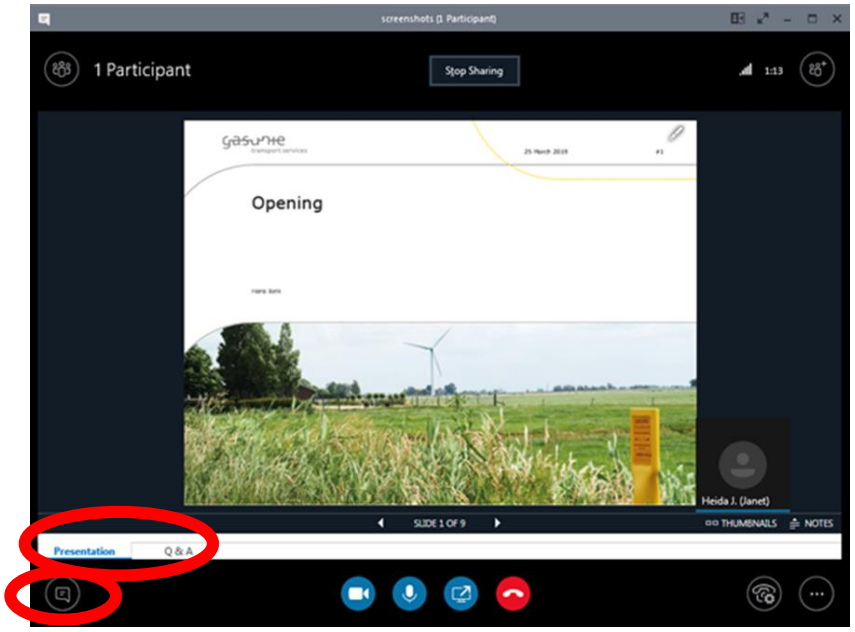
Opening

Hans Jonk | Gasunie Transport Services

House rules videoconference

- All audience participants will be muted by default. Please remain muted until invited by the moderator to speak.
- Please use a head set or earplugs for the best sound.
- Presentation vs. Q&A.
- Technical issues.



Agenda

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Investment Plan 2020

Process

Janet Heida | Gasunie Transport Services

Objective

- Article 7a of the Gas Act states that network operators are obliged to write an investment plan (IP).
- With the IP, network operators offer an overview including justification of their investments in the short and long term.
- Up to now, GTS complied with this legal provision through the Quality and Capacity Document (KCD / NOP).
- In 2018, national legislation was adopted, laying down further rules for both the status and the content of the investment plan.
- The most important change is the status of the document: previously the figures in NOP / KCD, which was offered to the Ministry of Economic Affairs & Climate (EZK) and Autoriteit Consument & Markt (ACM), were not binding. The publication was usually followed by a company visit of ACM to GTS sometimes followed by binding instructions of ACM for the way of working for the next KCD. The IP has to be offered for approval. Approval of the IP therefore means approval of ACM of the described investments and an obligation for GTS to realise them.

Content and form of the IP 2020

- The IP contains, legally, the following three elements:
  - Developments in the energy market => scenarios up to 2030
  - Bottleneck analysis of the transport network
  - Description of investments in the transport network
    - Looking back over the past 2 years
    - Looking 5 and 10 years ahead
- GTS will publish an English and Dutch version of the IP.

Stakeholders

- Market parties and representative organisations
  - Information session I: process and scenarios (November 2019)
  - Information session II: methodology and investments (March 2020)
  - Consultation IP 2020 (May 2020)
- Dutch TSOs and DSOs
  - Continuous alignment
- NNO’s
  - Within context subject/project
- ACM and EZK
  - Continuous alignment

