

# Argentina

# Energy Scenarios 2030

Undersecretariat of Energy Planning

December 2019



Secretaría de Gobierno de Energía  
Ministerio de Hacienda  
Presidencia de la Nación

The results of the exercises shown on this document are function of the combination of different assumptions in terms of demand, investment, prices and productivity.

These are estimates of what could happen based on these combinations of assumptions, taking into account average values of hydraulicity, power generation plant factors, temperature and historical behavior of the industrial and residential segments in reference to the evolution of other variables used for modeling.

Likewise, the editors emphasize that this exercise does not assign different probabilities of occurrence to the modeled scenarios, but rather presents the results impartially as an input for the decision-making in the public and private sectors.

Due to the dynamic nature of the energy sector, these scenarios are also dynamic. That is why, in successive iterations, their results can vary significantly in line with the evolution of the national and international context, economic development, international energy prices, the evolution of the Climate Change agreements or the occurrence of technological or geopolitical disruptive events.

This presentation summarizes the main inputs and results of the document *Energy Scenarios 2030*, 2019 edition, developed by the Undersecretariat of Energy Planning of Argentina. The full document is available in Spanish at:

<http://datos.minem.gob.ar/dataset/escenarios-energeticos>

## Current Policies

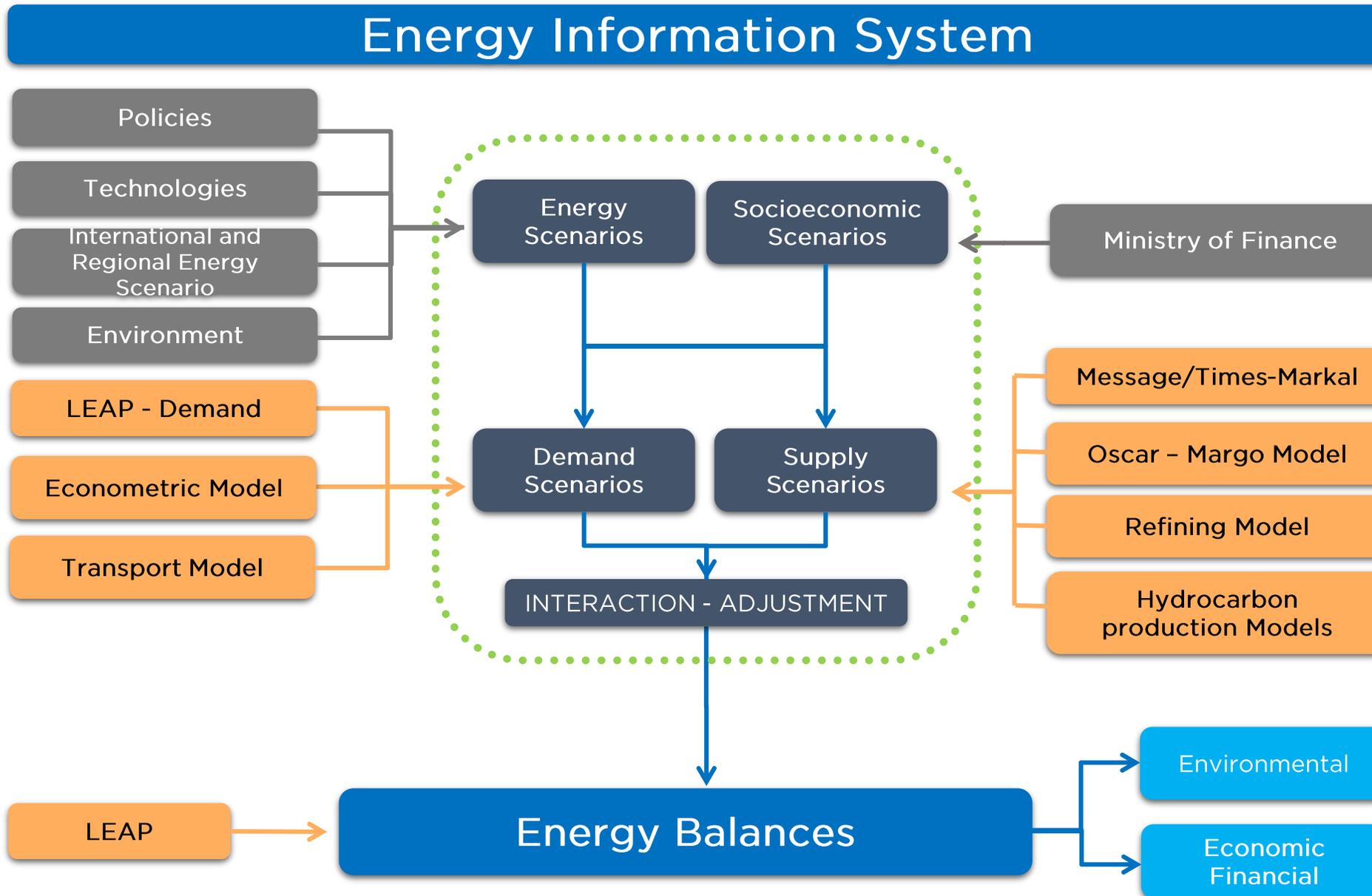
- ✓ Combinations of price and demand scenarios (trend and efficient).
- ✓ Compliance with the Renewable Energy Law in 2025, expanding to 25% RE in 2030, and incorporation of large hydro and nuclear projects.

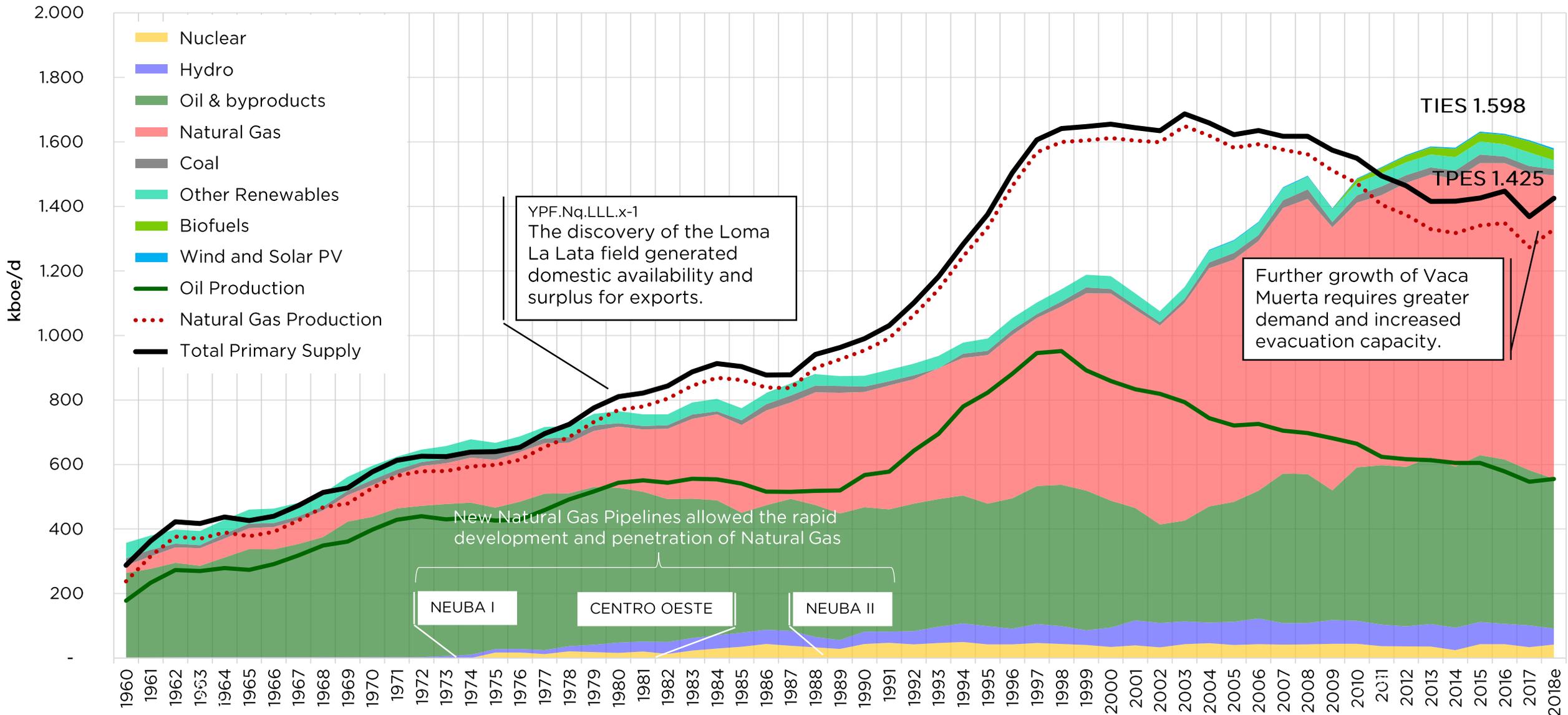
## Gasification

- ✓ High penetration of Natural Gas in transport.
- ✓ High use of Natural Gas as fuel in industry.
- ✓ New industrial developments due to more availability of Natural Gas at competitive prices (e.g. petrochemicals).

## Electrification

- ✓ Massive penetration of the electric mobility.
- ✓ Replacement of other oil fuels with electricity.
- ✓ More use of Natural Gas and Renewable Energy as sources for power generation.





Production measured by Total Primary Supply (TPES) using lines. Consumption measured by Total Internal Offer (TIO) using areas.  
Total Internal Supply (TIES) = TPES + secondary energy trade balance.

Sustainable Development Goals

Climate change - Paris Agreement

G20 Energy Transitions Working Group

Towards a Shared Vision of the Argentine Energy Transition  
towards 2050



## Population

- 2018: 44.5 M.
- 2030: 49.4 M.
- 1% i.a.



## GDP

- 2018: -2.5%.
- 2019: -2.5%.
- 2018-2030: cagr 2.78%.



## Households

- 2018: 14.1 M.
- 2030: 17.3 M.
- 1.7% i.a.



## Natural Gas Coverage

- 2030: 11.8 million homes, this represents 68% coverage.



## Renewable electricity target

- 2030: 25% of electricity demand and 1,000 MW of distributed generation.



## Vehicle fleet

- 2018: 13.9 M veh. 311 p/1000 habitants.
- 2030: 21.3 M veh. 431 p/1000 habitants.



## Energy Efficiency

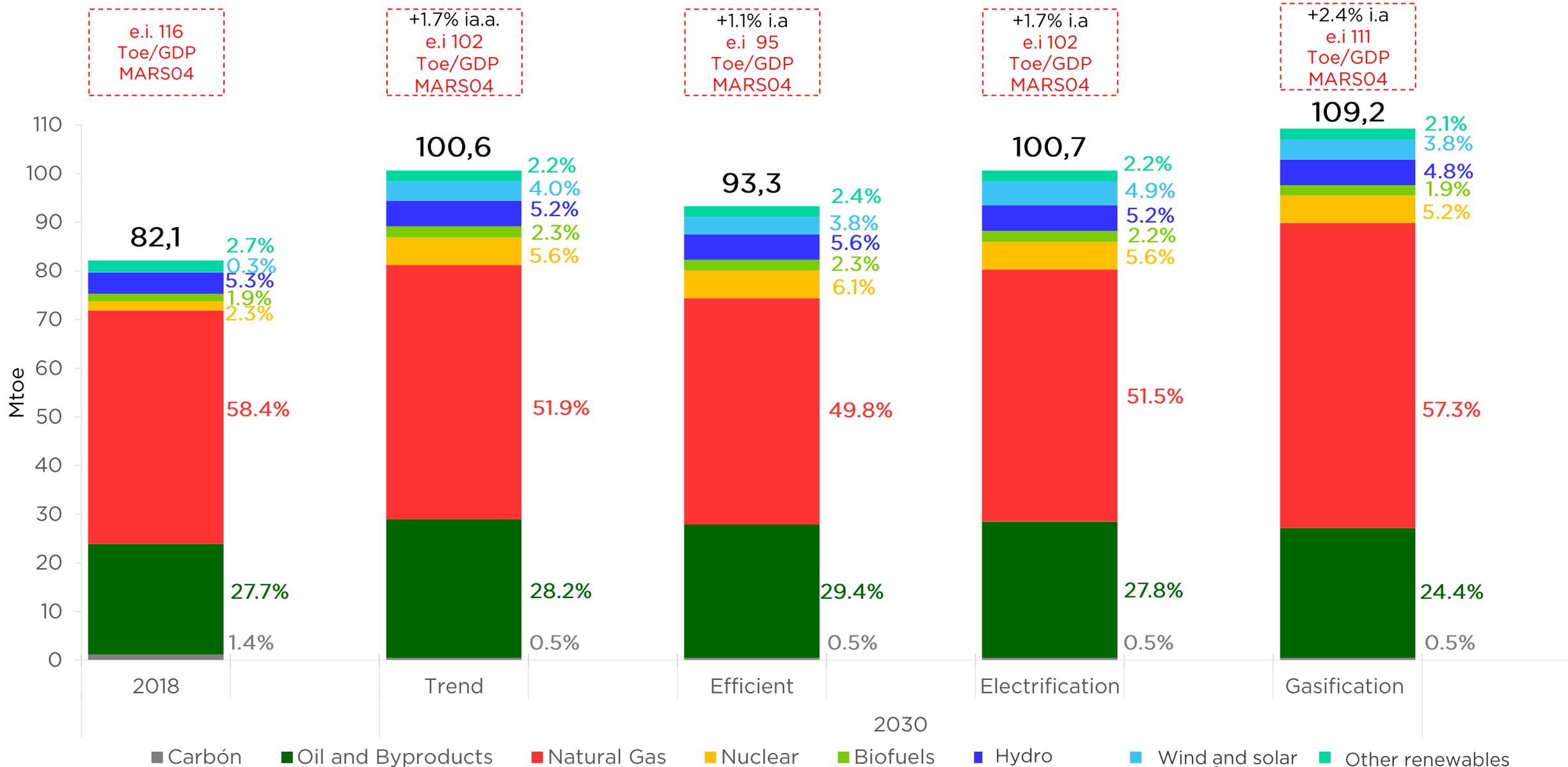
- 2030: 5.7 Mtoe (8.3%) saving on final demand.



## Emissions

- 2018: 178 MtCO<sub>2</sub>eq.
- 2030 (Efficient Scenario): 197 MtCO<sub>2</sub>e.

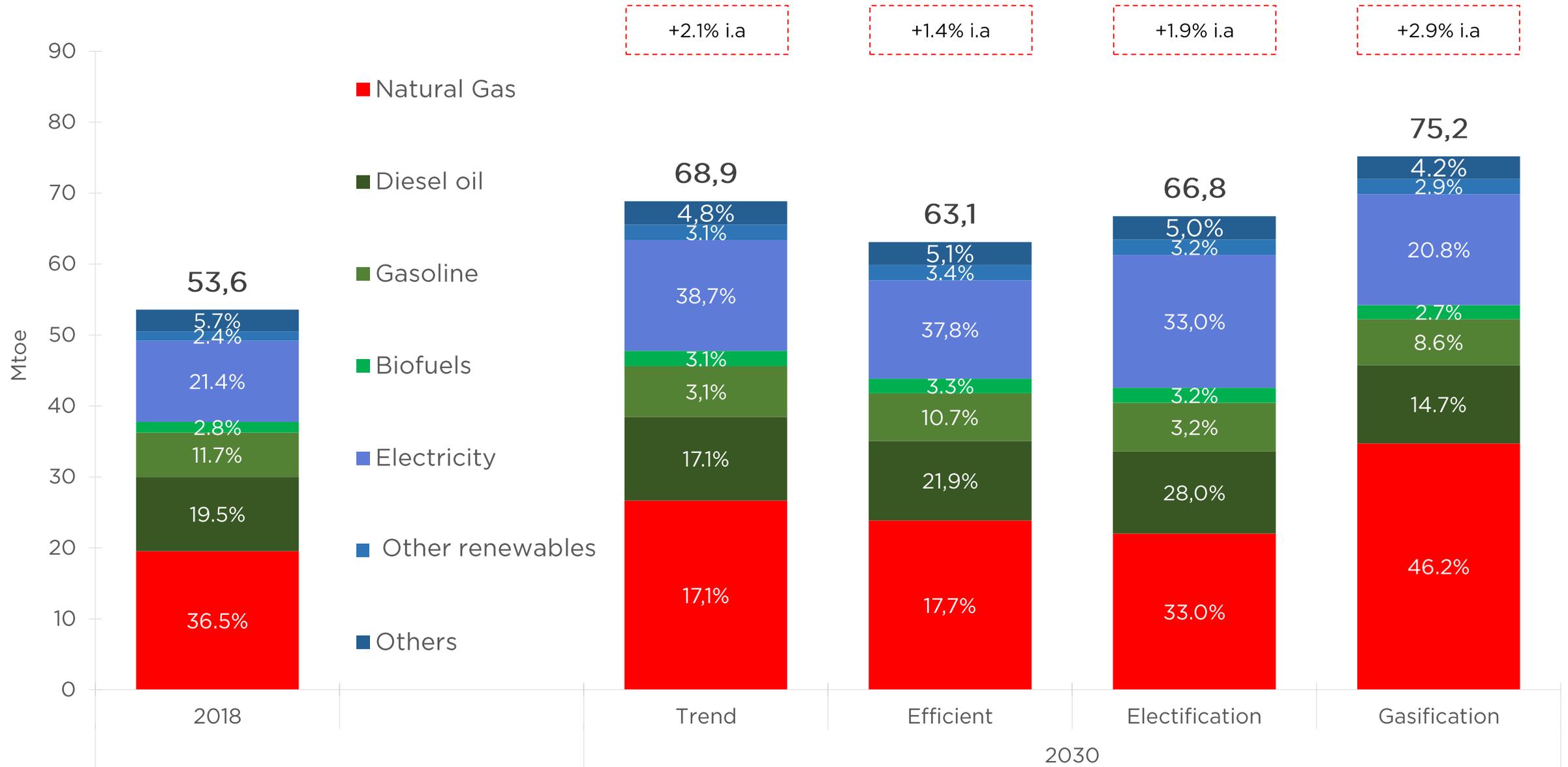
# Total Internal Energy Supply



\*TIES: Total Internal Energy Supply is the primary energy supply with the balance result of secondary.

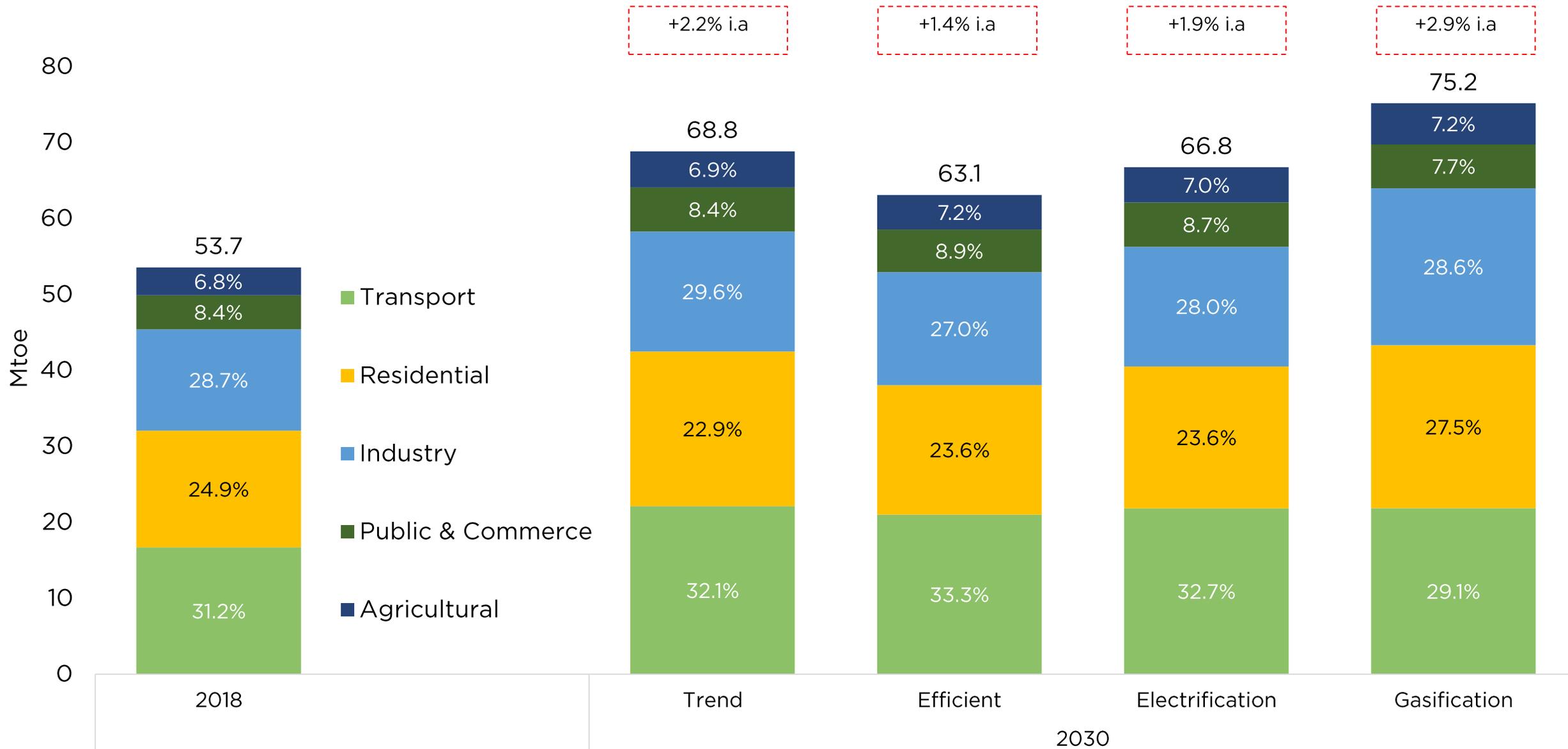
\*\* Other Renewables Energies includes firewood, bagasse and biomass.

# Final Consumption by Source



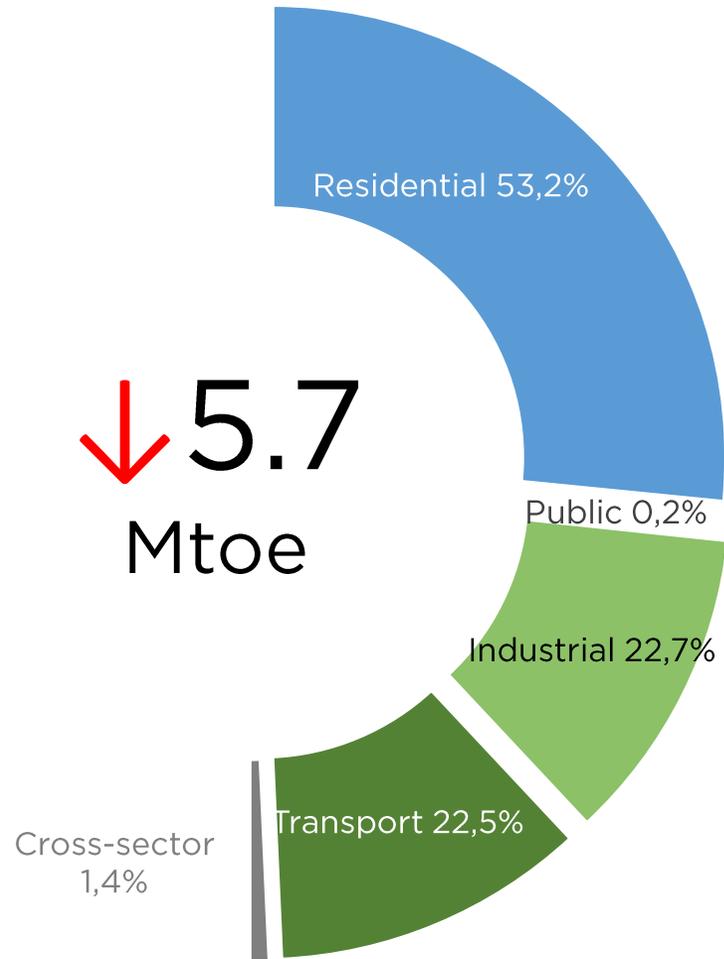
Note: total demand does not include non-energy consumption.

# Final Consumption by Sector



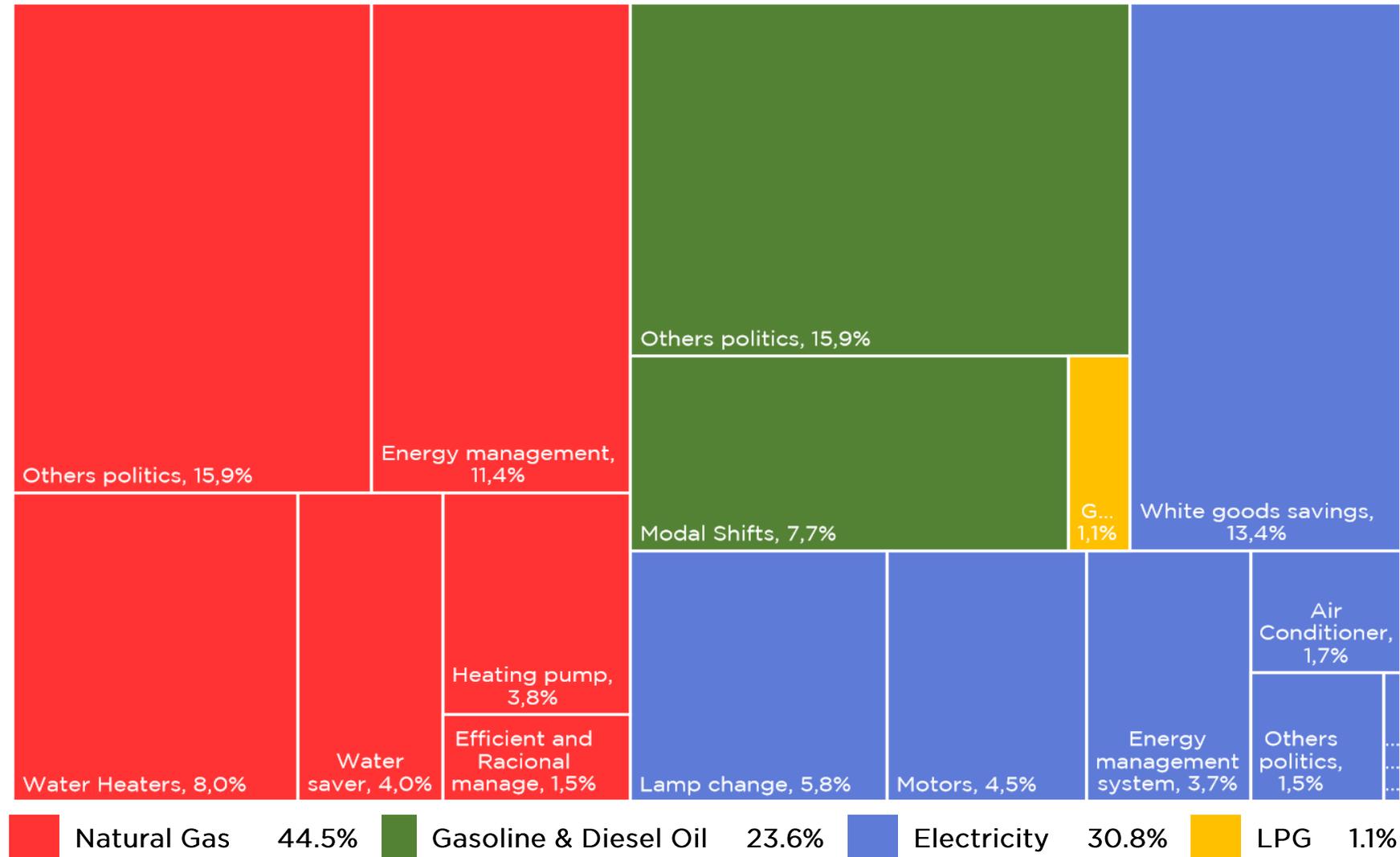
Note: total demand does not include non-energy consumption.

## Savings by Sector



8.3% of saving regards to Trend Scenario

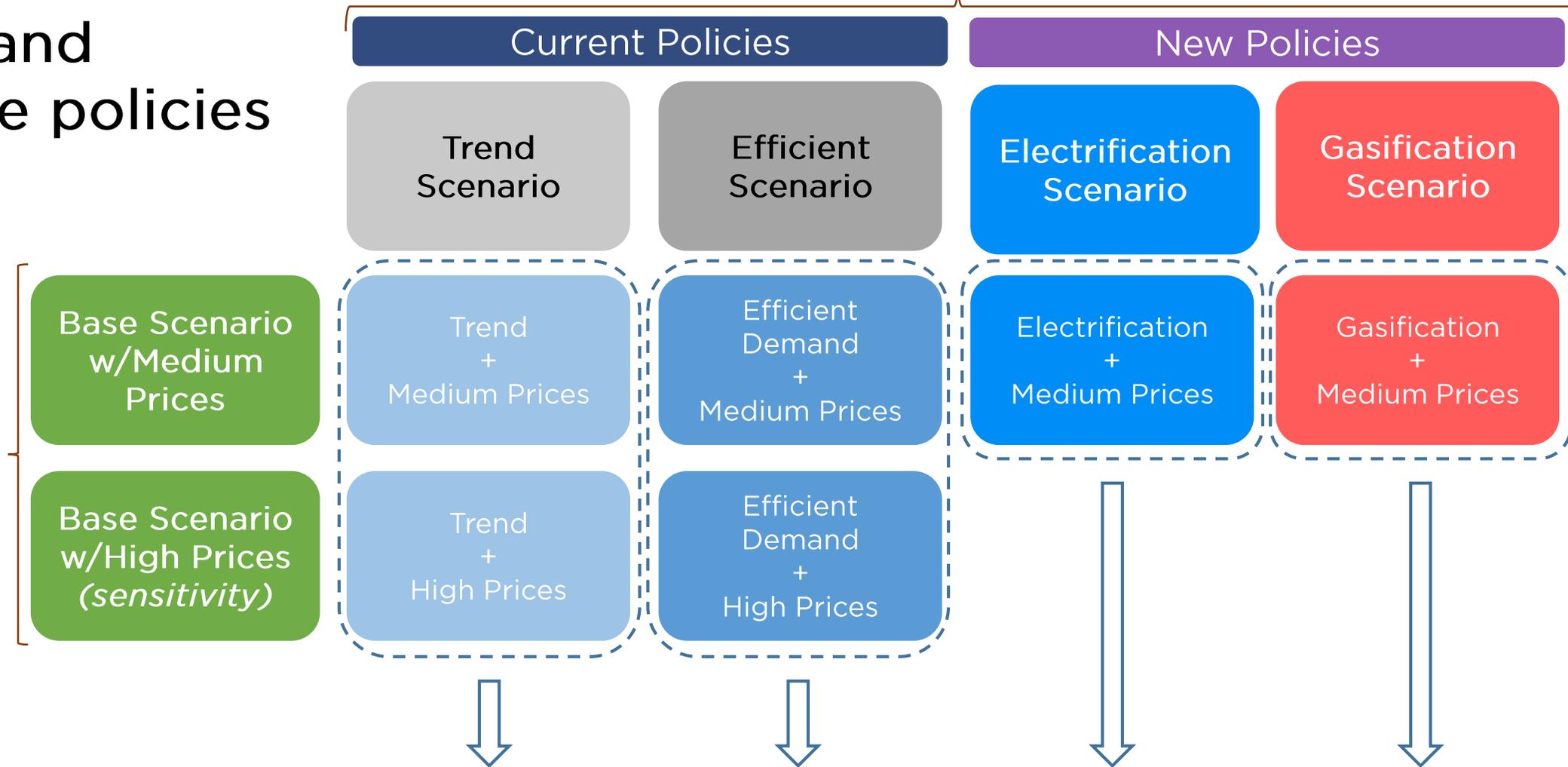
## Savings by Fuel



## Scenarios of existing and disruptive policies

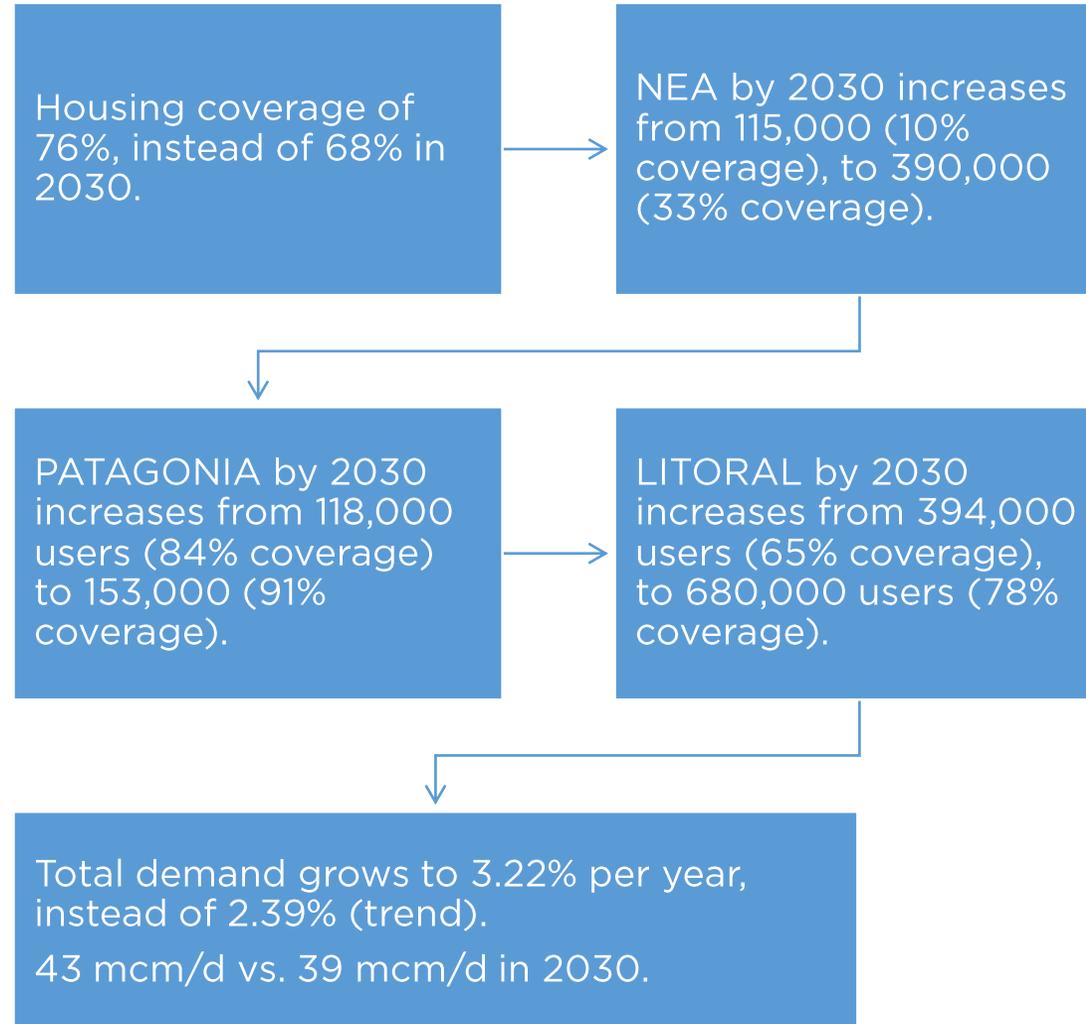
### 4 Demand Scenarios

Scenarios oil production and oil prices

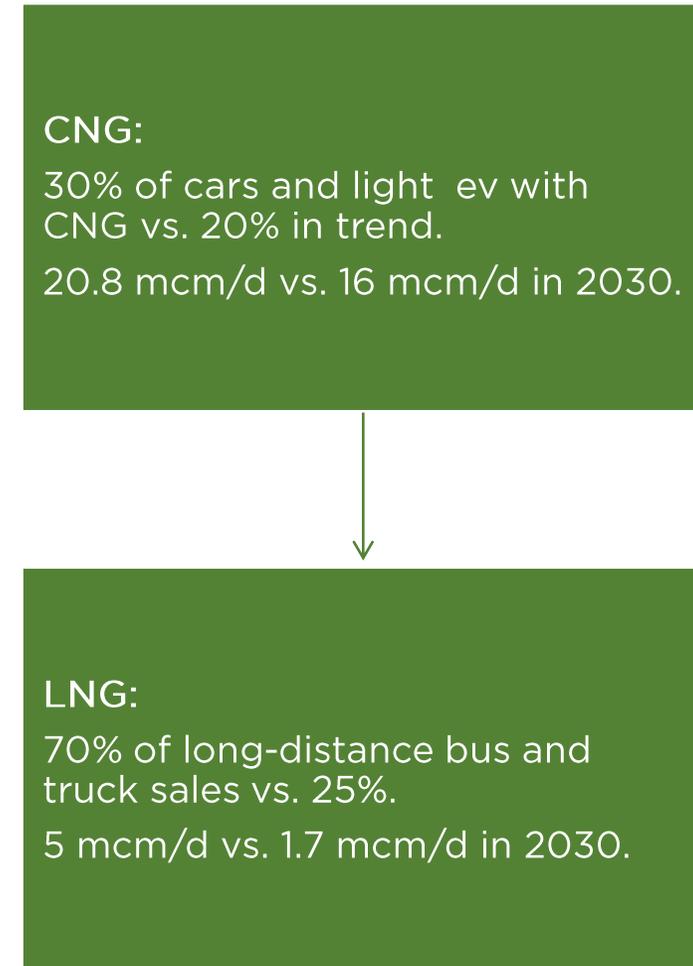


4 scenarios of Natural Gas production for each estimated demand.

## Residential

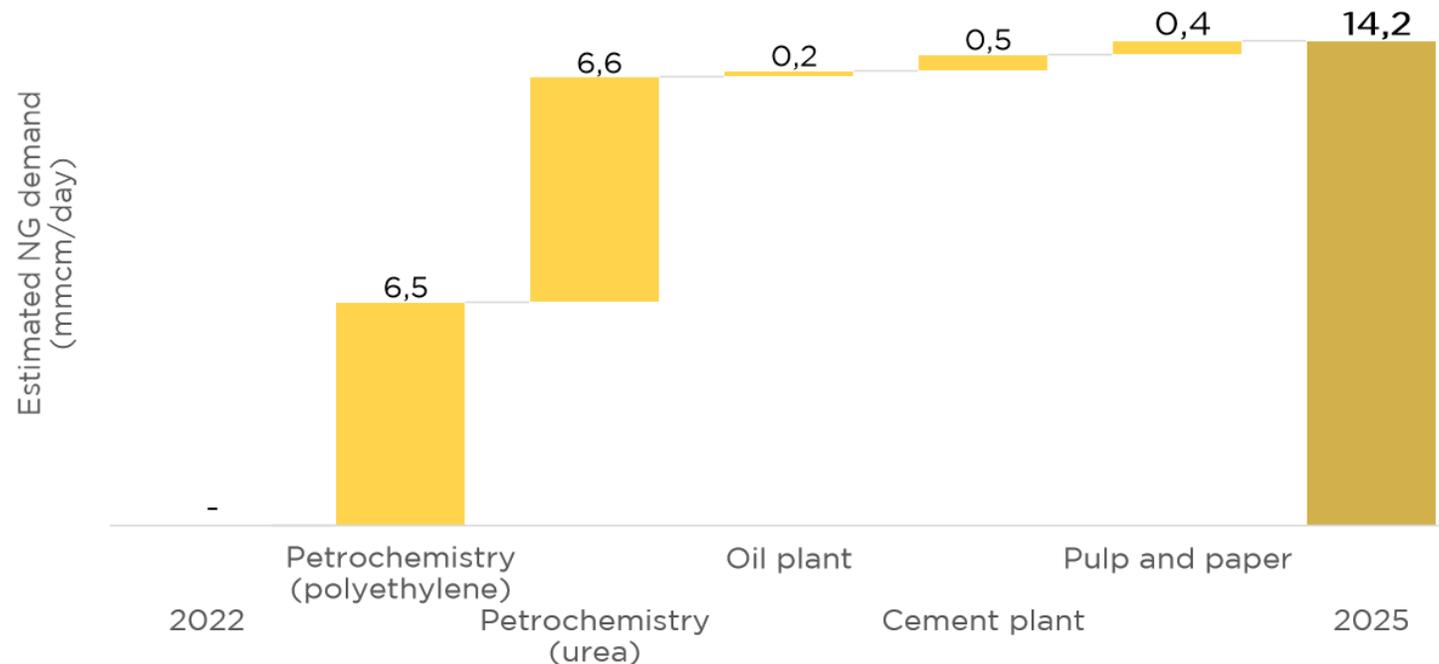


## Transport



## Industrial

- Incorporation of 9 natural gas industrialization projects for a total of 14.2 mcm / day (prepared jointly with the Ministry of Production and Labor)



- NEA Region:
  - With information of GN consumption by sector of activity 2015, the sectorial energy intensity of Argentina was obtained (GN / AV consumption).
  - This intensity was applied to the sectoral VAs of Chaco, Corrientes, Formosa. A GN consumption of 2.7 mcm / d was obtained.

## Residential

vs.

Replacement of 50% of the kitchen and electric water heaters park.

80% of electricity heater sales.

NG demand decreases to 2.37% per year, instead of increasing 2.36% (trend).  
22 mcm/d vs. 39 mcm/d in 2030.

Electric demand increases by 29.3 TWh.

## Transport

Electric cars: 30% of sales in 2030.

Decrease in CNG cars from 22.2% to 20.8% of the park.

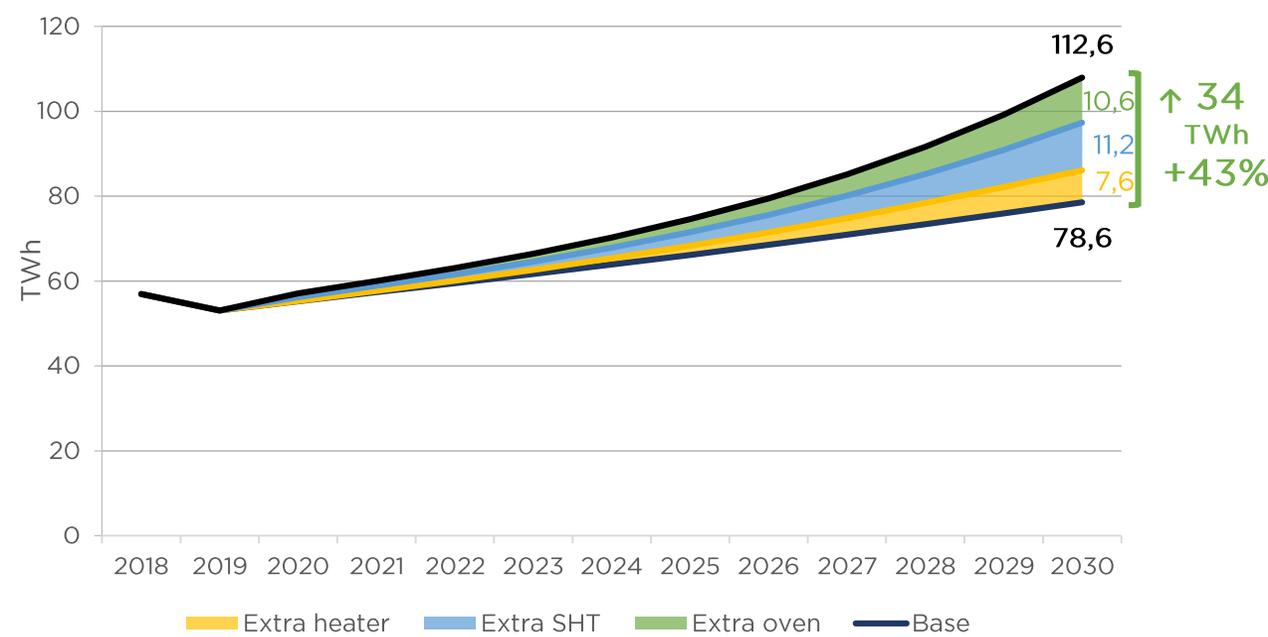
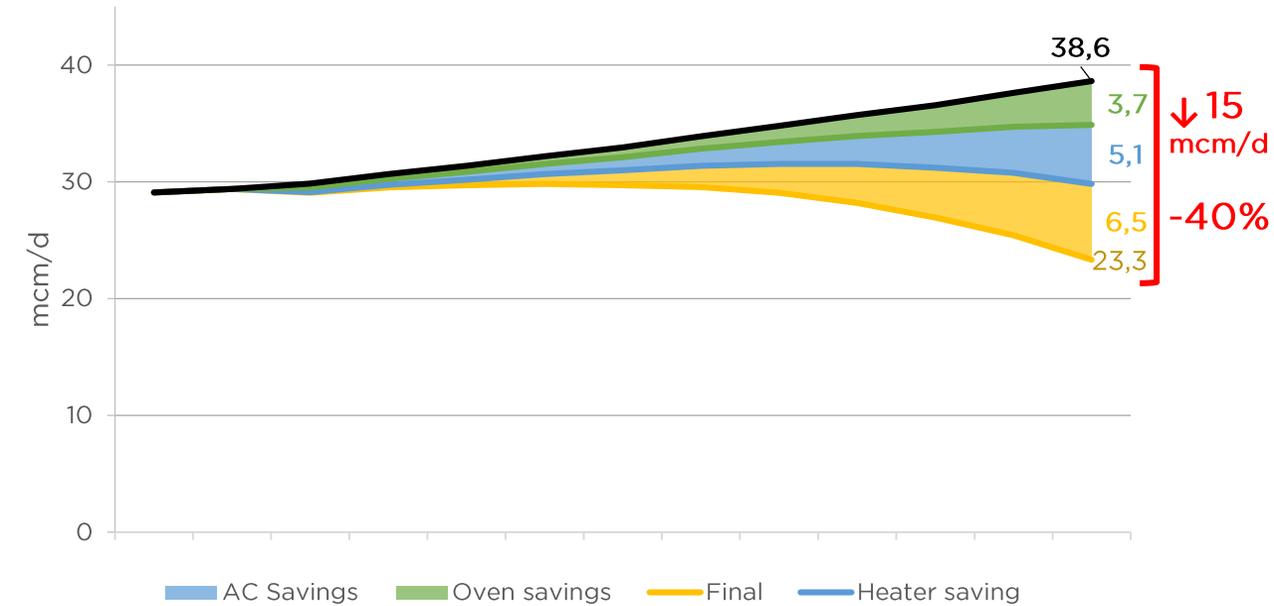
Electric buses: 50% of short-distance bus sales.

