



2050 scenario analysis using the EU CTI 2050 Roadmap Tool

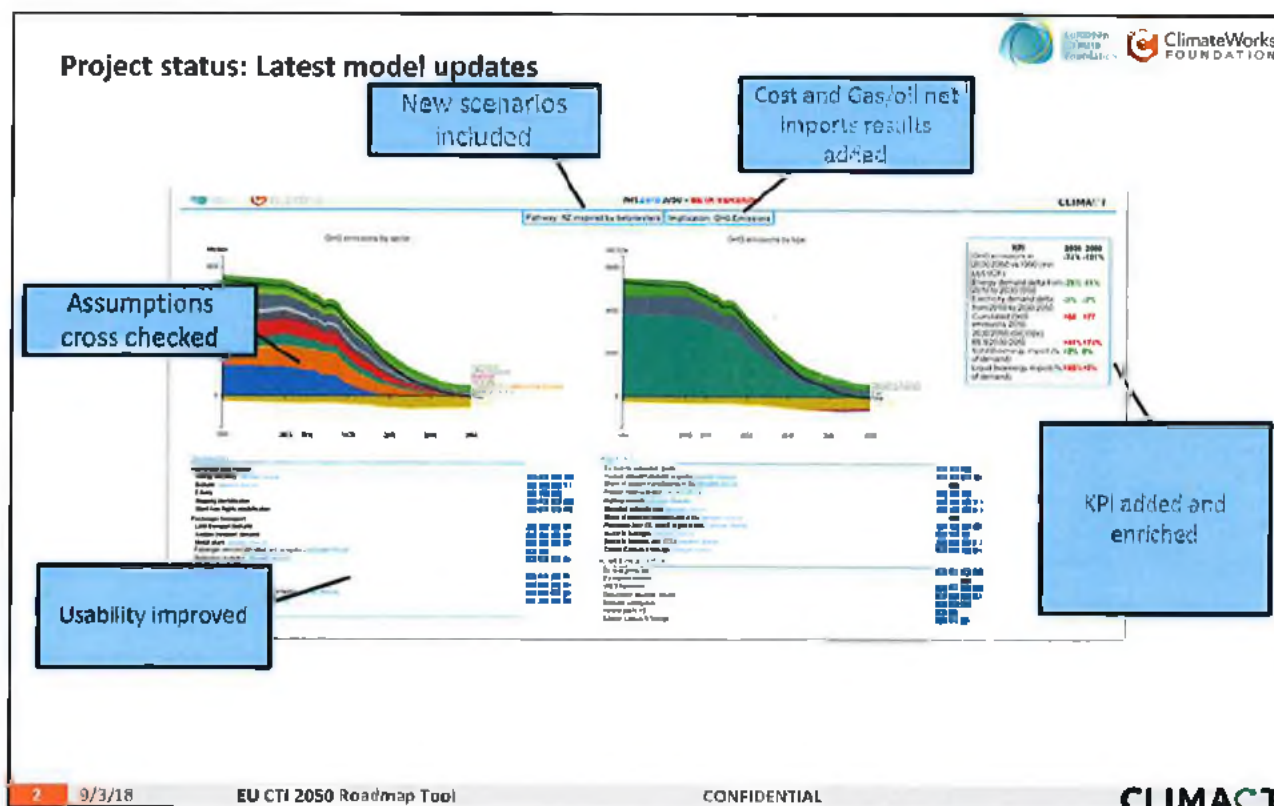
Meeting with Dominique Ristori

3 September 2018



CLIMACT sa
www.climact.com | info@climact.com | T: +32 10 750 740

CLIMACT



Several organisations have agreed to test and help refine the model over the summer 2018, and to explore possible pathways to net zero:



