La transizione verde: le sfide per l'Italia e l'Europa

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«Gli effetti del cambiamento climatico sull'economia italiana»
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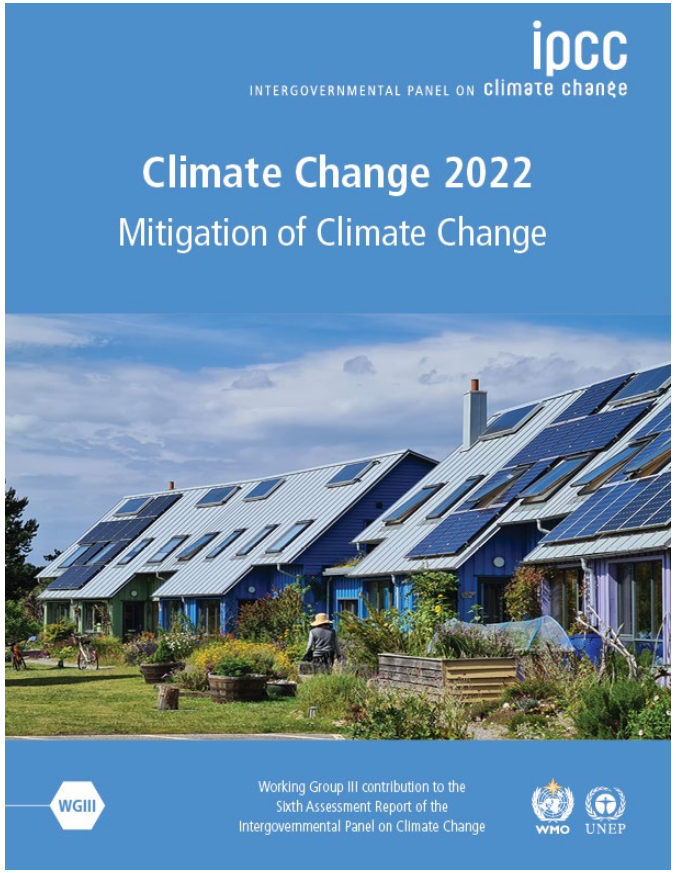
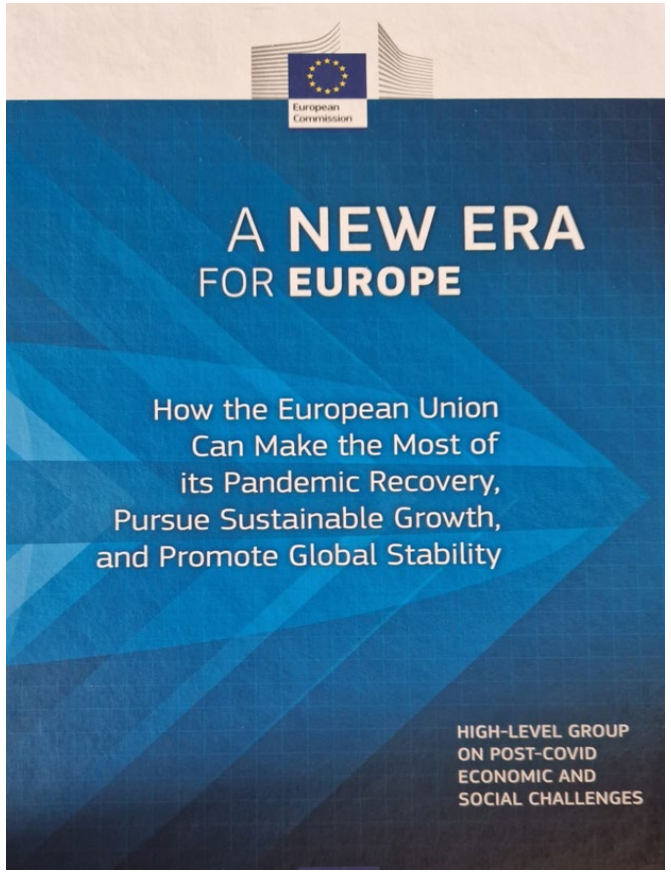
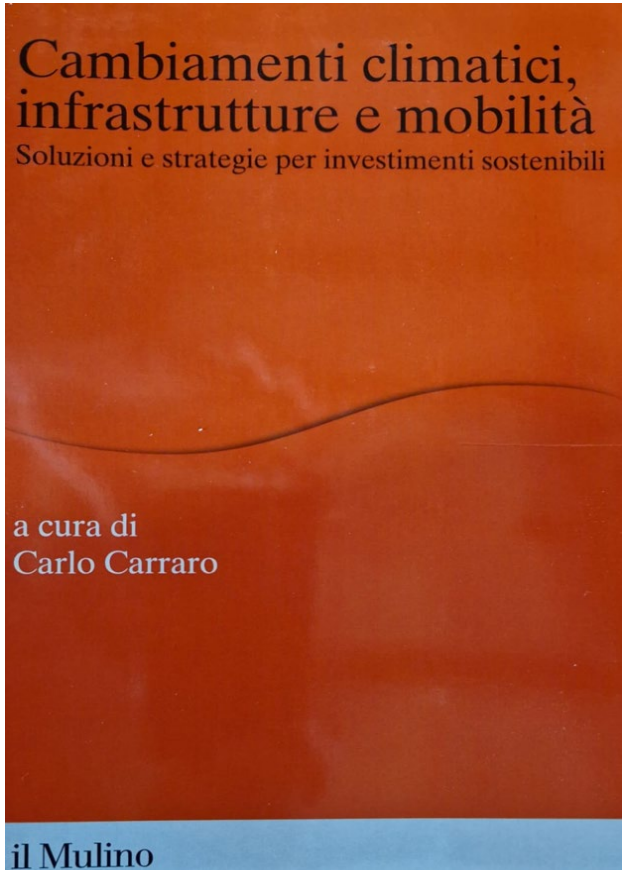






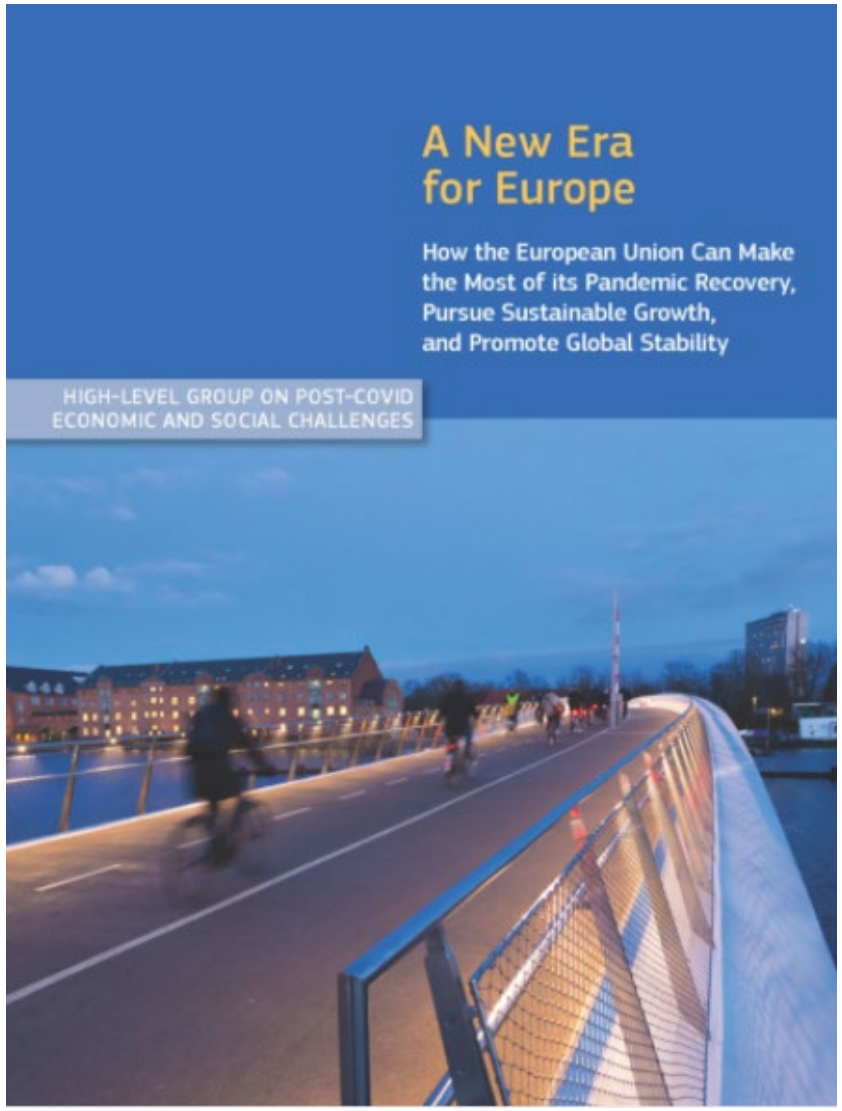
This lecture is based on three recent reports that I co-authored

