frontier economics

Stranded assets in Dutch gas transmission infrastructure and implications for REG 2022

Summary - a report for Energie Nederland, Nogepa, VGN

2 March 2019

Executive summary – Stranded assets contribute significantly to the tariff increase and should be considered in REG2022

Increase in tariffs caused by stranded assets

- **Overcapacity** created in first three **Open Season** processes
- Accelerated **Groningen phase out** and temporary need for **blending stations**
- Investments in **hydrogen** appear to be funded by natural gas users
- The level of stranded costs in the GTS RAB ranges from approx. €1 billion to €2.2 billion over time

Users not responsible for costs. Decisions mainly political

The users are not responsible for the stranded costs. Dutch government has taken policy decisions that affects the utilisation of GTS infrastructure

- **Gas rotonde policy** – has spurned Shipper interest and capacity addition (Open Season)
- **Groningen phase out** – gov't acted on pressure following earthquakes

Any cost recovery should avoid distortions to competition

- Current regulation causes that all gas infrastructure is funded by remaining users through network tariffs. But such **high tariffs** would be inefficiently high and lead to a vicious circle - Efficient pricing of infrastructure implies **lowering the tariff for underutilised assets**
- Tariffs should also **not allow cross-subsidies** from current natural gas network customers funding the future use of hydrogen infrastructure

Issues for REG2022

Several factors drive an increase in gas transmission tariffs if unabated

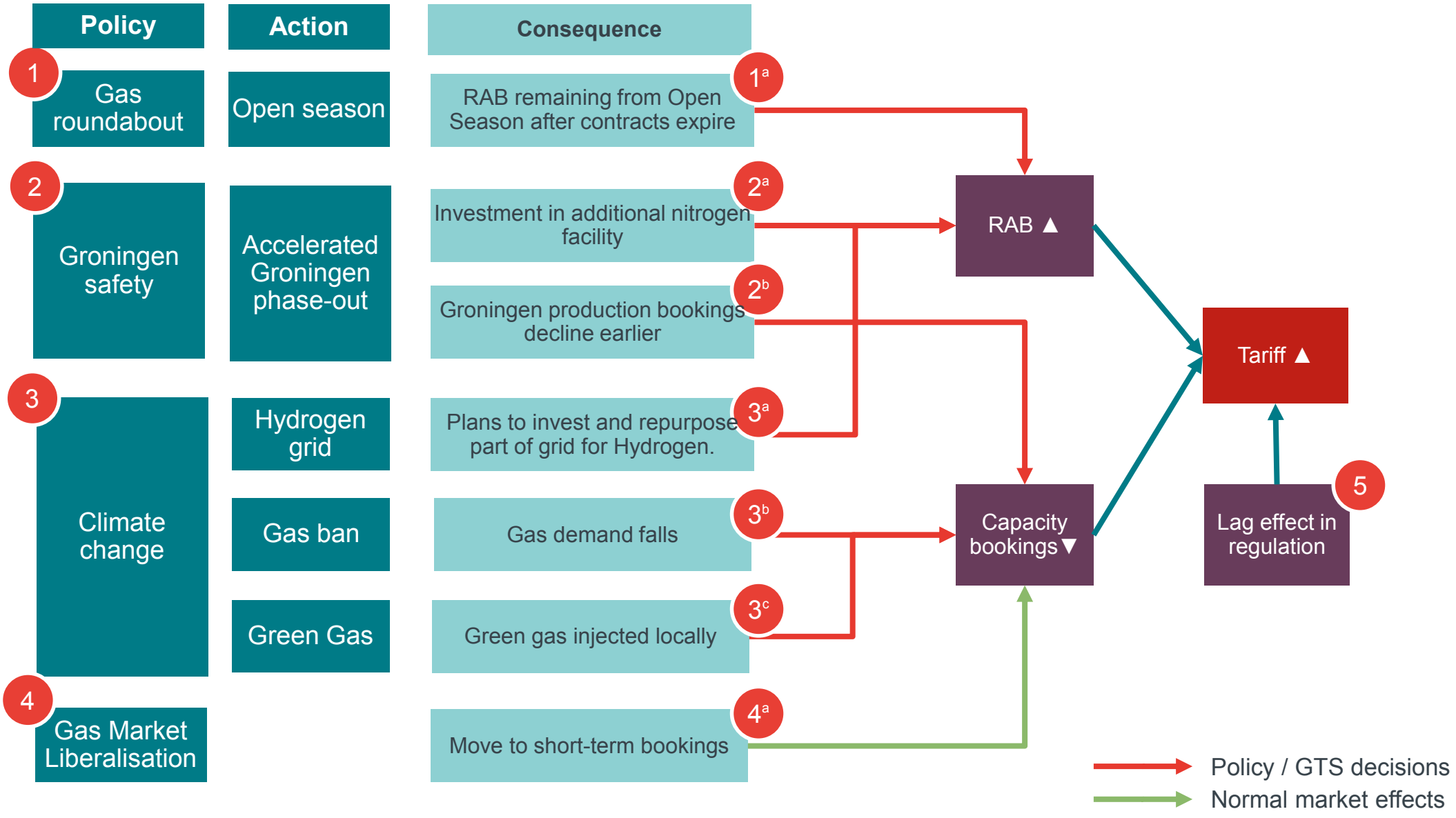
- **Cross subsidies** through gas tariffs **to** fund **hydrogen** build up
- **Historic** asset **investment** has been **unchallenged** in Project Morgan/Hogan; Efficiency analysis also does not easily address stranded assets
- **Adjustment lag** in the regulation formula in combination with falling gas demand

