

The long term costs of the energy transition

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Different actors, different costs

- Public spending/Incentives
- Citizens/Distributional effects
- Financial sector/Cost of capital

✓ *Europe/Member States*

Public spending: Europe

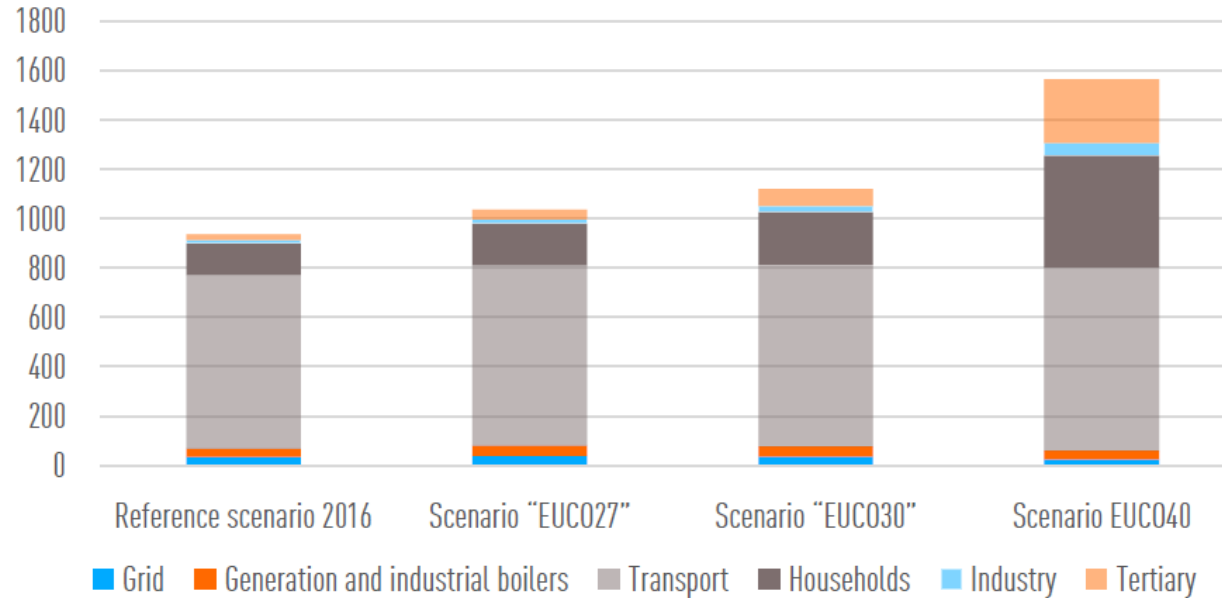
The Fit for 55 package: toward climate neutrality

Achieving the - 55% target would require at least an annual additional investment of €438 billion between 2021 and 2030 (excluding transport)

- The EU's long-term budget for the next seven years will provide support to the green transition, according to the Commission, with around 30% of programmes under the €2 trillion 2021-2027 Multiannual Financial Framework and NextGenerationEU dedicated to supporting climate action.
- Some 37% of the €723.8 billion (in current prices) Recovery and Resilience Facility, which will finance member states' national recovery programmes under NextGenerationEU, is allocated to climate action

Looking back...

Energy-related investments needs between 2020 and 2030 in different scenarios (annual average, in billions of euros 2010)



Source: Commission Staff Working Document. Impact assessment accompanying the proposal for a Directive on Energy Efficiency, Brussels, 30.11.2016, SWD(2016) 405 final, part 1/3, table 22, p.66

The scenario "EUCO27" assumes the adoption of policy measures to ensure the attainment of the 2030 EU climate targets—that is, reducing at least 40% of GHG emissions, ensuring 27% of renewables and reducing energy consumption by 27% by 2030—. The scenarios "EUCO30" and EUCO40 introduce more ambitious measures to ensure a 30%/40% reduction of energy consumption respectively by 2030. Source: European Commission, "Impact assessment accompanying the proposal of Directive on Energy Efficiency" (SWD(2016) 405 final), 2016

...there was already a gap

Investment needs and gaps in the energy sector (annual average, in billions of euros)