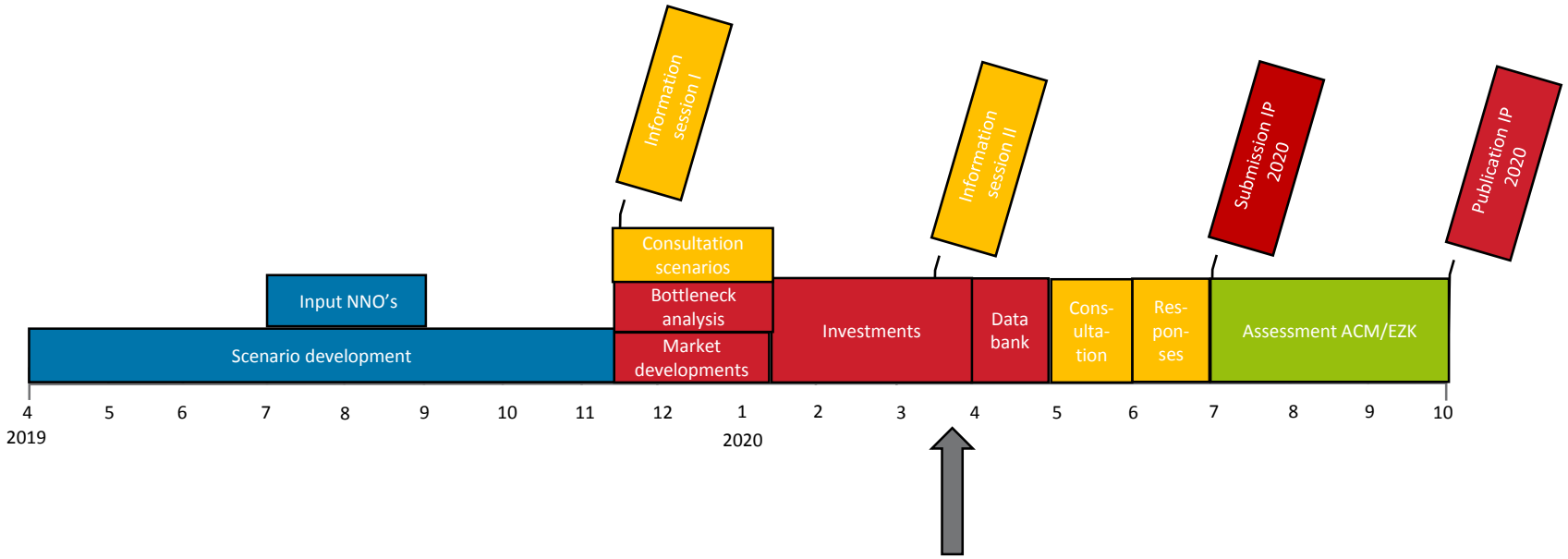
Deadline and period of validity

- Deadline for submission of the IP to ACM and the Minister is 1 July 2020 at the latest.
- Approval:
  - EZK: has GTS taken sufficient account of developments in the energy market?
  - ACM: could GTS reasonably have come to the draft investment plan and are the investments necessary?
- This investment plan applies for a period of eighteen months.
- In future, GTS must submit an IP to ACM and the Minister on 1 January of every even calendar year. These investment plans are valid for two years.
- GTS has an obligation to report in the event of a significant change via an addendum.

Relation with other projects

- Incremental capacity
- Closure of the Groningen field
- Market integration of the German market areas GASPOOL and NCG

Planning



ENTSOG/ ENTSOE

ACM/EZK

MARKET PARTIES

GTS

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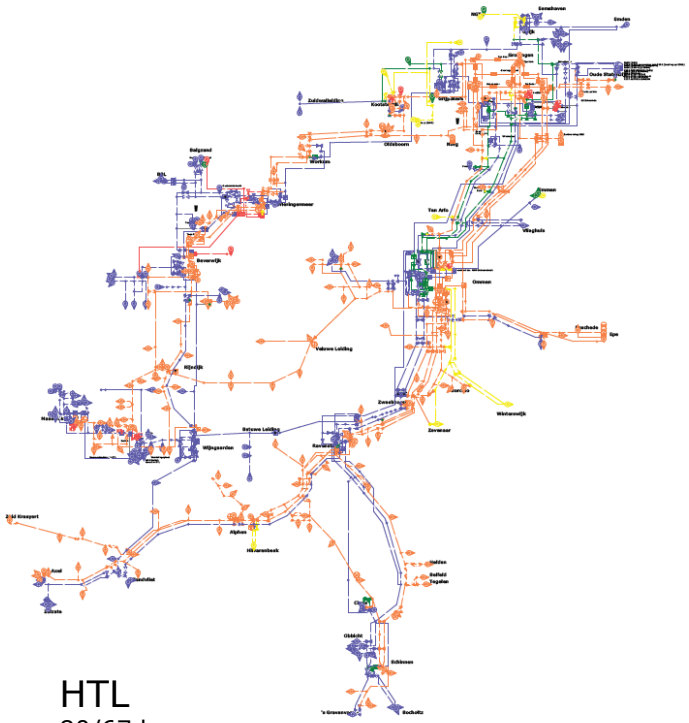
25 March 2020

IP2020: Capacity Methodology

Determining capacities and bottlenecks in the entry/exit system of GTS

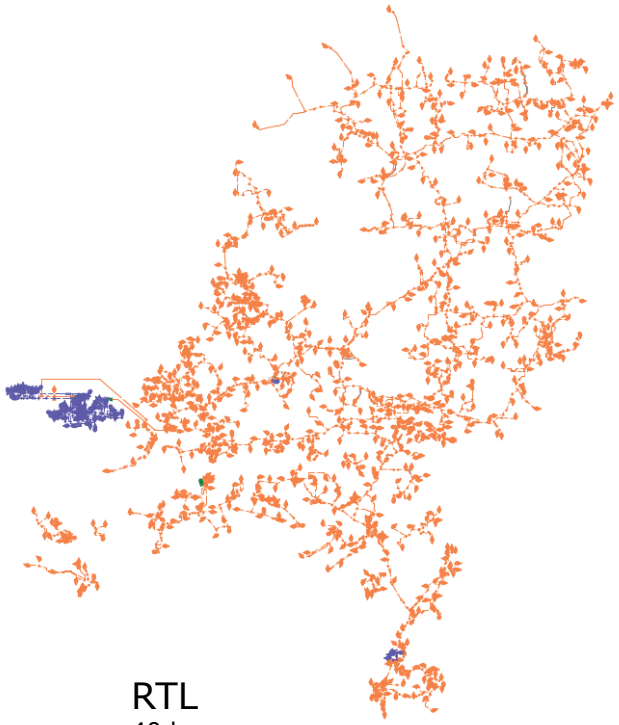
Jarig Steringa | Gasunie Transport Services

