

Ten-Year Network Development Proposal 2021

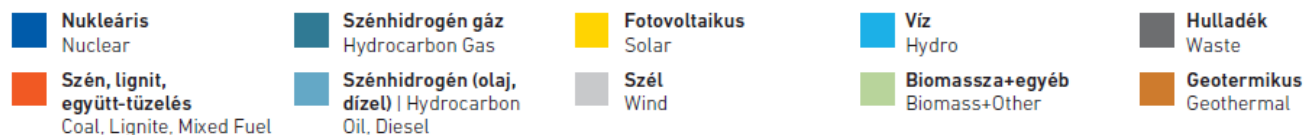
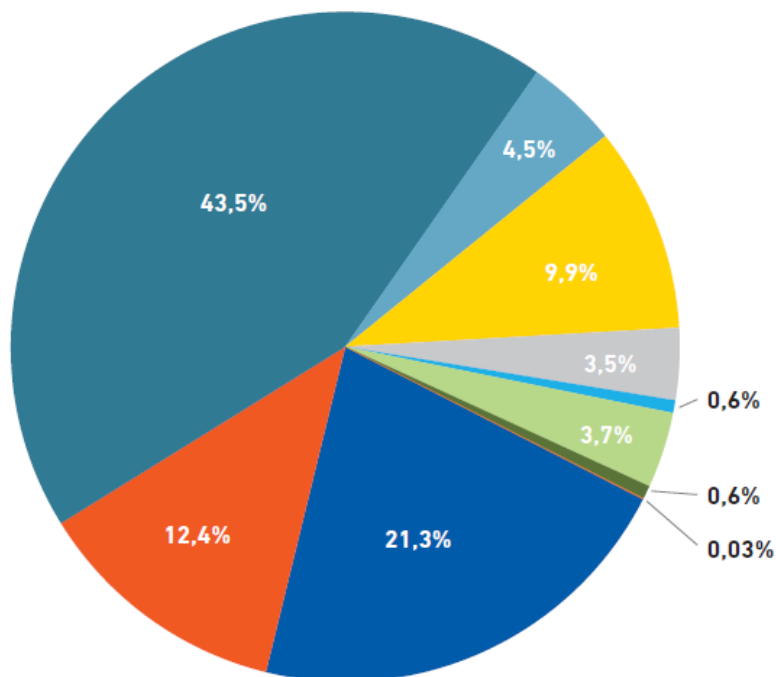
July 2021.



MEMBER OF MOL GROUP

Domestic primer energy consumption and electricity generation

2

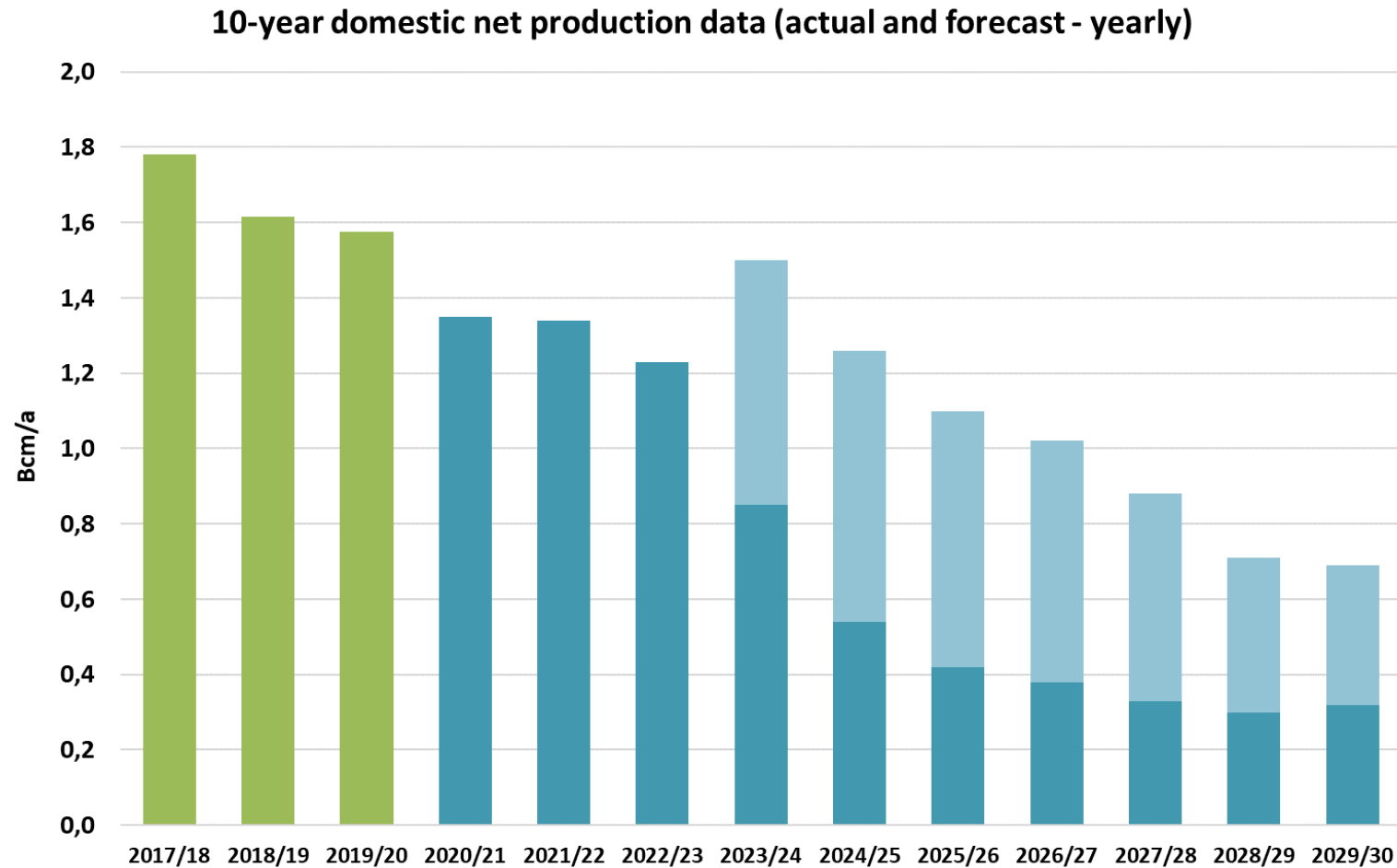


| VER összesen (Primer források szerint) Hungarian Electricity System, Total (Sources of total domestic PP) | NBP NTO [MW] | BT IC [MW] | BT SUM BT [%] | ÁH CL [MW] | Rtá ACC [MW] | Nettó BT NGC [MW] |
|---|--------------|------------|---------------|------------|--------------|-------------------|
| Hagyományos erőművek összesen Power plants – Conventional, Total | | | | | | |
| Nukleáris Nuclear | 0,0 | 2012,8 | 21,3% | 0,0 | 2012,8 | 1898,9 |
| Szén, lignit, együtt-tüzelés Coal, Lignite, Mixed Fuel | 0,0 | 1166,3 | 12,4% | 270,0 | 896,3 | 1048,9 |
| Szénhidrogén gáz Hydrocarbon Gas | 0,0 | 4111,8 | 43,5% | 1083,0 | 3028,8 | 4028,4 |
| Szénhidrogén olaj, dízel Hydrocarbon Oil, Diesel | 0,0 | 421,1 | 4,5% | 0,0 | 421,1 | 421,1 |
| Összesen Total | 0,0 | 7712,0 | 81,7% | 1353,0 | 6359,0 | 7397,2 |
| Megújuló erőművek összesen Power plants – Renewables, Total | | | | | | |
| Fotovoltaikus Solar | 0,0 | 936,3 | 9,9% | 0,0 | 936,3 | 936,3 |
| Szél Wind | 0,0 | 327,5 | 3,5% | 0,0 | 327,5 | 327,5 |
| Víz Hydro | 0,0 | 57,8 | 0,6% | 0,0 | 57,8 | 57,8 |
| Biomassza+egyéb Biomass +Other | 0,0 | 346,1 | 3,7% | 24,0 | 322,1 | 320,3 |
| Hulladék Waste | 0,0 | 59,4 | 0,6% | 22,1 | 37,3 | 59,4 |
| Geotermikus Geothermal | 0,0 | 2,7 | 0,03% | 0,0 | 2,7 | 2,7 |
| Összesen Total | 0,0 | 1729,8 | 18,3% | 46,1 | 1683,7 | 1704,0 |
| Összesen Total | 0,0 | 9441,8 | 100,0% | 1399,1 | 8042,7 | 9101,2 |

Source: Data of Hungarian Electricity System 2019

Nuclear power and fossil fuels dominate domestic power production.