	REQUIRED ¹	CURRENT (ANNUAL INVESTMENT, AVG. 2001-2015) ²	GAP
Power generation	53	41	12
Energy networks (gas and electricity)	64	47	18
Energy efficiency	112	42	70
Total	230	130	100

1. Estimated annual investment needs between 2016-2030 under “reference scenario”; 2. Annual investment in EU28 over the period 2001 to 2015

Source: EIB, “Restoring EU competitiveness 2016 updated version”, Luxembourg: EIB, 2016

Source: Institut Delors, 2019

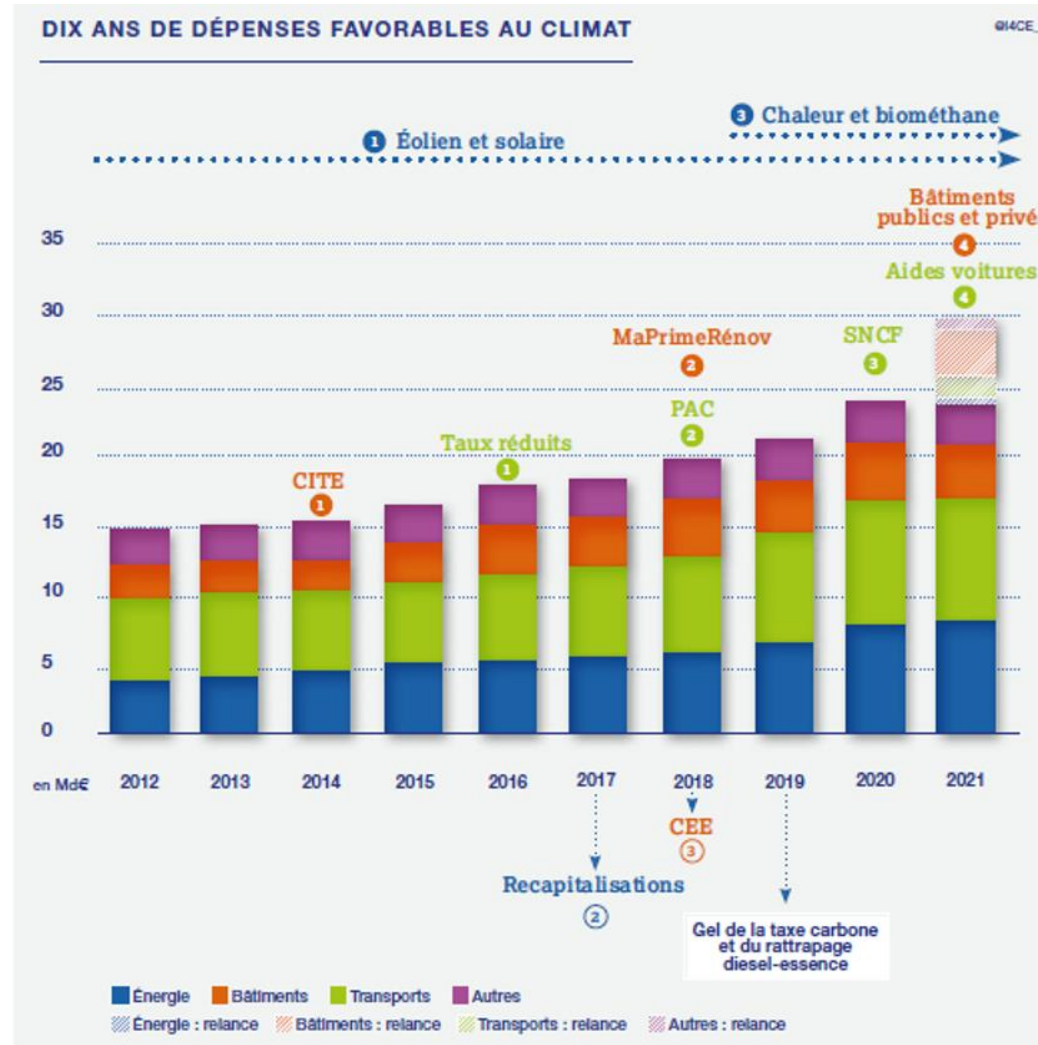
Public Spending: France

- The European Court of Auditors estimates, on the basis of the work of the HLEG (High Level European Group), that the cost of the energy transition at European level between 2021 and 2030 is €11,200 billion, i.e. €1,120 billion per year.
 - As France economic weight in Europe (based on the GDP ratio) is around 13%, the national cost could be estimated at €145 billion/year (of which two thirds for transport, a quarter for the residential and tertiary sector, 7% for networks and 1.7% for industry).
- To set orders of magnitude, let us recall that total French industrial investment is €400 billion per year and that the national GDP is around €2,300 billion.