The GTS network



HTL
80/67 bar

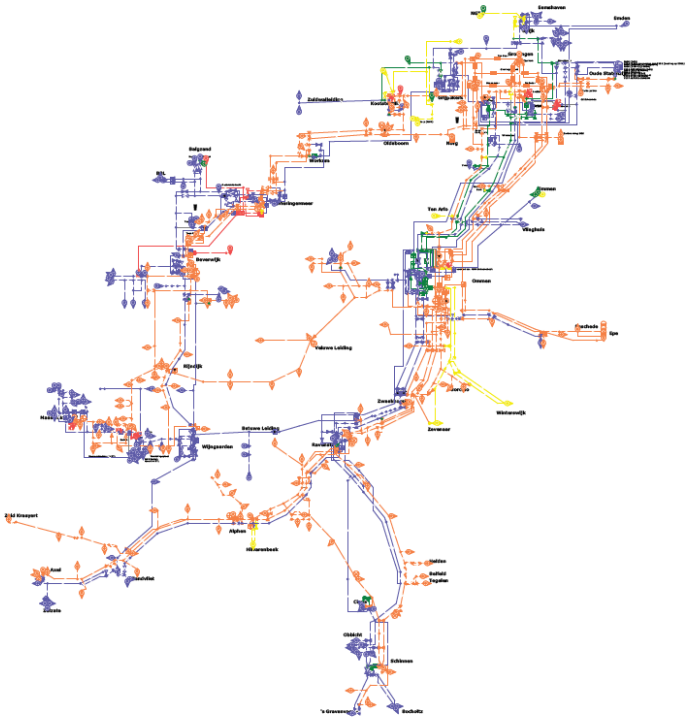
Connection
through M&Rs



RTL
40 bar

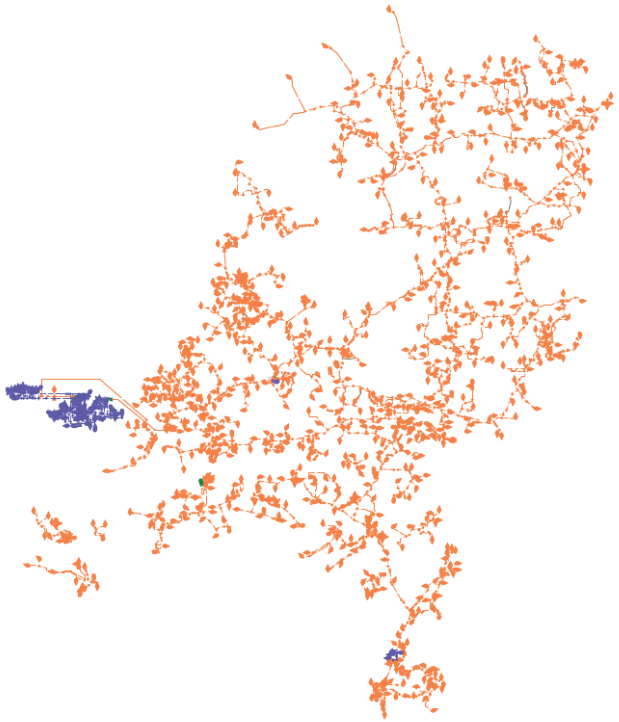
High pressure network (HTL)

- 80/67 to 40 bar
- 6000+ km pipelines
- 15 compressor stations
- 4 nitrogen blending stations
- Transit and domestic transport
- Connection to storage and LNG
- Various gas qualities
  - L-gas – local distribution
  - H-gas – industry and import/export
  - Ready for hydrogen and green gas transmission



Medium pressure network (RTL)

- 40 to 8 bar
- 6000+ km pipelines
- Transport to
  - direct customers
  - local distribution networks (households)
- 80+ connections with HTL (M&R stations)
- Mostly L-gas
  - two industrial H-gas regions (Maasvlakte, Limburg)



The network of GTS is an entry/exit system

1. Entry into and exit from the system are independent
   - GTS has no control over supply
2. Balancing system for continuous operation
3. Entry & exit limited by contracts
   - Markets display specific behaviour (depending on season, circumstances)

The Dutch highway system is an entry/exit system

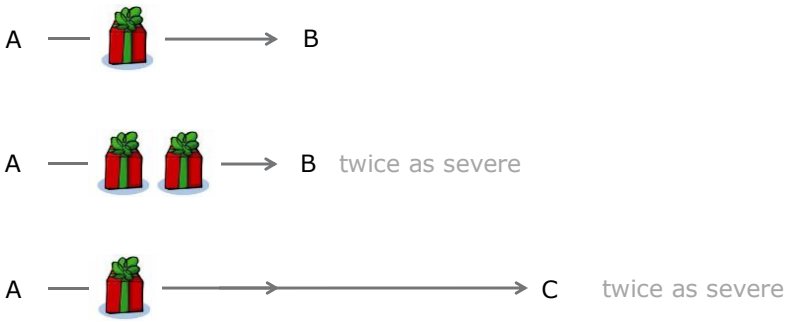
- Entry & exit limited by technical conditions
- Car drivers exhibit specific behaviour
- Rush hour provides realistic, severe snapshots

➢ Challenge for GTS: "What can happen to us?"
   - What are the most severe transport situations that can occur realistically?