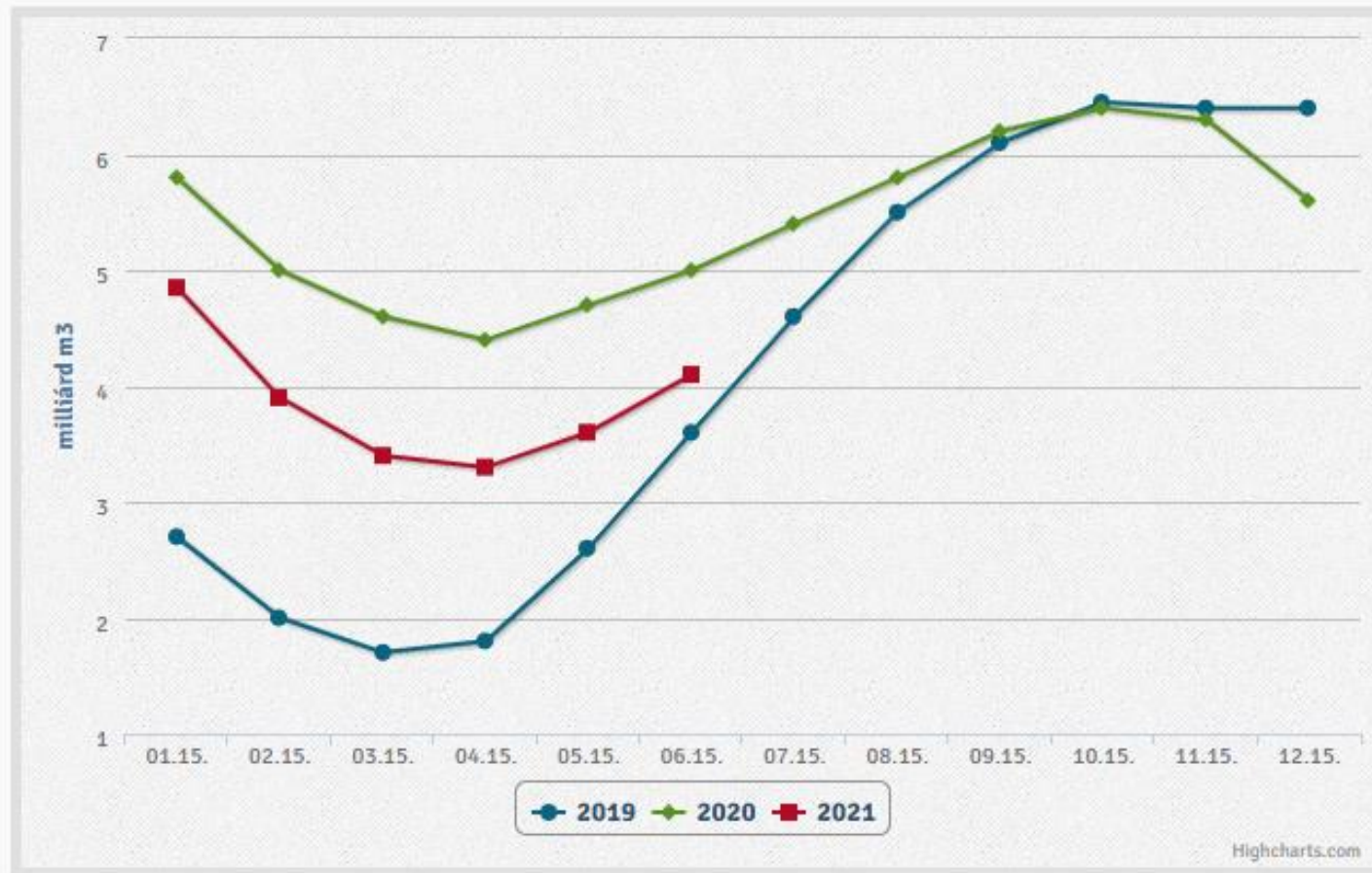
Decreasing trend characterizes domestic natural gas production



Source: Ten-Year Network Development Proposal 2021

Domestic use of natural gas storage

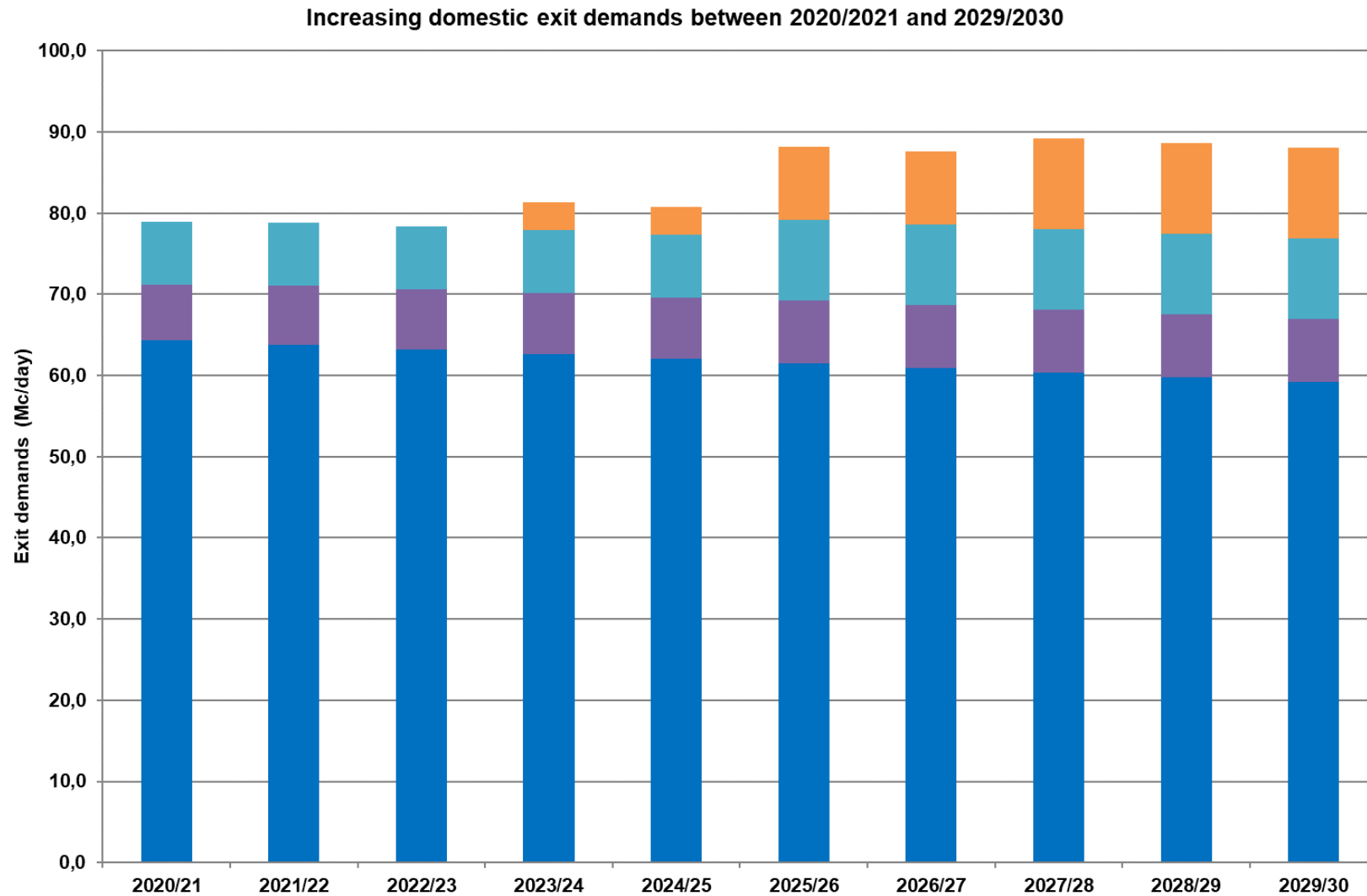
4



Source: <http://www.mekh.hu/magyarorszag-foldgastaroloinak-keszletszint-alakulasa>

Demand of domestic exit points

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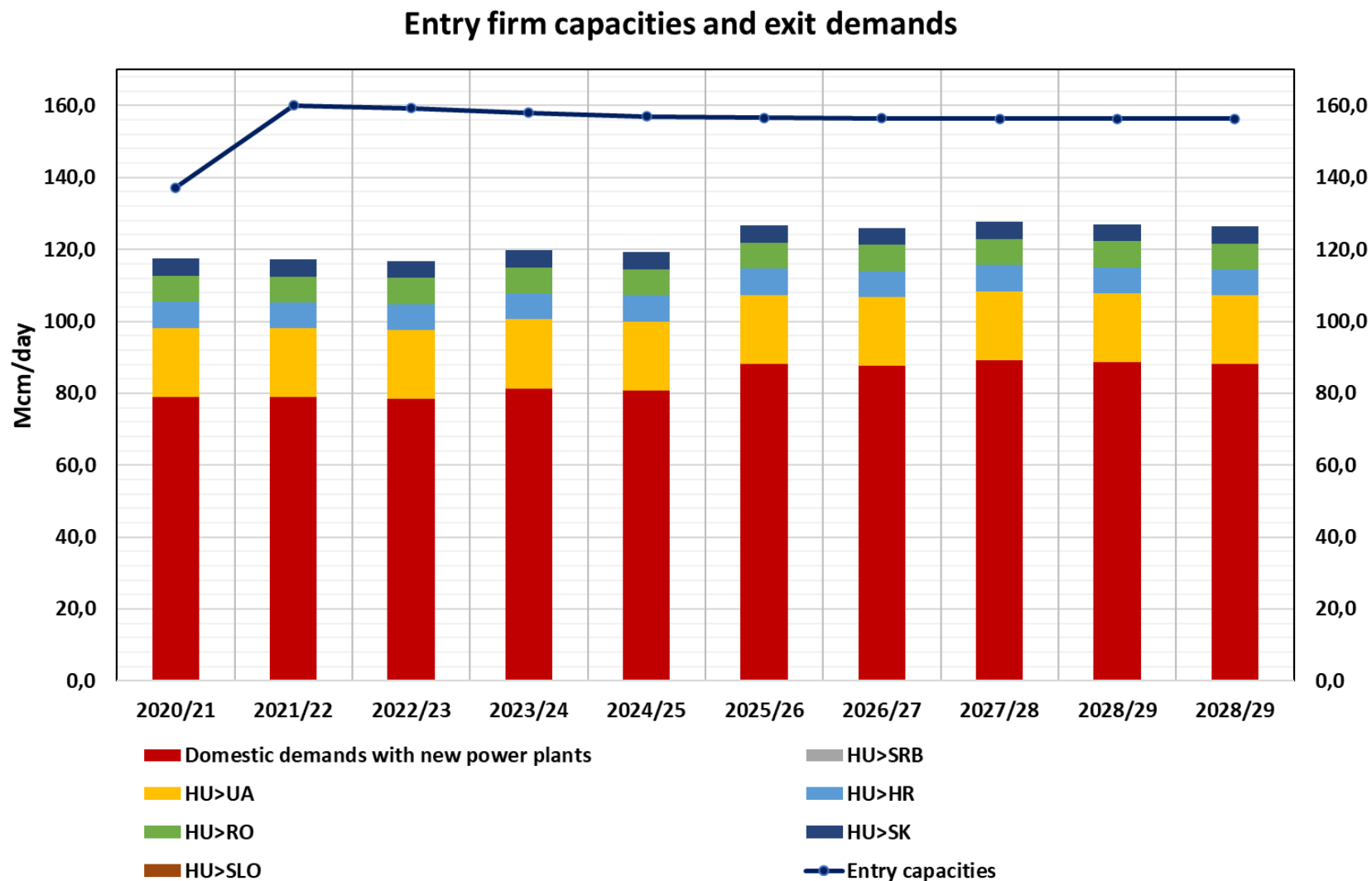
Source: Ten-Year Network Development Proposal 2021

Legend:

- DSOs
- Industrial
- Power plants
- New power plants

Hungarian entry and exit capacities with approved developments I.