elementenergy

IDDRI




Department for
Business, Energy
& Industrial Strategy



CLIMATE & STRATEGY
PARTNERS

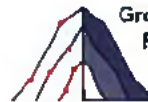


Institute for
European
Environmental
Policy



**The Coalition for
ENERGY SAVINGS**

Stefan Scheuer
Sustainable &
Energy Demand
EU Policy



Grantham
Research Institute
on Climate Change
and the Environment

3

9/3/18

EU CTI 2050 Roadmap Tool

CONFIDENTIAL

CLIMACT

Where we are



- Model finalized
- Scenarios
 - Scenarios received from a dozen organizations
 - They are still being finetuned and validated by the organizations
 - Scenarios designed by CLIMACT
 - EUREF16 reproduced
 - EUCOs used as GHG trajectory comparison – are there new better alternatives?
 - « Incremental innovation only » vs « Incremental and step innovation »
 - Other contrasted Net-zero 2050 scenarios
- Report
 - Draft version
 - Launch around the 26th of September

4

9/3/18

EU CTI 2050 Roadmap Tool

CONFIDENTIAL

CLIMACT

Agenda



• Key messages from the model

▪ Introduction : why net zero?

- Reaching net zero is technically feasible but requires immediate focus
- Net-zero in 2050 requires acting now leveraging all the no-regret options available in each sector
- Net-Zero pathways bring us closer to the Europe we want, with lower costs and greater multiple benefits
- Deep dive on value chain industry issues

6

9/3/18

EU CTI 2050 Roadmap Tool

CONFIDENTIAL

CLIMACT

Net-zero by 2050 is required



- 1.5 degrees the limit in view of high risks of climate damages, also in Europe;
- 1.5 requires global CO2 to be net zero not later than 2050 and total GHGs net zero by 2055-2070;
- Industrialized regions, such as the European Union have to reach that point earlier in order to give developing countries more time, i.e. 2050;
- Current EU 2030 targets are derived from an 80% GHG reduction by 2050
- ...

▪ Source: Rogelj et al, *Nature Climate Change* 2018; van Vuuren et al, *Nature Climate Change* 2018; Kriegler et al, *Phil.Trans.*, 2018; Griscom et al, *PNAS*, 2018, IPCC, AR5, 2014, Burke et al, *Nature*, 2018

7

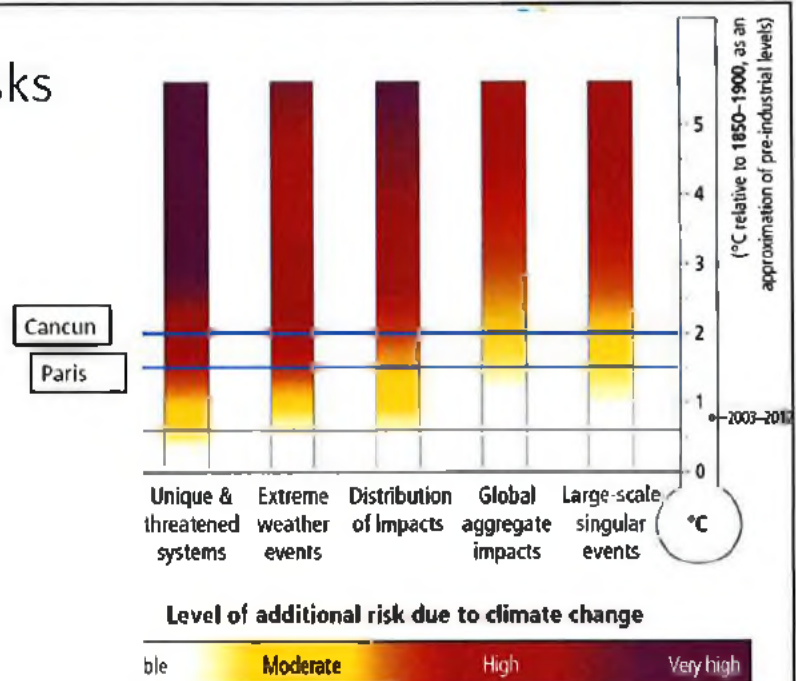
9/3/18

EU CTI 2050 Roadmap Tool

CONFIDENTIAL

CLIMACT

Climate change risks



Source: IPCC AR5 Synthesis Report

8

9/3/18

EU CTI 2050 Roadmap Tool

CONFIDENTIAL

CLIMACT

Agenda



Key messages from the model

- Introduction : why net zero?

