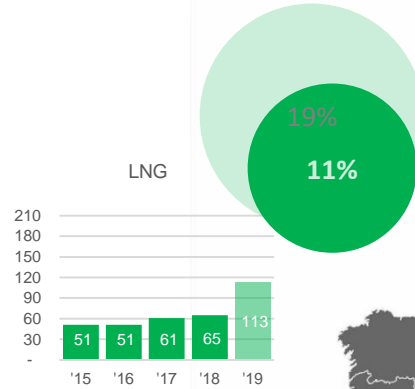
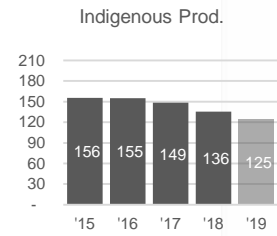
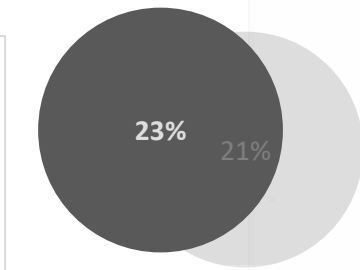
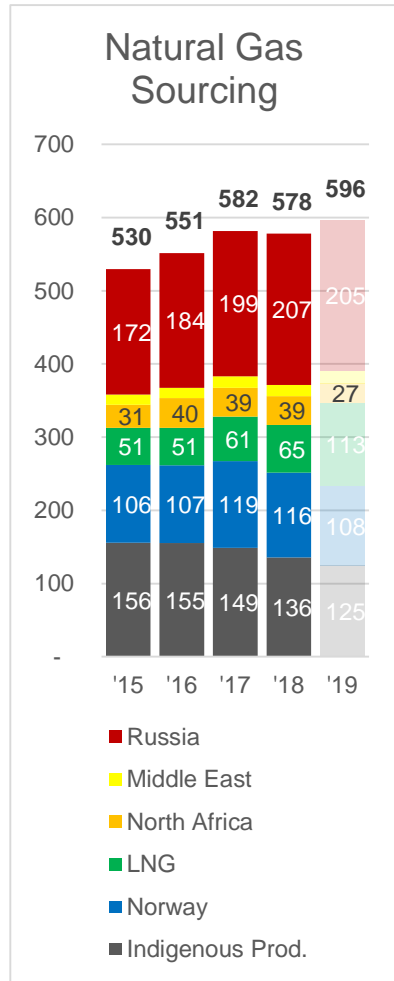


Gas Infrastructure and Climate Change Challenge

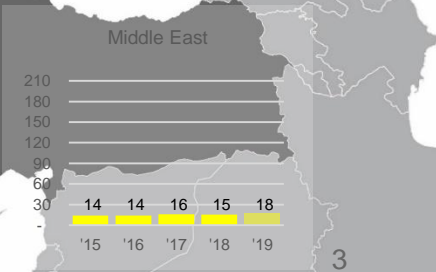
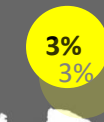
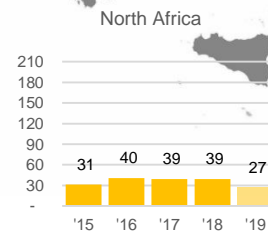
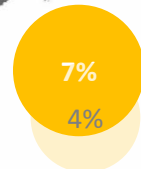
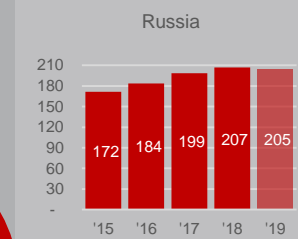
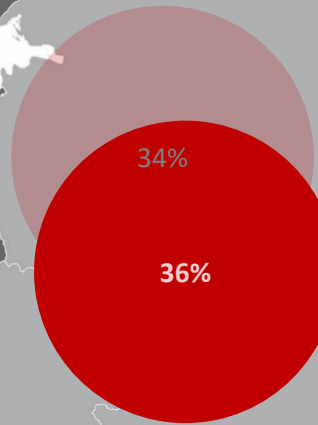
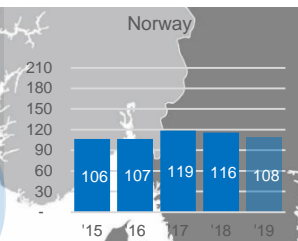
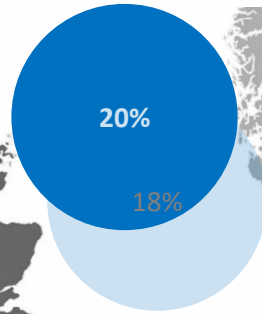
Central European Energy Conference
2019 (CEEC XIII)

- 1) Market Development**
- 2) Eustream's Projects
- 3) Climate Change

European Natural Gas Sourcing (Flows)



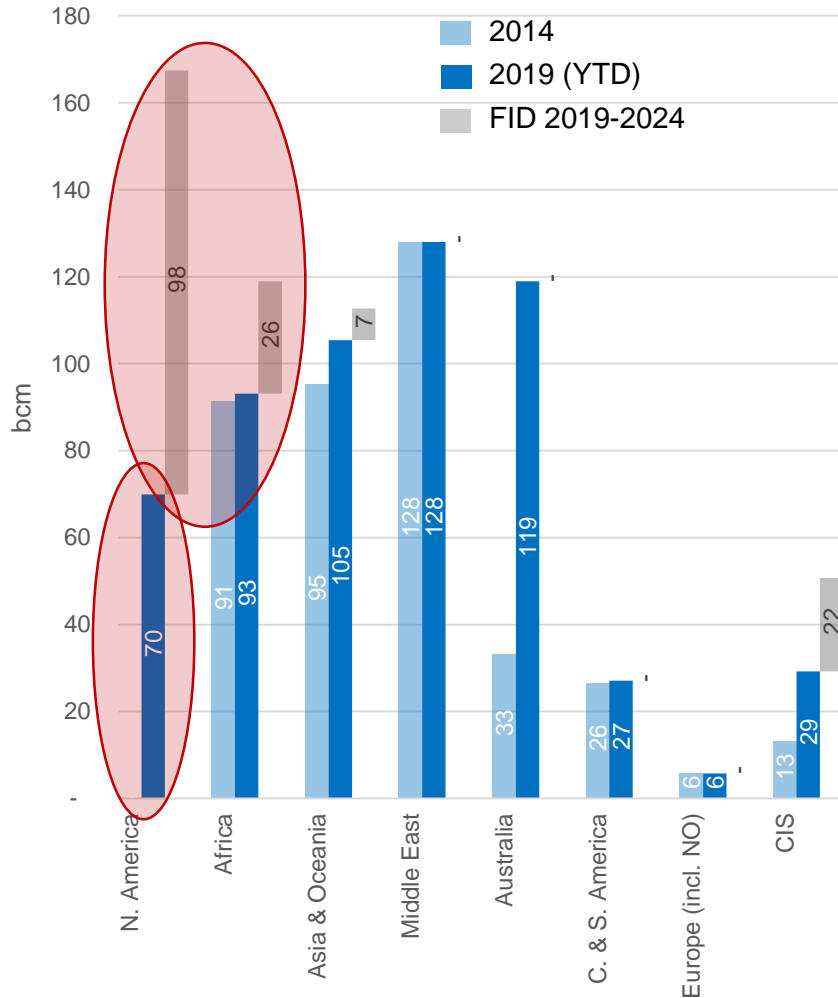
Other
(UGS / diff.)