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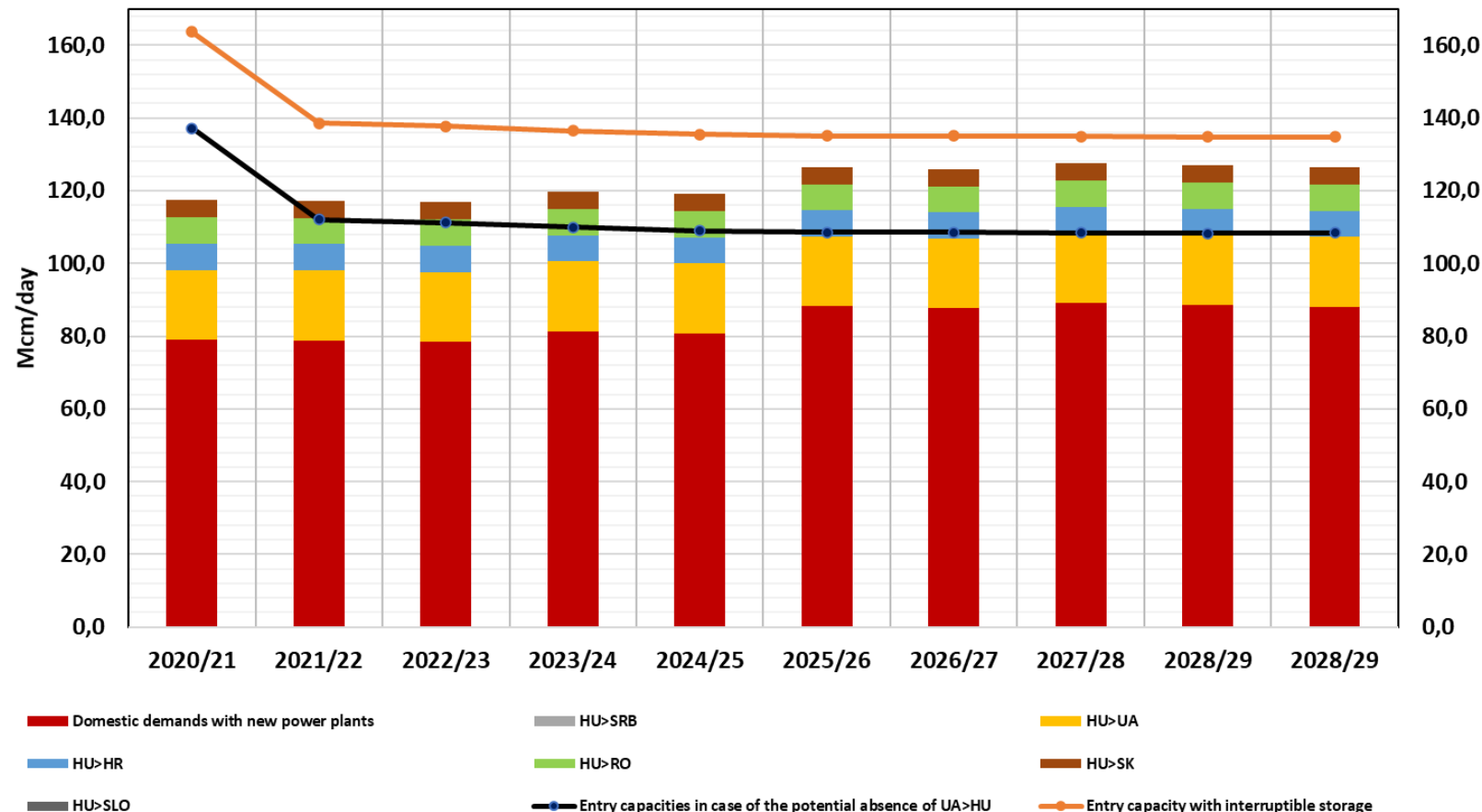


Source: Ten-Year Network Development Proposal 2021

Hungarian entry and exit capacities with approved developments II.

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Entry firm capacities in case of the potential absence of UA>HU supply and exit demands

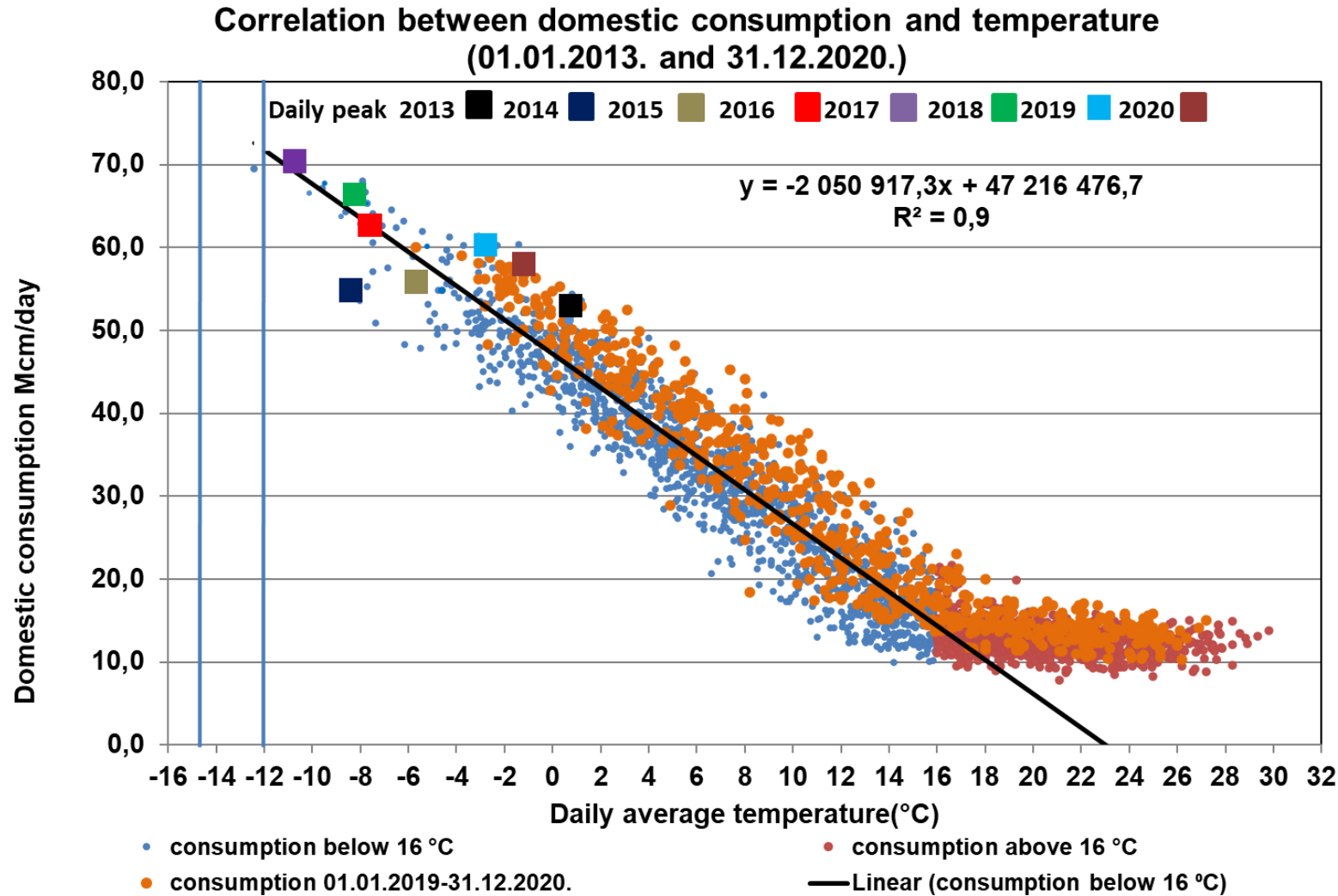


Source: Ten-Year Network Development Proposal 2021

In case of the largest transmission demands, by interruptible entry capacities the domestic exit demands can be ensured even in the potential absence of UA>HU supply.

Correlation between domestic consumption and temperature I.