Reaching net zero is technically feasible but requires immediate focus

- Net-zero in 2050 requires acting now leveraging all the no-regret options available in each sector
- Net-Zero pathways bring us closer to the Europe we want, with lower costs and greater multiple benefits

9

9/3/18

EU CTI 2050 Roadmap Tool

CONFIDENTIAL

CLIMACT

Emerging key messages



It is possible to reach net-zero GHG emissions for EU-28 by 2050

1. It is possible to reach Net-zero in 2050 but it requires increasing the effort, and innovation must fill the gap
 - Several contrasted pathways lead to net zero by 2050 or even earlier, leveraging both reduced emissions and carbon sinks
 - Net-zero logically means that large reduction efforts are required in all sectors.
 - The transition is ambitious but **feasible**: reaching net zero does not mean we have to reinvent the wheel or fully disrupt all sectors
 - While a lot of solutions already exist today, **innovation will be required** to bring down the costs further, and to develop additional solutions
2. Net-Zero pathways bring us closer to the Europe we want, with lower costs and great co-benefits
 - Net-Zero pathways are **cost attractive** in terms of energy system in the medium term, and allow shifting financial flows back towards the EU
 - Long-term planning will provide certainty/stability to investors as these shifts take place
 - Beyond the energy system costs, the transition also bring major **co-benefits** which also have large monetary impacts, quantified based on other existing studies
3. Net-zero in 2050 requires acting now, all sectors have no-regrets
 - Many choices are common to all scenarios and based on existing solutions: we must move now on these **no regrets options**
 - **Delaying these actions will increase the difficulty** of reaching net zero, so to be in line with net-zero pathways we need to increase the ambition for 2030. This will avoid requiring unachievable later efforts, i.e. excessive pace of reduction or having to go too negative

10

9/3/18

EU CTI 2050 Roadmap Tool

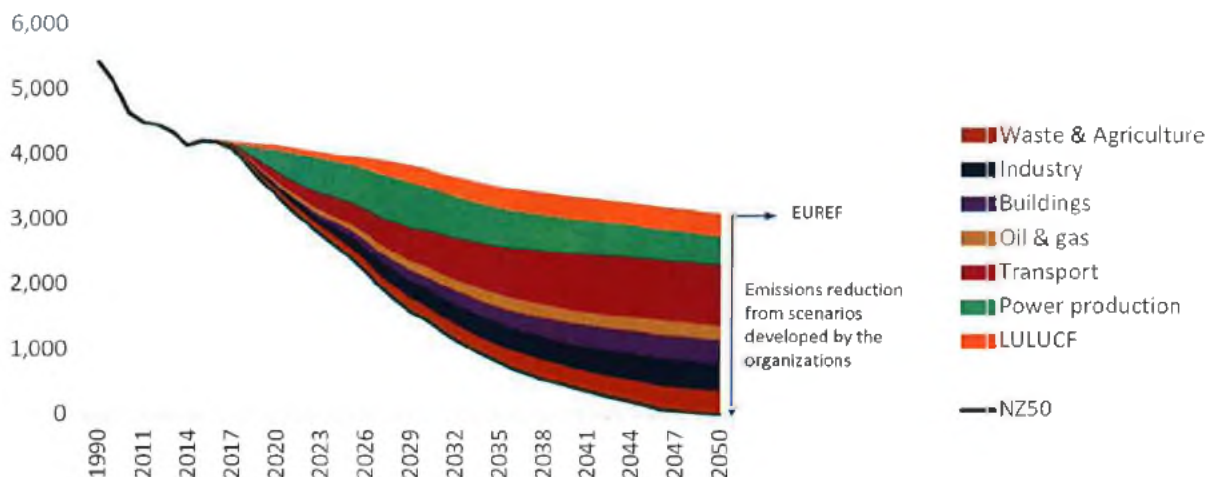
CONFIDENTIAL

CLIMACT

Emissions reduction range identified from BT scenarios (MtCO₂e)



