltingue, Larrau, price is 20% of firm capacities.

Interruptible capacity is in general worth half of firm annual capacity, at some points it is 75% and 90% though. The availability and allocation of interruptible capacity is carried out on a point-specific basis and depends on the temperature-driven consumption, nominations of all shippers and maintenance works scheduled.

Interruptible capacity is also made available from non-nominated capacity taken from shippers according to the UIOLI principle on short notice. Interruptible short-term capacity is 1/500 of firm annual capacity or 1/1500 of total firm summer and winter season prices.

Contract **duration** for transmission tariffs is either (multi-) annual, annual, seasonal, monthly or daily. Capacities of one year and less procured at short notice are required to represent 20% of the whole capacity portfolio offered. Multi-annual capacity subscriptions are limited to a maximum duration of 4 years for the link between GRTgaz North and GRTgaz South and may not make up more than 80% of total capacities. Monthly tariffs are at 1/8 of annual tariffs, daily tariffs 1/160 of annual tariffs.

Conversion capacity of H gas to L gas and vice versa is available for the Northern H and L gas zones in both directions.

Fuel gas is covered by tariffs.

Regulation		
The two TSOs GRTgaz and TIGF are regulated slightly differently. Tariffs for GRTgaz are based on a profit-sharing mechanism. Revenues are fixed for a 4 year period from 2009-2013, with an expenses and revenues claw-back account for differences between some expected costs and revenues and some ex post occurring costs and revenues (Capex and Opex linked to fuel gas). Profits from productivity gains are shared equally between GRTgaz and network users. Allowed revenues increase by 8% in 2009 and by 4.6% in the following years. For TIGF revenues are only allowed for two years with much higher increases of allowed revenue of 20% in 2009-2010 compared to 2007-2008. The focus here is on renewing aged network assets. TSOs are incentivised to sell more capacity than forecasted. They retain 50% of the difference between the actual revenue linked to transmission on the upper transport network and the forecasted revenue. As transmission tariffs are fixed based on assumptions relative to load factors and capacity subscriptions, the difference between ex-ante estimated costs and revenues, and ex-post determined costs and revenues is credited a claw-back account. Resulting imbalances are settled via adjustment of future tariffs. For the purpose of financial neutrality, the imbalances of the trust account yield a nominal interest rate of 4.2% before tax.		
CAPEX		
RAB	**Historic cost**	Assets are valued applying a 'current economic cost' method, based on historic cost, adding inflation (CPI) since start of operation and using mixed linear-progress depreciation method.
	Replacements	Planned investments are included in RAB
	Extensions	Planned investments are included in RAB. Higher allowed return for investment increasing the capacity of the network.
Depreciation	**Method** **Grid assets** **Other assets**	• Linear-progressive • Pipelines: 50 yrs • Compression facilities: 30 yrs • Other technical installations: 10 yrs
Cost of capital (WACC)	7.25% (real before tax)	• Consists of a risk-free rate of 2.3%, a debt premium of 0.4%, and a market risk premium of 4.5%.

		• For new investments a higher rate-of-return up to 10.25% is possible.

OPEX

The allowed OPEX of the current regulatory period are based on the OPEX of the TSO from 2007 and the OPEX forecast of the TSO. The cost estimations of the TSOs are audited by an external advisor.

The current provisions relative to OPEX that entered into force on 1 January 2009 are only relevant for GRTgaz. For 2009, operating income is detracted from gross operating costs, resulting in net operating costs. For the period 2010-2012 net OPEX will be annually adjusted by an official inflation index plus a premium of 1.1%, to be granted under reserve of energy costs for the operation of compressor stations, among others. In contrast, net OPEX has already been fixed for TIGF for 2009 and 2010.

Miscellaneous

While current RAB is remunerated at WACC, new investments aiming at enlarging transmission capacity or reducing the number of market areas may profit from a higher rate of return. Therefore, the former incentive scheme, which attributed an additional 125 base points to any investments on the transmission system put into practice after 1 January 2004, is re-valued. Investments envisioned after 1 January 2008 and implemented after 1 January 2009 may be conceded an additional 300 base points for a period of 10 years, given CRE's approval based on individual evaluation of the application. Thus, the investor may benefit from a total return of a maximum of 10.25% for new investments.

Balancing

The two TSOs defined their balancing regimes independently from each other, although in close co-operation with the regulator. In the following text the GRTgaz system will be described only.

Renominations are possible until 3:00 on the day of the delivery.

Procurement of Balancing Gas

In mid 2007 GRTgaz created a short-term balancing market, operated by the national energy exchange Powernext, to partially cater for gas in excess or in deficit on the gas transmission system due to the difference of the sum of injection and the sum of extraction. Balancing is carried out for each balancing zone separately. Nomination, deployment and invoicing of balancing energy takes place similarly to the standard process in the GRTgaz transmission contract.

Market-based procurement of balancing energy covers about 20% of the balancing needs. In addition, the French system uses linepack as well as, to a lesser extent, storage used by the TSOs.

Settlement of imbalances

Imbalance		Tolerance level	Penalty	Cashout price
Daily	✓	(1)	(2)	(2)

(2) GRTgaz offers shippers a standard tolerance band (in MWh/day) as a step by step decreasing proportion of their transport capacity booked and specific for each balancing zone, which has been updated in the current balancing rules. Additionally, shippers may acquire an optional tolerance band of +/-3% against yearly payment (€17/MWh/d), which may be reduced at lower temperatures. Moreover, GRTgaz defines a lower daily threshold of 70% of the daily tolerance (standard plus optional) and a cumulative threshold of 5 times the lower daily threshold.

Delivery Capacity subscribed	<0,5 GWh/day	>0,5 GWh/day <1 GWh/j	>1 GWh/day <2 GWh/j	>2 GWh/day <50 GWh/j	>50 GWh/day
Balancing zone	Tolerances in percentage of the total Delivey Capacity subscribed				
North	30%	20%	20%	5%	4,5%
North B	30%	20%	5%	5%	5%
South	30%	20%	20%	5,5%	5%

Example: A Shipper with total capacity booked of 60 GWh/day in zone ‘South’ will have a standard tolerance calculated as follows:

30% * 0.5 + 20% * (2 – 0.5) + 5.5% * (50 – 2) + 5% * (60 – 10) = 3,59 GWh/day

(3) Imbalances outside the tolerances are subject to the following charge pattern:

- Any deviations up to the lower daily threshold are added to the cumulative deviations account, which is subject to an additional tolerance (see below).
- The share of imbalances above the lower daily threshold but below the daily tolerance is charged at a price P1, which is defined as the volume-weighted average price of all balancing market transactions of that day; a one-price formula applies, i.e. shippers with excess energy (positive imbalance) receive the same price as shippers with a deficit (negative imbalance).
- The share of imbalances exceeding the daily tolerance are charged as follows:
  - Positive imbalances are penalised at the minimum of 70 % of P1 and 50 % Zeebrugge day-ahead market price;
  - Negative imbalances are penalized at the maximum between 130% of P1 and 150% Zeebrugge day-ahead market price.
- Imbalances on the cumulative balance account that exceed the cumulative tolerance on a specific day are charged at price P3, which is the minimum of 30% of P1 and 50% of the Zeebrugge day-ahead price on that day.

Miscellaneous

The settlement scheme described above leads to an unequal distribution of expenses and earnings for the TSO. GRTgaz seeks to frequently neutralise the imbalance settlement account and distribute the account value, including the value of remaining balancing gas quantities, among shippers at pro-rata of their yearly capacity booking.

As the balancing price is partially left to a competitive mechanism, shippers are constantly updated on the cost of their imbalances, which are connected to economic information instead of a normative reference price. From 1 December 2009, GRTgaz balancing platform will be integrated with the wholesale market operated by Powernext. Market liquidity is expected to be improved by merging the isolated balancing market with a national gas exchange. A first step had already been made by putting the lot size of 250 MWh in line with the minimum lot size of Powernext Gas.

9. Germany

Tariff structure and methodology

In 2006/2007 a principally de-coupled entry-exit tariff system was introduced. As the German gas network is highly fragmented, the law and market rules prescribe the cooperation of network operators, primarily within a market area, but also between different market areas. Flow commitments and limitations to fully decoupled entry and exit capacity reservations are allowed to prevent congestion.

Gas transmission tariffs are calculated by the tariff at the specific entry or exit point (in €/(kWh/h)/a), multiplied with the booked entry or exit capacity in kWh/h. Within the principles of allowed revenues, TSOs are free to set their entry and exit tariffs under control of regulatory overview.

Capacity is primarily allocated according to the first come first served principle. In case of congestion (more than 90% of technical capacity booked), capacity shall be auctioned once in a year.

Tariff	Firm	Interruptible	Tariff basis			Notes
			Fixed	Capacity	Energy	
Transport	✓		-	kWh/h	-	(1)
Interruptible		✓		kWh/h		(2)
Backhaul		✓		kWh/h		(3)

(1) For booking periods of less than one year, tariffs are further multiplied with daily, weekly, monthly and/or seasonal factors (summer is cheaper than winter), by which short-term capacity is by far more expensive than yearly capacity.

(2) Interruptible contracts are available at varying conditions from several TSOs with prices ranging from 60-100% of normal tariffs, additionally reimbursement applies in case of interruption.

(3) Some TSO's offer additional products, such as backhaul and shorthaul capacity. Backhaul capacity, if offered, is generally available for 60% of the normal capacity price.

Short-term capacity is offered at varying conditions (depending on the TSO), prices range between 120% and 425% (seasonally dependant).

Regulation		
Gas networks are under revenue cap regulation starting in January 2009. As there was the possibility for interregional or internationally operating gas TSOs to apply for exclusion from the regulation, the incentive regulation of some TSOs will start in 2010 instead of 2009. So, the first regulatory period of incentive regulation will last four or three years. From 2013 the revenue cap will be fixed for a five year regulatory period. The regulator decided for a revenue cap as general tariff methodology for all energy networks. Unless there is no exclusion from regulation this general revenue cap formula is applied to gas TSOs and DSOs. TSOs can apply for so-called investment budgets if they make extension investments or investments to restructure their transmission system. Hereby special revenues for investments are granted. The revenue cap is applied on the basis of total cost (TOTEX), adjusted for efficiency increases. To derive the individual revenue reduction path ("X-factor") a TOTEX benchmarking is carried out using DEA (Data Envelopment Analysis). The maximum inefficiency of network operators is capped at 40%, i.e. irrespective of the actual result, the benchmarked network operators will be set at 60% efficient outcome even if their benchmarking result is below. The annual efficiency increase requirement for the first regulatory period is determined as 1/10 of the inefficiency. The network's total costs are divided into non-controllable and controllable costs. Non-controllable cost contains concessions, fees and other cost beyond the TSO's control. In contrast, controllable costs are subject to general and individual efficiency improvement requirements and inflation adjustment. A regulatory account is established for each of the regulated companies to record deviations from the actual revenue and the allowed revenues. This is done on a yearly basis. The regulated company is required to submit to the regulator by 30 June each year the realised revenue and energy transmitted for the previous year (January to December). The regulator has the responsibility first to approve these and secondly to calculate the difference between the actual and allowed revenues, which it records in the regulatory account. The account balance is determined for the first four years of the revenue regulation (first regulatory period). This amount is then carried over to the next regulatory period and allocated as an addition or deduction of non-controllable costs.		
CAPEX		
RAB	**Cost base / concepts**	The regulator uses two valuation concepts for the assets contained in the RAB: • physical asset maintenance for equity funded parts of assets acquired until the

		end of 2005, and • financial capital maintenance concept for debt funded part of assets acquired until the end of 2005 as well as for assets acquired from 2006. The first approach uses depreciation based on replacement costs, however only the equity funded part, and real rate of return on equity. The second approach uses depreciation based on historic costs and nominal rate of return on equity.
	Replacements	The regulatory regime does not foresee an ex-ante CAPEX approval. This implies that replacement investments are not considered separately but assumed to already be part of the allowed CAPEX.
	Extensions	For a certain group of investment (e.g. investment reducing congestion) the Gas TSO's can apply for a so-called investment budget. The CAPEX (depreciation plus return) of the extensions that are approved by the regulator are added to the allowed revenue two years after commissioning (meaning the cost are already considered in course of the regulatory period).
Depreciation	• **Linear**	Pipes 45-65 years Compressors 25 years
Cost of capital	**Return on Equity**	• up to 40 % equity ratio for assets that have been acquired before 1 January 2006 – **7.56 %,** real before corporate tax and after trade tax • up to 40 % equity ratio for assets that have been acquired after 31 December 2005 – **9.29 %,** nominal before corporate tax and after trade tax

		• equity that exceeds 40 % equity ratio for assets is treated as debt: for the first regulatory period 4.23 % (see also cost of debt)
	Cost of Debt	The regulator chooses as market-based return on debt the average market rate of the last 10 years on bonds issued by domestic institutions. For the first regulatory period: 4.23%.

Balancing

Since October 2008, the German gas system has been operating a daily balancing regime, with hourly incentives. Each market area has one balancing TSO who is responsible for balancing the system and procuring / providing system flexibility. Sources of flexibility strongly differ between the market areas. As a trend, northern market areas have more underground storage available, whereas TSOs in the south tend to use more linepack or other (smaller) storage. Some market areas have also other sources, such as interruptible (industrial) customers, flexible supply contracts or production.

TSOs are obliged to always use their own linepack first. Secondly, they shall exchange balancing gas (linepack) between different market areas. Only after both are exhausted, are the TSOs allowed to access other, i.e. external sources of flexibility. This external flexibility shall be contracted via a market-based mechanism. In practice, the TSOs tender balancing flexibility once or several times a year.

Settlement of imbalances

Imbalance		Tolerance level	Penalty	Cashout price
Daily	✓			(1)
Hourly	✓	(2)	(3)	

(1) Imbalance settlement prices are based on a price basket consisting of the daily gas prices at Zeebrugge, TTF, NBP and the EGT hub: Positive imbalances are 'bought' by the TSO at the second lowest price of these four minus 10%, negative imbalances 'sold' at the second highest price plus 10%.

