How to boost the European Green Deal's scale and ambition

Dr Rafael Wildauer
Stuart Leitch

UNIVERSITY of GREENWICH
PEGFA | Institute of Political Economy, Governance, Finance and Accountability

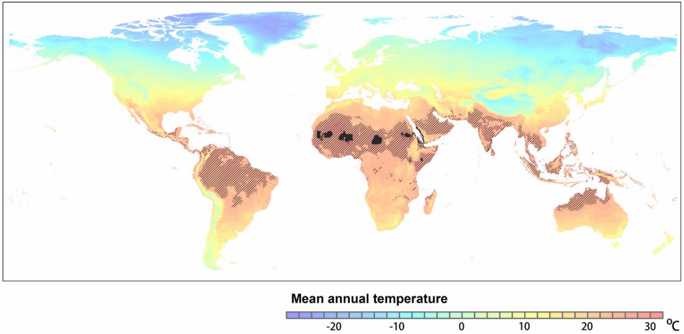
Collaborative effort

- Part of project: "A fiscally sustainable public investment initiative in Europe"
- Project partners:
- The research team:
  - Dr Rafael Wildauer, University of Greenwich
  - Prof Jakob Kapeller, University Duisburg-Essen
  - Stuart Leitch, University of Greenwich

Three core messages from climate science

Price of inaction is probably higher than we think

- Consequences of inaction (EEA, 2017): droughts, heatwaves, storms and floods
- Doing nothing will make world much less suitable for human habitation
- In 2070 3.5 billion people could life in regions with MAT's $> 29°C$ (Xu et al., 2020)
- Tipping points and the principle of accelerating risk



There is not much time left

- Goal is clear: net zero emmissions (be careful with negative emissions)
- Global carbon budget estimates for 1.5°C target
  - Annual global emissions 2018: 42 $GtCO_2$
  - from 2020: 349 $GtCO_2$ (66% chance to stay below 1.5°C) (IPCC, 2018, p. 108)
  - from 2020: 235 $GtCO_2$ (66% chance to stay below 1.5°C) (Constrain, 2019)
  - 5-8 years left at current rates
- EU27 carbon budget estimates for 1.5°C target
  - Annual EU27 emissions 2018: 3 $GtCO_2$
  - from 2020: between 21 and 27 $GtCO_2$ (66% chance to stay below 1.5°C) (Anderson, John, & Stoddard, 2020):
  - at current rate: 7-9 years before we use up that budget

Required Policies

- **Energy production**: Strategic goals: 1) de-carbonise energy production 2) electrification of energy carriers
- **Buildings**: Strategic goals: 1) deep renovations for increased efficiency 2) clean on site energy production
- **Transport**: Strategic goals: 1) expand public transport (int. highspeed rail) 2) electrify
- **Industry**: Strategic goals: 1) electrify, 2) increase efficiency and reduce material consumption

The European Green Deal (EGD)

Old, new and necessary targets

Table 2: The EU's main climate targets in perspective

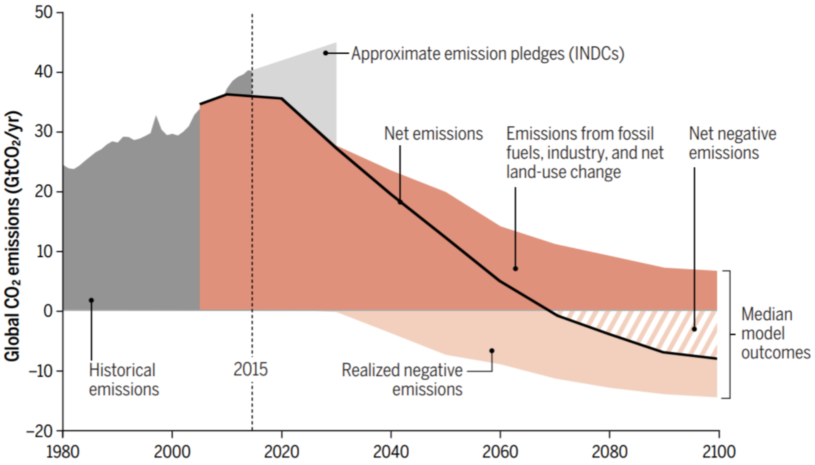
Targets for 2030	Clean Planet for All (2018)	European Green Deal (2020)	Scientific Literature
Cut in greenhouse gas emissions (1990 levels)	-40%	-50% to -55%	-65%[A]
Share of renewables in energy production	32%	32%	72%[B]
Improvements in energy efficiency	32.5%	32.5%	