NG consumption: from 17.9 mcm / d to 16.9 mcm / d in 2030 (-6%)

Additional Total electricity demand: 1.7 TWh in 2030 (+ 150%).

**+31.1 TWh in total electricity demand (+ 16%)**

# Electrification in the Residential sector

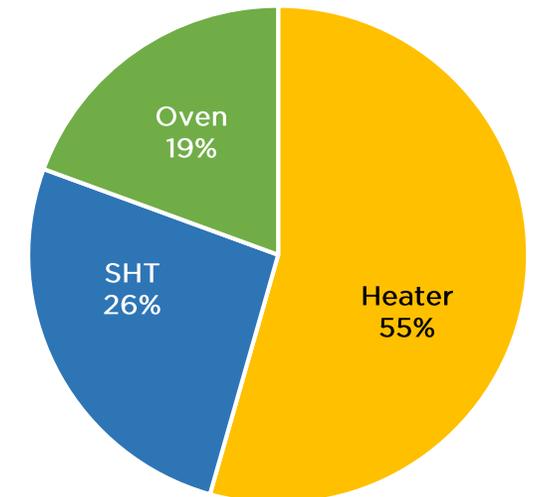


Appliances	Performance (Net Energy/ Net )
Natural Gas oven	0.50
Electric oven	0.70
Natural Gas water heater	0.80
Natural Gas thermo water heater	0.64
Electric thermo water heater	0.95
Natural Heater	0.65
Gas water heater	3.32
Electric heater	1.00

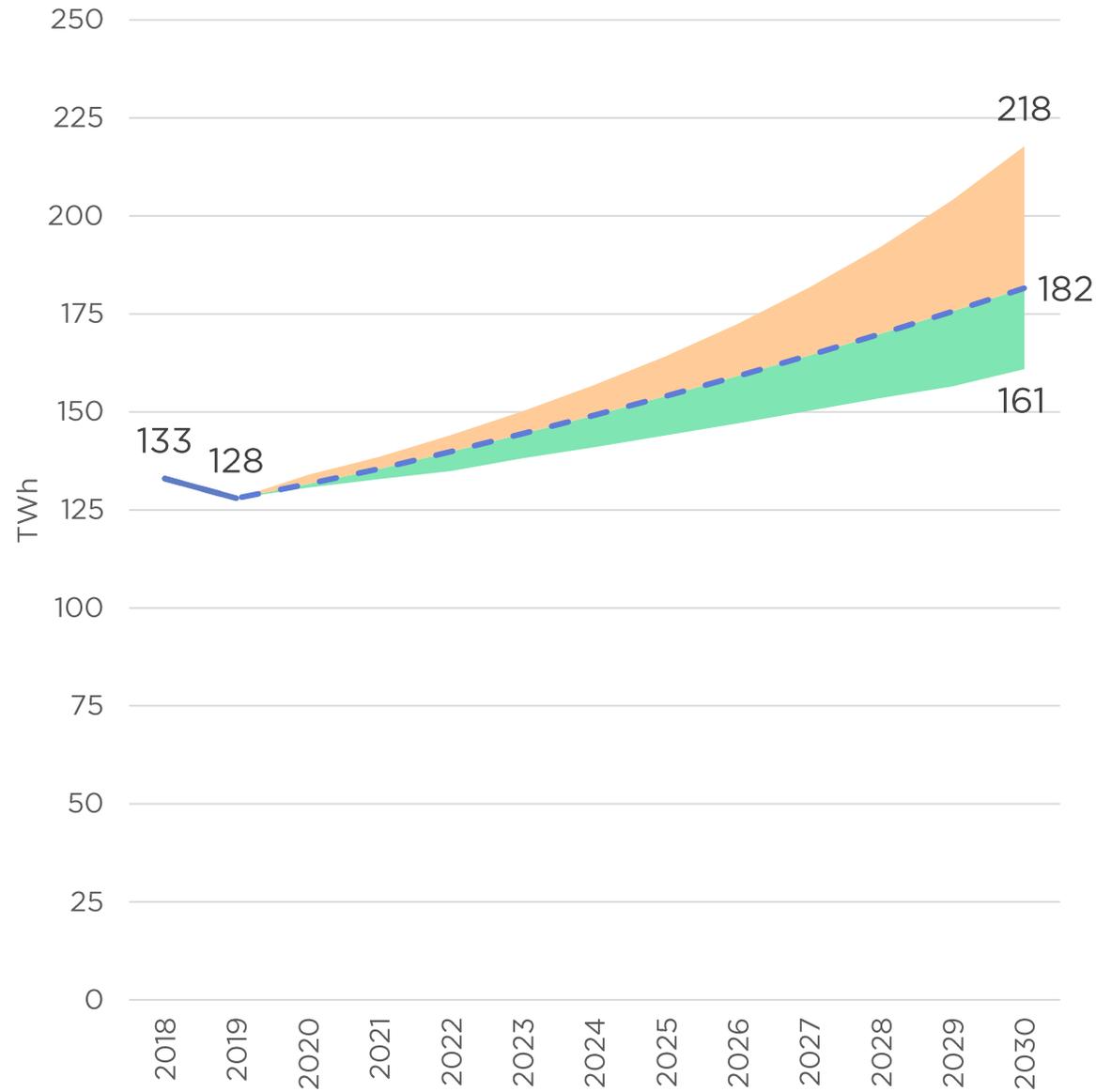
## In 2030:

- 80% of heater sales will be electric.
- Half of the kitchen and water heater park will be electric.

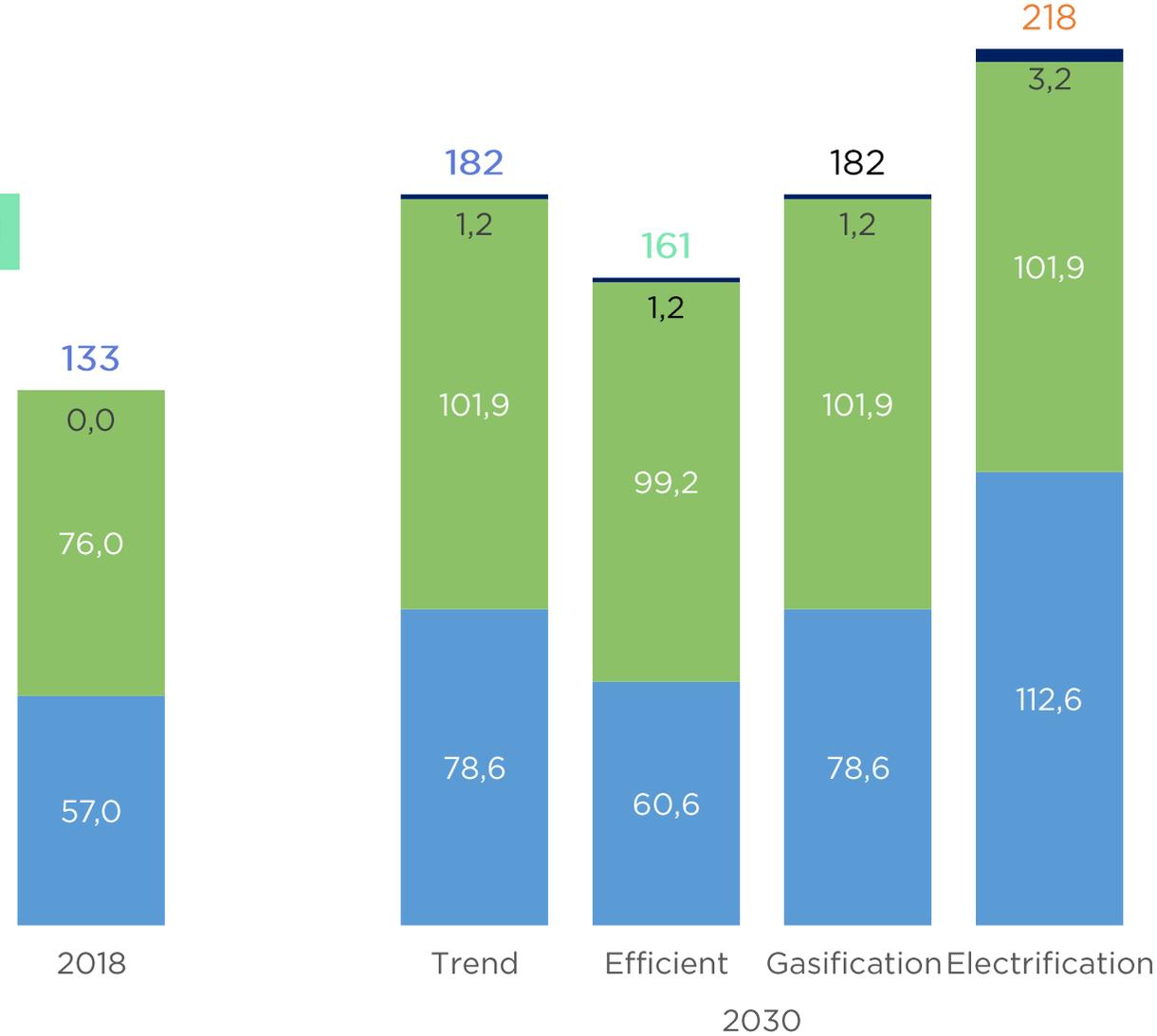
Current distribution of residential NG consumption



Notes: 1. A gas appliance was replaced by the electrical equivalent.  
2. In the case of heating, 70% was replaced by AA and 30% by electric heater.



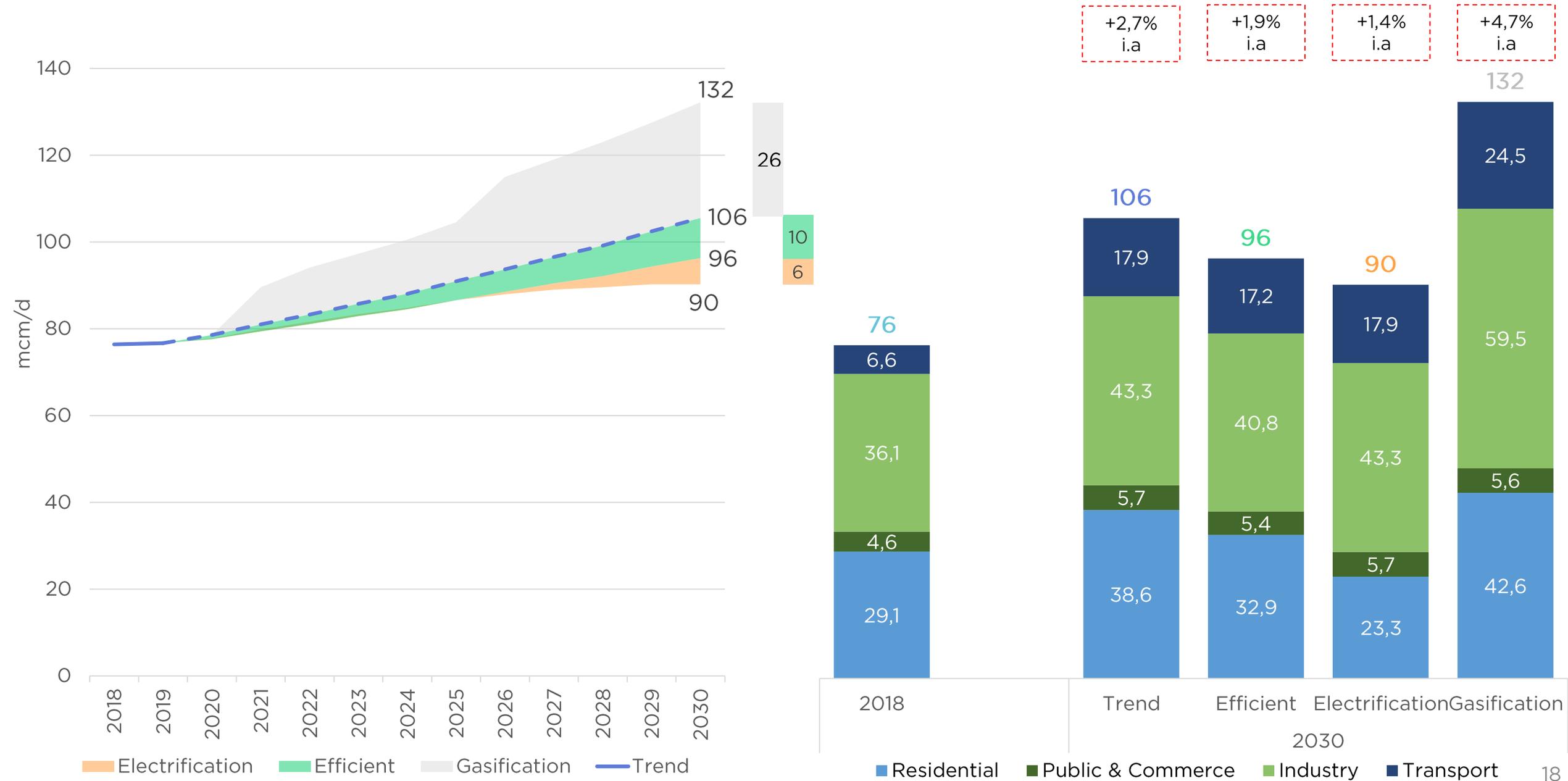
+2.6% i.a  
+1.6% i.a  
+2.6% i.a  
+4.2% i.a



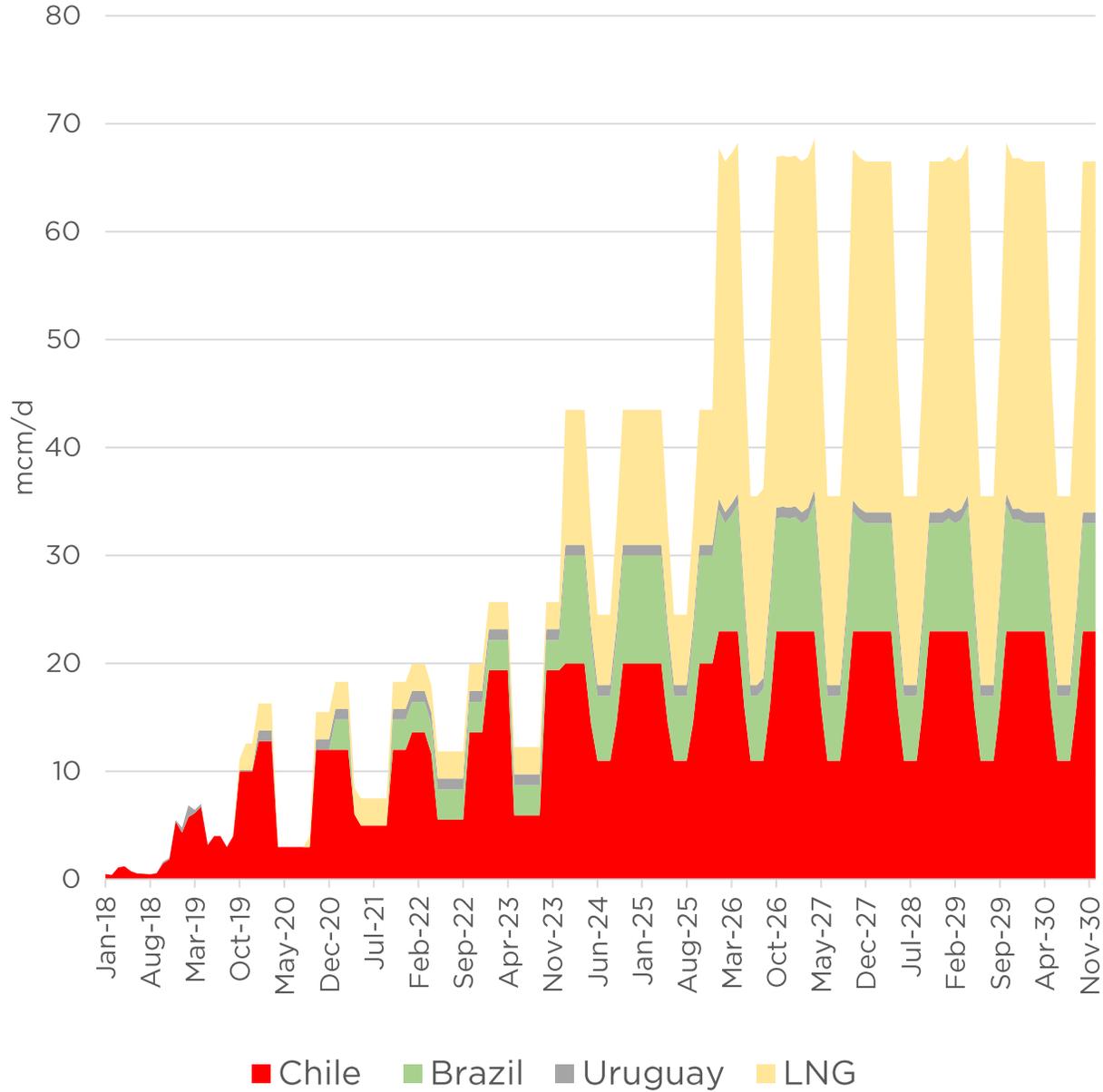
Efficient Electrification Trend & Gasification

Residential Commerce & Industry Electric Vehicles

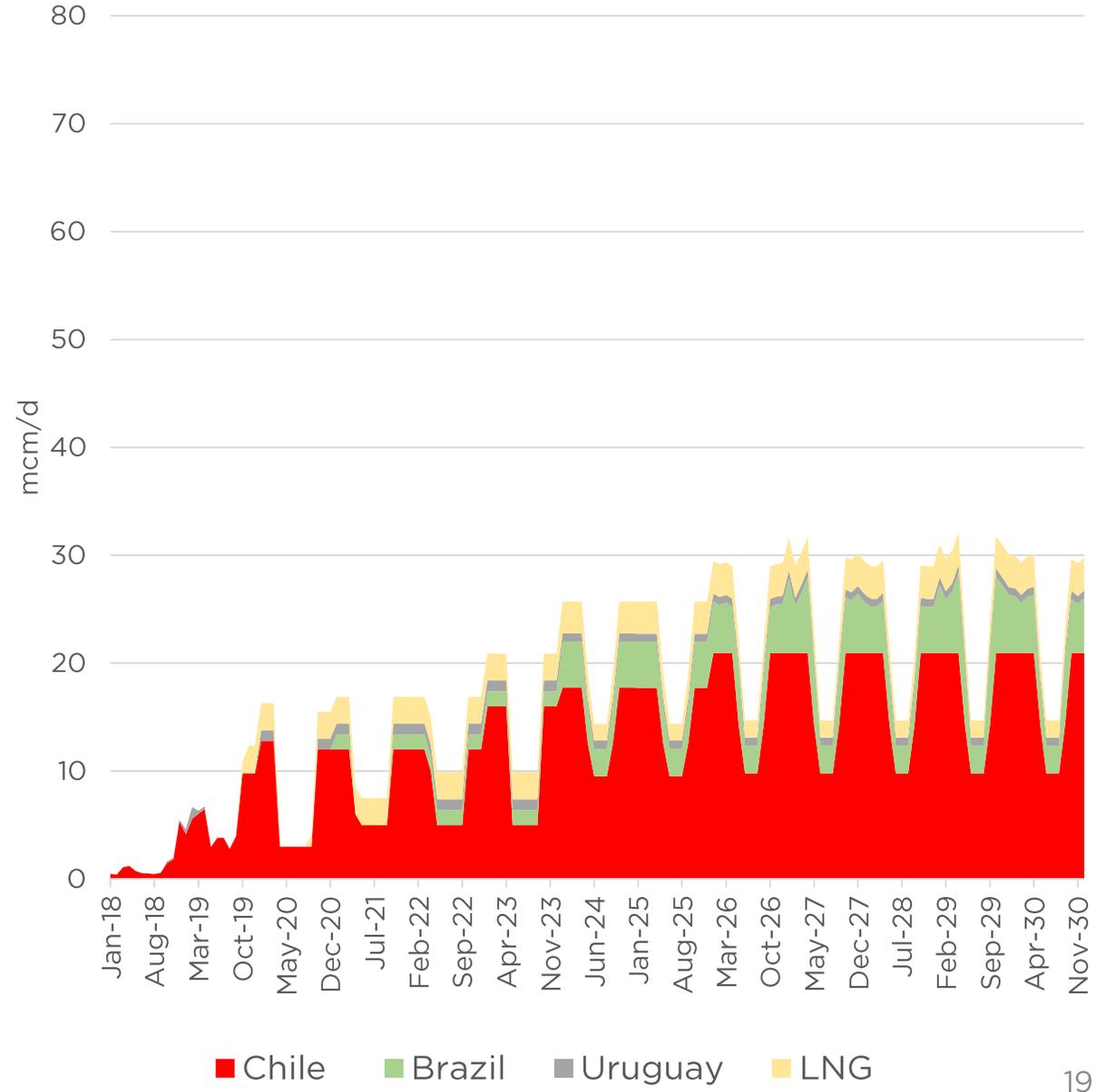
# Final Demand of Natural Gas (excluding power plants)