EU Greenhouse gas emissions (MtCO₂e)



12

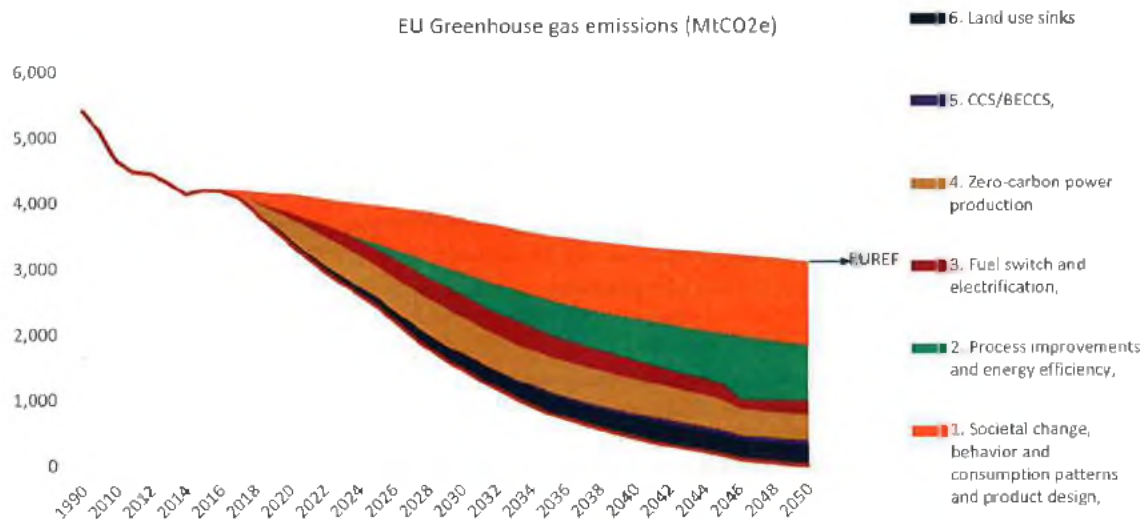
9/3/18

EU CTI 2050 Roadmap Tool

CONFIDENTIAL

CLIMACT

Societal and behavioural levers deliver more than a third of the mitigation potential