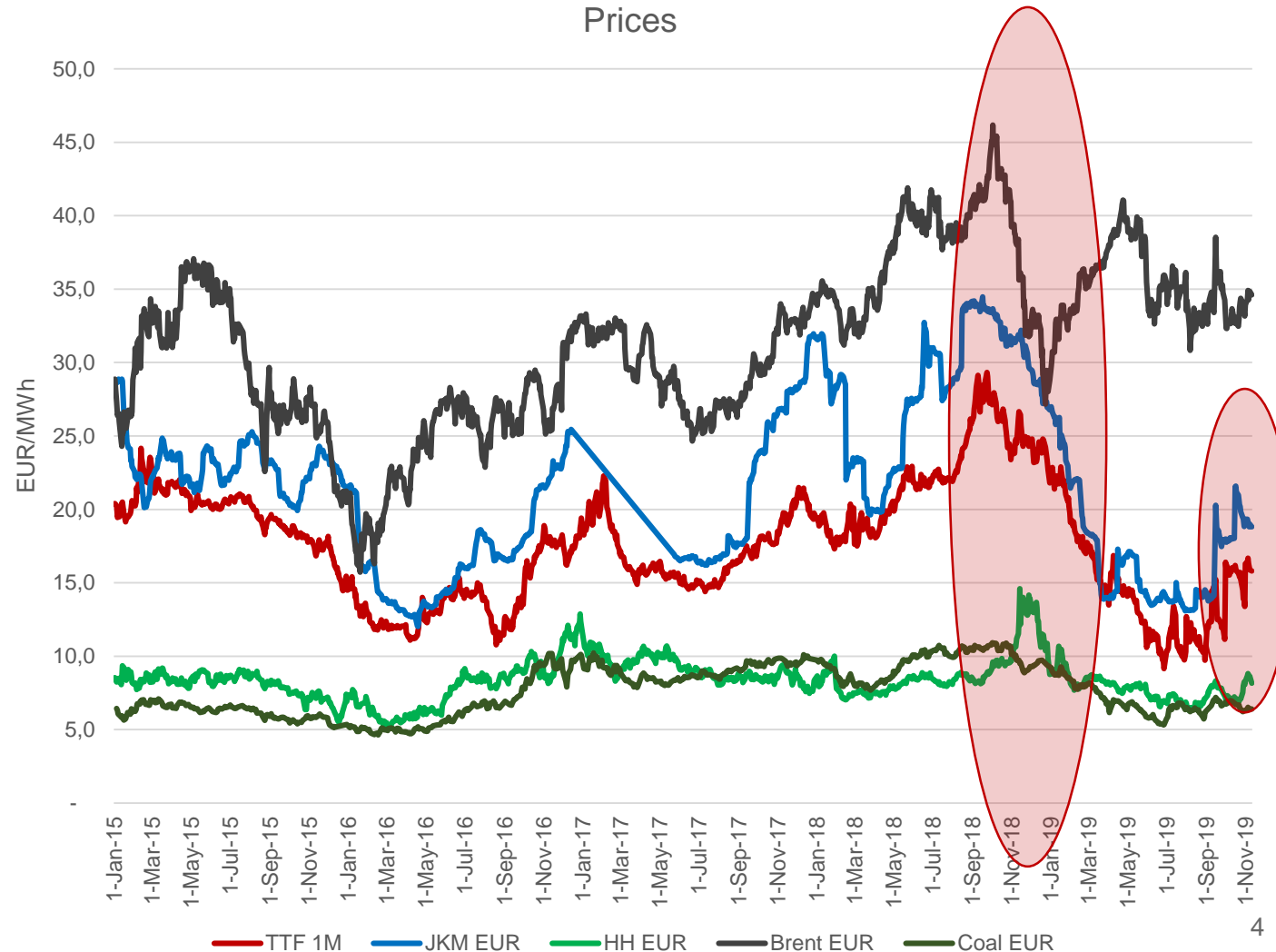
Notes:
Year 2019 is EUS internal FC, data are presented in bcm with GCV 10.48 @ 20° Celsius
Europe includes: EU28, CH, BA, MK, MO, RS, TR, UA

LNG Increase as Result of New Global Liquefaction Capacities and Price Spreads Between Regions