One of the main messages from the three reports:

We are clearly facing a sequence of environmental and humanitarian catastrophes, with huge economic implications

Nevertheless solutions exist and may trigger a better economic growth

Policy design and timing are critical



Towards a better world

1. Enabling the triple (green, digital and social) transition
2. Fair and effective taxation for the triple transition
3. Moving towards a Health Union
4. Strengthening Europe's role in the world
5. Making the governance of the Union fit for purpose

All challenges are interconnected

https://ec.europa.eu/info/publications/new-era-europe-how-european-union-can-make-most-its-pandemic-recovery-pursue-sustainable-growth-and-promote-global-stability_en

The pandemic first, the war now, may be important accelerators of the energy transition

- The opportunities provided by the **recovery plans** designed to stimulate economic growth after the pandemic are crucial to fight climate change. Many national plans, particularly in the EU, contain measures to reduce greenhouse gas (GHG) emissions and increase climate resilience, while aiming to stimulate economic growth after the pandemic recession.

- The war is also going to accelerate the transition, by **increasing energy prices** and giving the right time of urgency to achieve multiple objectives (energy security, price stability, lower costs, lower emissions…).

But there are also threats

• **Putin's war** may lead to the **loss of valuable time** in addressing the growing **climate crisis**, with **green electricity** generation and transportation systems **transitions** being just two examples that will likely require some additional years.

• **Four factors** explain why, for the foreseeable future, climate change may be significantly sidetracked and these are: the **global scramble** to secure **oil and gas supplies**; inflation; the **international system's increasing fracture**; political leaders in the **western democracies'** limited bandwidth

• With the **overall objective** being one of finding ways to progress towards **net-zero**, several steps are recommended: **strengthening coalitions**; implementing regulations and economic incentives; accelerating partnerships

Recommendations contained in the “A New Era for Europe”

Enabling the triple transition

- **Accelerate the transition to a climate-neutral economy and mitigate the transition risks**
- Focus on reskilling and upskilling the labour force
- Introduce a Sustainability and Growth Pact (SGP 2.0) and NGEU 2.0
- Enhance non-banking finance for innovative green and digital technology firms

Fair and effective taxation for the triple transition

- Encourage and help national tax administrations to fight tax evasion and tax avoidance
- Put more emphasis on behavioural taxes, in particular environmental taxes
- Adjust the composition of taxes towards less elastic tax sources
- Broaden the corporate tax base and adopt BEFIT

Moving towards a Health Union

- Invest in health system resilience, especially through technology and data sharing
- Boost preparedness at the EU level and globally
- Promote sharing best practices and benchmarking
- Tackle market failures in health and complete the single market for health products
- Consider new innovative business models and public-private partnerships

Strengthening Europe’s role in the world

- Seek soft-power gains that could accompany the EU's climate transition
- Improve technological innovation and the production of advanced goods and services
- Strengthen the euro internationally
- Fight cyber threats, terrorist attacks, and external state-sponsored propaganda
- Move towards the Defence Union

Making the Governance of the Union fit for purpose

- Reinforce the Community approach and the role of the European Parliament
- Use the European Semester to improve the institutional quality of governments
- Strengthen the institutional capacity of the European Commission

Three scenarios to assess the transition

- Business as Usual

Under this conservative scenario, Europe would repeat its path forward after the 2008-2013 financial crisis due to a lack of political will to take bolder action. There would be a few changes and new institutions that paved the way for recovery, followed by a return to previous habits and trends. Future shifts would likewise be incremental, rather than paradigm shifting: more digitalisation and teleworking, more healthcare spending, and more movement toward green energy sources and climate policy.

- European New Era

The best-case scenario is one in which the COVID crisis gives Europe the motivation to move past its historic limitations and pursue lasting improvements for its economy, its society and its environment. This path would show the most progress on all three elements of the triple transition and set the EU on a course toward broad-based prosperity

- Fragmentation and Conflict

If the EU and its allies are unable to work together, the outcome will be one of Fragmentation and Conflict. On this path, the EU is unable to manage the difficult trade-offs necessary for the triple transition to take shape, and this sets the stage for another crisis cycle within a decade or so.

Three scenarios: the ECB and IPCC

- A '**business as usual scenario' (BAU)** – in the European Central Bank's words a '**hot house world scenario**' – in which little regulation or policy aimed at limiting climate change is introduced, thus leading to extremely high physical risks. **This is similar to the IPCC's RCP7.0 or RCP8.5 scenarios**, with a predicted temperature increase of about 4°C by the end of the century compared with pre-industrial levels.
- A '**new deal'** or '**New Era**' scenario, combining the Green Deal already envisaged in the European Union with policies to substantially reduce disparities within and across societies. The European Central Bank describes this as an '**orderly transition'** scenario, where temperature increase by the end of the century would be stabilised at 1.5-2°C. For the IPCC, this would be the **RCP1.9 or RCP2.6 scenarios**.
- In between these two scenarios, there could be a '**fragmentation and conflict'** or '**disorderly transition scenario'** that assumes the implementation of ambitious and effective climate policy measures will be delayed and uncoordinated. Therefore, transition risks, conflicts and their associated costs become significant. Physical risks would also be higher than in the previous 'new deal' scenario. This scenario, where ambitious policies are delayed, is **close to the IPCC's RCP4.5**, where temperature increase at the end of the century would be about 3°C.

Three scenarios: climate change and transition risk

- **Scenario 1 (BaU)** is characterized by high impact from climate change and low transition risk (there would be no transition) ➔ 4°C;
- **Scenario 2 (EU New Era)** is characterized by low impact from climate change (thanks to mitigation) and medium/low transition risk (thanks to well-designed mitigation policies) ➔ 2°C;
- **Scenario 3 (Fragmentation and Conflict)** is characterized by medium impact from climate change and high transition risk ➔ 3°C.

Scenario 1 is unlikely (a high impact/low probability scenario) because current policies are already consistent with a 3°C scenario (RCP 4.5 or 'Disorderly Transition')

Why? Why is GHG mitigation urgent?

Just as an example: five main future impacts of climate change (from IPCC AR6)

- Temperatures will reach 1.5C above 1850-1900 levels by 2040 **under all emissions scenarios**
- The Arctic is likely to be practically ice-free in September - at least once before 2050 - **in all scenarios assessed**
- There will be an increasing occurrence of some extreme events "unprecedented in the historical record" **even at warming of 1.5C**
- **Extreme sea level events** that occurred once a century in the recent past are projected to occur **at least annually** at more than half of tidal gauge locations by 2100
- The expected **economic loss** induced by climate damages **is between 2% and 10% of global GDP** in 2050.

Impacts and damage from climate change

Between 1980 and 2019, **weather and climate-related extremes accounted for around 81% of total economic losses caused by natural hazards in EU countries**, totaling EUR 446 billion (European Environment Agency, 2021). This is equivalent to **EUR 11.1 billion per year**.

The **average annual** (inflation-corrected) losses from weather and climate-related extremes were around:

- EUR 6.6 billion in 1980-1989;
- EUR 12.3 billion in 1990-1999;
- EUR 13.2 billion in 2000-2009; and
- EUR 12.5 billion in 2010-2019.