13 9/3/18

EU CTI 2050 Roadmap Tool

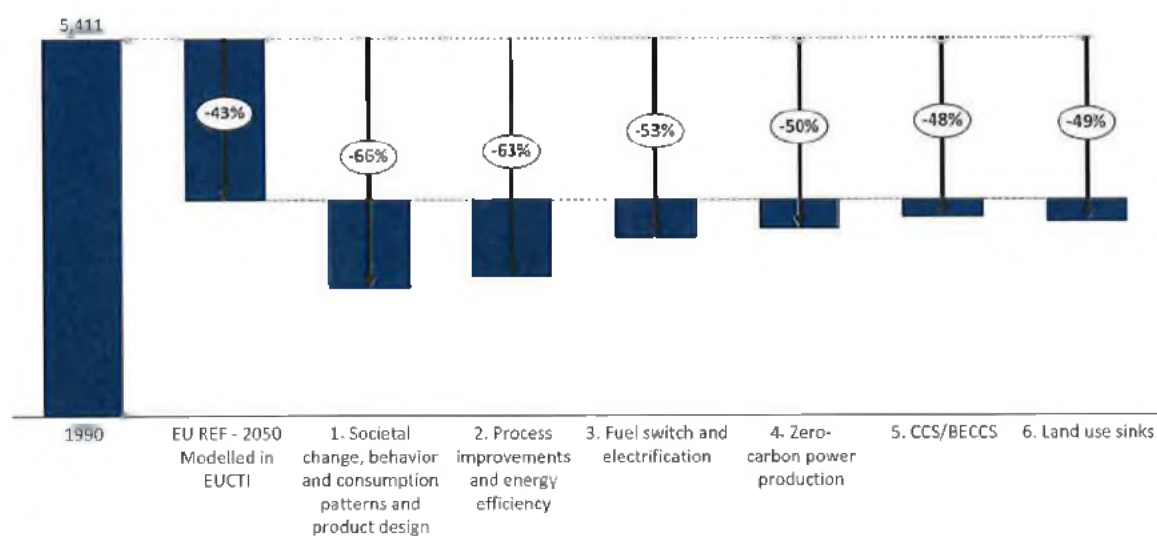
CONFIDENTIAL

CLIMACT

Impact by lever group applied independently



EU Greenhouse gas emissions (MtCO₂e)



15 9/3/18

EU CTI 2050 Roadmap Tool

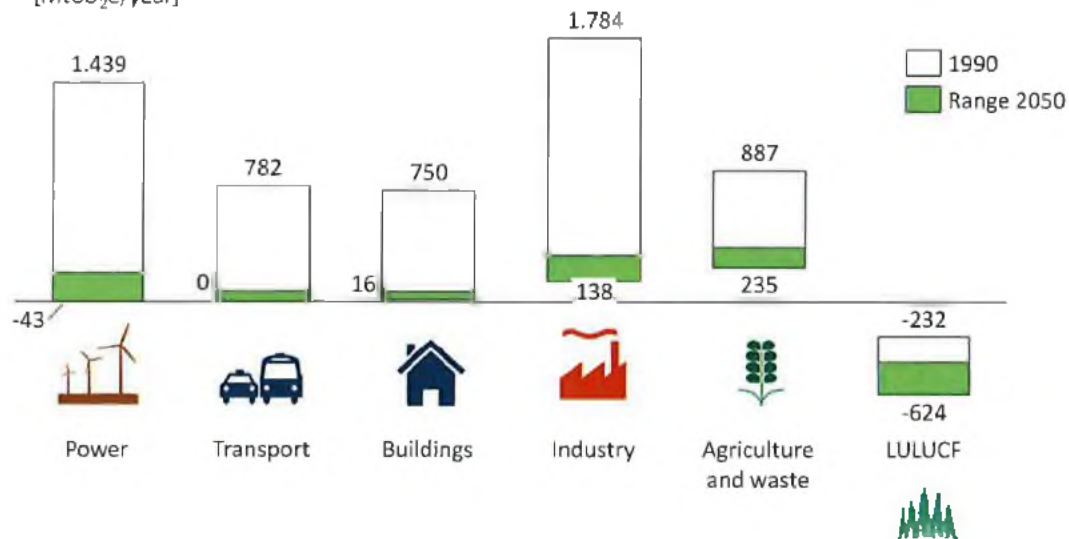
CONFIDENTIAL

CLIMACT

High ambition is required in all sectors, whatever the chosen pathway



GHG emission reductions in EU sectors between 1990 and 2050 in the illustrative scenarios
[MtCO₂e/year]