Global Liquefaction Capacities

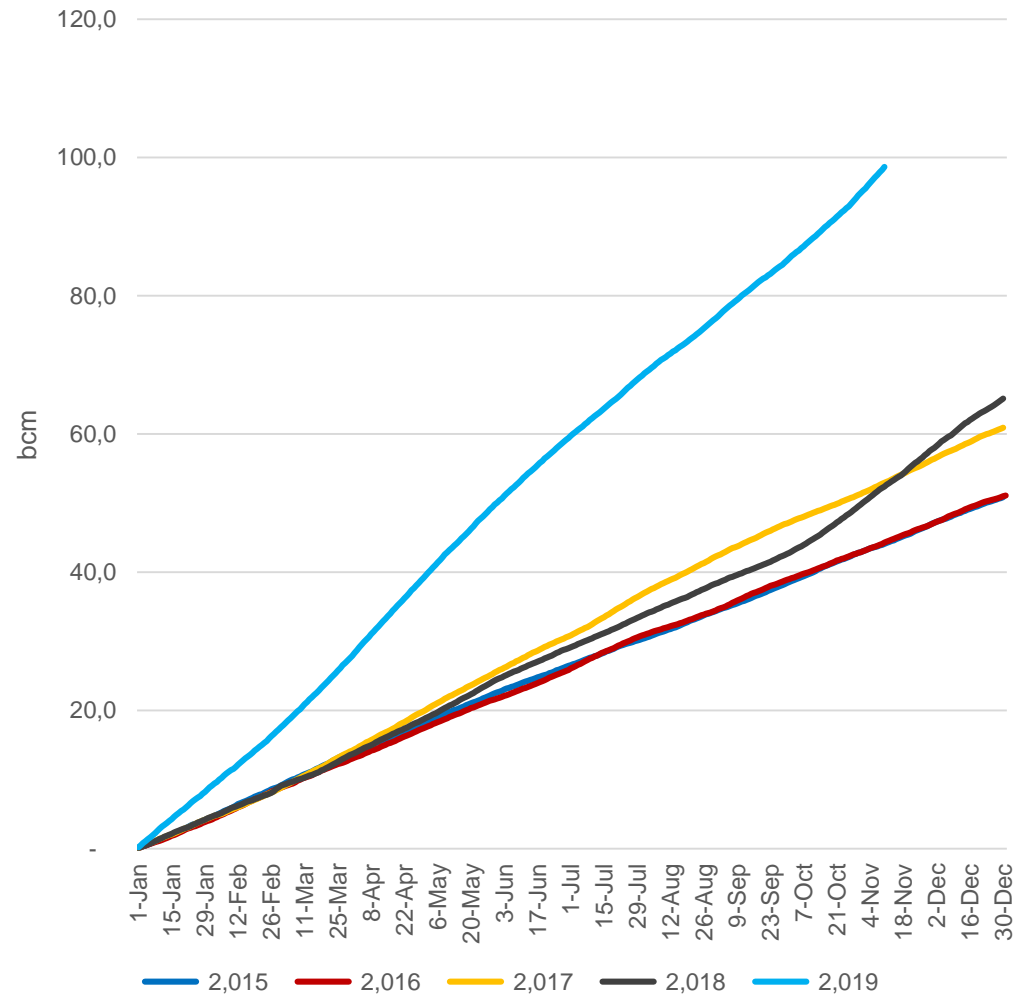


Prices

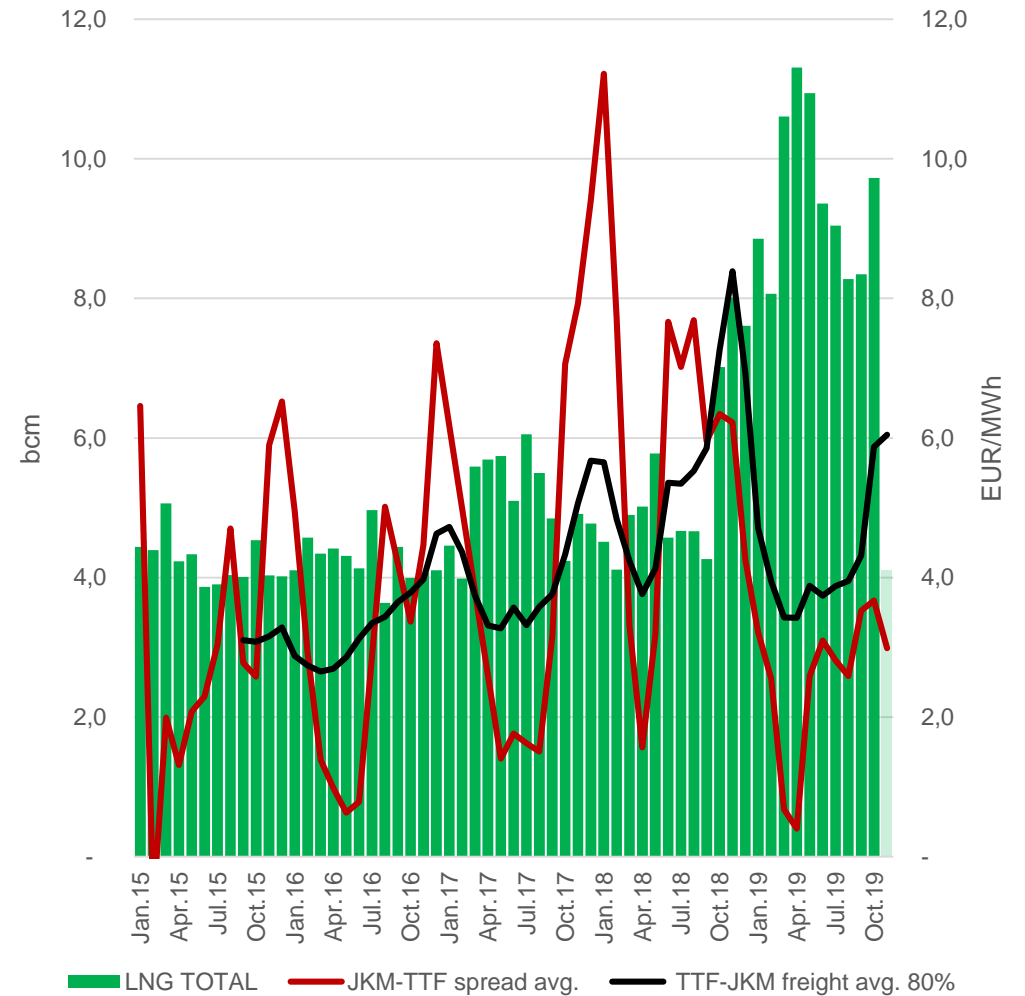


LNG Increase as Result of New Global Liquefaction Capacities and Price Spreads Between Regions