Executive summary – A number of potential measures could avoid or limit adverse tariff impacts in REG2022…

	Issue	Possible solution in regulation
Historic and future overcapacity	▪ **Excess capacity** from **Open Season** – when existing long term bookings end, unused capacity will be charged to remaining users ▪ **Groningen phase out** and **lower demand** creates more overcapacity, also in N_2 provision	▪ Current network users should not be charged the cost of overcapacity ▪ **Efficiency benchmarking** can offer some relief, but needs to be appropriately designed
Cross subsidies for hydrogen build up	▪ ACM projects build up in **Hydrogen infrastructure** from 2024 ▪ But utilisation for hydrogen will initially be low ▪ Cost of hydrogen infrastructure will be charged to natural gas users (from 2020 and beyond)	▪ **Hydrogen users** rather than remaining natural gas users should be charged with the (incremental) cost of the hydrogen infrastructure ▪ Clear separation of H_2 and existing gas network regulation
Adjustment lag in the regulation formula	▪ Future revenue allowance is based on historic (**photo year**) cost from years with high demand ▪ **Falling demand** (combined with high historic cost) leads to rising tariffs	▪ Requires more **dynamic approach** to setting revenue allowance. This could include: ▫ Forecasting costs ▫ Indexing costs to volumes ▫ Introduce a price cap

… needed for fair and cost efficient tariffs to avoid inefficient downward spiral of higher tariffs and lower gas use

