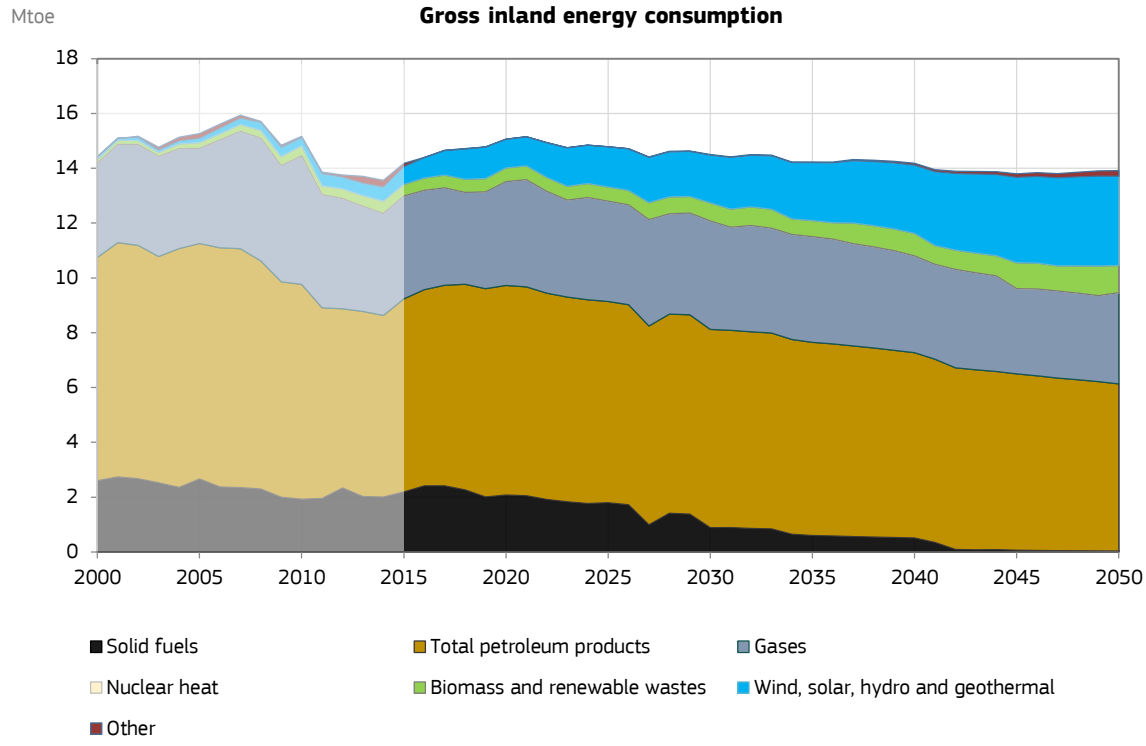
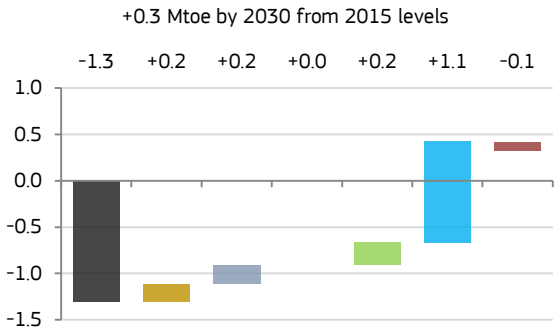
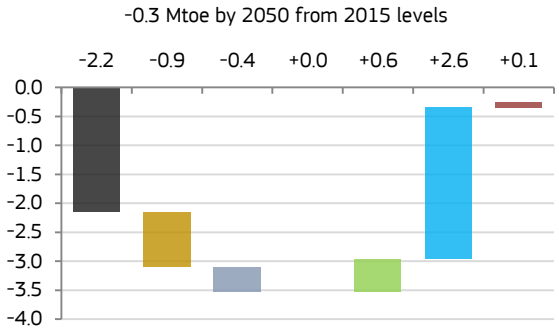
POTEnCIA - Model results overview