➢ Find complete set of realistic, severe cases ("snapshots")
   - Realistic: within contracts and in accordance with "market behaviour"
   - Severe: measured in terms of expected "transport load" based on flow and distance

Severe, realistic snapshots

Severe = high transport load T

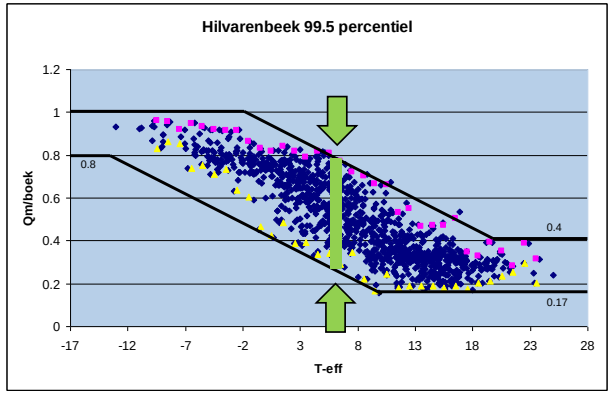


Severe cases have large T = Q x L

- Q = total flow from entry to exit
- L = mean transport distance

Realistic =

within contractual/observed limits

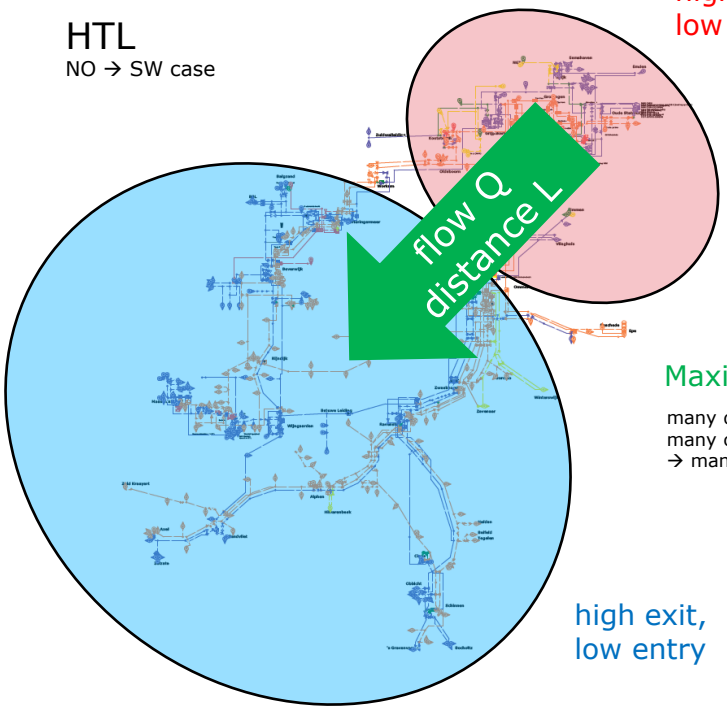


Each entry and exit between min/max limits

- Depending on contracts, temperature, season,…

Example snapshots

HTL
NO → SW case



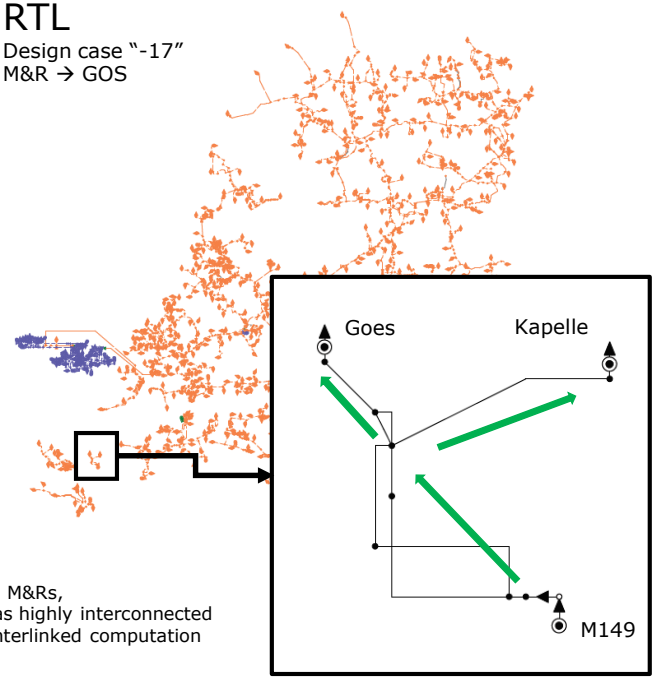
high entry,
low exit

Maximised Q.L

many directions,
many circumstances
→ many snapshots

high exit,
low entry

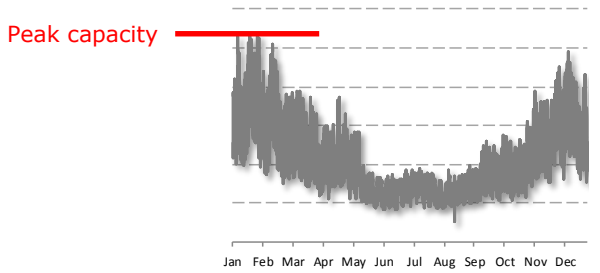
RTL
Design case "-17"
M&R → GOS



80+ M&Rs,
areas highly interconnected
→ interlinked computation

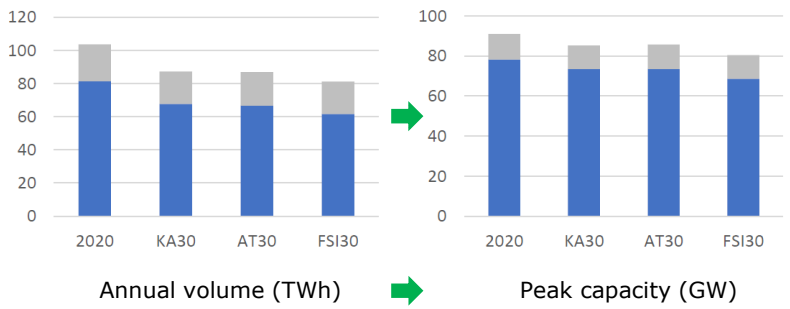
Capacity from volume scenarios

- Annual volume → hourly capacity
  - Convert to 8760-hour time series
    - Profile depends on temperature, wind, solar
    - Assumptions for market developments (historical data + trends)
  - Read peak demand from time series
- Capacity shows slower decrease than volume