(2) Hourly incentives are applied to metered customers only, with 'small' customers having a 15% tolerance (related to 1/24 of the metered daily value) and large metered customers (> 300 MW) having a tolerance of 2%. For the daily settlement period no tolerances are granted.

(3) Hourly deviations outside the hourly tolerances are charged a fee of 15% of the average between the price for positive and negative imbalances

10. Great Britain

Tariff structure and methodology
The GB market has a nodal priced, decoupled, entry–exit tariff regime for transmission capacity. This is supplemented by other tariffs that act to ensure revenue recovery, fund incentive arrangements or recover specific identifiable costs such as those associated with connection and metering services. Firm Entry baseline capacity is available in daily, monthly or quarterly bundles of daily rights allocated through auctions that operate on-the-day and at day-, and between one month- to 16 years-ahead. Incremental Entry capacity rights are obtainable through the long-term auctions (included above) subject to meeting an investment test threshold that will oblige the TSO to release additional capacity from a point in the future, with a default lead time of 42 months. Firm Exit baseline capacity is available in annual bundles of daily rights through an administered process that allocates rights from the next gas year up to three years into the future, i.e. Y+1, Y+2, Y+3. Firm Exit capacity is also available through daily auctions, held day-ahead and within day that provides single day rights. Incremental Exit capacity is available as enduring daily rights through an administered process. The enduring rights are available from usually 48 months ahead (Y+4) and continue until the user provides notice to reduce those rights, with a minimum commitment from the user to pay for four years of capacity charges. Interruptible Entry capacity is made available day-ahead and the new Exit regime (being introduced from 1 April 2009) will introduce a standing offer of daily interruptible (“Off-Peak”) Exit capacity according to a rules based assessment of available capacity.

Tariff	Firm	Interruptible	Tariff basis			Notes
			Fixed	Capacity	Energy	
Entry charges						
Entry capacity	✓	✓		kWh per day		(1)
Entry TO and SO com-					kWh	(2)

modity charges						
Exit capacity charges						
Exit (flat) capacity	✓			kWh per day		(3)
Exit (flex) capacity				no charge		(4)
Daily Off-Peak capacity		✓		kWh per day		(5)
Exit TO and SO commodity charges					kWh	(6)
Short-haul commodity tariff					kWh	(7)
Site or User specific charges						(8)
Overrun charges						(9)
Daily Imbalance charges						(10)
Scheduling charges						(11)
Physical contract renomination incentive						(12)

(1) Entry capacity charges are applied on a pence per kWh per day based on the capacity held at each Aggregated System Entry Point (ASEP) allocated to the user through the auction process and that they have not surrendered, traded or transferred. Entry capacity in the day-ahead auctions is subject to a 33% discount on the reserve price whilst entry capacity on-the-day is subject to a zero reserve price. Overrun charges apply where a user uses capacity in excess of its Entry capacity holding. Interruptible Entry Capacity is available through a daily auction, either day-ahead or within day and is subject to a zero reserve price.

(2) Entry TO and SO commodity charges are the same for all ASEPs and are applied on a per kWh basis and based on a user's total metered gas flow through the ASEP.
No fixed or target split for capacity and commodity charges. Actual values indicate a split of approx. 50%. Nevertheless, this is only a momentary snapshot and subject to changes in auction revenues and network utilisation.

(3) Exit (Flat) capacity provides a right to flow with an implied requirement to do so at an even rate across the gas day. The Exit (Flat) capacity product is acquired on an Enduring and Annual basis through an administered process and on a daily basis via auctions. The En-

during Capacity is available from four years into the future, whereas Annual capacity is available for the next year up to three years ahead of the current year.

(4) Exit (Flex) capacity is applicable to Distribution Network Operators only and provides a right to diverge away from the constant (flat) offtake rate by the flex amount over the peak hours 06:00 to 22:00.

(5) Daily Off-Peak capacity is an interruptible product released by the TSO on days where forecast demand is less than 80% of the 1-in-20 peak day demand.

(6) Exit TO and SO commodity charges are the same for all exit points and are applied on a per kWh basis and based on the total metered gas flow through all of a user's exit points.

(7) An optional Entry/Exit commodity tariff is available that replaces the Entry / Exit SO commodity charges and the TO commodity charge. This is designed to overcome the relatively high charge for short distance transportation when the normal commodity charges are applied.

(8) A number of specific tariffs are also applied to direct identifiable costs back on the users that cause them.

(9) Entry overrun charges are applied where the quantity of gas delivered by a user on the day exceeds the quantity of entry capacity held by the user for the day. A user only incurs Overrun charges where there is an aggregate overrun at the specific Exit point.

(10) The daily imbalance for each user is calculated for each day as the difference between the sum of the aggregate of the user's daily input quantities and the sum of the aggregate of the user's daily output quantities. The imbalance charge is determined depending on the direction of the user's imbalance.

(11) Where a user flows a different quantity of gas compared to their nominated flows, they incur scheduling charges.

(12) For a physical market transaction a user (if originating the trade) must make a contract renomination. Failure to do so, or within the prescribed time (i.e. before the effective time of the trade) means they will be liable for an incentive charge.

Regulation
The GB gas TSO is primarily regulated through two five year revenue controls that set the maximum allowable revenue recoverable from the licensed business. These controls are for the **Transmission Owner (TO) and System Operator (SO)**. The System Operator control is divided into two parts, one that covers the internal costs of the business (a five year control) and the other that covers the external costs of running the SO business. The incentive scheme components are **sliding scale regulation** with caps and collars to limit profits and losses. The **revenues allowed through the regulatory** review process are translated into tariffs through a tariff methodology that is required to be produced by the TSO licence and for which the regulator has a right of veto on any amendments.
The TO allowed revenue equals: **TO base allowed revenue** (operating costs, capital costs and profit, minus an adjustment for Milford Haven (project specific incentive adjustment) **Plus non controllable costs** (adjustment for rates, adjustment for licence fee, pension deficits, Independent systems costs (funding for remote towns in Scotland), any security costs determined by the regulator (relates to terrorist threats to major infrastructure and activities are prescribed by government)
Plus revenue adjustments for (innovation funding adjustment (encouraging research and development projects), capital expenditure incentive (business holds the benefit (or loss) of achieving incremental capacity at a lower (or higher) cost compared to the unit cost allowance for five years, logged up costs (crop and quarry claims) **Less** (TO revenue under/over recovery from previous year, SO Revenue restriction **The SO allowed revenue equals:** **SO entry incentives, costs and revenues** entry capacity investment incentive (for capacity releases prior and after 1 April 2007), operational buy-back costs plus incentive revenue, Milford Haven specific buy-back incentive (costs less incentive payment) and incremental entry buyback cost plus incentive. **Plus SO exit incentives, costs and revenues** (constrained LNG incentive target costs, exit capacity investment incentive, long run contracting incentive revenue, Non-obligated exit capacity revenue and exit buyback incentive and costs (incentive to manage buy-back of released exit capacity when congestion occurs). **Plus SO external incentives, costs and revenues** (shrinkage costs and incentives, operating margins costs and incentive, residual gas balancing costs and incentive, quality of information incentive, environmental incentive and unaccounted for gas).

Plus SO internal incentives, costs and revenues (internal operating costs and incentive and internal capex incentive.

Plus Non-incentivised costs (tax allowance, pensions, Xoserve allowance (cost recovery for running the market administrator).

Plus SO income adjusting event (allows the recovery of costs for unforeseen events that have a significant impact on cost or revenue that would threaten the financial security of the TSO)

Plus overall buyback collar adjustment

Plus delivery incentive payment

Less SO revenue under/over recovery for previous year

CAPEX		
RAB	The Regulatory Asset Valuation for the transportation business was set upon the separation from British Gas group. This initial value has then been rolled forward by taking into account capital additions and regulatory depreciation as defined in the price controls and indexed by retail price inflation.	
Depreciation	**Method**	Linear • 56 years for pre-vesting assets • 45 years for post-vesting assets
Cost of capital (WACC)	6.25% (real before tax)	• Ofgem relies on CAPM approach for setting WACC • Observed premium on utility debt but taking into consideration long term historical averages. Premium set at a figure above that implied by current market levels on the basis that it was statistically low compared to historical levels. • A real pre-tax cost of debt consistent with current 10 year trailing average data for gilt yields and the current 10 year average spread of 'A' rated utility bonds with a ten year maturity.
OPEX		
TO costs	Costs: maintenance of the existing network, covering routine and fault maintenance planning and work, non controllable items such as business rates, licence fees and pension deficit recovery costs.	

SO internal costs	Labour costs and IS costs attributed to the system operator
SO external costs	Costs of fuel gas and shrinkage. Incentivised costs, charged to users on a pence per kWh basis
• Excess auction revenues are used to offset the costs of buy-back that would otherwise flow back to users.	

Balancing

The GB gas system operates a daily balancing regime, with nominations and capacity rights providing an end of gas-day expectation of delivery i.e. capacity is described as kWh per day. Any residual imbalances in the system are contractually cleared by the action of the TSO to balance the system. Users have the opportunity to clear their imbalances up to 15 days beyond the end of the month, when imbalances are cashed out; however, users have to notify their intended final position within 7 business days after the gas day. Shippers are primarily responsible for maintaining balance in the gas system and are subject to charges that provide a financial incentive to balance their positions on a daily basis.

Users are exposed to the System Marginal Price for any residual imbalance that is settled by the system operator. This price is linked to the market price through either the highest (or lowest) balancing trade or the System Average Price that represents the average cost of balancing actions, adjusted upwards or downwards depending on the individual users direction of imbalance.

The TSO has commercial incentives on its residual balancing activities. This has two elements, a price performance measure that seeks to expose the TSO to the costs of its balancing actions and a linepack management incentive that balances the price incentive to ensure an appropriate mix of internal and external residual balancing actions. The price incentive encourages the TSO to trade close to the market price for all of its balancing trades.

In its role as system operator, the TSO has responsibility for managing any residual system end of day imbalance position and ensuring that system pressures are maintained within safe limits at all times within the day. In fulfilling this role, it primarily takes energy balancing trades on the On the day Commodity Market (OCM) National Balancing Point (NBP) market.

Settlement of imbalances

The GB gas system is balanced on a daily basis. The Daily Imbalance for each user is calculated in for each day as the difference between the sum of the aggregate of the user's daily input quantities and the sum of the aggregate of the user's declared daily output quantities. Imbalance is determined across a user's portfolio. The residual imbalances in the system are contractually cleared by the action of the TSO to balance the system and settled.

The Imbalance Charge is determined depending on the direction of the user's imbalance. The charge is calculated by multiplying the daily imbalance quantity of the User by either System Marginal Sell Price (user has a positive imbalance) or the System Marginal Buy Price (user has a negative imbalance). Where the user has a positive imbalance, it will receive a payment from the TSO, where the user has a negative imbalance, it will be charged by the TSO.

The prices applied to the imbalances charges are calculated as follows.

The System Marginal Buy Price is the greater of:

- The System Average Price plus 0.0287 pence/kWh[1]; and
- The price in pence/kWh which is equal to the highest balancing action offer price on the day;

The System Marginal Sell Price is the lesser of:

- The System Average Price less 0.0324 pence/kWh[1]; and
- The price in pence/kWh which is equal to the lowest balancing action offer price in on the day;

The System Average Price for the day is the price in pence/kWh calculated as the sum of all balancing transaction charges divided by the sum for all balancing transactions respectively for the day. Where no balancing transactions are made on a day, the System Average Price is the arithmetic mean of the System Average Price determined of the 7 preceding Days.

The totality of balancing costs are revenue neutral to the transporter.

A daily adjustment neutrality amount is charged to recover costs associated with clearing charges associated with unauthorised gas flows at entry and exit points and operating margins gas

Miscellaneous

The transporter has a range of sources available to balance the system on a daily basis including:

- Trading systems buy and sell actions
- A 'free' allowance of linepack change of 2.4mcm per day that can be used to manage system imbalance, after which it will incur an incentive charge (daily capped to -£30,000 cost to the transporter for using more). This has changed since 1 April 2009 – up to 1.5mcm NGG receives the max payment, at 2.8 it starts to incur a charge
- Interruptible demand is no longer available as a self-declared service by users but is available to the transporter through exit capacity management contracts under the enduring exit capacity regime
- Operating margins are required to be held and are typically held as constrained storage facilities that provide a system reserve to the transporter (typically under emergency situations e.g. for orderly run down of the system or catastrophic failure of an element of the network.)

[1] The values added or deducted are intended to represent the value of flexibility in the system and were set based on the costs of injection or withdrawal of gas from the Hornsea storage site.

11. Greece

Tariff structure and methodology
The Greek gas market regulation is still in a transitional period with a lot of characteristics of the future system already decided by law, but secondary regulation with further detail is lacking. According to the Gas Law (law 3428/2005) a Tariff Regulation will include the methodology for setting the TPA tariffs. Tariffs will be set by the TSO based on the methodology specified in the Tariff Regulation and will be approved by the regulatory authority. Tariff Regulation will also need formal approval by the Ministry of Development. Until the elaboration of the Tariff Regulation, TPA tariffs are defined in a Ministerial Decision (MD 4955/2006) issued under a previous law. According to the provisions of MD 4955/2006, the TSO DESFA is applying a **postage-stamp tariff** system for gas transmission. Three entry points in the National Gas System (LNG terminal Revythoussa, Bulgarian and Turkish border) exist, while there are no domestic production or storage facilities available, with the exception of the LNG tanks which are however only used for the LNG station's operation and not for long-term storage purposes. Transit through Greece is not taking place. At the moment there is no congestion. In case of congestions market-based rules (auctions) are planned for. Also the use-it-or-lose-it principle is formally planned to be implemented. Transmission charges are on an annual basis and are split into a capacity and a commodity charge. Capacity charges are based on the maximum daily booked/used transportation capacity during a respective year, commodity charge is applied on transported quantities. 95% of the costs for the LNG terminal are recovered through transmission charges and only 5% are covered actually by LNG charges. Tariffs are based on expected volumes and split into capacity and commodity charges by a 90/10 ratio.

