



French experience on long term energy & climate planning

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France within the EU

Population (1/1/2016)

- EU28: 510 M
- France: 67 M

GDP per capita (market prices) (2014)

- EU28: €27,500
- France: €32,300

Total Final Energetic Consumption (2014)

- EU28: 1,062 Mtoe
- France: 142 Mtoe



EU Climate Action

- Key EU targets for **2020**

http://ec.europa.eu/clima/policies/strategies/2020/index_en.htm

- 20% cut in GHG emissions compared with 1990
(-10% from non EU-ETS sectors and -21% from the EU-ETS)
- 20% of total energy consumption from renewables
- 20% increase in energy efficiency

- Key EU targets for **2030**

http://ec.europa.eu/clima/policies/strategies/2030/index_en.htm

- At least 40% cut in GHG emissions compared with 1990
(-30% from non EU-ETS sectors and -43% from the EU-ETS)
- At least 27% of total energy consumption from renewables
- At least 27% increase in energy efficiency

- Long-term goal

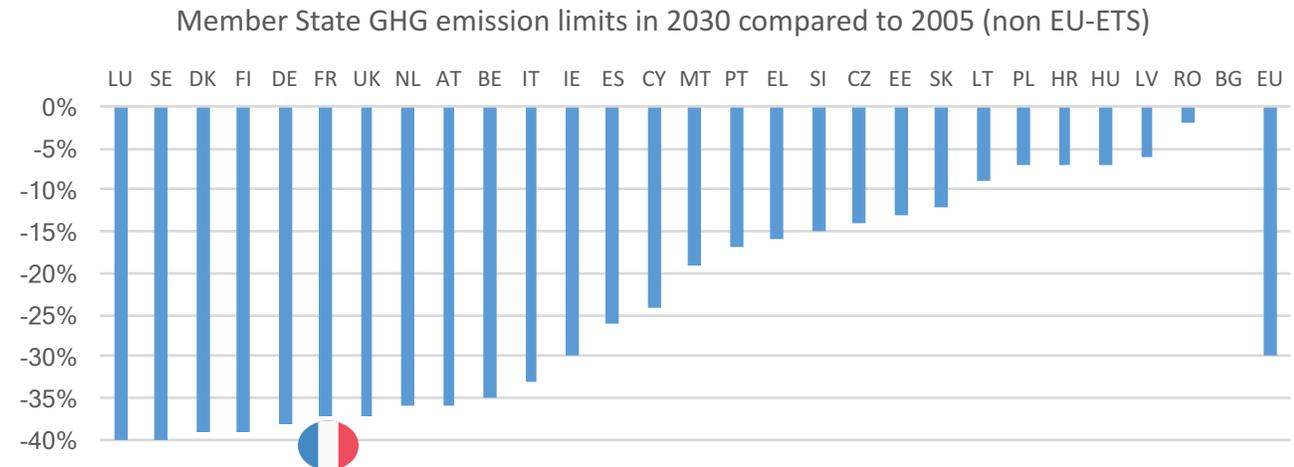
- By 2050, the EU aims to cut its GHG emissions substantially – **by 80-95% compared to 1990 levels** as part of the efforts required by developed countries as a group
- Turning Europe into a highly energy efficient and low-carbon economy will also boost the economy, create jobs and strengthen Europe's competitiveness

- Action towards climate targets

- The EU is pursuing its climate targets through a combination of **financial support** and **regulation**

- Adapting to climate change

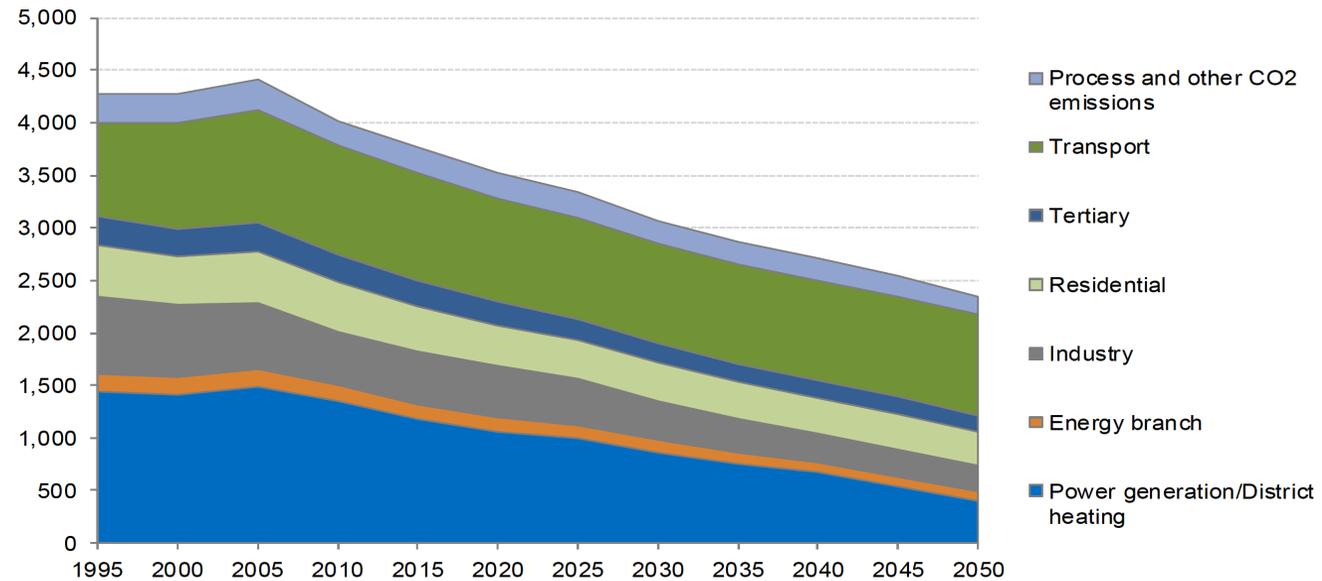
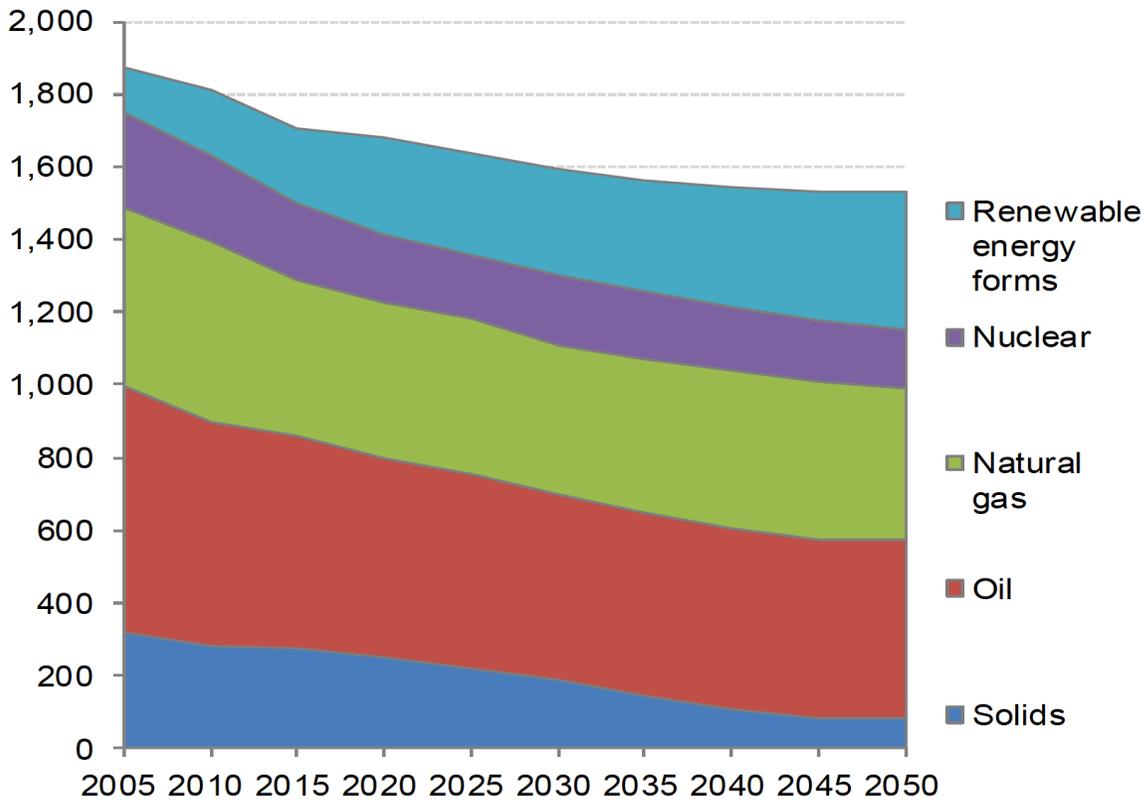
- The EU Commission has adopted an **EU Adaptation Strategy** and wants all its MS to adopt national plans by 2017



EU Reference Scenario to 2050

• EU28 Gross Inland Consumption (Mtoe)