8760-hour time series

Sector	Vol decrease	Cap decrease
Households	16-22%	6-11%
Industry	8%	3%
Power plants	30+%	24%
Export	30-45%	30%



Annual volume (TWh) → Peak capacity (GW)

IP2020 – Capacity analysis HTL

- Three scenarios
  - KA – Climate agreement
  - AT – Alternative transition
  - FSI – Foundation for system integration (part of HTL re-used for hydrogen)
- Three reference years
  - 2020 – delta analysis on 2019 data only
  - 2025, 2030 – full analysis of complete set of snapshots

➢ Around 200 extreme snapshots analysed for each reference year in each scenario

➢ No bottlenecks found

- ➢ Flow re-routings in many cases, through standard component switches
- ➢ High levels of nitrogen blending in majority of cases

IP2020 – Capacity analysis RTL

- Three scenarios
  - KA – Climate agreement
  - AT – Alternative transition (including infeed of green gases from low-pressure distribution networks)
  - FSI – Foundation for system integration (no hydrogen in RTL)
- Three reference years
  - 2020 – delta analysis on 2019 results only
  - 2025, 2030 – full analysis

➢ "Design case" analysed for each reference year in each scenario

➢ No bottlenecks found

  ➢ Installation of green gas boosters to be studied separately in each individual case

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IP 2020: Quality Methodology

Wim Borghols | Gasunie Transport Services

Replacement Investments

- Replacement Investments are done to:
  - Improve the condition or quality of the system
  - Relocate a part of the grid due to external reasons
- GTS applies 'risk-based Asset Management'
  - Measures are ranked according to risk-reduction per spend €
  - Risks are made financial (converted to €)
- Replacement Investments are done to solve 'quality bottlenecks' in the system
  - A 'quality bottlenecks' is a situation in which the combination of the score on one or more of our business values (safety, security of transport, sustainability and acceptance of financial loss) with respect to severity and with respect of frequency is such that action is required OR
  - A situation that in itself is qualified as 'unacceptable risk'.
  - These analyses are performed using the GTS-risk matrix

GTS - risk matrix

		BEDRIJFSWAARDE				frequentie van voorkomen				
		Schadebereidheid	Duurzaamheid	Transportzekerheid	Veiligheid	I	II	III	IV	V
		€	Ton CO2eq	m3		0,0001-0,001	0,001-0,01	0,01-0,1	0,1-1	1-10 per jaar
ERNST GEVOLG	A	3k < S < 30k	100 < D < 1k	1k < T < 10k	gering letsel of gezondheidseffect (max EHBO)	0,0001	0,001	0,01	0,1	1
	B	30k < S < 300k	1k < D < 10k	10k < T < 100k	licht letsel of gezondheidseffect (RWC, MT)	0,001	0,01	0,1	1	10
	C	300k < S < 3M	10k < D <- 100k	100k < T < 1M	ernstig letsel of gezondheidseffect (LTI)	0,01	0,1	1	10	100
	D	3M < S < 30M	100k < D < 1M	1M < T < 10M	blijvende invaliditeit tot 1 dodelijk slachtoffer	0,1	1	10	100	1000
	E	30M < S < 300M	1M < D < 10M	10M < T < 100M	meerdere dodelijke slachtoffers (1-10)	1	10	100	1000	10000

Origin of projects in the investment portfolio

Qualitative bottlenecks resulting from periodically performed risk analysis (Bow-Tie, Hazop, etc.) ["top-down"] *

Qualitative bottlenecks which are corrective actions resulting from findings during operation or maintenance ["bottom-up"]