Tariff	Firm	Interruptible	Tariff basis			Notes
			Fixed	Capacity	Energy	
Transport	✓		-	MWh of peak day	MWh	
LNG	✓			MWh of peak day	MWh	(1)

(1) LNG tariffs refer to booking of and use of vaporisation capacity and – implicitly – to the respective LNG reception services and temporary storage. A shipper who uses the LNG terminal for supplying customers connected to the transmission system has to pay both tariffs.

The basic charging period for transmission tariffs corresponds to one calendar year. Evidently there is no short-term capacity available, or if price would be the same, as price is based on the booked/used capacity on the peak day of the year. However, in the case of a new shipper, special provisions permit a proportional capacity charge for the first year of service. Longer term contracts are permitted and specific provisions oblige the TSO to expand capacity, once physical congestion is anticipated mainly at the entry and exit points.

Secondary trading of capacities and gas will be facilitated by the trading platform provided by the TSO.

Exclusively for supplying new customers a trial tariff applies for the first six months at a given exit point for a specific customer starting with the month in which the first gas offtake takes place. This tariff is solely based on a commodity charge.

There are no backhaul or shorthaul capacity products or interruptible capacity offered.

For the time being costs such as TSO's consumption and losses are included in tariffs' Opex.

Other services:

TSO offers other services such as cooling of LNG ships, which are not regulated and respective charges are set by the TSO.

Regulation		
For the regulation of the Greek gas transport network a type of cost-of-service regulation is applied. The revenue requirements of DESFA are calculated on an annual basis. The provisions for operating expenses, depreciation, RAB, and the overall required income are fixed for the period 2006-2016. To increase tariff stability a smoothing procedure is applied over the eleven years using the WACC for the calculation of the present value. The resulting tariff is corrected by inflation (CPI).		
CAPEX		
CAPEX consists of depreciation and return on employed capital.		
RAB		The RAB (or the "employed capital") includes all tangible and intangible assets after depreciation, working capital and new investments. Capital contributions are not considered in calculating the RAB.
Depreciation*	straight-line depreciation	Accounting depreciation, including capital contributions.
Cost of capital (WACC)	**Domestic** **Transit**	6.56% (real pre-tax) 10.06% (nominal, pre-tax) WACC is applied on the RAB and used for smoothing of the tariffs.
OPEX		
Provisions for OPEX are fixed for 2006-2016.		

Balancing

The TSO is primarily responsible for keeping the national gas system in balance.

Shipper's imbalance is calculated daily as the difference between delivery and adjusted offtake on a specific day. Daily imbalances are accumulated on summed up to Cumulative Imbalance Quantity. Only the net cumulative monthly imbalance is charged for.

If the Overall Positive Monthly Imbalance Quantity exceeds the Overall Negative Monthly Imbalance Quantity, the Operator shall charge the special Balancing Account kept for each user with the negative Cumulative Imbalance Quantity on the last day of the month. This amount equals the product of the monthly weighted average Balancing Gas Price

In the event that the Overall Monthly Positive Imbalance Quantity is less than the Overall Monthly Negative Imbalance Quantity, the Operator shall charge the special Balancing Account kept for each user with negative Cumulative Imbalance Quantity on the last day of the month. This amount equals the product of Monthly weighted average Balancing Gas Price, which is allocated to the user according to the proportion of Cumulative Imbalance Quantity on the last day of the month by the Overall Monthly Negative Imbalance Quantity.

The TSO calculates the Daily Imbalance Quantity as a percentage of the Booked Daily Capacity of the shipper. If the outcome is within the tolerance limits (e.g. less than 10%), then the shipper is charged according to the Daily Balancing Gas Price without any penalties, in other cases penalties are applied.

Daily Balancing Gas Price (DBGP) is also a cash-out price for the residual quantity used by the TSO to balance the system. The balancing gas is allocated among shippers according to their positive or negative imbalances. The TSO debits shippers with negative imbalance and credits shippers with positive imbalance using the DBGP as a charging price.

Ex-post trading of imbalances is not possible.

For the **procurement** of balancing gas, the TSO has the right to contract balancing agreements with third parties in order to supply to or withdraw gas from the transmission system. Contract duration for balancing agreements is limited to one year. The price payable by the TSO or the counterparty is set in these agreements. For the time being the main source of balancing gas is the LNG terminal.

12. Hungary

Tariff structure and methodology

TSO FGSZ Zrt. operates an **entry/exit transport tariff model** with regulated tariffs. Allocation of transport capacity is according to the first-come-first-served principle after annual tendering. In case of congestion, auctions are organised. Transit is part of the entry/exit system, except for contracts realized before market opening (2004).

Hungary is one market area and balancing zone. The transport tariffs are charged on contracted capacities and energy metered at delivery points. In case of congestion, auctions are organised to allocate capacity.

Commodity charges are based on variable cost elements, including compression, fuel gas and return on assets, while capacity charges are based on fixed costs such as depreciation, operating costs, overhead and return on assets.

Tariff	Firm	Interruptible	Tariff basis			Notes
			Fixed	Capacity	Energy	
Transport	✓	✓	-	m3/d or m3/h	m3	(1)
Backhaul	✓	-	-	m3/d or m3/h	m3	(2)

(1) The capacity charge distinguishes between public utility wholesalers (PUW) and other shippers. Capacity tariffs are higher for the latter. The capacity tariff is charged to the daily (hourly) capacity contracted for PUW (others). The same entry (exit) tariff is applied to all entry (exit) points. The energy charge is equal for everyone and paid for gas metered on delivery points.

(2) Backhaul is charged at the exit (entry) tariff at the entry (exit) point.

Interruptible capacity can be made available by the TSO to shippers that did not acquire (firm) capacity on the capacity auction (after an over-subscription to firm capacity in the annual tender).

- A 10% (50%, or 90%) discount on the firm annual capacity tariff applies to interruptions for a maximum period of 10 (30, or >30) days in the winter period.
- For monthly interruptible contracts, a 10% (50%, 90%, or 100%) discount on the firm monthly capacity tariff applies to interruptions for a maximum period of 3 (10, 25, or >25) days.
- Daily interruptible contracts are charged by 1/60 of 110% (50%) of the annual firm capacity charge in the winter (non-winter) period.

When shippers fail to comply with requested interruptions within two hours, they pay a **penalty for interruption error**, which is 150% of 1/365 of the annual transport capacity charge for each hour of non-compliance.

The basic contract **duration** for transport capacity tariffs is one year. Contracts for multiple years (only whole years) as well as for months and days are possible. Regulated tariffs for multiple year contracts are determined annually.

- The annual tariff is valid for when the highest capacity planned to be used falls in the winter period. If however, if the highest capacity falls in the summer period, an additional charge of 5% of the annual transmission capacity charge for the positive difference between capacity contracted in summer and winter is charged.
- A monthly capacity contract during the winter (summer) season, is charged by 90% (20%) of the annual transmission capacity tariff for the first month, and an additional 10% (5%) for the second and third month in the same contract. The capacity is free of charge in the next (fourth etc.) remaining months, if it is in the same contract.
- A daily capacity contract in the winter (summer) season is charged by 1/30 of 110% (50%) of the annual transmission capacity tariff, for the first 40 days. Thereafter, daily capacity is free of charge.

In case of more than 1% **excess utilisation** of transport capacities, a penalty and a posterior capacity tariff apply. Excess capacity of a shipper at an exit or entry point is determined by the maximum of the hourly (or daily in case of PUW) differences during a month. The penalty is 150% of the applicable capacity tariff on a day with average temperatures higher than -12°C. The posterior charge applies to colder days (i.e. below -12°C).

There is no distinction between **local vs. cross-border** entry/exit points.

Regulation		
A revenue-cap regulation with a four year regulatory period is applied for the regulation of the Hungarian TSO. The current regulatory period runs from 1 January 2006 to 31 December 2009. A detailed secondary law on tariffs and the Grid Code are under preparation. Currently, the fixing of the annual revenue requirements is based on an extensive cost evaluation process. However for the next regulatory period the regulator plans to include benchmarking methods in the determination of the allowed cost. The annual adjustment of network tariffs is based on CPI-x. The value of x may vary between 1.8% and 2.2%, whereby a value of 1.8% is applied.		
CAPEX		
RAB		Net replacement value
Depreciation	**Method**	Linear over 40 years. Based on replacement cost,
Cost of capital (WACC)	6.9%	Real, pre-tax
OPEX		
OPEX comprise: labour costs, energy (fuel) cost, share of overhead cost, other operational cost. A profit sharing mechanism applies: half of the excess (if the company's profit exceeds the profit limit) must be returned to the customers.		

Balancing

FGSZ Zrt. is responsible for the daily balancing of the system. The TSO buys balancing gas from system users, which can offer positive or negative options when they nominate. The gas law allows no profit on balancing for the TSO.

Balancing costs are recovered through imbalance charges and penalties charged on shippers that cause the imbalance. Daily balance charges (or cash out price) are based on the options called by the TSO to balance gas, i.e. commodity is settled by these prices. By law there should also be sanctions (penalties) for imbalance in place. However, currently there are no penalties because of a dispute over the Grid Code.

Nomination is possible up to 14:00 before the gas-day. Should there be any inconsistency between the nomination on the transmission, distribution and storage systems, the system user has the possibility to correct the nomination until 24:00. Renomination is possible on the gas-day only on the call of the TSO and it might be carried out within 2 hours after the call.

The **procurement** of balancing gas by the Hungarian TSO is carried out in the following order:

- The TSO buys balancing gas from system users, which can offer positive or negative options during the daily nomination. In case of imbalance, the TSO calls the cheapest positive option in case it is short, and calls the most expensive negative option if its system is long.
- Shippers can also offer capacity independent flexibility tools. However, this is not used in practice.
- The TSO can ask shippers to renominate during the gas day, which is free of charge.
- Gas from storage. The TSO has the right to reserve storage capacity but so far it has not used this tool.
- Curtailment of demand.

Estimation of the shares of the different instruments on a yearly basis: 94%, 0%, 4%, 2% and 1% (because of the gas crisis; curtailment of demand is used in gas crisis situations only), respectively.

Note that domestic gas production cannot provide flexibility and cannot be used for balancing. Imbalances are calculated as the difference between delivered and withdrawn gas quantities.

Settlement of imbalances				
Imbalance		**Tolerance level**	**Penalty**	**Cashout price**
Basis	✓	2% (option) (1)		
Hourly	-			
Cumulative	-			
Daily	✓		✓, but not applied	Weighed price of means (options etc.) involved by the TSO.

(1) The basic **tolerance** level is 2% of nominated capacity. For those shippers offering balancing options it is up to the extent of the options offered by the system user.

It is not possible to pool imbalances between shippers or to trade imbalances ex post.

Miscellaneous

The process of balancing, the settlement of balancing costs and the penalties for imbalance out of the tolerance zone should be described by the UKSZ (Grid Code) that has to be submitted by the TSO to the Regulator for approval. The market participants are represented in the Committee which is drafting the Grid Code, however they have not been able to reach a final agreement that the regulator would also accept. This is the main reason for not having a final UKSZ for the current regulatory period. The regulator has fined the TSO for not having an acceptable Grid Code (the TSO has abandoned its claim.)

A new Grid Code was submitted to the regulator by 30 April 2009 and was approved by HEO with conditions. The improvements are under approval.

13. Republic of Ireland

Tariff structure and methodology

The ROI market has a **decoupled, entry–exit tariff regime** for transmission capacity. The allowed revenue is divided between **capacity and commodity in a ratio of 90:10**. The capacity tariff is then determined by dividing the allocated (90% of total) revenue by the forecast of the peak days kWh for capacity for the year. The commodity tariff is determined by dividing the allocated (10% of total) revenue by the forecast kWh for the year.

Entry capacity is priced differently for two entry points and a discount is applied for short-term booking of capacity. Exit capacity has a single price that applies for all long-term exit capacity with a discount applied for short-term capacity in the network. Long-term capacity is annual capacity, short-term capacity is monthly or daily capacity. Interruptible capacity is currently made available at the Inch Bi-Directional Point to facilitate storage and through nominations accepted in excess of Primary Capacity held at all entry / exit points where the system allows. Business rules for a more extensive interruptible product at entry were developed in 2008. However, due to the lack of congestion at the entry points, the product was not systemised. In addition to the tariffs, further charges are applied to encourage good behaviours from the shipping community, e.g. imbalance charges, overrun and scheduling charges.

Tariff	Firm	Inter-ruptible	Tariff basis			Notes
			Fixed	Capacity	Energy	
Exit (onshore network)	✓	✓		kWh/day	kWh	(1)
Entry (interconnector)	✓	✓		kWh/day	kWh	(2)
Entry (Inch)	✓	✓		kWh/day	kWh	(3)

(1) Nominations accepted in excess of Active Capacity where the system allows

(2) Nominations accepted in excess of Active Capacity where the system allows. Further business rules for interruptible have been developed

(3) Interruptible Product to facilitate Exit to Inch Storage. Nominations accepted in excess of Active Capacity where the system allows business rules for interruptible have been developed

Other charges that may apply –

- **Balancing**
  Balancing charges are applied to shippers, which increase where their imbalance exceeds their permitted tolerance and are calculated as the sum of its first tier imbalance quantity multiplied by the first tier imbalance price and its second tier imbalance quantity multiplied by the second tier imbalance price.