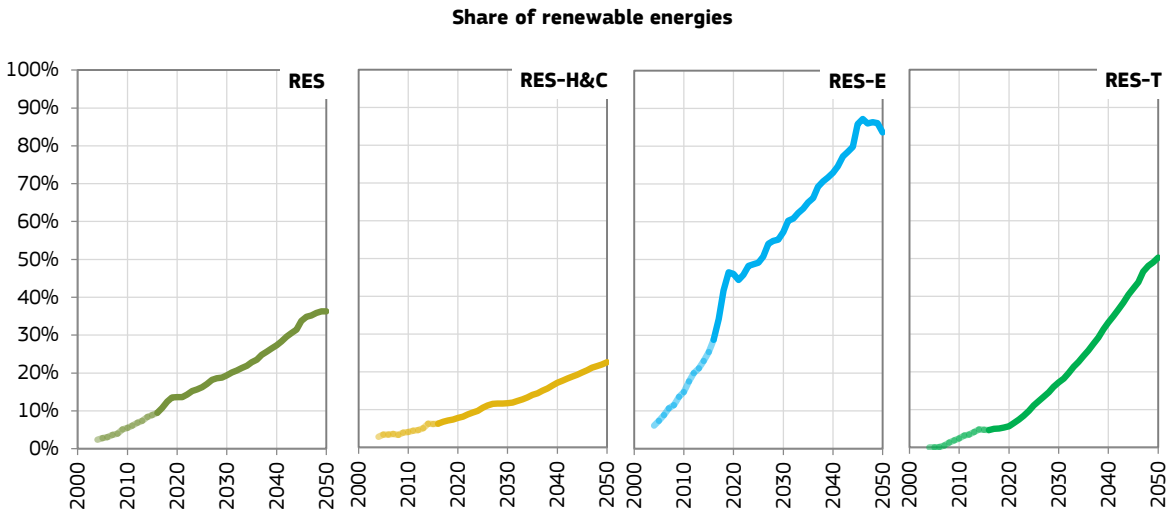
Ireland

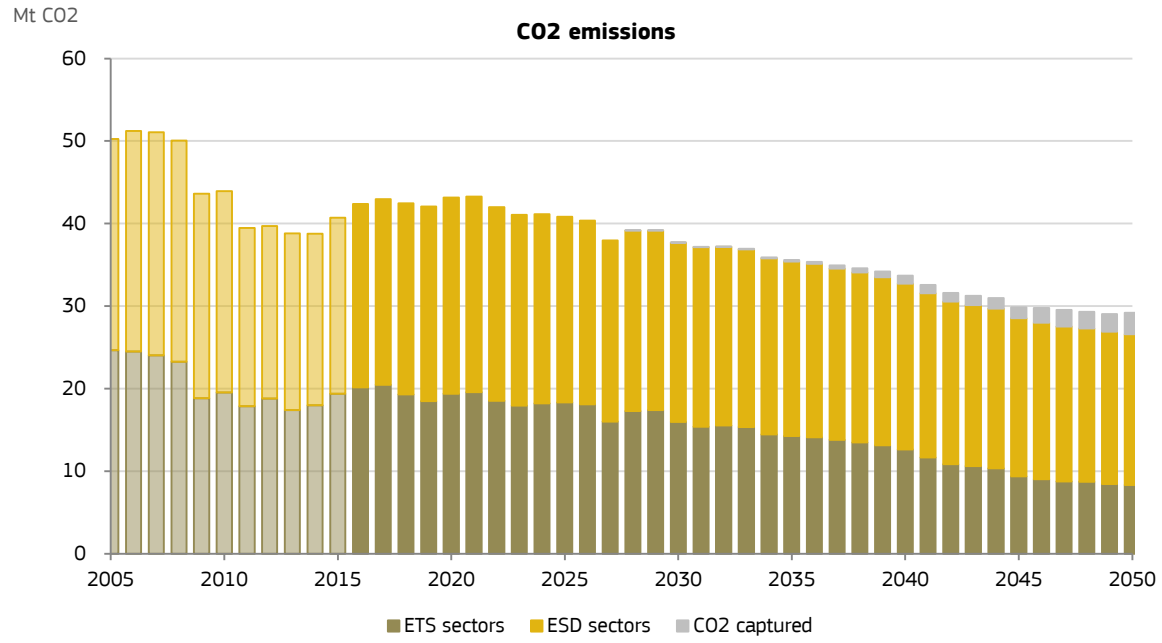
Central_2018 scenario

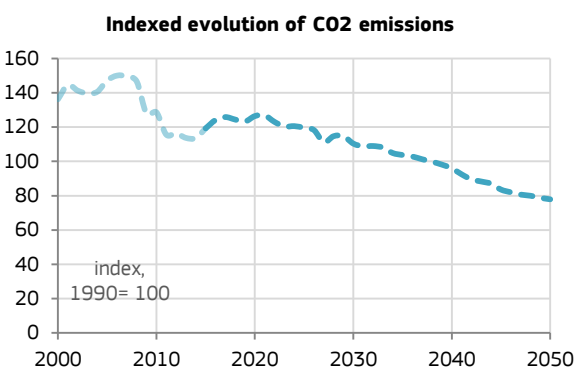

Mtoe
Gross inland energy consumption
18
16
14
12
10
8
6
4
2
0
2000
2005
2010
2015
2020
2025
2030
2035
2040
2045
2050
Solid fuels
Total petroleum products
Gases
Nuclear heat
Biomass and renewable wastes
Wind, solar, hydro and geothermal
Other

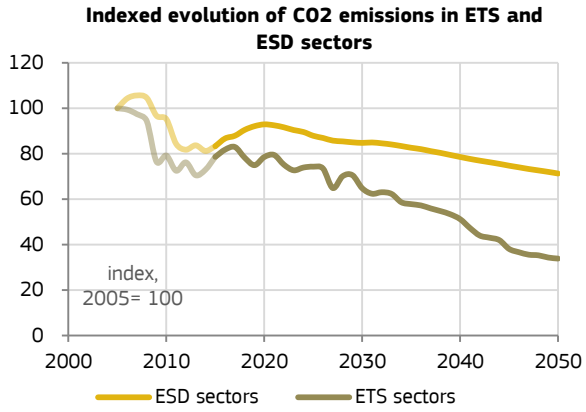

+0.3 Mtoe by 2030 from 2015 levels
-1.3 +0.2 +0.2 +0.0 +0.2 +1.1 -0.1
1.0
0.5
0.0
-0.5
-1.0
-1.5

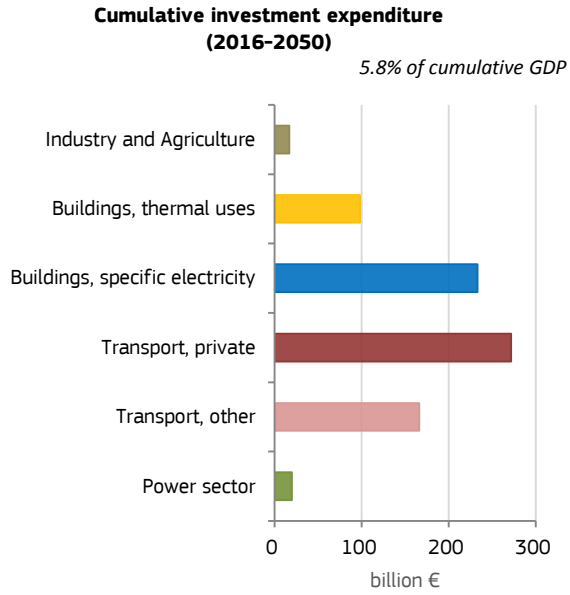

-0.3 Mtoe by 2050 from 2015 levels
-2.2 -0.9 -0.4 +0.0 +0.6 +2.6 +0.1
0.0
-0.5
-1.0
-1.5
-2.0
-2.5
-3.0
-3.5
-4.0