A: Anderson and Stoddard (2020) argue that a 75% reduction is necessary for energy CO2 emissions only. The underlying carbon budget of at most 27 $GtCO_2$ is also consistent with Constrain (2019). Greenpeace[62] argues that at least 65% percent reduction is required to achieve net zero emissions by 2040. B: Anderson and Stoddard (2020) argue for zero carbon energy production between 2035 and 2040. The EU27's share of renewables in energy production was 19% in 2017. Simply assuming a linear increase of 4 percentage points annually leads to a renewable share of 72% in 2030.

Where does the difference come from?

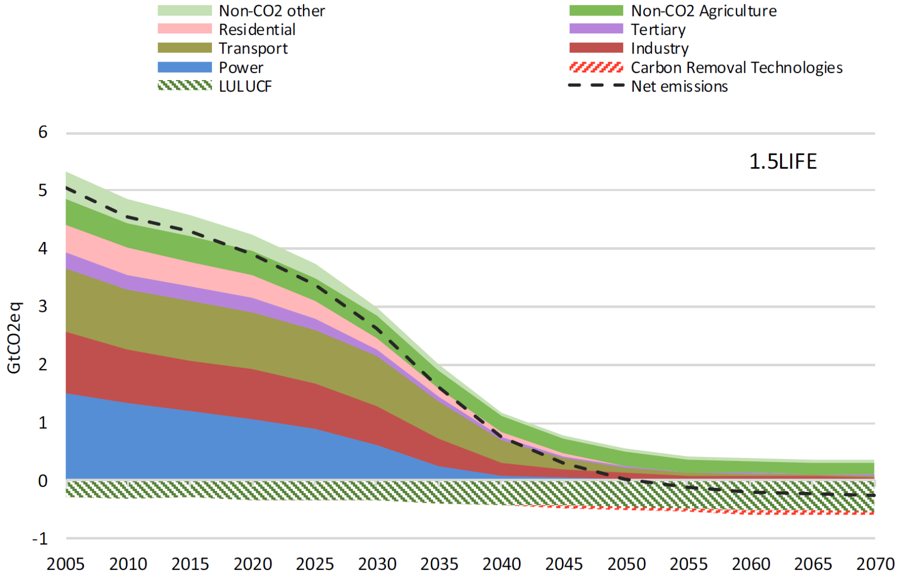
No quick fixes

Modelers generally report net carbon emissions, unintentionally hiding the scale of negative emissions. Separating out the positive CO_2 emissions from fossil fuel combustion, industry, and land-use change reveals the scale of negative CO_2 emissions in the model scenarios (*16*). INDCs, Intended Nationally Determined Contributions.



Source: Anderson and Peters (2016)

Where does the difference come from?



Source: EC (2018), Figure 90

Investment needs

The commission's estimates in context

Table 3: EU27 investment expenditures and investment gap estimate.

source	business as usual scenario	1.5°C scenario estimate	investment gap
	billion €		
European Commission - total investment[A]	1,190	1,480	290
European Commission - excl. transport investment[A]	377	576	199
Authors' calculations - excl. transport investment[B]	824	1,679	855

The European Commission investment figures are based on the PRIMES model suit (EC 2018b, Table 10) which are referred to in the EGD documents. The business as usual column refers to the baseline scenario used in EC (2018b) and consists mainly of pre-2015 policies and initiatives. The authors' business as usual scenario is based on recent historical investment expenditures. The 1.5°C scenario column contains the estimated investment expenditures, necessary to limit global warming to 1.5°C (1.5TECH scenario in the case of EC/PRIMES). The investment gap is the difference between business as usual and 1.5°C scenario. For a detailed breakdown see Table 8 the Appendix and the following sections. A: Expenditures for the 2031-2050 horizon in 2013 prices. B: Expenditures in current prices.

Investment in Buildings

- European Commission (EC, 2018) for **buildings renovation**:
  - baseline scenario investments of € 253 bn
  - 1.5C scenario investments of € 302 bn
  - investment gap of € 49 bn
- Compare that to sector-survey-based **buildings renovation** estimates (EC, 2019):
  - current policies investments € 245 bn
  - trippling required to meet 1.5C: € 735 bn.
  - investment gap of € 490 bn.