A number of developments lead to a doubling of GTS tariffs by 2030



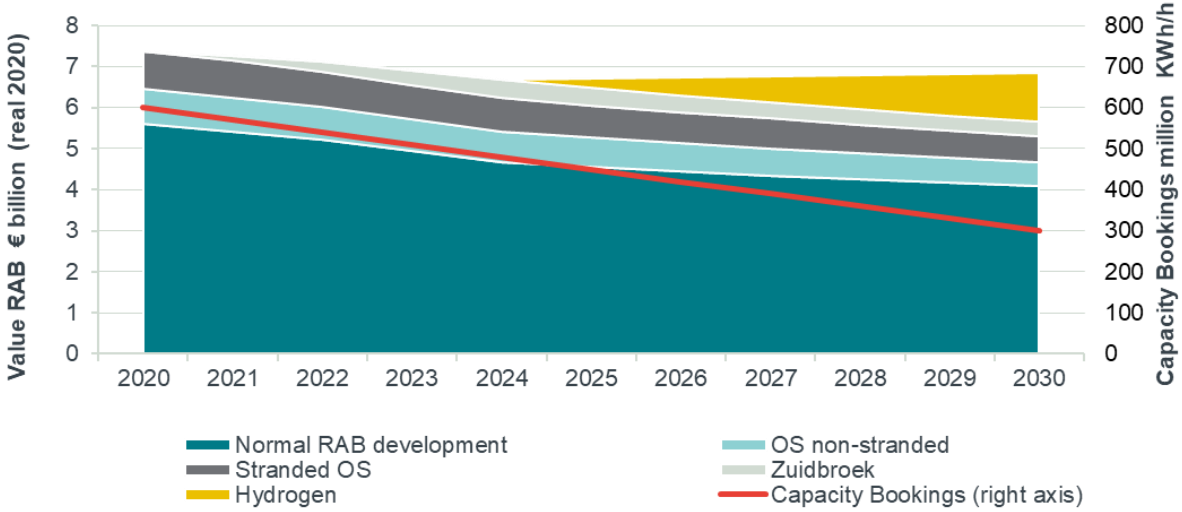
As a results of these developments we estimate a significant part of the RAB of GTS as stranded

1. **Open season** — **€ 0.75 - 1.45 bn** stranded assets invested during first three open seasons based on current flows – up to **20%** of GTS total asset value 2018 (€ 7 bn)
2. **Groningen phase-out** — Groningen phase out induced construction of nitrogen plant with investment costs **€ 550 million ± 30%**
3. **Climate change** — Up to **€1.7bn** capital expenses in addition (for gas and hydrogen infrastructure)

Aggregated impact on RAB

The aggregate impact on the RAB changes over time. We estimate the total impact of stranded costs on GTS RAB to be €2.2 billion on a €6.8. billion RAB in 2030 (elements 1,2 &3 above).

This estimate is based on underutilised transport capacity today (element 1), and is conservative considering gas flows are expected to decline in the future.



The tariff increase is to a large extend driven by costs that can be considered stranded

Our definition of stranded costs:

- Asset base that is
  - **underutilised** and
  - In absence of a regulatory environment **could not be recovered by GTS**

Factors causing assets to strand:

Factors stemming from **normal market events**:

- Lower capacity bookings
  - Short term bookings
  - Energy efficiency

4[a]

Factors stemming from (climate) **policy decisions**:

- Higher RAB
  - N2 facility
  - Hydrogen grid
- Lower capacity
  - Forced decline Groningen
  - Gas ban / Green gas

2[a] 3[a] 2[b] 3[b] 3[c]

Factors stemming from **corporate decision-making:**

- The Open Seasons.

1[a]

Our understanding of ACM's view:

- "Omzetregulering" means GTS is able to recover efficient costs. If all existing assets were accepted as efficient, there can not be any stranded costs. Implicit in the ACMs definition is that the remaining recovered cost cannot be stranded.
- **Key question is "recoverable by whom"?** Perhaps recoverable by GTS (commercial), but not by its users (societal/economic).

The current regulatory approach allocates all stranded costs to users although they are not responsible.

Stranded costs should ideally be treated like in competitive markets where company cannot pass costs on to customers

In a competitive market:

- stranded assets would lead to an impairment and cost could not be charged on customers, and
- new supply tasks are not cross-subsidised by other customers.

Effects of a competitive market can partially be mimicked through regulation

- stringent benchmarking,
- adjustments to regulation, and
- separation of new supply tasks

This is in line with ACM's task to regulate GTS in a way that it acts as if they were in a competitive market.