Public Spending: France

- To achieve the national objectives of the national low-carbon strategy (SNBC), in its version established in 2015, Ademe and OFCE have estimated that the additional annual investment should be between €43 and €62 billion (i.e. a total cost of between €63 and €82 billion/year).

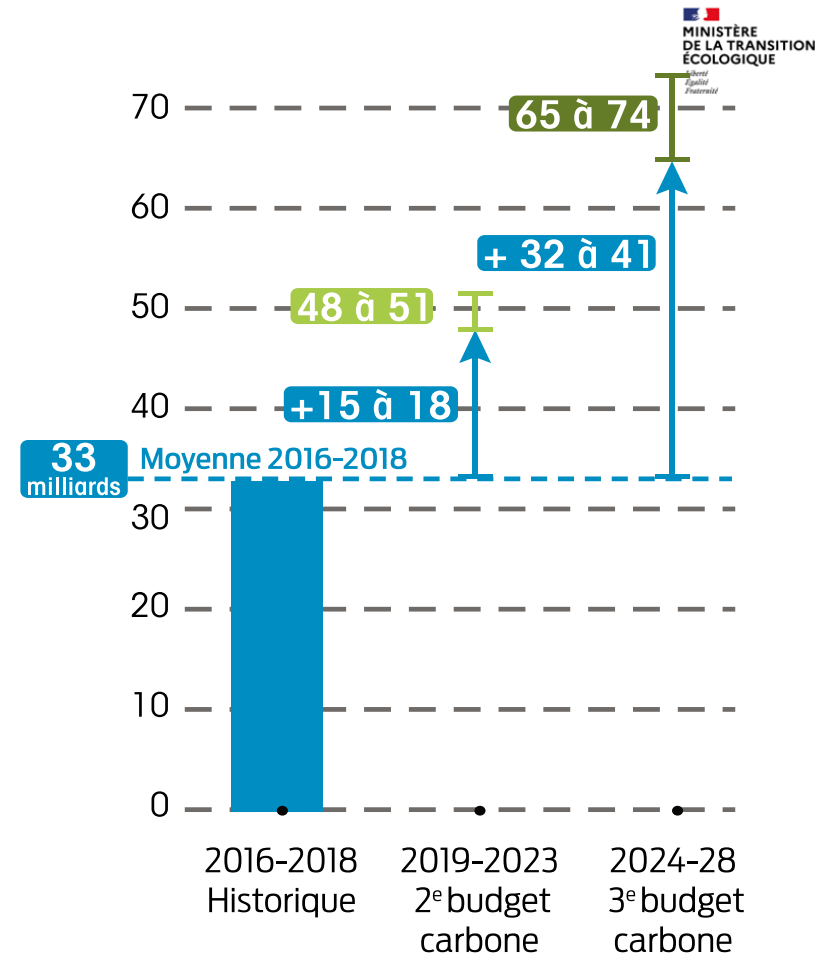
Looking back...



Source: I4CE, 2020

...the French investment gap

To achieve the greenhouse gas emission reduction targets set by the National Low Carbon Strategy (NLCS) for the period 2019-2023, it would be necessary to invest between €48 and €51 billion per year in energy efficiency, renewable energies and decarbonised mobility. This means an increase of 15 to 18 billion euros compared to past spending



■ Investissements climat
 Besoins d'investissements d'après SNBC 2018 et PPE 2019 :

- Deuxième budget carbone
 - Troisième budget carbone
- Source: I4CE, 2020

Citizens and distributional effects

Just transition Funds: Europe

- A Just Transition Fund , initially endowed with €7.5 billion and later increased to €40 billion within the framework of the European Recovery Plan, should generate, with the leverage of national co-financing and the partly compulsory use of cohesions funds FEDER and FSE+, between 160 and 260 billion € in investments
- The "sustainable infrastructure" component of the "InvestEU" programme support for investment: this strand, which has been increased to a total of €20 billion (instead of the €10 billion initially planned), should lead to some €90 billion in investment.
- A "Public Sector Lending Facility" under the aegis of the European Investment Bank and marginally benefiting from EU funding would aim to finance local public authorities implementing projects to the tune of EUR 25-30 billion €.