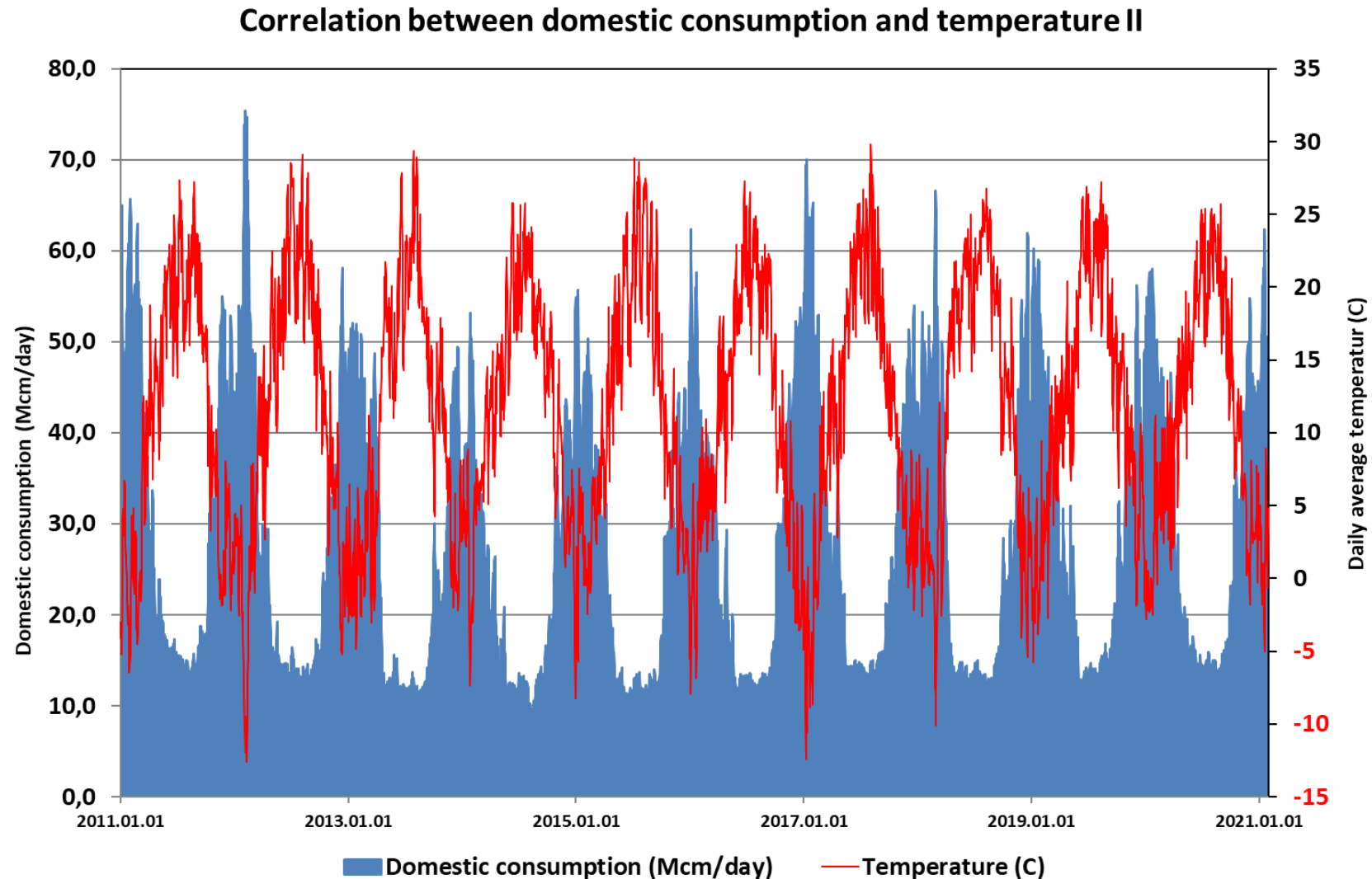
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Source: Ten-Year Network Development Proposal 2021

Correlation between domestic consumption and temperature II.

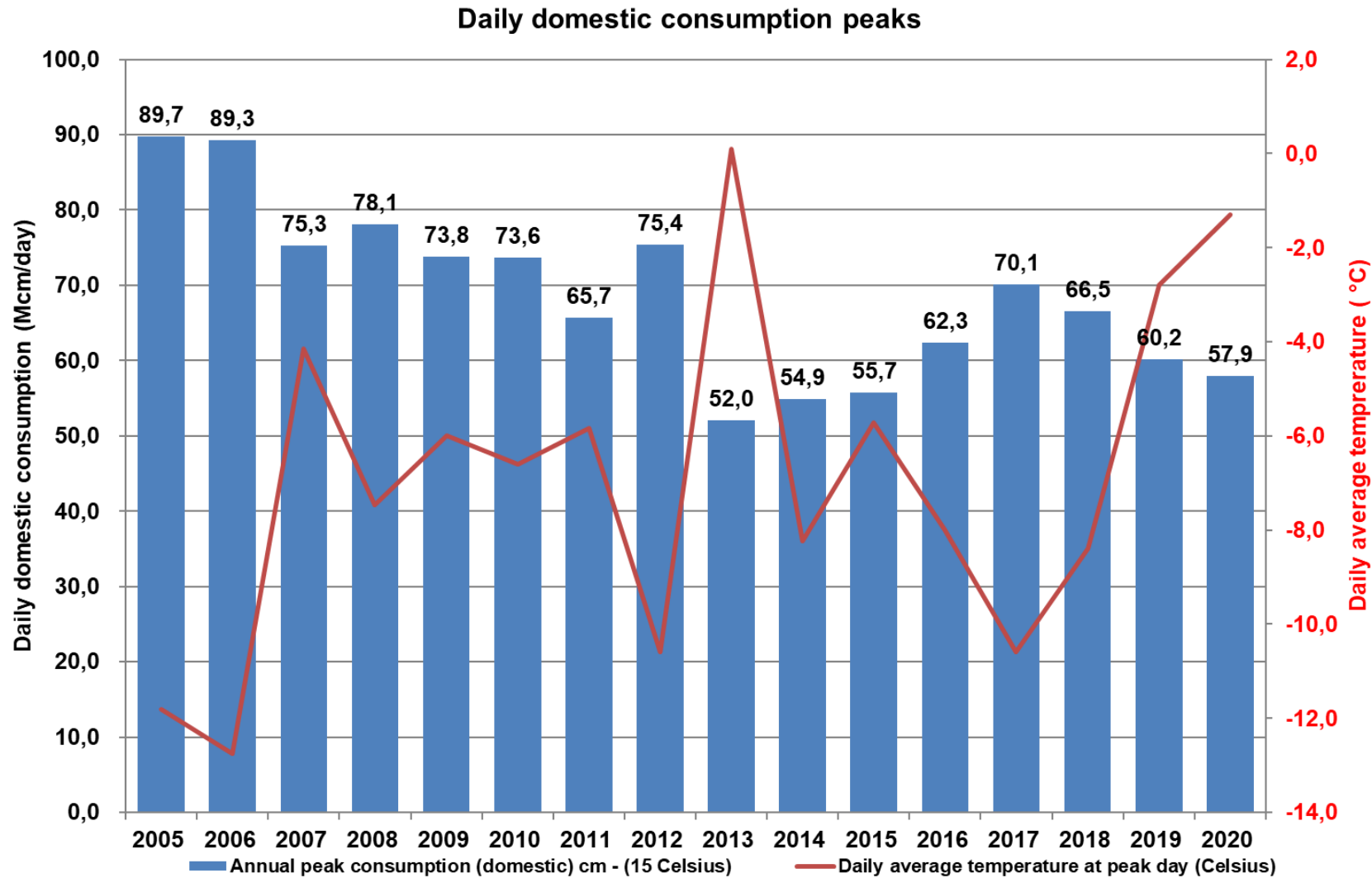
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Source: Ten-Year Network Development Proposal 2021

Daily domestic peak consumption

10



Source: Ten-Year Network Development Proposal 2021

Capacity demand survey at interconnection points

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From the non-binding capacity demand assessment procedure initiated by FGSZ Ltd. in **July 2017** based on the provisions of the CAM NC, the incremental capacity process started in case of the following interconnection point:

- Hungarian-Austrian interconnection point (5.2 bcm/y and 9 bcm/y)
 - In case of the incremental capacity auctions for HU>AT 5.2 bcm/y and 9 bcm/y capacities run on 6 July 2020, the sum of the net present value of the binding bids of the network users was 0, thus the economic test of FGSZ Ltd. was negative and terminated with a negative final investment decision.

Capacity demand survey at interconnection points

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From the non-binding capacity demand assessment procedure initiated by FGSZ Ltd. **in July 2019** based on the provisions of the CAM NC, the incremental capacity process started in case of the following three interconnection points:

- HUAT interconnection point (HU>AT direction, max. 120,000 cm/h)
 - In case of the HUAT interconnection point, the preparation of the incremental capacity auction is in progress and for this purpose the neighbouring TSOs will develop a joint project proposal.
- HUSK interconnection point (both directions, max. 600,000 cm/h)
 - In case of the incremental capacity auctions for HUSK interconnection point run on 6 July 2020, the sum of the net present value of the binding bids of the network users was 0, thus the economic test of FGSZ Ltd. was negative and the project was economically not viable. With this, the binding incremental capacity procedure from Hungary to Slovakia, that started on 4 May 2020, ended unsuccessfully, without any capacity allocation and was terminated with a negative final investment decision.
- HUSI interconnection point (SI>HU direction, max. 50,000 cm/h; HU>SI direction max. 190,000 cm/h)
 - In case of the HUSI interconnection point, preparation of the incremental capacity auction is in progress, and for this purpose neighbouring TSOs will develop a joint project proposal.

Projects in the development proposal 2021- I.

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Ongoing developments

- Establishment of Serbian – Hungarian entry capacity with 6 bcm/year (at 20 °C) max. capacity.

New projects proposed for implementation in the next 3 years

- Increasing Serbian – Hungarian entry capacity up to 8.5 bcm/year (at 20 °C) without pipeline development.
- Ensuring firm capacity from Hungary to Ukraine.

Conditional projects to be developed in the following 3 years

- Currently there is not conditional projects to be developed in the following 3 years.

Projects in the development proposal 2021 - II.

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Conditional project to be developed in the 4th–10th years

- Ensuring capacity demands in the direction of HU>AT.
- Slovenian-Hungarian interconnector 20,000 or 190,000 cm/h capacities - depends on demand.
- Development of Szada compressor station.
- Development of compressor station and measuring system at Csanádpalota.
- Connecting FGSZ's system to the European Hydrogen Backbone, preparation of the provision of the expected transport demand of the domestic hydrogen producers and hydrogen users.
- Development of FGSZ's gas-turbine-driven compressors with electric-driven compressors.