To effectively prevent adverse effects all three options should be explored

Stranded assets
Aim: fair pricing

Impairment

Stringent Benchmarking: (1)

- Cover as many tasks as possible and develop separate efficiency analysis for tasks not covered in main benchmarking investigation (2)
- No minimum efficiency
- Do not use endogenous variables for benchmarking

Adjustment to regulation formula (5)

- Forward looking regulation approach or indexation
- Avoid historic photo years in case of structural breaks

Hydrogen grid
Aim: fair pricing, no cross subsidy

No cross subsidy

Separation of regulatory accounts for natural gas and hydrogen (3a)

- Define separate regulatory accounts for H_2 networks and recover costs via separate tariffs for H_2 entry and H_2 exit.
- No recovery of H_2 network cost via natural gas network tariffs

Benchmarking leaves responsibility for (some) stranded costs to GTS when applied stringently, but cannot capture all stranded costs

How benchmarking captures stranded costs as inefficiency

Benchmarking measures (in)efficiency of GTS

- Benchmarking is a method which aims to explain TSOs costs (Input) through supply task parameters (output)
- Explanation of costs is done by comparing TSO data with data from other TSOs

Stranded assets reflected in output parameters

- Stranded assets should become visible in benchmarking through output parameters:
  - Cost of network stay constant (or increase) while
  - Output of the network has been reduced (e.g. fewer network points, smaller supply area, lower gas transport volume/capacity usage)

Allowed revenues reduced by efficiency parameter

- Revenue regulation estimates efficient costs of service based on efficiency parameter (inflation and frontier shift)
- Allowed revenues are limited by efficient costs. Stranded assets are therefore not passed through to shippers.

Requirements for benchmarking to capture stranded costs as inefficiency

Stranded assets/costs reflected in supply task or cost base

Output parameters reflect change in supply task

Efficiency score applied directly to cost base

Disclaimer: If change in supply task is general trend and also affects comparators, then part of the stranded costs cannot be identified by benchmarking.

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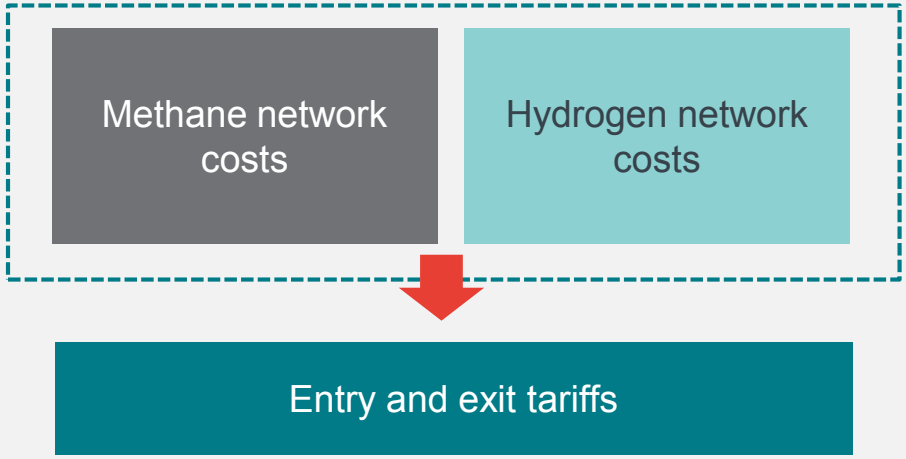
Benchmarking can be improved to capture more stranded costs

Reduce time gap between benchmarking and regulation	▪ Benchmarking was based on asset base from 2010 and 2014 but applied in regulation between 2017 and 2021. Benchmark from 2017 likely to be used for REG2022. ▪ Conducting benchmark closer to start of regulatory period would **capture stranded costs more timely** ▪ In addition, regulatory periods can be shortened to react to trends more accurately.
Assess role of stranded assets in cost base	▪ Sometimes certain assets (and associated costs) are removed from benchmarking ▪ If benchmarking is intended to capture stranded costs, stranded assets ideally stay in the asset base used for benchmarking. However, the role of stranded assets need to be considered if benchmarking is imperfect.
Additional benchmarks	▪ Benchmarking can currently only be applied to costs which were used in benchmarking (gas quality conversion was excluded in benchmarking for REG 2017 and latest CEER benchmarking only looks at transport task). ▪ Strive to create additional benchmarks for TSO tasks currently not captured by benchmarking like QC
Select suited output parameters for benchmarking	▪ Output parameters should reflect the different supply tasks of GTS and capture the change in supply task, i.e. lower demand, lower gas transport (by contrast: use of installed capacity as output measure would disguise stranded cost)
Stringent application of benchmarking results	▪ ACM can consider not to increase efficiency score by – i.e. no 5% increase of score ▪ Can start regulatory period on the basis of efficient cost and not on a multi-year glide path to efficient cost - i.e. apply efficiency score directly from 1st year of new regulatory period