- **Capacity Overrun**
  Entry Capacity overrun charges apply where the quantity of Natural Gas allocated to an individual Shipper at an Entry Point is greater than the Active Entry Capacity or Active Back-Up Entry Capacity which is held by that Shipper at such Entry Point in respect of a Day.

- **Exit capacity overrun**
  An Exit Capacity Overrun applies where the quantity of Natural Gas allocated to an individual Shipper at or in respect of an Exit Point is greater than the Active Capacity which is held by that Shipper at or in respect of that Exit Point to which the allocation relates. The charge is eight times the applicable Exit daily capacity charge, subject to the caps described below.

- **Shrinkage costs**
  Shrinkage costs are the costs of providing shrinkage gas procured through contracts entered into by the transporter in an open tender process and the associated entry capacity charges to permit the shrinkage gas to be nominated into the system.

- **Scheduling charges**
  A Scheduling Quantity is a quantity equal to the absolute difference (in kWh) between a Shipper's Valid Nomination or Valid Renomination at an individual Entry Point / Exit Point and a Shipper's Final Allocation for that Entry Point / Exit Point in respect of a Day;

- **Reconciliation charges**
  A disbursements account exists to deal with deficits in or excesses of revenue collected through the various charges imposed through the Code of Operations to which the transporter is intended to be revenue neutral (i.e. not the Exit or Entry charges).

- **Failure to Interrupt Charges**
  Failure to Interrupt Charge. A Shipper submitting Interruptible CSEP Exit Nominations at a CSEP (including the Storage Exit Point at Inch) shall be liable to a charge ("Failure to Interrupt Charge") calculated on a Day on which the Transporter has issued an Interruption Notice; and

  - where the final CSEP Exit Allocation in respect of a Shipper calculated by reference to Interruptible CSEP Exit Nominations at the CSEP on the Day exceeds the Shipper's Available Interruptible Exit Nomination Quantity plus the Shipper's Failure to Interrupt Tolerance Quantity on that Day; or

- where the aggregate Allocations calculated by reference to Interruptible CSEP Exit Nominations at the CSEP exceed the Aggregate Available Interruptible Nomination Limit.

Monthly and daily products are priced differently at a percentage of the annual tariff for each month.

	Monthly	Daily
October / November	15%	0.75%
December	20%	1.33%
January	35%	2.33%
February	40%	2.67%
March	30%	2.00%
April	15%	0.75%
May – September	8%	0.40%

Shippers holding long-term entry capacity are able to reserve back-up capacity that can be nominated against in the case of restrictions due to offshore events or onshore events. Back-up capacity attracts a Reservation charge that is a proportion of the annual tariff for the entry point (10 days equivalent of capacity charges) and if utilised (i.e. a Nomination is made against the Back-up capacity) a Back-up Capacity charge is levied that is a multiple of the daily equivalent of the annual capacity charge, that varies seasonally and whether notice has been given of the restriction.

Regulation

The allowed revenue for gas transmission in Ireland is regulated by the Irish regulator The Commission for Energy Regulation (CER). The regulator applies a revenue-cap regulation with a building blocks approach. The five year regulatory period started in October 2007.

The allowed revenue is corrected on an annual basis for pass-through costs, under-/ over-recovery, independent System Operator costs (subject to annual approval of the CER with 80% of forecast cost passed through in the transmission revenue allowance). For pass-through costs the deviation between forecast and actually out-turn is shared between the transporter and customers on a 50:50 sharing basis. Inflation is also applied to allowed revenues on an annual basis. Costs of energy balancing, scheduling, and shrinkage do not pass through as operating costs in the transmission tariffs. Fuel gas is considered as shrinkage and is therefore charged through to shippers as part of that charge.

CAPEX		
RAB	The regulatory asset base is based on indexed historic costs. RAB is rolled forward considering allowed investment and depreciation profiles.	
Depreciation	**Method** **Grid assets** **Other assets**	Linear Pipelines – 50 years Compressors – 25 years Other assets, e.g. IT – 5 years
Cost of capital (WACC)	5.2% (real pre-tax)	• Estimated with an equity beta of 0.9. • Gearing is 55%
OPEX		
Operating costs cover all of the costs of operating and maintaining the networks business.		
Miscellaneous		
At the most recent regulatory review, unspent capital expenditure and operating expenditure were clawed back following an ex-post review. It reflected significant underspend of 30% underspend of capital expenditure and a large 25% underspend in operating costs largely relating to factors beyond the transporters control.		
The transporter has an incentive to find new sources of revenues from encouraging greater utilisation of interconnector linepack. They retain 30% of the revenues attributable to the new service at least until the next regulatory review. To this end, an interconnector inventor product was developed. In 2007 the CER signalled its intent to introduce a rolling five-year incentive for CAPEX efficiency savings.		

Balancing

Shippers are obliged under the Code of Operations to maintain a zero imbalance through the gas day, with the TSO providing a residual balancing function. Shippers are required to submit nominations to achieve a zero imbalance position by 10:00 on D-1. A Shipper may only make a Renomination between 18:00 hours on D-1 ("Renomination Start Time") and 01:45 hours on Day D ("Renomination End Time") and in order for a Renomination to be accepted as Valid by the TSO the Shipper must submit (or arrange for another Shipper to submit as part of a Trade / Transfer) an equal and opposite Renomination within 60 minutes (Zero Imbalance Position). 01:45 on D: in accordance with Part D Section 1.2.5 (b) a Shipper may only make a Renomination between 18:00 hours on D-1 ("Renomination Start Time") and 01:45 hours on Day D ("Renomination End Time") and the Transporter shall not be required to accept a Renomination notified earlier than the Renomination Start Time or later than the Renomination End Time.

Imbalance cash-out is undertaken relative to the **UK OCM System Average Price** on the day for first Tier & UK OCM System Marginal Sell Price for Second Tier. Balancing gas is procured by the system operator through annual tender rounds for balancing gas.

Linepack levels are predetermined and are based on the system configuration/infrastructure in place at any time. On certain days shipper imbalance positions may result in an overall supply/demand imbalance which reduces or increases linepack levels on the network. The transporter can take actions in the form of Balancing Gas Buys or Sells to maintain the linepack levels within an acceptable range.

Settlement of imbalances

Balancing is undertaken on a daily basis and on an aggregate of all entry and all exit allocations. Shippers are required to start each gas day with a zero imbalance and to maintain that balance throughout the day. The settlement of imbalances is undertaken on a monthly basis. Net revenue or costs from the settlement of imbalances are accrued into the disbursements account.

Where a shipper ends the gas day (including any after the day trades) with an imbalance, imbalance charges are applied. There are two tiers of prices that apply, the first tier prices that apply within the permitted tolerance and reflect the marginal cost of gas on the day (the Euro equivalent of the UK OCM System Average Price published by National Grid and Imbalance Gas Transportation Costs), and second tier prices that include an element of penalty for imbalance quantities outside of that tolerance (the Euro equivalent of the UK OCM System Marginal Price published by National Grid and Imbalance Gas Transportation Costs).

Each Shipper has a daily imbalance quantity attributed to it for each day, which is calculated by the TSO after the Allocations have been made. A shipper can make an After the Day Trade up to 7 days after the month end, whereby shippers are permitted to trade their positive imbalance quantity with another shipper's negative imbalance quantity (or vice versa).

Imbalance		Tolerance level	Penalty	Cashout price
Daily	✓	See below	See below	See below

Imbalance charges are calculated as follows:
DIC = (FTQ * FTIP) + (STQ * STIP), where:
DIC = the Shipper's Daily Imbalance Charge for the Day;
FTQ = the Shipper's First Tier Imbalance Quantity for the Day, which is limited to the allow-able tolerances for each Entry point and type of Exit point.
FTIP = the First Tier Imbalance Price for the Day, which is the Euro equivalent of the UK System Average Price
STQ = the Shipper's Second Tier Imbalance Quantity for the Day, which is any imbalance above the tolerance level.
STIP = the Second Tier Imbalance Price for the Day, which is +/- 5% of FTIP or Euro equivalent of UK system Marginal Sell Price (whichever is lower/higher, i.e. more penalizing for the shipper)

There are separate tolerance ranges for each entry point and per type of offtake. In total a shipper's tolerance is calculated as a sum of the tolerances at each entry point and exit type.

Entry tolerances are 1.5% of the nominated quantity for both the Moffat and Inch entry points, which are referred to as first tier imbalance quantity. An additional tolerance is applied where the metered flow does not match the end of day quantity.

Exit tolerances are fixed per exit point:

Sector/Size(Annual Quantity)	Exit Tolerance %
LDM1 (LDM >1,500,000,000kWh)	4.5
LDM 2 (DM>260,000,000 to1,500,000,000kWh)	12
LDM 3 (LDM >57,500,000 to 260,000,000kWh)	25
DM	40 (of DM nominations)
NDM	2.5 (of NDM allocations)
Inch exit	1.5

Miscellaneous
Balancing gas is primarily available to the transporter from the supplier of balancing gas or through changes in linepack (subject to specific ranges to ensure safe operations– not published). The supplier of balancing gas provides the service as specified by the transporter to a maximum buy/sell quantity per gas day. Imbalance costs have been pegged to the UK System Average Price, or System Marginal Buy or Sell price since the inception of the Code of Operations in February 2005. A modification was undertaken in March 2006 that modified the imbalance price by the costs of transportation (either adding or sub-tracting depending on the direction of imbalance). This sought to correct the incentive for shippers to leave the system long and consequently receive the costs of transportation.

14. Italy

Tariff structure and methodology
The Italian gas transmission network is operated mainly by Snam Rete Gas, which owns approximately 95% of the network. The regulator opted for an entry-exit tariff system. Local gas transport is treated differently to cross-border transport. The allocation of transmission capacity is according to the first-come-first-served principle. The regulator AEEG states that capacity at all entry points is not fully booked; evidently there is no congestion in the network. The transmission tariffs structure is charged on contracted capacities at entry and exit points and on the volume of gas to be transported.

Tariff	Firm	Inter-ruptible	Tariff basis			Notes
			Fixed	Capacity	Energy	
Transport	✓	✓	-	m3/d	GJ	
Backhaul	-	✓	-	m3/d	GJ	(1)

(1) **Backhaul** is the right to feed-in or extract gas administratively against the physical flow at border points. The cost of backhaul flows are 14% of cost of forward flows.

(2) **Interruptible** capacity is supplied at entry points on two levels, with the second one interrupted over the first one. For level 1 a discount of 10% of the entry capacity charge applies, for level 2 this is 20%.

Transport contracts are available on an annual basis and six-monthly, quarterly and monthly. In case of shorter contract **durations,** the capacity charge is multiplied with a coefficient ranging from 1 for six months in winter period (Oct – Mar) to 1.6 for monthly contracts in summer period (Apr – Sep). Capacity is allocated up to five years in advance.

A **shorthaul** tariff component is applied for transports on the national transmission system of less than 15 km. In this case the normal capacity charge multiplied by (*distance in km*/15).

In case of **excess utilisation** (if shipper uses during one gas day capacity greater than assigned at a specific point plus a tolerance margin ranging from 2% at border entry points up to 10% at redelivery points) a capacity overrun fee applies. Another fee applies for excess capacity usage at the storage hubs.

A capacity / commodity split of 70/30 applies.

Regulation		
Tariffs are proposed by TSOs to the regulator AEEG and are approved if the tariffs comply with revenue regulation. The overall allowed revenue is regulated on the basis of a revenue cap with building blocks approach, using a RAB, a rate of return allowed on the RAB, an allowed depreciation rate and a recognised level of operating costs. A four year regulatory period applies. The allowed revenue is adjusted annually, using a hybrid method. For adjustment purposes, the capacity revenues are split into a component related to the return and a component related to operating costs and depreciation. The revenues adjustment mechanism has a hybrid nature: • Cost plus for the capacity revenues related to the return on capital (the return on capita is adjusted on an annual basis taking into account the inflation rates and eventual asset disposal and computing the depreciation for years after 2004); • Revenue cap for the capacity revenues related to the operating costs and depreciation (see formulae below); and • Price cap for the unit commodity revenue. The price cap is no longer applied to the total revenues (as was the case in the first regulatory period but it applies only to operating costs and depreciation.) The revenue cap includes a productivity target of 2%, the price cap includes a productivity target of 3.5%		
CAPEX		
RAB	**Historic costs based**	RAB is equal to the sum of the net value of tangible assets plus the working capital (1% of the recognised net value of tangible assets). Net value is calculated as gross value minus depreciations and capital contributions.
	Extensions	For new infrastructure investments a premium above the allowed return is granted. Depending from investment category and duration the premium can be up to 3% and 15 years.
Depreciation	**Method**	Linear
	Grid assets	40 yrs for pipelines and buildings 20 yrs for pressure stations and meters
	Other assets	10 yrs for all other tangible assets

Cost of capital (WACC)	6.7% (real pre-tax)	• Considers a risk-free rate of 4.259% (on bonds), a market risk premium of 4% and a beta of 0.56.

OPEX

The operating expenditures include all costs of running and maintaining infrastructure, this includes

- Costs of personnel
- Maintenance and overhead costs
- Compression costs and network losses
- External services
- Other provisions different than depreciations

Operational expenditures are regulated on an overall level using an incentive based method with a x-factor of 2%. Incremental operational costs for new infrastructure are recognised only for some categories of investments.

Miscellaneous

Investment incentives

The regulatory framework provides that investments generate additional revenues that are added each year to the revenues coming from RAB. As for revenues from RAB, revenues coming from new investments are a sum of return on capital, depreciation allowance and operating cost allowance.

The return on capital consists of the same allowed return for RAB plus a premium. The premium above the allowed return is differentiated by category of investment and duration up to 3% for 15 years. The depreciation allowance depends on the technical-economical life of the assets and the incremental operating costs are recognised only for some categories of investments.

Balancing

The TSO is primarily responsible for keeping the national gas system in balance.