Capacity bottlenecks, resulting from market demand

New connections

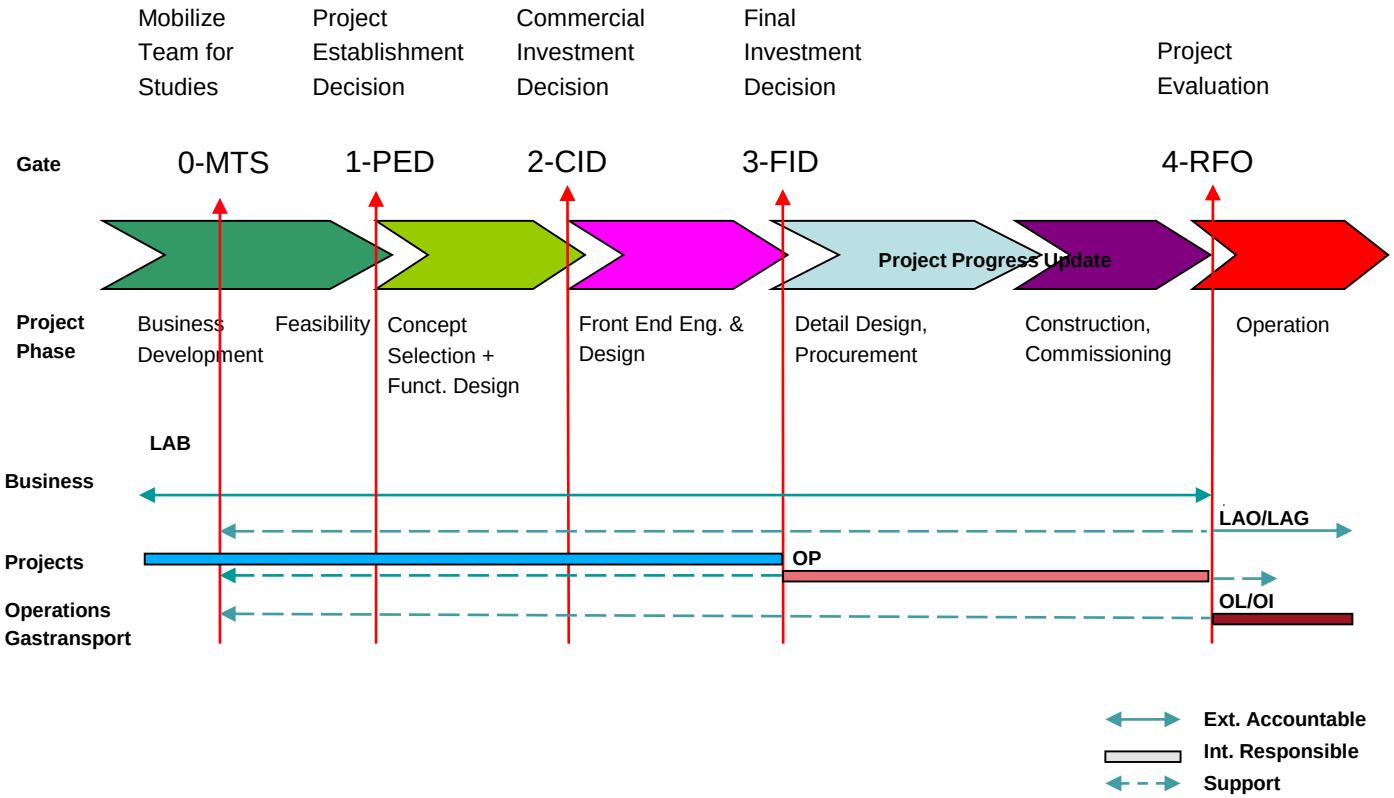
External drivers (a.o. spatial planning, legislation and IT-updates)