Separate regulation of methane and hydrogen networks to avoid cross subsidy

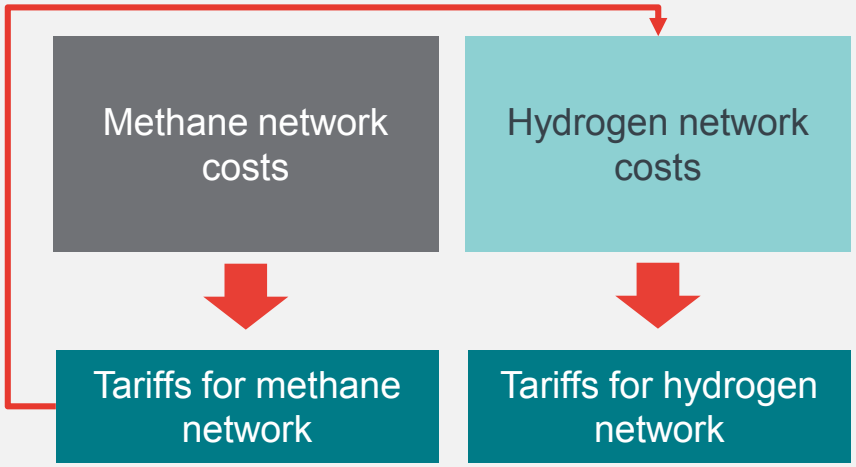
It is unclear how H2 networks will be regulated in the future: A joint regulation of methane and hydrogen networks will likely lead to cross subsidisation. Separated accounts and pre-established costs allocations for common costs can help to avoid such cross subsidies. GTS has a legal duty to prevent cross subsidies (e.g. Art 30(3) Gas Directive – unbundling and transparency of accounts, Art 25 Dutch Competition Act - allocation of costs)

No separation of networks



- As indicated by Morgan Study, build up of hydrogen network will require more investments relative to demand attracted to these networks.
- As a consequence the build up of the network is paid by existing network users while future users benefit from this cross-subsidy.
- H2 – if not gas w/l meaning of Gas Act cannot go into RAB

Separation between networks



- Separate regulatory accounts for both network types ensure that in principle every network user is only paying for the use of the network used.
- In case hydrogen is used for blending in the methane network, tariffs entry tariffs for the methane network would need to be paid.
- Assets which are used jointly (e.g. ICT) by both networks should be split according to the share of usage.

Regulation formula – in future it needs to better reflect the costs that GTS can be expected to actually incur

There are a range illustrative examples of how this issue has been addressed by other regulators in the past:

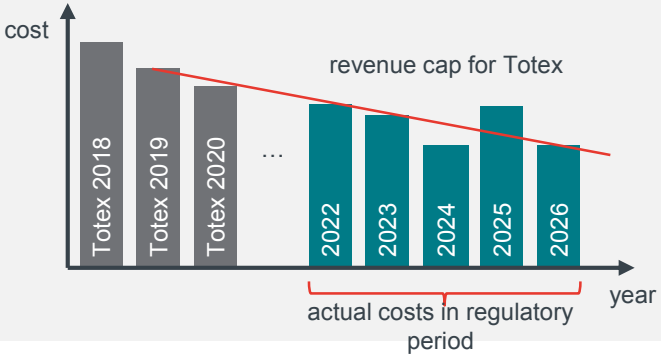
- Switch to different forecasting method
- Link revenue cap to demand to prevent excess revenues from decline in demand driven costs
- Price cap instead of revenue cap
- Reduce length of regulatory period

Forecasting of cost / cost review

How it works: Regulator assesses costs based on expert reports and makes cost projections (not based on historic costs)

Examples: Ofgem RIIO I approach in the UK is an example of a typical ex-ante regulation.