Shippers nominate required capacities to the TSO daily and are incentivised to maintain a balanced position by means of imbalance charges. The imbalance is differentiated for shippers with and without a storage account. Normal imbalance charges apply only for shippers without a storage account. Shippers are only charged for imbalances if a specific threshold is exceeded.

TSO uses a fixed price as a basis for the settlement of the imbalance volume between entry and exit. Both surpluses and shortages are settled on the basis of the same price.

The **procurement** of balancing gas by the TSO is first of all based on storage and linepack. The TSO is allowed to use available storage capacity if needed in case of imbalances. Linepack is mainly used to manage hourly physical balancing. In case of gas excess emergency (no free operation injection capacity at storage left) import of gas at entry points can be reduced by the TSO.

Settlement of imbalances

Imbalance		Tolerance level	Penalty	Cashout price
Daily	✓	6000 GJ/day / 8% (1)	8% - 15% 0.1 €/GJ > 15% 0.3 €/GJ	
Yearly		10% (2)	1.3 * annual regional capacity amount	

(1) Charges as only applied in case imbalance in excess of 6000GJ/day. Imbalance charges are also only applied if the imbalance absolute value exceeds 8% of shipper's daily withdrawal. Shippers with a storage account are spared from daily imbalance charges.

(2) Applies if within a gas day and during peak period shippers withdraw more than 10% of the capacity assigned at the redelivery points for which the commitment is made to make withdrawals in the off-peak period.

15. Lithuania

Tariff structure and methodology

The TSO Lietuvos Dujos is applying a regulated **postage stamp** tariff system for domestic gas transmission. Transit tariffs are calculated separately based on a point-to-point tariff system. The allocation of transmission capacity is according to the first-come-first-served principle. So far the system does not experience any congestion; therefore no capacity has been traded on the secondary market. The transmission tariffs structure is based on a capacity and a commodity element, the first is charged on booked daily capacities and the latter on transported volumes. Capacity charges should cover no less than 70% of costs.

Tariff	Firm	Inter-ruptible	Tariff basis			Notes
			Fixed	Capacity	Energy	
Transport	✓	✓	-	m3/d/y	m3	(1), (2)
Transit	-		-	m3/100km	-	(3)

(1) Tariffs are differentiated for shippers transporting less and more than 1 bcm per year (for smaller customers capacity charge being 172% and commodity charge 465% of that for large customers).

(2) As **interruptible** capacity the unused capacity is offered to the network users. Interruptible capacity is priced at 93% of the annual firm tariff for small customers; commodity fee is the same as for small customers.

(3) Transit is explicitly not regulated, because transits are taking place from one non-EU country to another non-EU country.

Other services e.g. backhaul etc. are not available.

The basic contract **duration** for transmission tariffs is one calendar year. Contracts are also available for durations from one day upwards. Capacity tariffs are differentiated for durations from 1 to 7 days, 8 to 30 days, 31 to 90 days and 91 to 181 days. In that case capacity tariffs are further differentiated for peak, base and shoulder period. For short-term contract the commodity tariffs for customers with less than 1 bcm/y applies. Values shown in following table refer to the small customer's tariff.

Validity in days	Warm period	Transitional period	Cold period
1-7	298%	365%	567%
8-30	222%	272%	423%
31-90	166%	204%	316%
91-181	124%	152%	236%
182-364	92%	113%	176%

In case of **excess utilisation** there is differentiation between instructed and voluntary excess. In case of the first one, the additional payment usually is the regular price, in case of the latter a penalty is applicable for the excess amount.

Costs for balancing are included in the transmission tariffs.

Regulation		
Tariffs are **regulated according to the price-cap method.** The allowed revenue is set in the course of a price cap regulation with a five year regulatory period with annual adjustments in case of changes of so-called base-line indicators to avoid windfall profits or losses. The price cap is periodically adjusted by a correction term in case indicators deviate from baseline values. The adjustment process shall help to avoid windfall profit or loses due to outside conditions.		
CAPEX		
RAB		For the RAB asset values are taken from financial accounts. Assets not related to the regulated activities, assets not in use and assets acquired from EU funds or subsidies are excluded.
Depreciation	**Method** **Grid assets** **Other assets**	Linear Distributions networks, transmission systems: 55 year; Buildings: 60 year, Machinery and equipment: from 5 to 20, Transportation (car): 6 year.
Cost of capital (WACC)	6.87% (real, pre-tax)	
OPEX		
OPEX consists of material expenses, labour expenses and purchasing expenses for fuel gas.		
Material costs	Estimated using the costs in the year before the regulatory period started. The material cost are adjusted with expected changes	
Labour costs	Salary, social costs, pensions, hiring labour. Labour cost are estimated based on the costs in the year before the regulatory period started, adjusted with expected increases in salaries and staff changes	
Energy (fuel) costs	Actual costs in the year before the regulatory period started, adjusted with expected changed due to investment, changes in transportation amounts and import prices.	

Balancing

The sole responsibility for the balancing of the Lithuanian transmission system lies with the TSO Lietuvos Dujos. Balancing is conducted on a daily basis.

The legal requirements demanding a new balancing regime set up by the regulator have not been implemented.

The main source for balancing capacity is the flexibility of supply on the side of Gazprom (the single supplier of gas to Lithuania), the use of the linepack and the underground gas storage in Latvia. Roughly the flexibility from Gazprom satisfies around 80% of balancing needs, the linepack is used for the rest, except rare cases when the Latvian UGS is used for balancing purposes.

In emergency cases interruptibility of customers could also be used as a measure for balancing.

Settlement of imbalances

Imbalance		Tolerance level	Penalty	Cashout price
Daily	✓	+/- 5%	(1)	

(1) Without approval: 184.65 Lt/1000 m3
With approval; 10.26 (Summer); 30.78 (Shoulder); 61.55 (Winter) Lt/1000 m3
Unused capacity: 3.00 Lt/1000 m3

Technically speaking the above mentioned process is not imbalance settlement but simple overrun charges, imbalance settlement does not exist in Lithuania.

16. Luxembourg

Tariff structure and methodology

The TSO applies a **postage-stamp tariff** system. Tariffs are uniform for all four entry points to the national network. Luxembourg has no domestic production or storage, no gas is exported.

Capacity is allocated according to the first-come-first-served principle. Shipper's fees are comprised of two access components, the first one being a one-time fee, but the second one an annual fee based on the number of delivery points supplied, and a capacity charge based on maximum hourly capacity booked in a year.

Transmission fees are calculated such that allowed costs are divided by the sum of forecasted capacity subscriptions at exit points.

Tariff	Firm	Interruptible	Tariff basis			Notes
			Fixed	Capacity	Energy	
Transport	✓		-	m3 in peak hour	-	

Interruptible capacity was not necessary until 2009 as there was and is no congestion in the network. However, interruptible capacity is now disclosed on Belgian entry as the Belgian entry point is fully booked, therefore potential congestion arises in the case of demand for supplementary capacity. New capacity allocation and congestion management methods are currently being developed.

Basic contract **duration** is one year. Contracts are available on multi-annual, yearly and monthly basis. For multi-annual contracts no discount applies compared to the annual contracts. For monthly capacity a factor applies with which the annual price is multiplied (factor being smaller than 1). Winter season months are more expensive than other months. Prices range from 12% (May-September) to 30% (December-February).

There is no tolerance concerning **excess use** of contracted capacity. In such cases a penalty fee applies.

Market rules allow for **secondary trading** on contracted capacities.

Given the physical situation in Luxembourg, backhaul services or even shorthaul products are not available.

Regulation		
Tariffs are subject to a **rate of return regulation** applied to the TSO. Tariffs are approved by the regulatory authority upon suggestion of the network operator. The regulatory decision needs formal approval by the Ministry of Economics and Foreign Trade.		
CAPEX		
RAB		RAB is the net value of all assets corrected for construction in progress, working capital and third parties' engagement (subsidies). Assets values are based on historic cost.
Depreciation	**Method**	• Linear • Different regulatory life time for existing assets and new assets, generally over 40 years.
Cost of capital (WACC)	8.5% (nominal, pre-tax)	The WACC includes • a nominal risk free rate of 4.50%, • a Debt Premium of 1.00% • T (Tax rate): 30.38% • Gearing is set to 0.50 • Equity Risk Premium: 4.60% • Equity beta: 0.76
OPEX		
OPEX are comprised of costs for consumable raw materials, external charges, personnel costs, other network costs and costs for services brought from upstream foreign network operators to maintain network security.		

Balancing

The TSO is responsible for keeping the national gas system in balance. Luxembourg has no physical storage capacity except linepack. The overall equilibrium is solely provided by the TSO and foreign network operators. Each shipper has a standard tolerance free of charge including a mixed hourly-daily tolerance margin. Additional free balancing margin is available against payment. The imbalance settlement is asymmetrical, imbalances are settled for each shipper individually, prices are derived from a reference price and a cost-based marginal price. Although balancing is done on hourly basis, a 2-hour time lag enables shippers to adjust nominations intraday.

Settlement of imbalances

Imbalance		**Tolerance level** (1)	**Penalty** (2)	**Cashout price**
Hourly	✓	50%/50%	Linearly increasing penalty: linearly increasing factor multiplied with the difference between tolerance and actual deviations	(3)
Cumulative	✓	3%/5%	See above	
Daily	✓	3%/5%	See above	

(1) Winter (November-March)/Summer (April-October); Standard Tolerance Band

(2) Penalties do not include balancing gas, this has to be cleared separately between shippers and TSO.

(3) Balancing gas is cleared at s*max{Dow Jones Zeebrugge Index; highest balancing gas price paid by Creos Luxembourg}, with factors being different for deficit (110%) and overrun (90%), being higher (deficit, 150%) or lower (overrun 70%) for deviations exceeding standard tolerance bands compared to deviations remaining within the tolerance band.

Besides the standard **tolerance** band available free of charge, additional flexibility is offered, subject to the amount of remaining free capacity and linepack.

17. Netherlands

Tariff structure and methodology						
TSO GTS is operating a regulated and **decoupled entry-exit** tariff system for gas transmission. Import, export and transit of gas are an integrated part of this. The allocation of transmission capacity is according to the first-come-first-served principle. The transmission tariffs structure is charged on contracted capacities.						
Tariff	**Firm**	**Interruptible**	**Tariff basis**			**Notes**
			Fixed	**Capacity**	**Energy**	
Transport	✓	✓	-	m3/h	-	
Backhaul	-	✓	-	m3/h	-	(1)
Wheeling	✓	✓	-	m3/h	-	(2)
Shorthaul	-	-	-	m3/h	-	(3)

(1) **Backhaul** is the right to feed-in or extract gas administratively against the physical flow at border points. Backhaul capacity is offered in three tiers, at a discount of 10%, 15%, or 30% of the standard capacity tariff, reflecting a 0%, 0-5%, and 5-15% chance of interruption. On the basis of past performances the chance of interruption determines the discount level for interruptible backhaul.

(2) **Wheeling** is considered transport over a distance of zero kilometres, i.e. transmission from an entry point to a nearby exit point.

(3) **Shorthaul** effectively is a customised point-to-point contract that gives the right to feed-in gas at a specified entry point and to extract it at a specified exit point, located within 50 km of the entry point.

Interruptible capacity is supplied in two tiers related to the probability of interruption. The risk of interruption of transport (i.e. entry or exit capacity) is reflected by a discount on tariffs of 15% for a 0-5% chance of interruption (30% for a 5-15% chance of interruption). For excess use of interruptible transport capacity, and for deviant contract durations for interruptible transport capacity, the same tariff methodologies apply as for firm transport capacity.

The basic contract **duration** for transmission tariffs is one calendar year. In addition, monthly and daily contract durations are considered. The monthly contract tariff depends on the season (winter, shoulder, summer). The tariff for 12 consecutive monthly contracts cannot be higher than the base tariff for one calendar year. Daily contract tariffs are 1/15 of the monthly tariff.

When entry or exit capacity is exceeded by a margin of more than 2% of contracted capacity, an ex-post surcharge applies. The amount of **excess utilisation** is specified per gas day, and determined by the largest excess amount in an hour. The tariff for excess is 1/2 x monthly factor x calendar year tariff. The monthly factor is season dependent.

In principle, there is no distinction made between **local vs. cross-border** entry/exit points. However, wheeling and diversion services are only possible on specified combinations of entry and exit points (only border points). Backhaul is only available at border points. Moreover, tariffs for monthly and daily exit capacity contracts at local distribution points depend on the ratio between small and large gas users in the portfolio.

Other services:

- Diversion of contracted capacity at an entry (or exit) point to another entry (or exit) point at the same location. This should not require additional transport capacity and is charged by a fixed one-off tariff.
- Reposition is a tailor-made service where contracted capacity at an exit point moves to another exit point for a certain period of time. The service is charged by a capacity tariff (m3/h).
- Quality conversion, on portfolio basis, is the right to feed-in high-calorific gas and extract low-calorific gas. Booking of QC was abolished from 1 January 2009 and is now a socialised service.
- Peak delivery: The TSO will deliver gas to license holders (=gas distributors) in case of temperatures lower than -9°C to ensure the supply to retail customers. On cold days (< -9°C on average), each license holder has the right and the obligation to take gas from the TSO in accordance with the ascribed amount for small / retail consumers. Peak delivery is charged by a capacity (m3/h attributed production capacity) and an energy tariff (m3/h delivered volume).
- The title transfer facility subscription is a service that allows shippers to trade gas within the system of GTS on the virtual trading point TTF. The subscription is a fixed amount per month and a variable tariff over traded energy (volume).