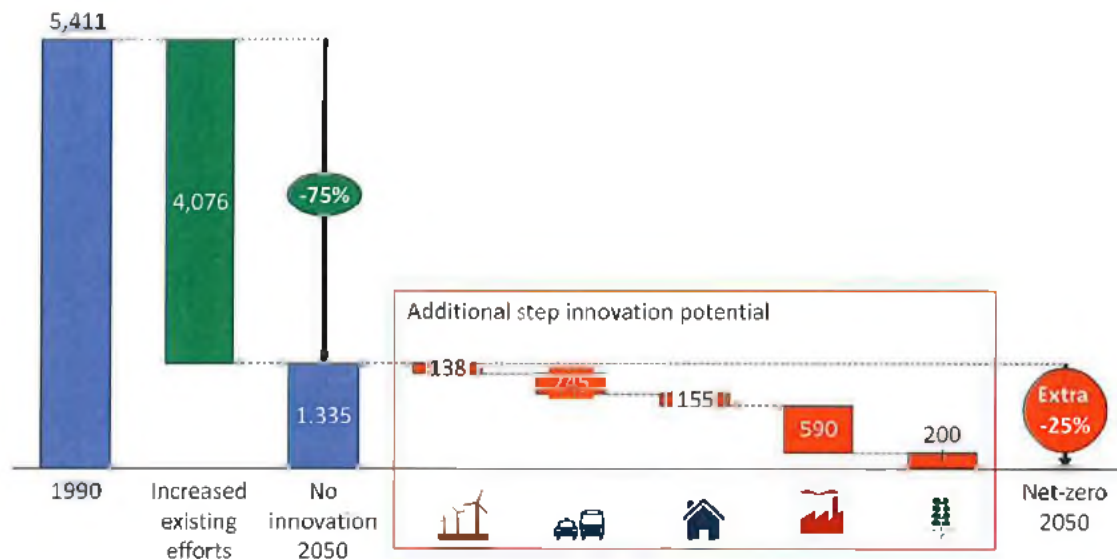
16 9/3/18

EU CTI 2050 Roadmap Tool

CONFIDENTIAL

CLIMACT

The impact of increased efforts (incremental innovation) and additional step innovation



17 9/3/18

EU CTI 2050 Roadmap Tool

CONFIDENTIAL

CLIMACT

Agenda



▪ Key messages from the model

- Introduction : why net zero?
- Reaching net zero is technically feasible but requires immediate focus
- **Net-zero in 2050 requires acting now leveraging all the no-regret options available in each sector**
- Net-Zero pathways bring us closer to the Europe we want, with lower costs and greater multiple benefits

1 9/3/18

EU CTI 2050 Roadmap Tool

CONFIDENTIAL

CLIMACT

Emerging key messages



It is possible to reach net-zero GHG emissions for EU-28 by 2050

1. It is possible to reach Net-zero in 2050 but it requires increasing the effort, and innovation must fill the gap

- Several contrasted pathways lead to net zero by 2050 or even earlier, leveraging both reduced emissions and carbon sinks
- Net-zero logically means that large reduction efforts are required in all sectors.
- The transition is ambitious but feasible: reaching net zero does not mean we have to reinvent the wheel or fully disrupt all sectors
- While a lot of solutions already exist today, innovation will be required to bring down the costs further, and to develop additional solutions

2. Net-zero in 2050 requires acting now, all sectors have no-regrets

- Many choices are common to all scenarios and based on existing solutions: **we must move now on these no regrets options**
- **Delaying these actions will increase the difficulty of reaching net zero, so to be in line with net-zero pathways we need to increase the ambition for 2030.** This will avoid requiring unachievable later efforts, i.e. excessive pace of reduction or having to go too negative

3. Net-Zero pathways bring us closer to the Europe we want, with lower costs and great co-benefits

- Net-Zero pathways are cost attractive in terms of energy system in the medium term, and allow shifting financial flows back towards the EU
- Long-term planning will provide certainty/stability to investors as these shifts take place
- Beyond the energy system costs, the transition also bring major co-benefits which also have large monetary impacts, quantified based on other existing studies

20 9/3/18

EU CTI 2050 Roadmap Tool

CONFIDENTIAL

CLIMACT

To be in line with net-zero pathways we need to increase the ambition for 2030 compared to the old EUCOs