Project analysed, but proposed not to be developed

- Development of Balassagyarmat measuring station capacity, capacity increasing of SK>HU up to 800,000 cm/h and Development of Gödöllő junction point with technological measuring.
- Increasing Serbian-Hungarian entry capacity up to 8.5 bcm/year (at 20 °C) with pipeline development.
- Slovenian-Hungarian interconnector with 50,000, 230,000 or 362,000 cm/h capacity.
- Eastring


Ongoing developments

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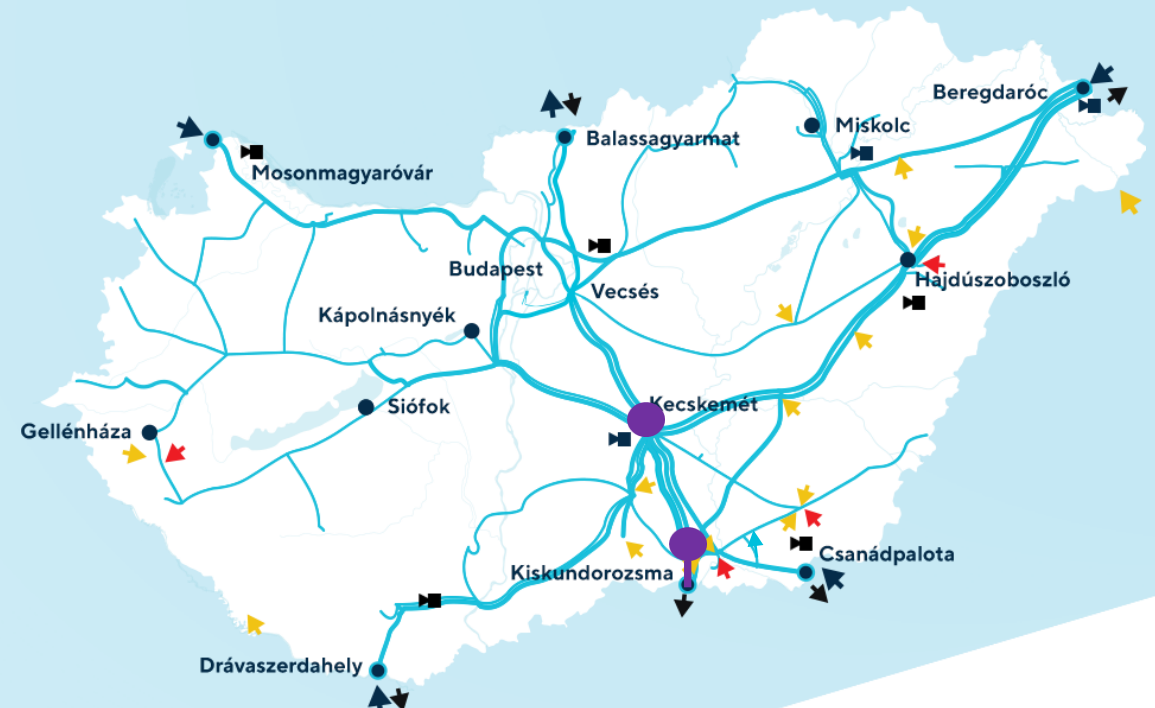
PROJECT DESCRIPTION

Establishment of Serbian Hungarian entry capacity up to 6 bcm/y (at 20 °C) max. capacity

The project ensures transmission of natural gas from Serbia up to 6 bcma/year.

- The project: 
- SRB/HU border-Kiskundorozsma pipeline, DN1200, PN75, 15 km;
 - Kiskundorozsma metering station + new connection at the node,
 - New pipeline connections at Városhöld node,
 - Modification of Városhöld node.
- Expected commissioning date of the project is 1 October 2021, in case of „New pipeline connections at Városhöld node” and „Modification of Városhöld node” is 1 October 2022.

PROJECT



New projects proposed for implementation in the next 3 years I.

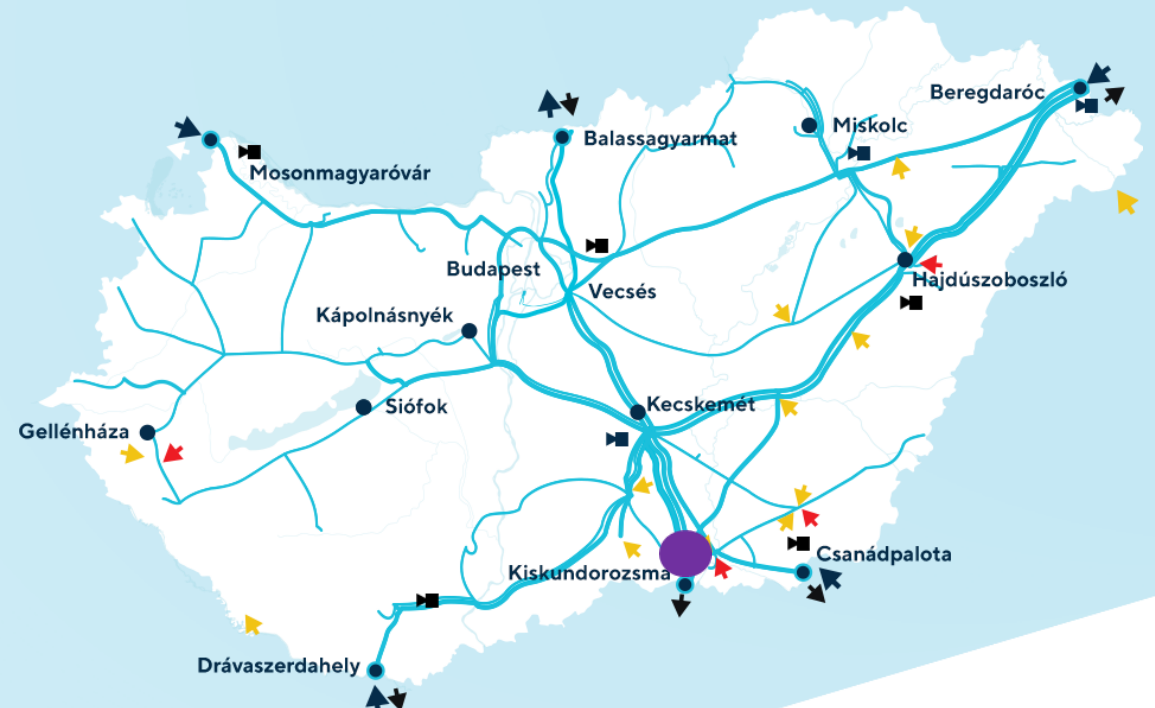
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PROJECT DESCRIPTION

Increasing the Serbian-Hungarian capacity up to max. 8.5 bcm/y (at 20 °C) capacity without pipeline development

With the availability of the infrastructure related to the Serbian-Hungarian entry capacity up to 6 bcm/y, 8.5 bcm/y entry capacity can be ensured from 1 October 2021 by optimizing the existing infrastructure assets, including other elements of the interconnected natural gas system.

PROJECT




New projects proposed for implementation in the next 3 years II.

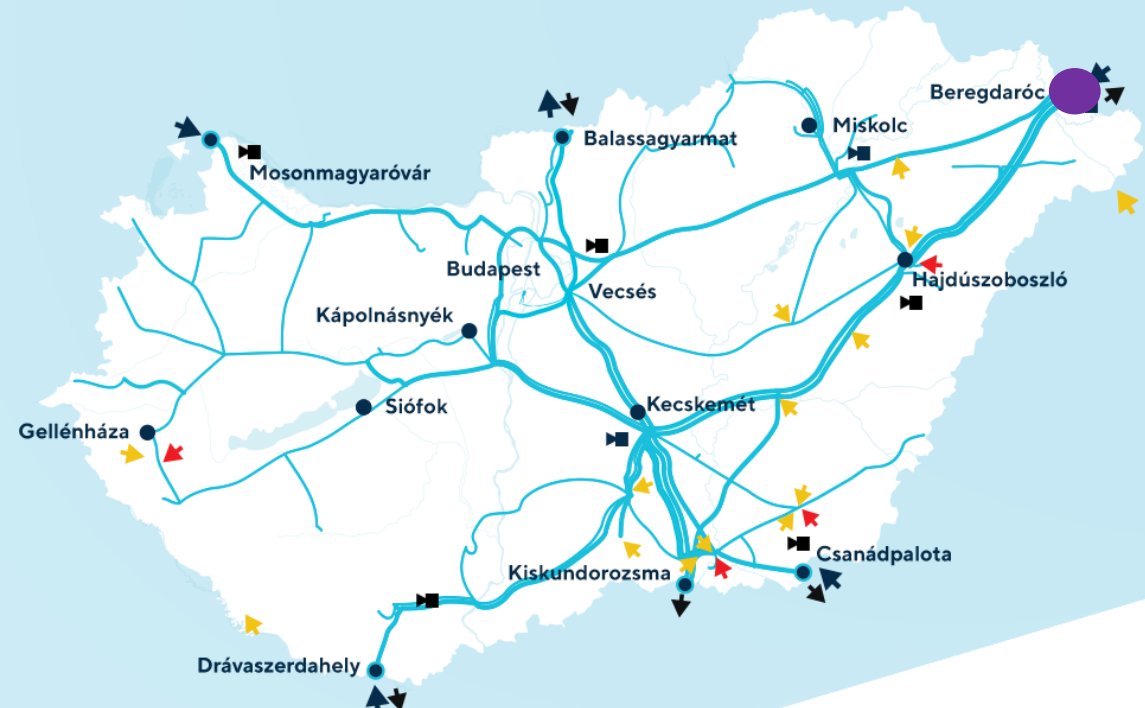
17

PROJECT DESCRIPTION

Ensuring firm capacity from Hungary to Ukraine

- The project ensures 800,000 cm/h firm capacity towards Ukraine.
- The project: 
 - Construction of a metering station in Beregdaróc suitable for settlement measurement in accordance with international conditions, which is connected to the DN1400 line.
- Expected date of commissioning: within 24 months after the final investment decision.

PROJECT






Conditional project to be developed in 4th – 10th years I.