About 0.1% of EU GDP

Economic losses from climate change

Table 2

Economic losses, in USD billion and as a % of global GDP, 2018

Regions	in USD bn*	in % of GDP
North America	45	0.19%
Latin America & Caribbean	12	0.23%
Europe	14	0.06%
Africa	5	0.22%
Asia	66	0.21%
Oceania/Australia	4	0.25%
Seas / Space	0	0.00%
Total	146	
World average		0.17%
10-y average**	212	0.26%

*rounded numbers

**inflation adjusted

Source: Swiss Re Institute

These numbers are similar to Carleton and Hsiang (2016)'s findings. They calculate **that current temperature increase (about 1 degree above pre-industrial levels) slowed global economic growth by roughly 0.25 percentage points per year** (around USD 200 billion yearly).

Climate damages in the three scenarios

The European Central Bank's modelling assessment finds that annual total damage from climate change in the EU would be:

- **about 2-3.5% of EU GDP** in the case of the 'New Deal' scenario (because damages are relevant even in the 2°C case, adaptation measures will be needed);
- **about 4-6% of EU GDP** from 2030 onwards in the 'Disorderly Transition' scenario.
- In the unlikely Scenario 1 (BAU), total damage would reach **10% of EU GDP**.

➔ **Mitigation benefits in the EU**:

- **4-6%** from Scenario 1 to Scenario 3;
- **6.5-8%** from Scenario 1 to Scenario 2
- **0.5-4%** from Scenario 3 to Scenario 2

How can these benefits be reaped?

Investments for:

- **Energy transition** (zero-carbon energy sources)
- **Industry transformation**
  - Energy efficiency and circularity
  - Electrification
- **City re-design, transports and buildings**
  - Energy efficiency
  - Electrification and digitilisation
  - Behavioural shifts
- **Infrastructures:**
  - Electricity grid and storage
  - CO2 capture and storage or re-use

Estimates of additional investment needs to keep global temperature increase below 2C (Scenario 2)

If computed wrt to BAU (Scenario 1 or no policy):

IEA, 2021: USD 2700bn
McKinsey, 2021: USD 1900bn
IPCC AR6: USD 2600bn
IMF, 2021: USD 1600bn

Consensus number: 2-3% of global GDP

If computed wrt to current policy (Scenario 3 or “disorderly transition”):

EC, 2021: USD 1100-1300bn
McCollum et al. (2018): USD 600bn
Carraro et al (2022): USD 600-800 bn

Consensus number: 0.8-1.2% of global GDP

Present global investments in energy infrastructures: about USD 1600 bn

Investments in the ‘New Deal’ or ‘New Era’ Scenario

Using the ensemble of IPCC AR6 scenarios, the global average yearly investments from 2023 to 2032 for electricity supply and its subcomponents, and for fossil fuel extraction (in USD billion 2015) to achieve 2°C stabilization (1.75-2.25) are:

Electricity supply: USD 1 663, of which: USD 100 using fossil fuels, USD 118 using nuclear, USD 760 using renewables, USD 97 for storage, and USD 491 for transmission and distribution;
Fossil fuel extraction: USD 353
Energy efficiency: USD 245

Total: USD 2,261

Investments in the ‘Fragmentation and Conflict’ Scenario

If the goal is to stabilise the temperature increase to between 2.75°C and 3.25°C (the trajectory implicit in the Paris Agreement’s NDCs or in Scenario 3), then global average yearly energy investments from 2023 to 2032 would be:

Electricity supply: USD 1 065, of which: USD 105 using fossil fuels, USD 59 using nuclear, USD 488 using renewables, USD 5 for storage, and USD 335 for transmission and distribution;
Fossil fuel extraction: USD 422
Energy efficiency: USD 228

Total: USD 1,715

By comparing the 2°C scenario (Scenario 2) with the 3°C scenario (Scenario 3), we are likely to **take into account that large investments in renewables and energy efficiency are already taking place** and will continue up to 2030 in order to achieve the Paris Agreement's targets. These **investments are mostly driven by the falling prices of renewables and batteries**

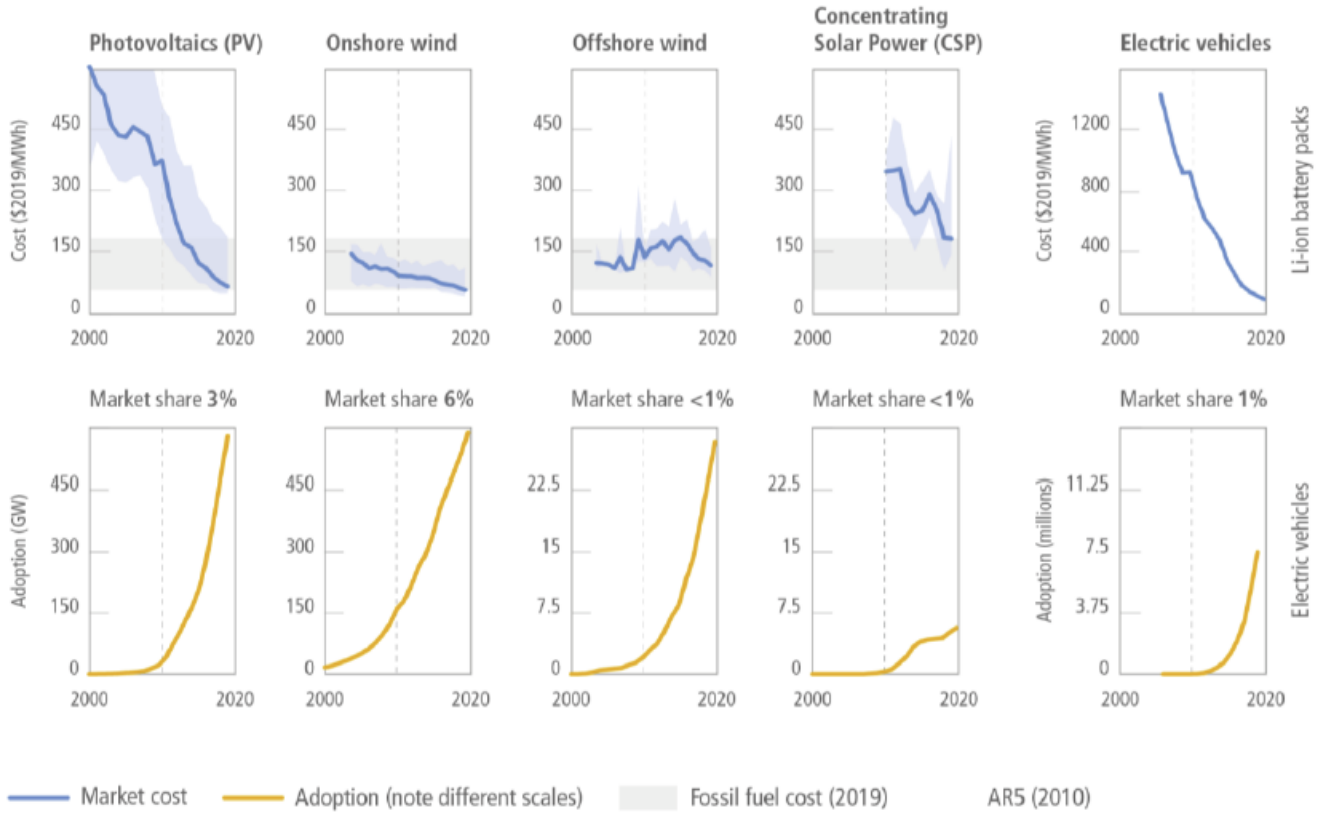
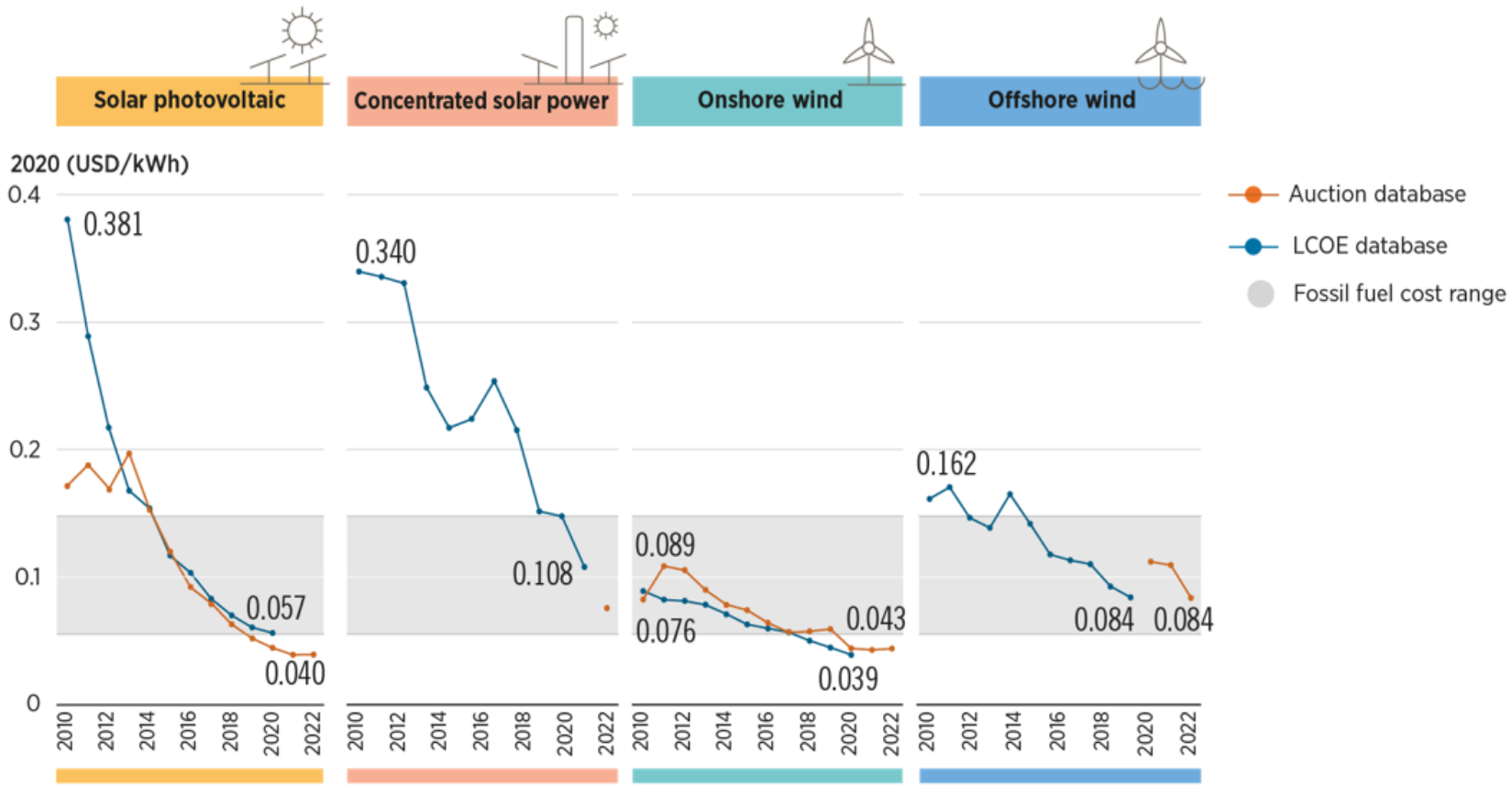