Compatibility with current regulation: Generally in line with current methodology. Instead of historic costs ACM could develop a best estimator for expected opex and replacement investments based on expert opinions. However, potentially in conflict with benchmarking approach (ex-post regulation).

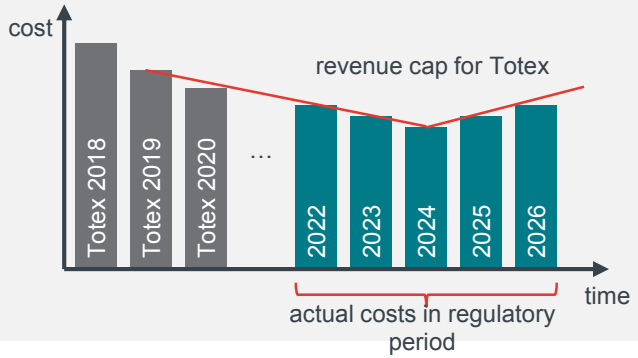


Indexation of cost to volume

How it works: Link totex allowance to energy prices, demand volumes and/or projects. This prevents excess returns from structurally falling demand by setting a variable budget for totex

Examples: Expansion factor in German network regulation*

Compatibility with current regulation: Indexation requires a volume depending tariff, this is likely not compatible with the network codes on harmonised gas tariffs. Alternative would be adjustments in next years tariff.

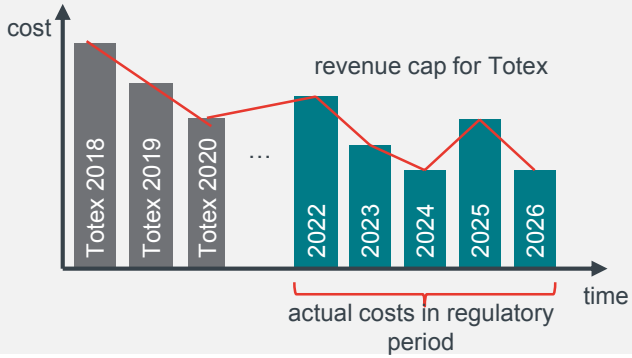


Price cap

How it works: Based on exp. volumes and costs, ACM defines a tariff which stays the same over a given period. This is an extreme form of indexation, as complete volume risk is transferred to GTS.

Examples: ACM regulation between 2010-2013 and E-Control (AT Gas TSOs).

Compatibility with current regulation: ACM used method in the past, however the ACM already stated that they prefer the current method.



** Note: in the specific German regulation, the expansion factor allows for an increase in the revenue allowance with rising demand, but not for a downward adjustment with falling demand*

Key points for REG2022 to ensure that users are not burdened with stranded costs

	Aim	Potential issues	Options to address them in REG2022
Stranded assets	Fair and competitive pricing	▪ **Stranded assets still in asset base** ▪ **Benchmarking not strict** enough to capture them as inefficiency ▪ **Time-lag in regulation**: Falling demand not captured in revenue cap	▪ **Strict benchmarking:** (1, 2) ▫ Cover as many tasks as possible and develop separate benchmarks for costs not covered ▫ No minimum efficiency ▫ Do not use endogenous variables for benchmarking ▪ **Adjustment to regulation** (5) ▫ Reduce length of regulatory period to three or four years ▫ Forward looking regulation approach or indexation ▫ Avoid historic photo years in case of structural breaks
New supply task	No cross subsidy of H_2 networks	▪ MORGAN study implies that there will be **some sort of cross subsidy** ▪ **Some assets will be used jointly** by existing and H_2 network	▪ **Separation of regulatory accounts for natural gas and hydrogen** (3^a) ▫ Define separate regulatory accounts for H_2 networks and recover costs via separate tariffs for H_2 entry and H_2 exit ▫ No recovery of H_2 network cost via natural gas network tariffs ▫ Split jointly used assets between regulatory accounts