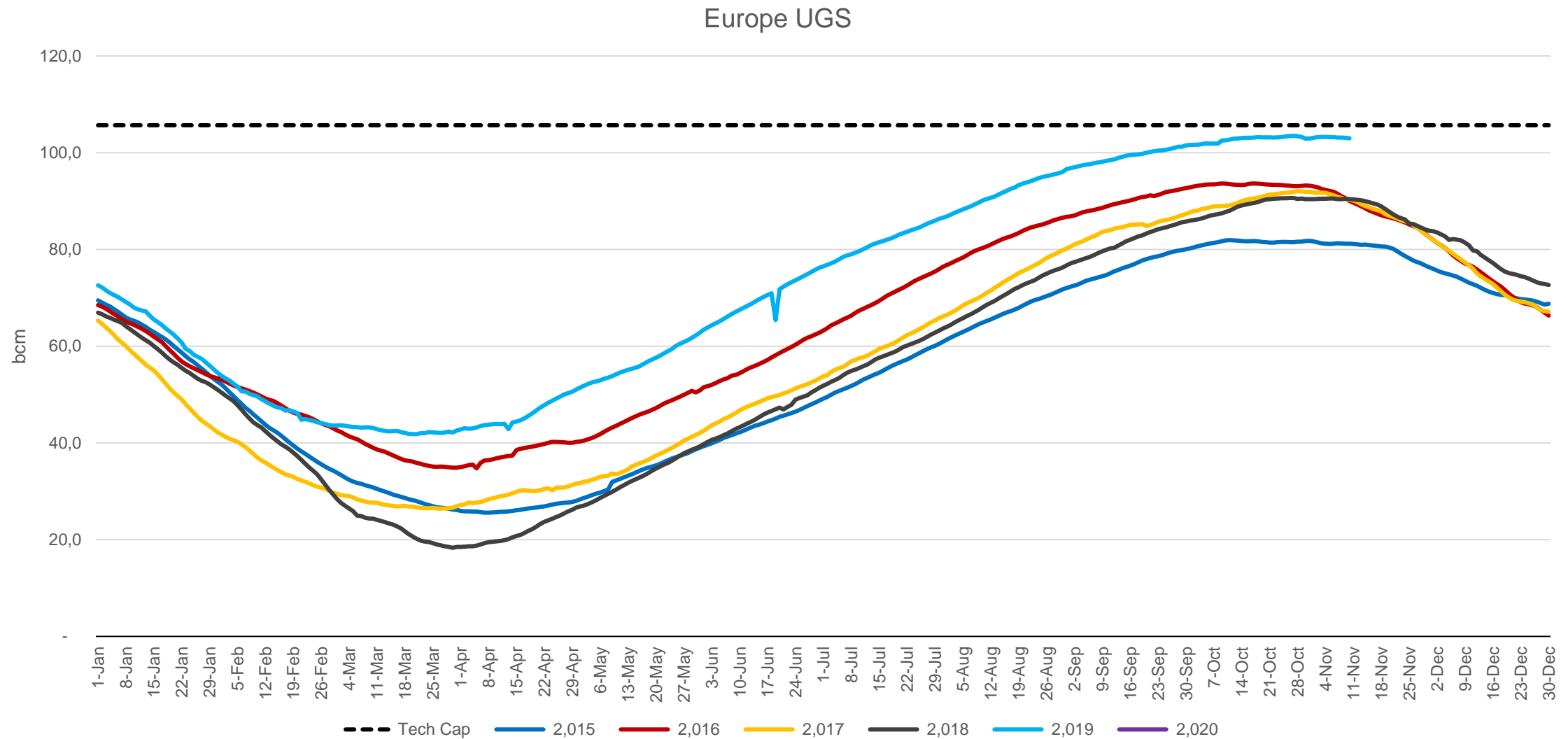
Aggregated Flow



LNG Deliveries to Europe



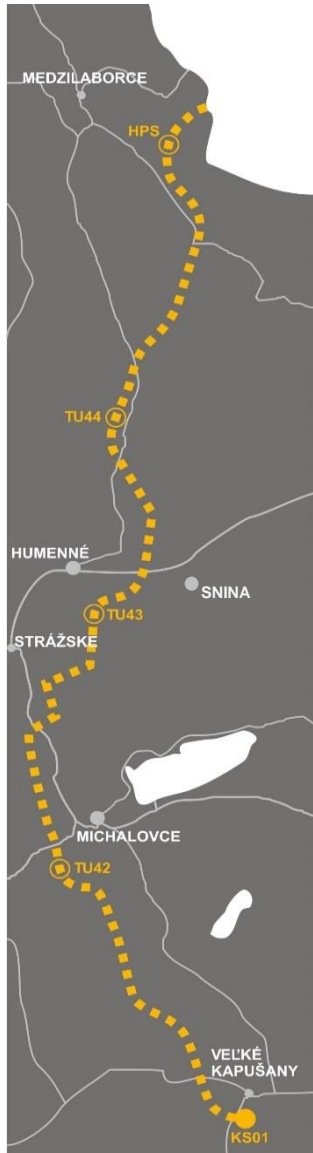
European Storages are at their Historical Maximum



Agenda

- 1) Market Development
- 2) Eustream's Projects**
- 3) Climate Change

Poland – Slovakia Interconnection



CS1 Velké Kapušany (SK) – Strachocina (PL)

Length	164 km (103 km at SK side)
Diameter	DN 1,000 mm
Compression power	32 MW (modification of existing 25MW electro-turbines at SK side)
Flow	Bi-directional
Technical capacity	4.7 bcm (to SK), 5.7 bcm (to PL)

Preparatory works finished at all 103-km route sections
Ca. 20 kilometers of welded pipeline up to date
Bordering metering station under construction



Poland – Slovakia Interconnection



CS05 – Lakšárska Nová Ves

Core Technology

- 2xGE 23MW + tandem compressors;
- Relocation and upgrade of two units from CS04 to CS05
- Expected technical capacity after completion at the level of 151 mcm/d (55.1 bcm/y)

Current Main Milestones

- Installation completed in 5/2019
- 72h trial operation completed in 11/2019
- End of 11/2019 guaranteed parameters test expected
- 1/1/2020 commercial launch expected



BRU(SK)A - New Capacity Booking from the Black Sea



BRU(SK)A

Capacity: 4.4 bcm/y

Length: 550 km (RO section)