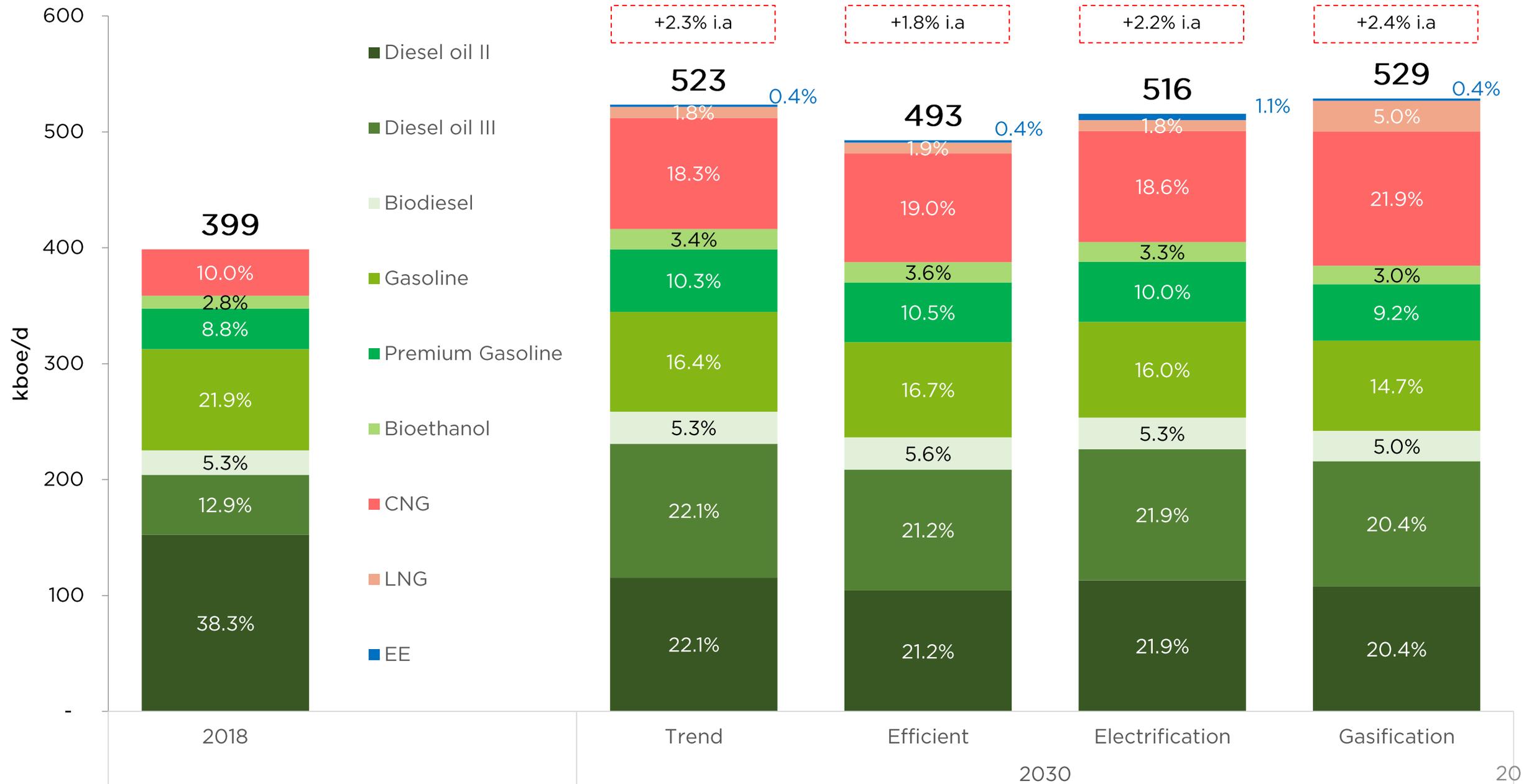


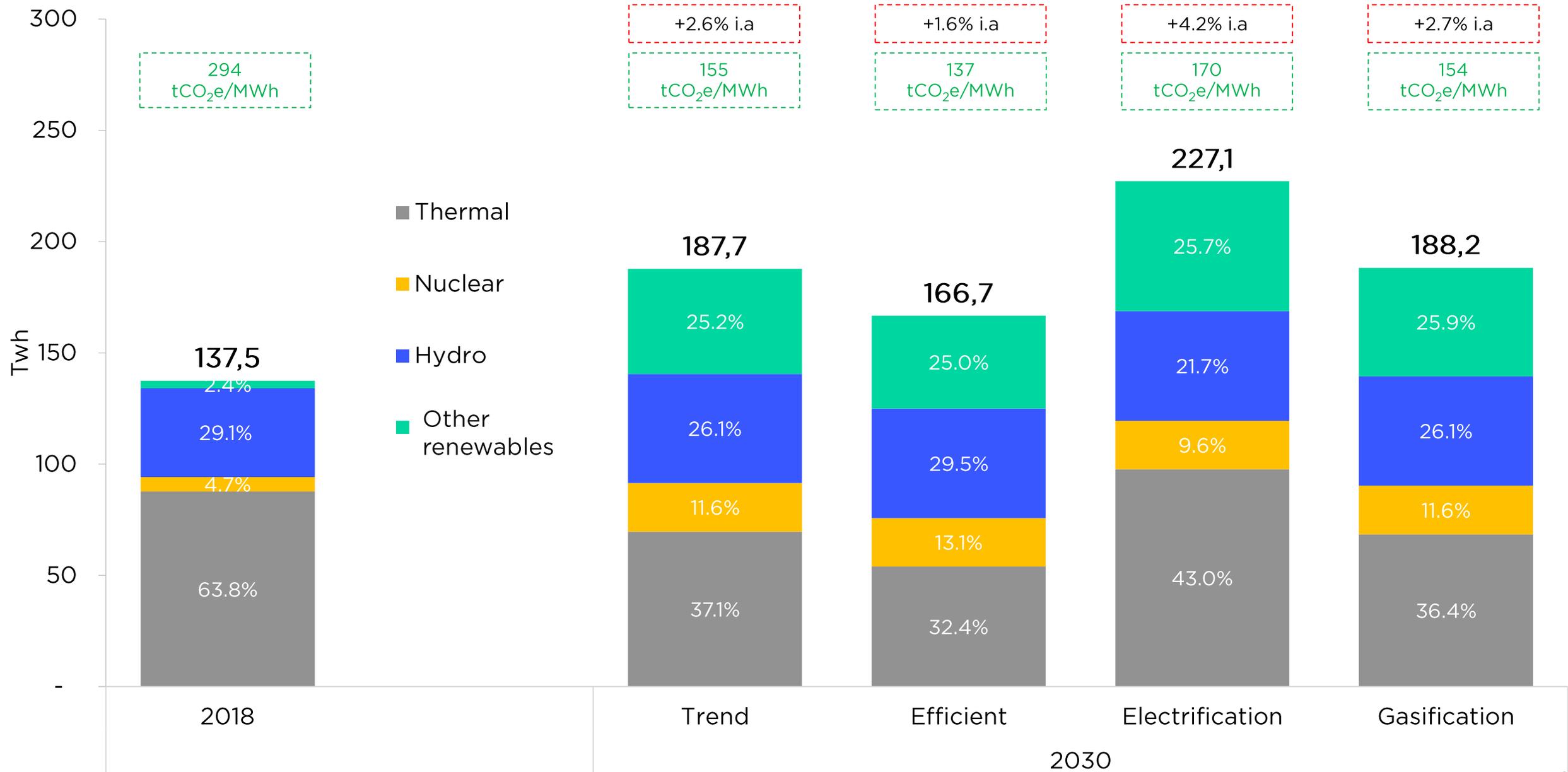
## Scenario with LNG Export



## Scenario without LNG Export

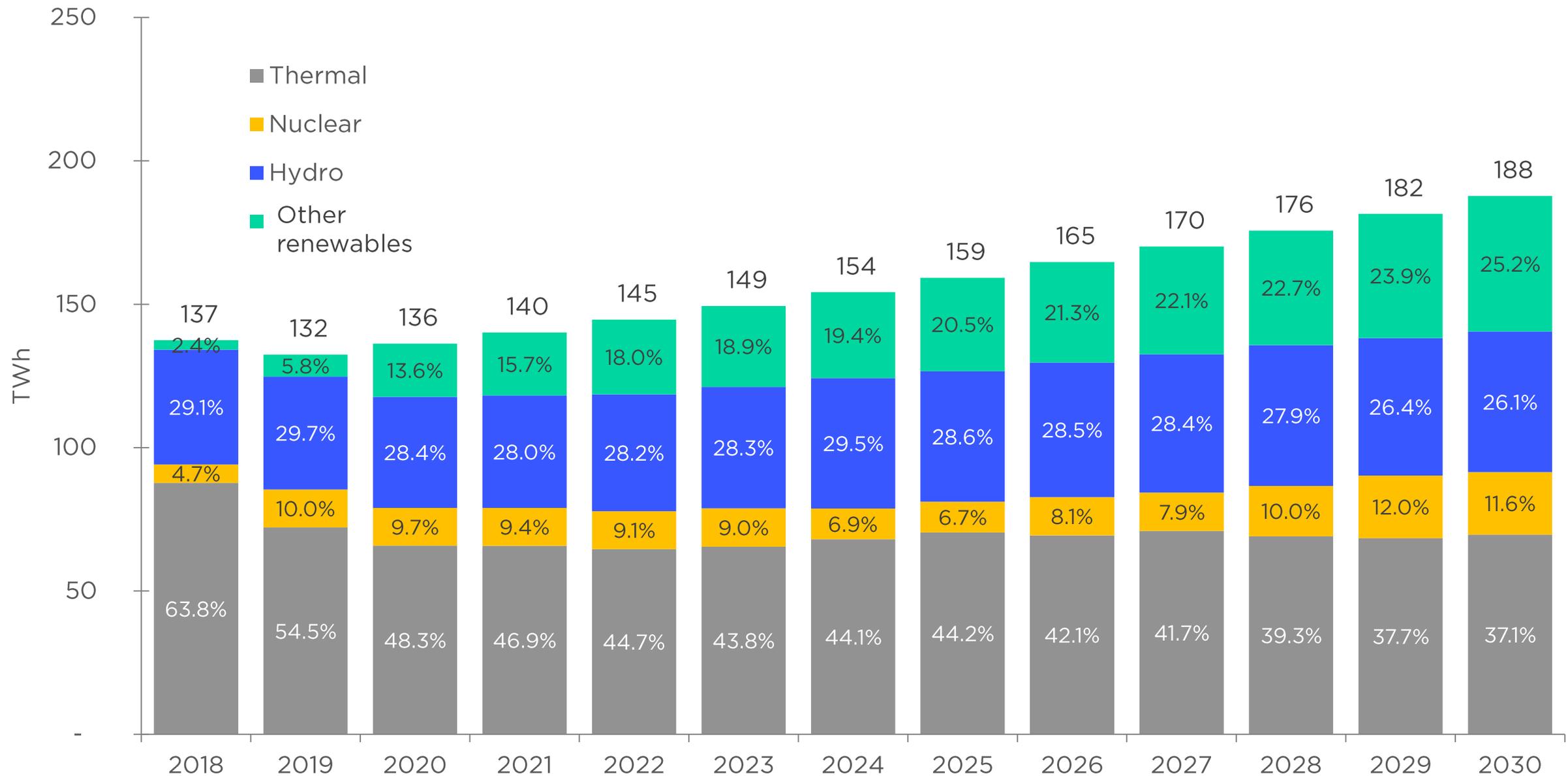




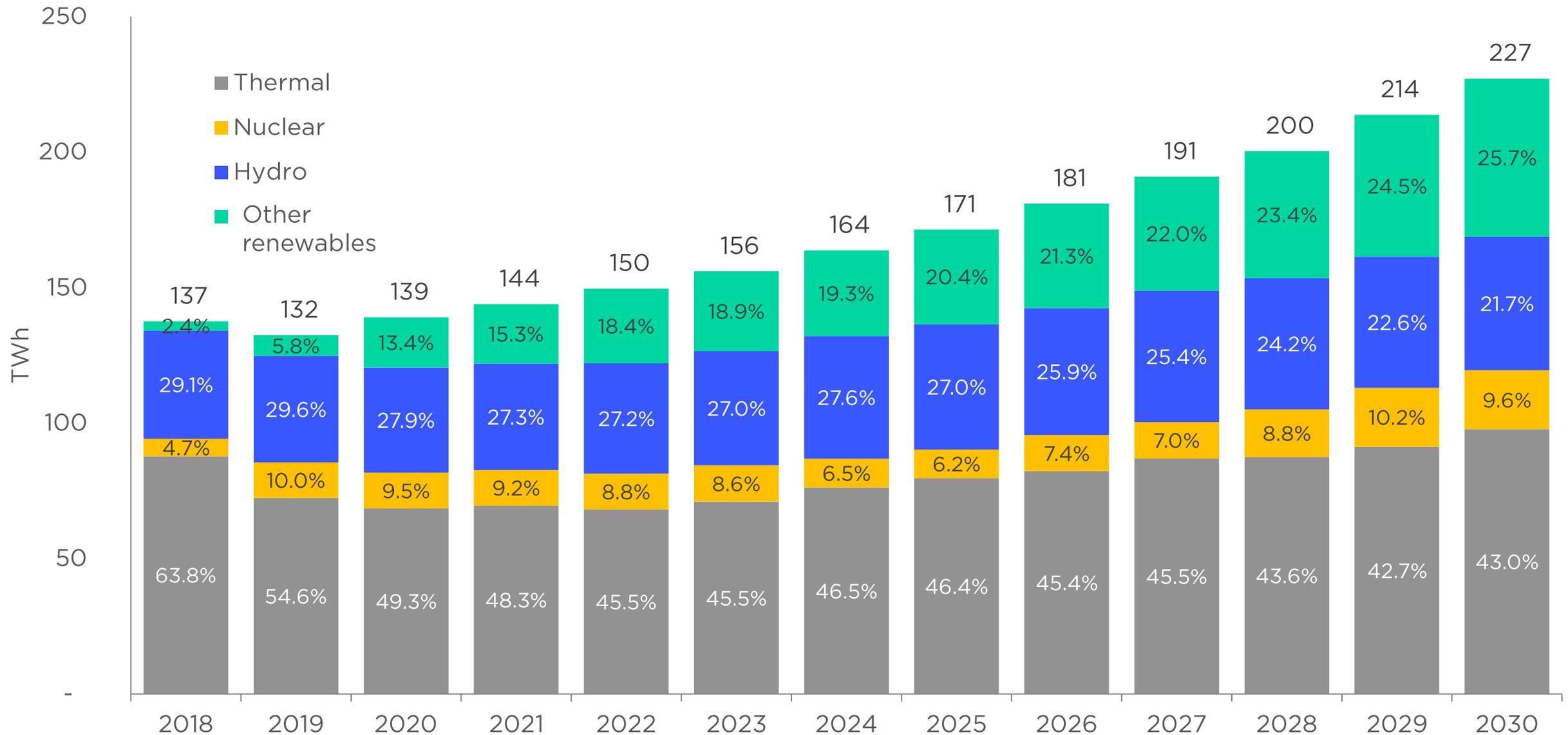


Note: Renewables includes distributed generation

# Electricity Generation by Source – Trend

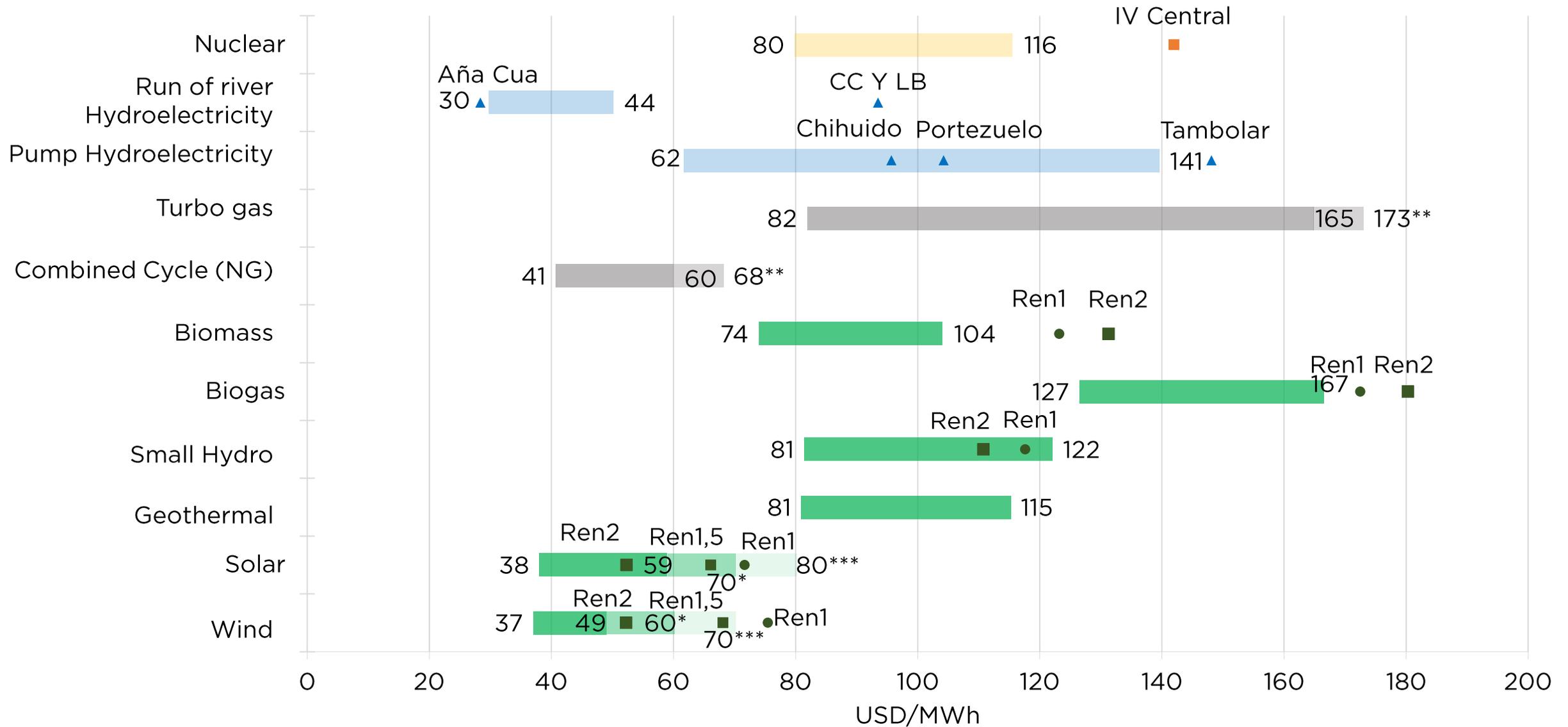


# Electricity Generation by Source - Electrification

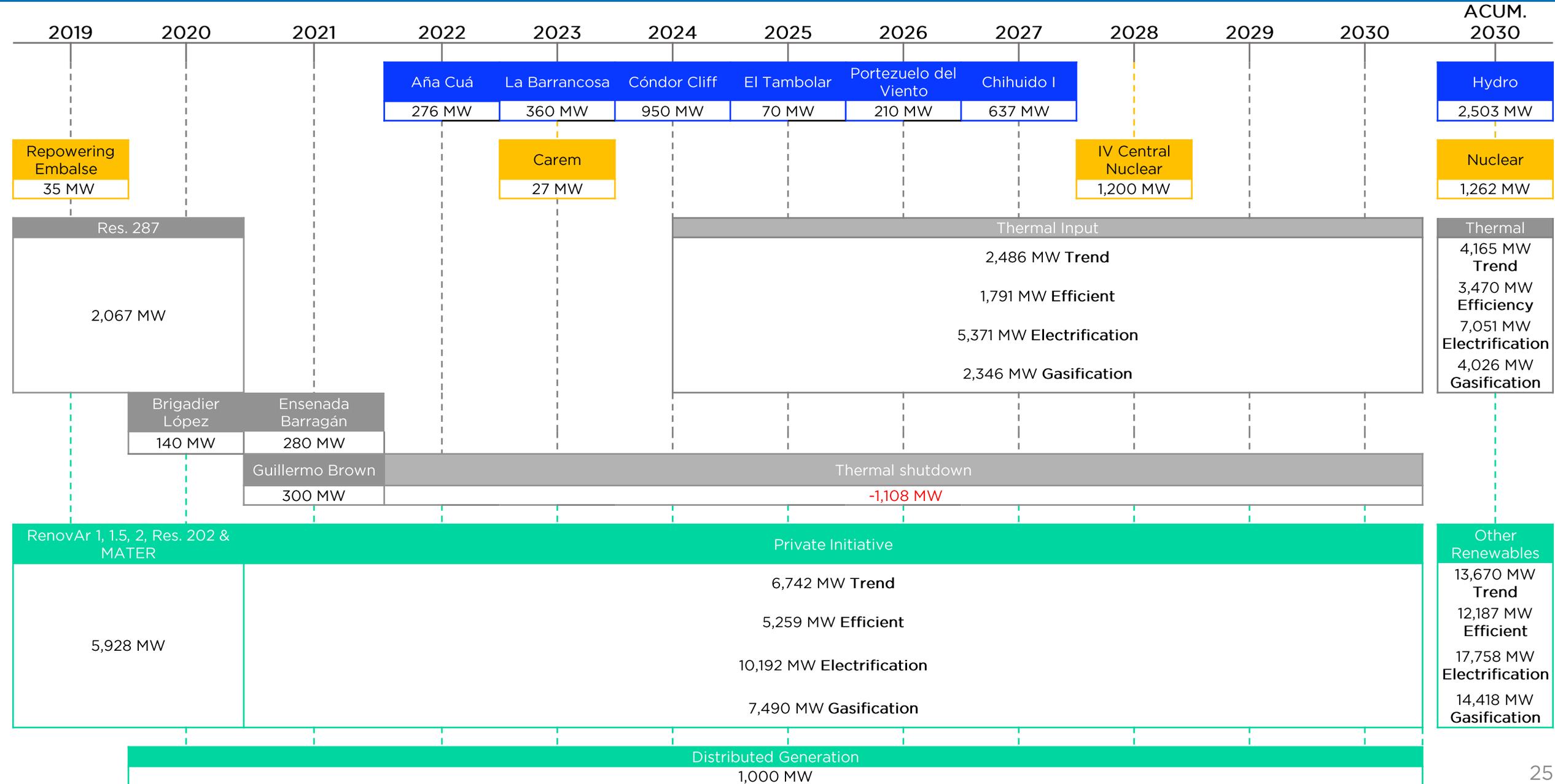


Note: Renewables includes distributed generation

# Levelized cost of energy (LCOE)

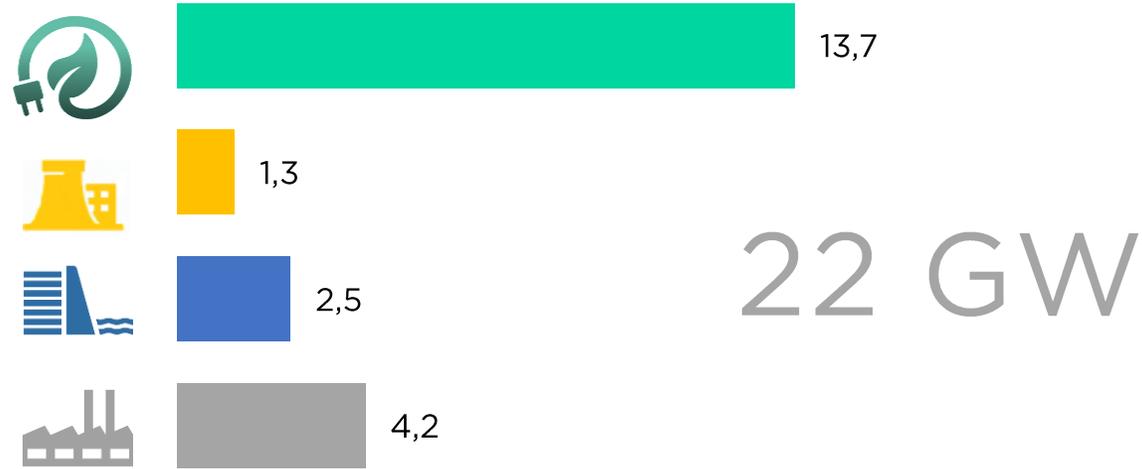


# New Power Plants to Enter The Electrical System

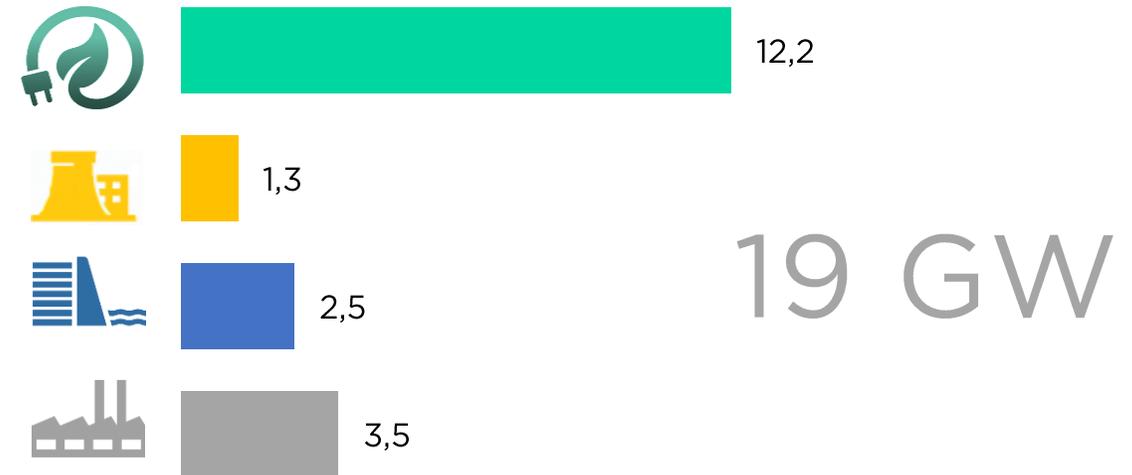


## New total installed power capacity by 2030 (GW)

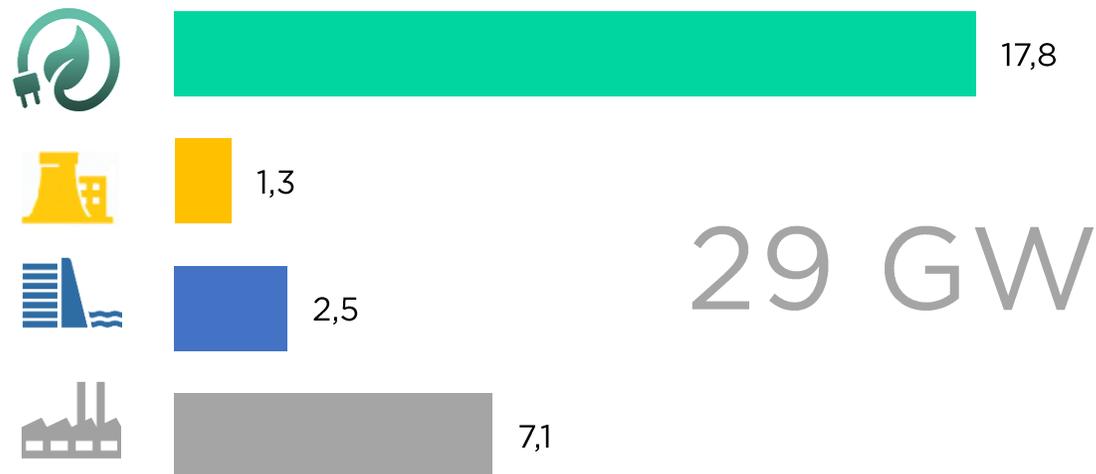
### Trend



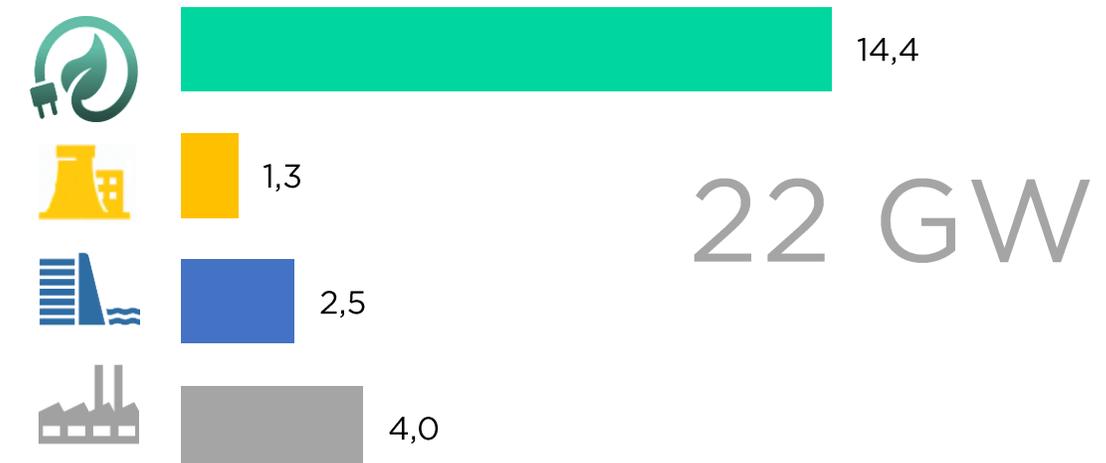
### Efficient



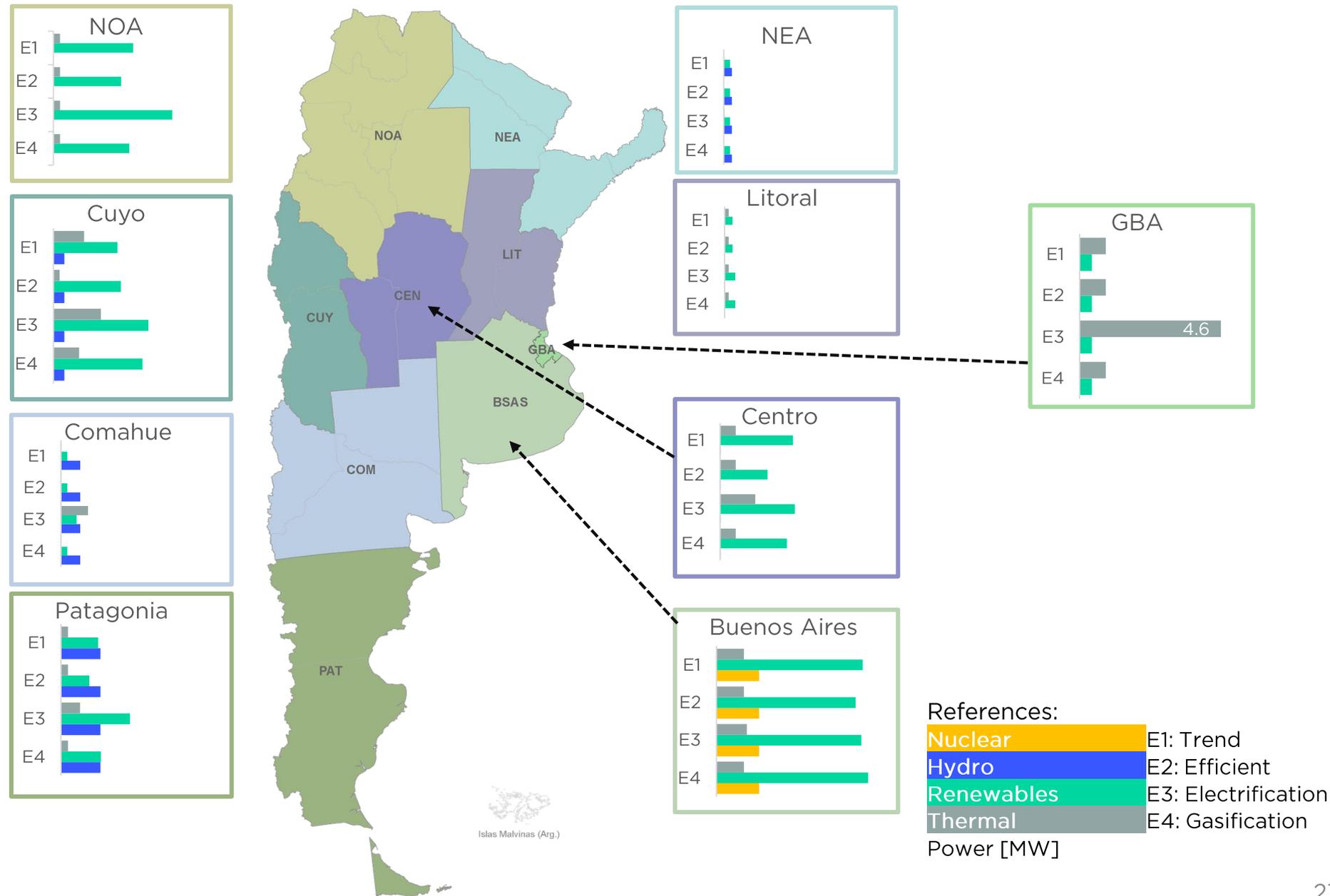
### Electrification



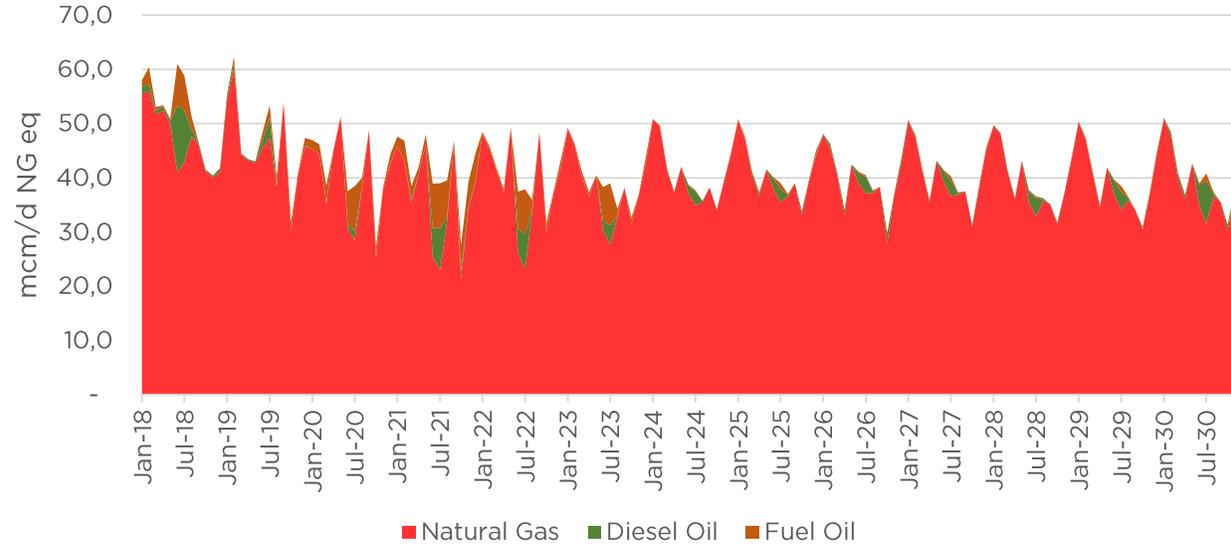
### Gasification



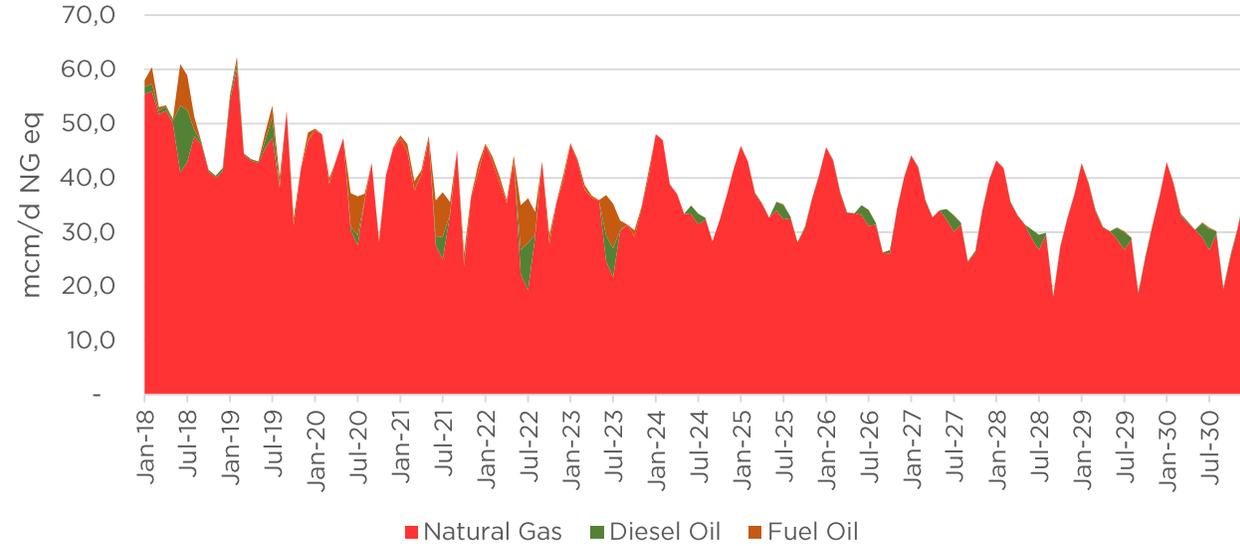
# Additional Installed Power Capacity by Regions



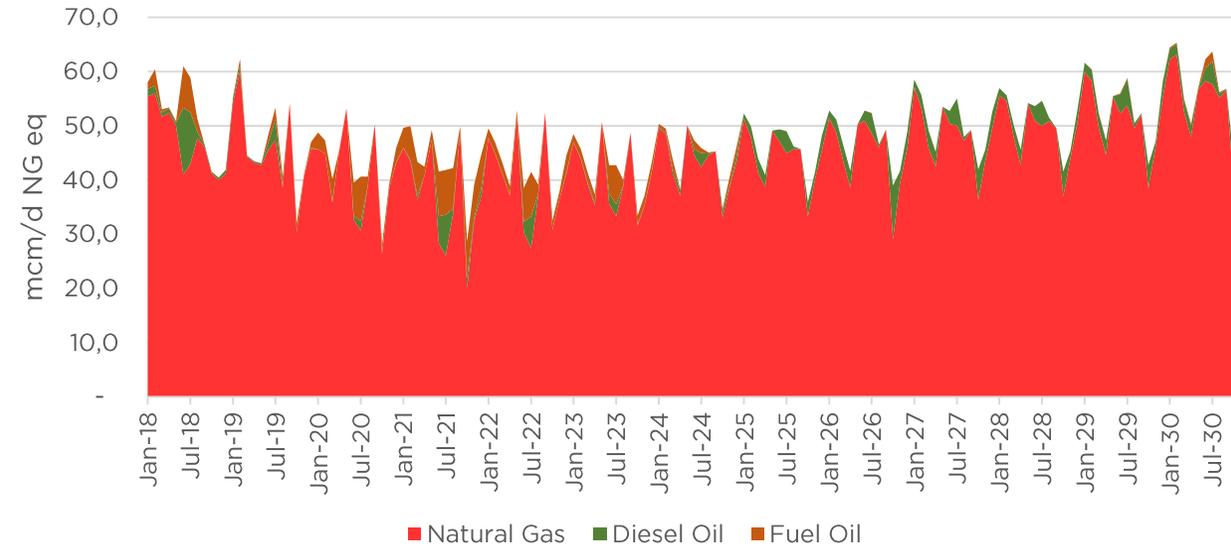
### Trend



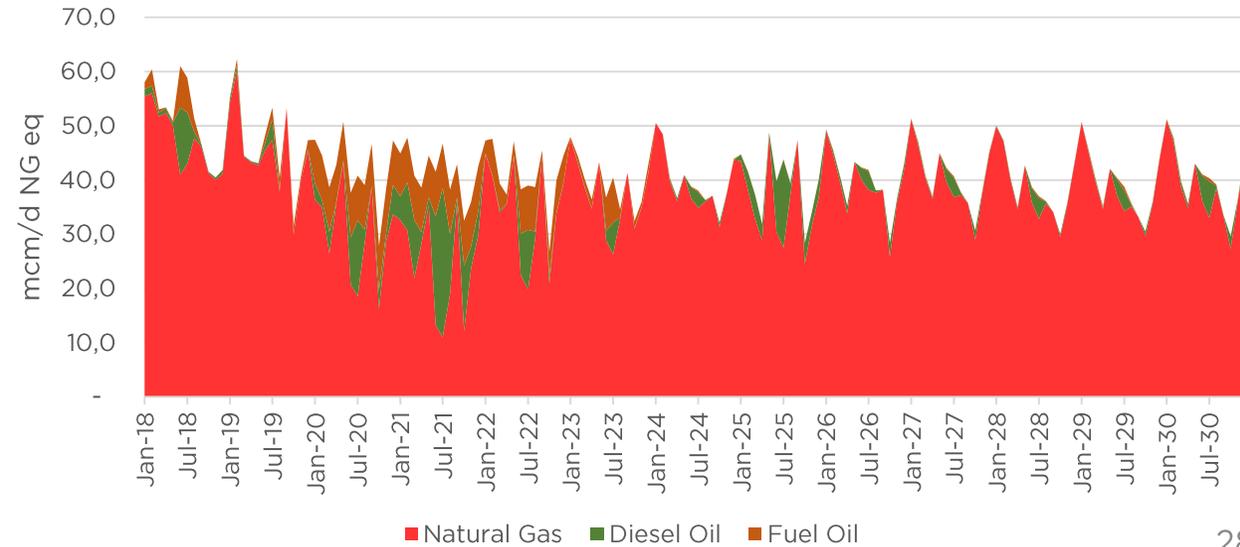
### Efficient

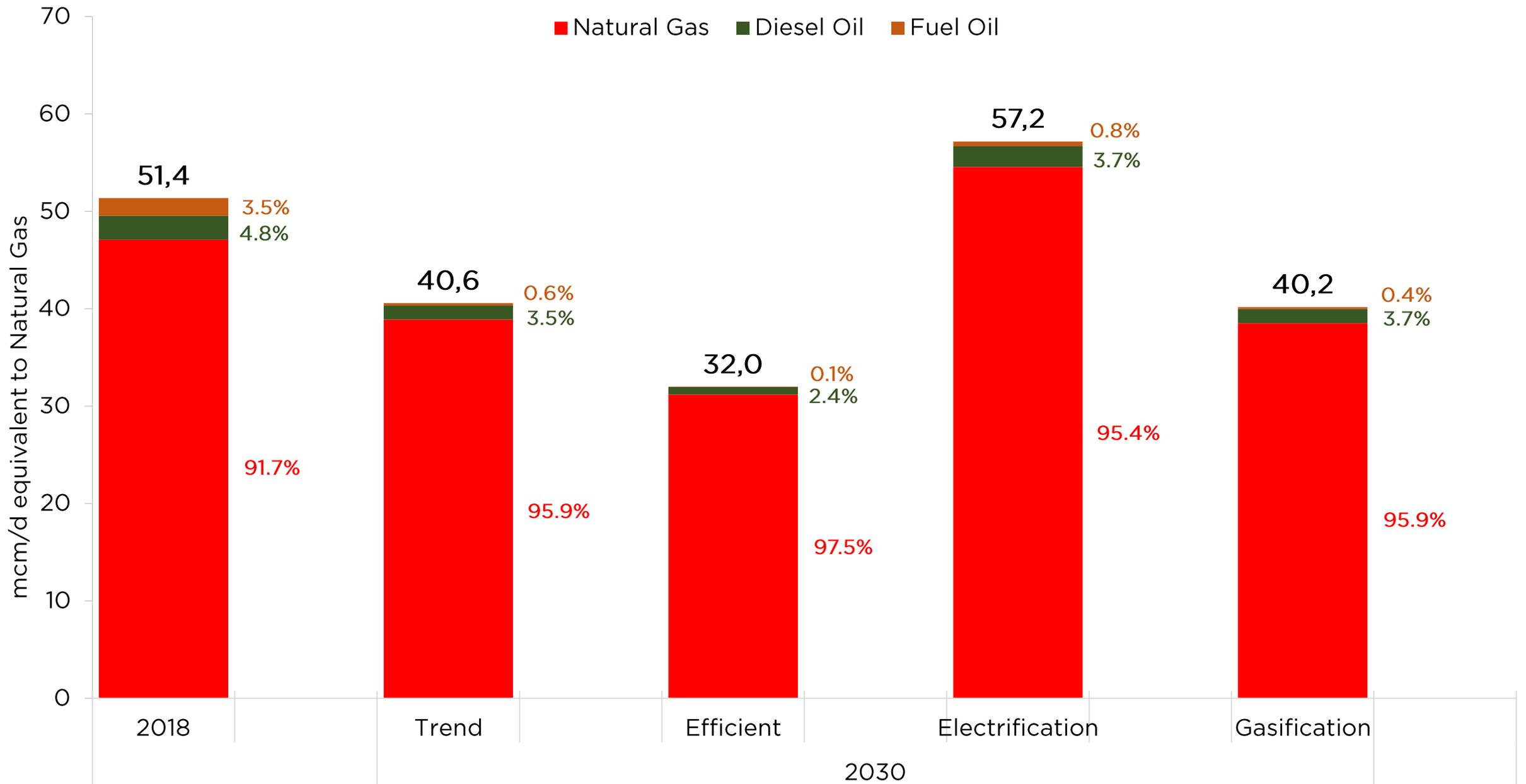


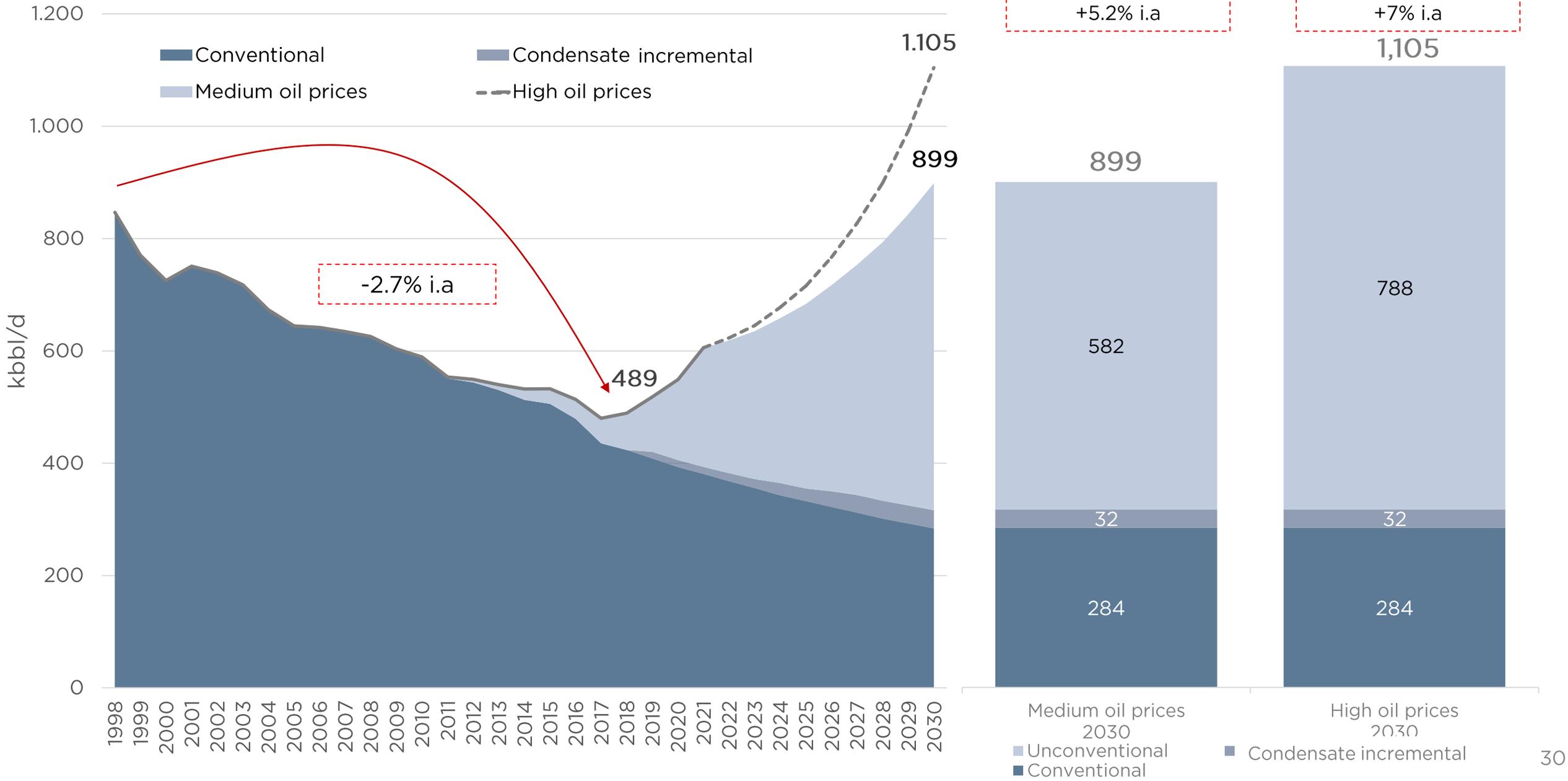
### Electrification



### Gasification

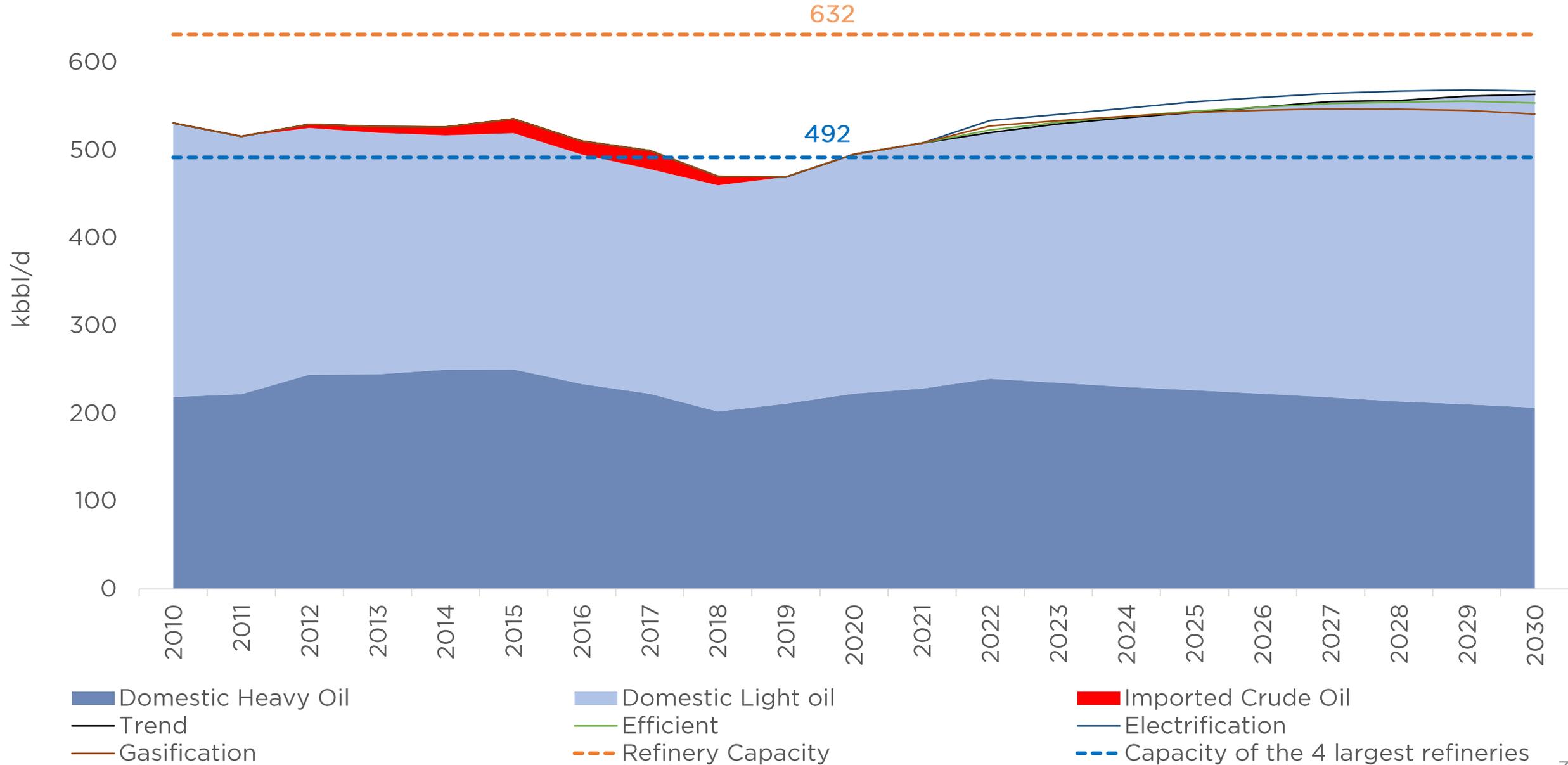




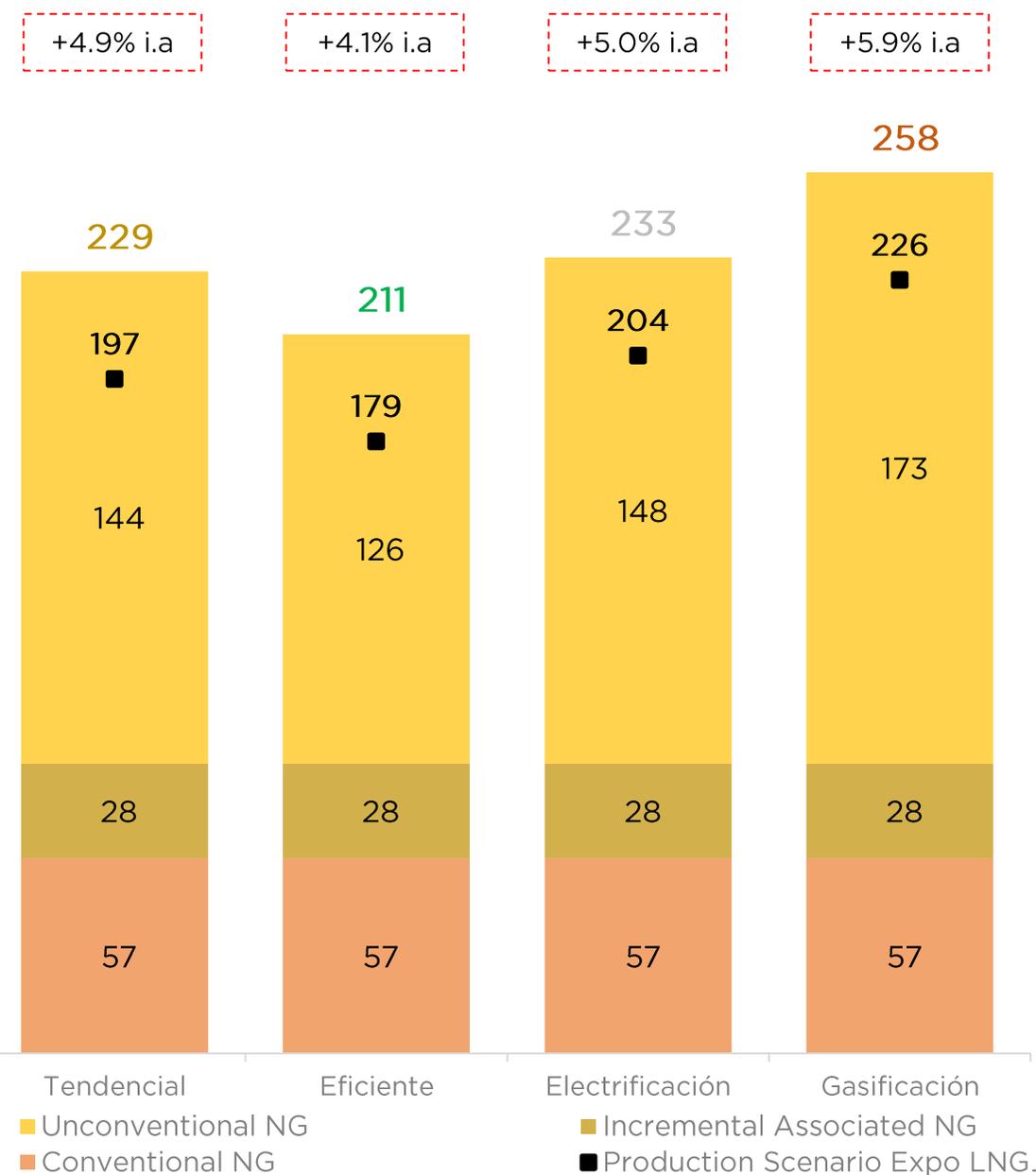
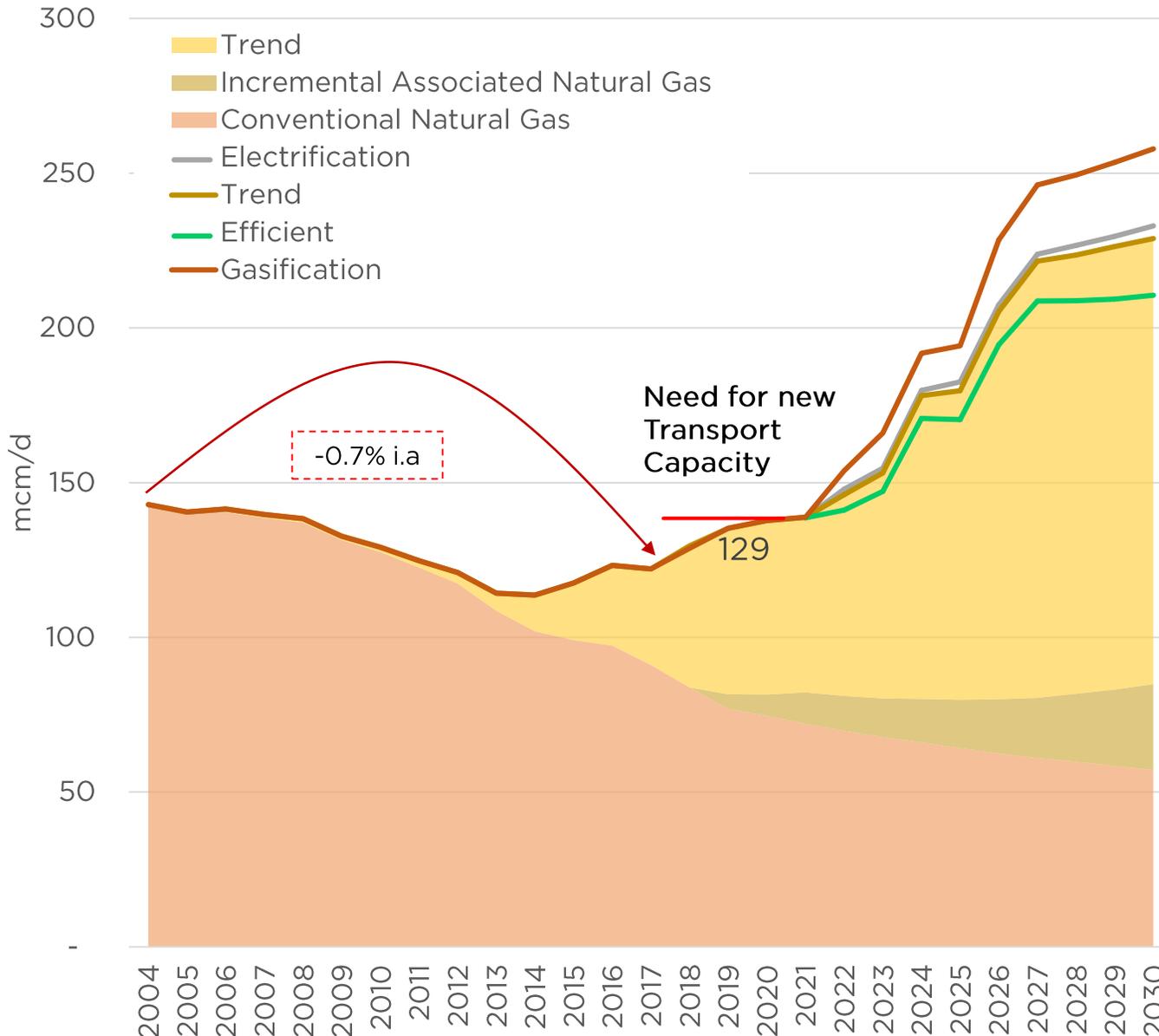


# Evolution of the Refining Sector

## Crude share and Refining Capacity

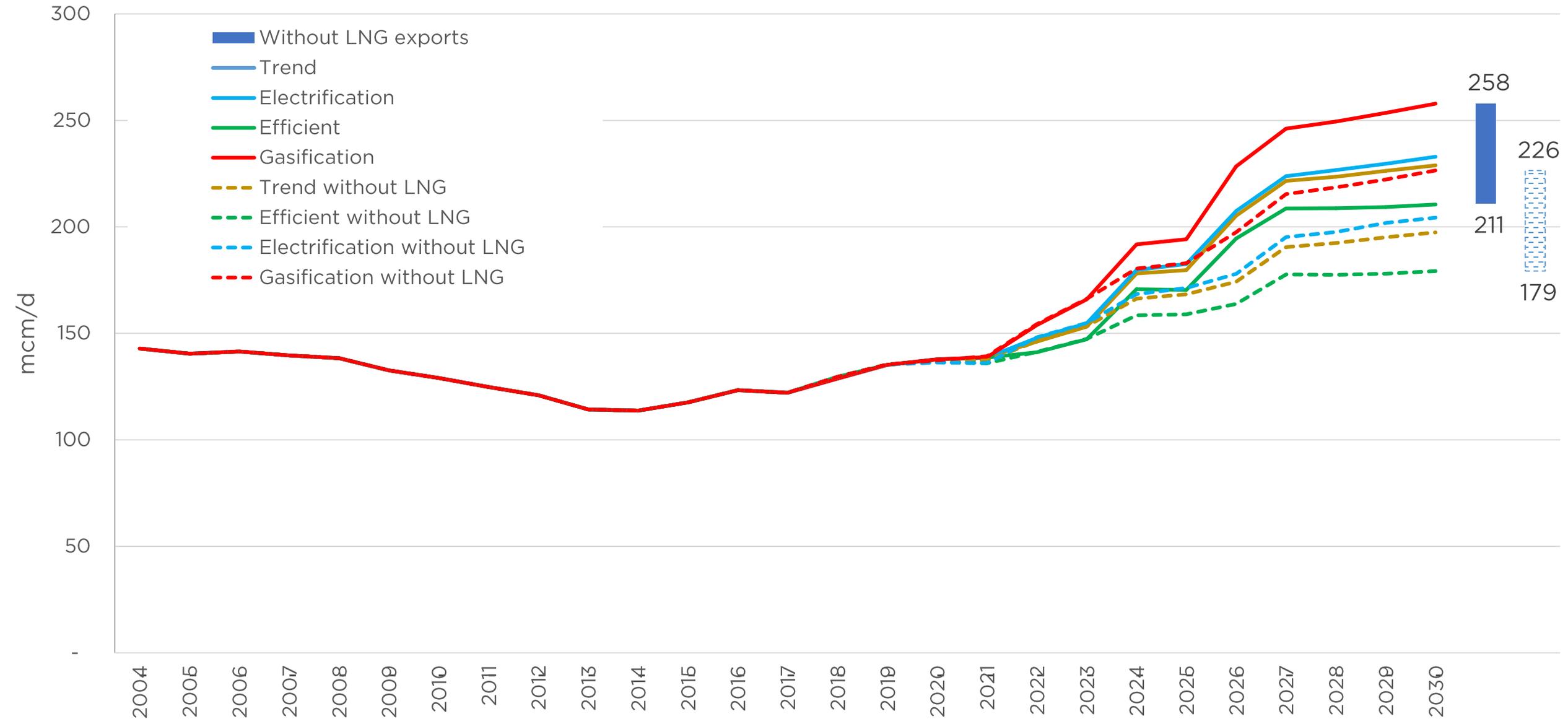


# Natural Gas Production

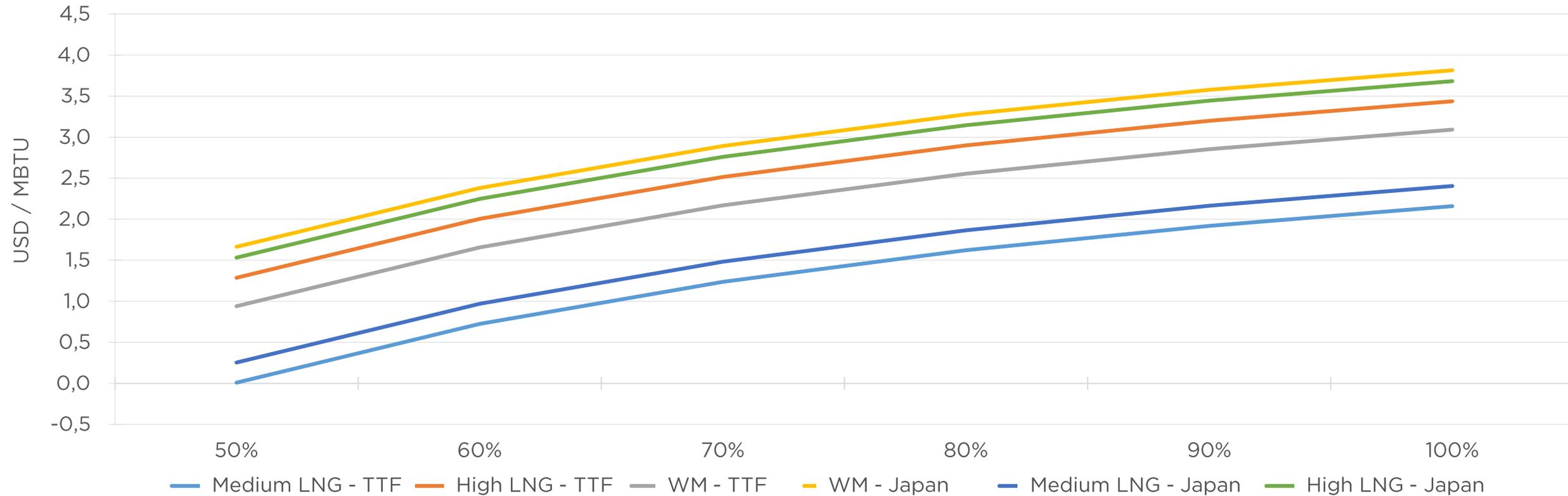


Conditions: Eliminate evacuation restrictions, generate new demand and achieve sustainable netbacks for LNG.