Regulation		
Tariffs are regulated based on a price cap mechanism over a four-year regulatory period. The regulator NMa determines the methods for determining tariffs, the x-factor and the tariff structure (e.g. capacity based) after consultation with the TSO (GTS) and other parties. The Ministry of Economic Affairs determines the level of capital costs of GTS and the allowed return on capital, as well as the depreciation methodology. On an annual basis, NMa approves (or rejects) the tariffs based on a tariff proposal by GTS. The TSO receives compensation for both capital cost and operational cost. Only the weighted average tariff (over all entry and exit points) is regulated. The regulator has determined a symmetrical bandwidth for individual tariff changes of 5%, i.e. individual tariff changes can be up to 5% higher or lower than the average tariff change. The x-factor is determined by the base income and the end income. Base income in 2009 is the sum over tasks/services over invoiced volume of the service multiplied by the tariff of the service. End income is defined as estimated total costs (CAPEX plus OPEX) at the end of the regulating period 2012. The x-factor has been set to 6.2% for the period 2009-2012.		
CAPEX		
RAB	**Historic** investments	RAB is the value of all capital equipment of GTS necessary to fulfil its regulated tasks. The RAB is based on indexed (1) historic costs of the gas infrastructure and the RAB is annually corrected for inflation by using the CPI.
Depreciation	• Linear	• Over the expected economic lifetime basis, generally 55 years • 20 years for extension of high pressure grid
Cost of capital (WACC)	5.5% (real, pre-tax)	• Consists of a risk-free rate of 2.5% (on bonds) and a risk premium of 3%. • Due to higher risks, the cost of capital for extension of the high pressure grid is set at 7%
OPEX		
Labour costs	Costs in 2007 and expected productivity development of 2% Both direct labour costs for GTS as well as indirect labour costs related to products and services supplied to GTS.	

	Salary, social costs, pensions, hiring labour
Energy (fuel) costs and other operational costs	Depend on transported volumes of gas. Realised costs (in 2007) per unit of output are used as a starting point. Next, the development of these costs in the period 2005-2007 determines a trend which is applied to calculate fuel and other operational costs in 2012.
(1) A combination of indexation was used to determine the RAB, including PPI (< 1963), combined gas transport project index (1963-1979), a land, road and water construction index for sewages (1979-2005) and CPI (> 2005)	
The TSO can have extra income for **substantial investments** if the regulator approves these investments.	
In November 2006 the Dutch court reversed the tariff decision made by the Dutch regulator. The court decided that a decision should be made on the tariffs of the services provided by the TSO and not on the total earnings of the TSO. In December 2008 the Dutch regulator took a new decision after the Ministry of Economic Affairs published a new framework for tariff regulation.	

Balancing

The TSO is primarily responsible for keeping the national gas system in balance. The TSO provides the bandwidth of tolerance levels per shipper portfolio on an ex-ante basis. A two hour time delay applies for the balance between entry and exit gas, representing the buffer capacity of the grid.

A shipper nominates required capacities to the TSO before 14:00 for the next gas day (for each hour and each entry and exit point). The shipper can re-nominate until 2 hours before the start of the hour concerned. Ex-post trading of imbalances is not an option in the Netherlands.

TSO uses the prices listed on the gas exchange - the APX-TTF day-ahead index - as a basis for the settlement of the imbalance volume between entry and exit. Both surpluses and shortages are settled on the basis of the same price.

Hourly and cumulative tolerances can be traded (transfer of user's rights between shippers) separately from the transport capacity. This should be reported to GTS which charges a fixed fee per transfer to the selling shipper.

The **procurement** of balancing gas by the TSO is based on storage and tenders. All possible options are potentially used if necessary, but it is not known which option is used when and to which volume and cost. There is however a special balancing service, performed by GTS, to balance a portfolio by means of a source put under the control of GTS by shipper, within the limits agreed upon.

The Gas Act states that as long as GasTerra has economic market power in the market for flexibility services, GTS is required to offer flexibility services. The method decision on flexibility services (NMa, taking effect on 1 January 2009) determines that GasTerra indeed has such market power. The method decision on flex basically is a continuation of the main features of the decision for the previous regulation period 2006-2008 and expects that GTS will continue the procurement and sale of flexibility via **tenders**.

Settlement of imbalances

Imbalance		Tolerance level	Penalty	Cashout price
Hourly	✓	(1)	10% (15%) of the APX-TTF day ahead index multiplied by the hourly imbalance volume for a surplus (deficit) in a portfolio	
Cumulative	✓	(1)	100% of the APX-TTF day ahead index multiplied by the cumulative shortage or surplus (2)	
Daily	✓	36% (3)	100% of the APX-TTF day ahead index (4)	APX-TTF day ahead index

(1) Levels determined as described below. At temperatures below 0°C they linearly decrease to 2% and 4% for hourly and cumulative tolerance respectively at -17°C

(2) The surcharge will be applied to the largest positive imbalance and the largest negative imbalance during a gas day.

(3) Until 1 July 2009. Decreasing to 10% for the period 1 July 2009 – 1 January 2010 and 2% thereafter.

(4) If both a surplus cumulative imbalance and a surplus daily imbalance occur in one gas day, only the larger of the two imbalances will be surcharged. The difference is settled at the end of each gas day.

Tolerance levels are determined yearly by the TSO for portfolios on the basis of a system of three tolerance brackets. The switch-points between the brackets are at portfolio sizes of 250,000 m3/h and 1,000,000 m3/h respectively. Interruptible and backhaul capacity are included in the determination of the size of a portfolio by a weighted factor that equals the percentage of the firm tariff applicable to the interruptible and backhaul capacity. The tolerance is assigned for both firm and interruptible capacities as well as for backhaul. No tolerance is assigned at virtual entry or exit points, such as TTF.

Special services:

- Shippers can obtain extra short term flexibility with GTS by contracting the so-called combiflex service. With the combiflex service a shipper can increase the hourly-, cumulative and daily tolerance of the basic balancing regime.
- GTS offers an online balancing service, i.e. keeping the balance between gas feed-ins at entry points and extraction at exit points. The tariff for this service has a fixed (initial one-off amount per assignment) and a capacity (up and downwards tuning of capacity in m3/h) element.

Miscellaneous

The Ministry prescribes that a **new balancing regime** must be developed by GTS, effective from 1 January 2010. Elements in the new balancing regime are:

- Introduction of a intraday imbalance market
- Costs of balancing (by the TSO) are charged to parties that cause the imbalance of the grid
- TSO provides steering information to network users
- Program (or portfolio) responsible parties
- Socialisation of costs of keeping reserve capacity

18. Poland

Tariff structure and methodology
OGP Gaz-System applies a regulated postage-stamp tariff system for gas transmission with charges based on contracted capacity at exit points. The tariff system is uniform and contains no locational elements. The allocation of transmission capacity is according to the first-come-first-served principle. The transmission tariffs structure is charged on contracted capacities. For contracted capacity the "use-it-or-lose-it" principle applies. The transmission fees are differentiated for the high and the low calorific gas networks and also for the level of ordered capacity, taken into account individually for each exit point (however the low calorific gas network is small compared to the high caloric one (or to networks located in other countries)). Transit is only handled by SGT EuRoPol Gaz SA as the operator and the owner of the Polish section of the Yamal pipeline. The transmission capacity on the Yamal-Europe pipeline is allocated on the basis of the agreement between Polish Oil and Gas Company (POGC) and Gazprom Export as legal successor companies of the initial contract parties of the pipeline. This agreement for the Yamal pipeline remains in force until the end of 2019. Given the limited access to the Yamal gas pipeline, no undertaking has applied for transmission services. In consequence, such services are provided for Gazprom Export (transit) and POGC (supplies to the Polish gas system - exit points in Lwówek and Włocławek). Tariffs for the Yamal-Europe pipeline are distant-based and charged by SGT EuRoPol Gaz SA.

Tariff	Firm	Interruptible	Tariff basis			Notes
			Fixed	Capacity	Energy	
Transport	✓	(✓)	(4)	m³/h	m³	(1), (2)
Transit	✓			km/m³/day	m³	(3)

(1) For capacity and commodity transport tariff components a split of 70% / 30% is used. Fuel gas is provided by the TSO and covered by the transmission charges.

(2) Interruptible capacity can be offered by the TSO if circumstances at an exit point make it impossible to offer firm capacity. Interruptible capacity is offered for four levels of delivery certainty limiting both the maximum length of a single interruption as well as the total number of days on which capacity might be reduced during the gas year. Short term interruptible capacity is only available semi annually. The risk of interruption of transport (i.e. entry or exit capacity) is reflected by a discount on tariffs of 6% to 35% (for yearly contracts).

(3) The transmission service charge is calculated by a variable distance charge weighted by the volume of gaseous fuel transmitted and a feed distance charge (based in the contractual capacity, the length of the transmission route and the number of hours or 24-hour periods during a settlement period).

(4) To cover the TSO's commercial services such as meter reading, invoicing etc. a subscription is charged from each shipper.

Both OGP Gaz-System and EuRoPol Gaz do not offer the backhaul and shorthaul products on gas networks maintained by them.

For capacity and commodity transport tariff components a split of 75% / 25% is used. Fuel gas is provided by OGP Gaz-System and covered by the transmission charges.

The basic contract **duration** for transmission tariffs is one calendar year. In addition, monthly, quarterly and semi-annual contract durations are considered. Short term contracts are not possible for exit points where the respective shipper already has a contract for one year or longer. The short term contract tariff depends on the season, with the highest (for monthly contracts) in February with a multiplicative factor of 4.3 (applied on capacity tariff only) and lowest from June to August with a factor of 2.1.

Other services and charges

- Gas odorisation
- Additional charges apply if gas delivered is outside quality specifications. The system is symmetric, i.e. shippers get a discount if gas withdrawn is below standard gross calorific value or gas injected is higher.

Regulation		
Tariffs are **cost based** (rate of return regulation), reflecting actual (justified) costs incurred by Gaz-System. The regulatory period is one year. According to the legal framework tariffs should cover the justified costs together with return on capital and protect customers against unjustified level of prices. Tariffs are calculated by the gas companies and approved by the President of ERO for one year. Longer periods are possible but not practiced. Transmission tariffs are established for a return on capital of approx. 9% (nominally).		
CAPEX		
RAB	**Asset Valuation Concept:**	The RAB is based on indexed historic costs of the gas infrastructure and annually corrected for inflation by using the CPI.
Depreciation	**Method**	• Linear
Cost of capital (WACC)	9% (nominal, pre tax)	• Risk-free rate is determined on the basis of valued average of rates on return of 10-year state bonds issued during the 12-month period former to the application day. • Premium rate for equity is 4.46 %, for debt 1%

Balancing

The OGP Gaz-System is the responsible party for keeping the domestic gas system in balance. In the low calorific gas system shippers are not allowed to be unbalanced because of the very small size and the lack of linepack and storage; the TSO conducts only physical balancing to ensure system security. For the high calorific gas system a system of commercial balancing is also applied, basically comprised of two components, firstly, an overall unbalance settlement (regarding only shippers' total injections and withdrawals), secondly, shippers' compliance with nominated quantities with every entry and exit point considered separately.

Renominations are possible until 15:00 on the day before. The shipper is obliged to adjust the nomination at the given point and correspondingly at the other entry or exit points and to supply the renomination to the TSO within 2 hours of the receipt of this information.

Ex-post trading of imbalances or pooling between different shippers is not used in Poland.

Basic imbalance settlement period is one day.

Physical balancing is conducted by the TSO relying on two instruments to maintain system stability:

- Linepack of the transmission system
- Storage capacity reserved for balancing

Storage capacity needed for balancing has to be provided by the storage operator or owner upon reservation by the TSO. Reservations are made in November for one year in advance beginning on 1 April in the following year. Only if the above mentioned instruments prove insufficient to maintain system stability is the TSO allowed to curtail gas entry or exit.

Settlement of imbalances

Imbalance		Tolerance level	Penalty	Cashout price
Daily	✓	15%/5% (1)	Standard charge for imbalance ranging from 15% / 5% to 45% / 15%, increased charge if imbalance exceeds 45% /15%, charge applicable always for volumes exceeding 15% / 5%. (1)	No cashout
Cumulative	✓	(2)	(2)	Gas Reference Price (3)

(1) Daily imbalance limit is 15% / 5% (small / large customers, see below). Up to that limit, bal-

ancing is provided by the TSO free of charge. Top daily imbalance limit is 45% / 15%. Imbalances between daily and top daily limit are subject to a standard charge of PLN 0.1681/m³ for those volumes exceeding daily limit. If the imbalance exceeds the top daily limit an increased charge of PLN 0.3362/m³ applies for all volumes exceeding the daily limit.

(2) If cumulative imbalance is not zero at the end of the month, shippers are subject to a penalty based on the gas reference price (weighted average price of gas fuel purchased by TSO in the previous gas month)

Maximum cumulative (monthly) imbalance limit is 40% / 20%. If cumulative imbalance at month's end exceeds maximum cumulative limit a penalty applies.

(3) At the end of the month imbalance accounts are cleared. Cashout mechanism is a symmetric single price system; TSO charges if the imbalance is below zero and pays if the imbalance is above zero.

Imbalance limits are differentiated for small customers with less than or equal to 15,000 m³/h total contracted entry capacities and for large customers with more.

Compliance with nominations is considered at every entry and exit point. If nominations are not met by shippers additional overrun/underrun charges apply.

Special services:

- At present some work was carried out to consider the possibility of additional imbalance tolerance for shippers.

19. Portugal

Tariff structure and methodology

The general tariff model chosen by the regulator is based on a postage stamp method.

Transmission tariffs applied to cross border flows are different from those applied to domestic flows. The price of energy (commodity), which is differentiated by time (peak and off-peak), is the same. The difference is on the capacity price, which in the case of tariffs for international flows excludes costs associated with peripheral sections of the network (such as costs associated with Gas Reduction Metering System) that should not be imputed to such gas flows.

Tariff	Firm	Interruptible	Tariff basis			Notes
			Fixed	Capacity	Energy	
Network tariff	✓			€/kWh/day/month	€/kWh	(1)

(1) The transport of high-pressure natural gas is remunerated through the transmission network tariff. The price of energy is differentiated by two time periods (peak and off-peak). During working days an additional peak period commodity charge applies.