Figure SPM.5: The cost of batteries and some forms of renewable energy has been falling, while their deployment continues to rise.

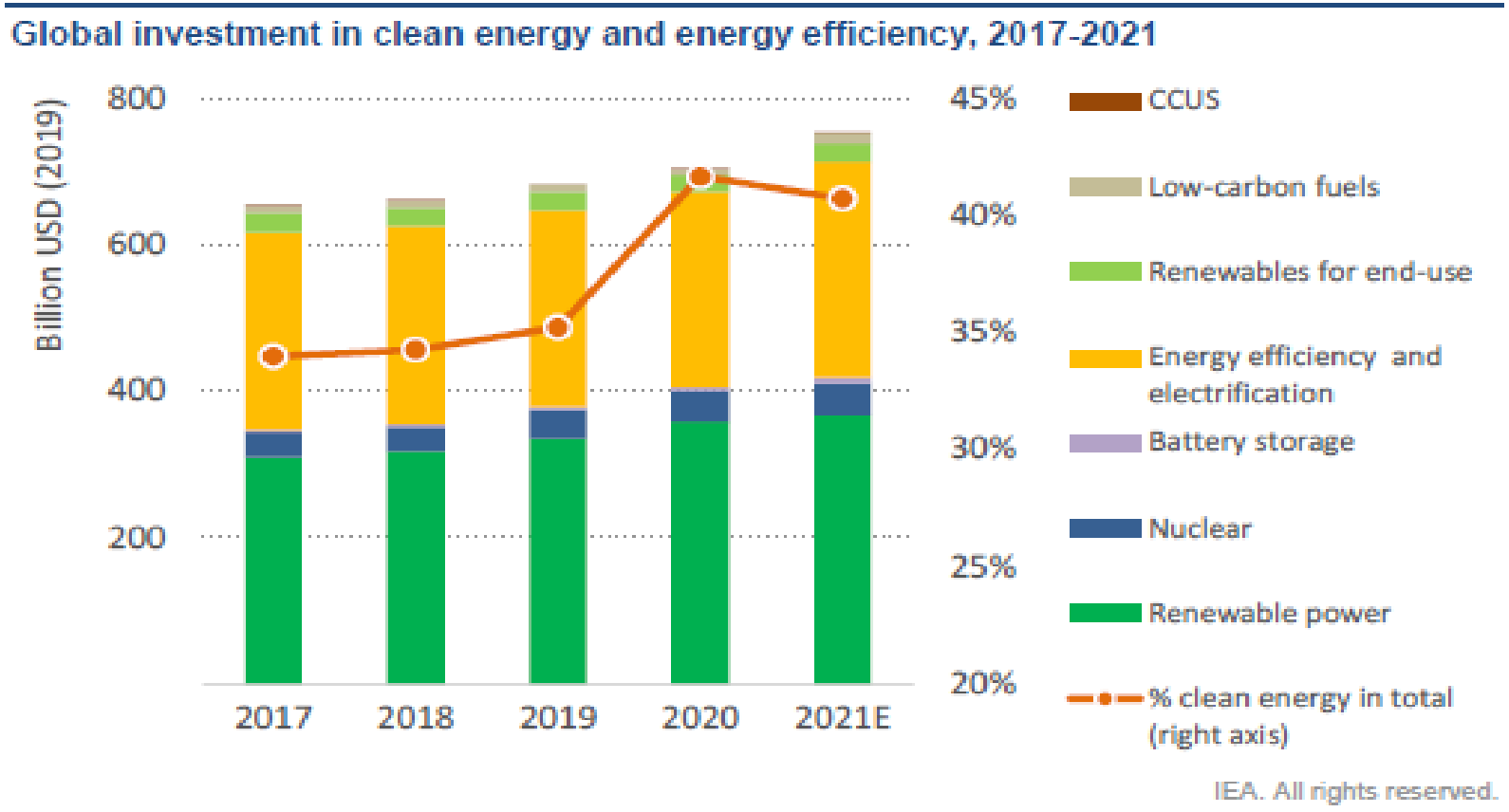
Renewables-based electricity is already the cheapest power option in most regions



The global weighted average levelised cost of electricity from utility-scale solar photovoltaic (PV) projects fell by 85% between 2010 and 2020, concentrating solar power (CSP) by 68%; on-shore wind by 56%, and off-shore wind by 48%.

IRENA
International Renewable Energy Agency

What are climate and energy investments today? About 800 millions



About half the “optimal investments needed between 2020 -2030

Comparing Scenario 2 (New Era) and 3 (Fragmentation and Conflict)

- By comparing the current trend of climate-related investments (the Scenario 3 trajectory) with the target trajectory (Scenario 2 or “no more than 2°C”), **the global additional investment needs would be:**

  USD 550 billion (about USD 80-110 billion in the EU)

  with a large fraction of this increase going to renewables, electricity storage and transmission and distribution.

- This estimate does not take into account the agriculture and transport sectors, but is nevertheless much lower than other estimates

- Moreover mitigation investments have not yet reached the optimal Scenario 3 level (1700 USD bn)

Summing up:

World

- Investments today: 800 bn; Optimal investments 1700 bn
- Missing investments today: 900 bn; Expected: 600-700 bn
- Additional investments to achieve 2°C (computed by comparing Scenario 2 and Scenario 3): 550 bn (0.7% of total global GDP)
- **Total 1150-1250 bn** (=600-700+550)
- **1.2-1.5% of total GDP rather than 2-3% often estimated**

Summing up:

Europe

According to the EU, investment needs based on historic trends, namely using the business as usual scenario (Scenario 1) as a benchmark, are about **EUR 260-300 billion** (using a 1.1 EUR-USD exchange rate).