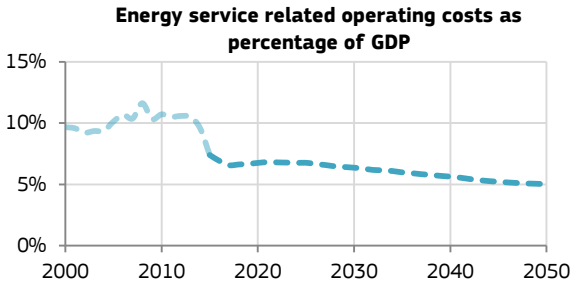

Share of renewable energies
RES
RES-H&C
RES-E
RES-T
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
2000
2010
2020
2030
2040
2050

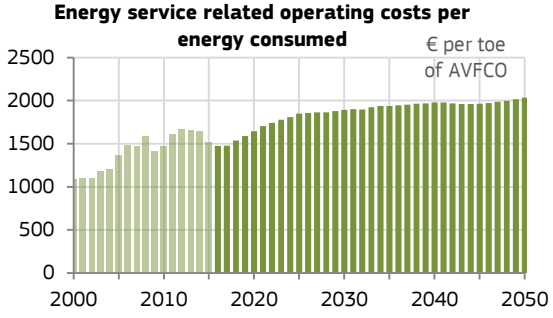

Mt CO2
CO2 emissions
60
50
40
30
20
10
0
2005
2010
2015
2020
2025
2030
2035
2040
2045
2050
ETS sectors
ESD sectors
CO2 captured


Indexed evolution of CO2 emissions
160
140
120
100
80
60
40
20
0
index,
1990= 100
2000
2010
2020
2030
2040
2050

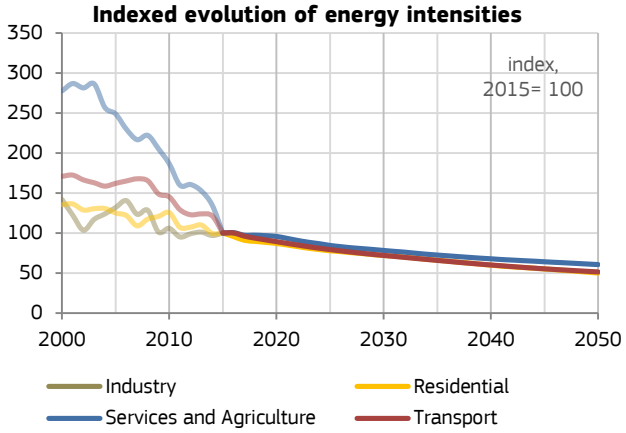

Indexed evolution of CO2 emissions in ETS and ESD sectors
120
100
80
60
40
20
0
index,
2005= 100
2000
2010
2020
2030
2040
2050
ESD sectors
ETS sectors


Cumulative investment expenditure (2016-2050)
5.8% of cumulative GDP
Industry and Agriculture
Buildings, thermal uses
Buildings, specific electricity
Transport, private
Transport, other
Power sector
0
100
200
300
billion €

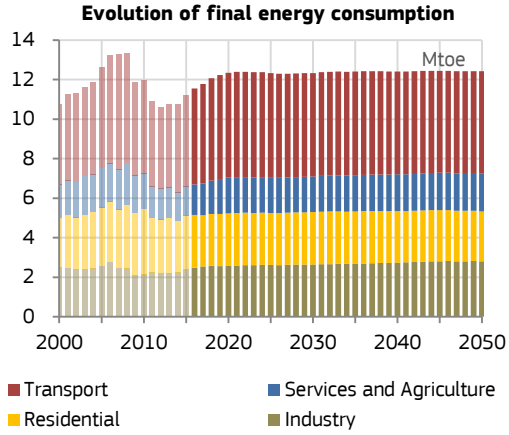

Energy service related operating costs as percentage of GDP
15%
10%
5%
0%
2000
2010
2020
2030
2040
2050


Energy service related operating costs per energy consumed
€ per toe of AVFCO
2500
2000
1500
1000
500
0
2000
2010
2020
2030
2040
2050