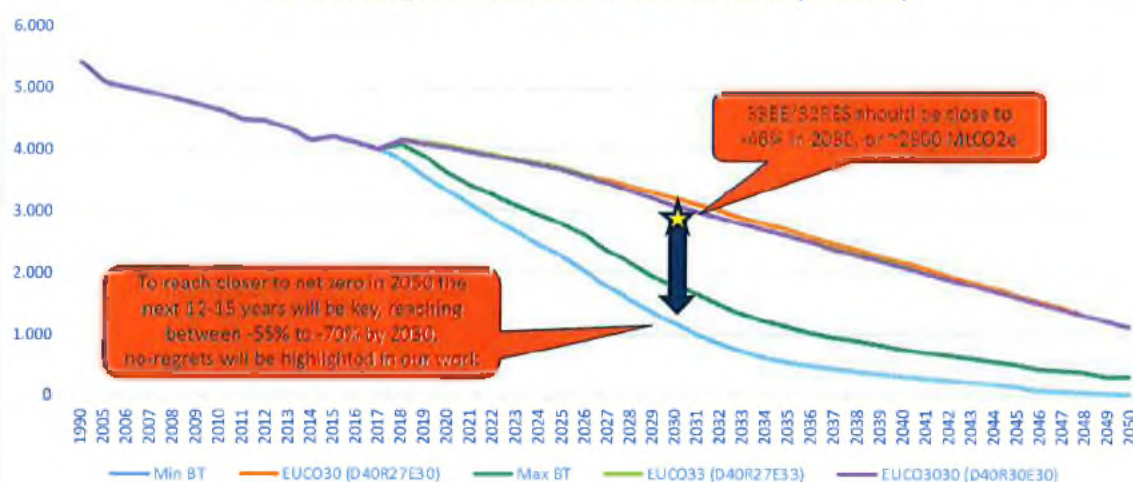
European
Climate
Foundation



ClimateWorks
FOUNDATION

Is there data available to compare this to the latest 33RE/32RES agreement?

Greenhousegas emissions of various scenarios (MtCO₂e)



21 9/3/18

EU CTI 2050 Roadmap Tool

CONFIDENTIAL

CLIMACT

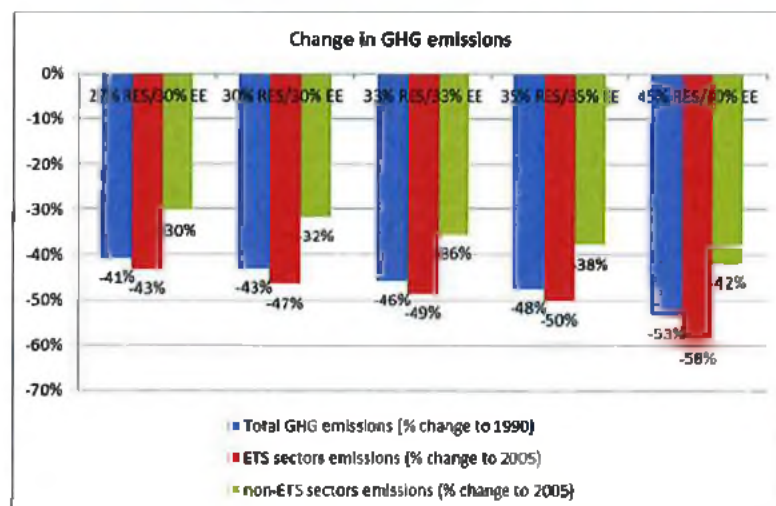
Non paper on complementary economic modelling undertaken by DG ENER regarding different energy policy scenarios including updated renewable energy technology costs in the context of Council and Parliament discussions of the recast of the renewable energy directive and the revision of the energy efficiency directive



European
Climate
Foundation



ClimateWorks
FOUNDATION



22 9/3/18

EU CTI 2050 Roadmap Tool

CONFIDENTIAL

CLIMACT

Agenda

• Key messages from the model

- Introduction : why net zero?
- Reaching net zero is technically feasible but requires immediate focus
- Net-zero in 2050 requires acting now leveraging all the no-regret options available in each sector
- **Net-Zero pathways bring us closer to the Europe we want, with lower costs and greater multiple benefits**