Short-term tariffs are available. Monthly capacity contracts are priced far below annual capacity tariffs with only 20% of a twelfth of the annual price (1.66%), however the peak period prime is 13 times higher.

The transmission network tariff is determined in a way that enables:

- Its structure to match the structure of marginal or incremental costs; and
- The recovery of the transmission activity allowed revenues.

The incremental costs are approximated by long run average incremental cost. The incremental cost shall be determined through the ratio between the present value of the annuities of the incremental investment costs (including the respective operation and maintenance costs) and the present value of the corresponding incremental demand. However, with prices equal to the respective incremental costs the allowed revenues may not be fully recovered. So, multiplicative factors are applied, for each price, in order to assure costs recovery, ensuring the economical-financial viability of the regulated companies and simultaneously reflecting the incremental costs.

Regulation		
The methodology to determine the tariffs and the regulated companies revenues are defined ex-ante in the tariff code, which is subject to an extensive consultation procedure. The regulation period is three years, with annual revision of tariffs and stabilisation of the parameters in the regulation period. The regulation parameters are established in the beginning of the regulation period for all the regulatory period. The tariffs are computed on an annual basis, taking into account the referred methodology and the approved parameters. The regulated parameters and also the annual tariffs approval shall be preceded by the consultation of the Tariff Council, where consumers and regulated companies are represented. The allowed revenues of REN natural gas companies (includes the transmission system, LNG terminal and underground storage) are established basically from remuneration on fixed assets at the weighted average cost of capital defined by the regulator for each regulatory period. In addition, recognised operating costs are also included in the tariffs. The basic approach for regulation of transmission tariffs consists of rate of return regulation using the building blocks approach. In addition, the cost of capital and the amortisation of such assets are smoothed for the concession period (40 years). The cost of capital smoothing, for each year of concession is the result of the multiplication of a constant unitary capital cost by the amounts of natural gas that will predictably be transported in each infrastructure. The cost of capital smoothing is a way of confronting the uncertainty of the quantities to be transported throughout the concession period and adjusting the recovery of investments between current and future users.		
CAPEX		
RAB	Cost of capital is calculated with a formula taking into account average values, rate of return, depreciation etc. Investment allowances are considered in the annual RAB.	
Depreciation	**Method**	Linear, over the expected economic lifetime basis
Cost of capital (WACC)	8% (real, pre-tax)	
OPEX		
The GDP deflator is used to determine the present value of operational costs and revenues, exception of costs incurred with acquisition of natural gas and investments for gas year 2008-2009. The operation costs (excluding depreciation) are approved on an annual basis with adjustment of two years (done on an ex-post basis).		

Balancing

The balancing period used in the natural gas system in Portugal is **daily**. The market players must manage the natural gas supply and demand balance within the tolerance derived from the maximum and minimum stock allocated to each of them. If a market player breaks these limits it creates a situation of individual imbalance, which is subject to a penalty scheme in the framework of the incentive mechanism to restore the individual balance.

The transmission system operator is responsible for determining the quantities of natural gas (stocks) held by each individual market agent in each of the infrastructures (i.e. transmission network, LNG terminals and underground natural gas facilities). Each of these infrastructures is considered, in accordance with the regulations in force, a balance zone, which functions as a physical support for the trading of natural gas between market agents.

The creation of an operational reserve has been provided for with a view to securing the integrity of the national natural gas system's infrastructures. This operating reserve is the amount of natural gas required to meet short-term needs, resulting from possible differences between the profiles of the volumes injected into and taken off the transmission network in the intraday period and the restoration of natural gas amounts due to minimum stock infringements by the market players, which may threaten the integrity of the transmission system.

Settlement of imbalances

For each of the infrastructures (i.e. LNG terminal, transmission network and natural gas underground storage) two types of balances shall be carried out: a physical balance related to the total amount of energy processed in each infrastructure and a commercial balance related to the quantity of energy processed by each market player in each infrastructure. Similarly a balance of the operational reserves is performed in order to determine the remaining stock reserves in each of the infrastructures.

If a market player violates the maximum and minimum stock limits allocated to it in the transmission network, this creates a situation of individual imbalance, which is subject to imbalance charges or a penalty scheme.

If a market player violates the maximum stock limit, corresponding to an excess of natural gas in the transmission network, the imbalance charge in force is based on the LNG storage tariff. This is a cost reflective approach in the sense that the excess of natural gas in the transmission network, exceeding the linepack capacity, is physically maintained in the LNG storage tanks. The imbalance charge corresponds to the tariff of LNG storage with a surplus depending on the dimension of the imbalance.

On the other hand, if the market player violates the minimum stock limit in the transmission network, the corresponding individual imbalance must be assessed according to the amount of gas stored by the market player in the system – linepack, LNG tanks and underground storage facilities. If the over-

all stock of natural gas is positive, related to all minimum stocks, an imbalance charge is applied based on the LNG storage tariff. On the contrary, if the overall stock of natural gas in the system is negative, corresponding to a lack of gas, the penalty applied is determined on the basis of a reference price for natural gas.

In all circumstances the market players must correct their individual imbalances and they have to restore their stock to within the established tolerance levels as soon as possible.

In case of serious imbalances or exceptional circumstances that constitutes a serious risk for the entire system security; the TSO shall intervene in order to restore the system variables within the normal operational values.

The market player, who, in a group of days beginning in day 'd', is in a situation of negative imbalance on the system is, therefore, subject to a penalty period as explained below:

- One daily penalty equal to the "value GN", multiplied by 0.30, concerning the quantities of gas below the minimum limits established;
- One additional daily penalty equal to the "value GN", multiplied by 0.30, for quantities below the established limits, in case the market player does not restore its stock by the end of day 'd+3' (inclusive). This second penalty shall be applied from day 'd+3' onwards (inclusive). If the commercial balance has not been provided to the market player by 17:00 hours of day 'd+2', the additional daily penalty will start to be applied on the day after the communication occurs.

The reference price for a certain day will be determined by the arithmetic average of the last seven available quotations, expressed in cent€/kWh, of the natural gas cost in the "Henry Hub" and in the "National Balancing Point" (NBP). The relevant quotations are the values published as final prices for future contracts with expiration date close to the reference day in the "New York Mercantile Exchange" (known as "Henry Hub Natural Gas Future") and in the "Intercontinental Exchange (ICE)" (know as "ICE Natural Gas Future").

In order to express the quotations in Euro, the official exchange rate published by the European Central Bank shall be applied. In case there is a natural gas quotation but the European Central Bank has not published the exchange rate, the quotation of the previous day shall be used.

20. Romania

Tariff structure and methodology						
TSO SNTGN Transgaz – S.A. Medias is operating a regulated **entry-exit** tariff system for gas transmission. Import, export and transit of gas are an integrated part of this. The allocation of transmission capacity is according to the first-come-first-served principle, based on annual capacity requests. The transmission tariffs structure is charged on reserved capacities.						
Tariff	**Firm**	**Interruptible**	**Tariff basis**			**Notes**
			Fixed	**Capacity**	**Energy**	
Transport	✓	✓	-	MWh/h	MWh	(1), (2)
(1) The transmission tariff is the sum of a fixed component for reserving capacity at entry and exit points and a volume component for the use of the transmission system. The capacity component is the same for all entry and exit points. (2) **Interruptible** capacity is available at a 22% discount for the capacity element (0.14 versus 0.18 RON/MW) of the tariff (the energy element is the same as the firm tariff).						
Shippers can submit transport capacity requests: • On an annual basis before 15 May, for a (multiple of) natural gas years[2]. • Or after 15 May for shorter periods, but only until the end of the prevailing gas year. Capacity reservations are updated each month by the shipper (i.e. a kind of renomination). Approved reservations are included in the annual transportation plan of the TSO. Transmission tariffs are however not differentiated by contract **duration**. The TSO has strong empowerments related to congestion management. In case of congestion, approved but unused capacity will be used in the following order: 1) voluntary return to the TSO, 2) capacity transfer facility, 3) mandatory transfer of capacity between shippers. There is no distinction made between **local vs. cross-border** entry/exit points.						

[2] A gas year in Romania runs from 1 July until 30 June.

Regulation		
The allowed revenue for transmission is calculated on an annual basis using a revenue-cap formula that is fixed for a five year regulation period (1 July 2007 – 1 July 2012). The revenue cap formula includes an efficiency increase requirement and forecast of annual inflation. CAPEX of new investment that takes place during the regulatory period are considered in the revenue cap formula. The regulator ANRE requires special accounting rules, known as regulated accounting evidence (RAE) that differ from normal statutory accounting.		
CAPEX		
RAB	Historic cost, adjusted by ANRE	The initial value of RAB is determined by the regulators taking into account the resulting tariff level. Investment for replacement and extension are not distinguished. CAPEX for investment are considered in the allowed revenue with a one year time lag.
Depreciation	**Method**	• Linear • Annual depreciation is fixed by regulator
Cost of capital (WACC)	7.88% (real pre-tax)	• Consists of the costs of dept and equity. Costs of dept include risk-free assets (Romanian bonds) and a risk bonus.
OPEX		
Labour costs	Including salaries, bonuses and other contractual rights	
Energy (fuel) costs	Fuel and water costs	
Other operational costs	Includes material costs, technology costs calculated according to norms and regulations in effect, maintenance costs, reparations, spare parts, etc., other administrative costs, advertisement, publicity, sponsorship, social actions, settlements, penalties, cost of exploiting transport pipes.	
For natural gas transmission, there are performance indicators for quality of service, and safety of service. The performance indicators regarding the quality of service refer to: • Handling of access applications with a view to connection to the NTS		

- Connection to the NTS of access applicants
- Notification regarding restoring of service
- Notification of scheduled interruptions and of service restoration following scheduled interruption
- Handling of NTS users' complaints regarding the measurement of natural gas
- Handling of complaints regarding the integrity and functioning of the NTS under safety conditions
- TSO obligation to inform applicants/users arising from other regulations issued by the regulatory authority

The safety indicators established for the natural gas transmission operator system performance standards regarding the of service are as follows:

- Annual percentage of network subject to control using gas leakages detecting devices
- Annual number of failings causing losses localised per one kilometre of checked network
- Annual number of failings causing losses signalled by third parties per one kilometre of active network
- Annual number of failings causing losses generated by third party actions signalled by third parties per one kilometre of active network

Balancing

The TSO is responsible for keeping the national gas system in balance on a daily basis. Specified tolerance levels apply to daily and weekly accumulated imbalances. The base tolerance level is 2.5%. Approved nominated capacities at exit points are used as a reference for tolerance levels.

A shipper nominates on a weekly basis firm capacities at specified entry and exit points to the TSO for the next week. After approval by the TSO, nominations are allocated. This is regarded as preliminary allocation. Final allocation is based on metering (i.e. ex-post). On a daily and weekly basis the TSO performs forecasts of capacity needed by users, based on their daily status report and weekly forecast for the next week.

The **procurement** of balancing gas by the TSO is based on linepack, underground storage, production, import and interruptible consumers. The TSO cannot own gas, thus stored gas quantities are state owned.

Settlement of imbalances

Imbalance		Tolerance level	Penalty	Cashout price
Cumulative	✓	2.5%-5% 5%-8% 8%-12% 12%-15% >15%	No further information available.	
Daily	✓	2.5%-5% 5%-15% >15%	(1)	

(1) Five ranges for weekly cumulated tolerances are defined, and three ranges for daily tolerances. The references for tolerance levels are approved nominated capacities at exit points. Penalty tariffs for imbalances are set by the regulator ANRE for each range. No further information available.

(2) Ex-post, the shipper may use the capacity transfer facility.

21. Slovakia

Tariff structure and methodology

TSO Eustream (former SPP) is operating a decoupled **entry-exit** tariff system for gas transmission, with different rates for individual entry and exit points. Import, export and transit of gas are an integrated part of the transmission system. Tariffs are regulated on a yearly basis and paid for booked capacities.

Market rules differ between cross-border and domestic capacity allocation.

Tariff	Firm	Interruptible	Tariff basis			Notes
			Fixed	Capacity	Energy	
Transport	✓	✓	-	m3/d	-	(1), (2)

(1) Although only a capacity tariff applies, grid users also have to give a part of gas volume for operational purposes (gas in kind). The volume depends on metered volumes at entry and exit points multiplied by applicable rates.

(2) **Interruptible** capacity is available at a discount, depending on the negotiated number of days with interruption. The tariff for interruptible capacity reflects the probability of interruption. Thus, the interruptible capacity tariff per day is 1/365 of the firm tariff, multiplied by the ratio between truly offered interruption capacity and contracted interruptible capacity. The latter ratio has a minimum level of 0.04.
No interruptible contracts have been signed up to now.

A **duration** factor of short-term (monthly or daily) contracts applies and depends on the agreed number of months or days of the gas transmission capacity contract. The duration factor of short-term contracts is determined as:

- Monthly contracts: 0.2222 + 0.1111 * number of months (i.e. for 30% of annual price for one month)
- Daily contracts: 0.0030 + 0.0189 * number of days.

Regulation
The regulation of the transmission tariffs in Slovakia is based on a basic price-cap formula whereby the initial transmission tariffs are fixed by the regulator URSO based on a benchmarking with neighbouring countries. The resulting individual entry and exit tariffs are indexed for inflation by 50%, i.e. next year's tariff can be directly derived from this year's tariffs. The fact that only 50% of the tariff is corrected by inflation can be interpreted as additional efficiency increase requirement to the transport company. The methodology of transmission tariff setting leads to annual increases of tariffs. There is no relation to the actual use of the gas system. The transmission charge includes the costs incurred in transporting natural gas through the Slovak transmission system. These are specifically understood to be the costs incurred in operation and maintenance and in meeting the natural gas quality standards, and the costs related to the balancing of the Slovak gas system. The treatment of existing assets and new investment is not clear.