Business cases

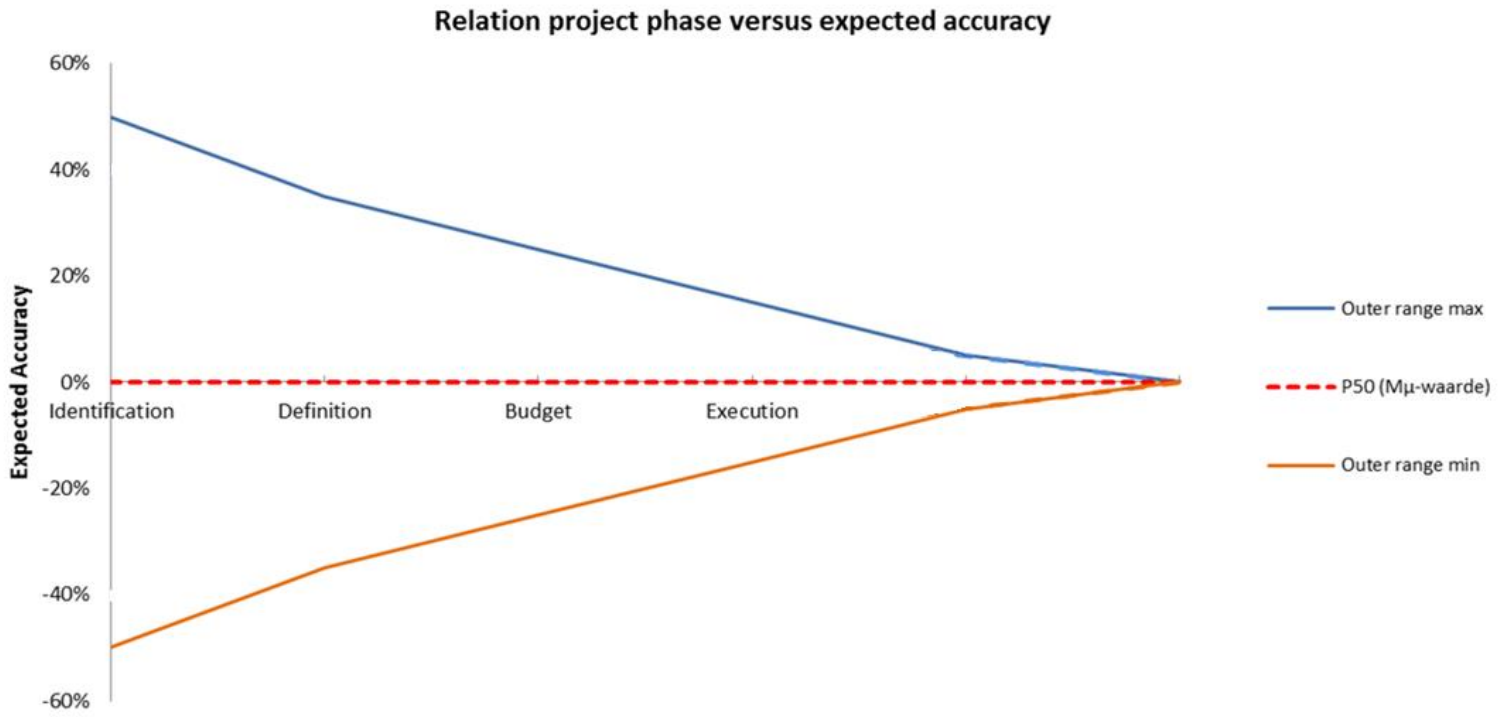
Investment portfolio

* Most risks from the risk analysis will be mitigated by other means

Project Governance



Project budget methodology



Portfolio selection process

1. Possible projects are ranked according to risk-reduction per spend €
2. Additional aspects that are used to prioritise activities and projects:
   a) Interference to the transport of Gas
   b) People (capacity of the organisation and service providers)
   c) Lead time for delivery of equipment
   d) Permits (e.g. current environmental regulation on nitrogen deposit)
   e) Synergy with other activities (cost, safety)
   f) Financial aspects (total budget available)
   g) Influence on maintenance
   h) Energy transition

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IP 2020: investment portfolio 2020, 2021 and further years

Wim Borghols | Gasunie Transport Services

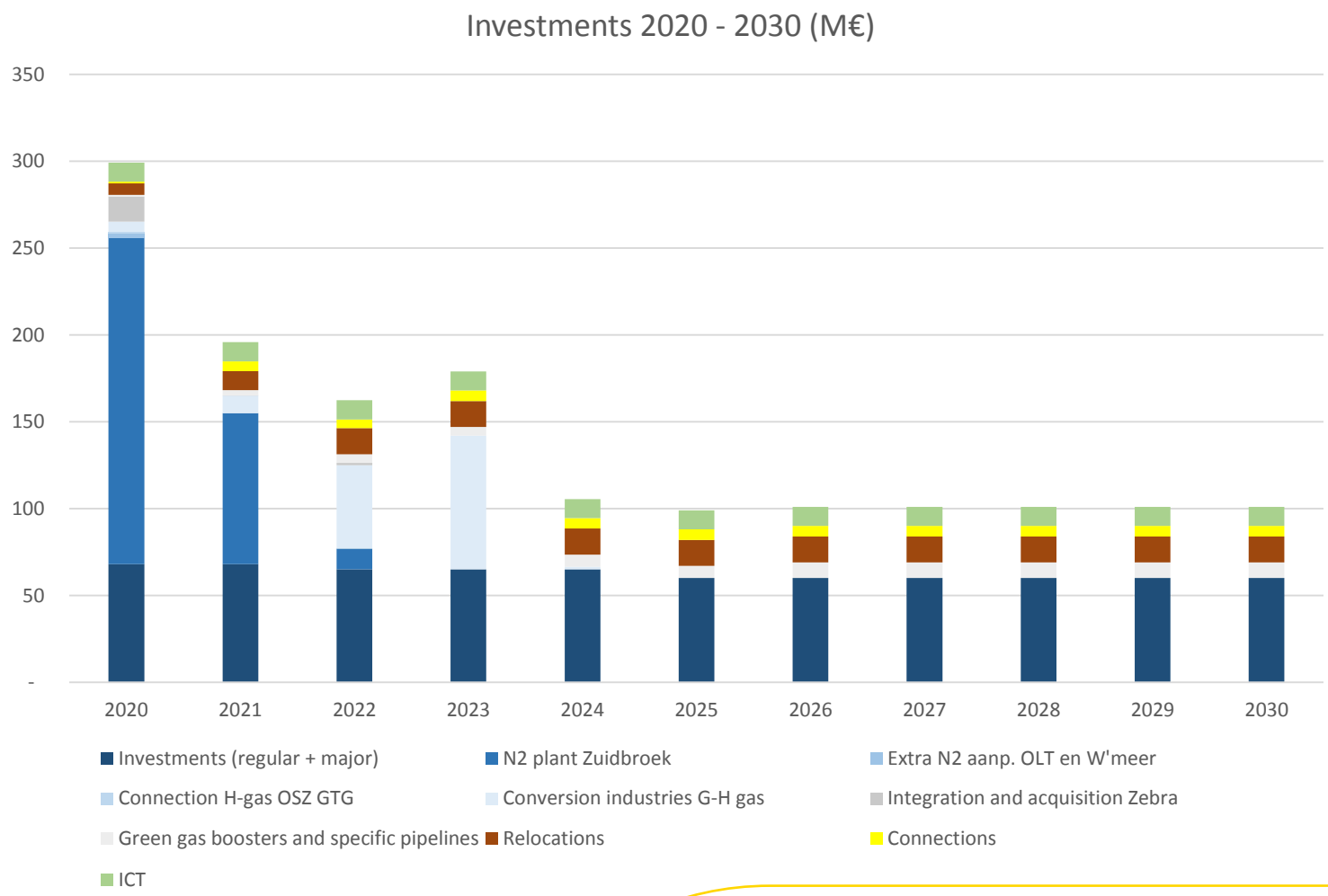
Process of establishing the portfolio for replacement (and extension) investments