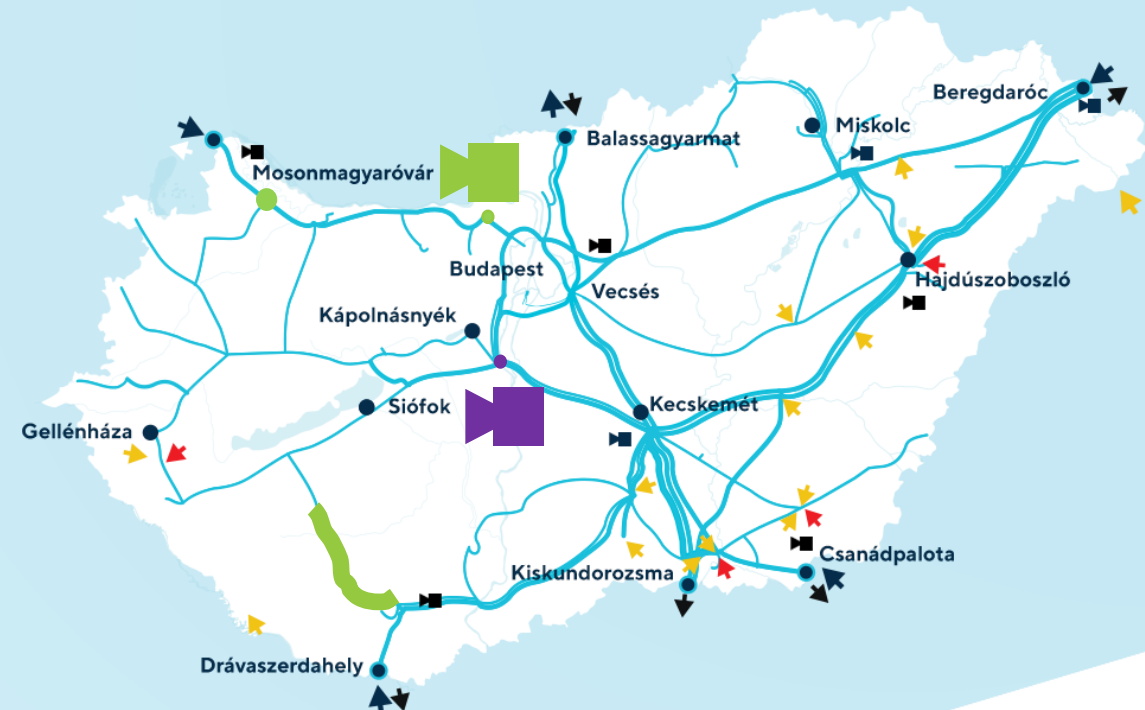
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PROJECT DESCRIPTION

Ensuring capacity demands in direction HU>AT

- The project ensures transmission in the direction of HU>AT.
- Previously examined projects:
 - Variant I.: 0.9 bcm/y (100,000 cm/h): 
 - Variant II.: 1.1 bcm/y (120,000 cm/h):  + 
- FGSZ Ltd. and Gas Connect Austria are launching a new investigation as follows:
 - If market participants do not submit non-binding capacity demands, than transmission system operators will prepare new technical solutions and project proposals for the capacity demands determined based on the non-binding capacity demand surveys of 2019.
 - If market participants submit new non-binding capacity requirements during 2021, transmission system operators will, where possible, seek to address the new capacity demands by further developing those technical solutions and project proposals.
 - Expected date of commissioning: to be determined.

PROJECT






Conditional project to be developed in 4th – 10th years II.

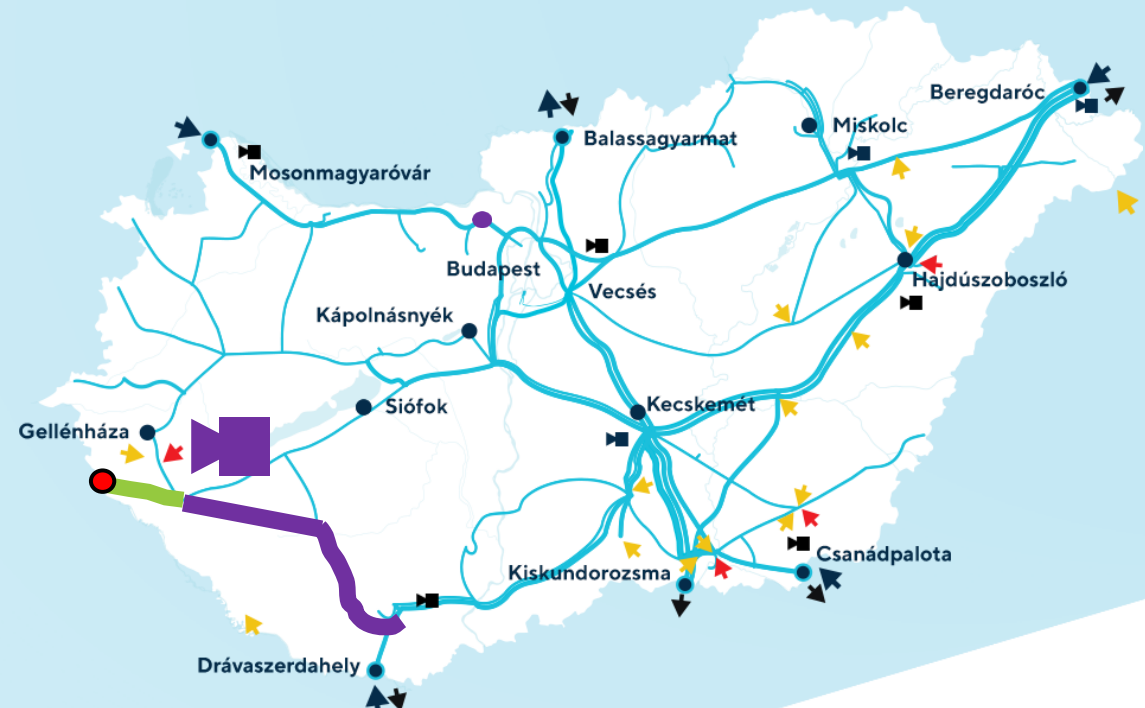
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PROJECT DESCRIPTION

Slovenian-Hungarian interconnection pipeline

- The project ensures HU-SI bidirectional deliveries.
- Projects (*the commonly agreed technical content is currently being consulted with the related TSO, so the required projects may change*):
 - Variant 1: Capacity HU>SI and SI>HU direction 20,000 cm/h; border pressure HU>SI 28 bar SI>HU 35 bar: SI/HU border-Toronyiszentmiklós-Nagykanizsa 41 km, DN600, PN75; Toronyiszentmiklós measuring station; 
 - Variant 2: Capacity HU>SI 190,000 cm/h, SI>HU direction 50,000 cm/h; border pressure HU>SI 64 bar SI>HU 35 bar: Variant 1. + new Nagykanizsa C.S. + Nagykanizsa-Kaposvár-Kozármisleny 158km, DN600, PN75 pipeline; 
 - Variant 3: Capacity HU>SI 190,000 cm/h, SI>HU direction 50,000 cm/h; border pressure HU>SI 45 bar SI>HU 45 bar: Variant 1. + new Nagykanizsa C.S. + Nagykanizsa-Kaposvár-Kozármisleny 158km, DN600, PN75 pipeline; 
- Expected date of commissioning: Variant 1: 1 October 2024.; Variant 2: 1 October 2025.; Variant 3: 1 October 2029.

PROJECT



Conditional project to be developed in the 4th – 10th years III.

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PROJECT DESCRIPTION

Increasing HU/SK capacity

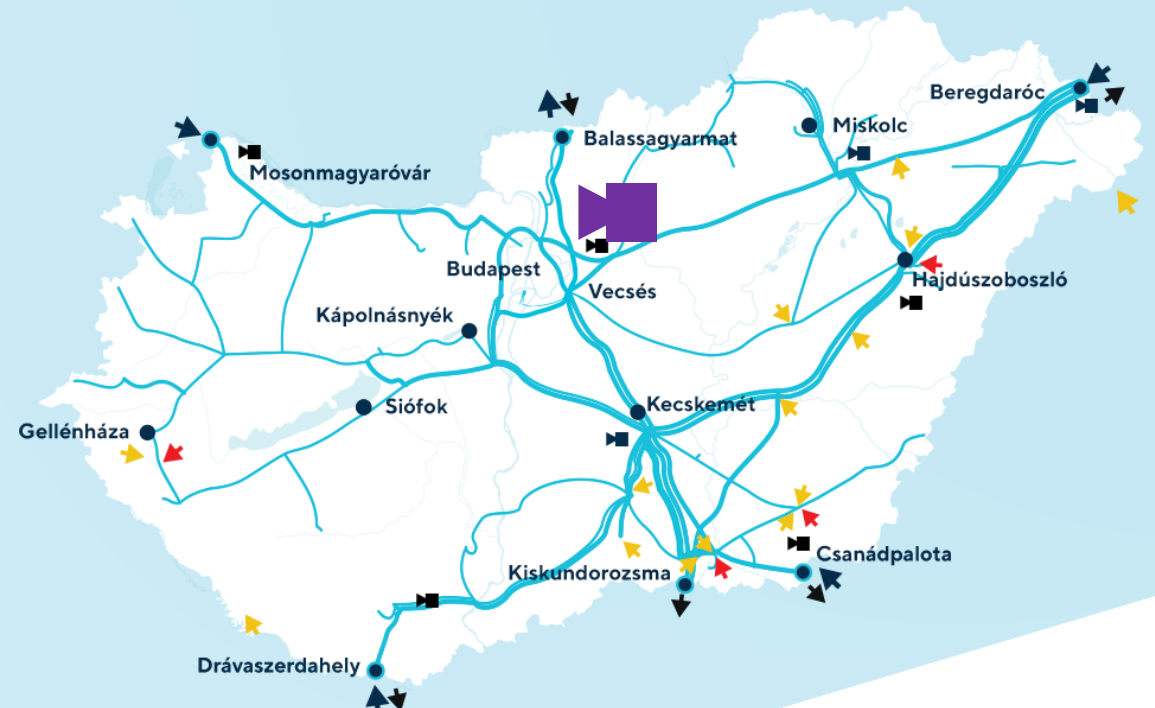
Increasing capacity in both directions up to 600,000 cm/h.

Expansion of Szada compressor station

If in the framework of the non-binding capacity demand survey launched in July 2021, there will be a need to increase the capacity of the HUSK interconnection point again; then the following developments are needed in order to ensure the compression needs at Szada compressor station.

- Projects:
 - Expansion of CS Szada with a 2x8 MW compressor + modification of existing units.
- Expected date of commissioning: to be determined.

PROJECT



Conditional project to be developed in 4th – 10th years IV.