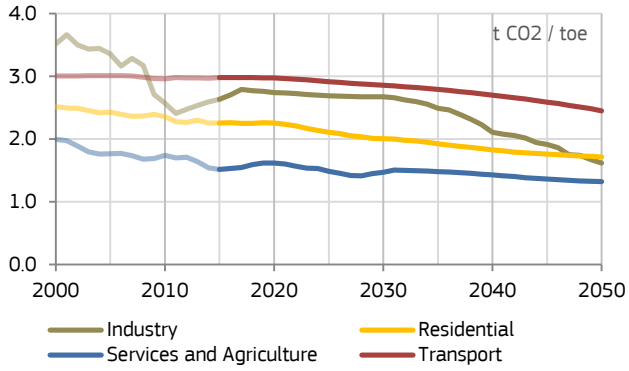
Indexed evolution of energy intensities



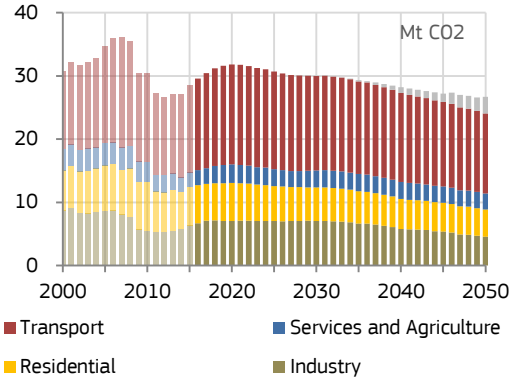
Evolution of final energy consumption



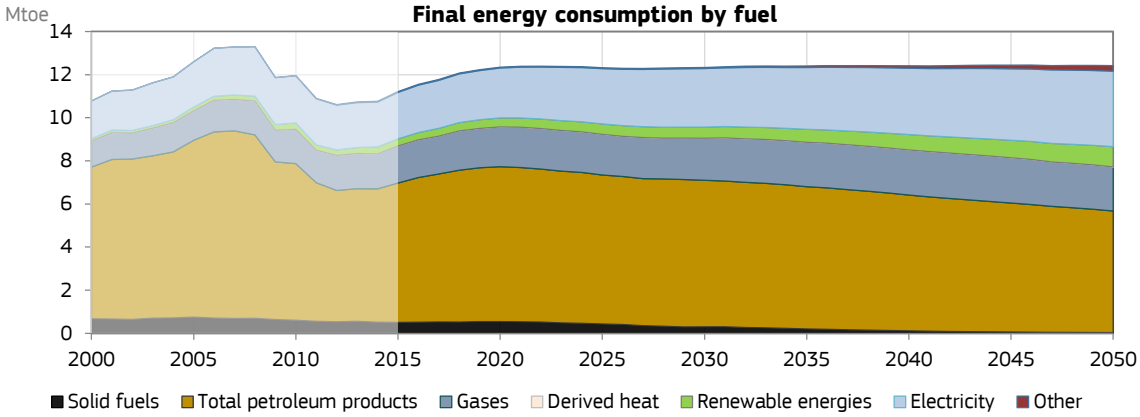
Evolution of carbon intensities



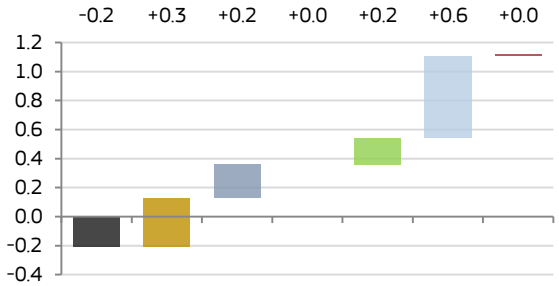
Evolution of CO2 emissions



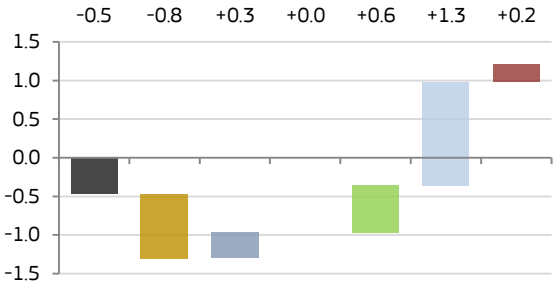
Final energy consumption by fuel

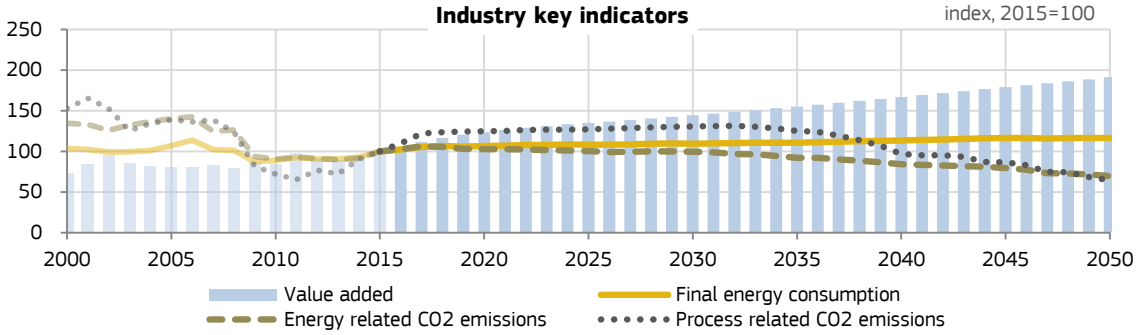


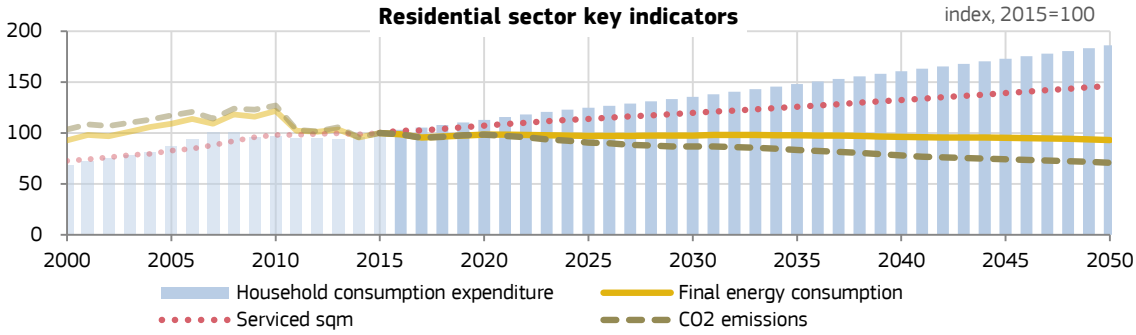
+1.1 Mtoe by 2030 from 2015 levels

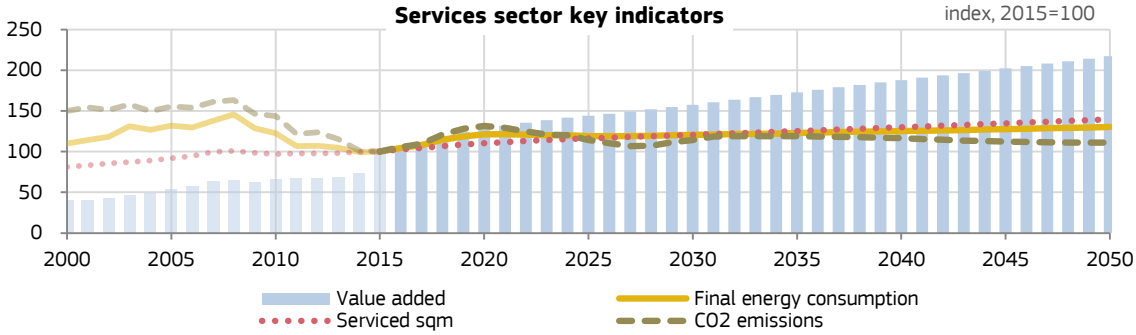


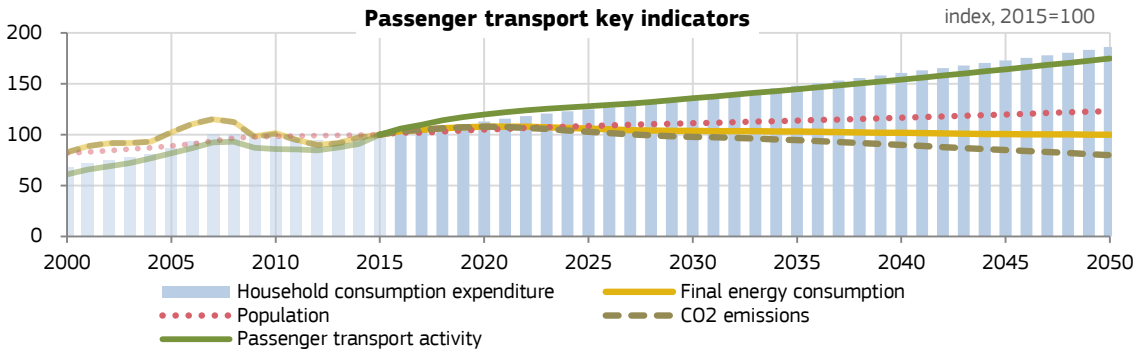