Citizens and distributional effects

Energy bills are expected to go up by an average of €429 per year per European household as a result of including buildings in the ETS.

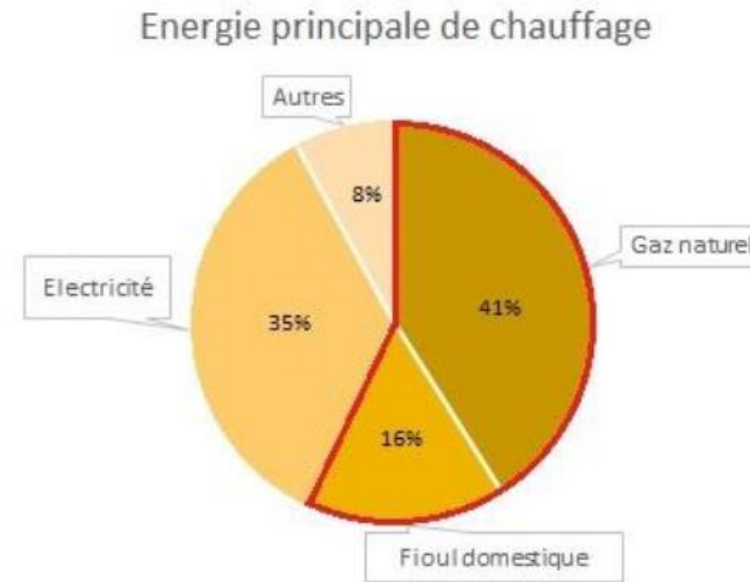
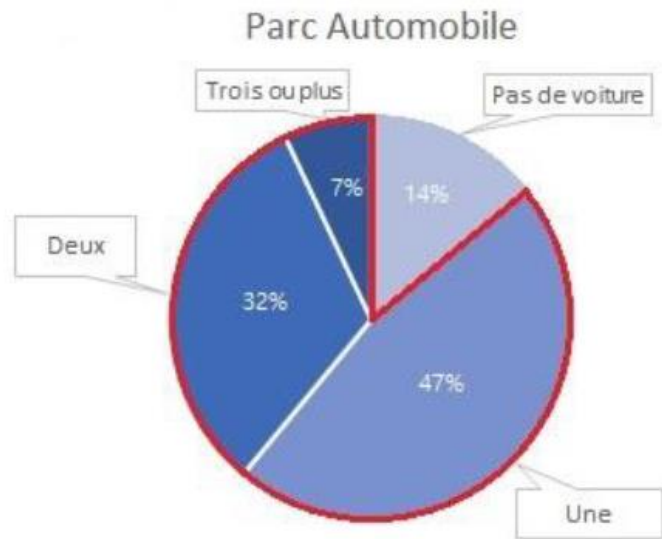
- A new Social Climate Fund is proposed to provide dedicated funding to member states to help citizens finance investments in energy efficiency, new heating and cooling systems, and cleaner mobility.
- The plan is to finance the Social Climate Fund via the EU budget, using an amount equivalent to 25% of the expected revenues from emissions trading for building and road transport fuels.
- It will provide an estimated €72.2 billion of funding to member states over the period 2025-2032. With a proposal to draw on matching member state funding, the fund would mobilise €144.4 billion for a socially fair transition

Citizens and distributional effects

- Within households suffering from the double exposure to mobility/heating, the first income decile allocates up to 16% of its annual budget to energy expenditure, a much higher proportion than that generally presented in the literature.
- The spatial heterogeneities must be taken into account. Our estimate reveals that 'incompressible' fuel expenditure (going to work, picking up children from school etc.) increases sharply as one moves away from urban centres for households with the same socio-economic characteristics.