# Natural gas production - Scenario without LNG export



# Netback estimation for LNG export at scale



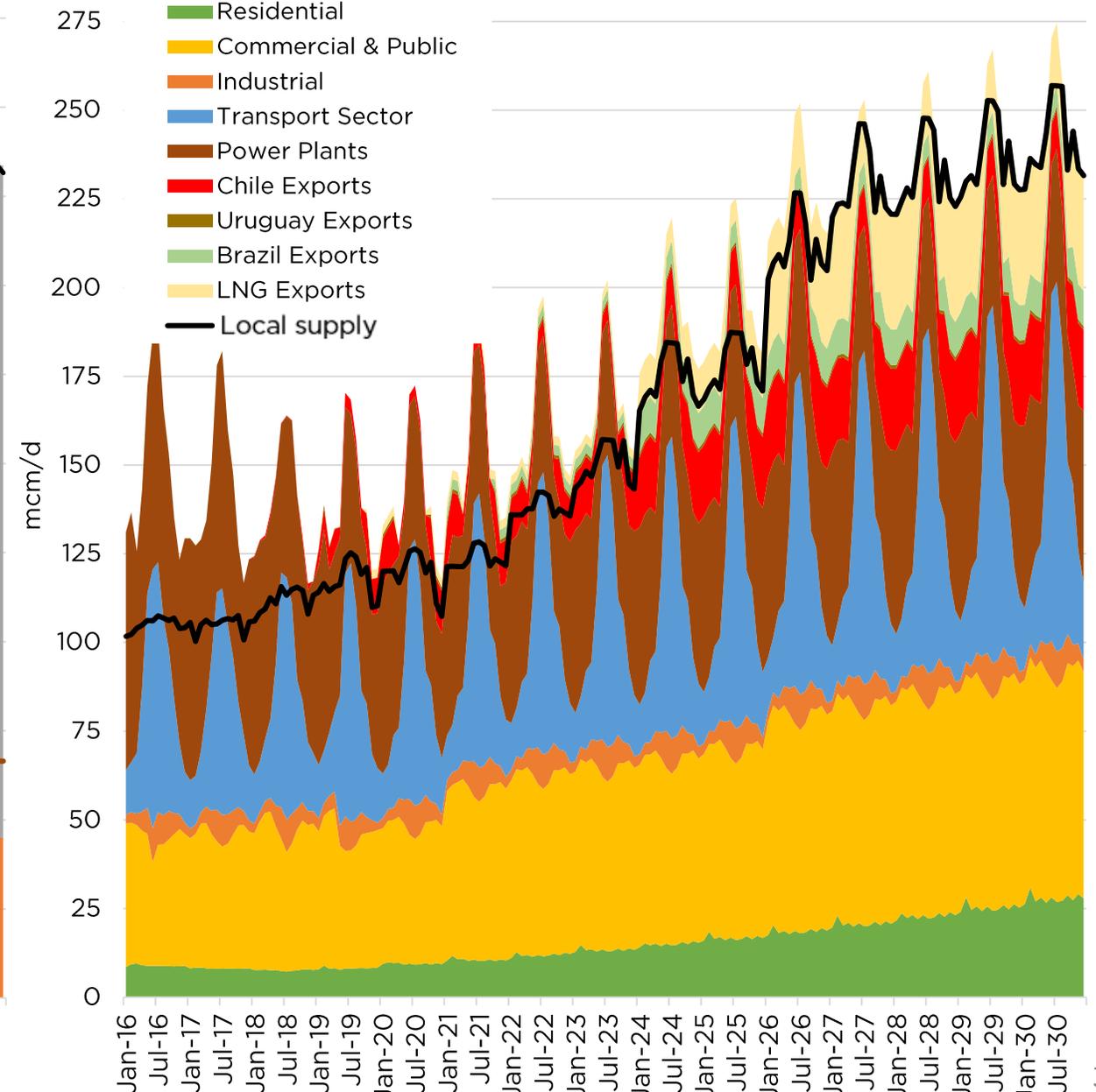
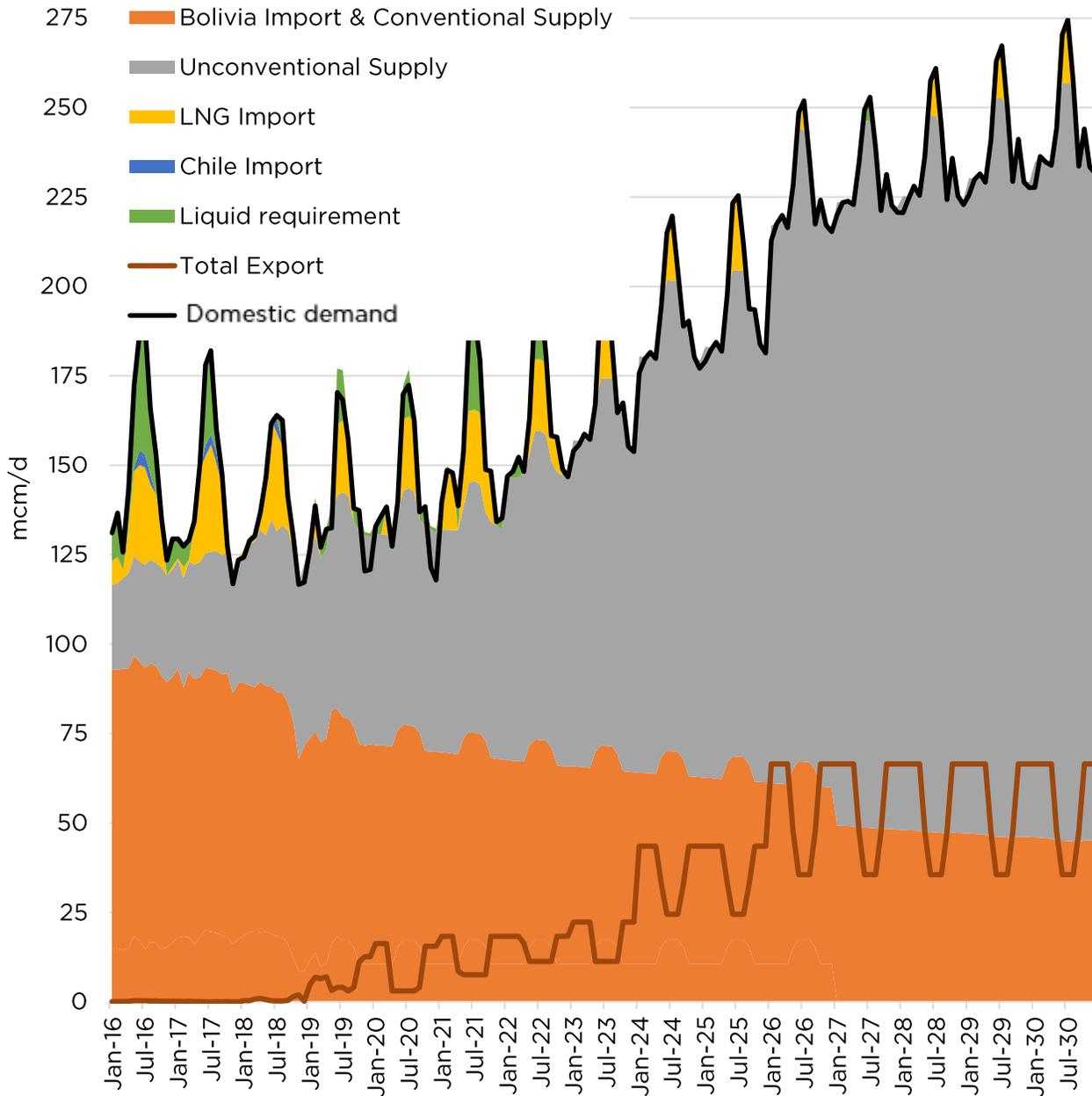
Componente	Energy Scenarios Prices				Wood Mackenzie Prices	
	TTF		Japan		TTF	Japan
	Medium LNG	High LNG	Medium LNG	High LNG		
Destination Price	6.1	7.3	6.7	8.0	7.0	8.1
Transport Japan / Netherlands	0.9	0.9	1.3	1.3	0.9	1.3
Cost of Liquefaction with FU 80%	2.7	2.7	2.7	2.7	2.7	2.7
Neuquina basin pipeline - Bahía Blanca	0.8	0.8	0.8	0.8	0.8	0.8
<b>Netback</b>	<b>1.6</b>	<b>2.9</b>	<b>1.9</b>	<b>3.1</b>	<b>2.6</b>	<b>3.3</b>

**Notes:**

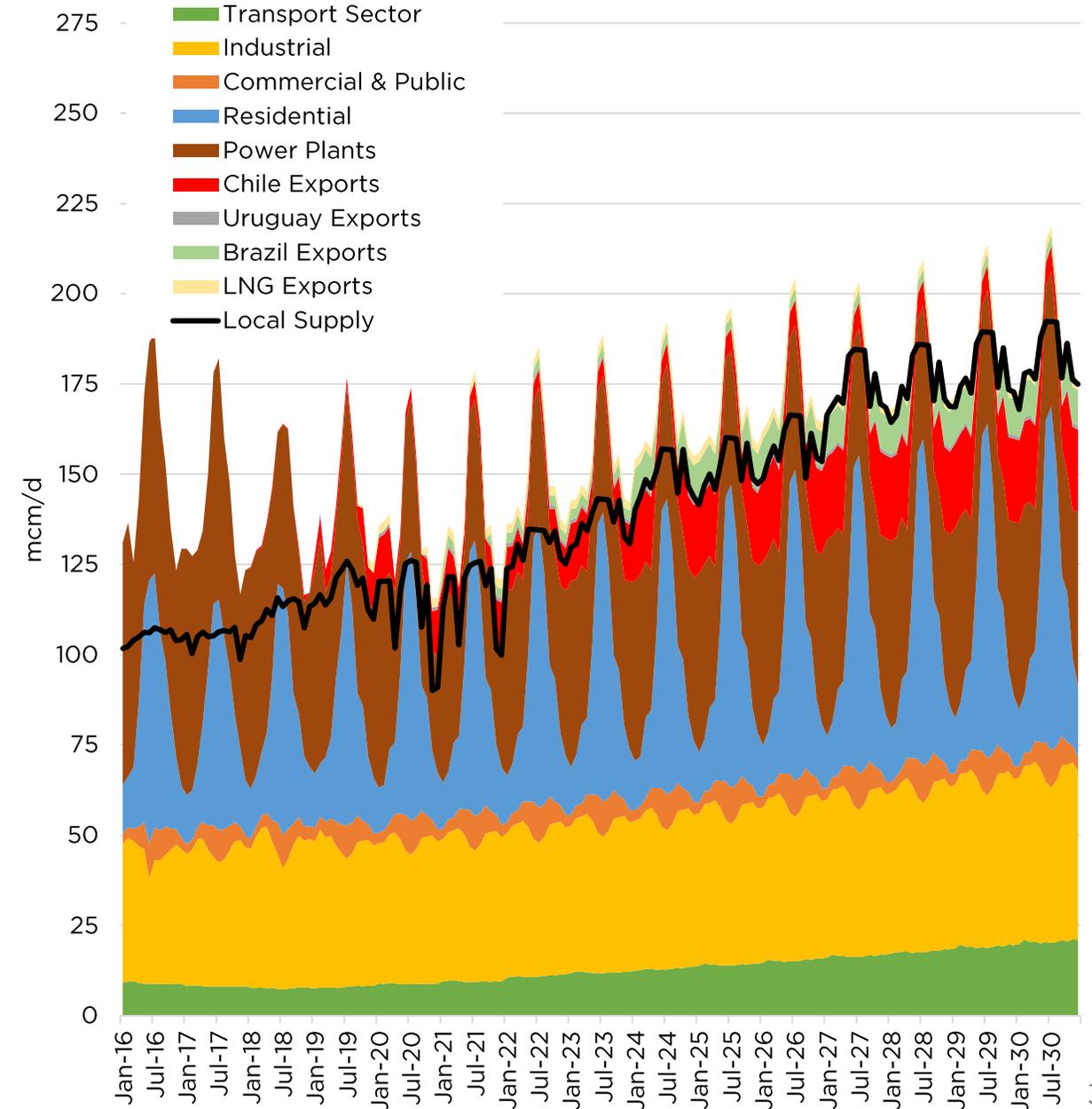
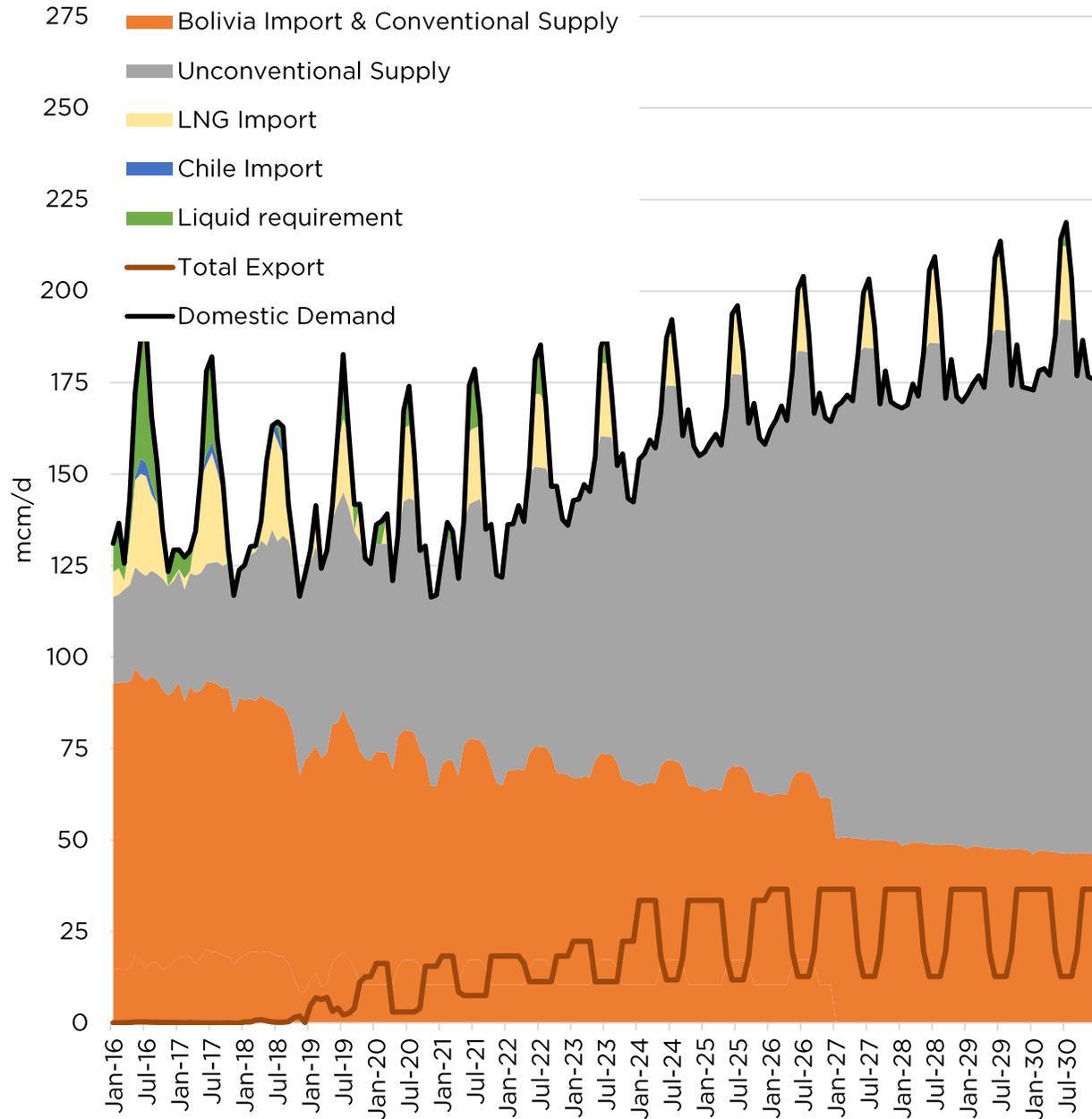
1) Capex of liquefaction plant of 750 USD / TPA,  
2) For the destination prices of Energy Scenarios, import price projections were taken, and transportation costs to the destination of a possible Argentine export were discounted (Japan / Netherlands).

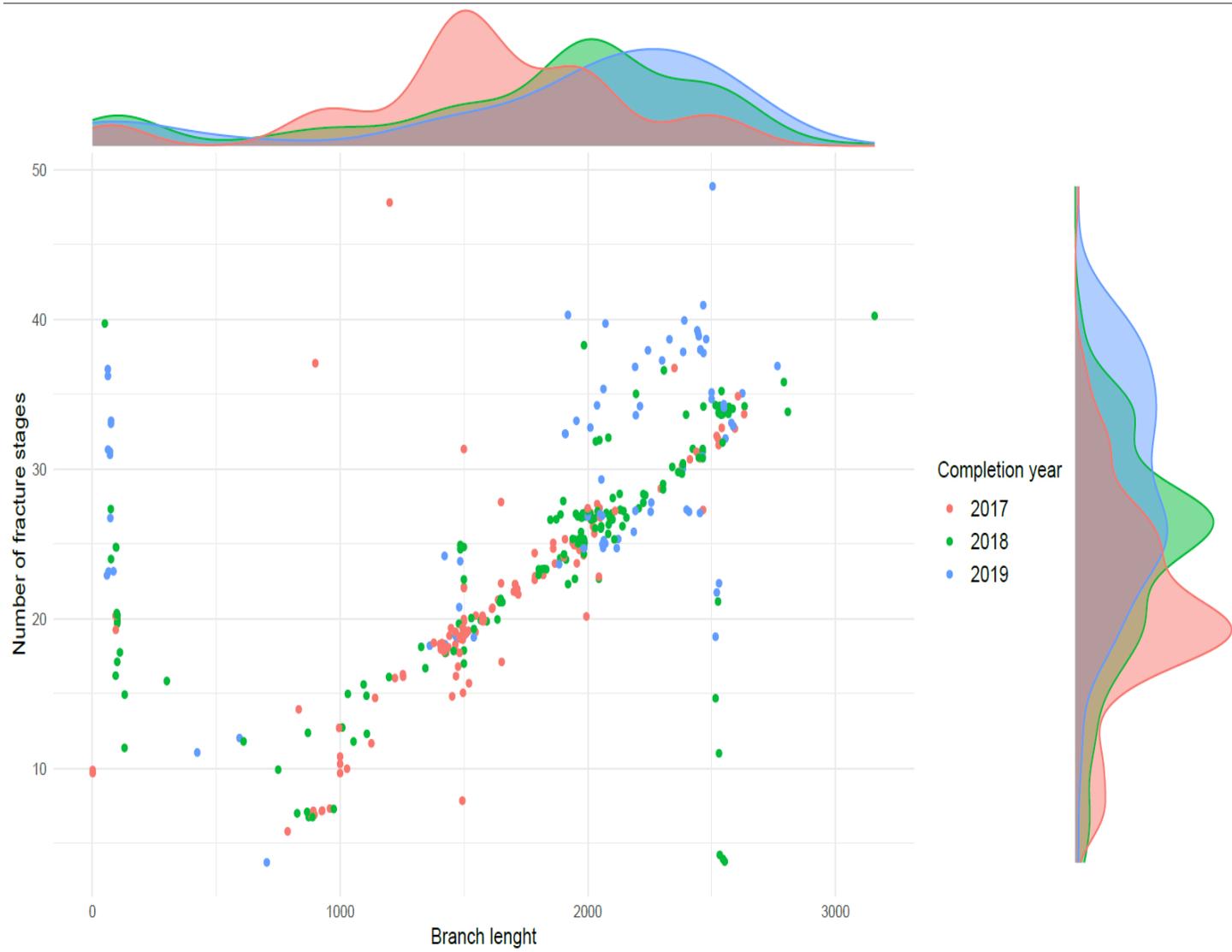
Source: SSPE based on own surveys and Wood Mackenzie.

# Supply and demand of natural gas - Trend Scenario with LNG

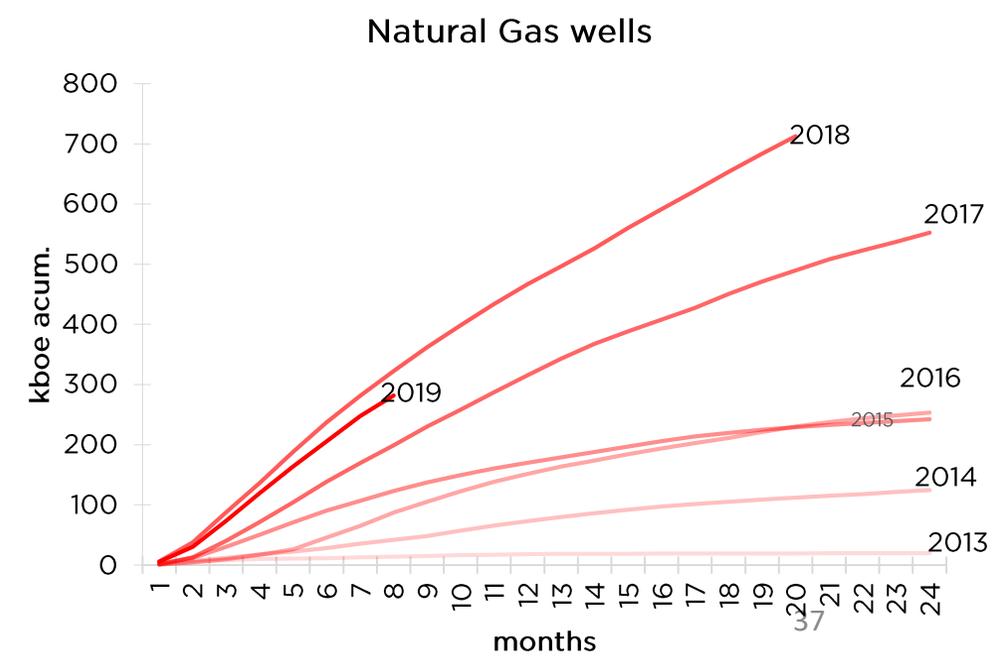


# Supply and demand of natural gas - Trend Scenario without LNG





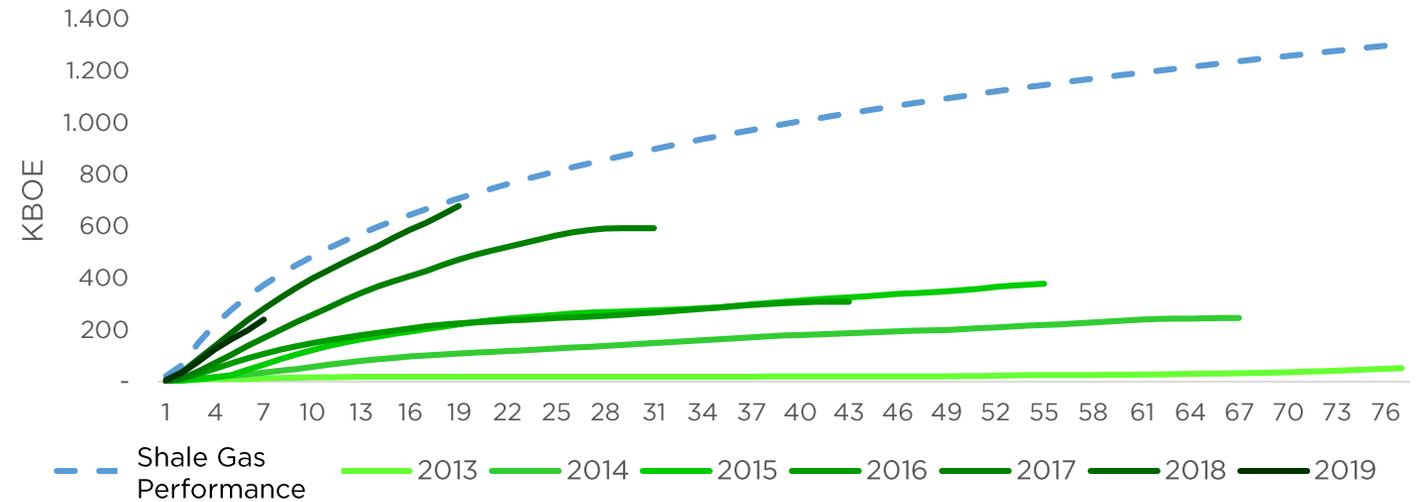
	Shale oil	Shale gas	Tight gas
EUR <sub>y30</sub> =	148 Mm <sup>3</sup> (932 kboe)	325 MMm <sup>3</sup> (11.5 BCF)	158 MMm <sup>3</sup> (5.6 BCF)
CAPEX	10.0 MMUSD	11.3 MMUSD	6.5 MMUSD
Number of fracture stages	35	35	8
Horizontal branch length	2,500 m	2,500 m	n.c.
GOR (m <sup>3</sup> NG / m <sup>3</sup> oil).	20	26,000	12,000



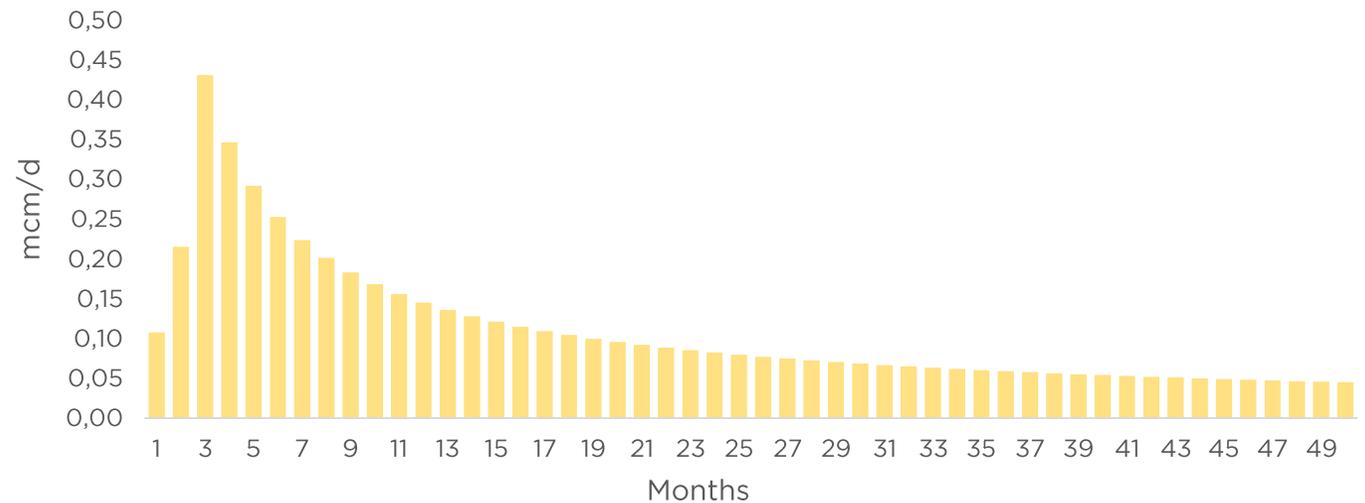
- ✓ EUR = 325 millions cubic meters (mcm) NG (11.5 BCF)
- ✓ EUR total = 2134 Kboe
- ✓ CapEx = 11.3 M USD + 15% *Facilities*
- ✓ OpEx = 5.9 USD/BOE (1 USD/MMBTU)
- ✓ IP30: 0.43 mcm /d NG
- ✓ GOR = 26,000 cm NG/cm oil (99% NG)

- ✓ Accumulated production 1° year = 25,5%
- ✓ Accumulated production 4° year = 50,8%
- ✓ Declination 1° year = -54%
- ✓ Annual declination from 2° year = -9%

## Productivity of shale gas wells

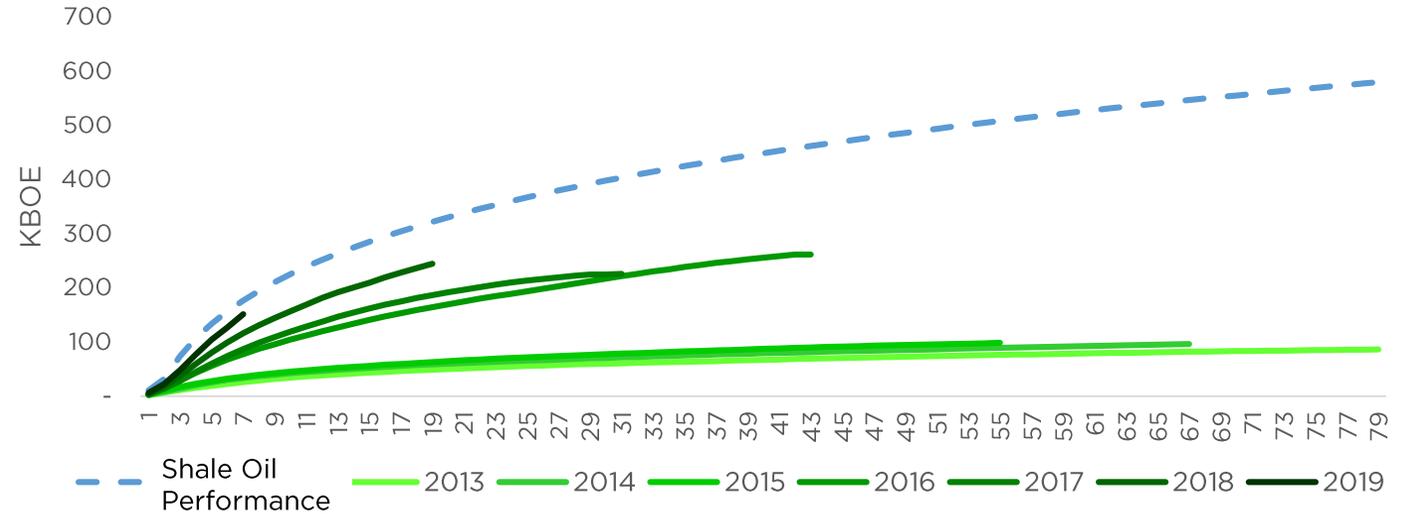


## Shale Gas Performance



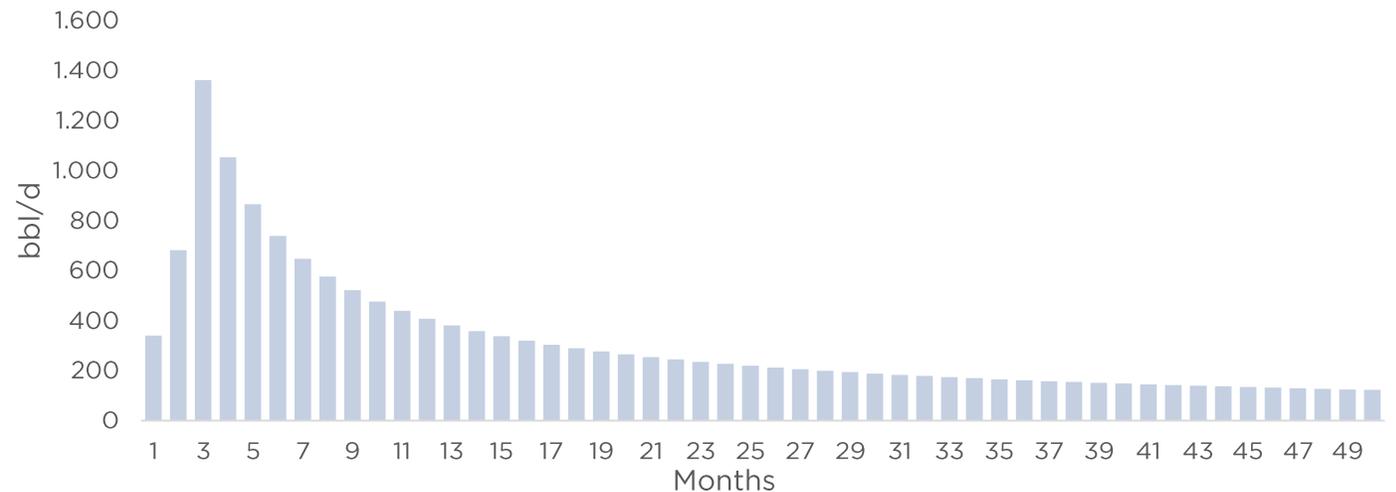
- ✓ EUR = 145 thousands cubic meters (cm) oil (913 kbbbl)
- ✓ EUR total = 932 Kboe
- ✓ CapEx = 10 MM USD + 15% *Facilities*
- ✓ OpEx = 7 USD/BOE
- ✓ IP30: 217 cm/d oil (860 bbl/d)
- ✓ GOR = 20 cm NG/cm oil (2% oil)

## Productivity of Shale Oil Wells

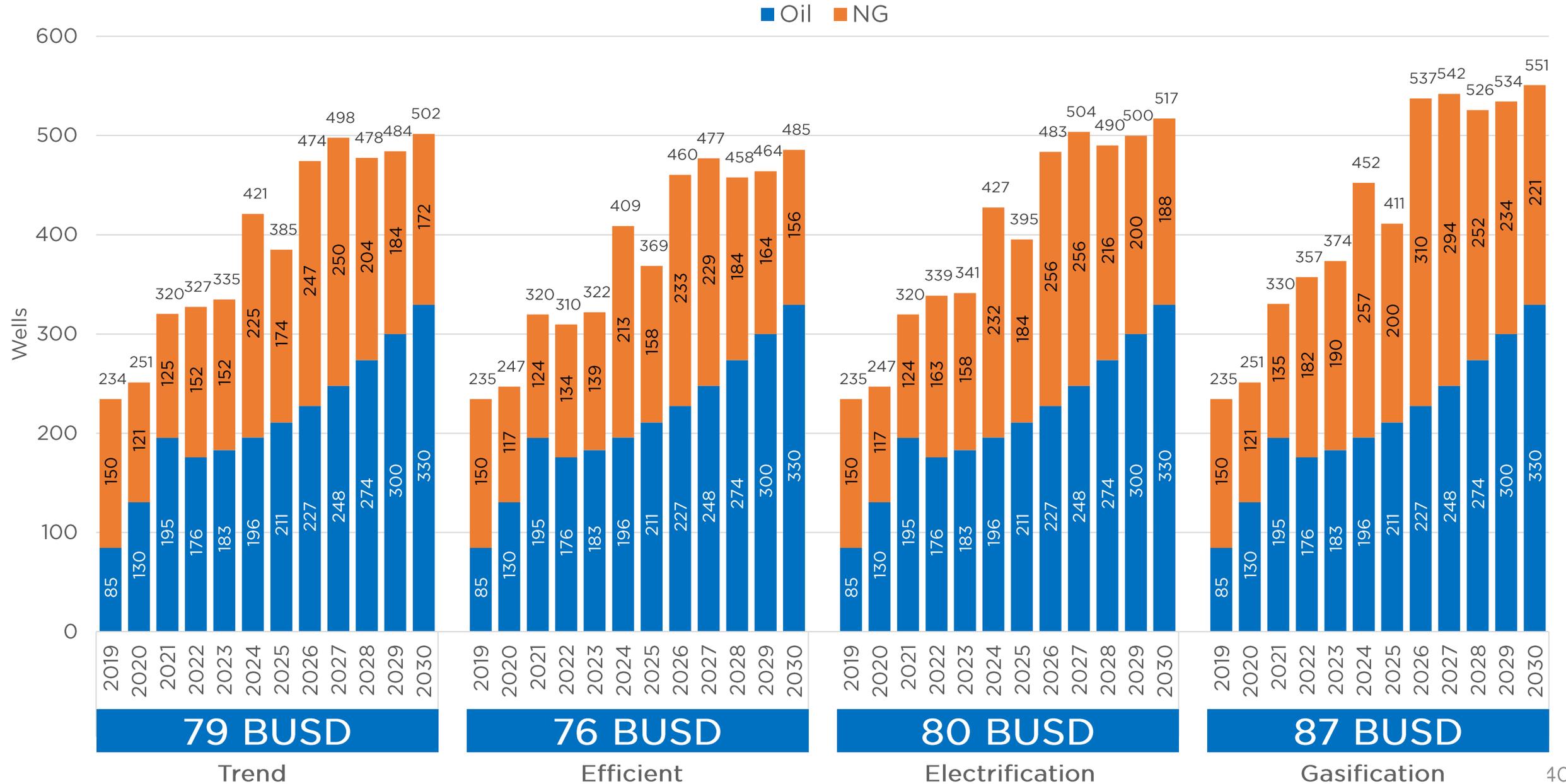


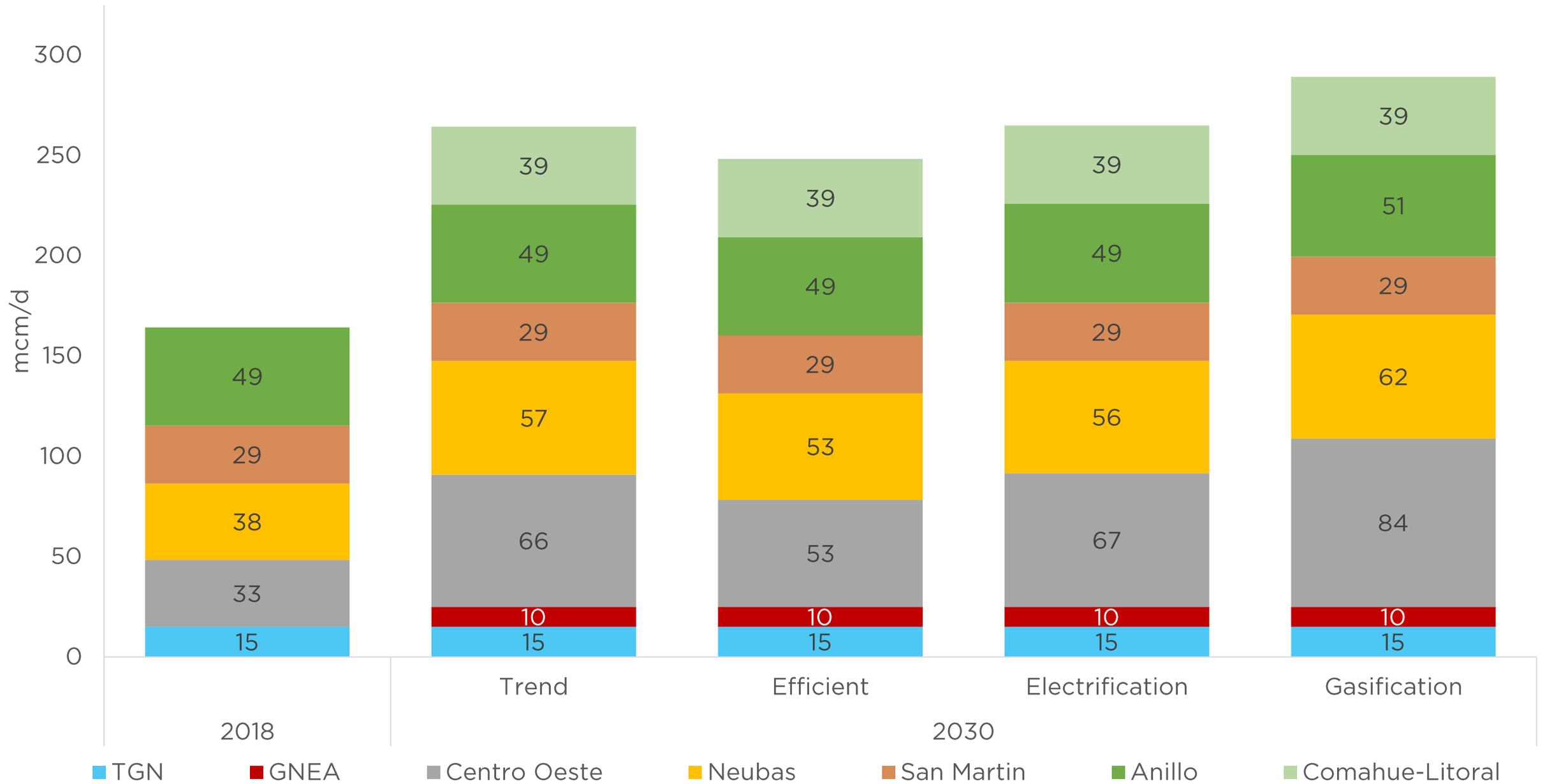
- ✓ Accumulated production 1° year = 27%
- ✓ Accumulated production 4° year = 51.7%
- ✓ Declination 1° year = -57%
- ✓ Annual declination from 2° year = -8%