+1.2 Mtoe by 2050 from 2015 levels

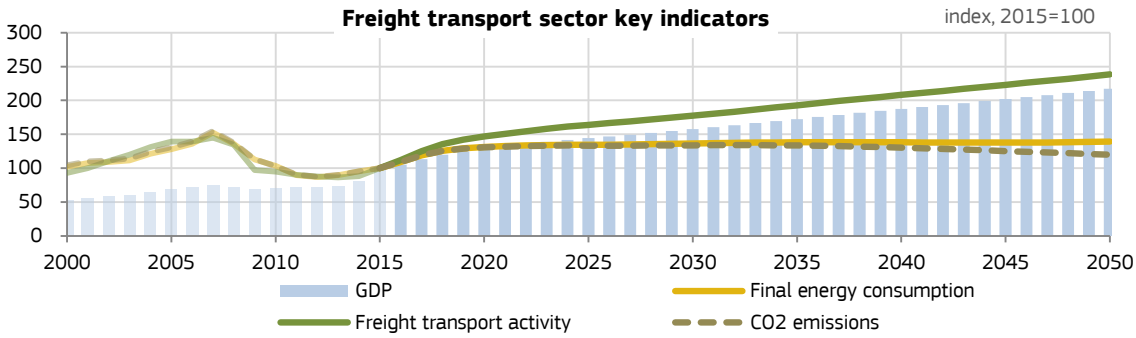


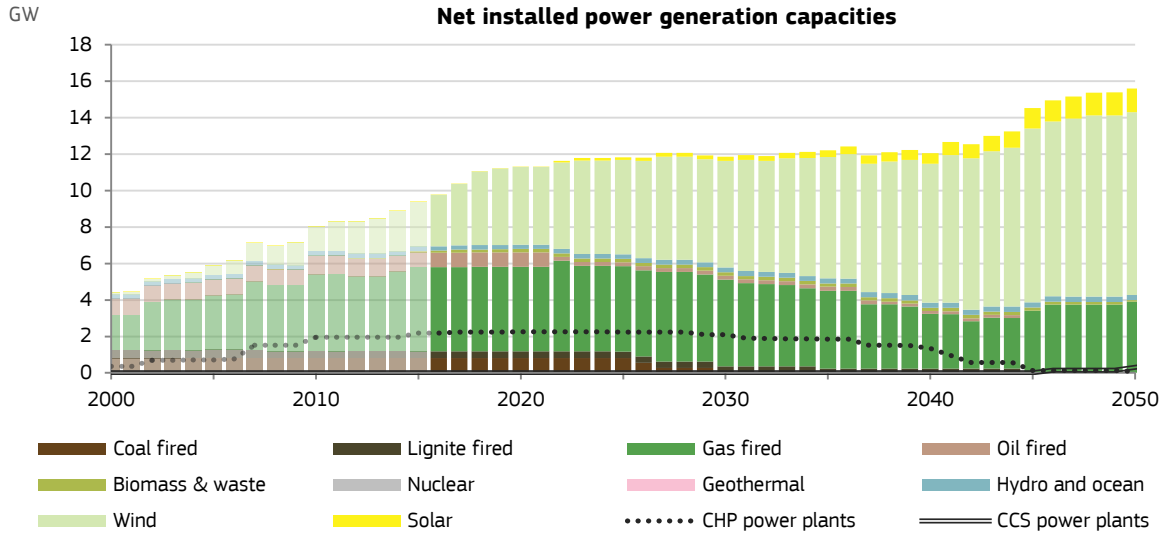

Industry key indicators
index, 2015=100
250
200
150
100
50
0
2000
2005
2010
2015
2020
2025
2030
2035
2040
2045
2050
Value added
Final energy consumption
Energy related CO2 emissions
Process related CO2 emissions

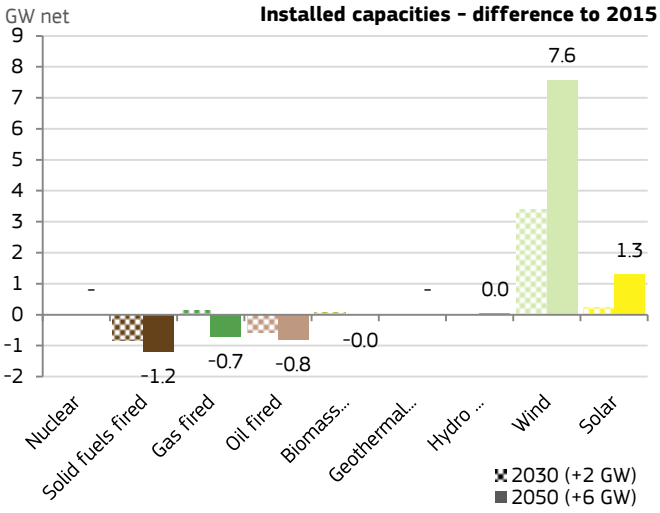

Residential sector key indicators
index, 2015=100
200
150
100
50
0
2000
2005
2010
2015
2020
2025
2030
2035
2040
2045
2050
Household consumption expenditure
Final energy consumption
Serviced sqm
CO2 emissions