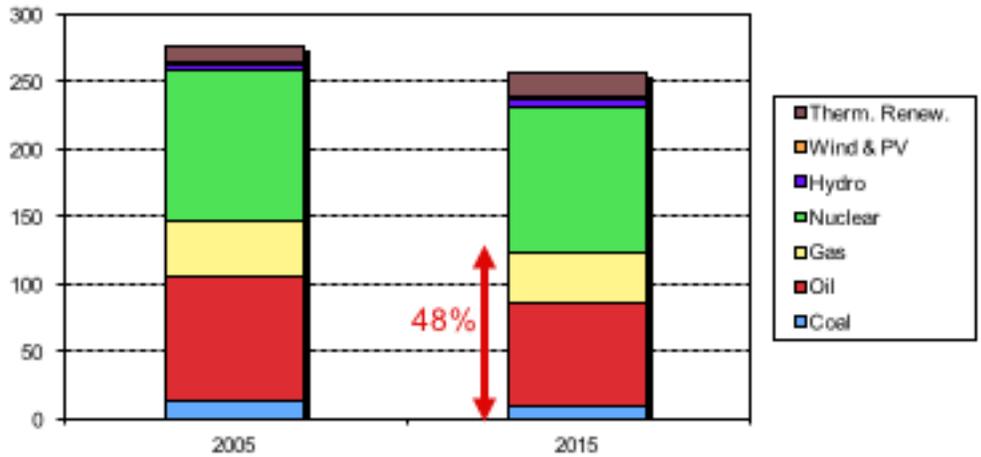
• Evolution of CO2 emissions (Mt) by sector



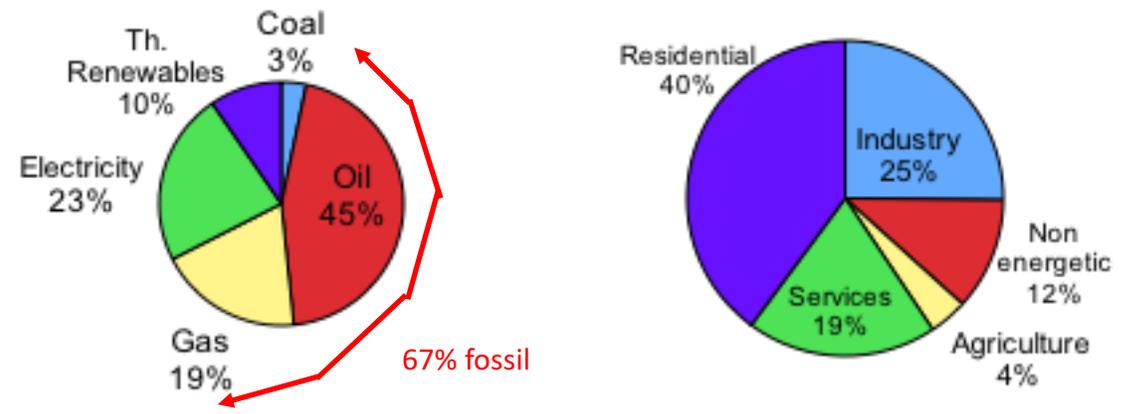
The French energy situation in a nutshell



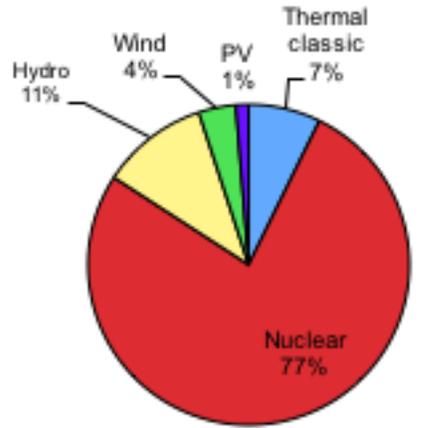
Gross inland consumption: 257 Mtoe



Total final energy consumption: 162 Mtoe



Gross electricity generation by fuel: 569 TWh



Final energy Intensity (2012): 91 toe/M€ GDP or 2.5 toe/capita

EU average: 102 or 2.4
 Germany: 95 or 2.9
 Italy: 89 or 2.1

Energy import dependency (Net energy imports/Gross cons., 2012): 48%

EU average: 53%
 Germany: 61%
 Italy: 81%

CO2 emissions (2012): 387 Mt or 5.9 t/capita or 214 t/M€ GDP

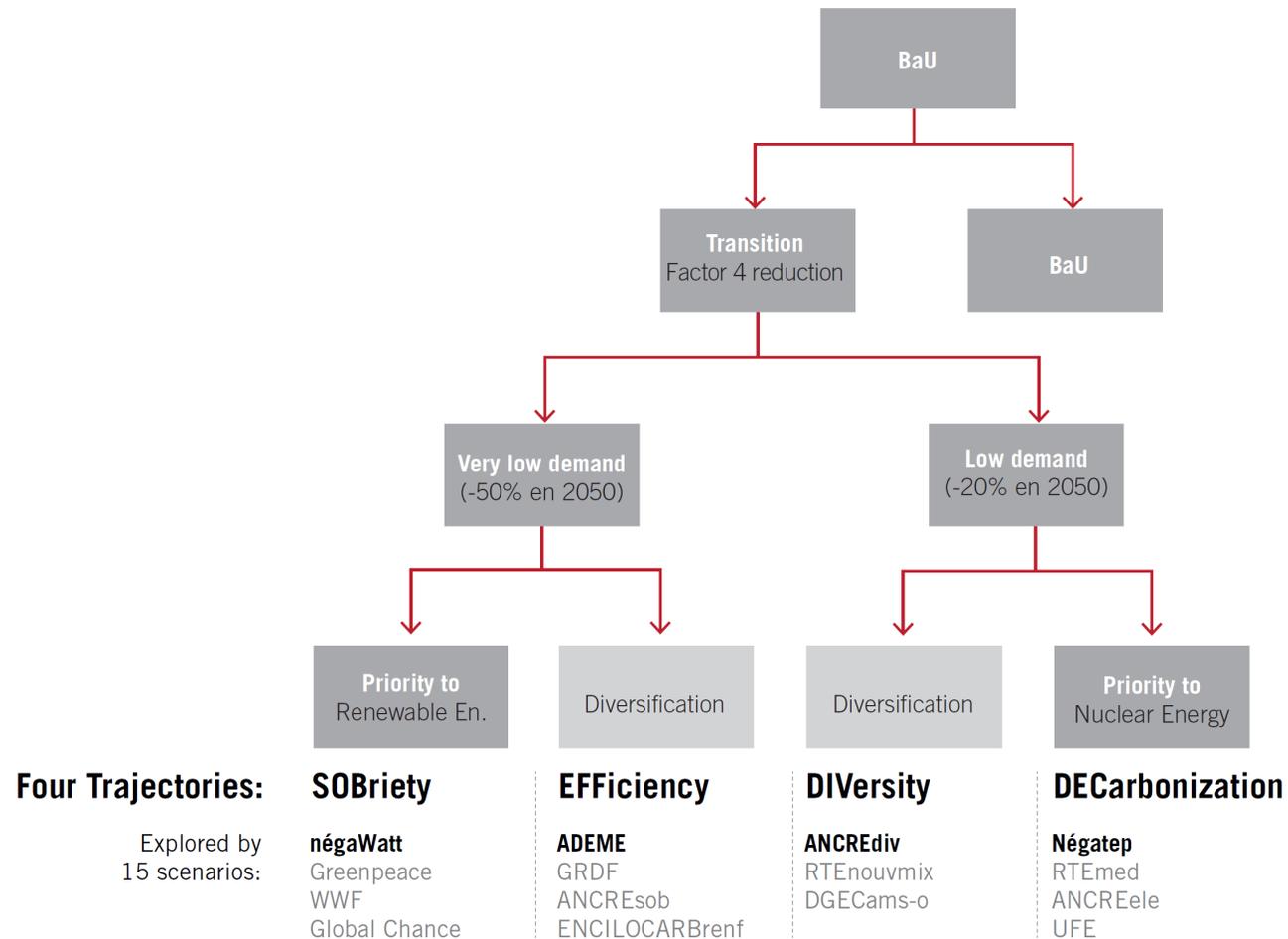
EU: 3 995 or 7.9 or 340
 Germany: 855 or 10.4 or 346
 Italy: 402 or 6.6 or 289

National strategy for ecological transition towards sustainable development (SNTEDD)

- Latest edition www.developpement-durable.gouv.fr/National-Strategy-of-Ecological,44461.html adopted by the French government in February 2015 for the period 2015-2020 to overcome 4 key environmental challenges:
 - Climate change
 - Accelerated loss of biodiversity
 - Resource scarcity
 - Increased health risks
- Unifying and coherent framework for many thematic or sectoral strategies (biodiversity, adaptation, agriculture, flood risks,...)
- Policies guidelines to reconcile long-term and short-term interests through 9 cross-cutting goals and priorities
- Set of indicators to monitor/follow the impact of the SNTEDD: <http://www.statistiques.developpement-durable.gouv.fr/indicateurs-indices/li/indicateurs-nationaux-transition-ecologique-vers.html>