Diameter: DN800

Mode: one-directional flow

COD: 2022

DOMINO Gas Field

Located: continental shelf of the Black Sea

Discovered: 2012

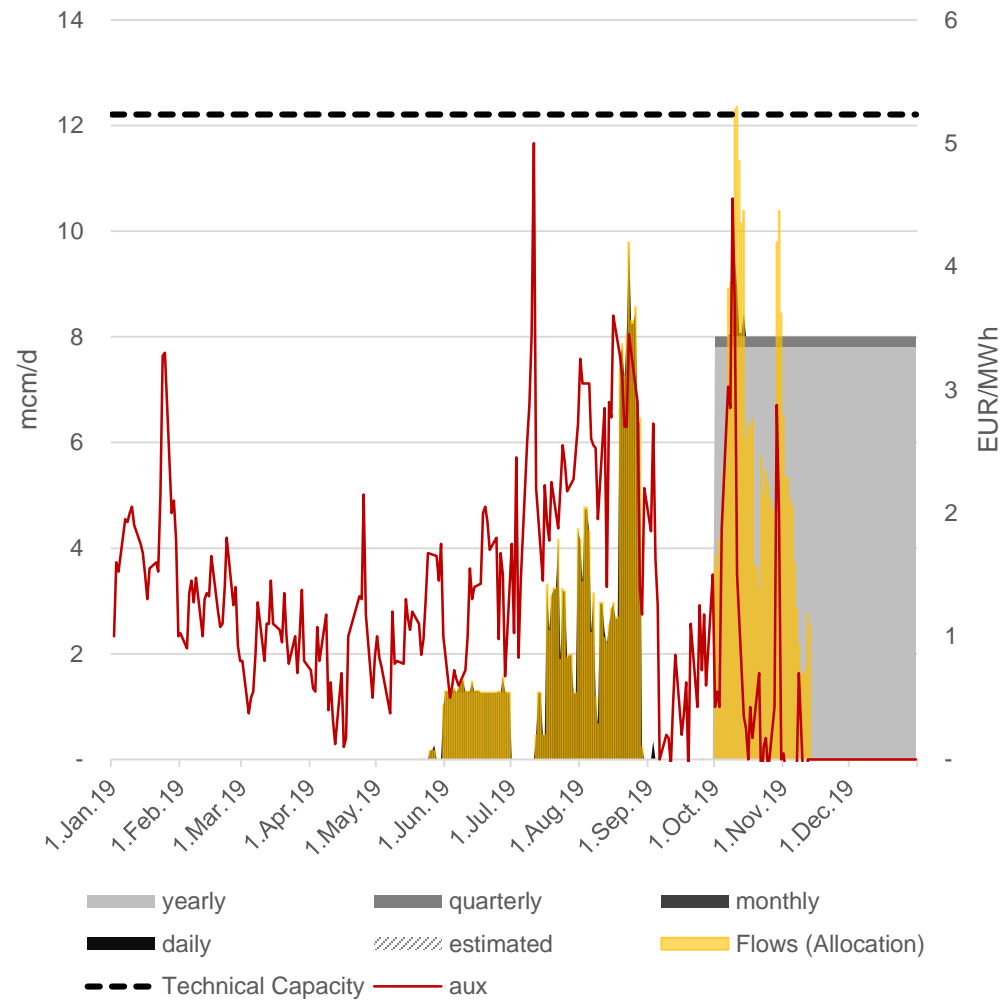
Developed: Petrom and ExxonMobil

COD: 2020

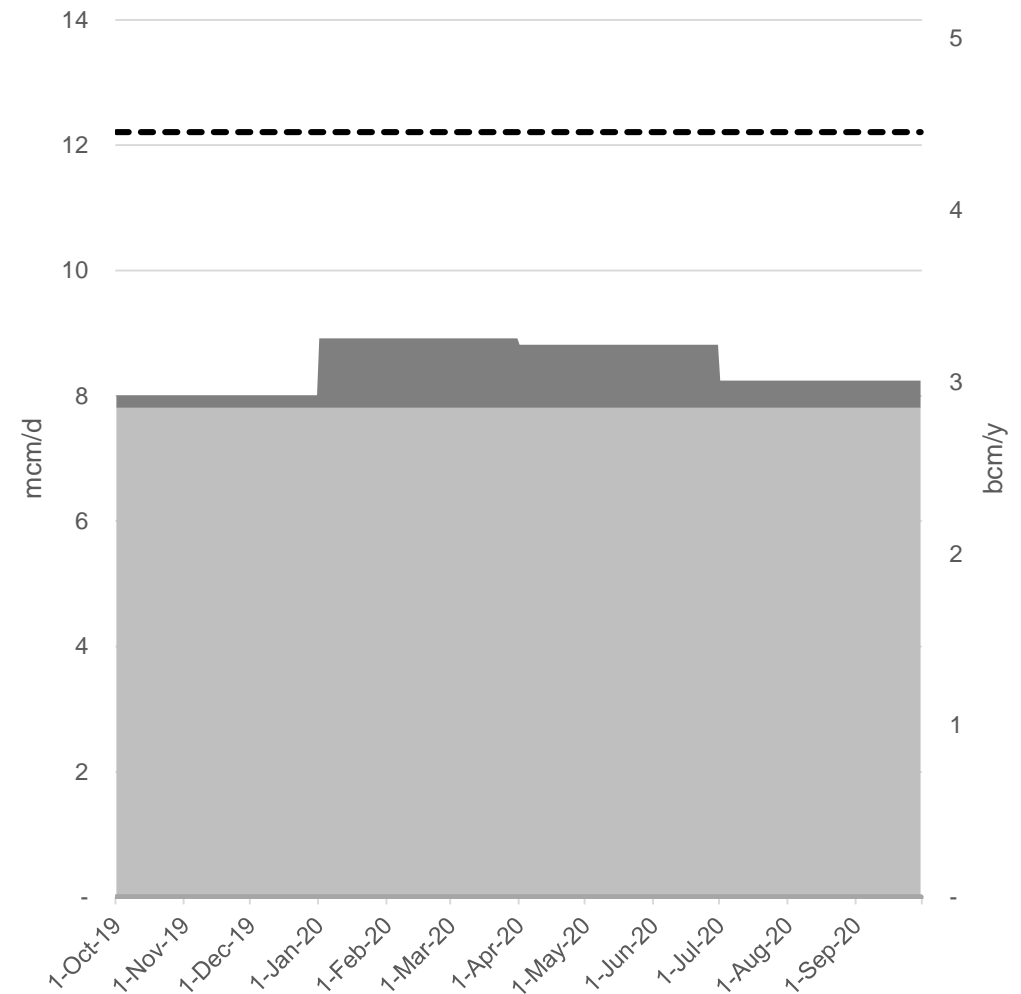
Proven Reserves: ca. 41 – 83 bcm