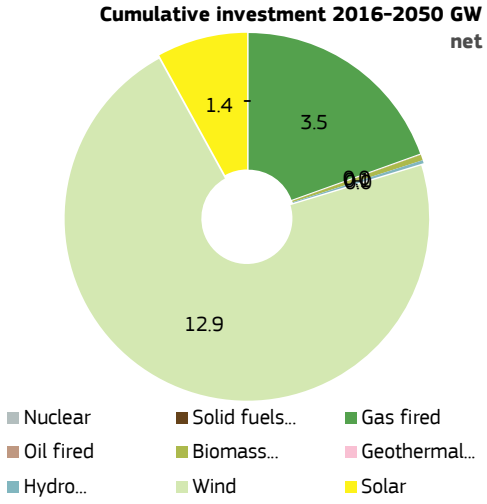

Services sector key indicators
index, 2015=100
250
200
150
100
50
0
2000
2005
2010
2015
2020
2025
2030
2035
2040
2045
2050
Value added
Final energy consumption
Serviced sqm
CO2 emissions

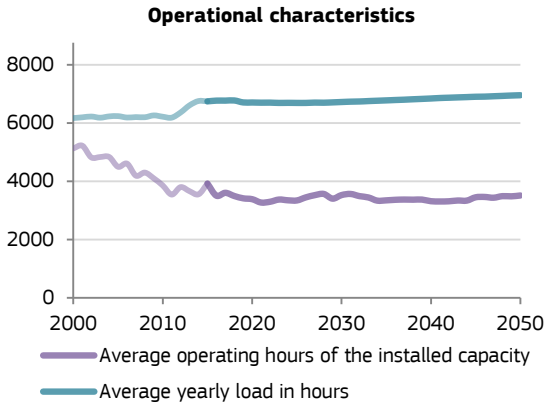

Passenger transport key indicators
index, 2015=100
200
150
100
50
0
2000
2005
2010
2015
2020
2025
2030
2035
2040
2045
2050
Household consumption expenditure
Final energy consumption
Population
CO2 emissions
Passenger transport activity

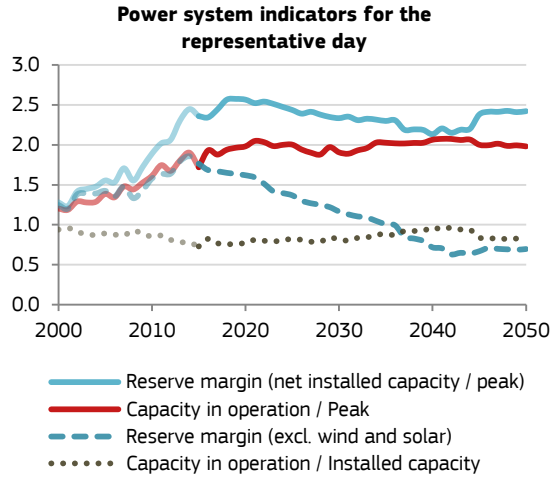

Freight transport sector key indicators
index, 2015=100
300
250
200
150
100
50
0
2000
2005
2010
2015
2020
2025
2030
2035
2040
2045
2050
GDP
Final energy consumption
Freight transport activity
CO2 emissions

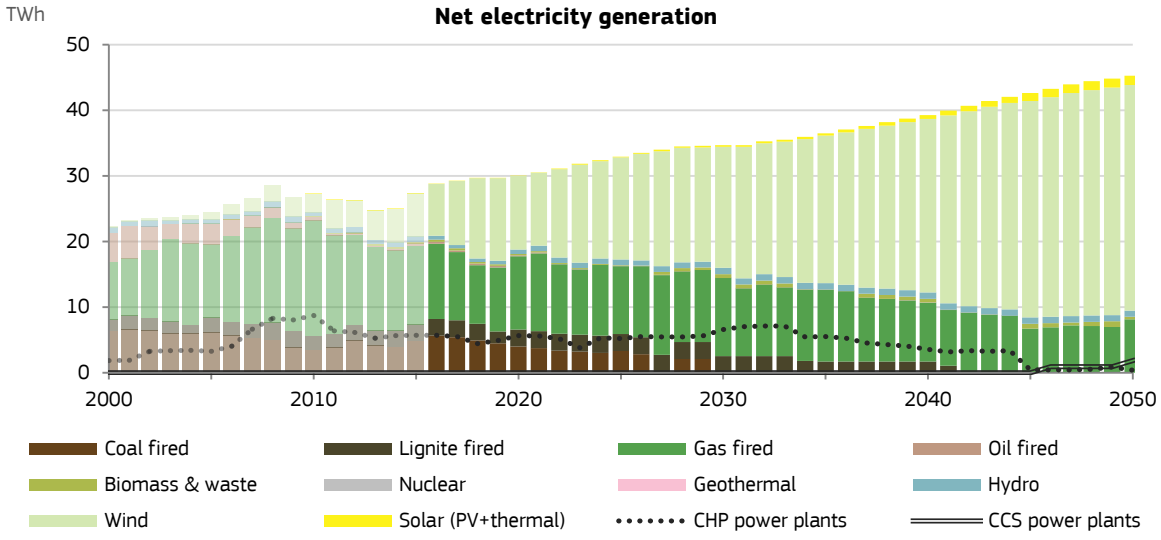

GW
Net installed power generation capacities
18
16
14
12
10
8
6
4
2
0
2000
2010
2020
2030
2040
2050
Coal fired
Lignite fired
Gas fired
Oil fired
Biomass & waste
Nuclear
Geothermal
Hydro and ocean
Wind
Solar
CHP power plants
CCS power plants