National Debate on Energy Transition in 2013

- Four preliminary pathways were issued at the end of the National Debate



French legislation for energy transition (low carbon society): 3 major impetus

- National Debate on Energies and “POPE” Steering Law of 13 July 2005
 - Cut of GHG emissions of **75% by 2050** (3%/y) and support -50% at World level
 - Decrease of the final energy intensity of 2%/y from 2015 and 2.5%/y from 2030
- “Grenelle de l’Environnement” Initiative in 2007-2010
 - “Grenelle 1” Steering Law #2009-967 of 3/8/2009
 - Ambitious targets for buildings (50 kWh/m²/year for new buildings, -38% energy cons. for existing buildings, energy audits of State buildings,...) and transportation
 - Application of “Factor 4” and of the EU “3 x 20%” policy
 - “Grenelle 2” Act #2010-788 of 12/7/2010 to implement “Grenelle 1”
 - Yearly Finance Law: CITE, Eco-PTZ+, bonus-malus, etc.
 - Energy R&D: PIA, Competitiveness poles,...
- Energy Transition towards Green Growth : on-going process since 2012
 - National Debate on Energy Transition from Nov. 2012 to July 2013
 - Environmental Conference of Sept. 2013 with President Hollande declaration
 - Energy Transition towards Green Growth Act (LTECV) #2015-992 of **17/8/2015**
 - Yearly Finance Laws for 2015, 2016 and 2017



More and more:

- Involvement of NGO's
- Improvement of EE and development of renewables
- Local authorities empowerment

Many quantitative objectives to 2030 and 2050 in LTECV, among which:



40% less greenhouse gas emissions in 2030 compared to 1990



30% less fossil fuel consumption in 2030 compared to 2012



Increase the share of renewable energy sources to **32%** of the final energy consumption in 2030 and **40%** of the electricity production



Carbon component trajectory up to **€100/tCO₂** in 2030



Reduce final energy consumption by **50% in 2050** compared to 2012



- **50%** less waste in landfill by 2025



Diversify electricity production and reduce the share of nuclear power to **50%** by 2025

Three main tools to keep momentum in the energy transition, as mentioned in the LTECV

- **National Strategy for low-carbon development (SNBC) 2015-2028 (*)**
 - The Government imposed, by successive 5-years periods, 3 GHG emissions ceilings (“Carbon Budgets”) that France should not exceed
 - In order to meet this commitment, the SNBC is set up for 3 successive 5-years periods
 - All future national policies (for instance transport, spatial and infrastructure planning and energy production) should take it into account
- **Multi-annual Programming for Energy (PPE) 2016-2023 (**)**
 - Governmental action plan that defined its priorities to support various forms of energy or energy savings, in line with the SNBC:
 - Energy efficiency and renewables
 - Security of supply
 - Balance between supply and demand
 - PPE is set up for 2 successive 5-years periods
- **Empowerment of regional and local authorities**
 - Including various strategic/action planning territorial exercises (SRADDET/SRCAE, PCAET, SRB, S3RENr, TEPCV,...)

(*) Adopted by decree of 18 November 2015

(**) Adopted by decree of 27 October 2016

The French National Low Carbon Development Strategy (SNBC) (1/8)

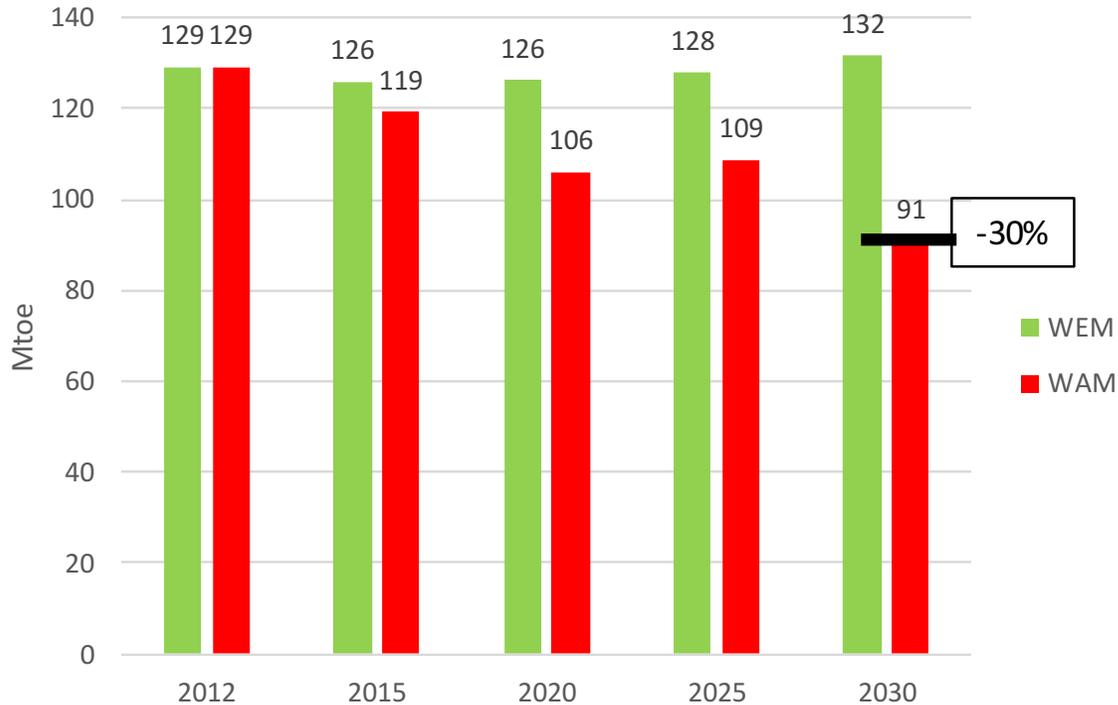
- SNBC defines strategic orientations to implement GHG emissions reduction in each sector of activity in accordance with LTECV
 - Based on a study made from mid-2014 to mid-2015 to develop GHG/energy scenarios to 2035: **WEM and WAM scenarios**(*)
 - Associated with Carbon Budgets, i.e. ceilings/upper limits of GHG emissions at national level, of 5 years each, until 2028, with **indicative** split by sector of activity
 - Based on these Carbon Budgets, it is easier to assess the tendency for the decrease of GHG emissions (independently of weather conditions, geopolitical crisis,...)
 - Scenarios, Carbon Budgets and SNBC should be updated and extended by **July 2019**

(*) WEM = With Existing Measures (BaU Scenario)

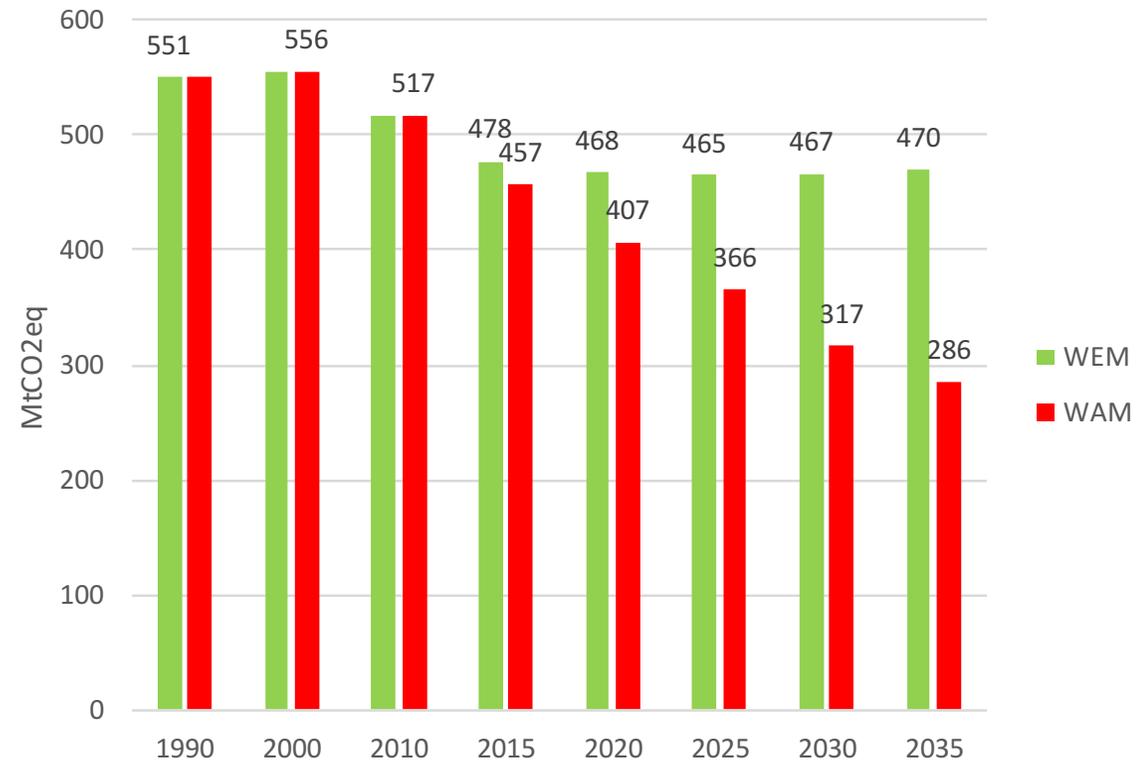
WAM = With Additional Measures (Reference Scenario)