## Shale Oil Performance

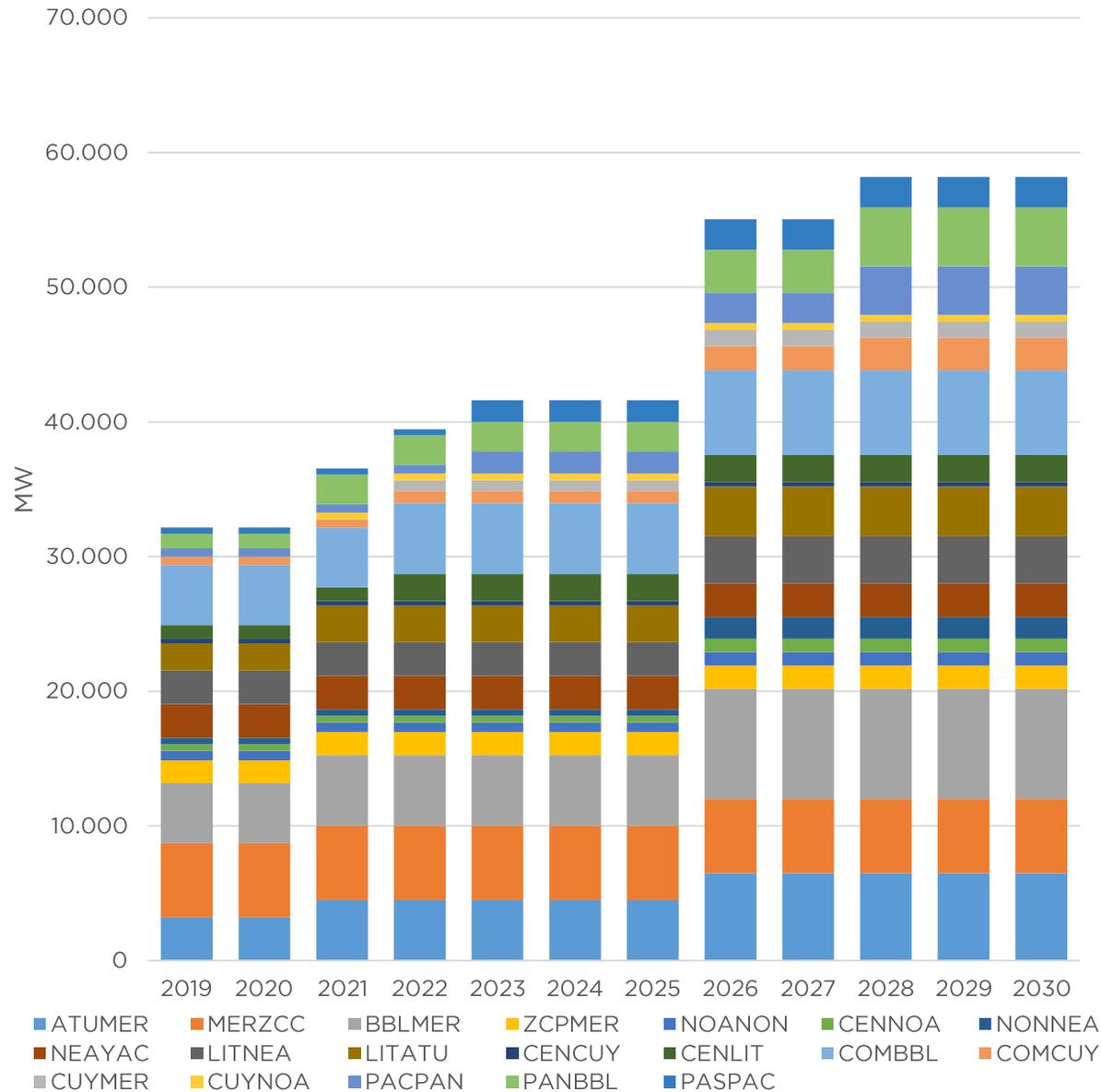


# New Unconventional Wells - Medium prices scenario

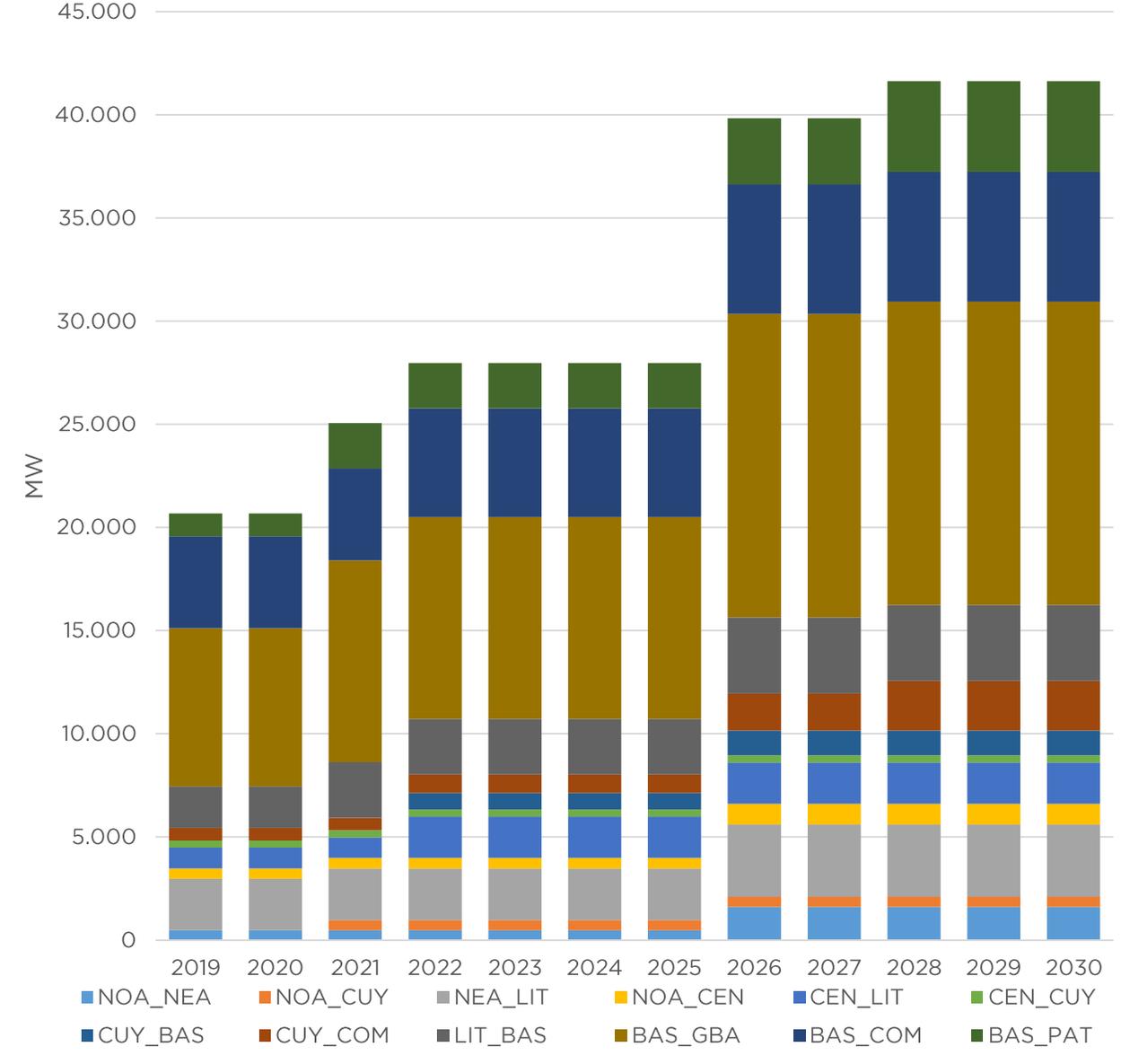




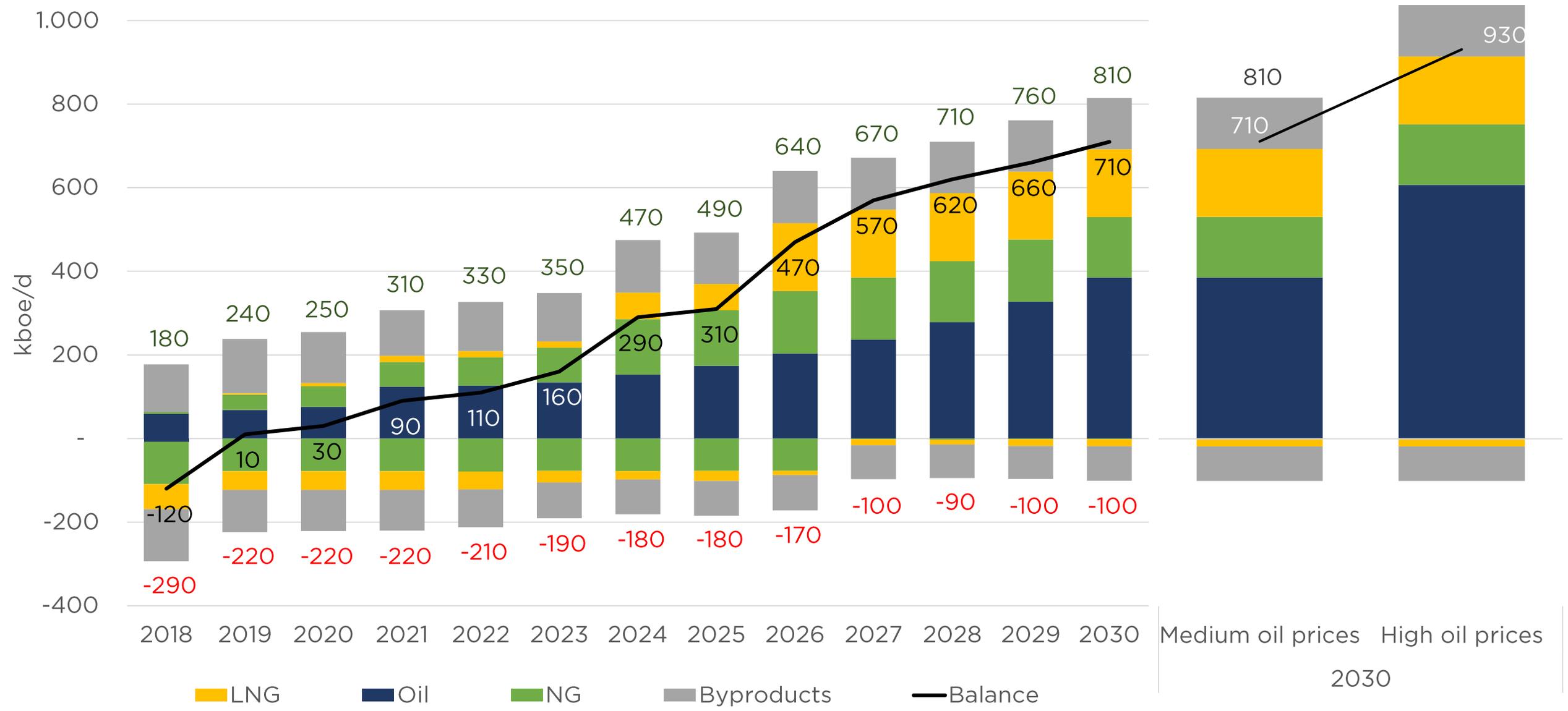
## MARGO



## MESSAGE



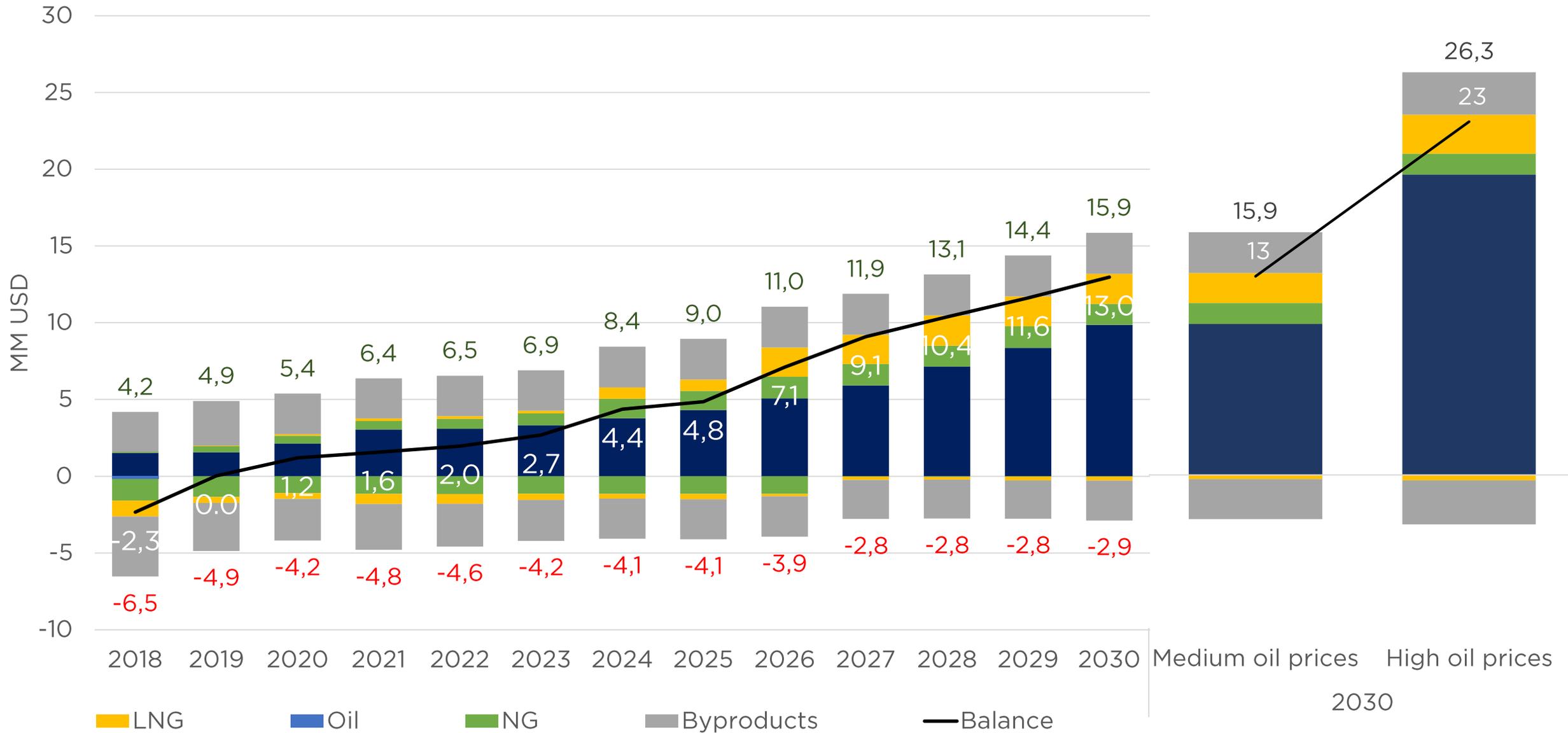
## Trend Scenario (Medium Oil Price)



# Trade Balance of Oil, Natural Gas and Byproducts

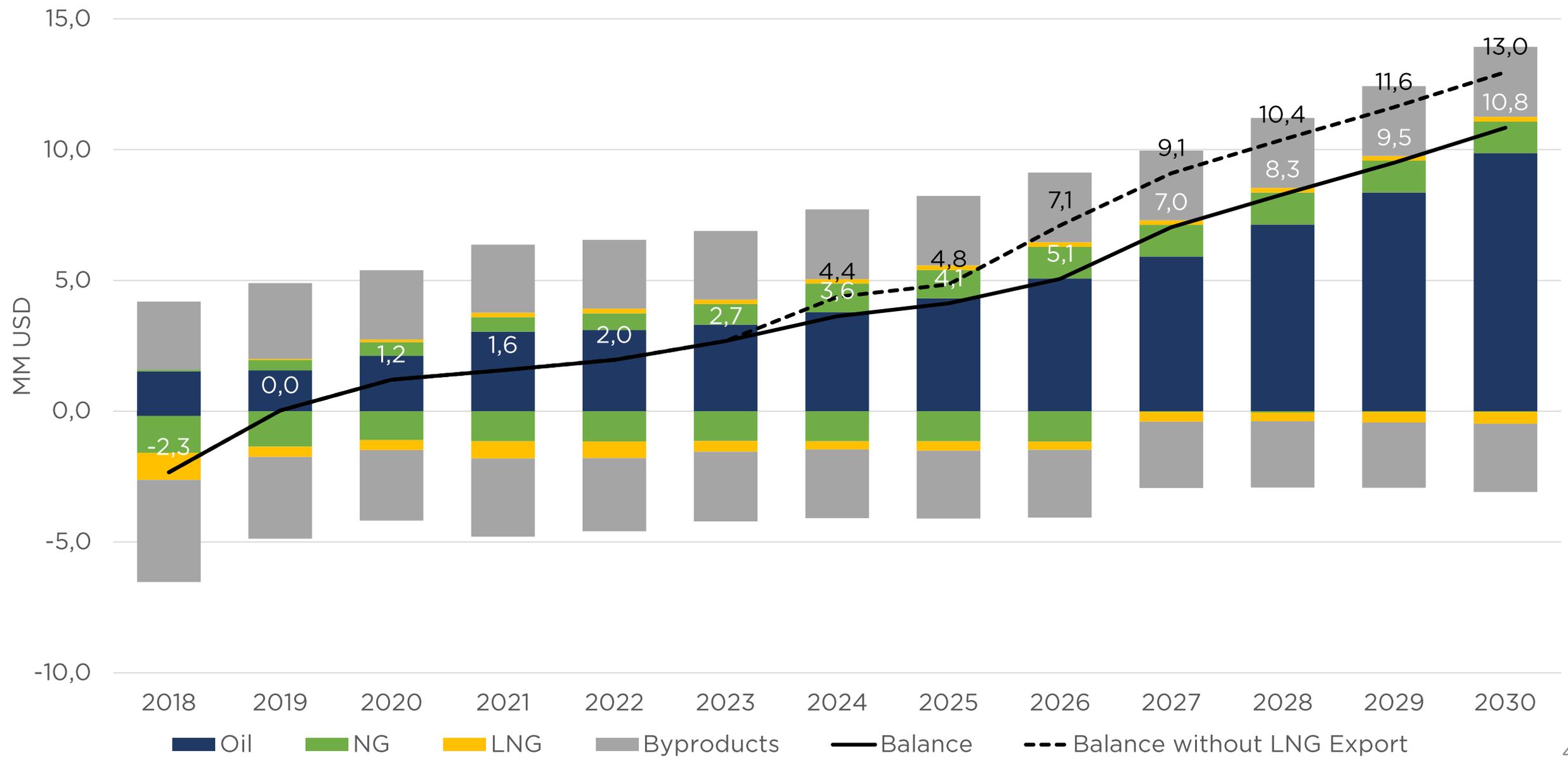
## Scenario with LNG exports

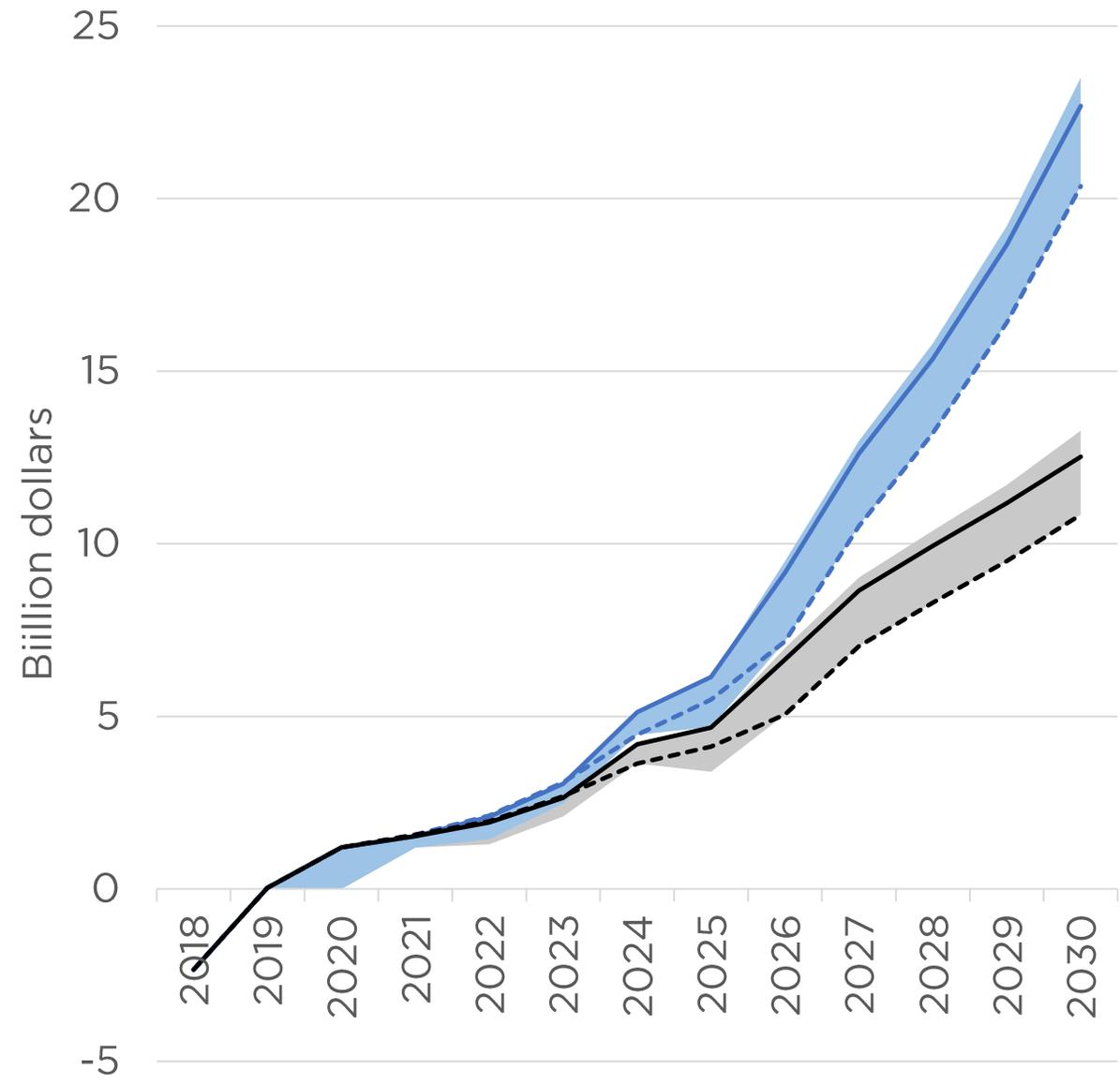
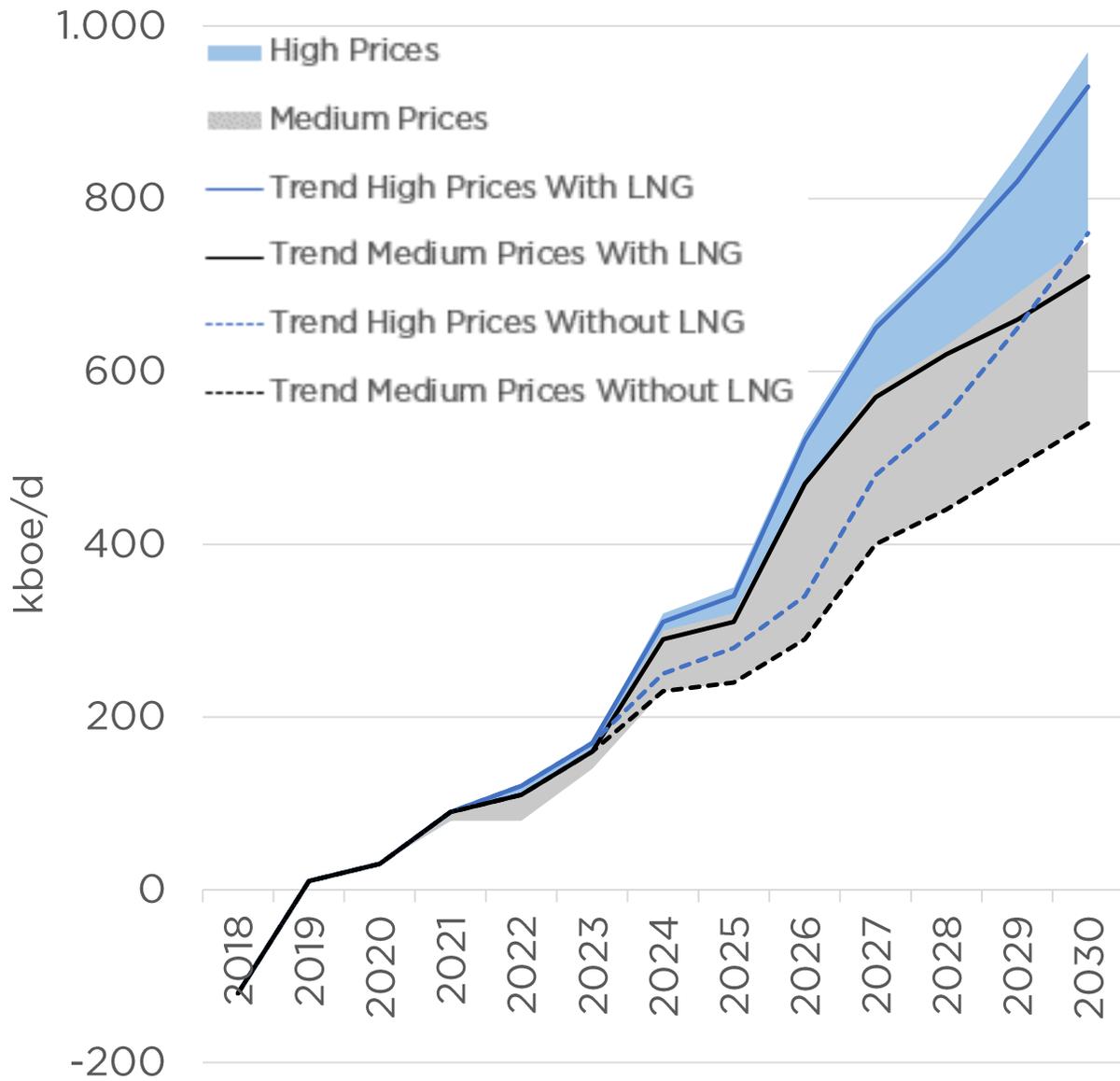
Trend Scenario (Medium Oil Price)



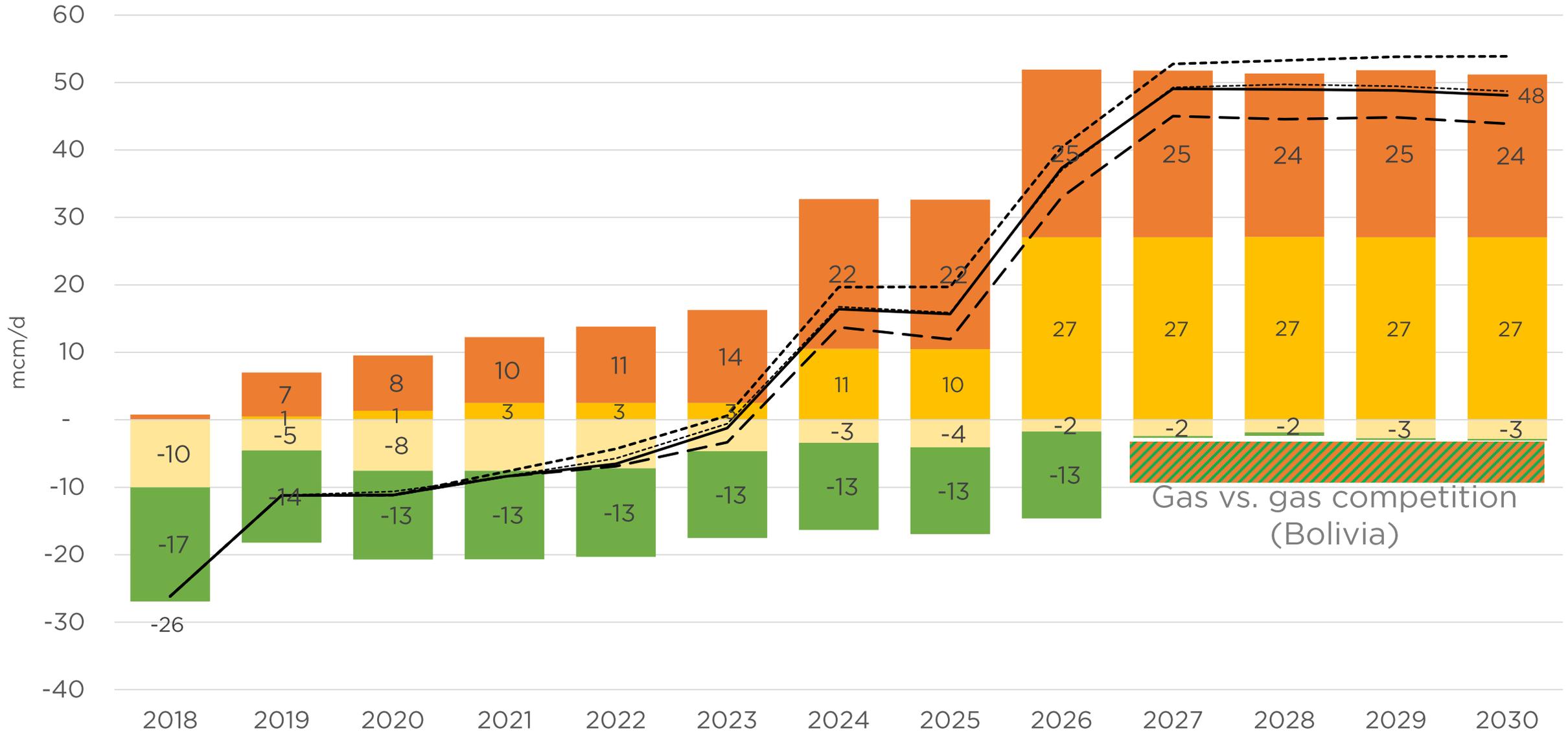
# Trade Balance of Oil, Natural Gas and Byproducts

## Trend Scenario without LNG Exports (Medium Prices)





# Trade Balance of Natural Gas and LNG (for Scenarios with LNG exports)

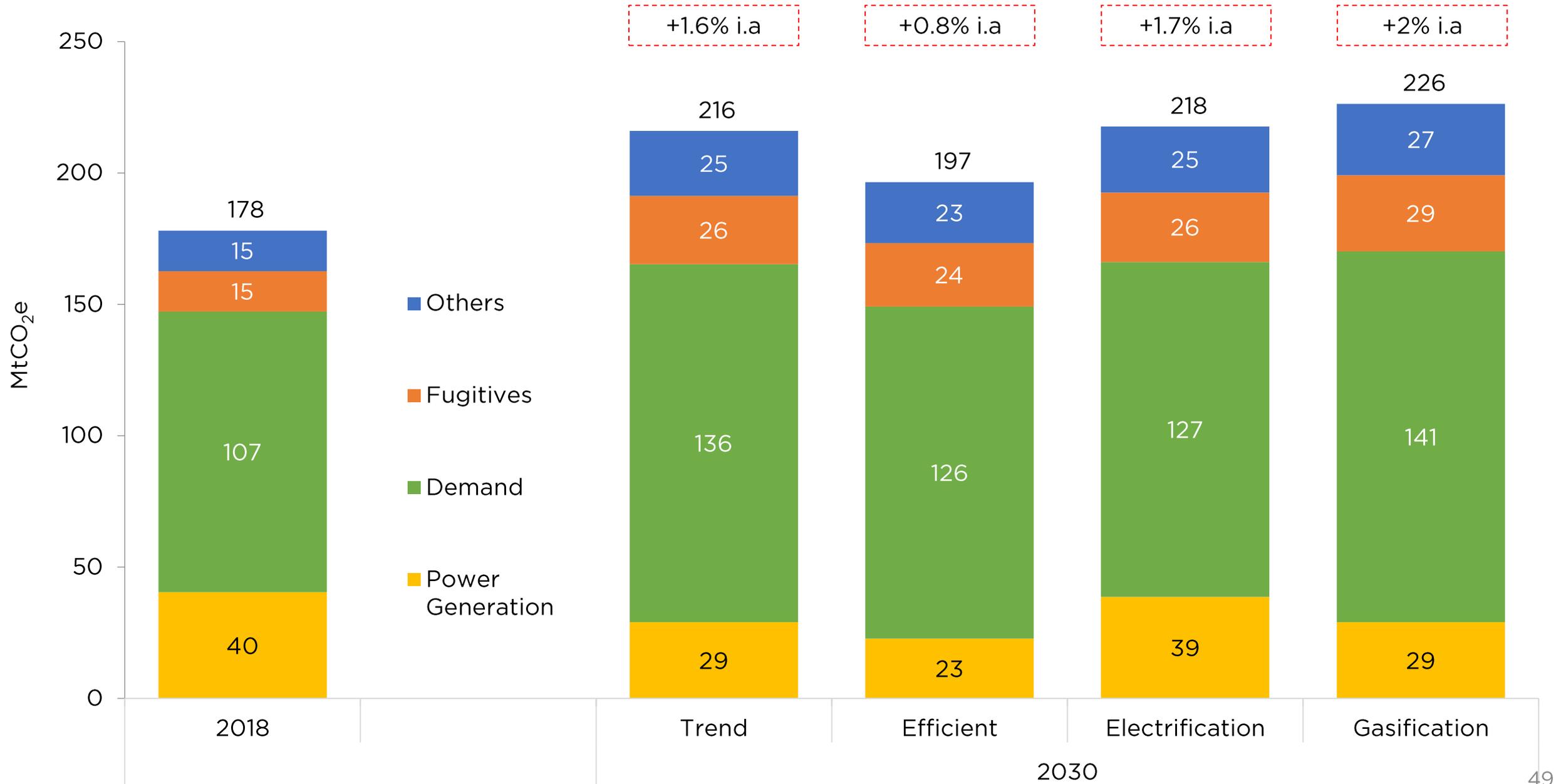


Sumar versión sin GNL en slide siguiente

# Capital investments needed in 2030 energy scenarios

## Scenarios with LNG exports and average prices

Total período (2019-2030)	Sector	Trend	Efficient	Electrification	Gasification
Accumulated investments (M USD)	Upstream unconventional	79,125	76,160	80,814	86,599
	Natural gas transportation	6,259	5,249	6,296	7,810
	Oil transportation	786	786	786	786
	Electricity transportation	13,702	13,702	13,702	13,702
	New power plants	34,994	31,937	46,350	35,700
	Liquefaction Plants *	5,625	5,625	5,625	5,625
	<b>Total</b>		<b>146,778</b>	<b>139,746</b>	<b>159,859</b>
Units	Upstream unconventional (wells)	4,710	4,555	4,798	5,101
	Natural gas transportation (mcm/d)	100	84	101	125
	Oil transportation (mcm/d)	52	52	52	52
	Electricity transportation (GW)	21	21	21	21
	New power plants(GW)	22	19	29	22
	Liquefaction Plants (mcm/d)*	30	30	30	30

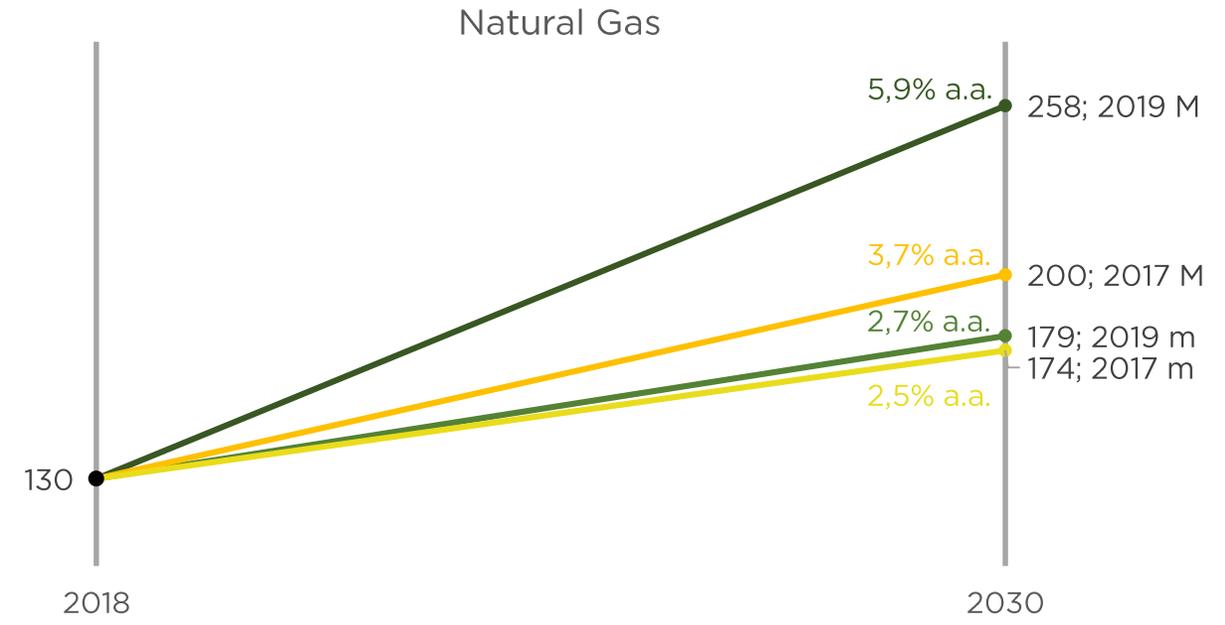
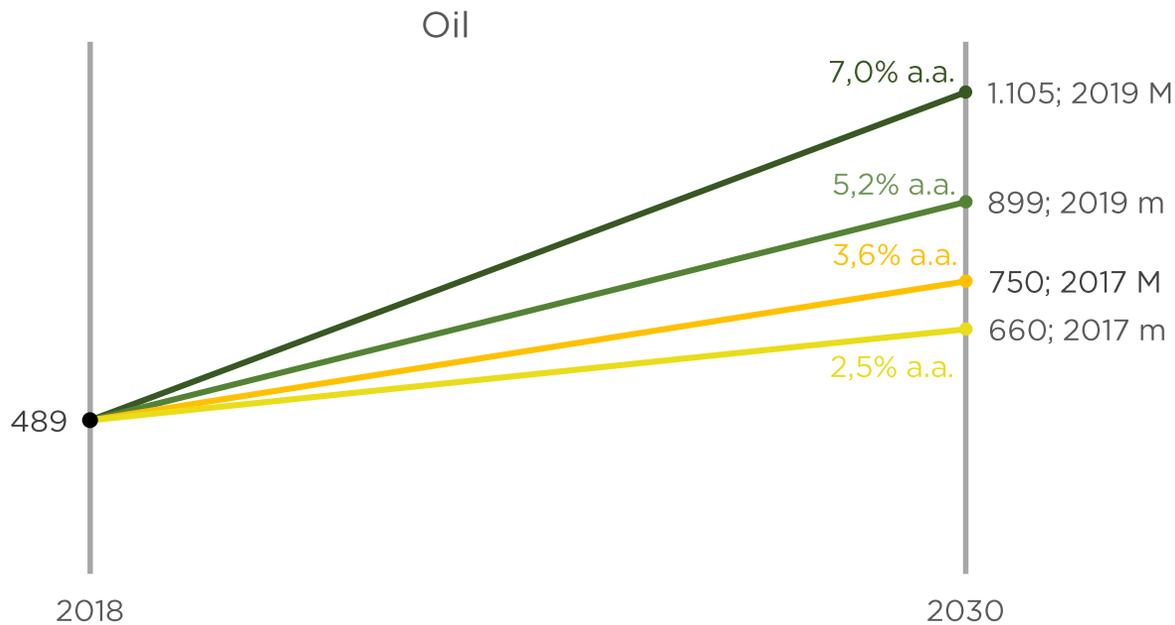
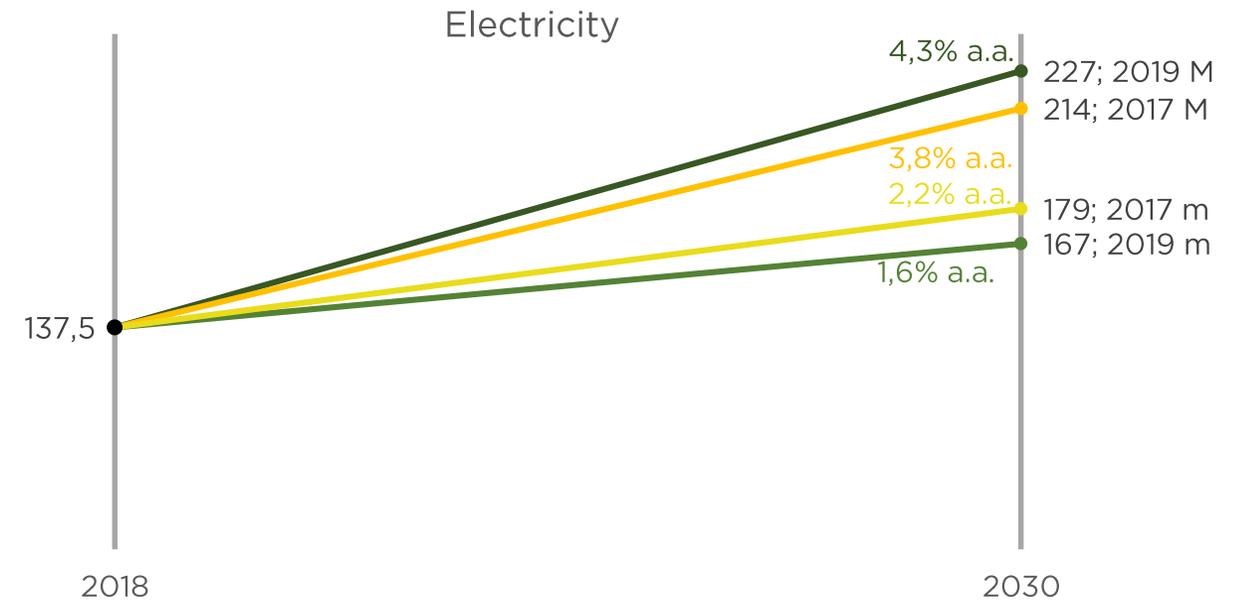
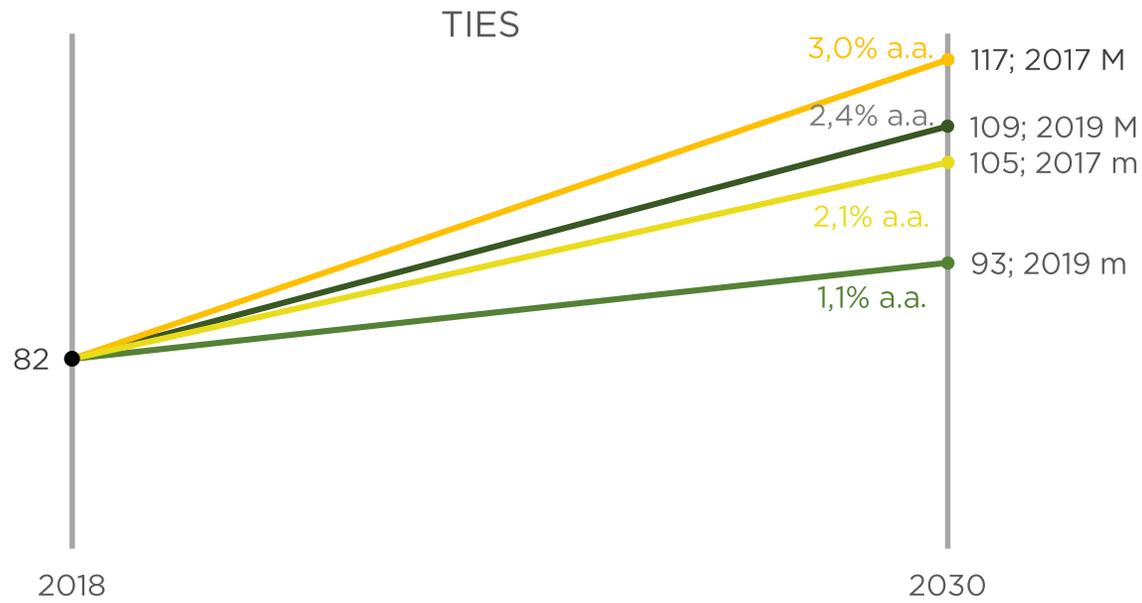


## GHG emissions in Efficient Scenario



## GHG emissions Trend Scenario





Process “Towards a shared vision of the energy transition from Argentina to 2050”



Con el apoyo de



## Advisory Committee

### Participants

Academia Nacional de Ingeniería  
Asociación de Distribuidores de Energía Eléctrica (ADEERA)  
Asociación de Entes Reguladores Eléctricos (ADERE)  
Asociación de Generadores de Energía Eléctrica de la República Argentina (AGEERA)  
Asociación Grandes usuarios de Energía Eléctrica de la República Argentina (AGUEERA)  
Cámara Argentina de Energías Renovables (CADER)  
Centro Argentino de Ingenieros (CAI)  
Comisión Nacional de Energía Atómica (CNEA)  
Comité Argentino del Consejo Mundial de la Energía (CACME)  
Confederación General del Trabajo (CGT)  
Ente Nacional Regulador del Gas (ENARGAS)

Fundación Ambiente y Recursos Naturales (FARN)  
Fundación EcoAndina  
Fundación Vida Silvestre  
Grupo Ex Secretarios  
Instituto Argentino del Petróleo y del Gas (IAPG)  
Instituto Petroquímico Argentino (IPA)  
Instituto Torcuato Di Tella (ITDT)  
Los Verdes-FEP  
Unión de Consumidores de Argentina  
Unión Industrial Argentina (UIA)  
Universidad de Buenos Aires (UBA)  
Universidad Tecnológica Nacional (UTN)  
Consejo Empresario Argentino para el Desarrollo Sostenible (CEADS)

### Viewer

Secretaría de Gobierno de Ambiente y Desarrollo Sustentable  
Secretaría de Gobierno de Agroindustria  
Ministerio de Producción y Trabajo  
Ministerio de Transporte





The proposal was to build consensus on the desired situation for the Argentine energy system by 2050 (in other words, the Transition Objectives).