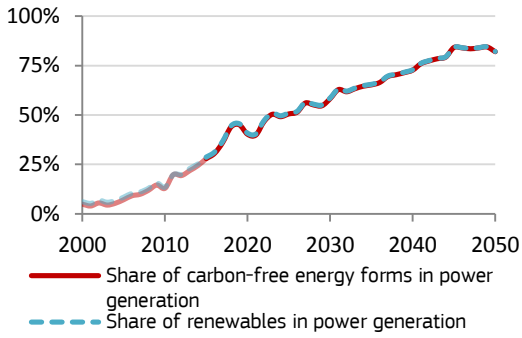

GW net
Installed capacities - difference to 2015
9
8
7
6
5
4
3
2
1
0
-1
-2
-
-1.2
-0.7
-0.8
-0.0
-
0.0
7.6
1.3
Nuclear
Solid fuels fired
Gas fired
Oil fired
Biomass...
Geothermal...
Hydro ...
Wind
Solar
2030 (+2 GW)
2050 (+6 GW)

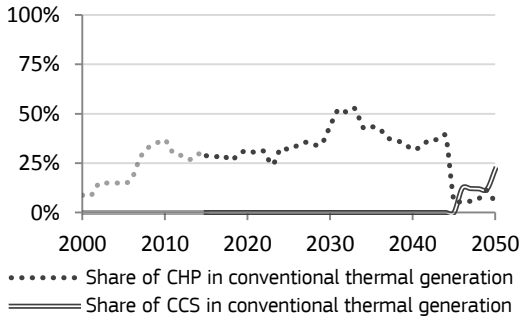

Cumulative investment 2016-2050 GW net
1.4
3.5
0.0
0.0
12.9
Nuclear
Solid fuels...
Gas fired
Oil fired
Biomass...
Geothermal...
Hydro...
Wind
Solar

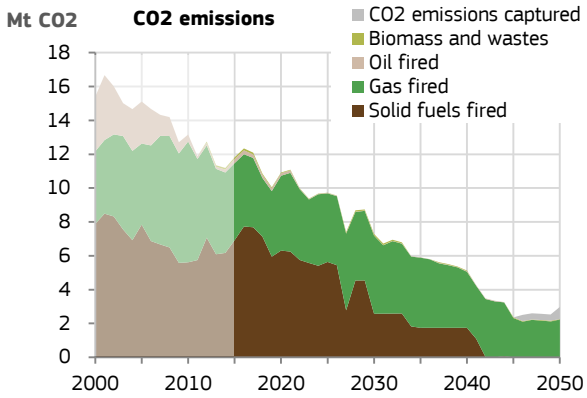

Operational characteristics
8000
6000
4000
2000
0
2000
2010
2020
2030
2040
2050
Average operating hours of the installed capacity
Average yearly load in hours

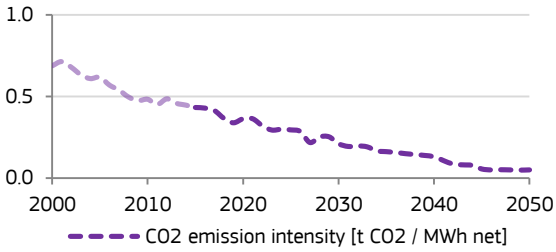

Power system indicators for the representative day
3.0
2.5
2.0
1.5
1.0
0.5
0.0
2000
2010
2020
2030
2040
2050
Reserve margin (net installed capacity / peak)
Capacity in operation / Peak
Reserve margin (excl. wind and solar)
Capacity in operation / Installed capacity

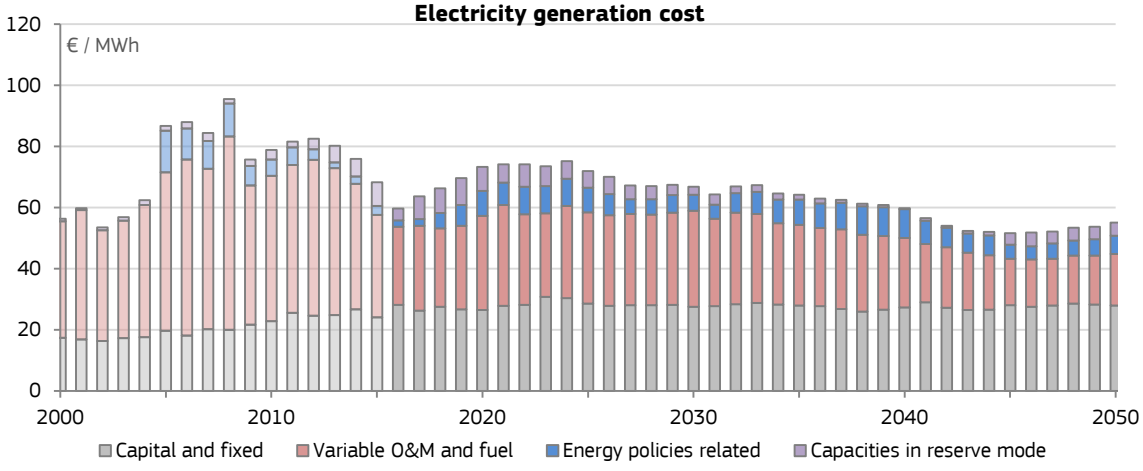

Net electricity generation
TWh
50
40
30
20
10
0
2000
2010
2020
2030
2040
2050
Coal fired
Lignite fired
Gas fired
Oil fired
Biomass & waste
Nuclear
Geothermal
Hydro
Wind
Solar (PV+thermal)
CHP power plants
CCS power plants

