Annex I: Evidence on the economic and energy security related benefits of Climate Action

The economic case for climate action is stronger than ever. There is a growing consensus amongst economists that a green transition would bring about significant long-term benefits in terms of emissions reductions, economic growth, job creation, economic competitiveness, and citizens' health compared to business-as-usual. A survey conducted by the European Investment Bank, shows that companies are increasingly convinced that reducing carbon emissions can have a positive impact on market demand, reputation and supply chains.

A) The economic benefits associated with the transition towards cleaner sources of energy:

- The International Energy Agency, in their report "Net Zero by 2050: A Roadmap for the Global Energy Sector", emphasises that **there should be no additional investment in fossil fuel supply projects beyond 2021 for the world to reach net zero by 2050** and have a 50% chance of limiting warming at 1.5 degrees. (May 2021)
- Data from the International Renewable Energy Agency (IRENA) shows that **investments in energy transition technologies create almost three times more jobs than investments in fossils fuels do.** According to IRENA, almost two-thirds of wind and solar projects built globally last year will be able to generate cheaper electricity than even the world's cheapest new coal plants. (June 2020)
- This collaborative study by members of the University of British Columbia, the EIEE, the Payne Institute, Sweden Chalmers University, the University of Bergen and the International Institute for Applied Systems Analysis, shows that the energy transition from fossil fuels to renewables will increase, not decrease, the number of jobs in the energy sector. If the world keeps a trajectory to well below 2°C, jobs in the energy sector would increase by over 40% by 2050, and 84% of the total energy jobs 2050 will be in the renewables sector, especially wind- and solar-power. (July 2021)
- The cost of generating electricity from fossil-fuel power plants in major EU economies is double that associated with renewable sources, according to new analysis by Ember. (July 2021)
- This study by Oxford University shows that a "**decarbonised energy system by around 2050 is expected to save the world at least $12 trillion compared to continuing our current levels of fossil fuel use.**" (September 2022)
- **In Europe aggressive investments in renewables would bring about a net gain of more than one million jobs by 2050, according to IRENA.** (2020)
- This report by Mercure et.al. outline how, given that the transformation for energy systems is ongoing, energy importers now have high incentive to decarbonise, and **high-cost exporters of fossil fuels will likely permanently see export losses.** To avoid future instability, particularly in oil producing countries, economic diversification and divestment away from fossil fuels is needed. (November 2021)
- Cambridge Econometrics state in this article that the Nationally Determined Contributions (NDCs) submitted before COP26 fall short of the 1.5C° goal, but that for **most countries the**

necessary decarbonisation can be achieved with the same or higher GDP compared to the NDCs, given the increase of sustainable economic activity. It also states that the longer investment continues to fossil fuel extraction companies, the asset value at risk of being stranded increases. (October 2021)

- The CLG report on 'Delivering the climate transition: Exploring the assumed costs of capital in EU energy and economic modelling' shows that the 10% interest rate used by the EU in its macroeconomic modelling of policy packages is 'too high in the current context' and obscures the fact the lifetime cost of low-carbon technologies may be lower. (March 2021)
- This CLG report outlines how Central and Eastern Europe has a comparative advantage when it comes to the transition to more sustainable transport, due to its extensive public transportation system and support for innovation. The region also has high untapped potential for scaling up energy efficiency, with large expected economic gains from such transitions, and has the natural potential for the generation of renewable energy and could benefit from the increased investments in renewables. (March 2019)
- This BloombergNEF analysis shows electric cars will be cheaper to produce than fossil fuel cars by 2027 at the latest. (May 2021)

B) Evidence on how the green transition can help achieve energy security:

- The 2022 IEA World Energy Outlook shows that 'the global energy crisis can be a historic turning point towards a cleaner and more secure future' and that predicted the continued rapid rise in renewables and a peak in carbon emissions by mid-decade. The report argues that the accelerated turn away from fossil fuels spurred by Russia's invasion of Ukraine is already leading to record investment in clean energy and predicts that emissions to peak in 2025. It notes however that even greater investment is needed to keep hopes of limiting warming to 1.5°C alive. Executive Director Fatih Birol announced that "the golden age of gas is approaching the end."
- A new briefing by E3G and Ember founds that the EU's record growth in wind and solar already avoided €11bn in gas costs since the war began.
- According to a recent study by Agora Energiewende, the combination of a rapid ramp up of wind and solar PV with increased energy efficiency in buildings and industry can reduce permanently fossil gas demand by 1200 terawatt hours in the next five years, thereby avoiding 80% of current Russian gas imports. (March 2022)
- Similarly, analysis from RAP shows that delivering the Fit for 55 Package and accelerating the deployment of clean energy and energy efficiency can reduce gas dependence from Russia by 66% equivalent to a reduction of 101 billion cubic metres by 2025 without necessitating new gas infrastructure. (March 2022)
- Accelerating the deployment of wind and solar projects, accelerating replacement of gas boilers with heat pumps and energy efficiency improvements in both buildings and industry are actions highlighted in the IEA's 10 point plan for reducing the EU's reliance on Russian supplies. (March 2022)