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**Coordination of Electricity Forecasting**

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**Latest versions and updated data:**

<https://www.argentina.gob.ar/energia/planeamiento-energetico>

<http://datos.energia.gob.ar/dataset/escenarios-energeticos>

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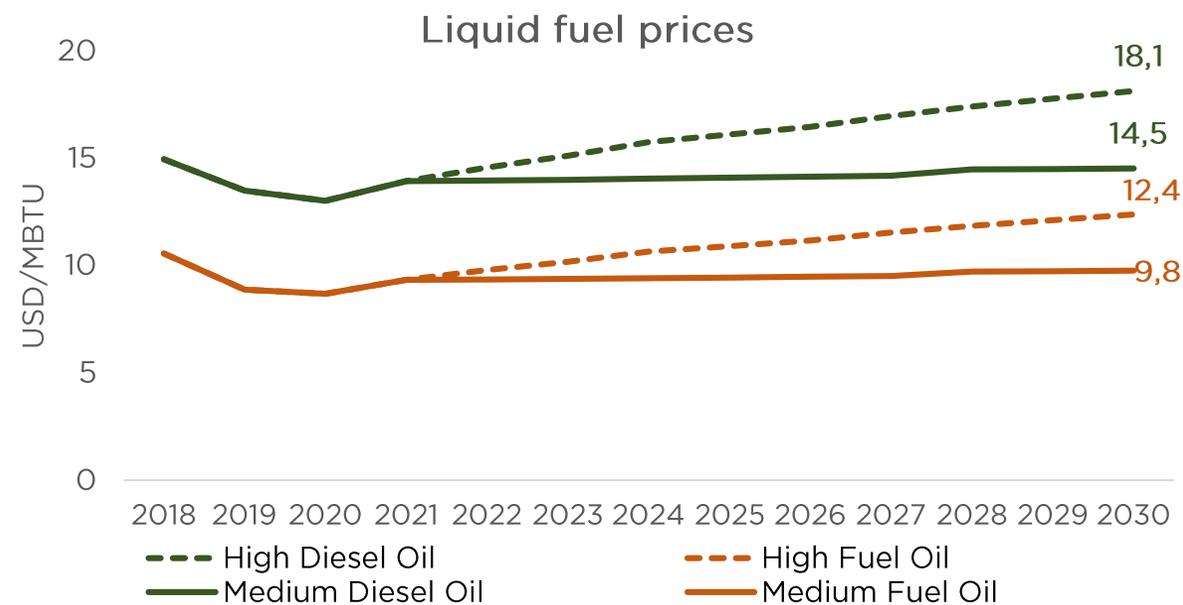
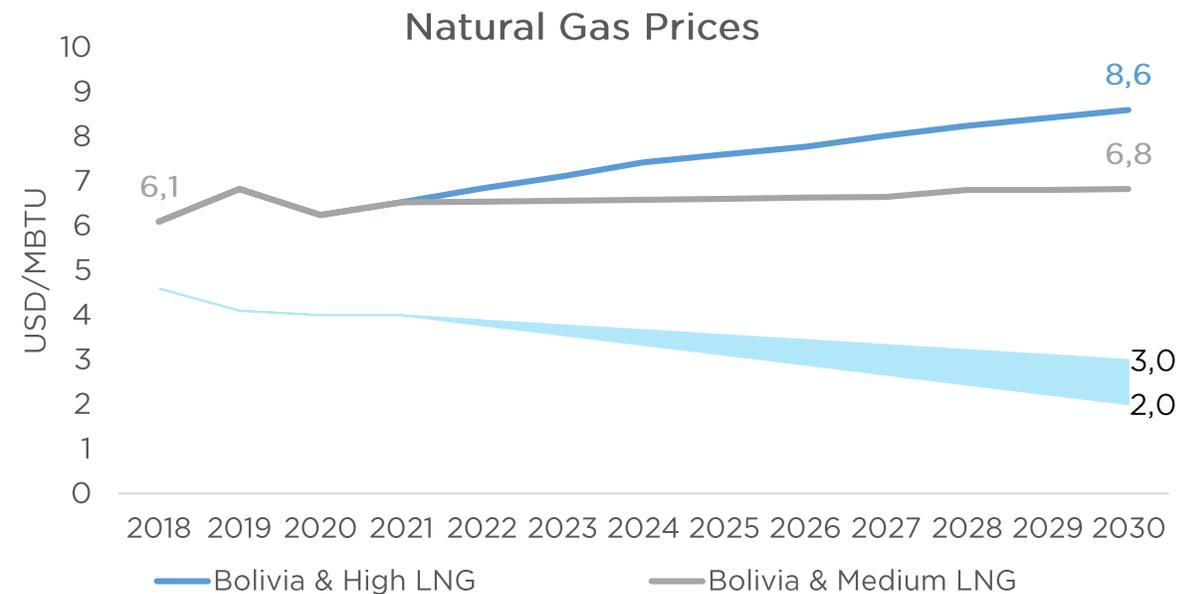
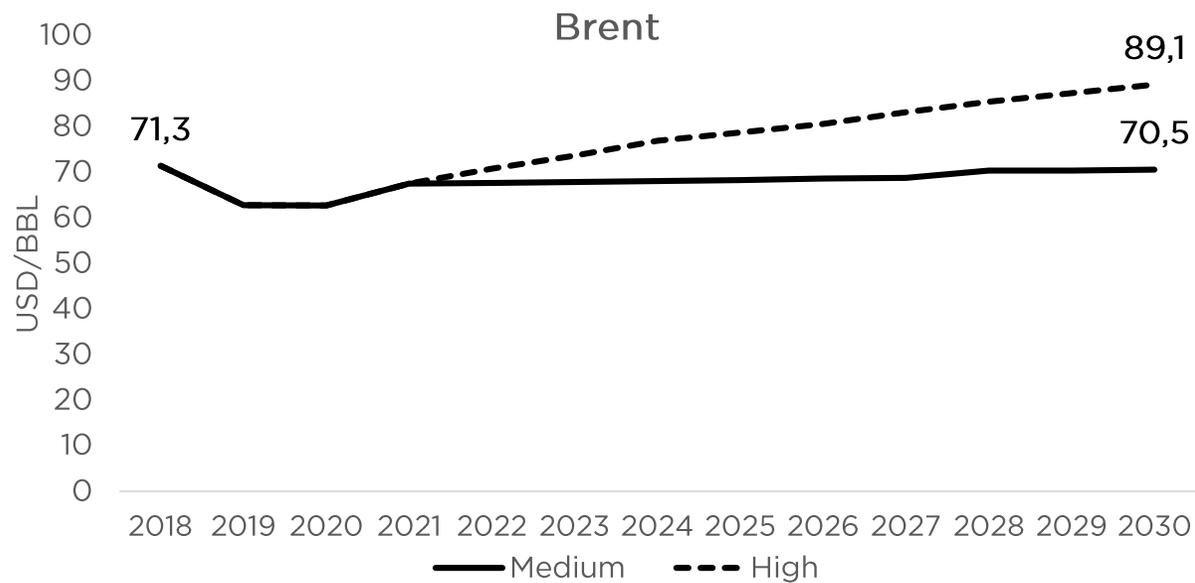
**Coordination of Inter-ministerial Programmes**

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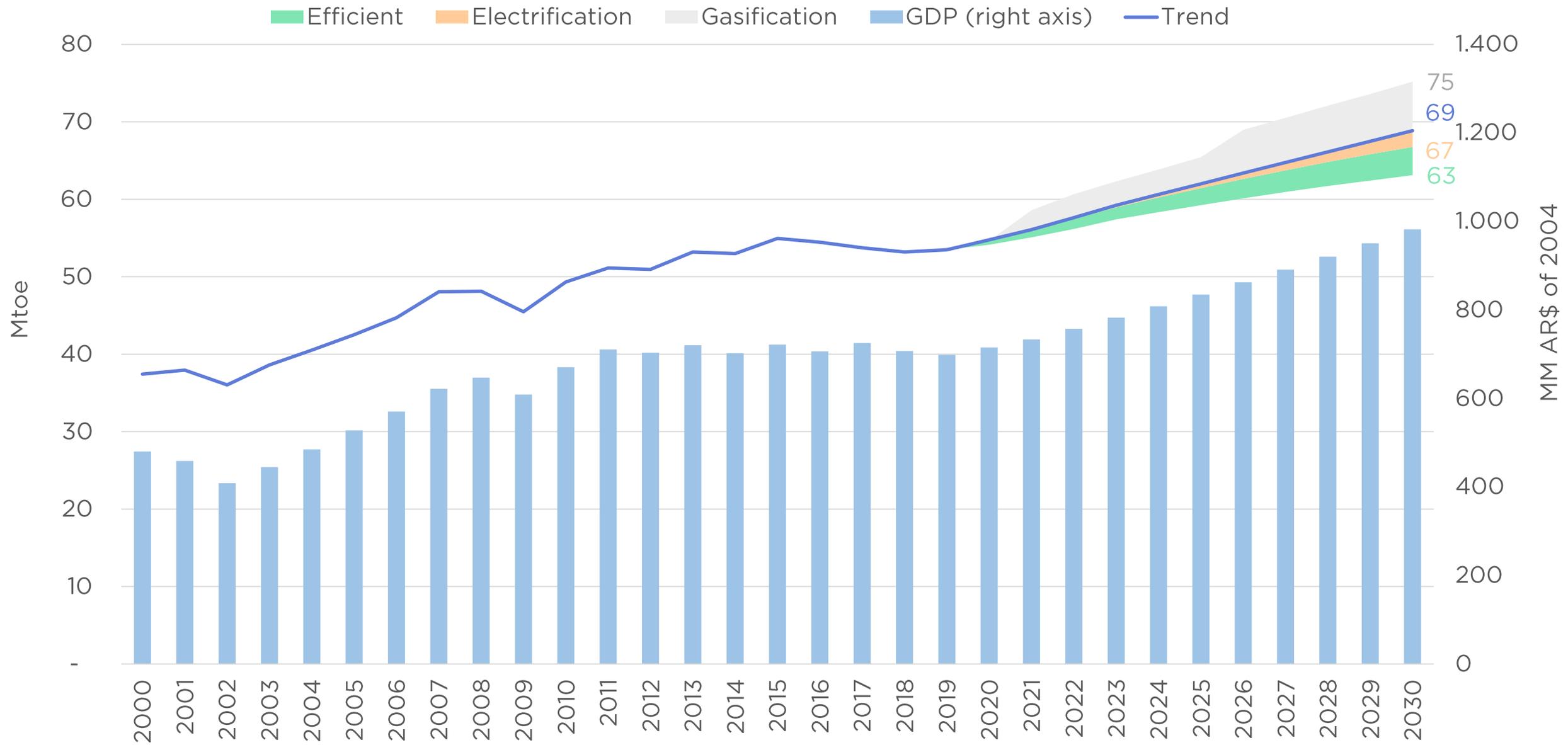


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# Annex

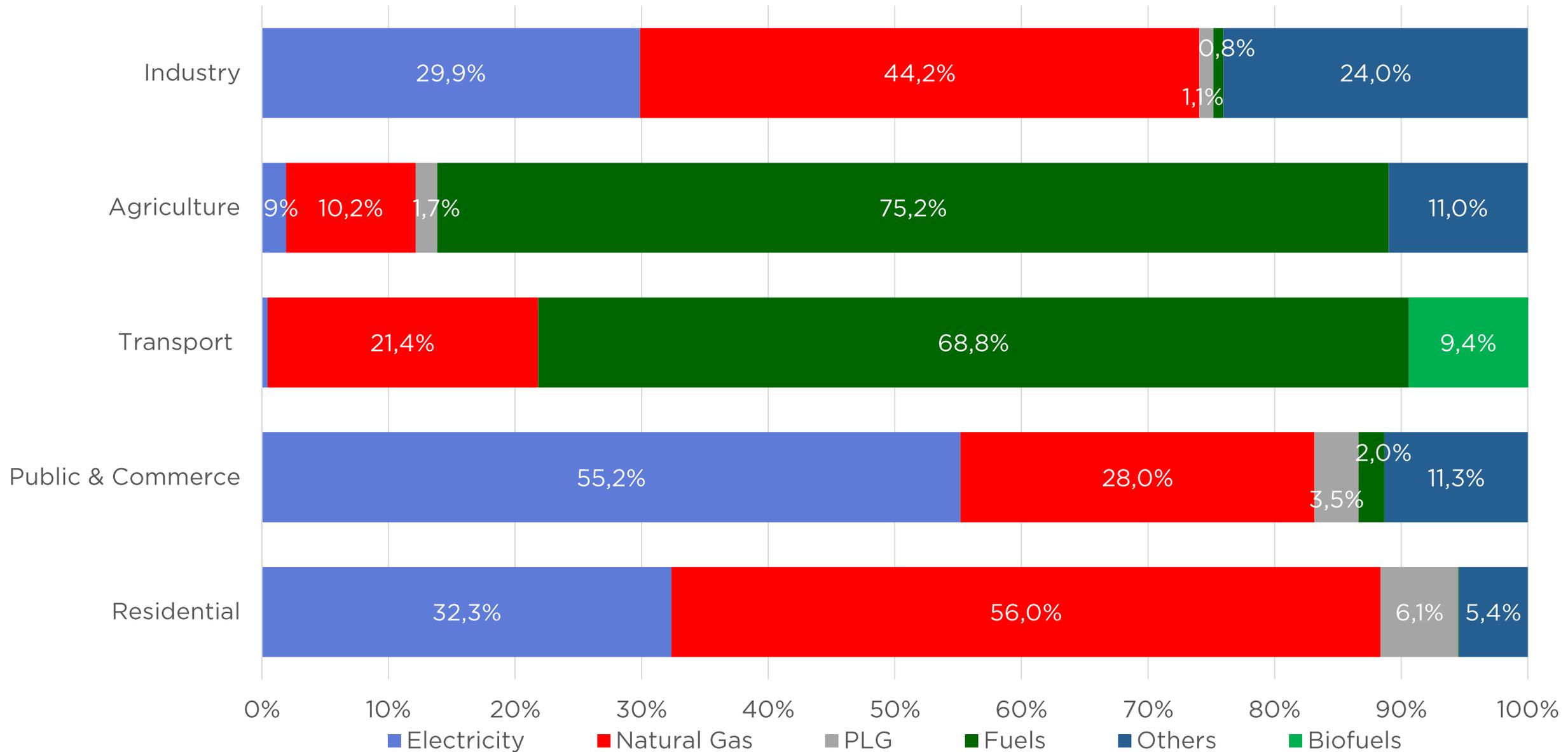


# GDP and Final Consumption



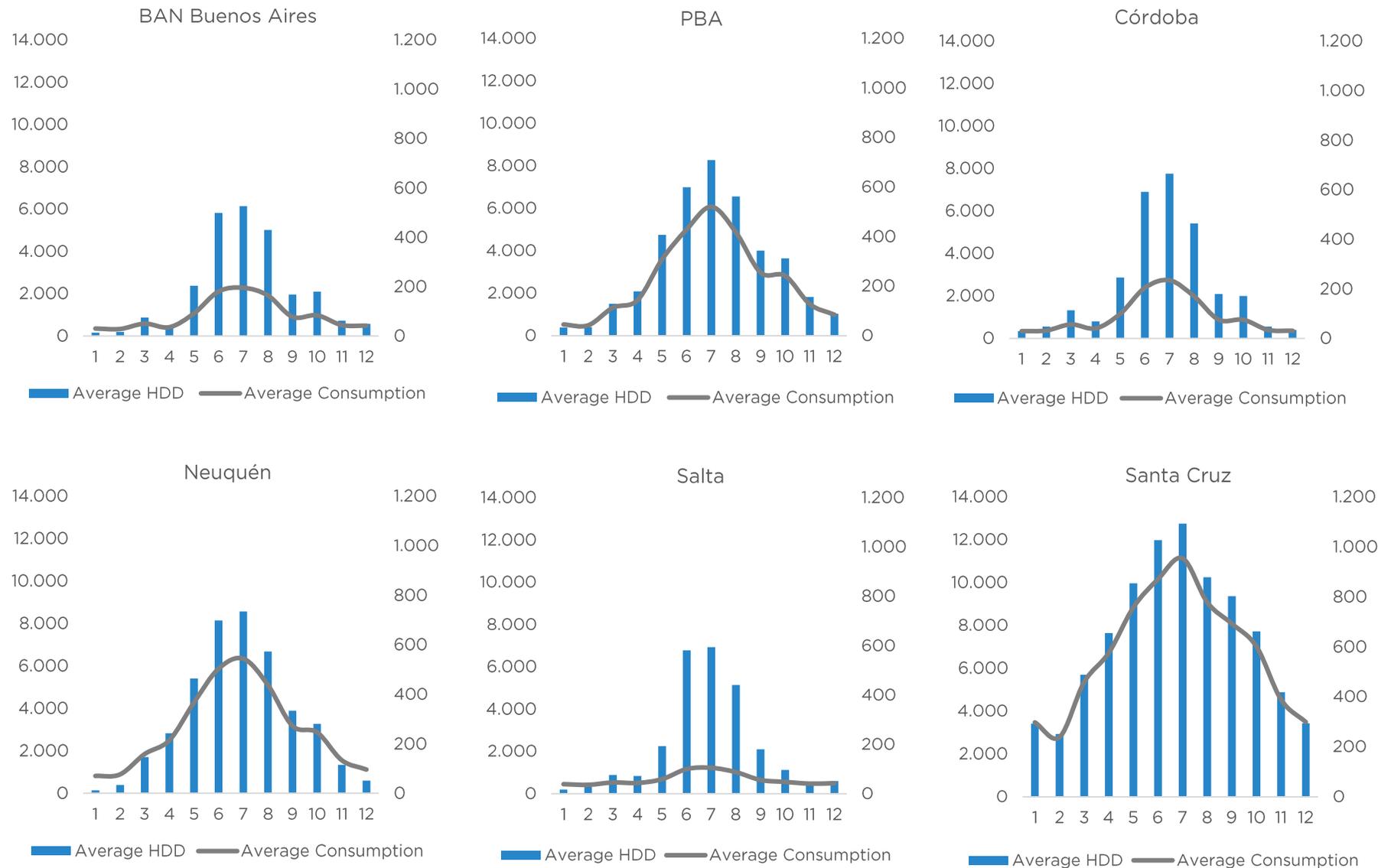
Note: total demand does not include non-energy consumption.

# Final Consumption Structure by Segments



Note: total demand does not include non-energy consumption.

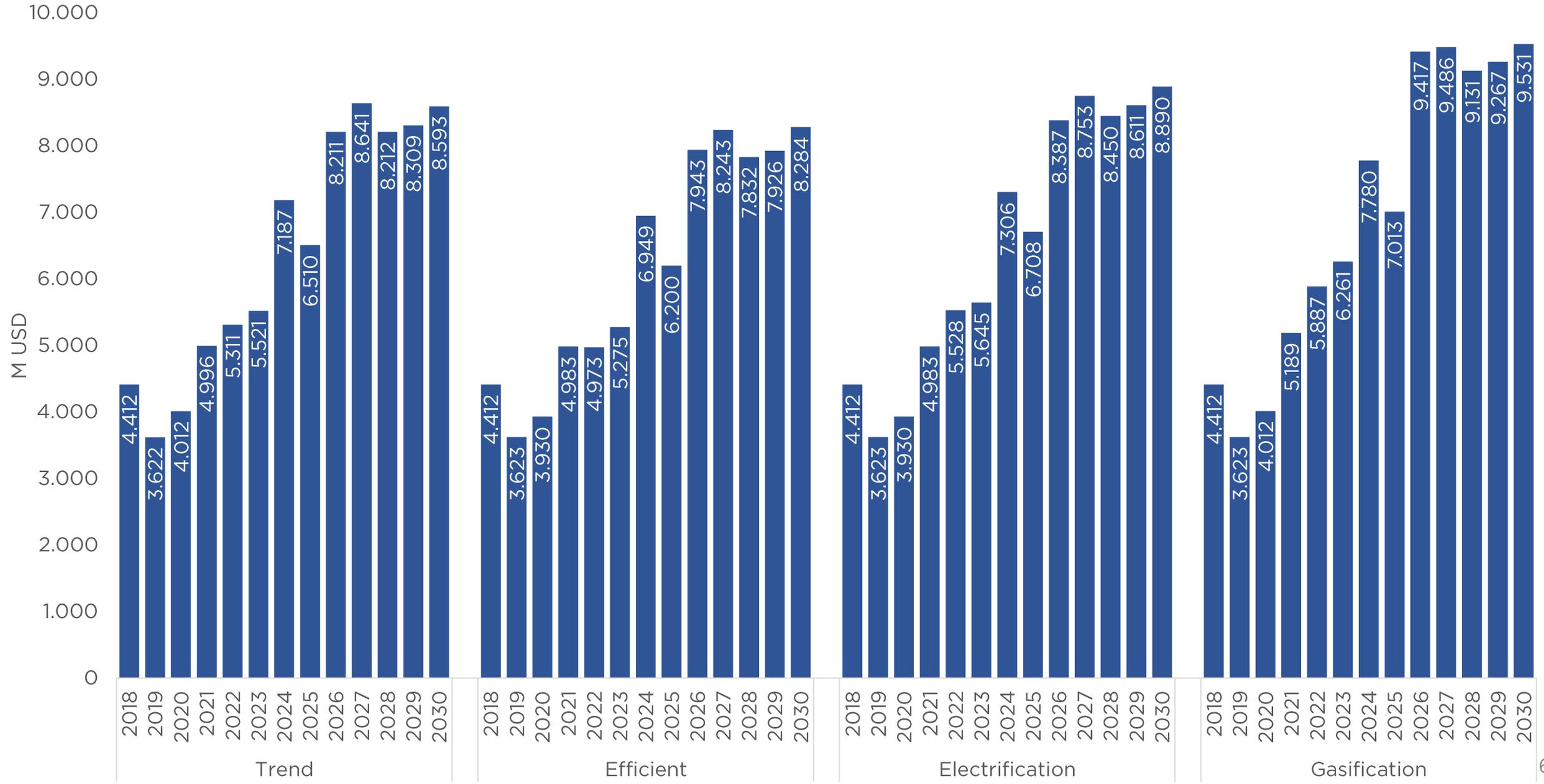
## Average Consumption Per User And Deficit Of Heating Degree Days (HDD)



## Growth population, 2020-2030

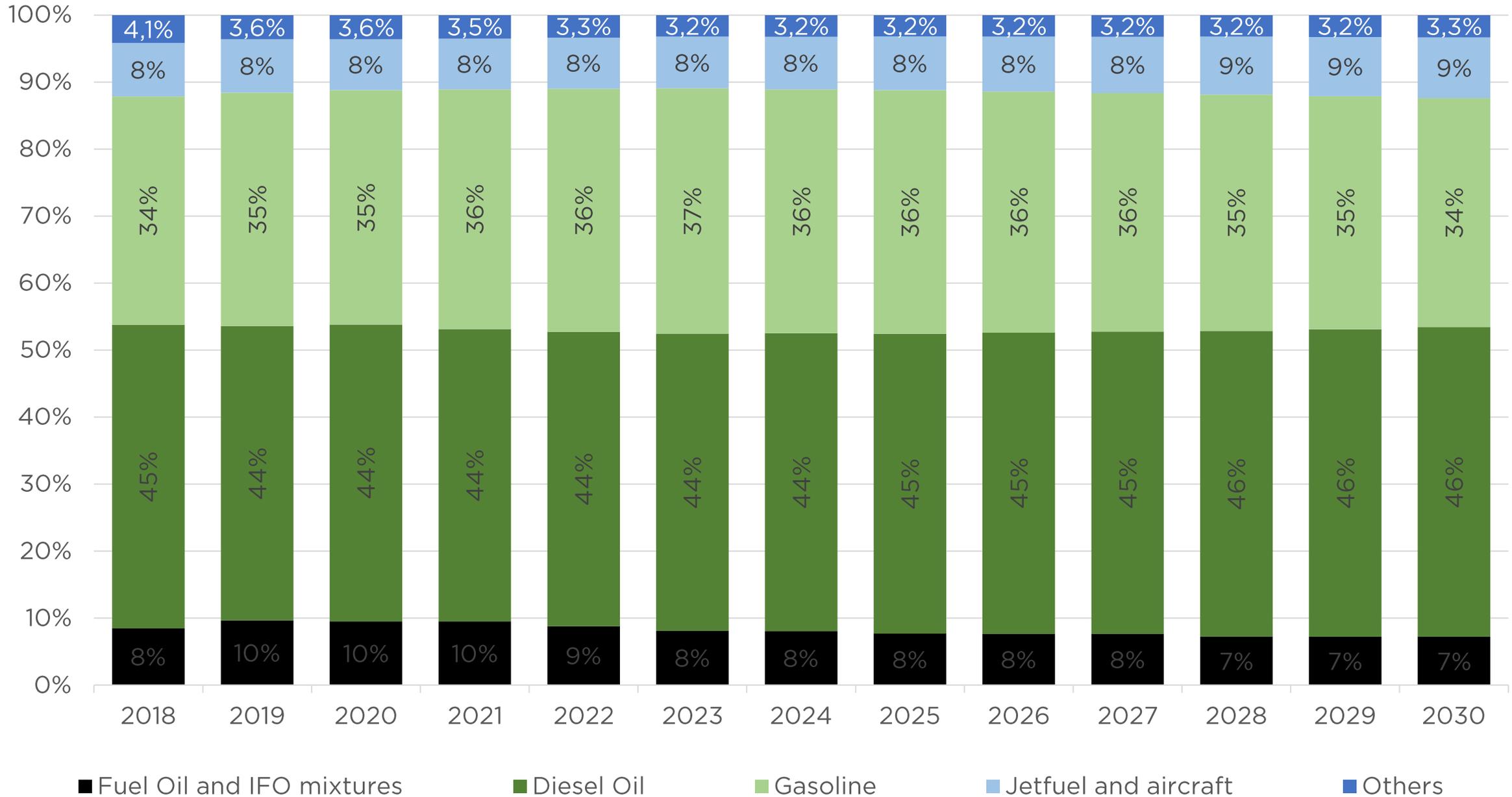
Year	Housing	Population
2020	14,7	45,4
2021	14,9	45,8
2022	15,2	46,2
2023	15,4	46,7
2024	15,7	47,1
2025	16,0	47,5
2026	16,2	47,9
2027	16,5	48,3
2028	16,7	48,7
2029	17,0	49,0
2030	17,3	49,4

# Investments Unconventional Wells



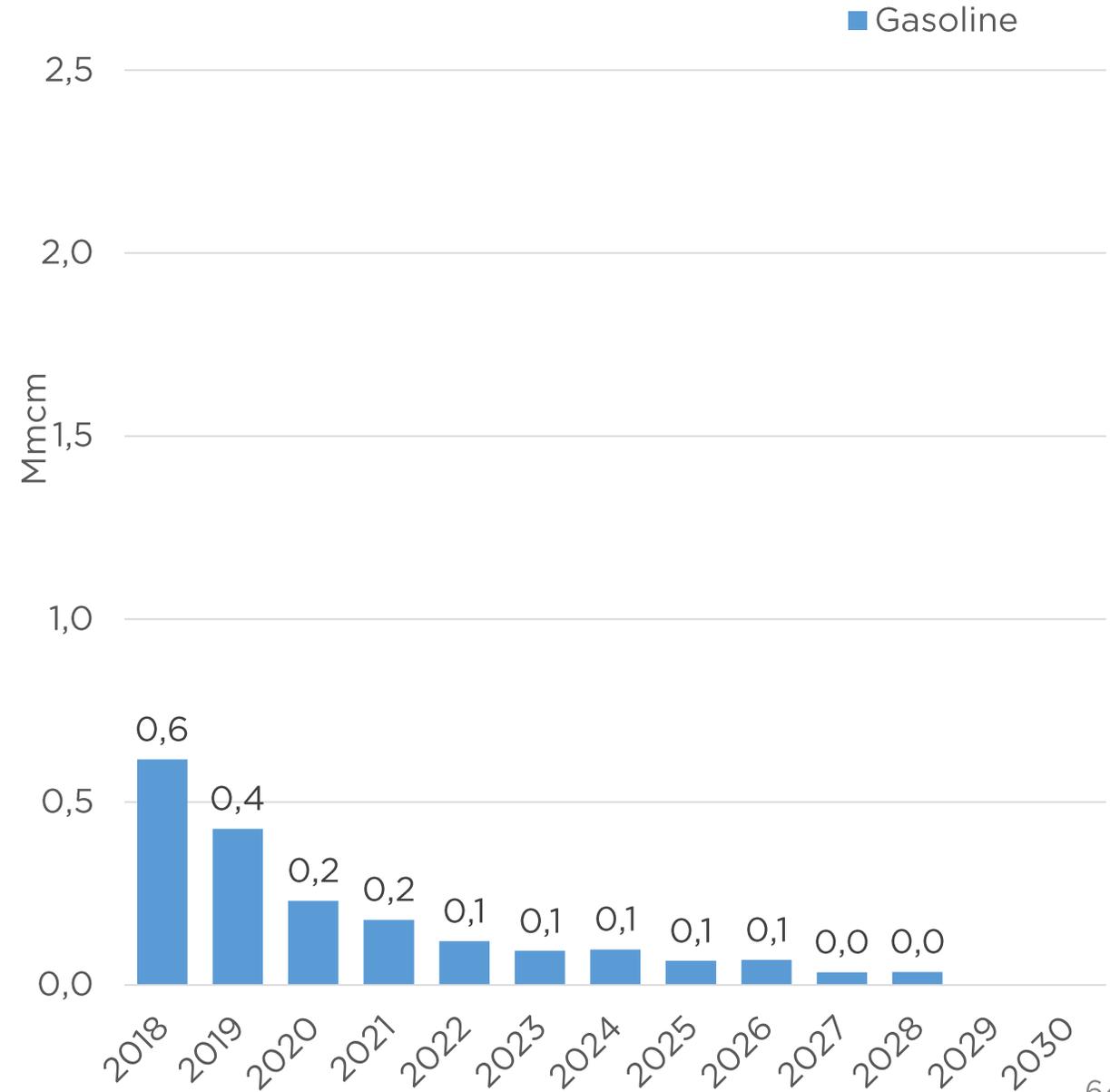
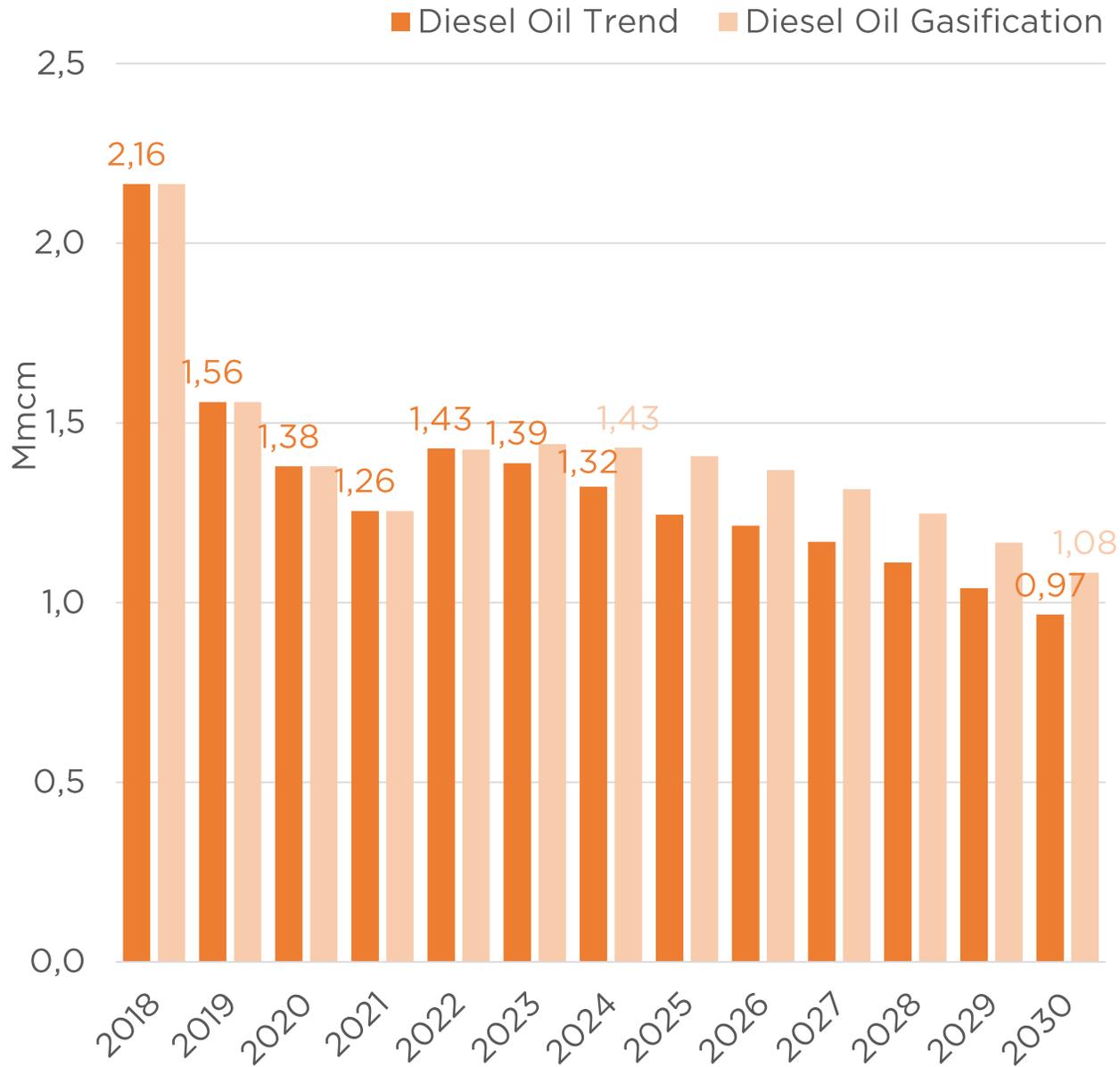
# Refining Sector Evolution

## Yield and mix of the refining park



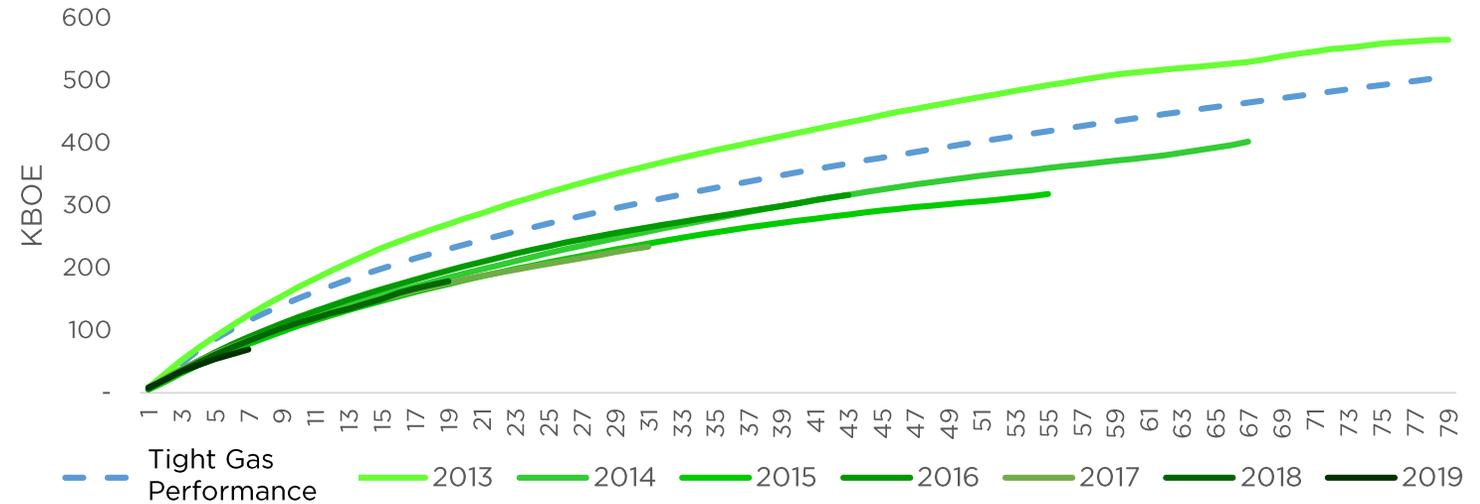
# Evolution of the refining sector

## Imports of gasoline and diesel



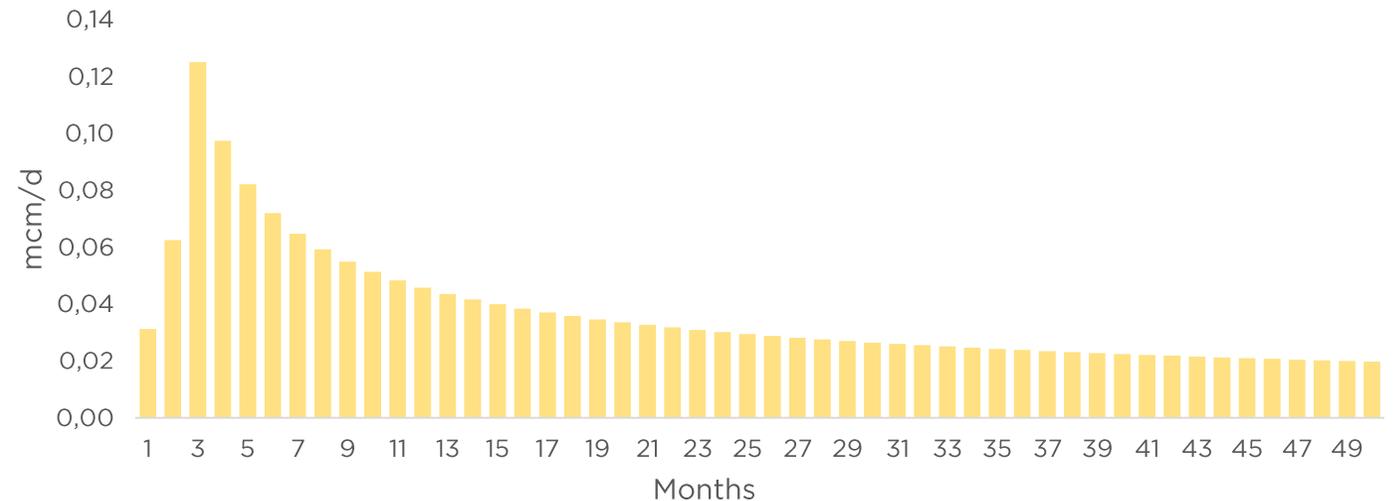
- ✓ EUR = 147 millions cubic meters (mcm) NG (5.2 BCF)
- ✓ EUR total = 1,041 Kboe
- ✓ CapEx = 6.5 M USD + 15% *Facilities*
- ✓ OpEx = 4.7 USD/BOE (1 USD/MMBTU)
- ✓ IP30: 0.13 mcm/d gas
- ✓ GOR = 12.100 (cm NG/cm oil)

## Productivity of tight gas wells

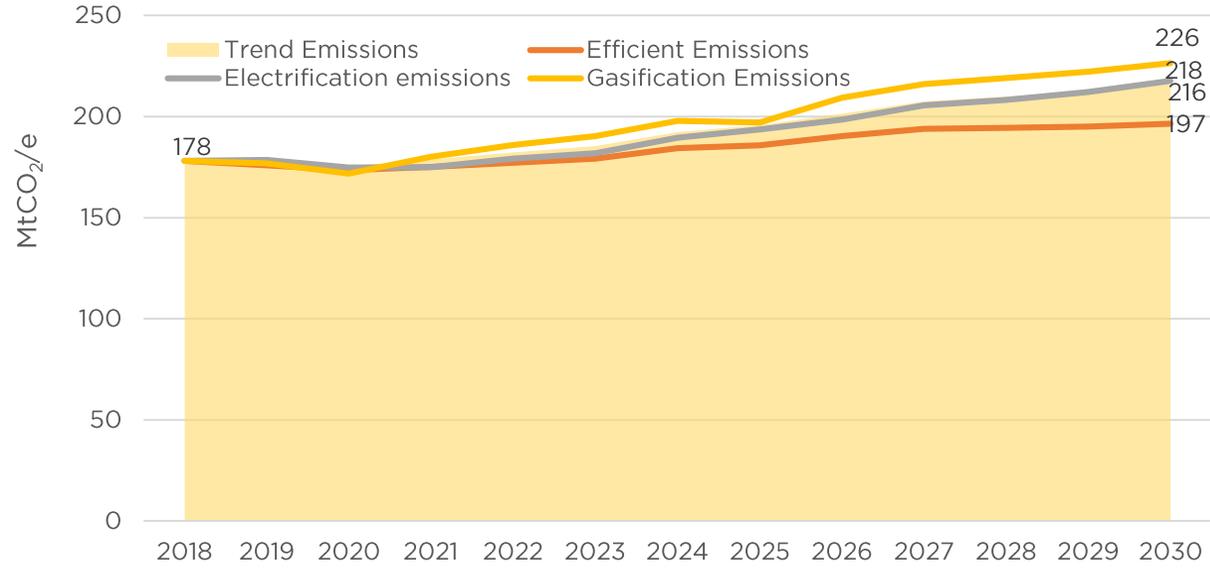


- ✓ Accumulated production 1° year = 16.5%
- ✓ Accumulated production 4° year = 37.4%
- ✓ Declination 1° year = -46%
- ✓ Annual declination from 2° year = -6%

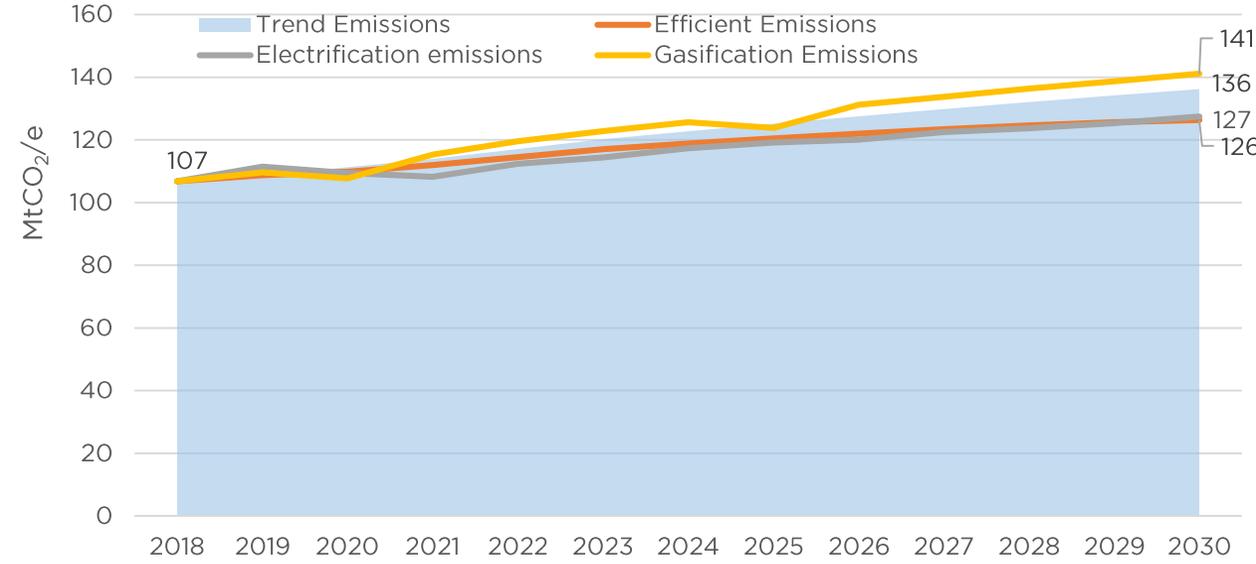
## Tight Gas Performance



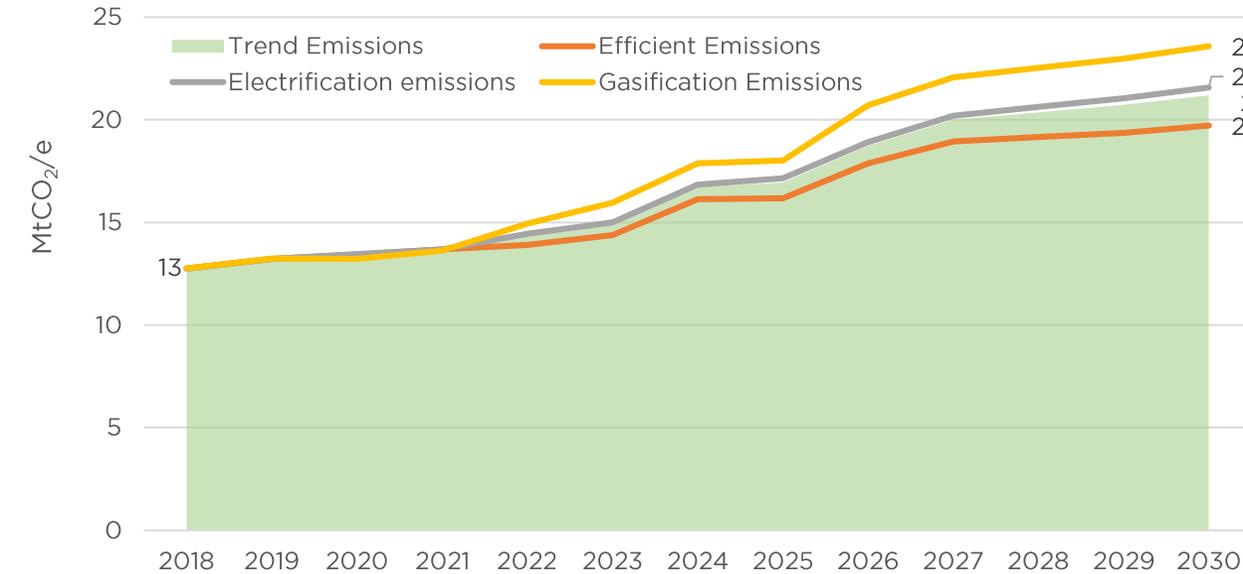
### Total Emissions



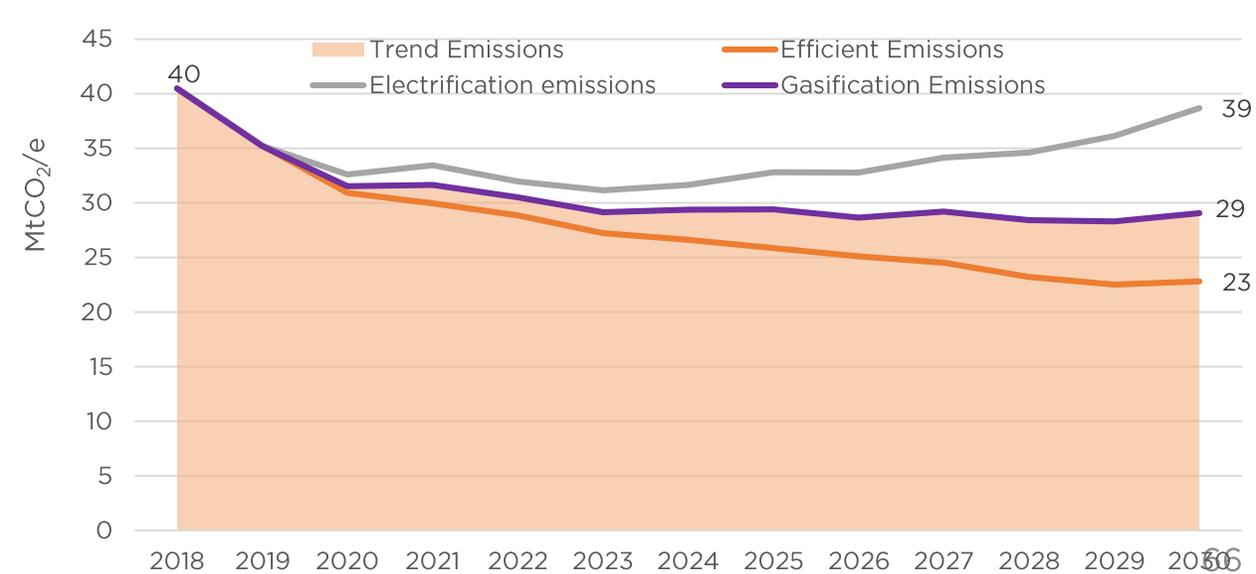
### Final Demand Emissions



### Fugitive Emissions



### Power Plant Emissions



# New Policy Scenarios

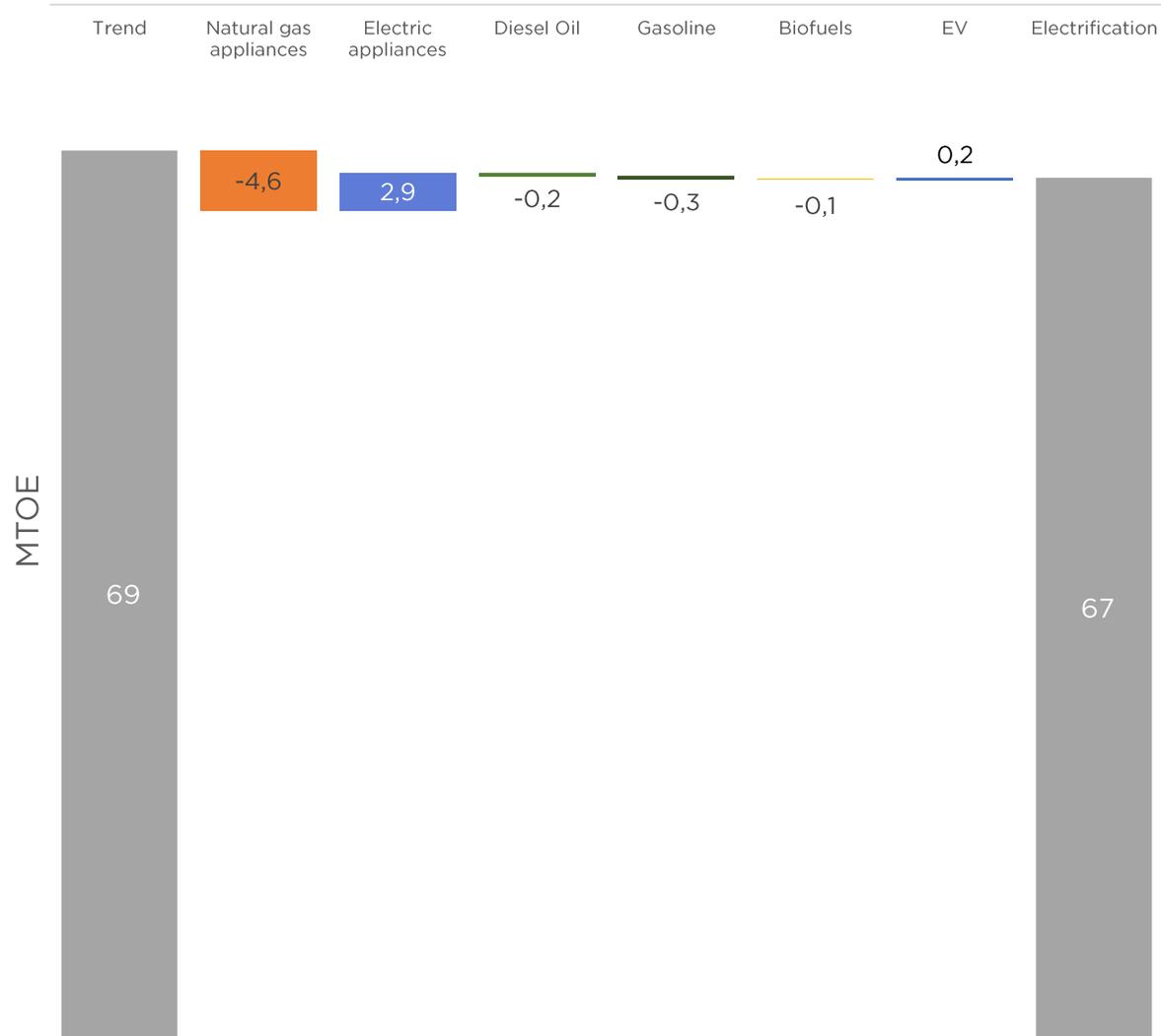
## Industrialization of natural gas and mass electrification