Physical Flows & Bookings at Exit Veľké Zlievce

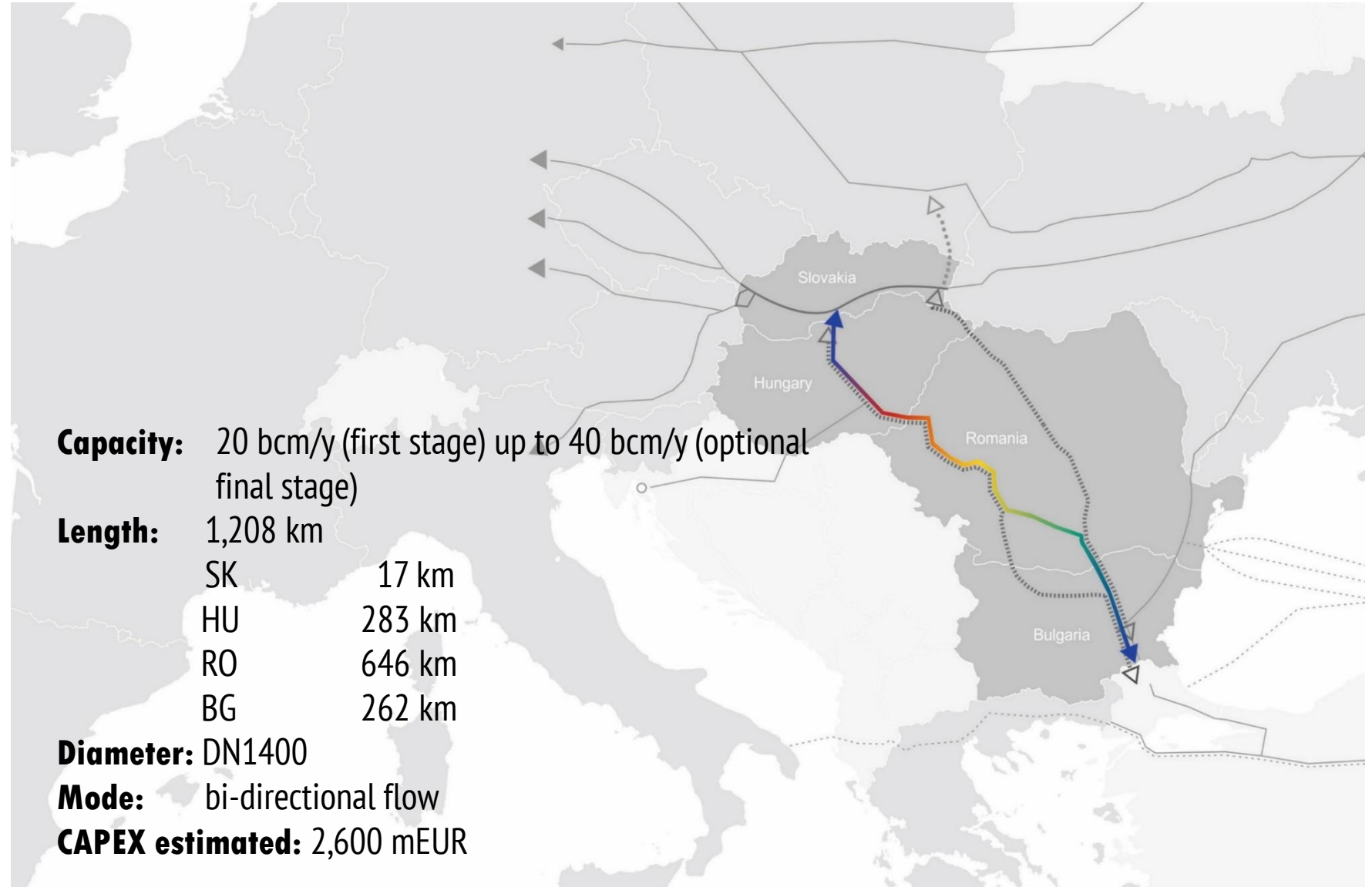
exVZ Booking vs. Real Flow 2019



exVZ Booking 2019/2020



EASTRING PIPELINE - CONNECTING MARKETS



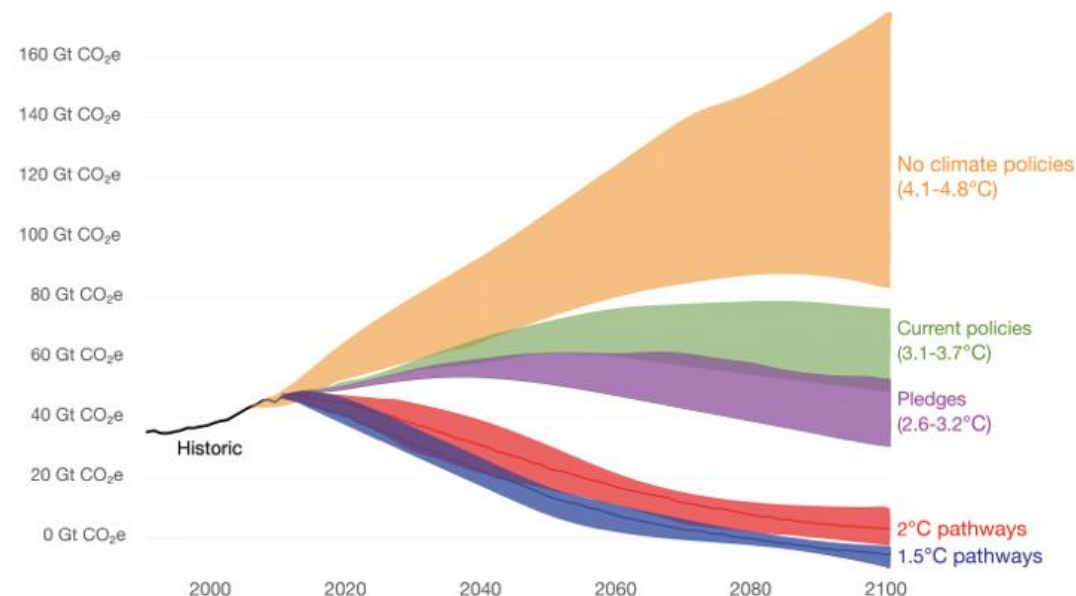
Co-financed by the Connecting Europe Facility of the European Union