The French National Low Carbon Development Strategy (SNBC) (2/8)

- Primary consumption of fossil fuels in WEM and WAM scenarios



- GHG emissions in WEM and WAM scenarios



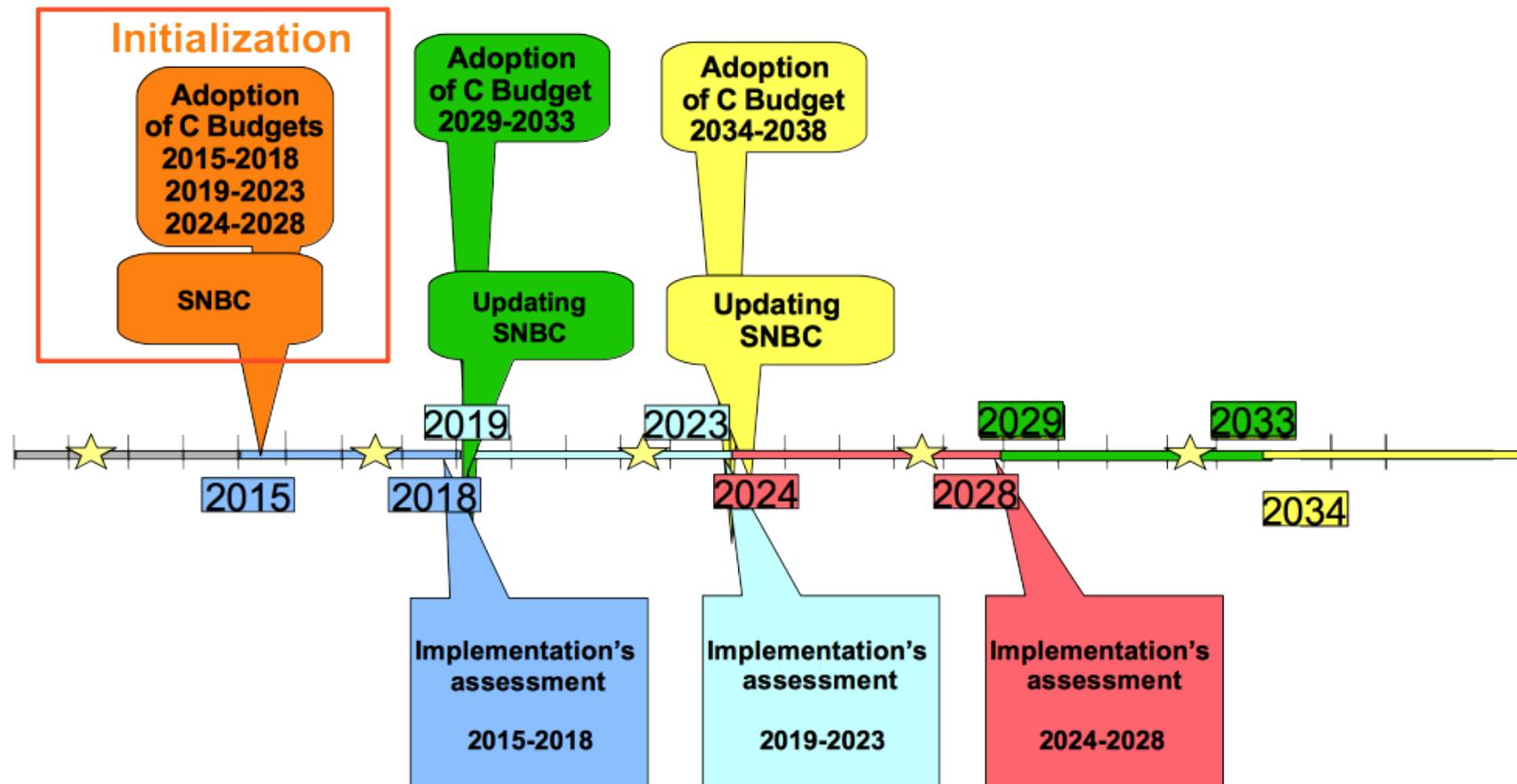
See www.developpement-durable.gouv.fr/scenarios-a-l-horizon-2020-2030.html

WEM = With Existing Measures (BaU Scenario)

WAM = With Additional Measures (Reference Scenario)

The French National Low Carbon Development Strategy (SNBC) (3/8)

- A continuous process of updating and extension



The French National Low Carbon Development Strategy (SNBC) (4/8)

- Concertation process all over 2015
 - Communication with various committees, incl.
 - Environmental Authority
 - CETE = Committee of experts for energy transition: 8 academics
 - CNTE = National Council for Ecological Transition: 50 delegates
 - Several dedicated meetings both on the scenarios and the draft SNBC
 - Consultation of the public
- Publication of SNBC
 - Decree of 18 November 2015 https://www.legifrance.gouv.fr/jo_pdf.do?id=JORFTEXT000031493783 together with a report providing orientations and recommendations www.developpement-durable.gouv.fr/IMG/pdf/SNBC_Strategie_Nationale_Bas_Carbone_France_2015.pdf and English summary: www.developpement-durable.gouv.fr/IMG/pdf/15147-2_strategie-bas-carbone_4p_GB.pdf

- CNTE
 - Chaired by the French Minister of Environment, Energy and the Sea
 - Composition:

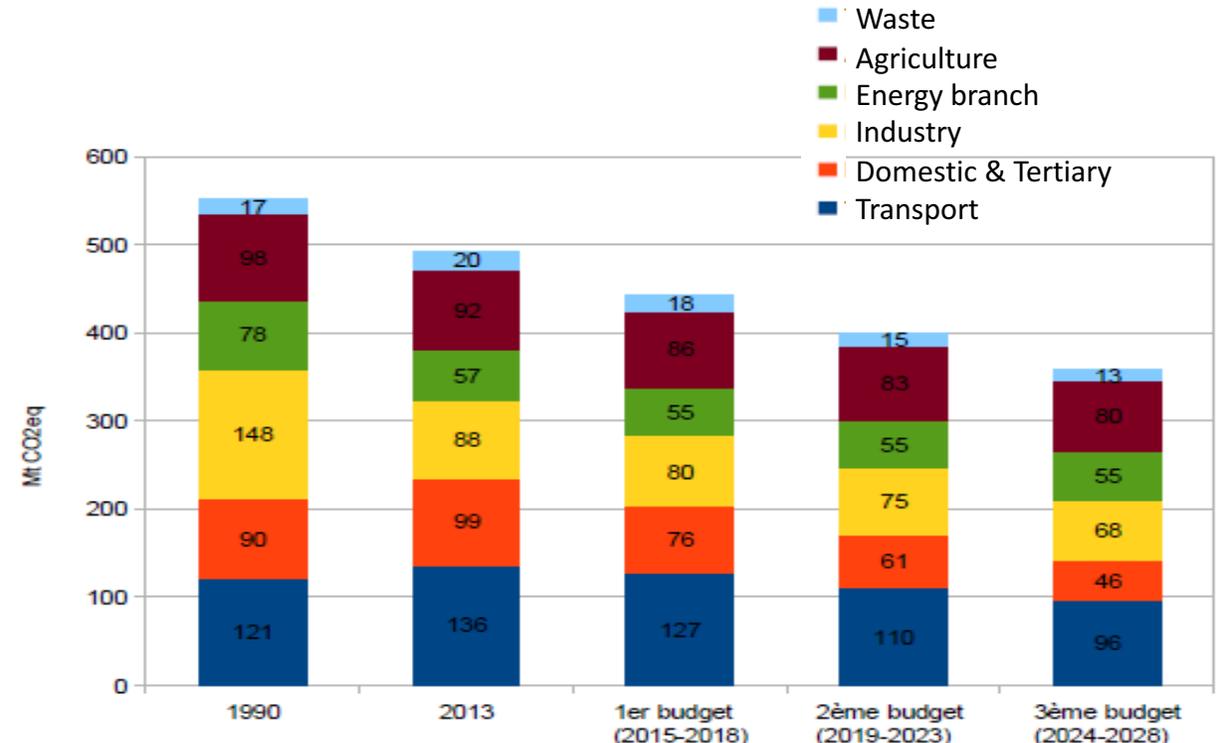
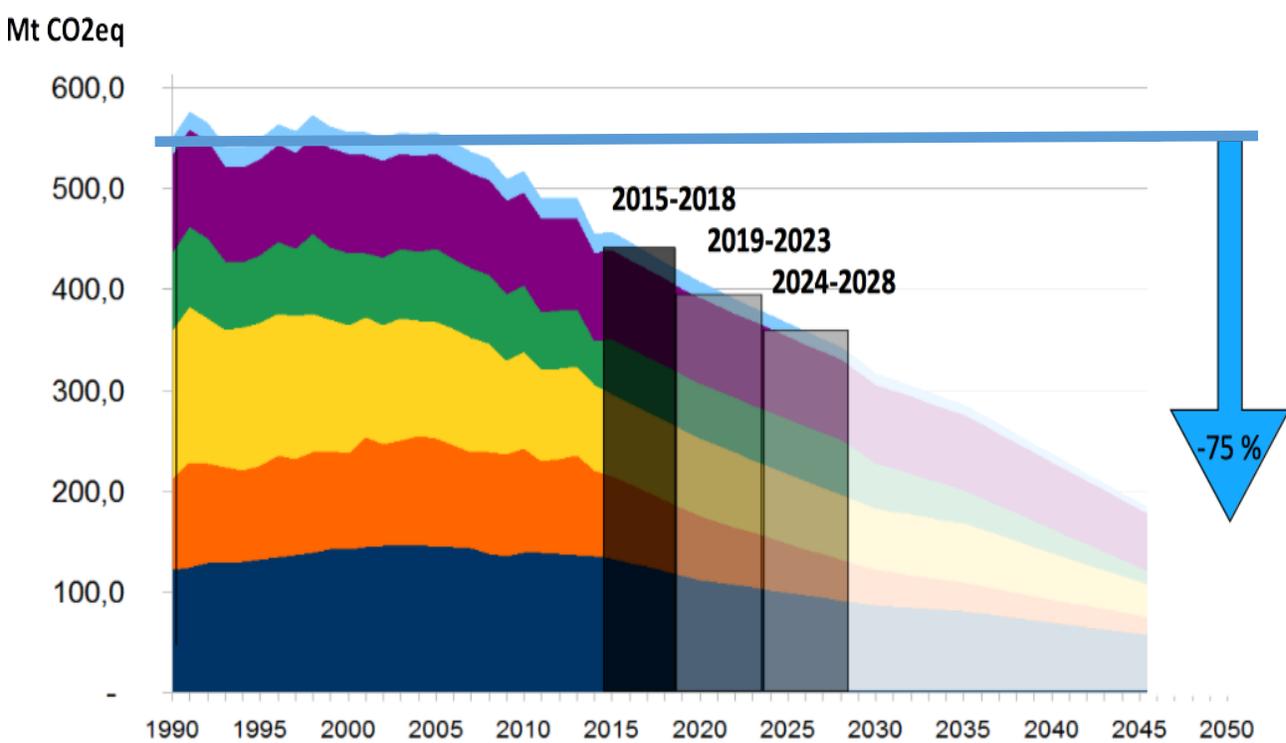