December 2019

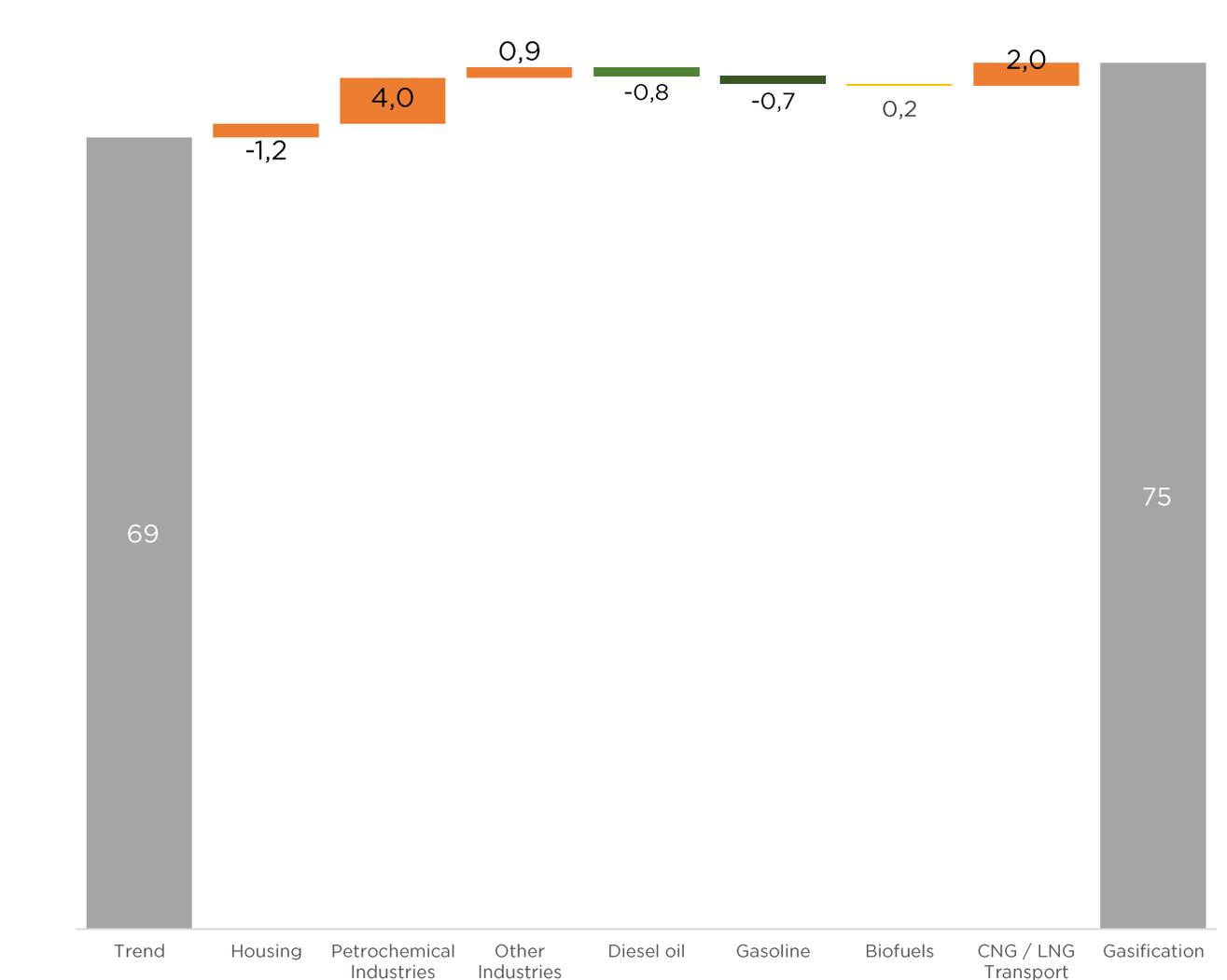


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Presidencia de la Nación

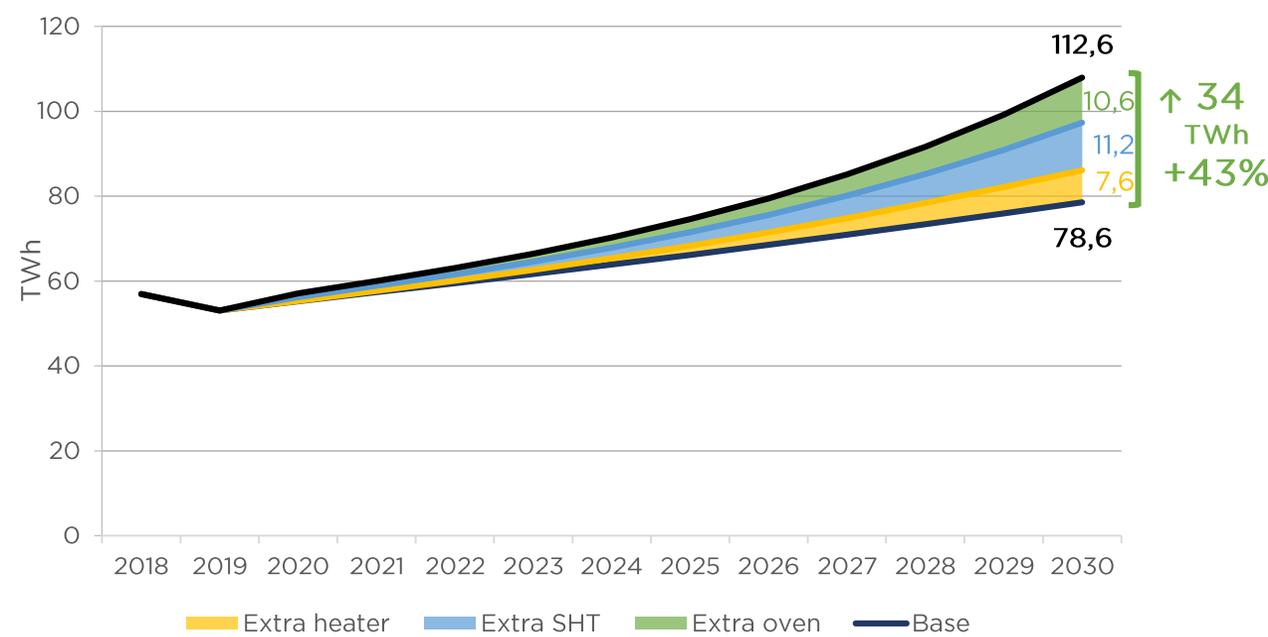
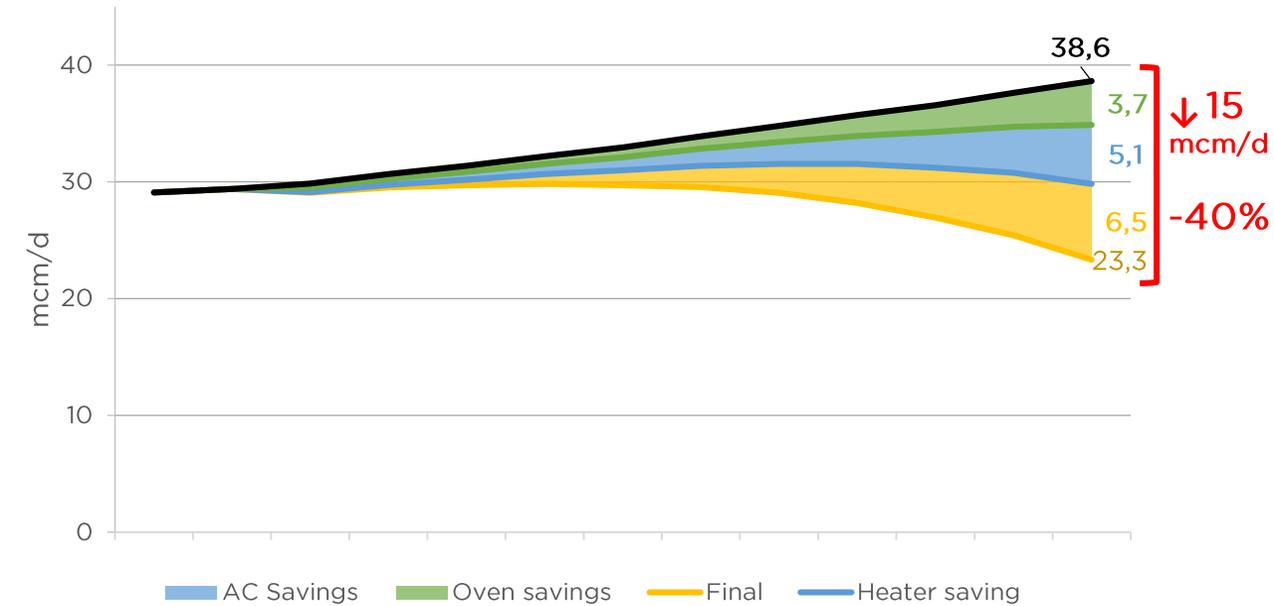
## Electrification



## Gasification



# Electrification in the Residential sector

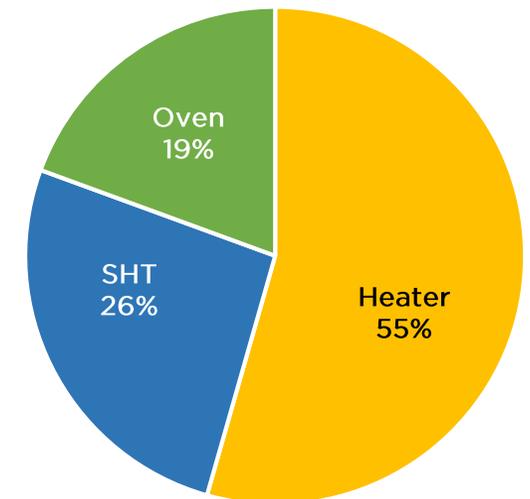


Appliances	Performance (Net Energy/ Net )
Natural Gas oven	0.50
Electric oven	0.70
Natural Gas water heater	0.80
Natural Gas thermo water heater	0.64
Electric thermo water heater	0.95
Natural Heater	0.65
Gas water heater	3.32
Electric heater	1.00

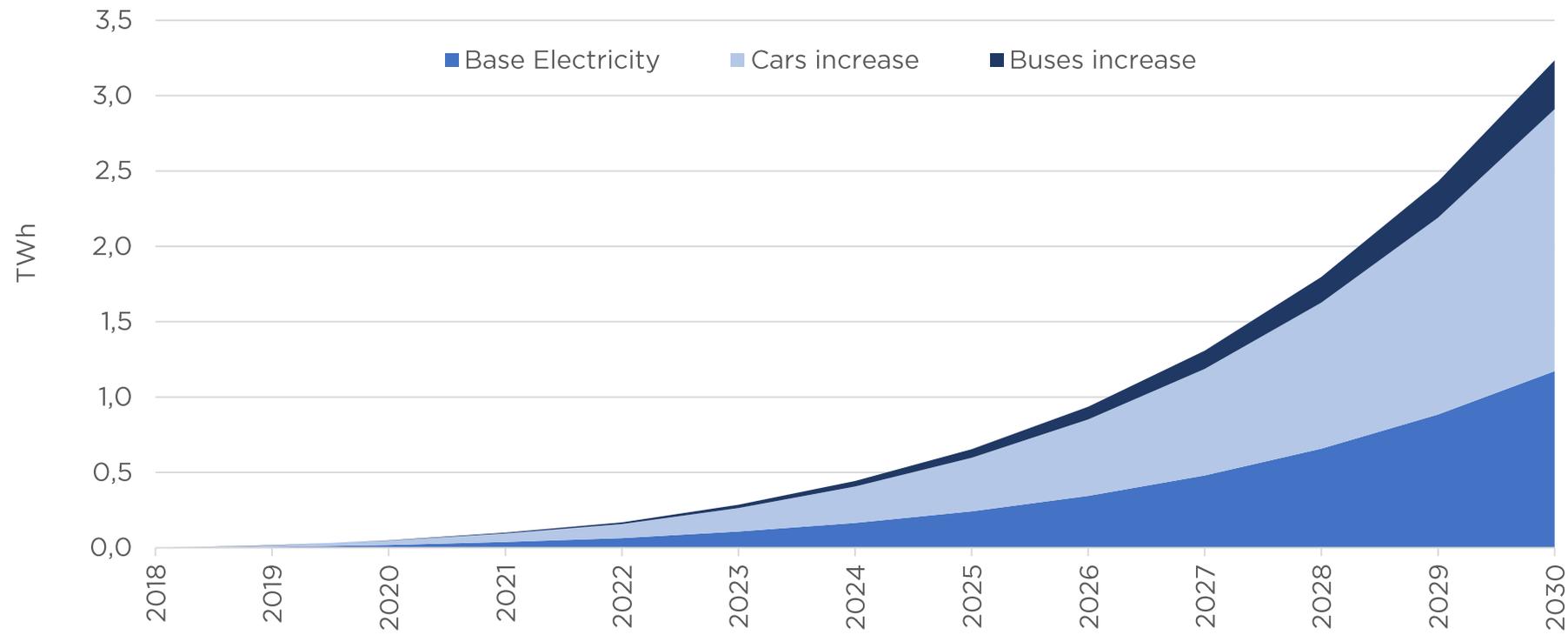
### In 2030:

- 80% of heater sales will be electric.
- Half of the kitchen and water heater park will be electric.

### Current distribution of residential Ng consumption



Notes: 1. A gas appliance was replaced by the electrical equivalent.  
2. In the case of heating, 70% was replaced by AA and 30% by electric heater.



Differences in fuel consumption in transport

	Mmcm Gasoline	Mmcm Bioethanol	Mmcm Diesel oil	Mmcm Biodiesel	Mmcm CNG	thousand Tn LNG	TWh Electricity
Trend	9.4	1.7	13.7	1.78	16.2	0.4	1.2
Electrification	9.0	1.7	13.4	1.75	16.2	0.4	3.2
Differential abs.	-0.4	0	-0.3	-0.03	0	0	2.0
Differential %	-4.0%	0.2%	-2.0%	-1.7%	0.0%	0.0%	175.9%

# Trade Balance

Scenarios

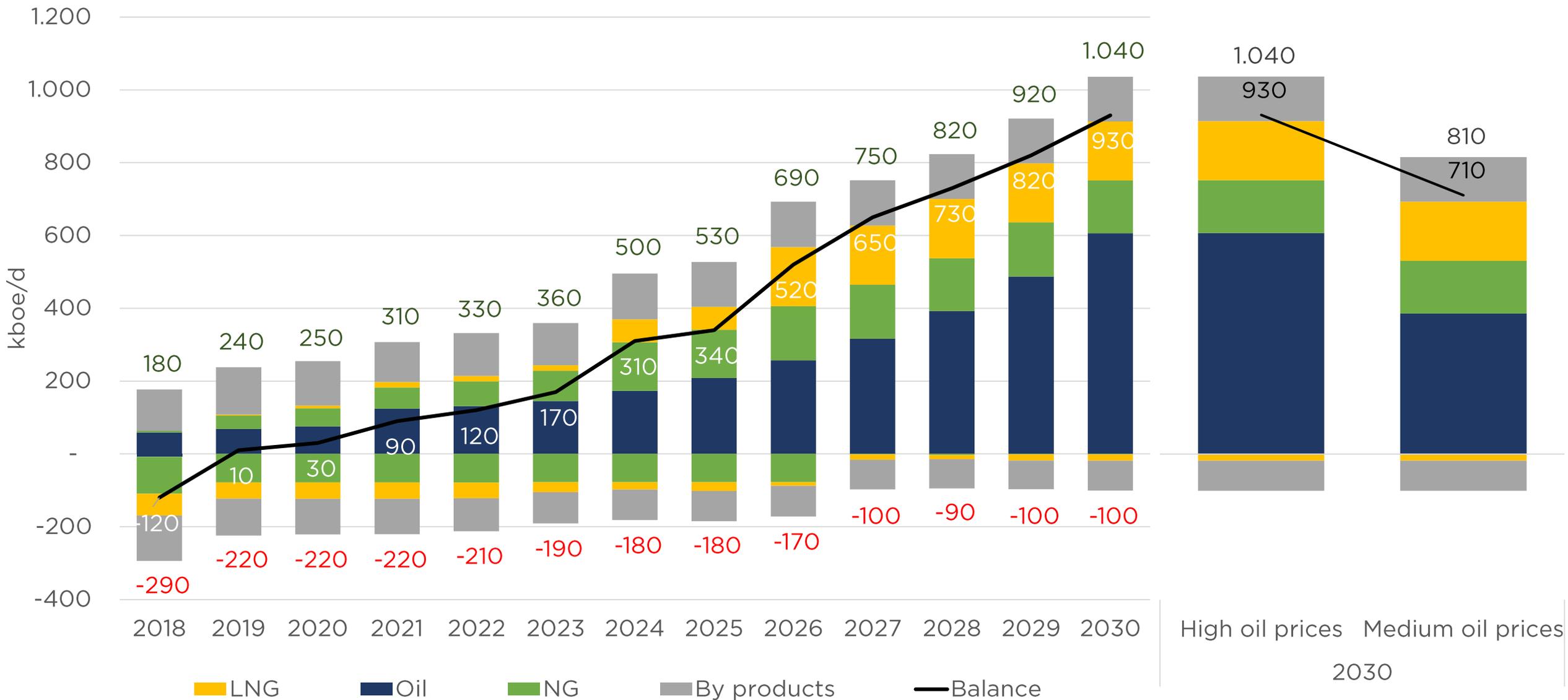
December 2019



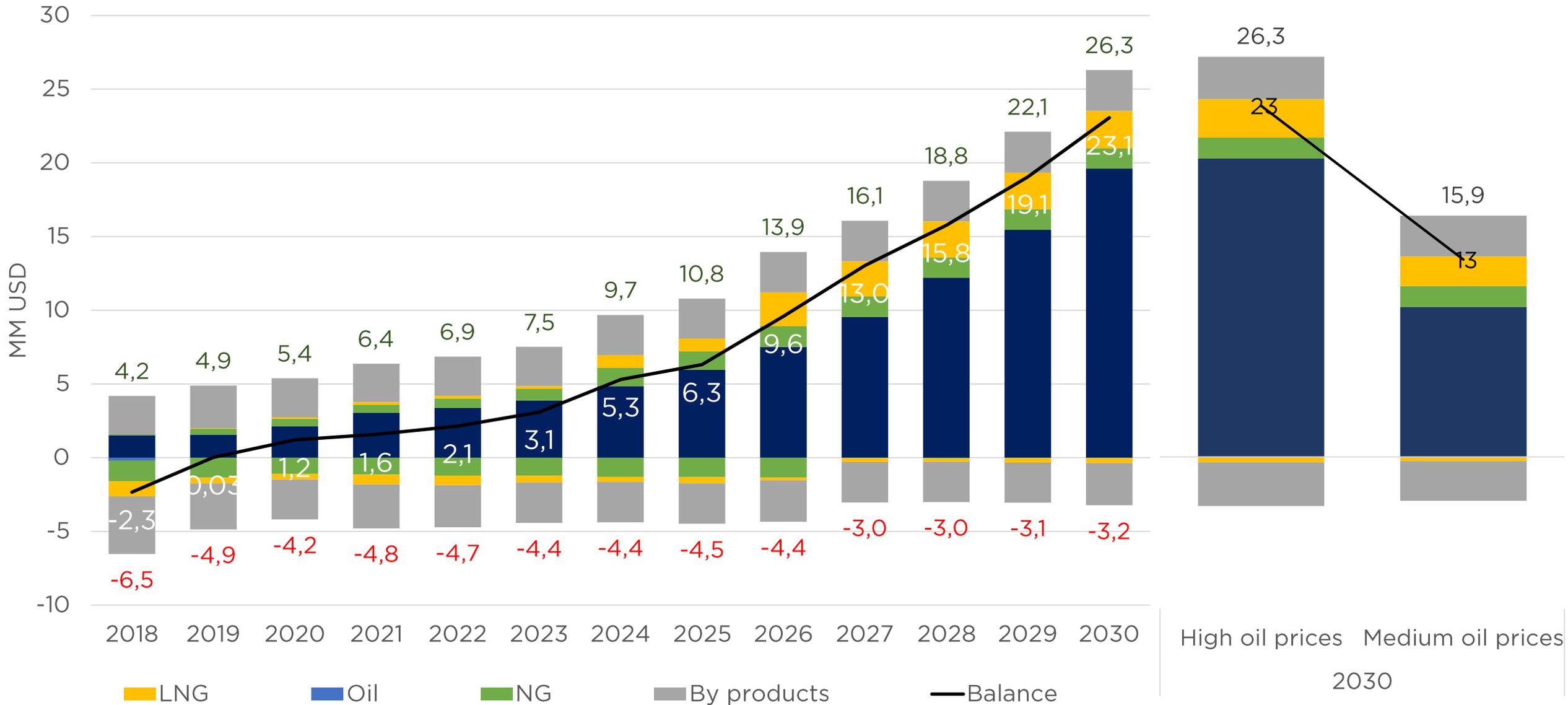
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# Trade Balance of Oil, Natural Gas and Byproducts

## Trend Scenario (High Prices)

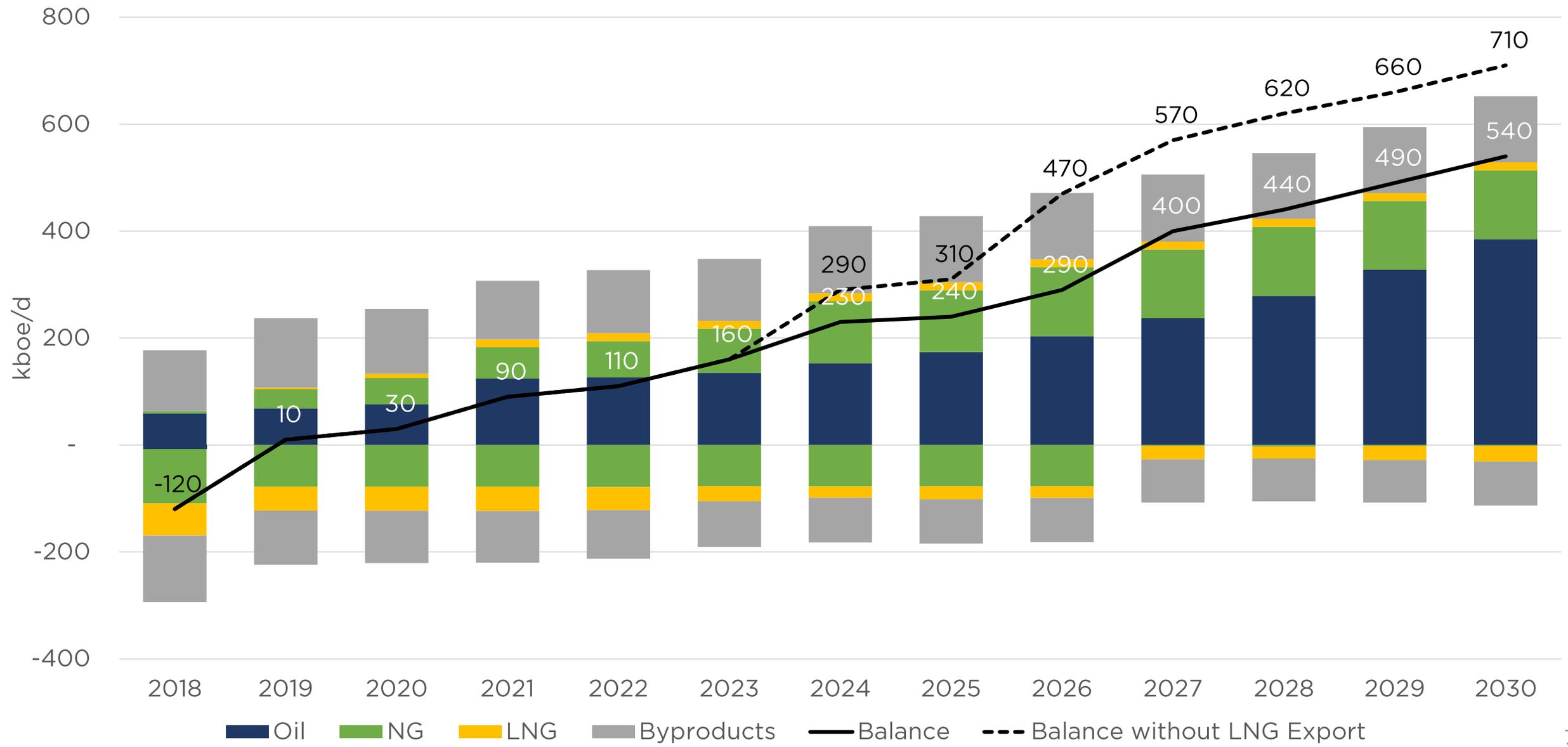


# Trade Balance of Oil, Natural Gas and Byproducts Trend Scenario (High Prices)



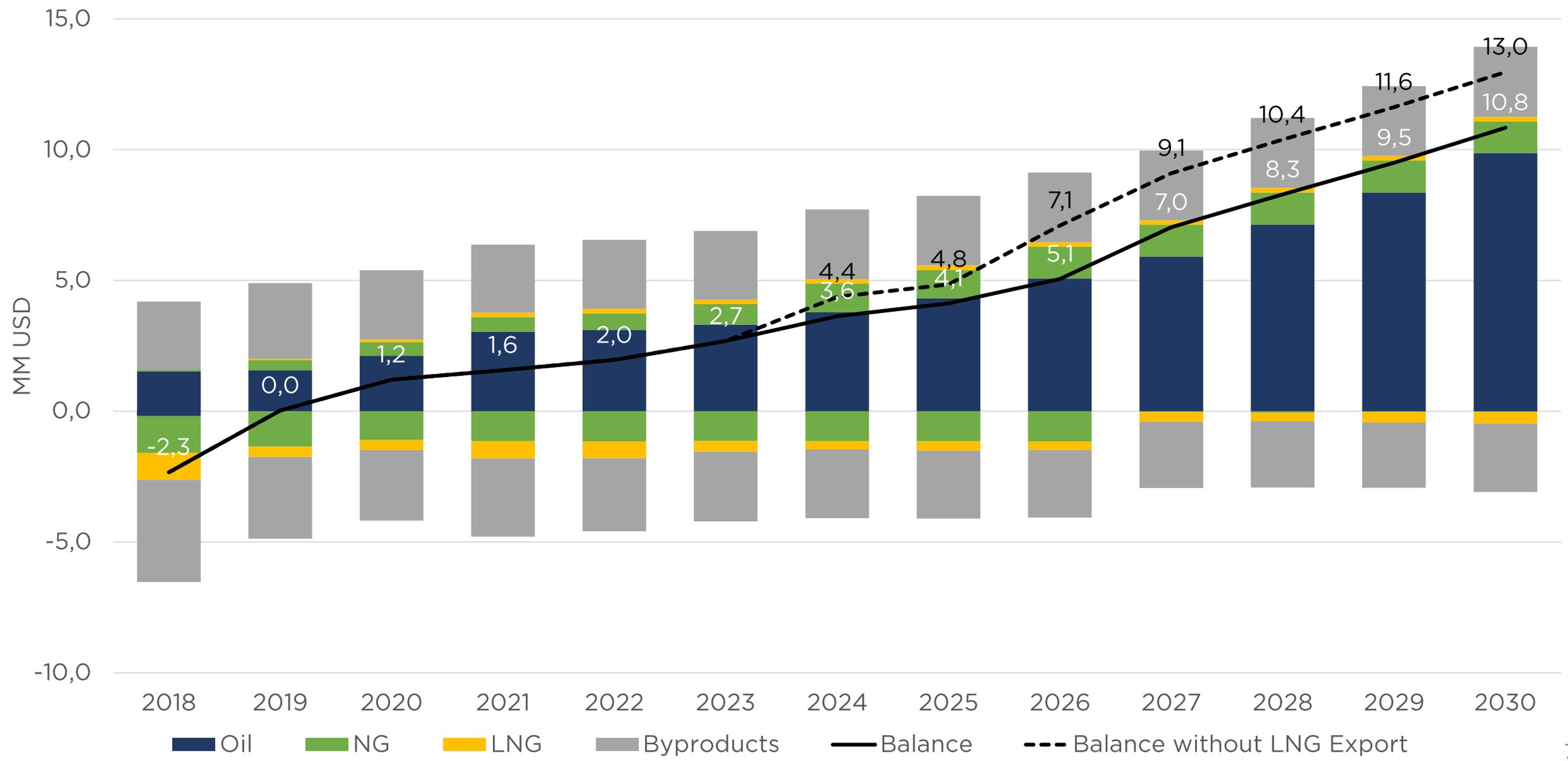
# Trade Balance of Oil, Natural Gas and Byproducts

## Trend Scenario without LNG Exports (Medium Prices)

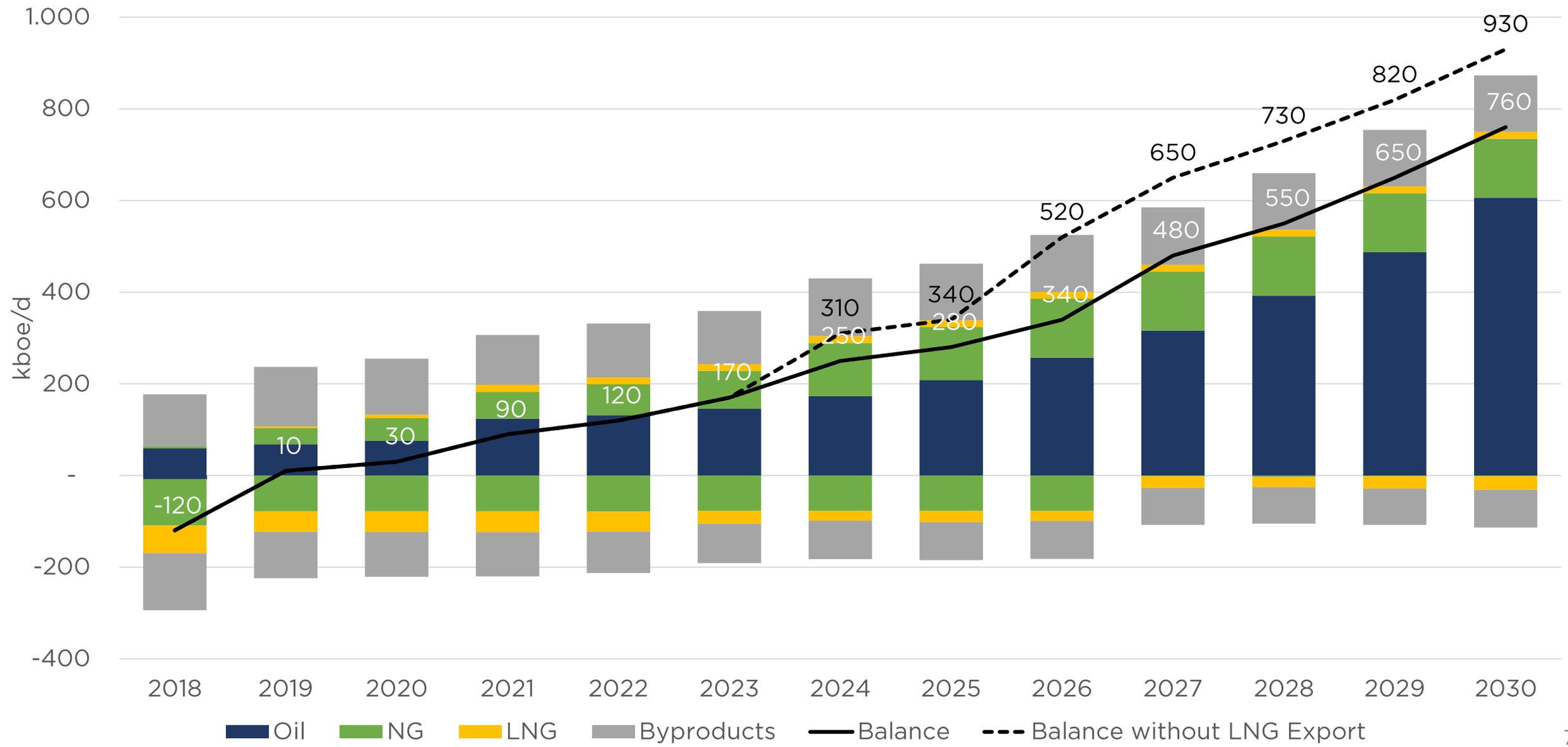


# Trade Balance of Oil, Natural Gas and Byproducts

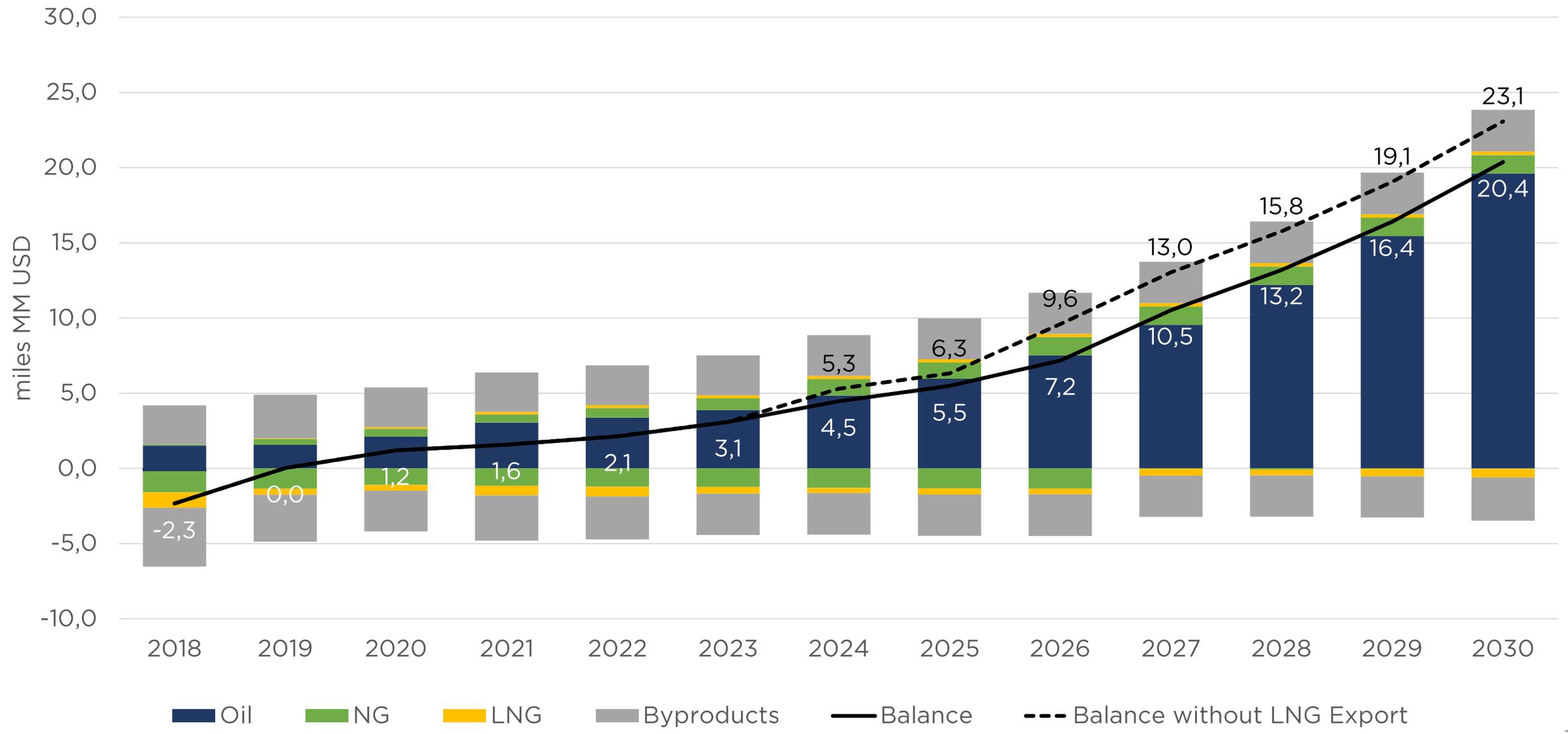
## Trend Scenario without LNG Exports (Medium Prices)



# Trade Balance of Oil, Natural Gas and Byproducts Trend Scenario without LNG Exports (High Prices)



# Trade Balance of Oil, Natural Gas and Byproducts Trend Scenario without LNG Exports (High Prices)



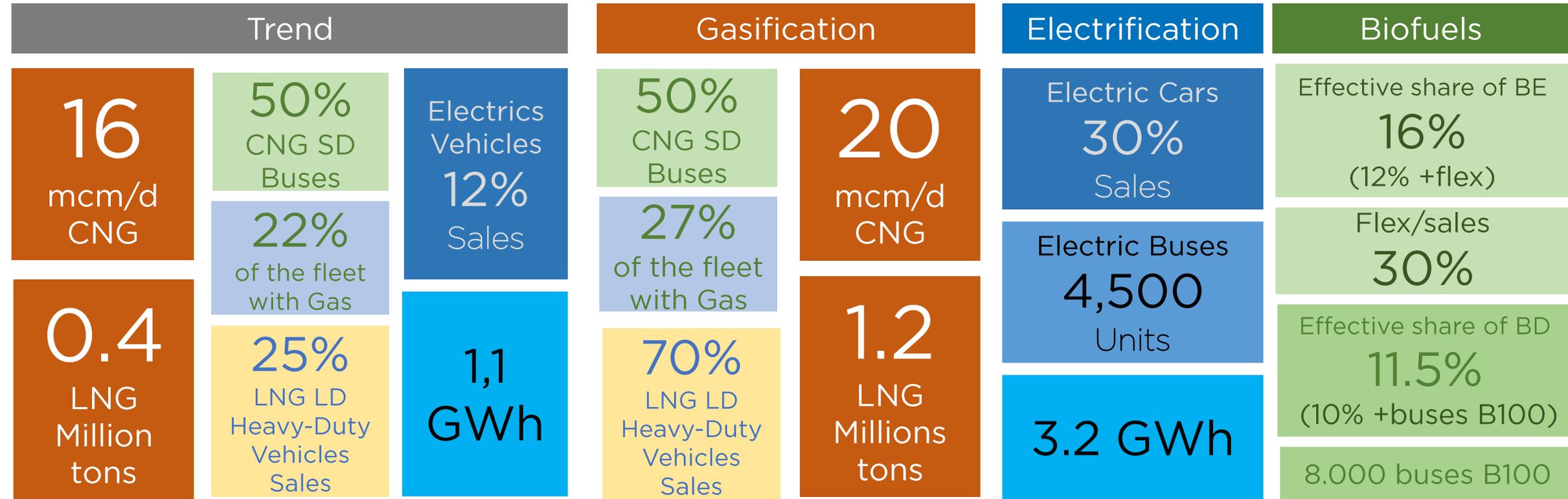
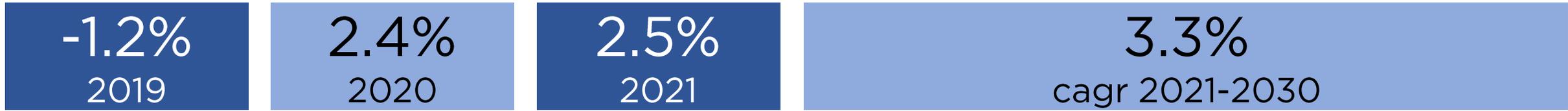
# Energy for Transportation



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# Assumptions for transport consumption estimation