Emerging key messages

It is possible to reach net-zero GHG emissions for EU-28 by 2050

1. It is possible to reach Net-zero in 2050 but it requires increasing the effort, and innovation must fill the gap

- Several contrasted pathways lead to net zero by 2050 or even earlier, leveraging both reduced emissions and carbon sinks
- Net-zero logically means that large reduction efforts are required in all sectors.
- The transition is ambitious but feasible: reaching net zero does not mean we have to reinvent the wheel or fully disrupt all sectors
- While a lot of solutions already exist today, innovation will be required to bring down the costs further, and to develop additional solutions

2. Net-zero in 2050 requires acting now, all sectors have no-regrets

- Many choices are common to all scenarios and based on existing solutions: we must move now on these no regrets options
- Delaying these actions will increase the difficulty of reaching net zero, so to be in line with net-zero pathways we need to increase the ambition for 2030. This will avoid requiring unachievable later efforts, i.e. excessive pace of reduction or having to go too negative

3. Net-Zero pathways bring us closer to the Europe we want, with lower costs and great co-benefits

- Net-Zero pathways are cost attractive in terms of energy system in the medium term, and allow shifting financial flows back towards the EU
- Long-term planning will provide certainty/stability to investors as these shifts take place
- Beyond the energy system costs, the transition also bring major co-benefits which also have large monetary impacts, quantified based on other existing studies

Costs are calculated in full transparency

Capital
investments



Fuel costs



Operations and
Maintenance

Externalities

Total costs

Climate change
Air quality
Congestion costs
Noise disturbances
Visual impact
Remaining natural resources
Preservation of fossil fuel resources
Dependence to new resources
Impact on biodiversity services
And other forest benefits
Impact on energy (in)dependence

25

EU CTI 2050 Roadmap Tool

CLIMACT

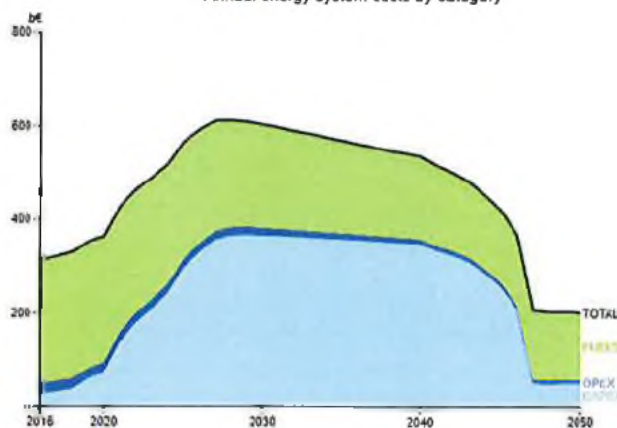
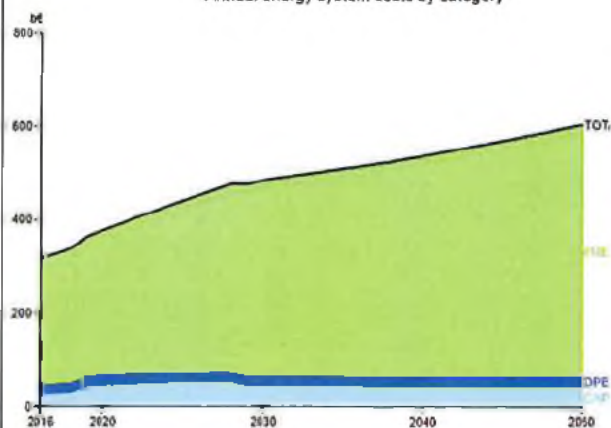
Costs in Buildings

EU REF 2016 – as reproduced in the EU CTI tool

Net-zero scenario in the CTI tool

Annual energy system costs by category

Annual energy system costs by category



26

EU CTI 2050 Roadmap Tool

CLIMACT