The French National Low Carbon Development Strategy (SNBC) (5/8)

Transport (28%)	Building / Dwelling (20%)	Agriculture Forestry (19%)	Industry (18%)	Energy branch (12%)	Waste (4%)
Targets					
Reduce GHG emissions by 29% by the 3 rd carbon budget period (2024-2028) compared to 2013 and by at least 2/3 between now and 2050	Reduce emissions by 54% by the 3 rd carbon budget period compared to 2013 and by at least 87% by 2050 + Cut energy consumption by 28% by 2030 compared to 2010	Reduce agricultural emissions by more than 12% by the 3 rd carbon budget period compared to 2013 and by 50% through the agro-ecology project	Cut emissions by 24% by the 3 rd carbon budget period and by 75% between now and 2050	Keep emissions below the 2013 level during the 1st 3 carbon budget periods and reduce energy production-related emissions of 96% by 2050 vs. 1990	Reduce emissions by 33% by the 3 rd carbon budget period
Means					
Energy efficiency of vehicles (2l/100 km for vehicles sold in 2030)	Implement the 2012 thermal regulation and a new one	Increase the implementation of the agro-ecology project	Manage the demand for energy and materials per product	Reduce energy demand and carbon footprint	Reduce food waste and prevent production of waste
Low carbon supply systems (vehicle quotas in public fleets, electric charging stations,...)	Renovate entirely the stock of buildings to high standards of efficiency by 2050 (BBC)	Promote a very significant increase in the amount of the wood harvested	Promote circular economy	Continue to develop renewables	Increase recycling and sorting
Demand side (city planning, teleworking, occupancy rate in vehicles,...)	Speed up DSM (eco-design, Linky, etc.)		Reduce the share of GHG intensive energy sources	Improve the flexibility of the energy system	Reduce diffuse methane emissions
Promote alternatives to private cars					Ultimately stop incineration without energy recovery
Encourage modal shift					

The French National Low Carbon Development Strategy (SNBC) (6/8)

- Carbon budgets: an illustration with a compatible GHG emission trajectory
- Indicative sectoral split of the 3 first carbon budgets (incl. overseas territories)



The French National Low Carbon Development Strategy (SNBC) (7/8)

- GHG emissions (and **energy**) evolutions per sector with respect to the BaU scenario

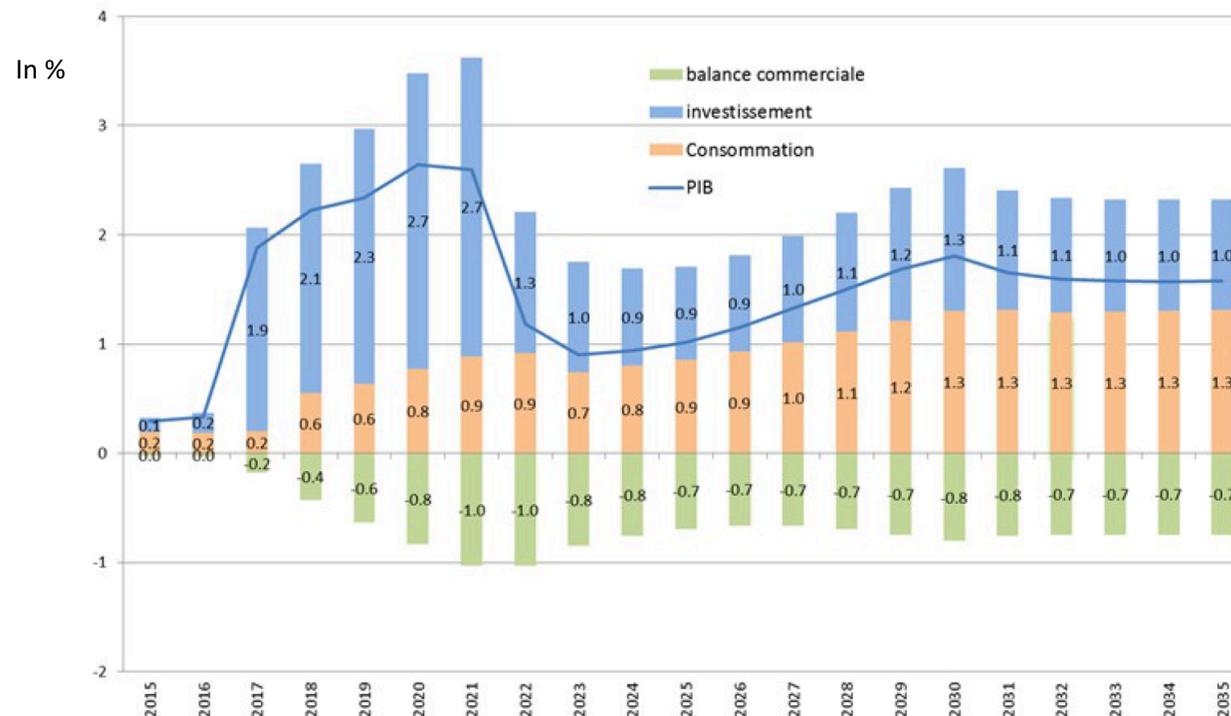
GHG (energy)	1 st Carbon Budget (2015-2018)	2 nd Carbon Budget (2019-2023)	3 rd Carbon Budget (2024-2028)
Waste	-8%	-14%	-21%
Agriculture	-5%	-8%	-11%
Energy branch	-14%	-19%	-28%
Industry	-4% (-5%)	-8% (-8%)	-16% (-13%)
Domestic & Tertiary	-8% (-4%)	-20% (-10%)	-34% (-17%)
Transport	-7% (-5%)	-18% (-12%)	-27% (-18%)
TOTAL	-7%	-15%	-23%

- Yearly average emissions

Yearly average emissions (MtCO ₂ eq)	1990	2013	1 st Carbon Budget (2015-2018)	2 nd Carbon Budget (2019-2023)	3 rd Carbon Budget (2024-2028)
EU-ETS (excl. international flights)		119	110	#N/A	#N/A
Other sectors		373	332	#N/A	#N/A
TOTAL	552	492	442	392	358