Source: Chaire Economie du Climat (2020) Taxe carbone, comment sortir de la crise-socioéconomique

Carbon tax exposure



Source: Chaire Economie du Climat, based on data Parc Auto 2019 and Budget des Familles 2011.

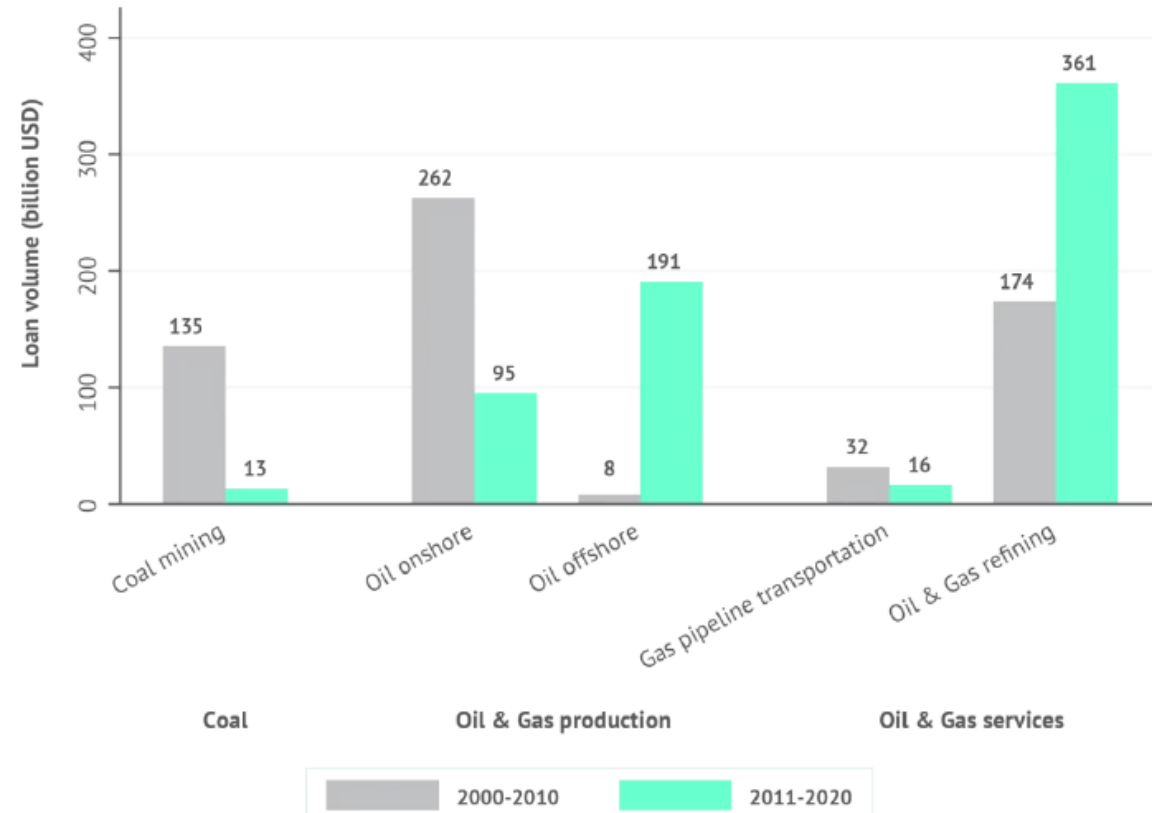
Finance: Cost of Capital

- How the cost of debt across different energy technologies and markets has changed over the last twenty years?
- Data: The Refinitiv Business Classification (TRBC) to classify transactions in the energy production and power generation sectors. renewable energy (biofuels and renewable energy services), oil & gas production, oil & gas-related equipment and services, and coal mining.