Investment in Research and Development

- EGD estimates do not include R&D expenditures
- Compare to 3% or 4% of GDP target for R&D expenditures from Europe 2020 strategy
  - current EU27 R&D investments € 302 bn
  - 3% R&D investment gap: € 75 bn
  - 4% R&D investment gap: € 201 bn

Investment in Energy Production

Table 4: Non-R&D capital formation in the electricity sector.

	2015	2016	2017	average
gross value of non-R&D capital stock	1,649	1,671	1,725	1,682
gross non-R&D capital formation	67	67	66	67
gross non-R&D capital formation relative to stock	4.1%	4.0%	3.8%	4.0%
additional 5% stock replacement	82	84	86	84
additional 10% stock replacement	165	167	173	168

Electricity sector defined as section D of NACE Rev. 2. All figures in billion Euros, current prices. Data: Eurostat (nama_10_nfa_st and nama_10_nfa_fl). Based on data for 18 EU member countries. EU 27 excluding Bulgaria, Croatia, Cyprus, Denmark, Ireland, Latvia, Malta, Spain and Sweden due to data availability.

Investment in Industrial Processes

Table 7: Core capital formation in manufacturing and mining sector (NACE B and C).

	2015	2016	2017	average
gross value of core capital stock	2,613	2,641	2,713	2,656
gross core capital formation	202	208	221	210
gross core capital formation relative to stock	7.7%	7.9%	8.2%	7.9%
additional 3% stock replacement	78	79	81	80

Values in billion Euros, current prices. Core capital formation is defined as all capital expenditures minus those on buildings (dwellings and structures) and minus R&D expenditures. Data source: Eurostat (nama_10_nfa_st and nama_10_nfa_fl). Based on data for 18 EU member countries. EU 27 excluding Bulgaria, Croatia, Cyprus, Denmark, Ireland, Latvia, Malta, Spain and Sweden due to data availability.

Recent Developments

Next Generation EU

- COVID-19 stimulus programme: Next Generation EU
- EU-Commission plans to borrow € 750 billion on capital markets (5.4% of EU27 GDP) ...
- and hand out as grants and loans to member states
- Part of that spent on EGD projects

$\rightarrow$ Positive development, no silver bullet

Conclusion and Policy Recommendations

Conclusion

1. The good news: a lot of the required technologies already exist
   - Big exception to that is many industrial processes
2. EGD: climate change on top of EU policy agenda
3. EGD: underestimate investment requirements
4. It should be upgraded into European master plan

Policy Recommendations: Increasing scale and ambition along four key dimensions

1. Reduce GHG emissions by 65% of 1990 levels by 2030, completely decarbonising the energy system by 2040.
2. Refrain from relying on large scale negative emission scenarios.
3. Scale up the investment target to match total required expenditures.
4. Use individual transfer payments and training grants to address the regressive nature of rising energy costs.

Policy Recommendations: Steps to reach these ambitious targets

5. Increase fiscal room via new revenue sources and reformed European fiscal framework.
6. Upgrade Sustainable Europe Investment Plan into a comprehensive climate master plan.
7. Implement and expand a carbon border adjustment mechanism.
8. Align the ETS with general emission targets and establish a price floor and inflation target.
9. Focus on providing stable finance for companies and refrain from encouraging further household sector borrowing.
10. Work with the European Research Council to establish a group of Europe-specific climate models published in an open source format.

Thank you

r.wildauer@greenwich.ac.uk

References I

Anderson, K., John, B., & Stoddard, I. (2020). A factor of two: how the mitigation plans of 'climate progressive nations' fall far short of paris-compliant pathways. *Climate Policy*(forthcoming).

Anderson, K., & Peters, G. (2016, oct). The trouble with negative emissions. *Science*, *354*(6309), 182–183. doi: 10.1126/science.aah4567

Constrain. (2019). Zero in report 2019.

EC. (2018). In-depth analysis in support of the commission communication com(2018) 773.

EC. (2019). Comprehensive study of building energy renovation activities and the uptake of nearly zero-energy buildings in the eu. doi: 10.2833/14675

EEA. (2017). Climate change, impacts and vulnerability in europe 2016: An indicator-based report. *EEA Report*.

References II

IPCC. (2018). An ipcc special report on the impacts of global warming of 1.5c above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty. *[Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)]*.

Xu, C., Kohler, T. A., Lenton, T. M., Svenning, J.-C., & Scheffer, M. (2020). Future of the human climate niche. *Proceedings of the National Academy of Sciences*. doi: 10.1073/pnas.1910114117