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PROJECT DESCRIPTION

Expansion of Csanádpalota compressor station and developments of the measuring station

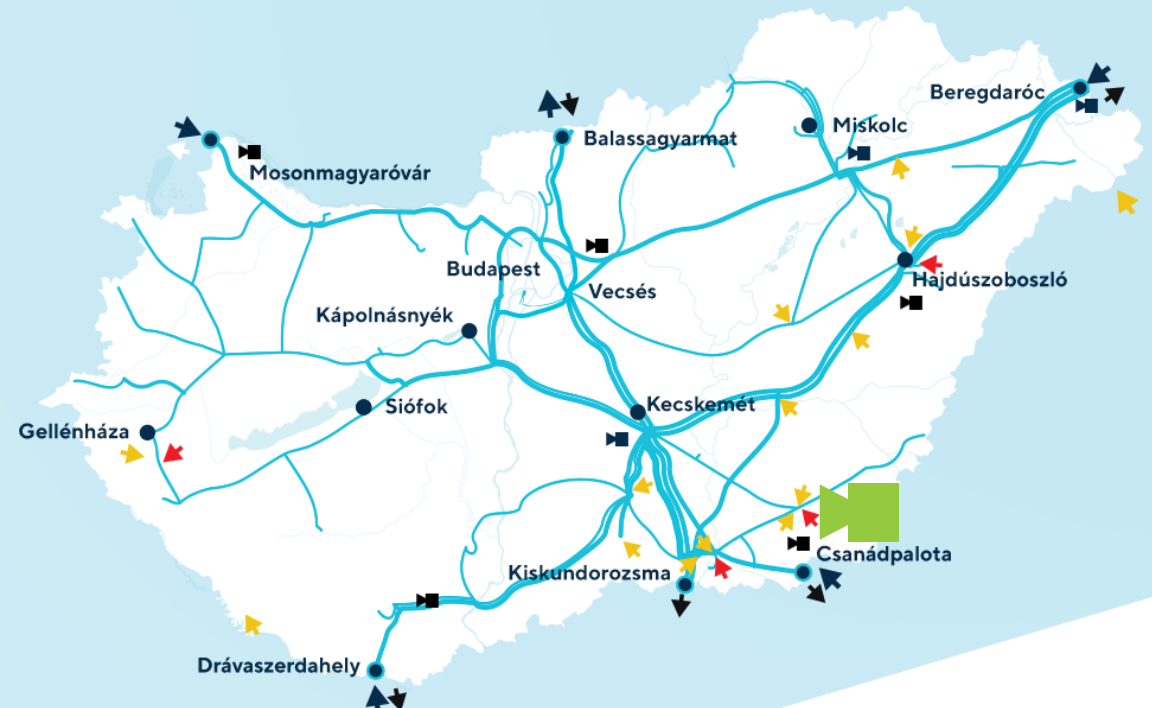
If in the framework of the non-binding capacity demand survey launched in July 2021, there will be a need to increase the capacity of the ROHU interconnection point again, then it will be necessary to expand the two units currently being built-in at Csanádpalota with an additional unit in order to ensure the compression needs at Csanádpalota compressor station, and it is also necessary to enhance the measuring station in accordance with the transmission demands.

Current elements of the projects:



- Expansion of CS Csanádpalota with a 1 x 4.5 MW unit;
- Modification of Csanádpalota measuring station.

PROJECT



Conditional project to be developed in the 4th – 10th years V.

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PROJECT DESCRIPTION

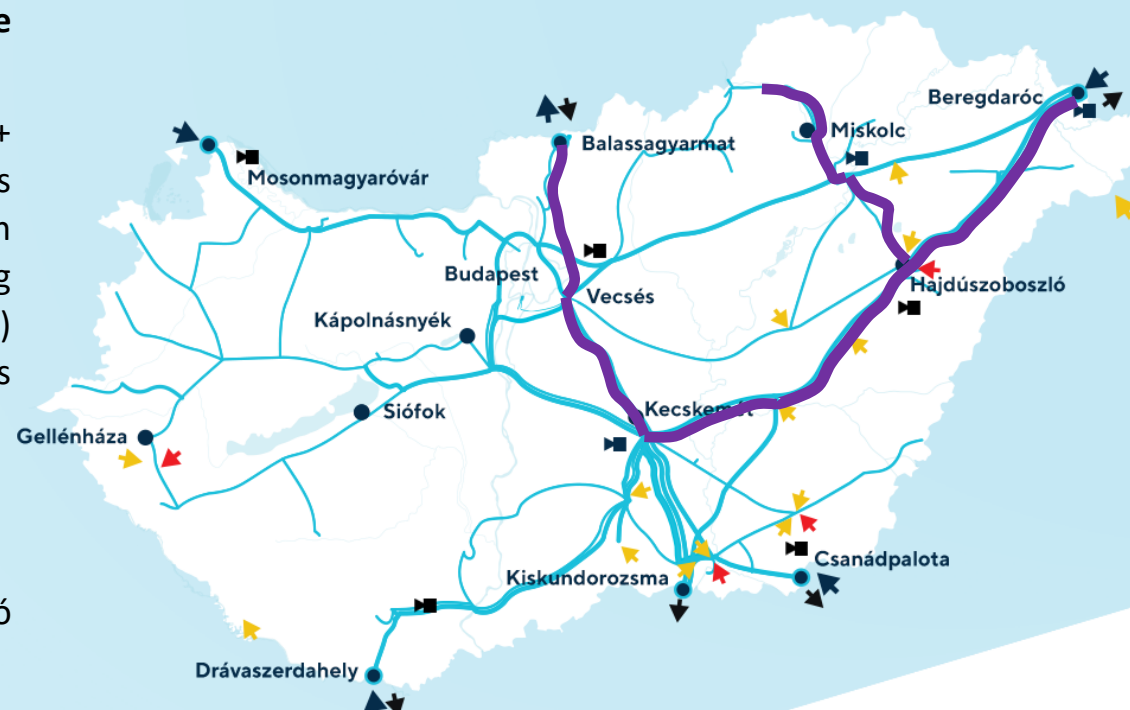
Connecting FGSZ's system to the European Hydrogen Backbone, preparing the provision of the expected transport demand of the domestic hydrogen producers and hydrogen users

According to the hydrogen strategy, first the presence of natural gas + hydrogen mixtures can be forecasted on the existing natural gas transmission system, then the presence of pure hydrogen transmission lines can be expected by modifying the existing pipelines and building new ones according to the domestic and transit (import/export) hydrogen consumption needs and the development of the supply needs of hydrogen producers.

Project: investigating the modification of the following pipelines

- UA/HU border-Beregdaróc DN800; Beregdaróc-Hajdúszoboszló DN800,
- Hajdúszoboszló-Endrőd DN800; Endrőd-Városföld DN800/DN600,
- Városföld-Vecsés DN700/DN600; Vecsés-HU/SK border DN800,
- Hajdúszoboszló-Nemesbikk DN600,
- Nemesbikk-Kistokaj-Kazincbarcika DN400/DN300.

PROJECT



Conditional project to be developed in the 4th – 10th years VI.

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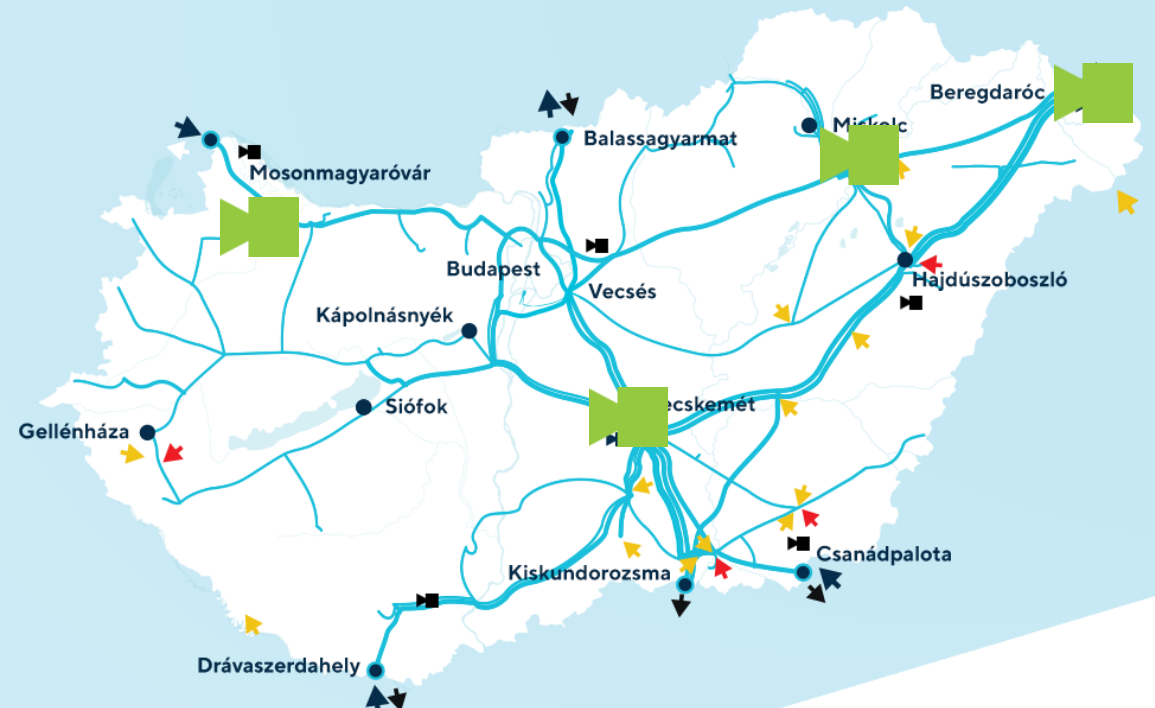
PROJECT DESCRIPTION

Development of FGSZ gas-turbine-driven compressors with electric-driven compressors or complete machine replacement.

In the framework of this project, FGSZ is currently investigating for which gas-turbine-powered compressors the development could be implemented; some of the units of the following compressor stations have emerged as opportunities

- Mosonmagyaróvár
- Városföld
- Nemesbikk
- Beregdaróc


PROJECT



Projects analysed, but proposed not to be developed I.