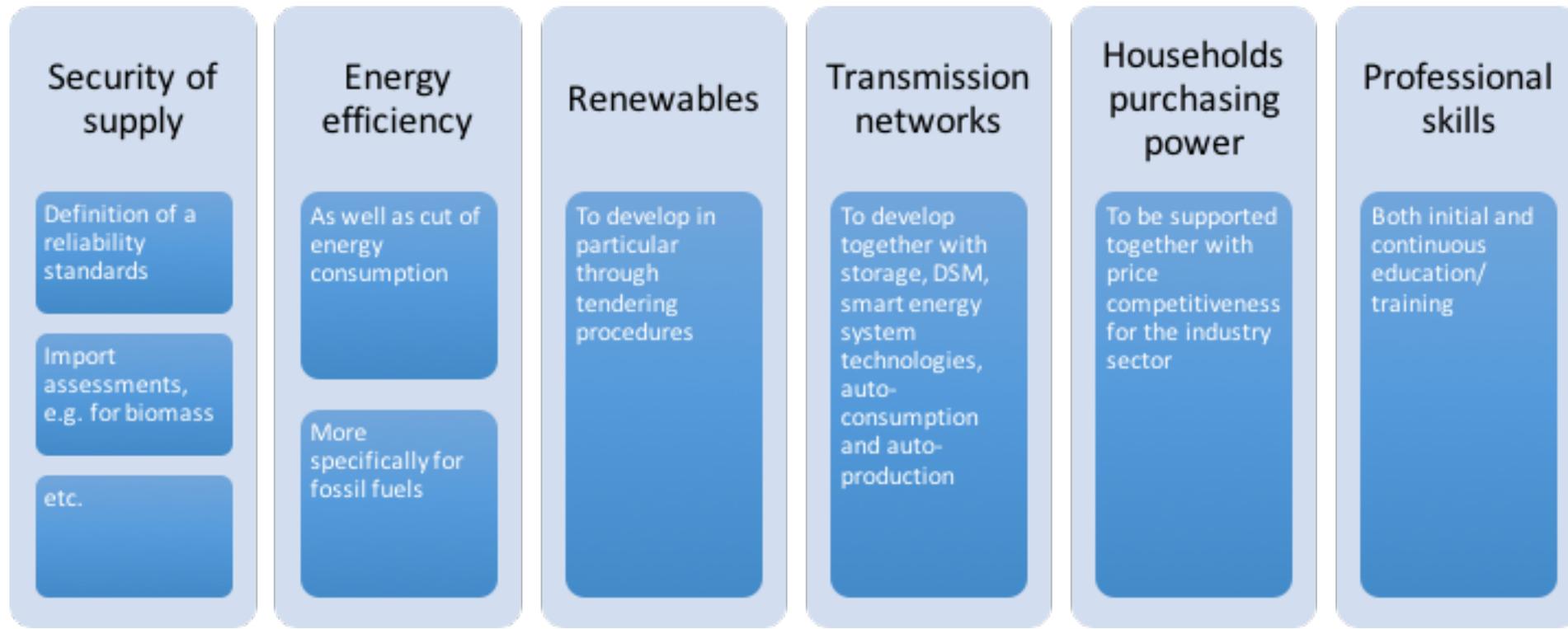
The French National Low Carbon Development Strategy (SNBC) (8/8)

- SNBC was assessed for its macro-economic impacts with the Three-ME model (ADEME & OFCE), see www.developpement-durable.gouv.fr/IMG/pdf/Thema-SNBC.pdf (French only)
- Comparison with a BaU scenario gives the following results over the next 2 decades (2015-2035):
 - Impact on GDP = +1.6 point in 2035 vs. BAU (mainly because of investments in new buildings over 2017-2021)
 - Jobs creation = +400,000 (net cumulative gain) in 2035 vs. BAU



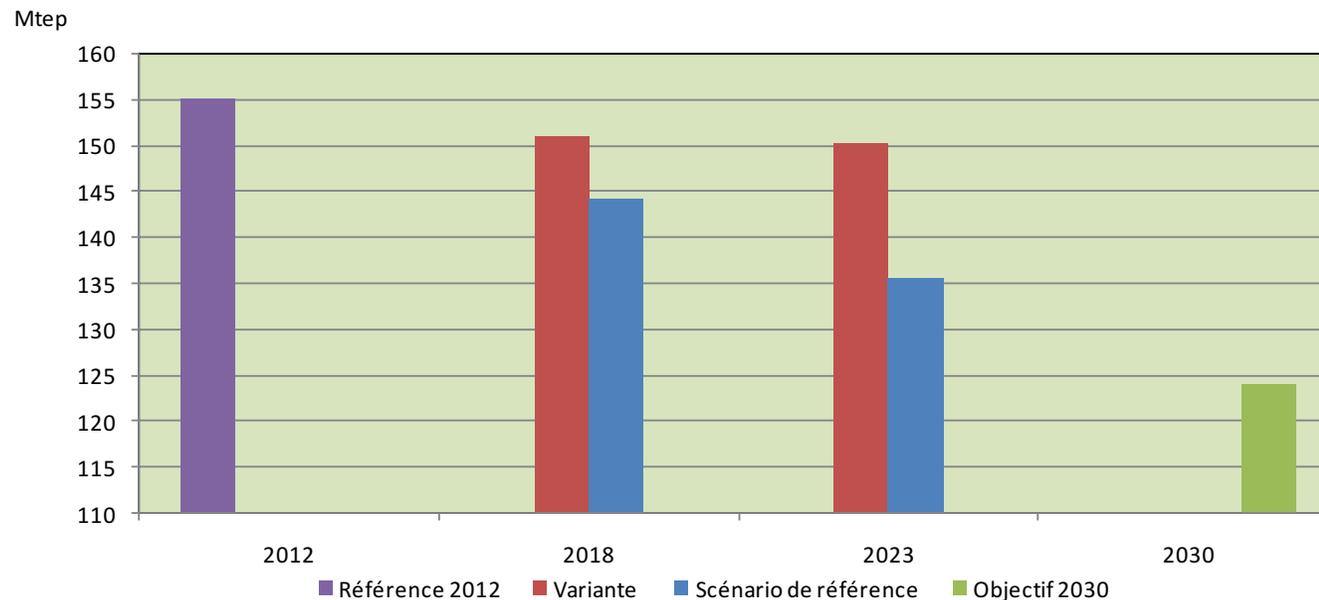
Multi-annual Programming for Energy (PPE) (1/5)

- LTECV merged several planning documents for various energy forms (electricity, gas and heat) into a single instrument, PPE, and widens their scope to include consumption, networks and security of supply
- PPE defines priorities of public action in an integrated and global energy approach in order to achieve the LTECV goals



Multi-annual Programming for Energy (PPE) (2/5)

- PPE analysis includes various energy demand scenarios taking into account different assumptions (macroeconomic outlooks, demographic forecast and energy efficiency outlooks)
- Two main scenarios were considered for energy demand
 - PPE Reference Scenario: -13% in 2023 (compared to 2012), that is compatible with LTECV target of -20% in 2030
 - PPE sensitivity analysis: -3% in 2023 (compared to 2012)



Multi-annual Programming for Energy (PPE) (3/5)

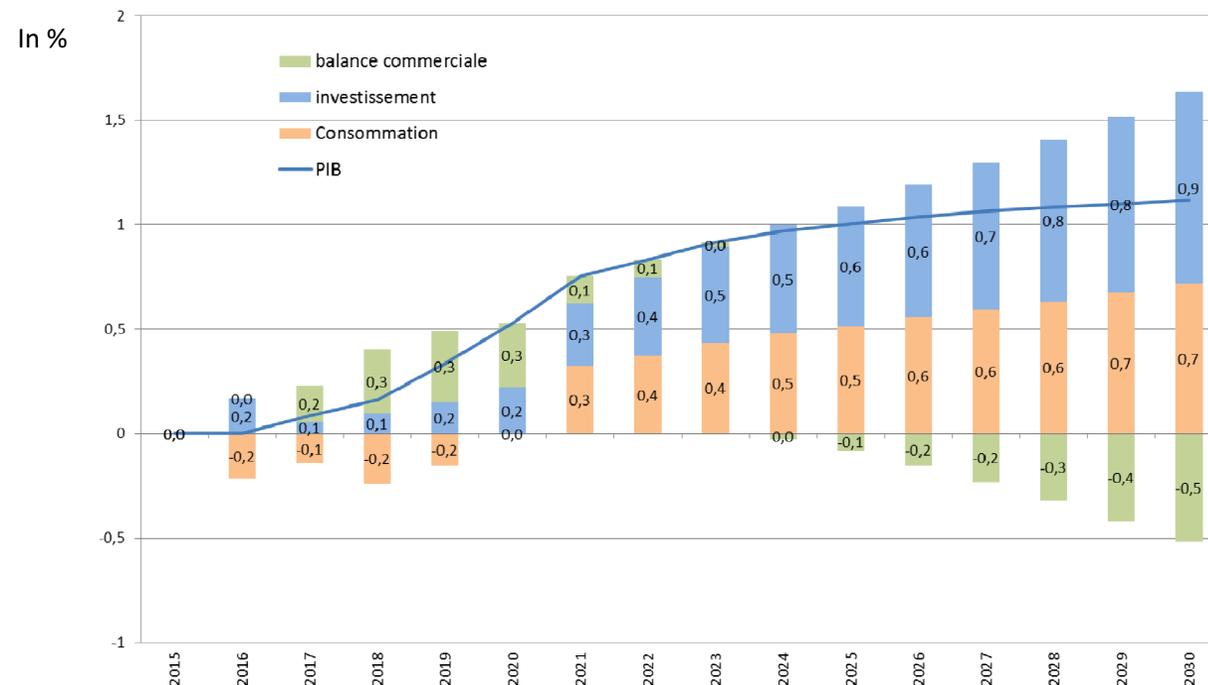
Energy efficiency	Renewables	Cleaner mobility	Security of supply	Longer term
Targets (2023)				
-12% for the final energetic consumption -23% for the primary consumption of fossil fuels (in line with -30% in 2030)	+70% for installed capacity of electric renewables and +35% for renewable heat, compared to 2014 (in line with the global objective of +32% in 2030)	Cut energy consumption in transport of 13%	Demand side response up to 6 GW (incl. erasing) Preserve high level reliability standards (electricity, gas)	Hydraulic storage of 1 to 2 GW between 2025 and 2030
Means (2023)				
To cut energy consumption in buildings of 15% by 2023	Schedule of calls for tenders	2.4 million EVs and plug-in hybrid vehicles	No new coal plant but CCS ready	Deployment of smart grids
Thermal renovation of 500,000 dwellings/y from 2017	Simplifications	Installation of 1 million charging points by 2020	Capacity mechanism to be launched in January 2017	Support of storage solutions
Financing tools	Participatory finance (crowdfunding)	3% trucks to be supplied with NGV and 20% bio-NGV within global NGV consumption	Ensure availability of gas storage infrastructures and development of gas interruptibility	Support of auto-consumption and auto-production
White certificates	Extend heat funding	Advanced biofuels	Ensure an effective distribution of oil strategic stocks	Engage -10 to -65 TWh of nuclear power by 2023
	Etc.	Etc.	Etc.	Etc.