Estimates using present trends (Scenario 3) as a benchmark are about **EUR 80-100 billion.**

An intermediate precautionary estimate that takes into account that present trends are not yet fully consistent with the Paris Agreement commitments would be **EUR 140-150 billion**.

First conclusion: investment is not an issue, at least in the EU and developed countries

Next Generation EU is already providing 40 EUR bn. Additional public resources will come from:

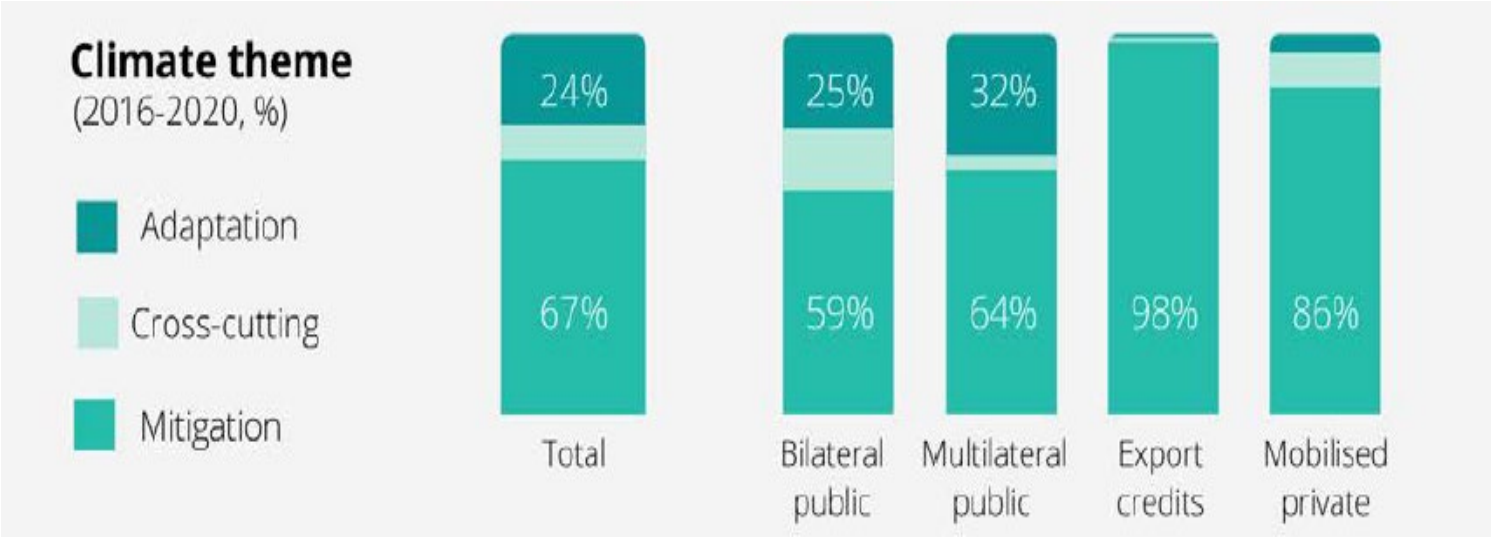
- ETS extension, ETS 2, CBAM, …
- Fossil fuel subsidy removal
- NextGenEU 2.0
- ……..

Private resources are coming from:

- Redirection of private investments (historically, climate-related investments are equally shared between public and private)
- Green finance (green bonds)

However, it's a big issue in less-developed countries!

Over a total of about 800 USD billions of climate finance, only about 10% goes to less developed countries



Are mitigation costs/transition costs an issue?

Mitigation costs depend on several assumptions on:

- What policy measures and their geographical and/or sectoral coverage
- Recycling revenues
- International cooperation
- Technological progress
- Cost of financing investments

Policy design is critical!

Are mitigation costs/transition costs an issue?

FROM IPCC AR6:

Mitigation pathways likely to limit warming to 2°C entail **losses in global GDP** with respect to reference scenarios of **between 1.3% and 2.7% in 2050**. In pathways limiting warming to 1.5°C with no or limited overshoot, losses are between 2.6% and 4.2%.

Annual mitigation costs

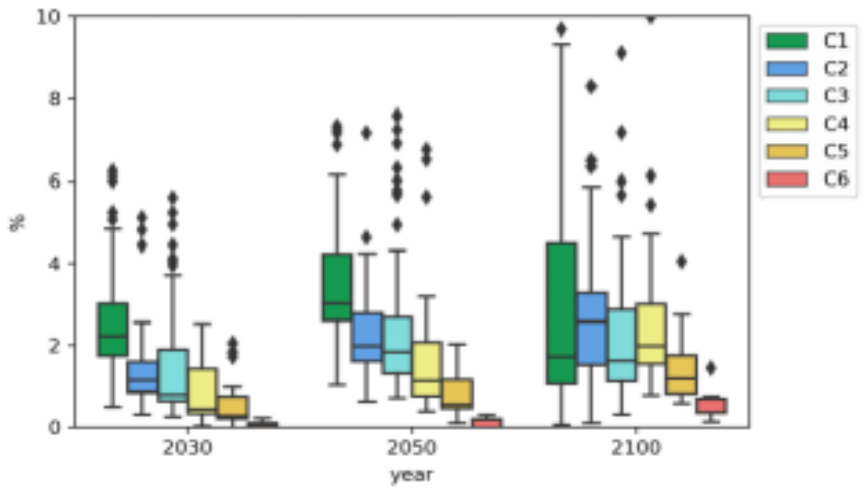
- **0.02-0.07** percentage points (interquartile range) over the century in pathways that limit global average temperature change to below 2°C; and

- **0.03-0.09** percentage points (interquartile range) in pathways that limit global average temperature change to below 1.5°C.

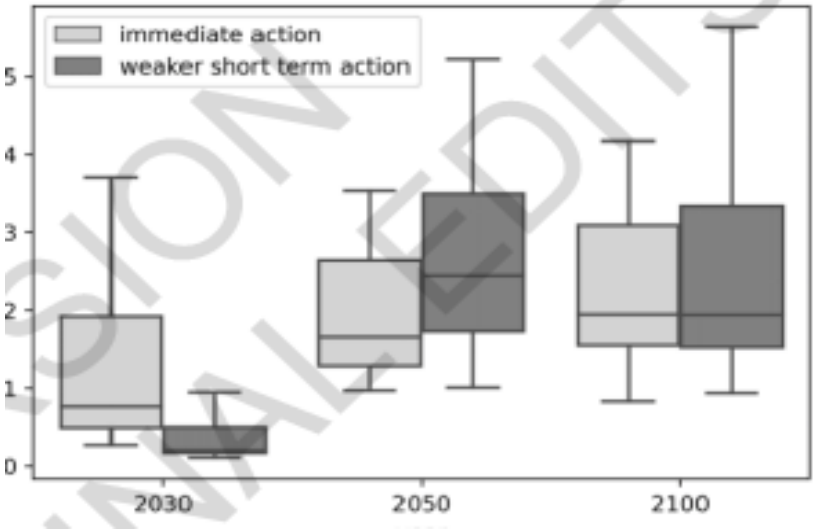
Macroeconomic losses are even smaller in the short term; the range is an annual GDP loss between **0.01% and 0.03% from now to 2030**.

These estimates are similar, **even smaller**, to the assessment of mitigation costs provided in IPCC AR5 (the reason is technological improvements)

The lower the temperature target, the lower the cost



Delaying action increases cost



Mitigation pathways in temperature categories C1 and C2 entail **losses in global consumption** with respect to their baselines – not including benefits of avoided climate change impacts nor co-benefits or co-harms of mitigation action – that correspond to an **annualized reduction of consumption growth by 0.04** (median value)(interquartile range [0.02-0.06]) percentage points over the century.

For pathways in temperature categories C3 and C4 this **reduction in global consumption growth is 0.03** (median value)(interquartile range [0.01-0.05]) percentage points over the century.