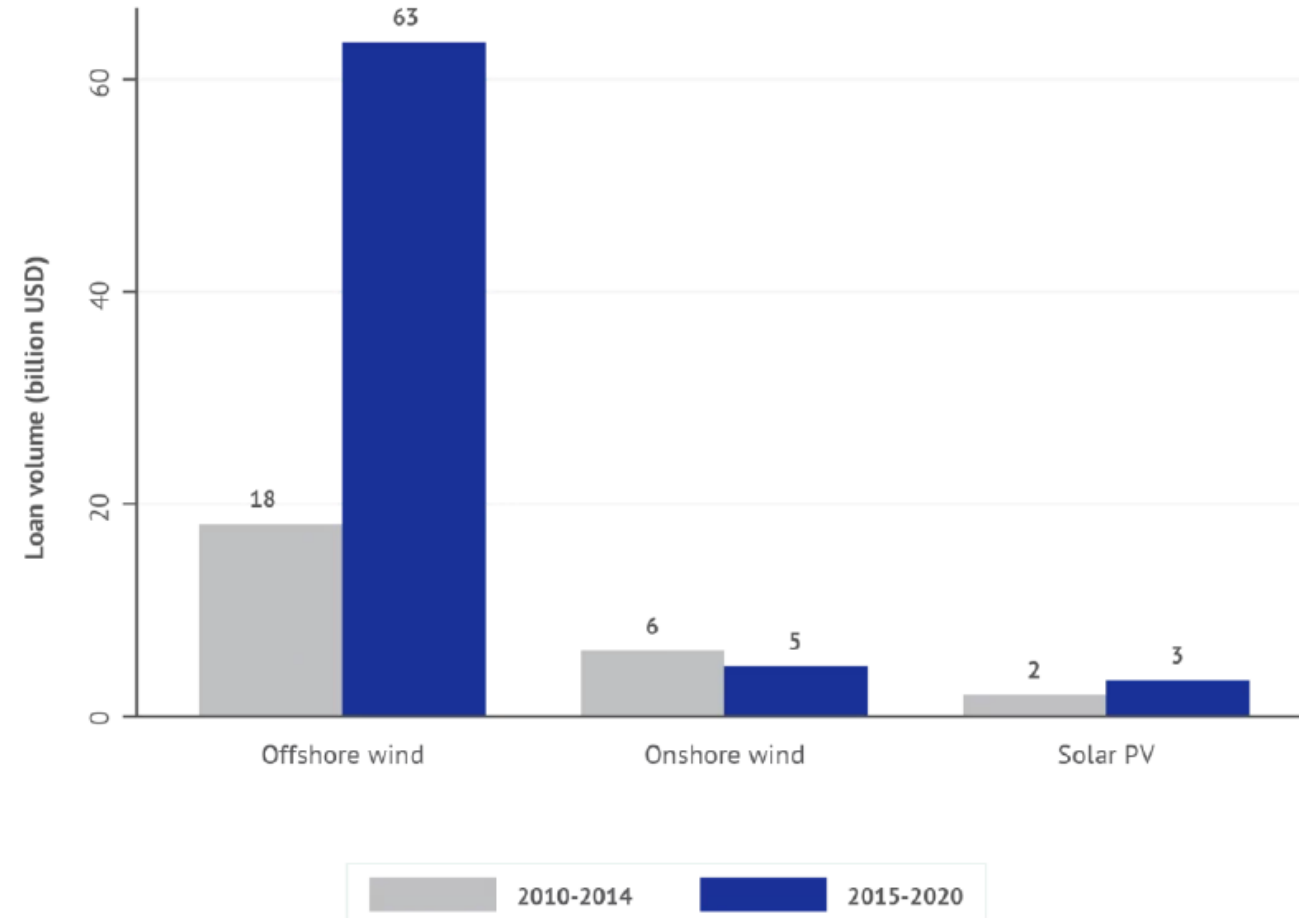
Source: *The energy transition and changing financing costs (Zhou, Wilson, Caldecott, 2021)*

Finance: Cost of Capital

Loan volume - Europe



Loan volume - Europe



Conclusions: different actors, different costs

- Public spending/Incentives: progressive catching up effect at the national level; trajectory less clear at the European scale
- Citizens/Distributional effects: progressive emphasis at the European level (Just transition); trajectory less evident at the national scale
- Financial sector/Cost of capital: doubts on the persistence of fossil fuels; need of more precise (national) evaluations