Balancing

In Slovakia, the DSO (SPP Distribucia) is responsible for keeping the regional gas system in balance on a daily basis. Tools available are line-pack and storage. However, the DSO is not allowed to buy balancing gas. There is no market based balancing.

There are daily and cumulative tolerance levels, but only imbalances resulting from the cumulative levels are penalised. However, imbalances are only charged to the shipper if their imbalance was in the same direction as the overall system imbalance. The basic tolerance level is 5% of daily contracted capacity.

According to market rules, it is possible to transfer the responsibility for imbalances to other shippers. It is not possible to trade (part of) the tolerance ex ante or ex post.

The **procurement** of balancing gas by the DSO is based on TSO and DSO linepack. Linepack capacity is sufficient to cover operational difficulties under normal conditions. Storage is the next option to settle imbalances. There is no advance contracting of balancing gas.

Settlement of imbalances

Imbalance		Tolerance level	Penalty	Cashout price
Cumulative	✓	5 x daily tolerance (1)	Related to price of imported gas (2)	
Daily	✓	5%	-	(3)

(1) 25% of contracted daily capacity.

(2) Imbalance prices are set by the regulator with reference to the price of imported gas (including Brent oil quotations). They are paid only if shippers overrun their tolerance limit on their cumulative account (5 times daily tolerance) and do not include deviation in nomination for the next day.

(3) In case of a deficit, the price is two times the reference price. In case of a surplus, the price is much lower: 0.4 times the reference price.

Balancing costs are recovered through imbalance charges. The difference between actual balance costs and imbalance charges at the end of the year is taken into consideration by the regulator and included in the transmission fees for the next year.

22. Slovenia

Tariff structure and methodology

The TSO Geoplin plinovodi is applying a **regulated postage stamp tariff system**. Transit is integrated into this tariff system, but at the moment a new tariff system is in preparation, which amongst others will change the regulation of transit tariffs. Transit tariff in future will be treated separately and charged on a point-to-point basis. The allocation of transmission capacity is conducted pro rata. The transmission tariffs structure is charged on booked capacities, but in the future tariff system a commodity charge will be introduced.

Tariff	Firm	Interruptible	Tariff basis			Notes
			Fixed	Capacity	Energy	
Transport	✓	✓	-	m3/day/year	-	(1)

(1) **Interruptible** capacity is charged with a discount of 10%. In the future tariff system the discount will depend on the duration and size of interruption.

The basic contract **duration** for transmission tariffs is one calendar year, longer terms are possible. In addition, monthly and daily contract durations are considered. Short-term tariffs are more expensive and further differentiated for the time of year in which they take place, according to the different demand patterns over the year. Monthly contracts are priced from 8.3% (May-October) to 24.5% (December-February) of annual contracts.

Regulation		
Transmission tariffs are regulated based on revenue cap regulation using a building blocks approach. Currently, Slovenia is about to change the system in terms of prolonging the regulatory period from one to three years and allowing ex post adjustments of the eligible cost. The regulatory regime foresees the application of OPEX-Benchmarking, which is currently not applied.		
CAPEX		
RAB	Historic cost	Principally RAB is determined by use of financial accounts, assets are valued with historic costs of acquisition.
Depreciation	**Method**	• Linear • Over the expected economic lifetime basis (in average more than 40 years)
Cost of capital (WACC)	5.87% (real pre-tax)	• Cost of debt: 5%, cost of equity 7.18, gearing: 60%
OPEX		
OPEX are divided into non-controllable costs, controllable costs and other expenses. Non-controllable costs include property taxes, concession costs, and other taxes. Controllable costs are labour costs and costs of material and services. Fuel gas is charged separately and is not part of the transmission tariff. Cost of gas losses are considered as a separate term in the price control formula. The investments in the gas transmission network are carried out on the basis of a long-term development plan prepared by Geoplin plinovodi, assessed and approved by the Ministry of the Economy. The future regulatory regime will introduce incentives for new investments, for instance an increased rate of return.		

Balancing

The TSO has the sole responsibility for keeping the national gas system in balance. The TSO applies balancing on a daily and a cumulative monthly basis with different tolerance levels and prices for imbalances. Shippers have no possibility to trade imbalances or balance margins and also no possibility to pool imbalances with other shippers. Imbalances are differentiated between allowed imbalances (within tolerance levels) and not-allowed imbalances (outside tolerance levels).

Imbalances are determined as the difference between nominated and metered values.

The **procurement** of balancing gas by the TSO is primarily based on contracts with shippers importing gas to Slovenia. The buying gas price (Cb) is regulated and calculated by the TSO each month, based on the previous value and price development of several oil prices and exchange rate EUR-USD). In case of a deviation of more than 0.4% compared to the previous month, renewed approval from regulator is needed. Secondarily linepack is used with approx. 3 mcm available in the system.

Settlement of imbalances

Imbalance		Tolerance level	Penalty	Cashout price
Daily	✓	+/- 2%		(1)
Cumulative	✓	+/-10%		(2)

(1) Prices (€/m3) for allowed imbalances are 1.15*Cb (positive) and 0.91*Cb (negative); Prices for not-allowed imbalances (i.e. outside tolerance) are 1.59*Cb and 0.68*Cb

(2) No further information available

23. Spain

Tariff structure and methodology
The tariff model applied in Spain is an **entry-exit model** with a single balancing zone. The charge for entry points consists of a uniform value for capacity reserved at any entry points of the system. For exit points a charge is applied independently of the exit location. The exit point tariff is charged considering capacity reserved and usage, and both depend on the pressure and on annual consumption. The usage charge is based on the volume of gas which has been shipped at the exit point. The transport service includes the right of using facilities necessary for transporting gas from an entry point of the transport network to the connection point with the distribution networks or the direct pipelines, as well as the use of storage facilities. Capacities are allocated according to the first-come-first-served principle. There is differentiation of transmission tariffs in terms of local vs. cross-border service, firm vs. interruptible service and duration of contracts. The international transport service includes the transport of natural gas from an entry point in the system to an international connection point. Within the national transmission system there is no differentiation of transmission tariffs in terms of time and location (exception is made to short-term capacity contracts). A part of the fuel gas is provided directly by the shippers, for facing the recognised gas transport losses in the system. These necessary losses are calculated by the Technical system manager. Another part is bought by the TSO in an auction process, where shippers can offer gas; costs are afterwards covered through transport tariffs.

Tariff	Firm	Interruptible	Tariff basis			Notes
			Fixed	Capacity	Energy	
Firm gas transmission	✓		-	kWh/day	kWh	
International transit charge				kWh/day	kWh	(1)
Interruptible contracts		✓		kWh/day	kWh	(2)
Short term contracts					kWh	(3)

(1) The international transit charge is computed by multiplying the standard transmission charges

by a certain coefficient being either 1 for longer distances or 0.65 for shorter distances.

(2) Interruptible services are offered at capacity prices of 10% - 12.5% of the price for firm capacity, whilst commodity charges are ranging from 115-167%.

(3) Short-term capacity contracts up to 1 day are allowed. Annual tariffs are applied to short-term contracts (in proportion to the share of the year), but overcharges are applied due to seasonality, commodity charges are equal to annual contracts.

Regulation	
The allowed revenues of transmission companies are established through an **incentive regulation model** (hybrid methodology between pure cost of service and pure revenue-cap). The rolling forward mechanism works as follows: a revenue cap (price index * efficiency factor) is applied over allowed revenues (both CAPEX and OPEX). For transmission of natural gas, remuneration for new facilities is set at service cost, calculated at standard costs. Operating costs are also remunerated at standard costs. Standard costs for investment and OPEX are updated by means of an index that takes into account the variation of the Consumer Prices Index (CPI) and Producer Prices Index (PPI).	
CAPEX	
RAB	For assets brought into service before 2008: • Allowed fixed cost of old investments (based on competitive market): assets are valued at historic cost method; • Allowed fixed cost of new investments (investments explicitly allowed): assets are valued at standard costs (this consists of annual investment costs plus annual operational costs). • Fixed cost of assets at the end of its useful life (non-operating assets) will not be included when determining the allowed revenues; • Fixed cost of assets at the end of its useful life (assets still in operation) will be included in the allowed revenues by an amount equal to operational costs plus 50% of investments costs; and • In an exceptional way, it is possible to include in the remuneration scheme singular investments. For assets brought into service after 2008, the annual capital cost of transmis-

	sion asset is calculated with the depreciation of the investment and the return on the fixed asset.	
Depreciation	**Method** **Grid assets**	Linear 40 years for pipelines 30 years for regulation and measurement 20 years for compressor stations
Cost of capital (WACC)	5.48-5.68 (nominal, post tax)	• Debt premium: risk free rate (10-year Euro swap) plus debt risk premium (average 10 years credit defaults swaps), credit ratings shall be within the range reference i.e. AA/A.
OPEX		
For assets brought into service before 2008, the annual operational costs are determined according to standard costs values and formulas. The values above are adjusted annually using an adjustment factor which includes the industrial price index, consumer price index. For assets brought into service after 2008, the annual unit values used to determine the operation and maintenance costs of fixed assets are given by the sum of fixed and variable operation and maintenance costs.		

Balancing
There is one balancing area. Energy is traded at a virtual national balancing point. The balancing period is one day and there is a tolerance band. Network users can trade at the Spanish balancing point within the day to adjust their balance. System balancing is achieved through linepack and the use of underground storage and LNG facilities. In addition, the system operator organises a daily auction mechanism to restore any deviations to an acceptable level. Any net costs or revenues of the TSO are returned to network users through an adjustment of network charges in the next year.

Settlement of imbalances				
Imbalance		**Tolerance level**	**Penalty**	**Cashout price**
Daily	✓	+/- 25%	See below	-

- Shippers are considered to be in balance as long as their gas volumes are within the ranges established as tolerance margins. There are 5 types of possible imbalances: excess / deficit of stock level in LNG tanks; excess / deficit stock level in storage for commercial operation and deficit stock level operational reserves (linepack).
- Network users are entitled to a tolerance band between 0 and 50% of the daily contracted capacity in the grid (equivalent to a ± 25 % tolerance band) and up to five days of the contracted capacity in case of LNG facilities
- The penalty on network imbalances outside the tolerance are as follows (T = 0.02098 €/MWh/day):
  - If the daily stock level is above 50% and below 70%, the penalty is 1.1 T
  - If the daily stock level is above 70% and below 100%, the penalty is 1.5 T
  - If the daily stock level is above 100%, the penalty is 15 T
  - If the daily stock level is below 0%, and the network user has a stock of LNG inside the Spanish system, the penalty is 1.1 T
  - If the daily stock level is below 0%, and the marketer does not have a stock of LNG inside the Spanish system, it must pay a daily fine equivalent of 15% of the reference price.
- If there is no market price in Spain, the reference price is equal to the arithmetic average of the Henry Hub gas price and the National Balancing Point (NBP) gas price of the 7 preceding days

24. Sweden

Tariff structure and methodology

The Swedish TSO Svenska Kraftnät is responsible for system operation and system balancing. However as it does not own the network, tariffs are set by the gas transmission owners. Since the largest part (approx. 70%) of the Swedish transmission system belongs to Swedegas AB, the following information on tariffs is based on Swedegas' tariffs.

Swedegas applies a **postage-stamp tariff** without any locational elements.

Transmission tariffs are charged based on contracted capacities. There is no secondary capacity market. Except biogas, the sole source of natural gas is import from Denmark.

Tariff	Firm	Inter-ruptible	Tariff basis			Notes
			Fixed	Capacity	Energy	
Transport	✓		1/a	m³/h/a	m^3	(1)
Balancing					MWh	(2)

(1) During winter months an additional winter capacity fee applies.
An energy volume based fee applies only to cover public levies ('Myndihetsavgifter').

(2) The TSO charges a consumption energy charge from balancing responsible parties

The basic contract **duration** for transmission tariffs is one calendar year. In addition, separate bookings of winter and summer season are possible. During winter months (October – April) an additional winter capacity fee per m³ and hour applies. The fee is multiplied with a factor ranging between 0.59 (for October) and 1.00 (for February). Also overrun charges are differentiated by month, being higher during winter months.

To cover the commercial services as meter reading, invoicing etc. an administrative charge and a metering and regulation charge is levied for every connection point per annum.

Regulation

Sweden applies rate-of-return regulation. Only the tariff methodology is approved in advance, whilst tariff levels are examined ex post. Tariffs are checked annually by the regulator.

Sweden intends to change to an ex ante tariff control in 2011.

Fuel gas is provided by the TSO and covered by the transmission charges.

The RAB is based on indexed historic costs of the gas infrastructure and the RAB is annually corrected for inflation by using the CPI.

Balancing

The TSO is the responsible party for keeping the national gas system in balance. Sweden applies the balancing group model, for every injection or withdrawal point there a balancing responsible party (BRP).

Renominations are possible until two hours before the actual hour.

Residual balancing is mainly based on the use of linepack. In addition, the TSO uses weekly tenders and, where necessary, additional transactions with BRPs to procure balancing gas.

Settlement of imbalances

Imbalance		Tolerance level	Penalty	Cashout price
Daily	✓	Variable (1)	-	(2)

(1) Permitted tolerances are variable and adjusted to reflect actual system conditions. Permitted tolerances are communicated to BRPs no later than 12:00 on the day-ahead.

(2) Positive imbalances of BRPs (BRP is selling balance gas) are priced at 50% of the balance base price or the system balancing gas price, whichever is lower.
Negative imbalances of BRPs (BRP is buying balance gas) are priced at 150% of the balance base price or system balancing gas price, whichever is lower.
The balance base price is derived from weekly trading between the TSO and BRPs, whilst the system balancing gas price is derived from residual balancing trades.

- Additionally, for balancing, a consumption energy charge of 0.9 SEK/MWh for total consumption within a BRPs responsibility applies.
- To account for differences between preliminary metered values and final metered values, these are considered as correction gas in the final settlement with BRPs.