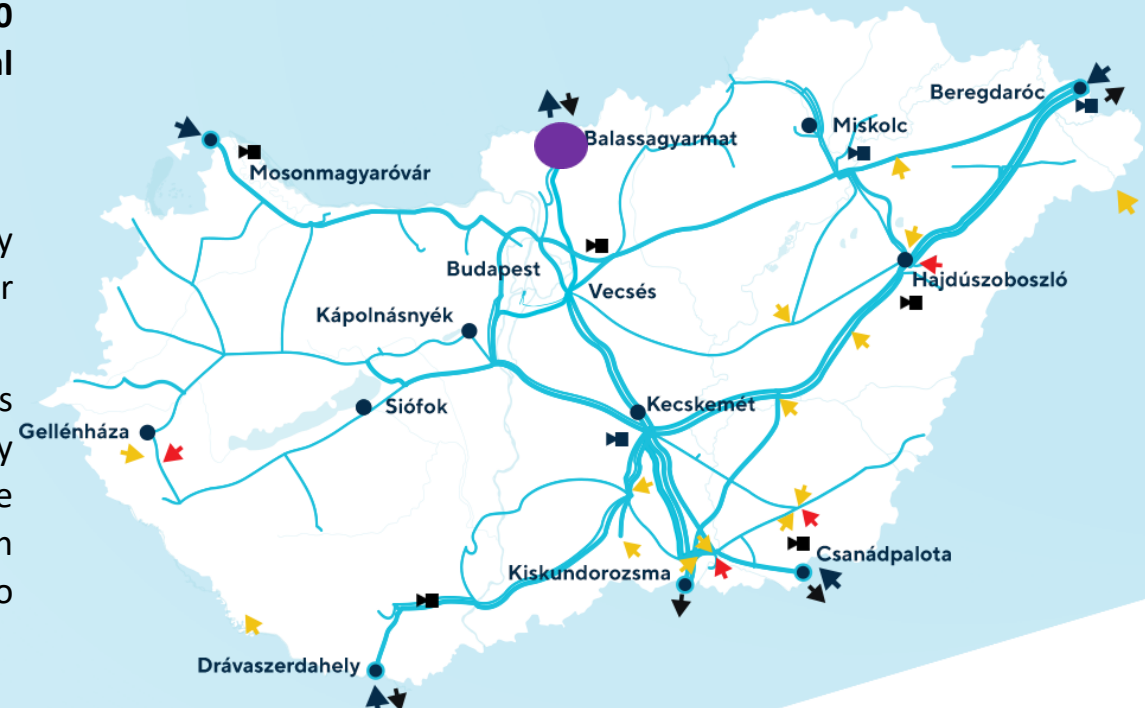
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PROJECT DESCRIPTION

Expansion of the capacity of Balassagyarmat measuring station, increasing the capacity in the direction of SK>HU up to 800,000 cm/h, and development of Gödöllő junction point with technological measuring: 

- Transits through Ukraine did not cease completely after 1 January 2020, as Ukrainian and Russian parties signed a new 5-year agreement at the end of 2019.
- The projects are currently not recommended for implementation (as a result of the reconstruction of the measuring equipment currently installed at the Balassagyarmat measuring station, after the installation of the new metering equipment, the measuring station will be able to authentically measure the delivered quantity up to 800,000 cm/h in the direction SK>HU, thus ensuring delivery).

PROJECT



Projects analysed, but proposed not to be developed II.

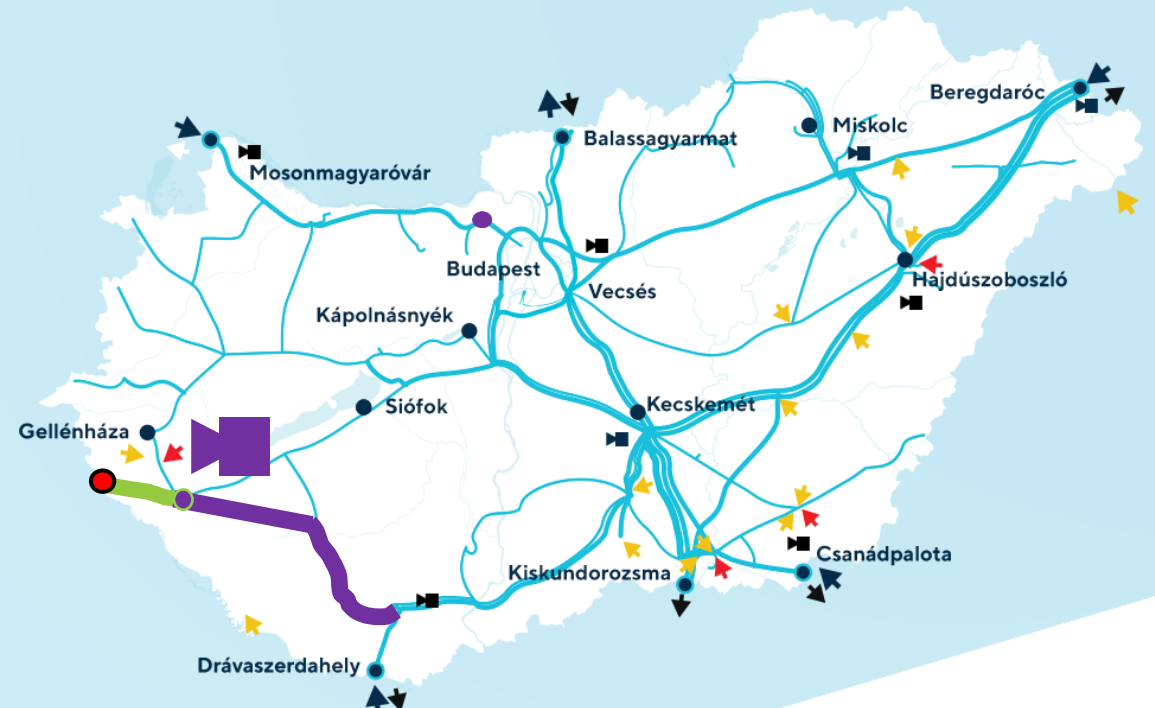
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PROJECT DESCRIPTION

Slovenian-Hungarian interconnection pipeline +

The feasibility of the Slovenian-Hungarian interconnector was tested at 5 different capacity levels (20,000/50,000/190,000/230,000/362,000 cm/h), of which 50,000; 230,000 and 362,000 cm/h versions are not recommended for implementation. Given that the 50,000 cm/h version would require a compressor station in Nagykanizsa and Dorog as well, and the implementation of the 230,000 and 362,000 cm/h versions by Plinovodi is currently not supported because the Slovenian TSO would only be able to make the necessary improvements by 2029.

PROJECT



Projects analysed, but proposed not to be developed III.

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PROJECT DESCRIPTION

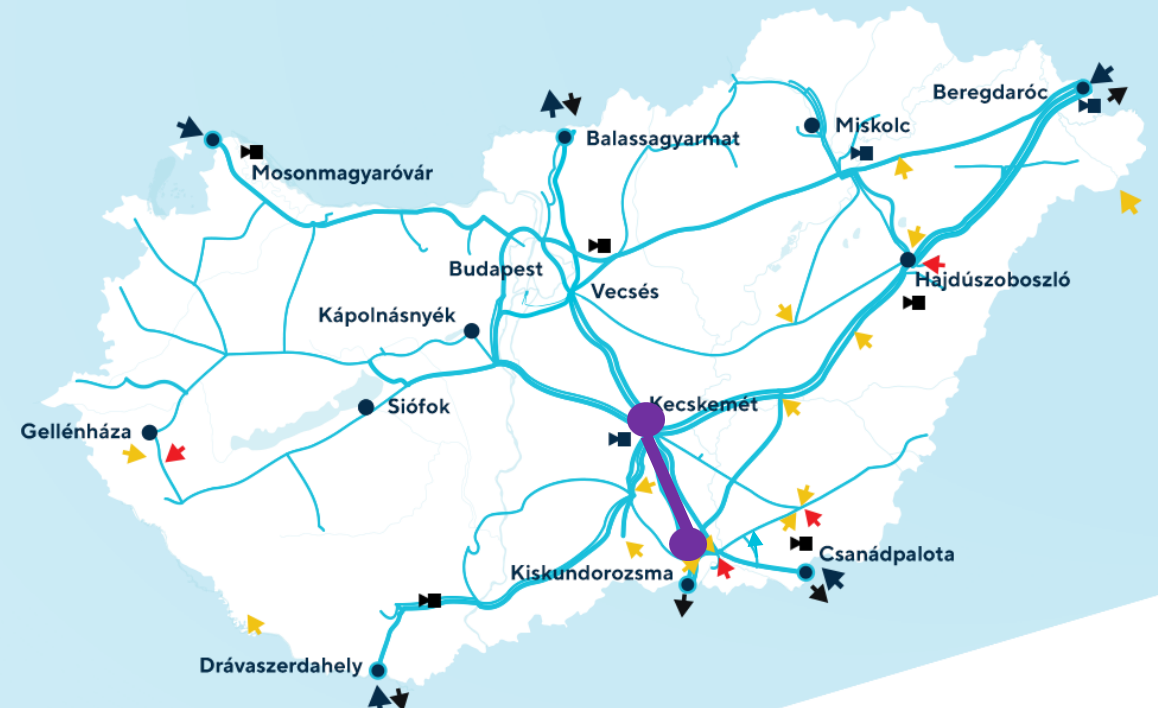
Increasing Serbian-Hungarian entry capacity up to 8.5 bcm/y (at 20 °C) max. capacity with pipeline development

The project allows the supply of natural gas from Serbia up to 8.5 bcm/y by managing internal bottlenecks.

The project:

- Kiskundorozsma measuring station + pipeline connections at Városhely;
- Kiskundorozsma-Városhely pipeline, 67 km, DN1000, PN75.

PROJECT




Projects analysed, but proposed not to be developed IV.

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PROJECT DESCRIPTION

EASTRING

The project enables the transmission in the direction of RO>HU>SK
(10-20-40 bcm/y).

- Project: 
 - RO/HU border - Csanádpalota - Városhőd - Vecsés - HU/SK border 282 km, DN1400, PN100 pipeline.
 - Exit capacity at Városhőd: 5 bcm/y, 600,000 cm/h.
- Expected commissioning date: to be defined later

PROJECT