From **Energy Modeling Forum** (EMF) (see Böhringer et al., 2021)

Under a scenario equivalent to Scenario 3, the 15 models used in EMF 36 find a range of:

- **0.07% up to 0.8%, and a mean of 0.43% for the global economic adjustment costs**

compared to the BAU. Costs are measured as welfare losses. Under more restrictive emission caps that are in line with a 2°C path in 2030 (our Scenario 2), global adjustment costs in most models more than double,

- ranging from 0.16% to 1.84%, **with a mean of 0.94%.**

Costs depend on several assumptions, one of the most important being the possibility to equalize marginal abatement costs across countries. Comprehensive international emissions trading (global) provides substantial global cost savings of 50-90% in most models. **The mean global welfare loss would be 0.15% in Scenario 2 with global emissions trading and 0.47% in Scenario 3 with global emissions trading**.

These mitigation cost estimates are likely to be biased downward…..

- Macroeconomic cost of climate policy are likely to underestimate transition costs.
- Mostly based on quantitative assessments coming from integrated assessment models and general equilibrium models.
- Equilibrium models cannot properly capture the cost of the transition from one equilibrium to another. In particular, they cannot capture:

  i) unemployment costs and all costs related to imperfect labour markets and/or

  ii) costs related to stranded assets and the transition from fossil fuels to renewables

  (models assume equilibrium in the labour market as well in all other markets).

The (small) equilibrium costs a decade from now may hide substantial costs along the pathway to achieve the GHG emission reduction target. These transition risks (and costs) need to be assessed.

Transition risks

a) The first – and probably most important of these transition risks – is related to the **employment implications of a green recovery**

b) A second transition risk (and cost) is related to the **impacts on economic activity and income distribution of higher energy prices induced by more stringent carbon policies**.

c) A third important transition risk to be highlighted involves **financial institutions**

- **First, the probability of default of carbon-intensive firms may increase**, thus worsening the non-performing loan ratios of commercial banks and putting banks themselves at risk.
- **Second, a sudden downward revision of expected profits from such firms triggers a devaluation of their outstanding financial assets** (e.g. bonds and stocks), thereby negatively affecting the portfolios of financial investors holding the assets

➔ **ECB stress tests will include climate risks**

What is the economic size of the above transition risks?

According to the European Central Bank's assessment:

- the transition cost in Europe in the case of an orderly (new deal) transition (Scenario 2) would be **practically zero. With appropriate revenue recycling, even negative**

- In the case of a disorderly (fragmented and conflictual) transition (Scenario 3), the transition risk would **cost about 1-2% per year** from 2030 to 2050

Therefore:

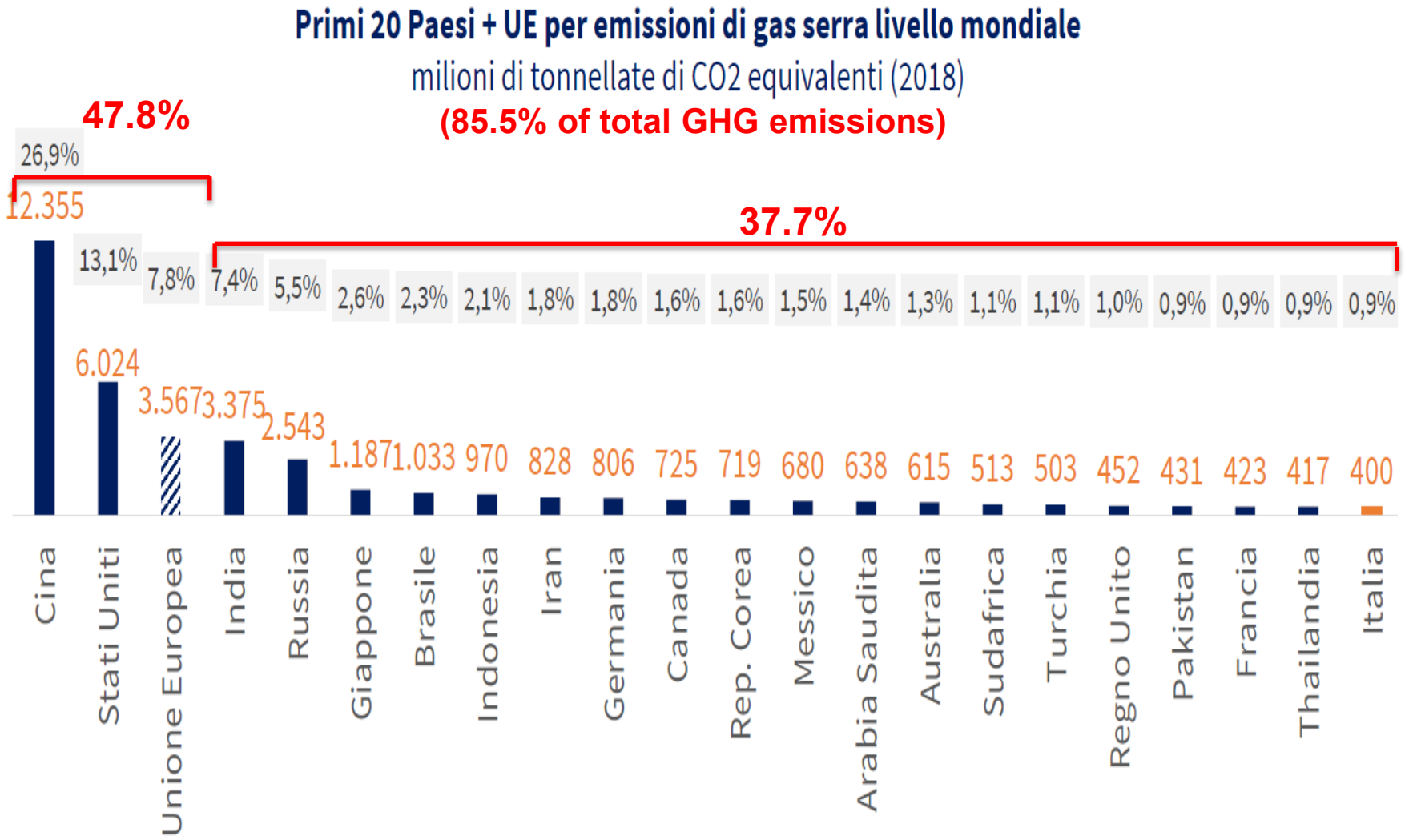
- In the ideal Scenario 2, **transition costs would be practically zero e mitigation benefits (avoided damages) would be high**
- By contrast, Scenario 3 would be characterized by sizeable transition risks and high climate damages
- Both equilibrium macroeconomic costs and transition costs are highly policy dependent.

Three main challenges for Europe

1. Europe cannot do it alone (it emits only 7.8% of global emissions). **Cooperation** is needed.
2. Transition must be just. The green transition needs to be coupled with a **social transition** (the European Green Deal proposed in December 2019 includes a $100 billion “Just Transition Mechanism”, over the period 2021-2027)
3. The green transition cannot occur without a **digital transition**

Hence the focus of the previously mentioned books/reports on:

- **Triple transition**
- **Geopolitical dimension of transition**



1. **Europe cannot do it alone**
2. **But at the same time no need for a global agreement for now**
3. **Actions and financial resources to support less developed countries are crucial**

Recommendations for a G20 initiative

- **Financial and technological support to developing economies** should be increased. Huge investments in infrastructure and education are necessary.
- A **global carbon price floor** (at least among the G20) – differentiated according to level of development to reflect the principle of common but differentiated responsibilities – would curb emissions and limit carbon leakage among participating countries.
- A **border carbon adjustment** could be implemented to protect the competiveness of energy-intensive industries. This would also be a strong economic incentive for countries with insufficient climate change goals to improve their policies.
- Joint action through a **coordinated green investment push** would create beneficial demand spillovers, lift global output and pave the way for higher carbon prices.
- Quickly **implementing the economic mechanism approved in Glasgow (in line with Art. 6 of the Paris Agreement)** could help equalise marginal abatement costs and would make climate policy more cost effective in all participating countries

Just Transition

A **just transition** could entails that the state intervene more actively:
- in the eradication of poverty,
- regulating prosperity and creating jobs in “green” sectors,
- in part to compensate for soon-to-be abandoned fossil-fuel-based sectors ,

and that:

- governments, polluting industries, corporations and those more able to pay higher associated taxes pay for transition costs, provide a **welfare safety net and adequate compensation** for people, communities, and regions that have been impacted by pollution, marginalised or negatively impacted by a transition from a high to low carbon economy and society

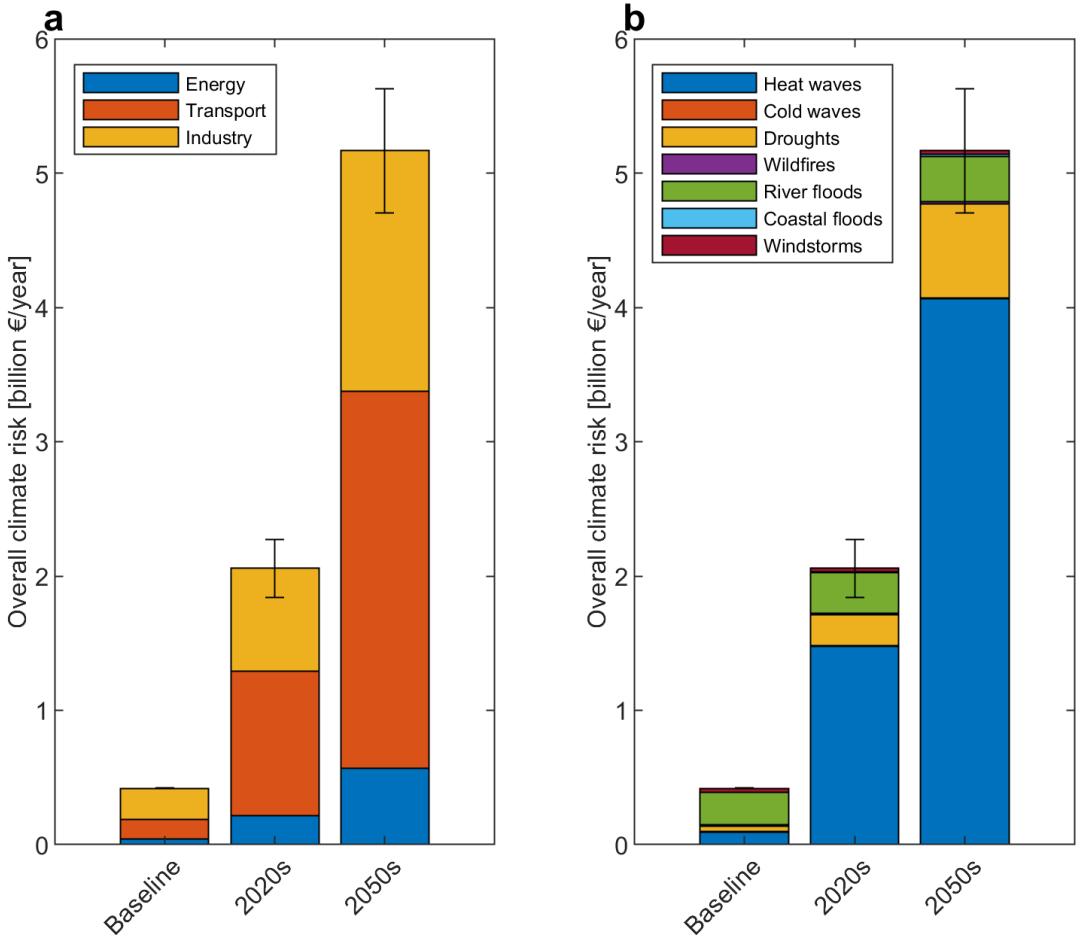
Le sfide per l'Italia

- Gli impatti dei cambiamenti climatici crescono rapidamente e con loro i danni economici ad essi associati

- L'instabilità politica, e la visione di breve periodo a questa collegata, ritardano l'introduzione di politiche adeguate

Proiezioni degli impatti economici associati ai cambiamenti negli eventi estremi

Impatti economici diretti



La crescita maggiore riguarda le infrastrutture di trasporto!

L'impatto economico diretto sulle infrastrutture in Italia è stimato crescere **entro il 2050 fino a 5.17±0.46** miliardi di euro l'anno, corrispondente ad un **aumento di circa 12 volte le stime di danno attuali.**

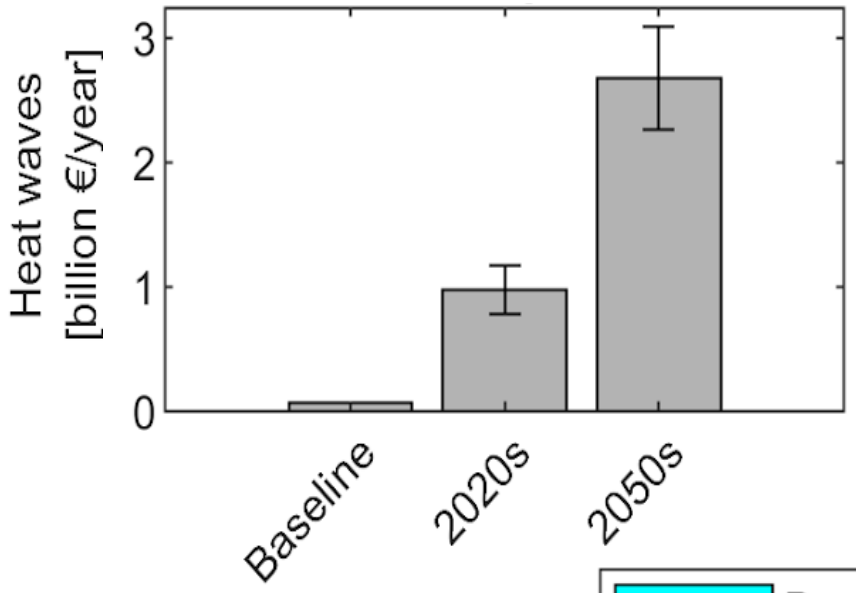
Settore	Danni attuali (baseline)	Crescita relativa (2050s)
Trasporto	0.15 Mrd € / anno	~1900%
Energia	0.04 Mrd € / anno	~1300%
Industria	0.23 Mrd € / anno	~700%

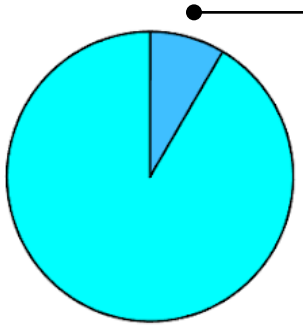
Oggi la maggior parte del danno viene da esondazioni fluviali, ma le proporzioni dei danni causati da siccità e ondate di calore aumenteranno fortemente, fino a rappresentare circa il 92% dei danni climatici nel periodo 2041-2070 (vs 31% nel periodo 1981-2010 di riferimento).

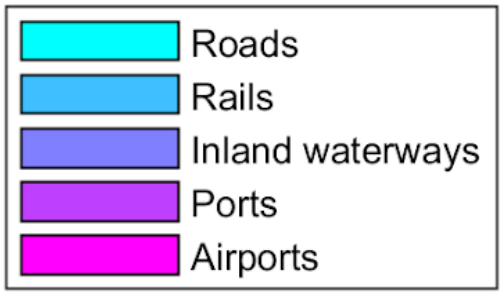
Proiezioni degli impatti economici associati ai cambiamenti negli eventi estremi

Rischi a livello di settore e infrastruttura | esempio: trasporti – ondate di calore

ONDATE DI CALORE E TRASPORTI







Fino al 2050 ….