- According to the European Industrial Insulation Foundation (EiiF) 2021 study, technical insulation of pipes, vessels, tanks and boilers offers an immediately available annual energy savings potential of 160 TWh (14 Mtoe) and CO_2 eq. emissions reduction of 40 Mt in EU 27 industry, equivalent to the annual energy consumption of more than 10 million EU households. Technical insulation has the reduction potential of more than almost 5% (70 TWh), avoiding 14 Mt of emissions, equivalent to the annual volume of gas needed to heat about 28 million households (12 MWh/household). (March 2021)
- The Agora Energiewende study also highlights the connection of more buildings to existing district heating as an important short term measure. Improvement of the heating loop/circuit at the building level with joint work with district heating operators and building utilities maintenance operators could lead to up to 10% energy efficiency savings or a decrease return temperature to better recover renewable heat at the level of the district heating production (March 2022)
- **The transition away from fossil fuels will not be prohibitively expensive.** The IEA World Energy Outlook 2021 stressed that the extra investment to reach net zero by 2050 is less burdensome than it might appear. More than 40% of the required emissions reductions would come from measures that pay for themselves, such as improving efficiency or installing wind or solar in places where they are now the most competitive electricity generation technologies.

C) Economic benefits of the transition to a green economy in the context of the economic recovery post covid-19:

- Reports from the major international organisations such as IEA, UNEP, OECD all showcase the benefits of a post-pandemic recovery focused on climate and the environment. (June 2020, March 2021, October 2020)
- Modelling results from Cambridge Econometrics show that a pandemic **Green Recovery Plan** (with measures aimed at boosting renewables uptake, energy efficiency and sales of electric vehicles, while improving the energy grid, besides tree-planting) **could save 2 million jobs in the EU in the short term, while reducing CO2 emissions by more than 15%** compared to 2018 levels. (October 2020)

Figure 3: Emissions impacts in the EU

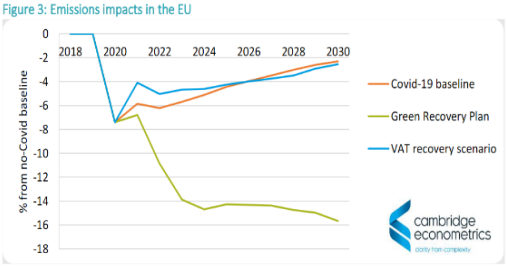
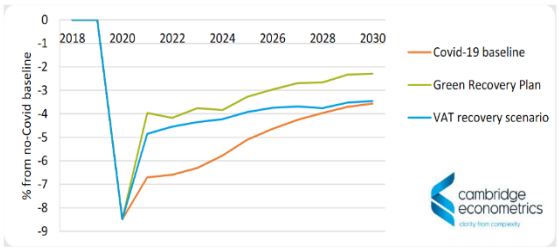


Figure 1: GDP impacts in the EU (% difference from no-Covid baseline)



- McKinsey estimates that deploying €75 billion to €150 billion for a green recovery in a European country would produce up to €350 billion of gross value added, creating up to three million new jobs. (May 2020)

- This CLG Europe report on ‘’Working towards a climate neutral Europe: jobs and skills in a changing world’’ shows that a transition to a climate neutral Europe through a proactive and well-designed policy framework will increase Europe’s resilience in the face of a changing world, and lead to a 1% growth in employment compared to baseline. (April 2020)
- A study on the effect of ambitious climate policy in Germany, by Institute of Economic Structures Research (GWS) and Prognos AG, shows that climate action would have an unequivocally positive macroeconomic effect, with an increase in both employment and in GDP, with a 1.4-1.7% increase in 2030 compared to baseline. (June 2021)
- Modelling by Cambridge Econometrics in the Cambridge Institute for Sustainability report on ‘Maximising the benefits: Economic, employment and emissions impacts of green recovery stimulus in Europe’ demonstrates how a Green Recovery Plan maximises benefits compared to other options, providing positive long-lasting economic benefits, a boost to employment and reducing emissions. (October 2020)