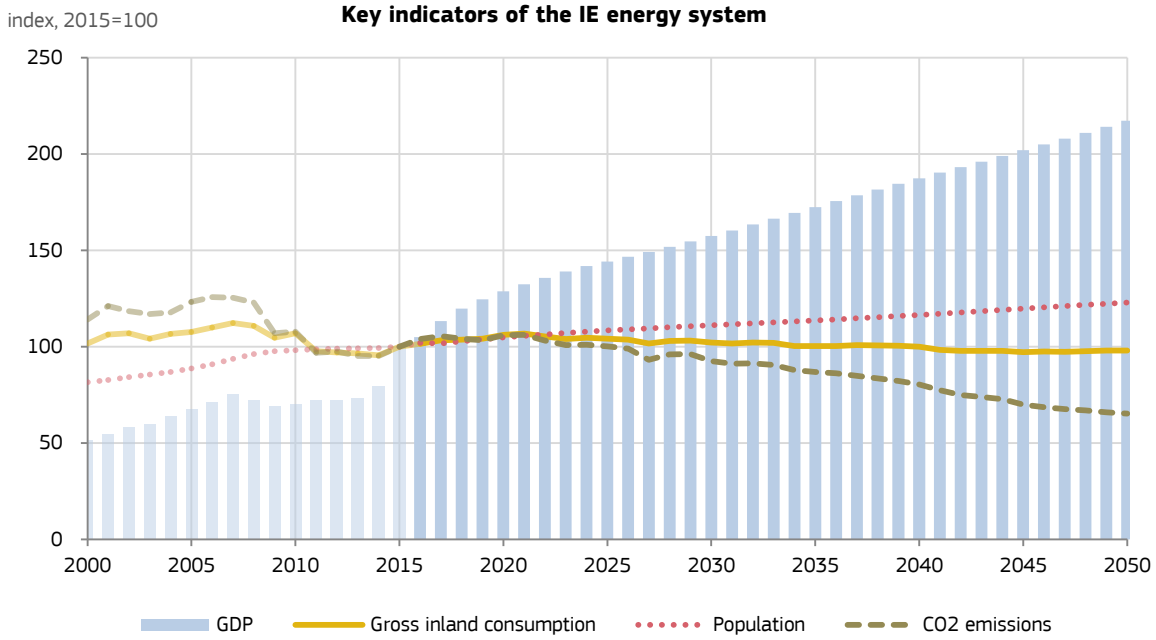
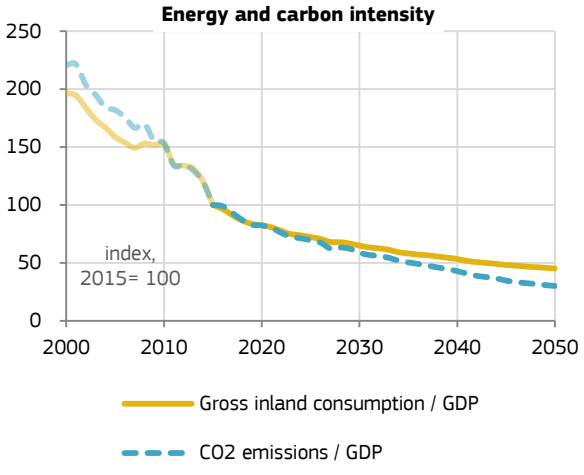
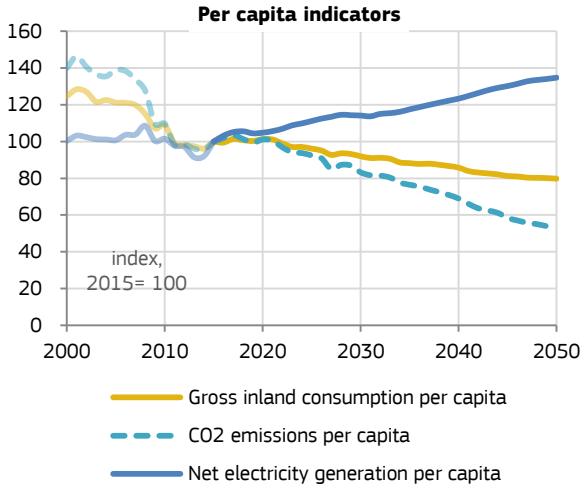

100%
75%
50%
25%
0%
2000
2010
2020
2030
2040
2050
Share of carbon-free energy forms in power generation
Share of renewables in power generation


100%
75%
50%
25%
0%
2000
2010
2020
2030
2040
2050
Share of CHP in conventional thermal generation
Share of CCS in conventional thermal generation


Mt CO2
CO2 emissions
CO2 emissions captured
Biomass and wastes
Oil fired
Gas fired
Solid fuels fired
18
16
14
12
10
8
6
4
2
0
2000
2010
2020
2030
2040
2050


1.0
0.5
0.0
2000
2010
2020
2030
2040
2050
CO2 emission intensity [t CO2 / MWh net]


Electricity generation cost
€ / MWh
120
100
80
60
40
20
0
2000
2010
2020
2030
2040
2050
Capital and fixed
Variable O&M and fuel
Energy policies related
Capacities in reserve mode



Key figures concerning the evolution of the Central_2018 - Indicators energy system						
	1990	2005	2015	2020	2030	2050
Final energy consumption [Mtoe]	7.3	12.6	11.2	12.3	12.3	12.4
Primary energy consumption [Mtoe]	9.6	14.7	14.0	14.8	14.2	13.6
RES [%] - Share of energy from renewable sources		2.8%	8.8%	13.6%	19.3%	36.3%
RES-E [%] - Share of electricity from renewable sources		7.4%	25.6%	46.2%	57.3%	83.6%
Total CO2 emissions [Mt CO2] (with intern. aviation, without LULUCF)	34.1	50.2	40.7	43.2	37.7	26.6
reduction to 1990		*47%*	*19%*	*26%*	*10%*	*-22%*
Emissions in current ETS sectors |(IE) [Mt CO2]		24.6	19.4	19.4	16.0	8.3
reduction to 2005			*-21%*	*-21%*	*-35%*	*-66%*
Emissions in current ESD sectors [Mt CO2]		25.6	21.3	23.8	21.7	18.2
reduction to 2005			*-17%*	*-7%*	*-15%*	*-29%*