- The current process uses a horizon of 1 year, i.e. the investment portfolio for 2021 is determined in the summer of 2020
- The numbers given are determined as follows:
  - 2020: established portfolio, FID has been passed
  - 2021: 80% FID passed, remainder will pass in Q3/Q4
  - 2022: indicative
- Please note: investment terms for IT-investments are very short

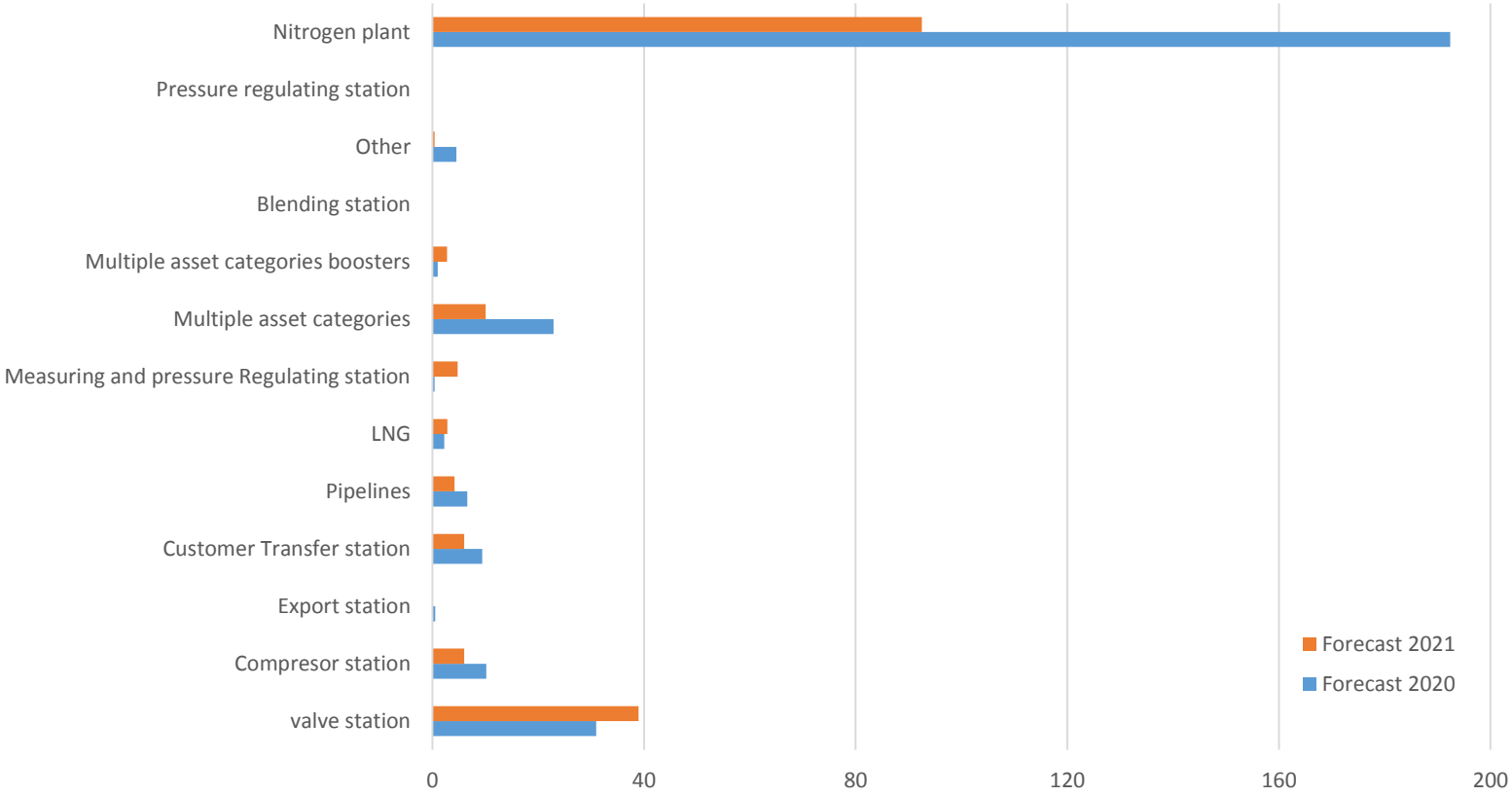
Special programmes

- GNIP
  - Started in 2011 to renovate GDS/City Gate (GOS), M&R and Valve-locations RTL
  - Verification of removed parts
  - ➢ Condition is such that renovation will stop for GOS and M&R;
  - ➢ For Valve-locations RTL, renovation is concentrated on locations < 1990; 150→50 locations/year
- Magnitude
  - Renewal of 70 km of grid in Groningen, due to risks during earthquakes
  - Almost finished
- Incorporation of the ZEBRA grid
  - Starting 2021, GTS will own and operate the ZEBRA-grid as part of the national grid
  - Some adaptions will have be done before 2021
  - After 2022 some investments are expected for the maintainability of the grid
- LNG Peakshaver
  - Studies are performed to deliver the functionality of the LNG-Peakshaver in a cost-effective way
- Some connections will be acquired in 2020-2021
- In addition, there are investments due to other legislation
  - Addition N_2 Zuidbroek, Wieringermeer, G-H conversion

Total investments, including long term expectation



Regular (< 5M€) and Major (>5 M€) investments



IP2020 (mln. €)	Forecast 2020	Forecast 2021
Total	281	168