Agenda

- 1) Market Development
- 2) Eustream's Projects
- 3) Climate Change**

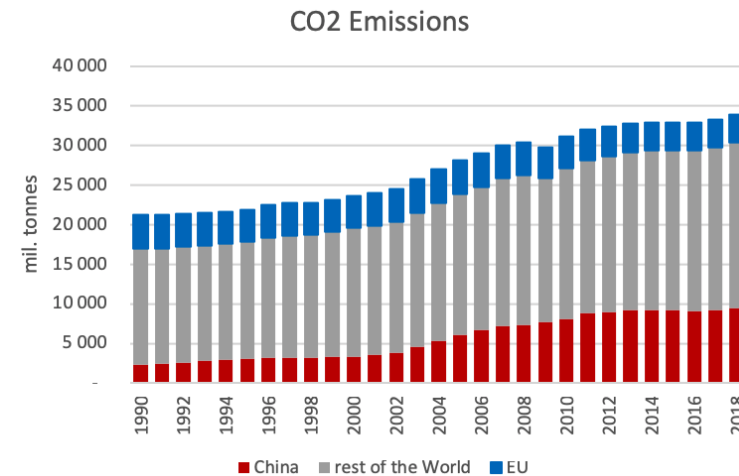
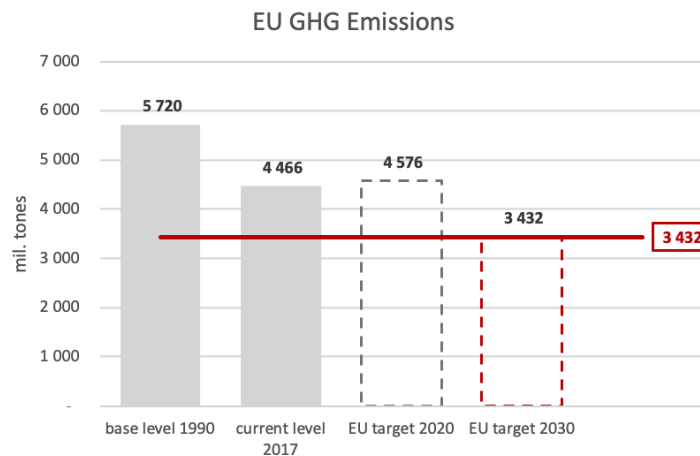
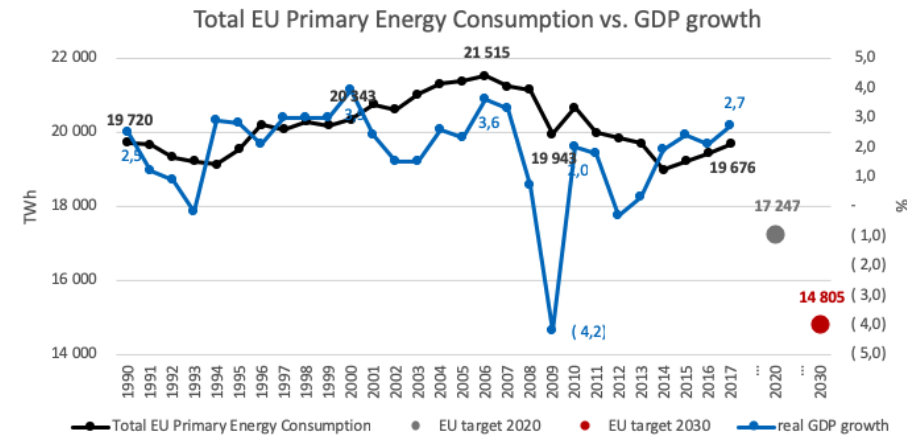
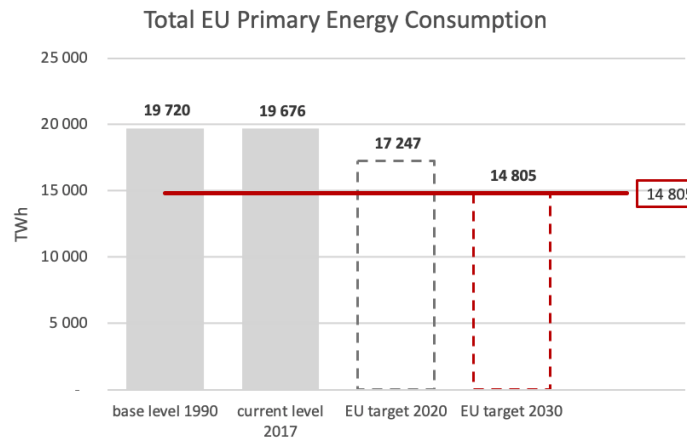
Climate Change – The Challenge and Facts

- In the last 800ths years the CO₂ concentration has fluctuated between 180 – 300 ppm; since 1950 increased up to 400ppm
- CO₂ is annually generated in great quantities of ca. 750 Gt; Vast Majority (95%) of CO₂ is generated by natural processes → Out of the 5%, which is generated by humans → only around 10% is generated in the EU (c. 4.5 Gt overall GHG)
- **EU's ambitions alone have effect on 10% CO₂ generated by humans resp. c. 0.5% of the total CO₂ production on Earth**
- Climate change is a global phenomenon (the effects occur irrespective of the location of CO₂ emissions)
- To achieve the relevant goal of maximum +1.5 degrees Celsius below pre-industrial levels, **European contribution alone is almost negligible and global measures are required**



Climate Change – European Results

- However, while EU is not meeting the energy demand targets, it has already substantially reduced its CO2 emissions and is on track to achieve the 2020 targets
- Unfortunately, the contribution to climate is unobservable as rest of the world has increased in CO2 emissions exceeding the EU's savings multiple times: e.g. **in 2018 EU has saved c. -70mn tonnes and the rest of the world has increased its emissions by +718 mt**



The Results, The Ambition and The Consequencies

- As the reduction has been substantially focused on the Power Sector, the Power Price has increased radically in countries such as Germany above 300 EUR/MWh. USA average price at the moment is at 121 EUR/MWh
- The share of household's expenditure on energy is already reaching over one quarter of income in certain countries
- EU while still not clearly defining how to meet the 2030 targets, is now on its way to 2050
- It has taken the lead in reducing the CO2 emissions by setting a target which requires to **reduce by 40% against the 1990's levels by 2030 and sets the ambition for 80%—95% reduction by 2050**
- EU's strategy is based on the document "**Clean Planet for All**"
- Europe, in its study outlines several **decarbonization Pathways utilizing a range of technologies, which are presently not employed at all or in very low scale**
- The study indicates that these measures may lead to a **cost of c. 1,400 bnEUR (11% GDP) to c. 2,500 bnEUR** all in real terms of 2013, thus nominal terms may be almost two times as much by 2050
- We firmly believe that the continuation of the **current ambitions (under the absence of a wider due analysis)** shall lead to **substantial negative consequences for the EU**
- The fact that Europe will burden itself with the **excessive costs of the announced ambitions shall jeopardize its competitive position on the global market** (most notably in a scenario where other major economies are not following the decarbonization path or follow much more loose targets)
- At the same time more **optimal solutions using efficient deployment of technologies (in or outside of the EU) are being ignored** along the way (still with EU remaining as the leader of cleantech!)