Multi-annual Programming for Energy (PPE) (4/5)

- Almost the same concertation process as for SNBC
 - Communication with various committees, incl.
 - Environmental Authority
 - CETE = Committee of experts for energy transition: 8 academics
 - CNTE = National Council for Ecological Transition: 50 delegates
 - Consultation of the public
- Publication of PPE
 - Decree of 27 October 2016 together with a report providing orientations and recommendations www.developpement-durable.gouv.fr/IMG/pdf/PPE-complet-1.pdf (French only)

Multi-annual Programming for Energy (PPE) (5/5)

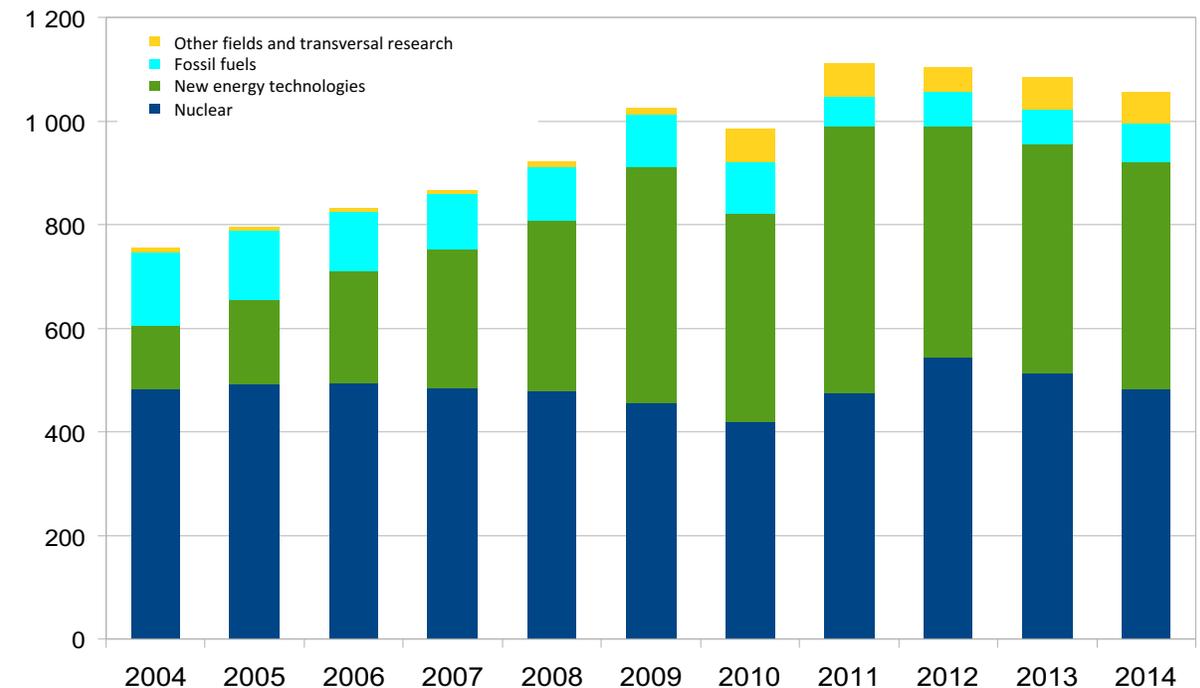
- The two main PPE scenarios were assessed for their macro-economic impacts, the same way as SNBC, see [www.developpement-durable.gouv.fr/IMG/pdf/7 - Volet Impacts économiques et sociaux.pdf](http://www.developpement-durable.gouv.fr/IMG/pdf/7_-_Volet_Impacts_economiques_et_sociaux.pdf) (French only)
- Comparison of the **PPE Reference Scenario** with a BaU one gives the following results over 2014-2030:
 - Impact on GDP = +1.1 point in 2030 vs. BAU (mainly because of investments in new buildings, as for SNBC)
 - Jobs creation = +280,000 (net cumulative gain) in 2030 vs. BAU



National Strategy for Energy Research

- Same principles of concertation process as for SNBC and PPE
 - Involvement of ANCRE, National Alliance for Coordination of Energy Research www.allianceenergie.fr
 - Conformity with SNBC and PPE
 - Coherence with the EU SET-Plan <https://setis.ec.europa.eu>
- Main objective: to identify and to structure big issues and challenges in research and innovation, at various time horizons up to 2050, to meet LTECV goals
 - Decision support tool for the government rather than a programming document
 - For instance:
 - To develop a transversal approach for Energy R&D in order to better take into account environmental issues, humanities and social sciences and digital challenges
 - To prepare new tools to manage flexibility and sophistication of the energy system at different time horizons

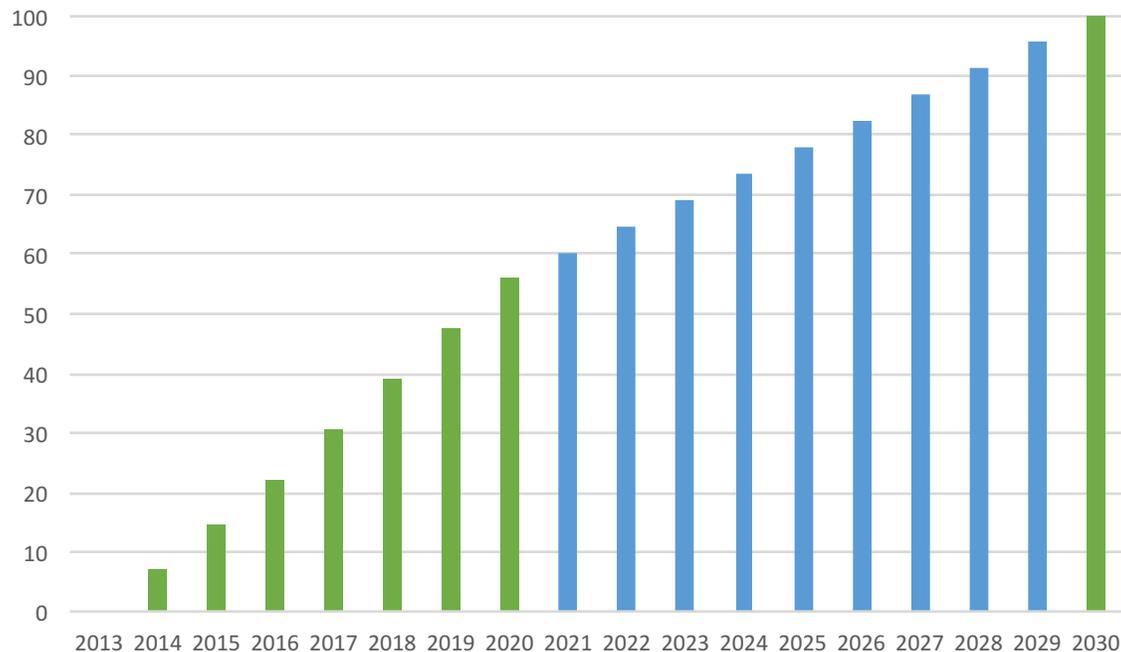
- French governmental expenses for energy R&D (in M€)



Carbon pricing: Carbon tax and EU-ETS are coexisting in France

- French Carbon Tax since 2014
 - Growth is compensated by tax cut in favour of energy transition (tax credit,...)