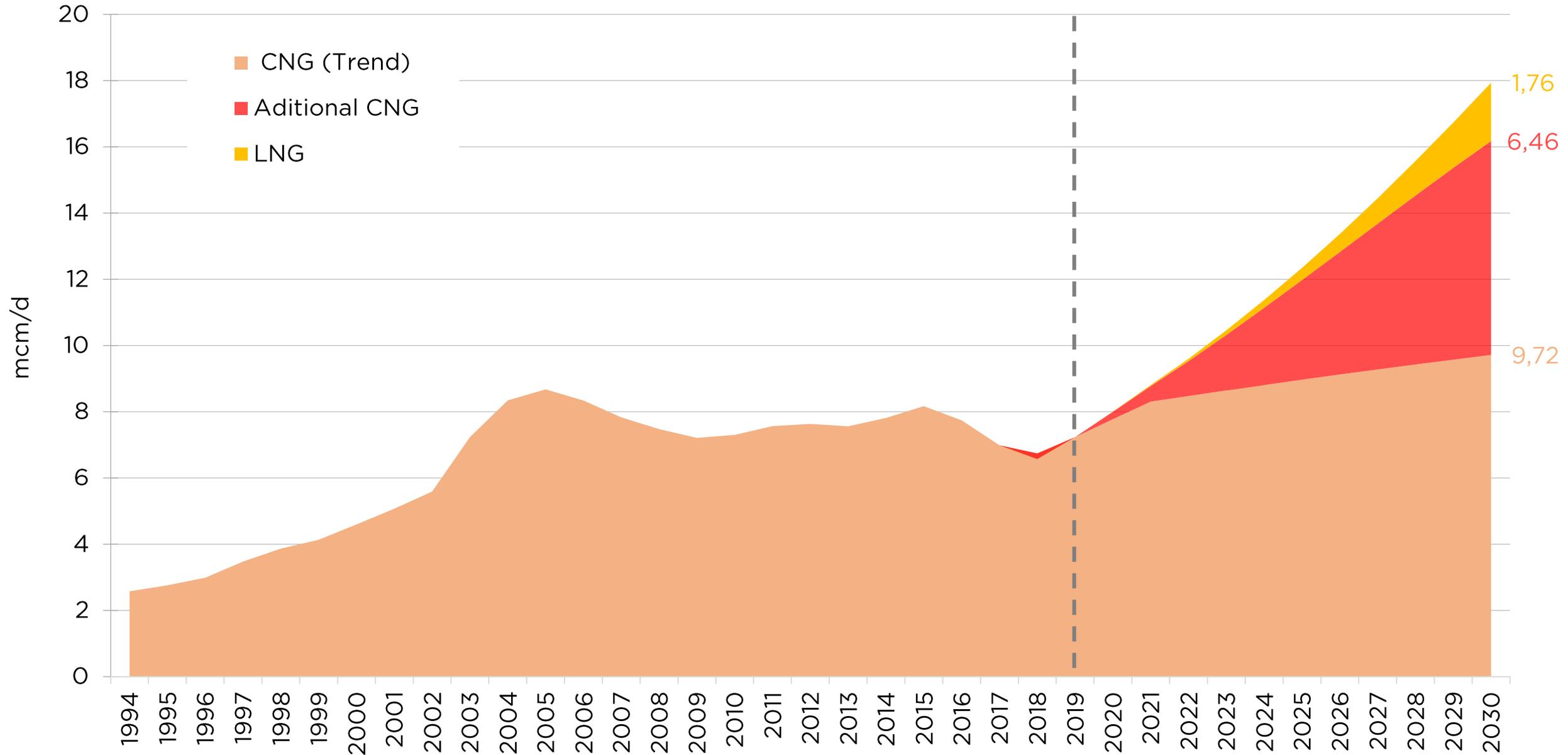
## GDP evolution scenario

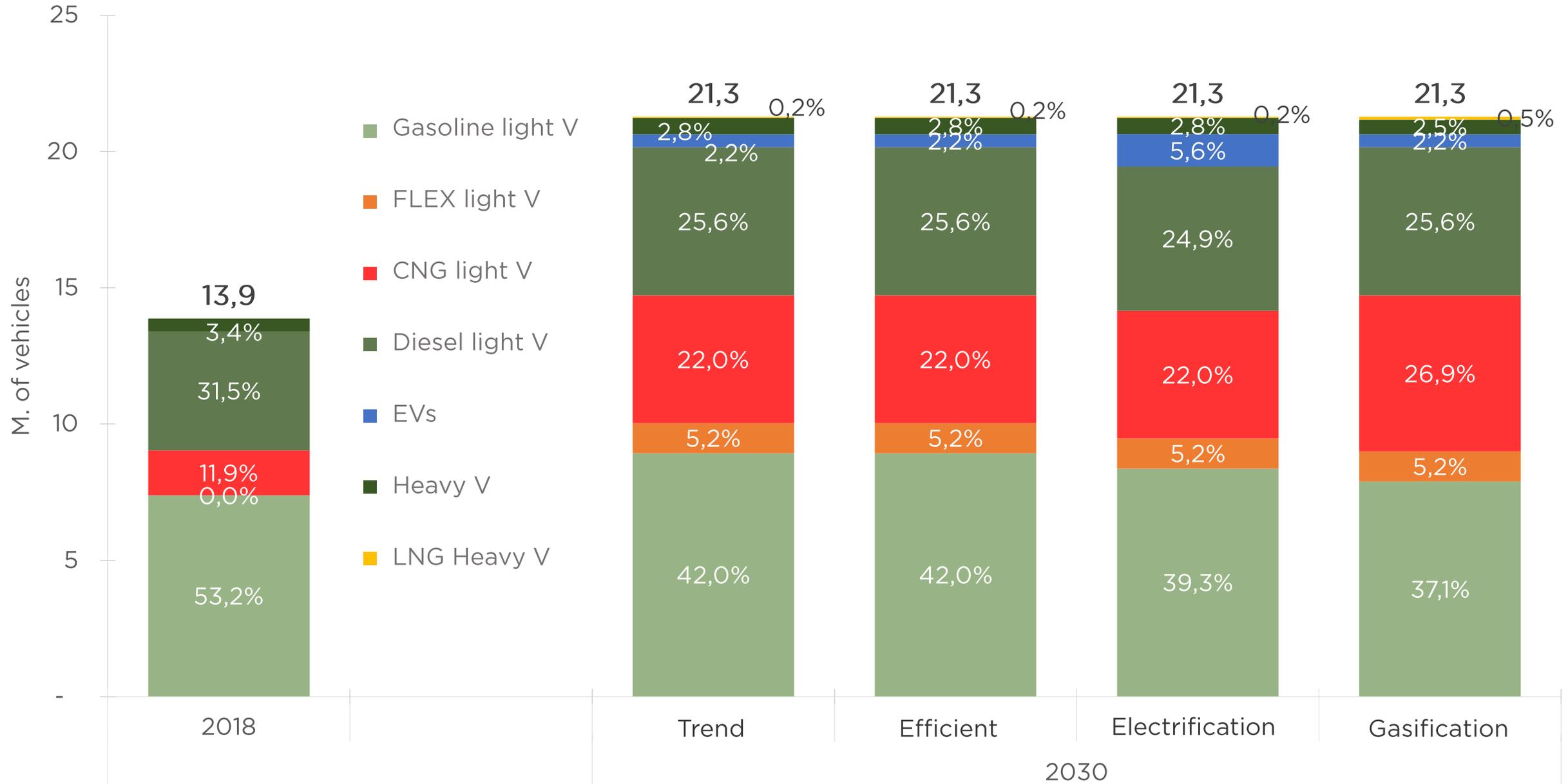


311  
2018

VEHICLES PER THOUSAND PEOPLE  
Engine Efficiency +10%

431  
2030





Trend	CAGR 2018-2030	2018	2030
Jet Kero (mcm)	-1.9%	0.7	0.6
Kerosene (kcm)	-12.9%	14.8	2.8
Gasoline (mcm)	1.5%	9.3	11.2
Diesel Oil (mcm)	1.2%	13.5	15.5
Fuel oil (k ton)	-23.9%	104	4
PLG (mton)	0.7%	1.50	1.62
<b>Efficient</b>			
Gasoline (mcm)	1.0%	9.3	10.6
Diesel Oil (mcm)	0.7%	13.5	14.7
PLG (mton)	0.4%	1.50	1.57
<b>Electrification</b>			
Gasoline (mcm)	1.2%	9.3	10,8
Diesel Oil (mcm)	1.0%	13.2	15,2
PLG (mton)	0.7%	1.50	1,62
<b>Gasification</b>			
Gasoline (mcm)	0.7%	9.3	10.1
Diesel Oil (mcm)	0.6%	13.5	14.5
PLG (mton)	0.0%	1.50	1.49

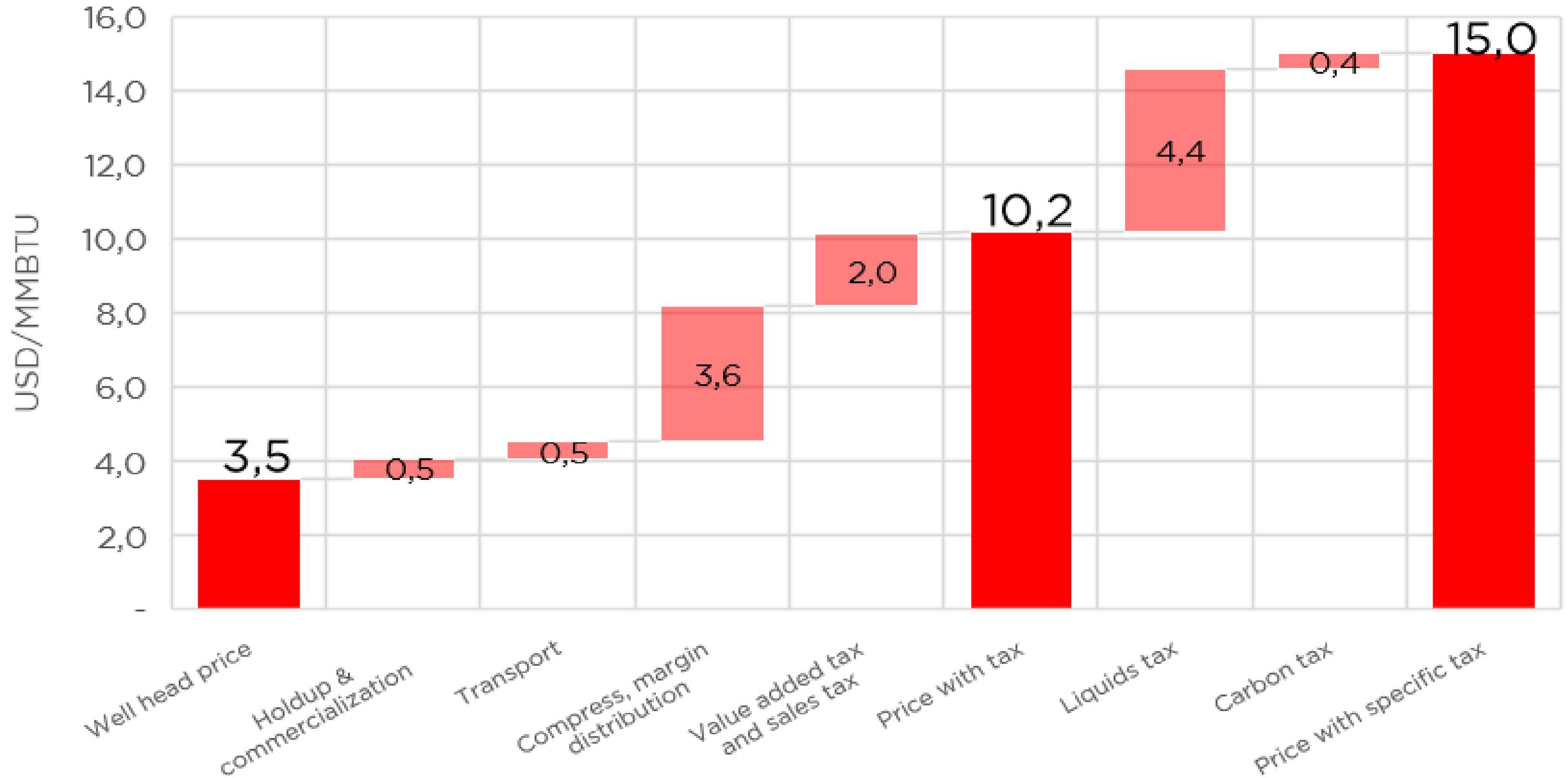
# Evaluation of automotive transport projects

	Cars	Buses	Trucks
CAPEX or vehicle prices (USD)	Gasoline / Flex: 23,400 CNG: 24,200 Electric: 39,100 Hybrid: 37,500	Diesel Oil: 160,000 CNG: 203,000 LNG: 224,000 Electric: 520,000 Biodiesel: 160,000	Diesel Oil: 135,000 LNG: 168,000
OPEX (USD)	Gasoline / Flex: 3,576 CNG: 3,830 Electric: 5,026 Hybrid: 5,155 Bioethanol: 3,576	Diesel Oil (CD): 17,780 Diesel Oil (LD): 13,780 CNG (CD): 25,109 LNG (LD): 19,292 Electric (CD): 35,840 Biodiesel (CD): 17,780	Diesel Oil: 21,988 LNG: 27,024
Car life time (years)	12	10	10
Annual average Km (per day)	20,000 (55)	70,000 (200) short distance 280,000 (800) long distance	280,000 (800) long distance
Fuel Prices	Gasoline: 1.03 USD/liter CNG: 0.44 USD/cm Electricity: with subsidy 149 USD/MWh	Diesel Oil: 0.94 USD/liter (24.3 USD/MMBTU) CNG: 0.38 USD/cm (10.2 USD/MMBTU) LNG: 0.64/Kg (15 USD/MMBTU) Electricity: with subsidy 136 USD/MWh; excluded subsidy 154 USD/MWh	Diesel Oil: 0.94 USD/liter (24.3 USD/MMBTU) LNG: 0.64/Kg (15 USD/MMBTU)
Consumption	Gasoline / Flex: 9.5 liter/100km CNG: 9.5 liter/100km Electric: 20 kWh/100km Hybrid: 3.46 liter/100km Bioethanol: 13.56 liter/100km	Diesel Oil: 45 liter/100km (CD and LD) CNG: 59.4 cm/100km (CD) LNG: 39 Kg/100km (LD) Electric: 116.5 kWh/100km (CD)	Diesel Oil: 39 liter/100km (LD) LNG: 23.6 Kg/100km (LD)
Vehicles' origin	converted	Factory	Factory

# Heavy-Duty Vehicles

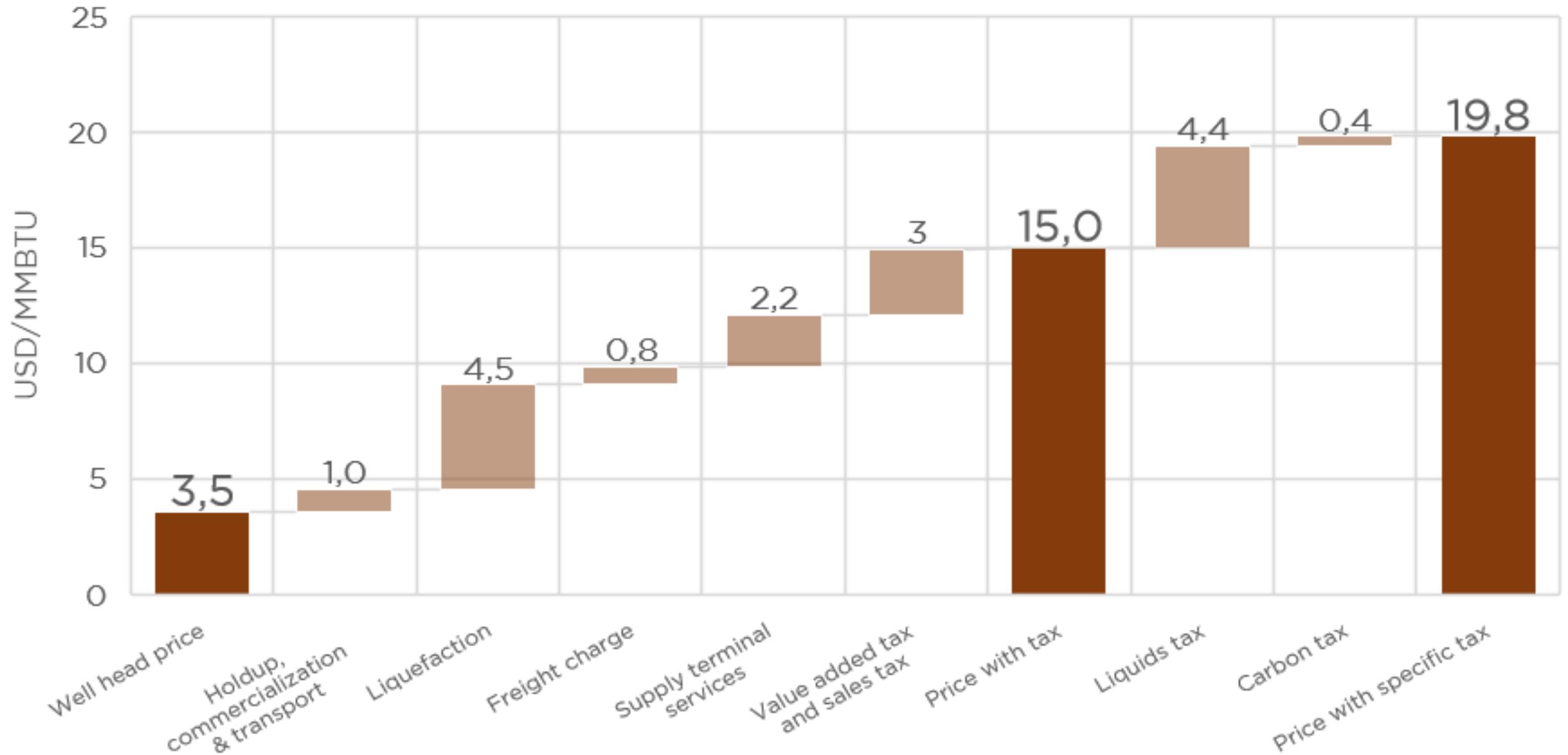
# Evaluation of alternative technology

## Transport sector CNG cost composition



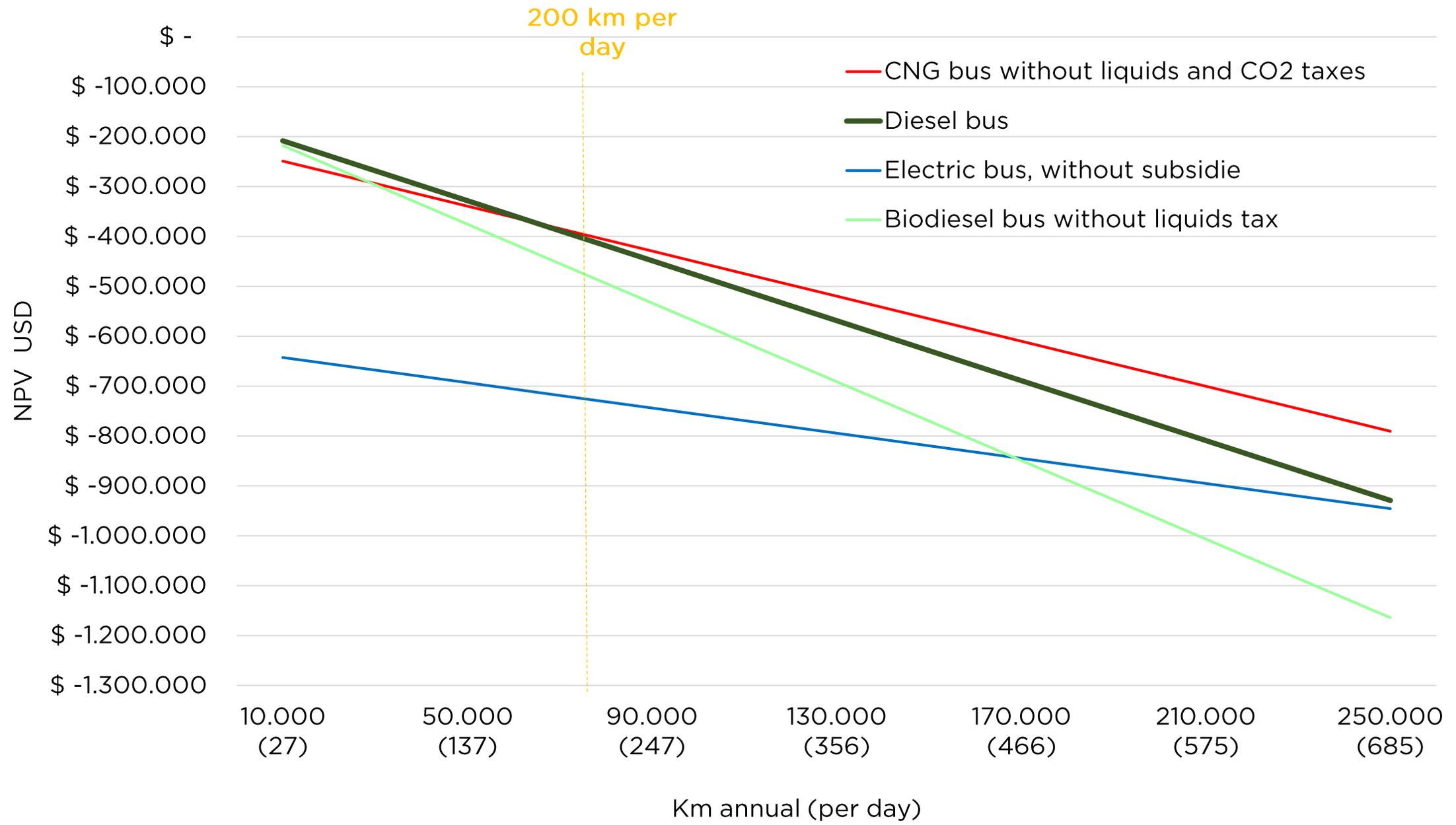
# Evaluation of alternative technology

## Transport sector Composition of the Price of LNG



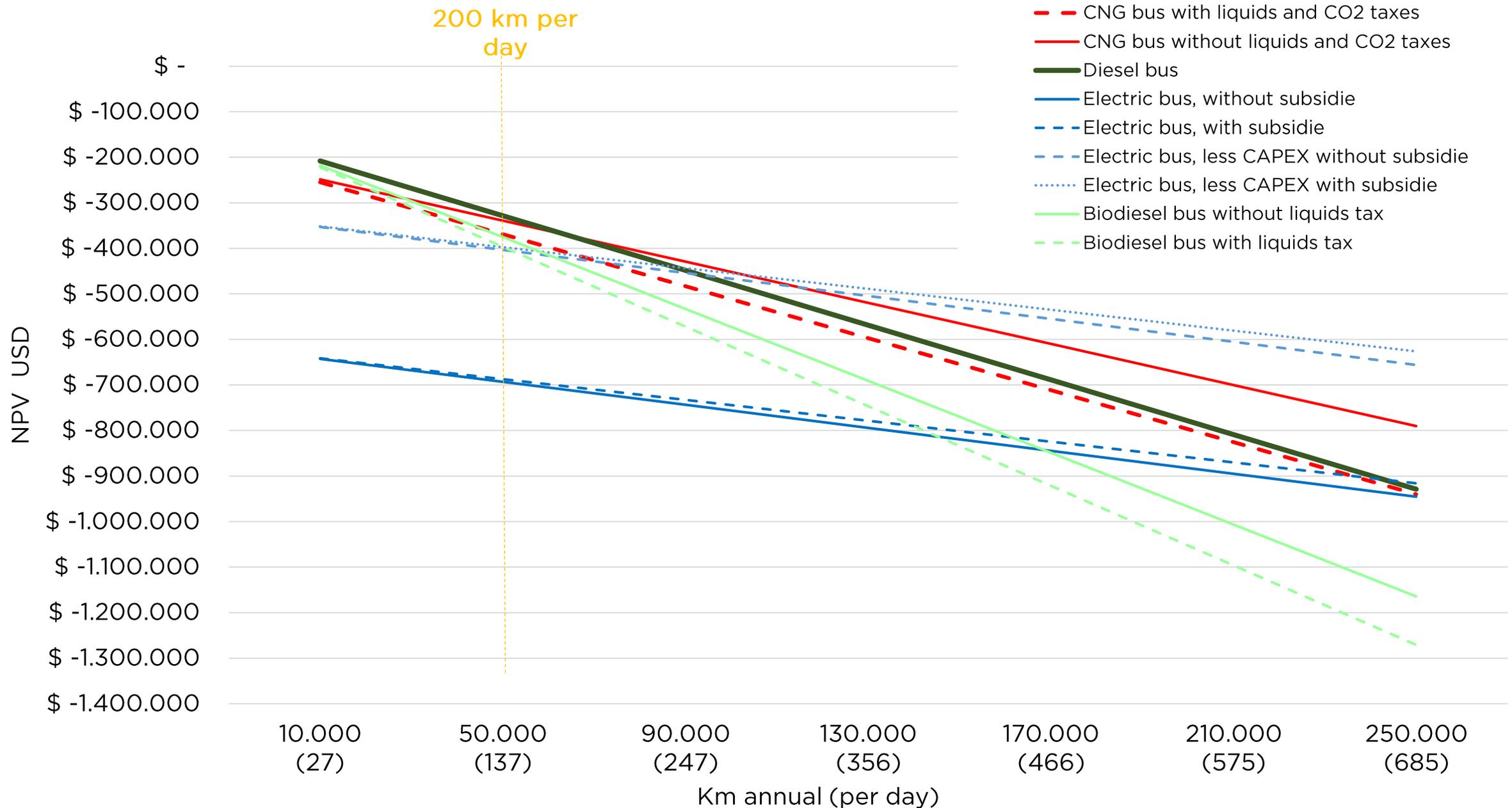
# Evaluation of alternative technology projects- Transport sector

## Net present value for short distance bus



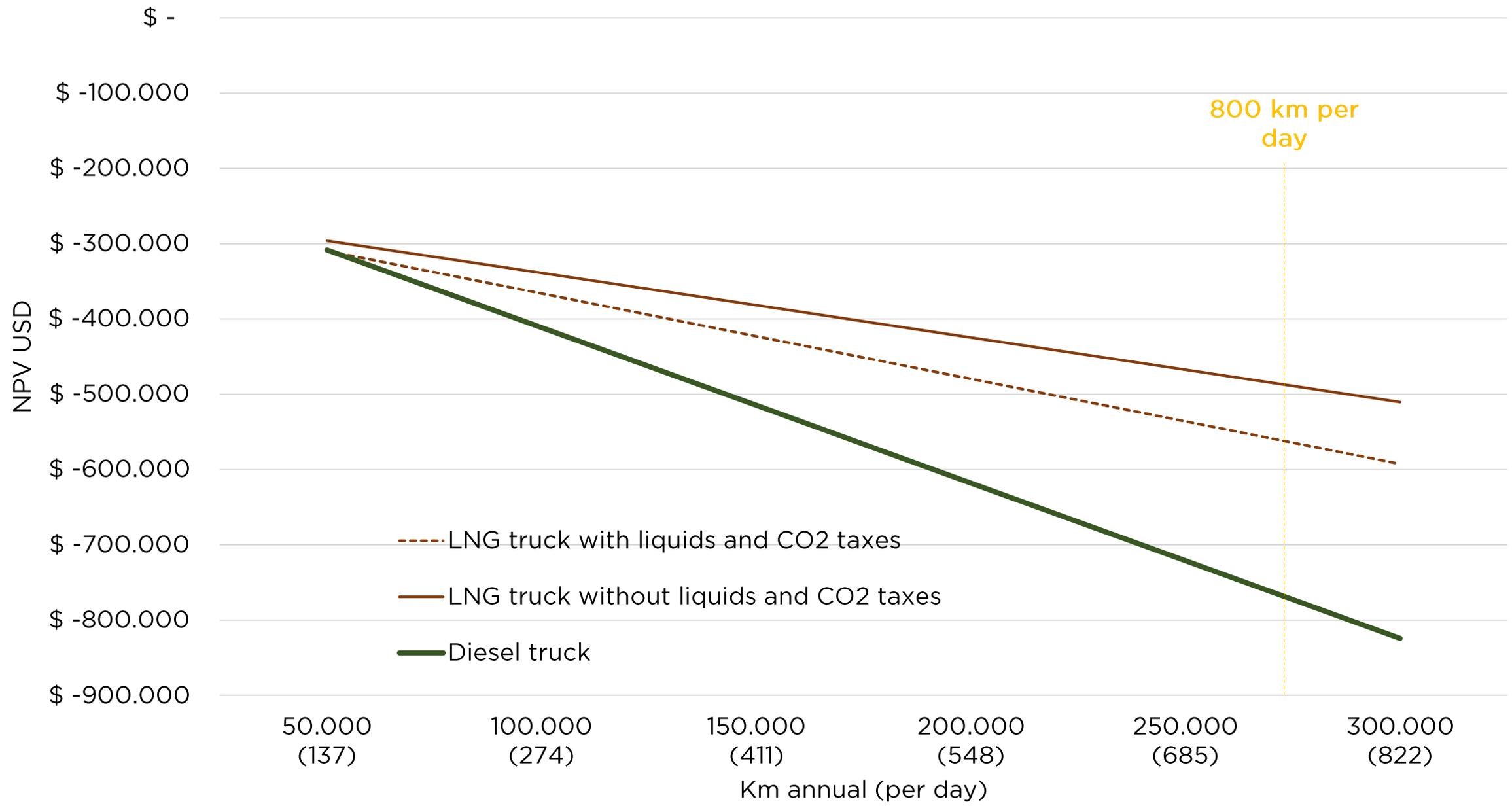
# Evaluation of alternative technology projects- Transport sector

## Net present value for short distance bus. Sensitivity



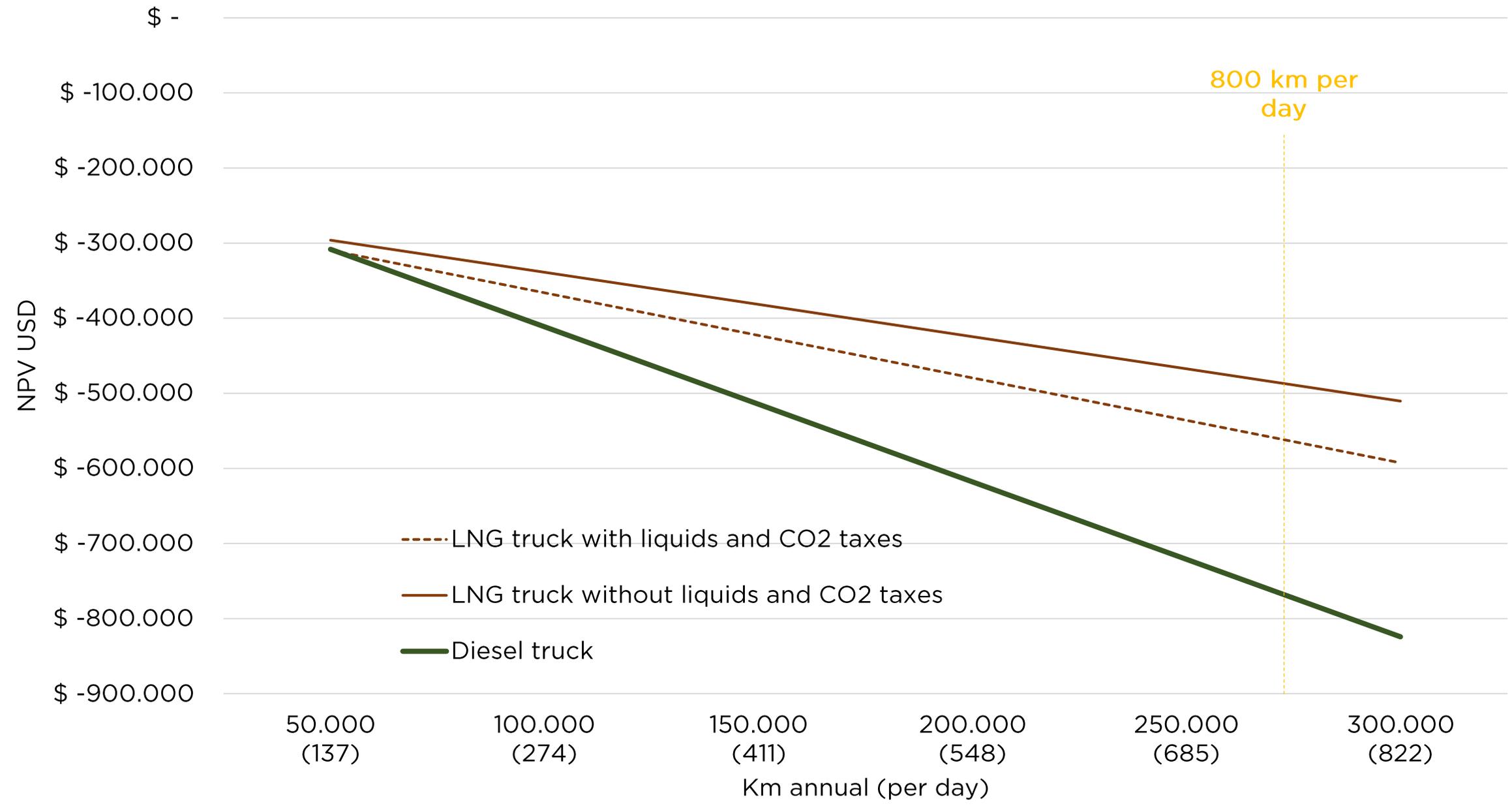
# Evaluation of alternative technology projects- Transport sector

## Net present value for long distance truck



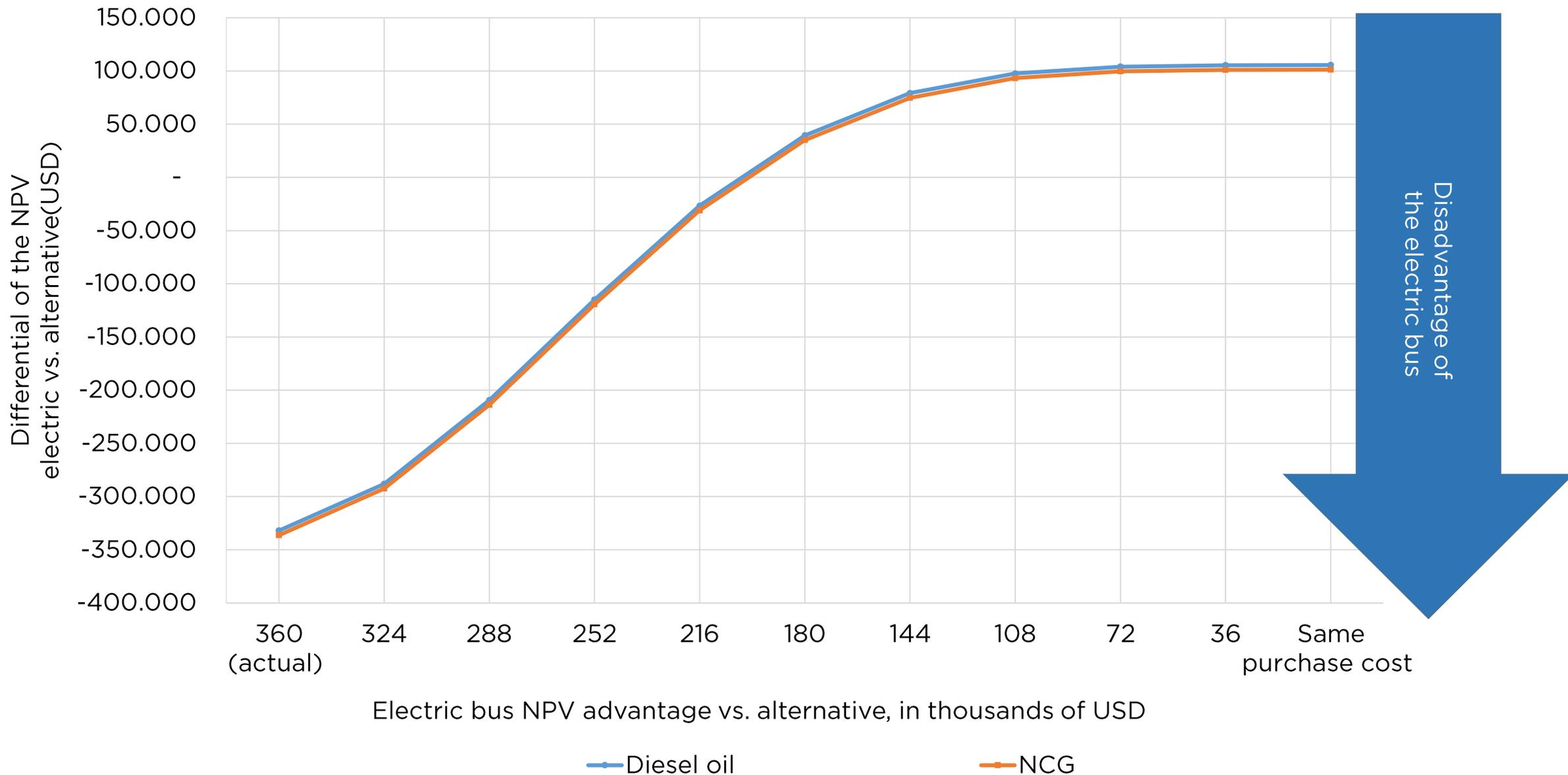
# Evaluation of alternative technology projects- Transport sector

## Net present value for long distance truck



# Evaluation of alternative technology projects - Transport sector.

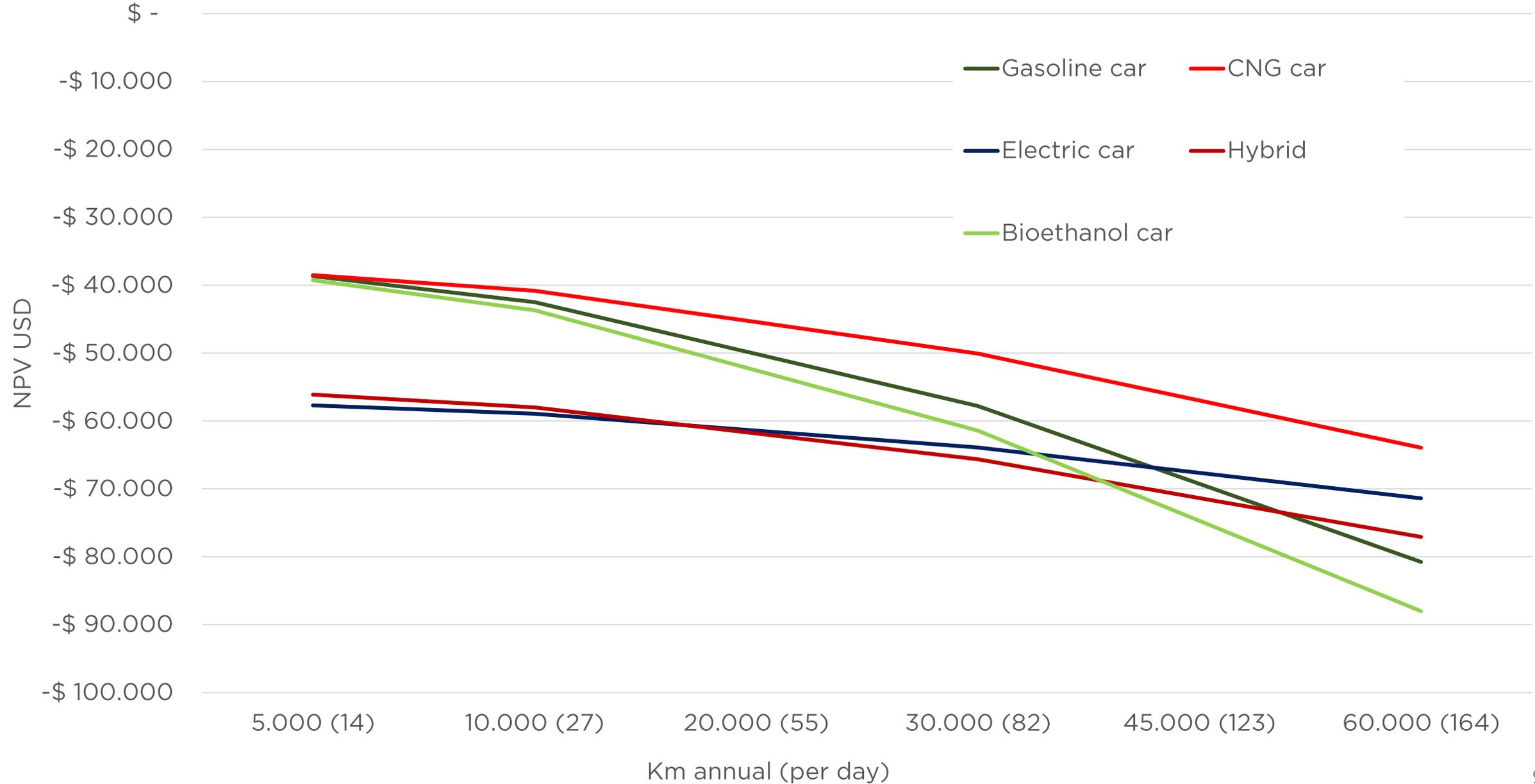
## NPV comparison of the electric bus respect to the rest of the technologies



# Light Vehicles

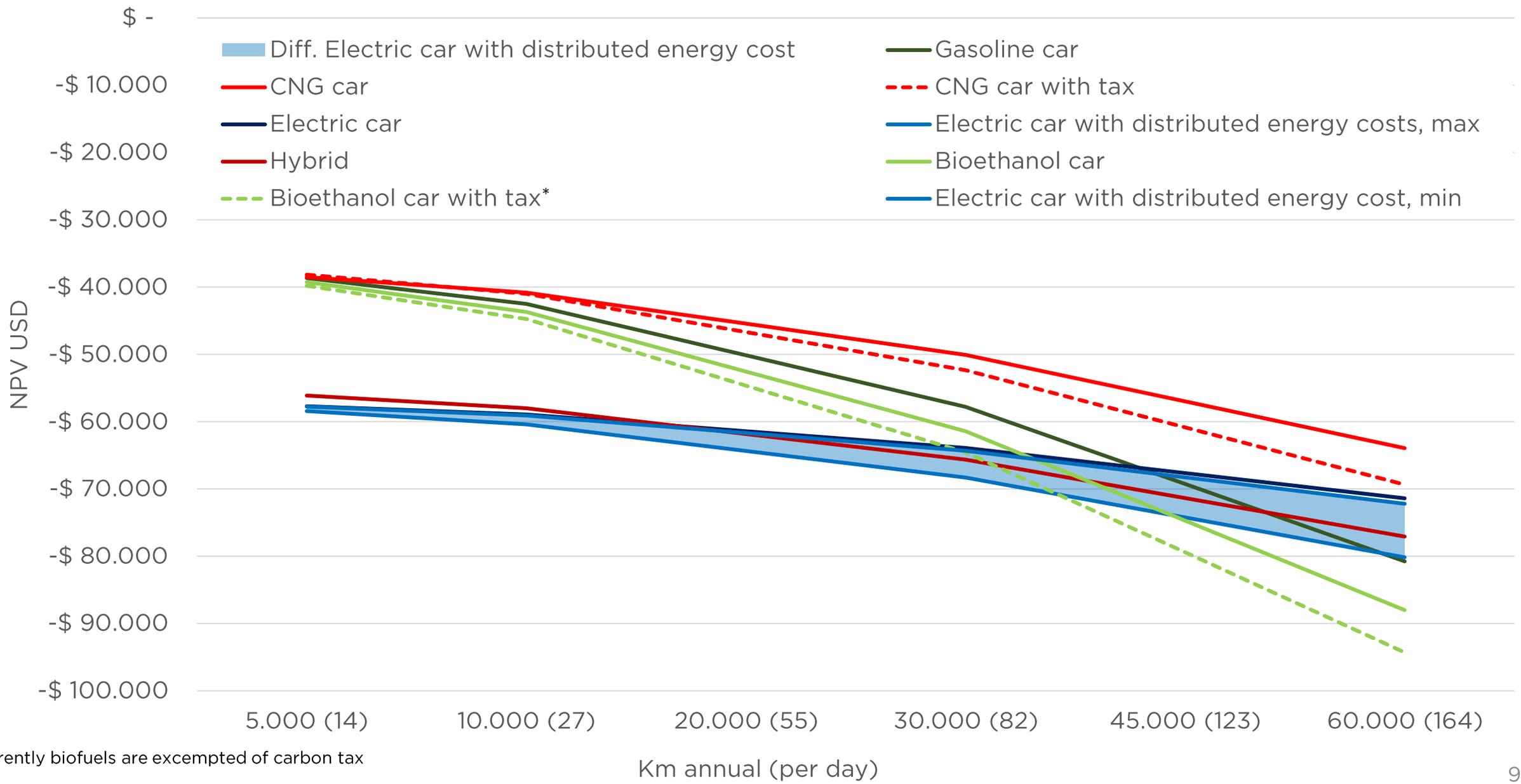
# Evaluation of alternative technology projects - Transport sector

## Net present value for cars.



# Evaluation of alternative technology projects - Transport sector

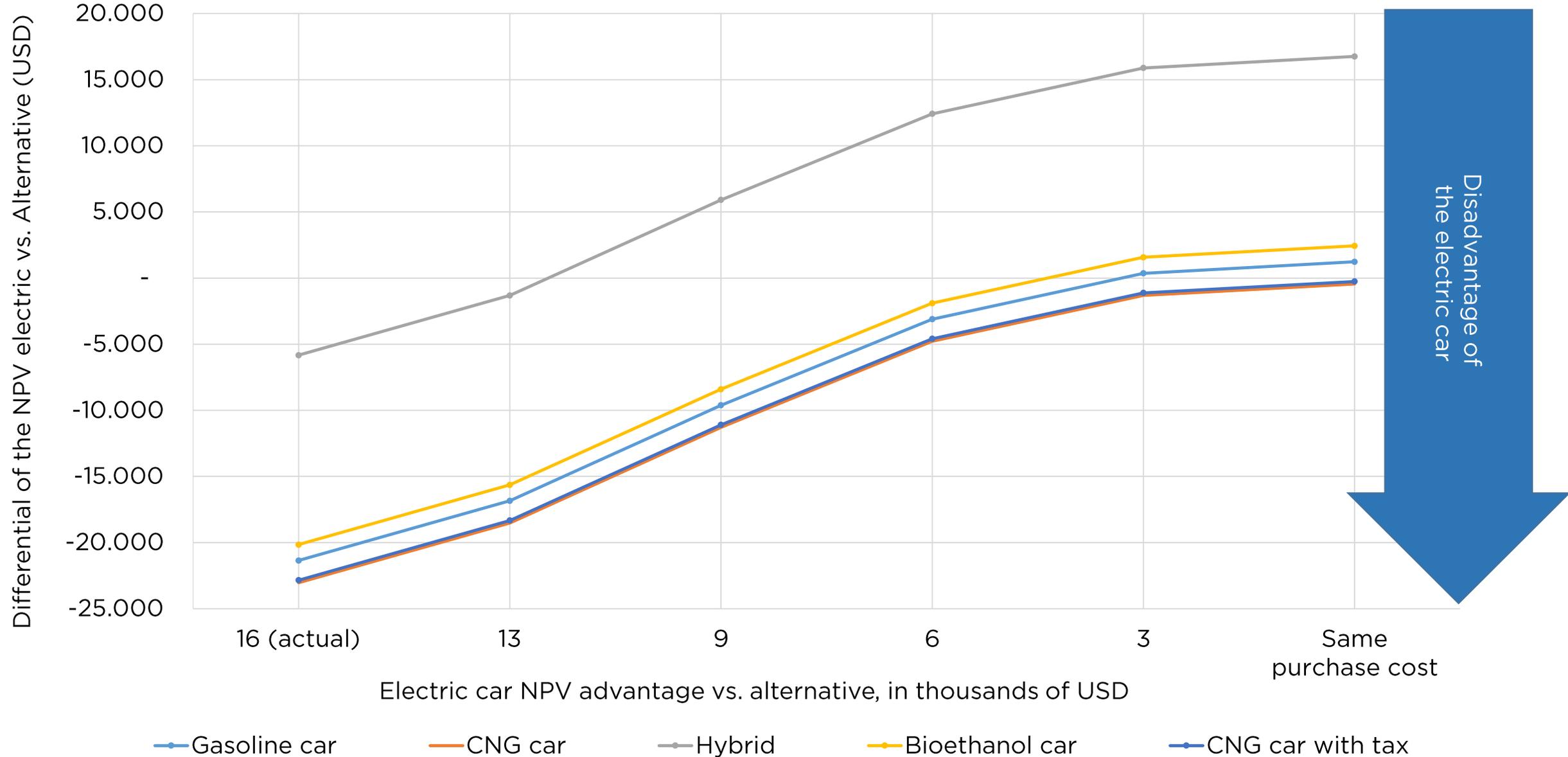
## Net present value for cars. Sensitivity



\*Currently biofuels are exempted of carbon tax

# Evaluation of alternative technology projects - Transport sector.

## NPV comparison of the electric car respect to the rest of the technologies



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**Latest versions and updated data:**

<https://www.argentina.gob.ar/energia/planeamiento-energetico>

<http://datos.energia.gob.ar/dataset/escenarios-energeticos>

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