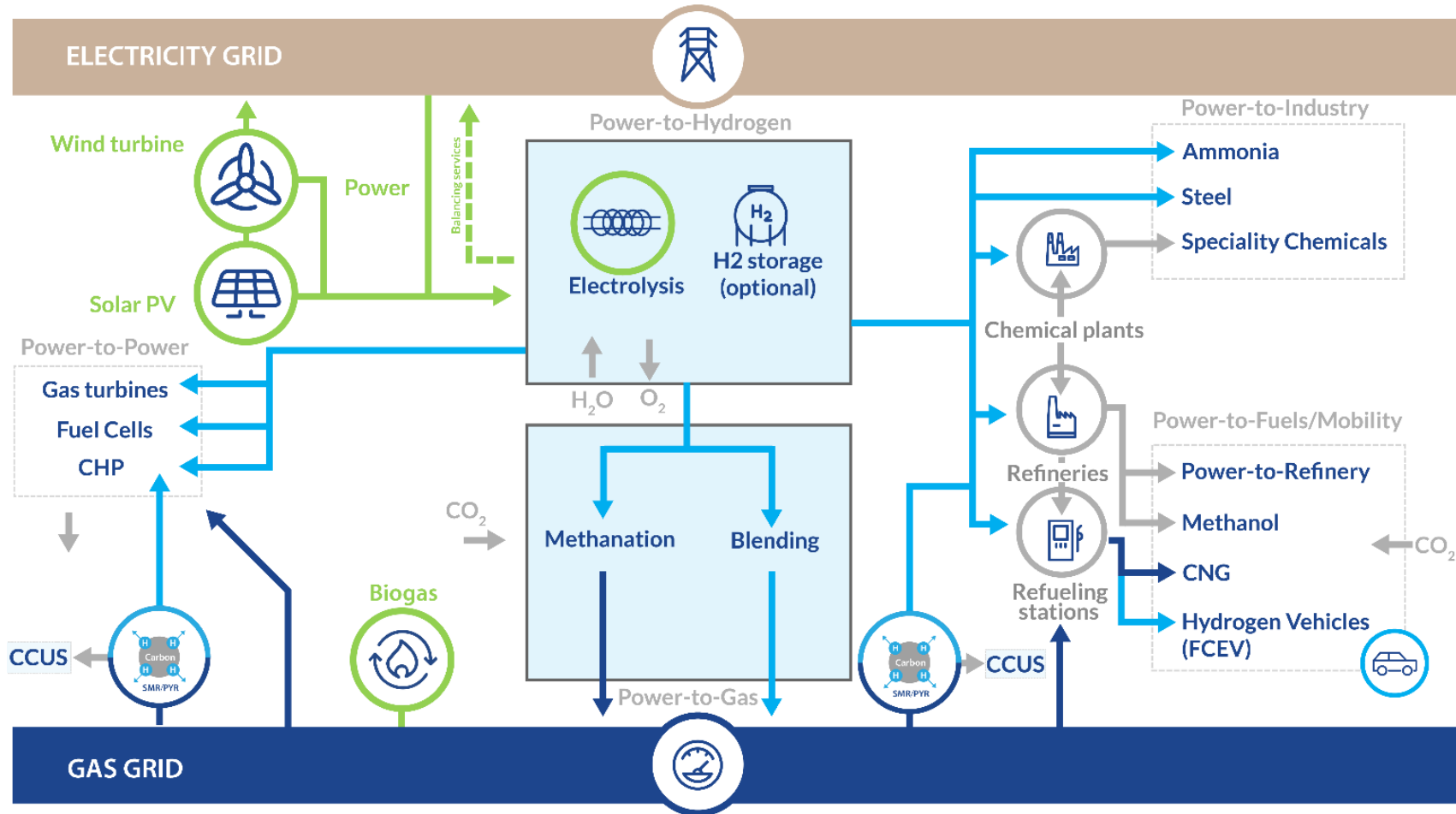
....All this to reach a saving which will be quite likely offset by growth of CO2 of a single country in a few years...

The Proposal

We believe that before a decision on 2050 is made in Europe a relevant dialogue and due analysis is required and at least the following examined:

- EU should (under international cooperation) create a full list of available measures to reduce CO2 using the existing available technology
- This list should cover not only the EU land but also countries abroad (i.e. China, India, Africa etc.)
- The measures should be organized as per their efficiency (i.e. the amount of EUR spent vs. CO2 reduction achieved). It is certain that 1 EUR spent in replacing a very old coal power plant abroad (or preventing a construction of such) shall deliver much greater result than deployment of heavily subsidized pilot technologies in EU in large scale.
- Simultaneously, Europe would continue to protect its position as the cleantech leader remain in possession of the relevant know-how which could be deployed around the world.
- Europe is able to meet its 2030 emission targets using currently available technology without excess economic burden on EU citizens.
- The time period until 2030 may be efficiently used in deploying new technology pilot projects without embarking on to large-scale subsidization schemes with questionable feasibility as well as economic outcome.
- Deployment of R&D projects or further analysis of renewable gases utilization in reasonable and responsible scope
- Regular re-assessing of targets based on R&D results, on the back economic implications and available technologies

ENTSOG Roadmap for Gas Grids



- Gas Network
- Hydrogen Flows
- Renewable Energy (RES)
- Liquid fuel Network
- Power Network

Gas Infrastructure and Climate Change Challenge

Central European Energy Conference
2019 (CEEC XIII)