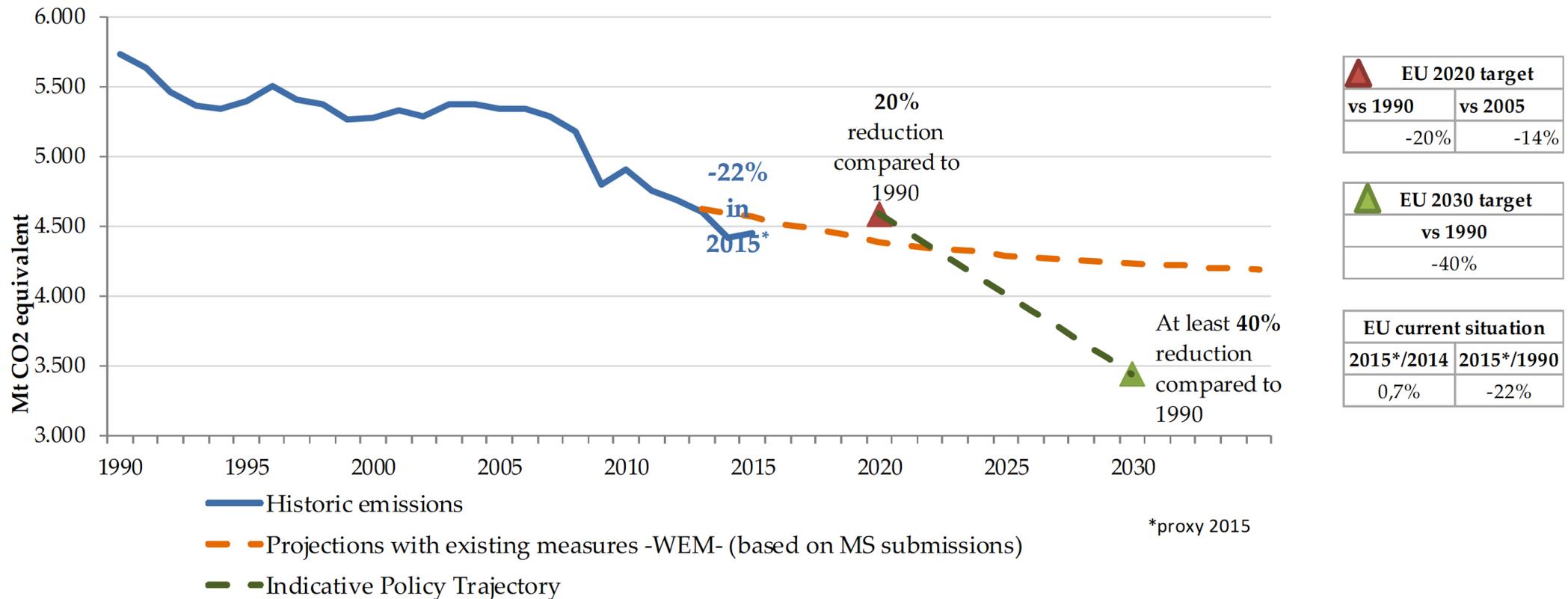
en €/tCO₂



- EU-ETS
 - Operates in the 28 EU countries +
 - Limits GHG emissions from:
 - Approximately 11,000 energy intensive installations and manufacturing industry sectors
 - Operators of flights
 - Cap and trade: in the period 2013-2020, the cap is reduced by 1.74% every year (i.e. -21% in 2020 compared to 2005)
 - Price is currently between 4 and 6 €/tCO₂

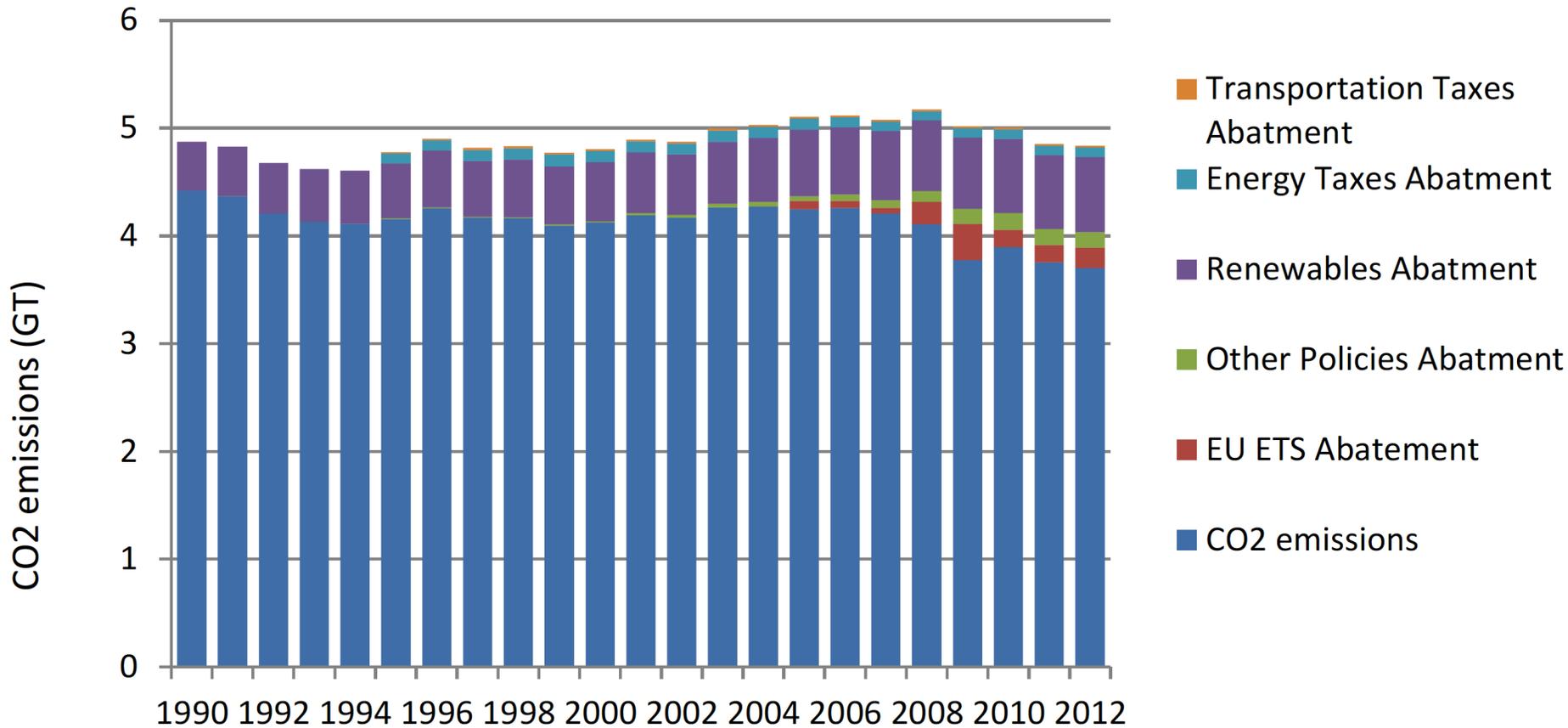
Importance of carbon pricing in the EU (1/2)

- France is in favour of a better EU carbon pricing because the current price signal is not enough and too volatile to support clean energy and to get progress towards the at least -40% GHG EU 2030 target (-30% non EU-ETS sectors and -43% EU-ETS)
- Negotiations are under way between the 28 MSs with proposals such as “price corridor”, “carbon floor”, benchmarks, etc.



Importance of carbon pricing in the EU (2/2)

- Ex-post evaluation of the impact of the EU-ETS, Renewable, Taxation and other policies on CO2 emissions from combustion
- Climate policy works as it reduces emissions and stimulates the uptake of clean technologies



Integration of the climate risk within the annual reporting of companies and institutional investors

- For institutional investors
 - Since 2012, portfolio management companies and fund management companies have to **report on environmental, social and governance (ESG)** criteria that they use in their investment policy (support to Socially Responsible Investment)
 - Decree #2015-1615 of 10 December 2015 set up the **“Energy and Ecological Transition for the Climate” governmental label**
 - 9 funds have been labelled so far, for a total amount of assets under management of b€ 1.2
 - Decree #2015-1850 of 29 December 2015 made mandatory for large institutional investors to report annually, from 1st January 2017, on the means to contribute to the energy and ecology transitions, including:
 - **Carbon footprint of portfolios**
 - **Green part of their investments**
 - **Low carbon development strategy set up to fight against climate change**
 - French public financial institutions (CDC, AFD, BPI,...) have been encouraged to launch **green bonds** that would be dedicated to environmental investments
 - The French government has announced its intention to launch a **sovereign green bond**
- For companies
 - Since 2001, French legislation has required large companies to provide extra financial reporting on **environmental, social and governance (ESG) aspects**, including risks and uncertainties
 - Decree #2016-1138 of 19 August 2016 made mandatory for them to report annually, from 1st January 2017, on **significant items of GHG emissions due to the companies activities**, including through the **use** of goods and services that they produce



Thank you for your attention!

More details on the Ministry website www.developpement-durable.gouv.fr
and in the last edition of the “Panorama” www.developpement-durable.gouv.fr/Sortie-du-rapport-Panorama.html

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