Deformazione dei binari causata dalla dilatazione termica

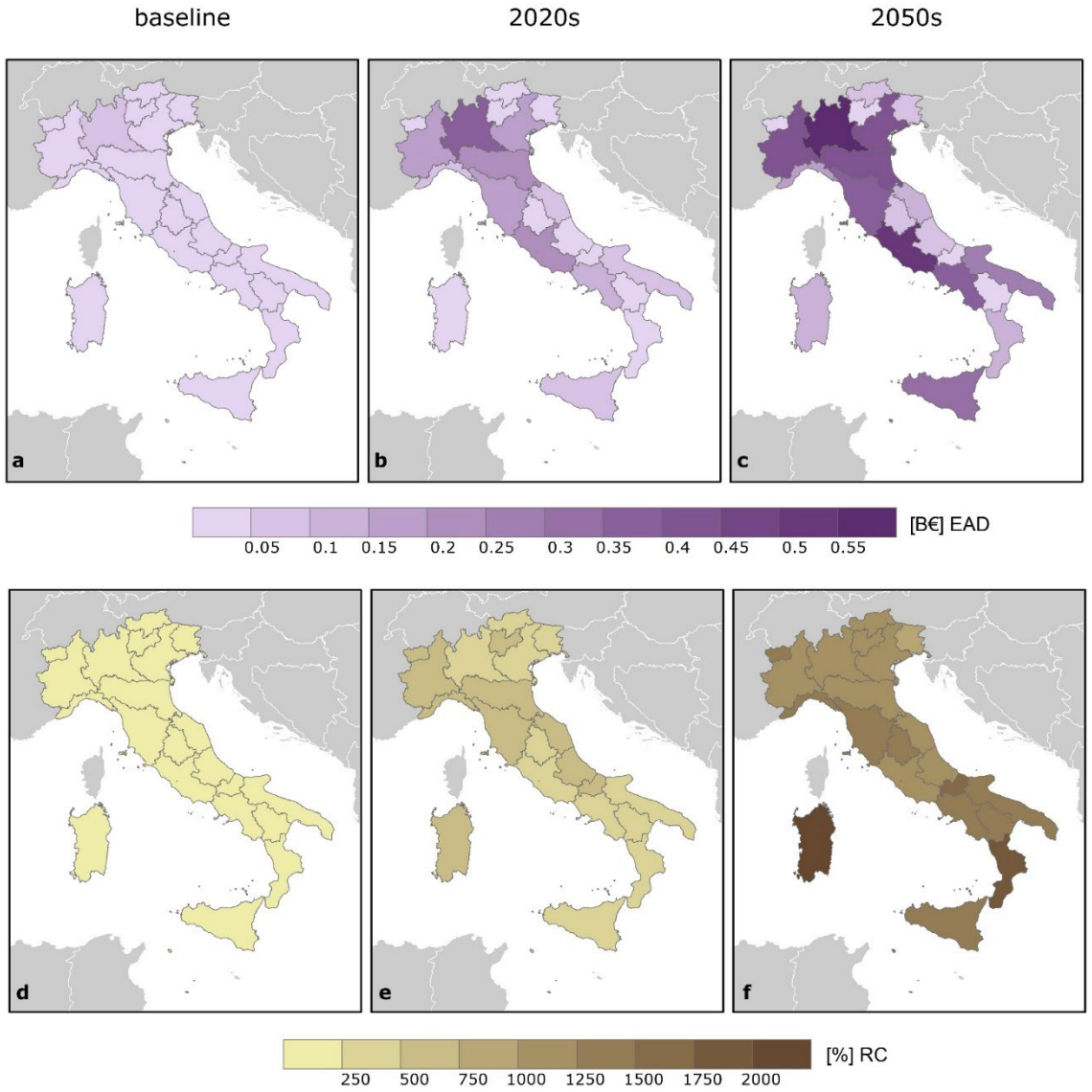
Deterioramento del manto stradale

Proiezioni degli impatti economici associati ai cambiamenti negli eventi estremi

Variazione spazio-temporale dei rischi

In termini assoluti il rischio climatico sarà probabilmente più pronunciato nelle regioni settentrionali e tirreniche (maggiore dotazione infrastrutturale in queste regioni)

In termini di variazione relative, il gradiente appare invertito, con le regioni meridionali, in particolare Sardegna, e Calabria, caratterizzate da un aumento di rischio climatico percentualmente più marcato (aumento in siccità più pronunciato in queste regioni)



Benefici economici delle misure di adattamento

- Gli investimenti in adattamento/protezione delle infrastrutture potrebbero evitare gran parte dei danni climatici potenziali **con un costo in media 5-6 volte inferiore al danno evitato**.
- **Ulteriori benefici sociali e/o ambientali*:*** ad esempio, le azioni «green» sono strettamente connesse col benessere e la *riduzione delle disuguaglianze*; hanno **elevato impatto sulla salute** anche in relazione all'invecchiamento della popolazione.

Danno complessivo via infrastrutture RCP 4.5 (BAU)			Danno sistemico complessivo (non solo infrastrutture) RCP 4.5	
2030	2050		2030	2050
2.1-8.3	8-13		10.5 - 41.6	60
0.1 - 0.4%	0.33 - 0.55%		0.5 - 2%	2.5%
Stimolo macro degli investimenti in adattamento infrastrutture			Beneficio economico totale (danno evitato su infrastrutture + stimolo macro per adattamento)	
2030	2050		2030	2050
4.1-6.25	2.4 - 6		6.25 -14.5	9.6 - 19.2
0.2-0.3%	0.1-0.25%		0.3-0.7%	0.4-0.8%

Gli investimenti necessari sarebbero ovviamente inferiori in presenza di mitigazione/decarbonizzazione

Benefici economici delle misure di mitigazione

- la transizione ecologica (passaggio da uno scenario RCP 4.5 ad uno scenario RCP 2.6) farebbe **guadagnare all'Italia dallo 0.5% all'2.3% del PIL** già entro il 2050 in termini di danni evitati (valutazione conservativa)
- Se il PIL italiano crescesse dai circa 1800 miliardi di euro attuali ai circa 2400 miliardi stimati dall'OCSE nel 2050, il danno evitato sarebbe di circa 12–55 miliardi di euro all'anno.

	Investimenti annui totali in mitigazione		Danno diretto su infrastr evitato (da RCP4.5 a RCP 2.6)***		Danno complessivo via infrastr. evitato (da RCP4.5 a RCP 2.6)***		Danno sistemico totale evitato via mitigazione (da RCP4.5 a RCP 2.6) ** ***	
	2030	2050	2030	2050	2030	2050	2030	2050
Mld	16		0,77	0,51	0.8 - 6.8	2.7 - 7.92	1.9 - 31.2	12 - 55
%PIL	0.77%		0,04	0,02	0.04 -0.33	0.11 - 0.33	0.09 - 1.5%	0.5 - 2.3%

Fattori cruciali per questi risultati:

- investimenti in fonti rinnovabili, che ridurrebbero anche dipendenza energetica e costi energia
- accesso a risorse finanziarie a basso tasso di interesse per finanziare esternamente il 50-70% degli investimenti
- processo tecnologico → **economie di scala**
  importanti investimenti in R&D
  cooperazione internazionale

Gli impatti su crescita e occupazione del pacchetto Fit-for-55

Simulazione degli obiettivi e dei mercati delle emissioni previsti nel pacchetto Fitfor55:

- -55% emissioni nel 2030 rispetto al 2005 che si ripartisce in un -62% ai settori ETS e in un – 43.7% nei settori Non-ETS
- E’ attivo il mercato ETS in EU, le quote sono allocate con meccanismo d’asta.
- Nei settori non-ETS gli obiettivi vengono raggiunti con l'implementazione di una carbon tax
- Gli obiettivi sulle rinnovabili sono implementati tramite sussidio alla produzione (nel caso questo fosse necessario)

Utilizzo del gettito fiscale

Scenario 1: Dal 2026 il gettito generato dalla vendita dei permessi, e dalla carbon tax nei settori non ETS, viene utilizzato nel modo seguente:

- 1/3 a sostegno degli investimenti nel settore delle rinnovabili,
- 1/3 a sostegno dei settori industriali (per sviluppare i comparti green e innovativi),
- 1/3 a sostegno delle famiglie.

Scenario 2: Il gettito viene utilizzato nel modo seguente:

- 2/3 a sostegno dei settori industriali (per sviluppare i comparti green e innovativi),
- 1/3 a sostegno delle famiglie.

Si assume che l'effetto combinato di opzioni di economia circolare, innovazioni di processo e di materiale consentano al 2030 all'industria chimica di ridurre i coefficienti di emissione del 7%, all'industria pesante (acciaio e cemento) del 10%, al manifatturiero del 5%. I dati derivano dal rapporto: Material Economics (2019). *Industrial Transformation 2050 - Pathways to Net-Zero Emissions from EU Heavy Industry*. University of Cambridge Institute for Sustainability Leadership.

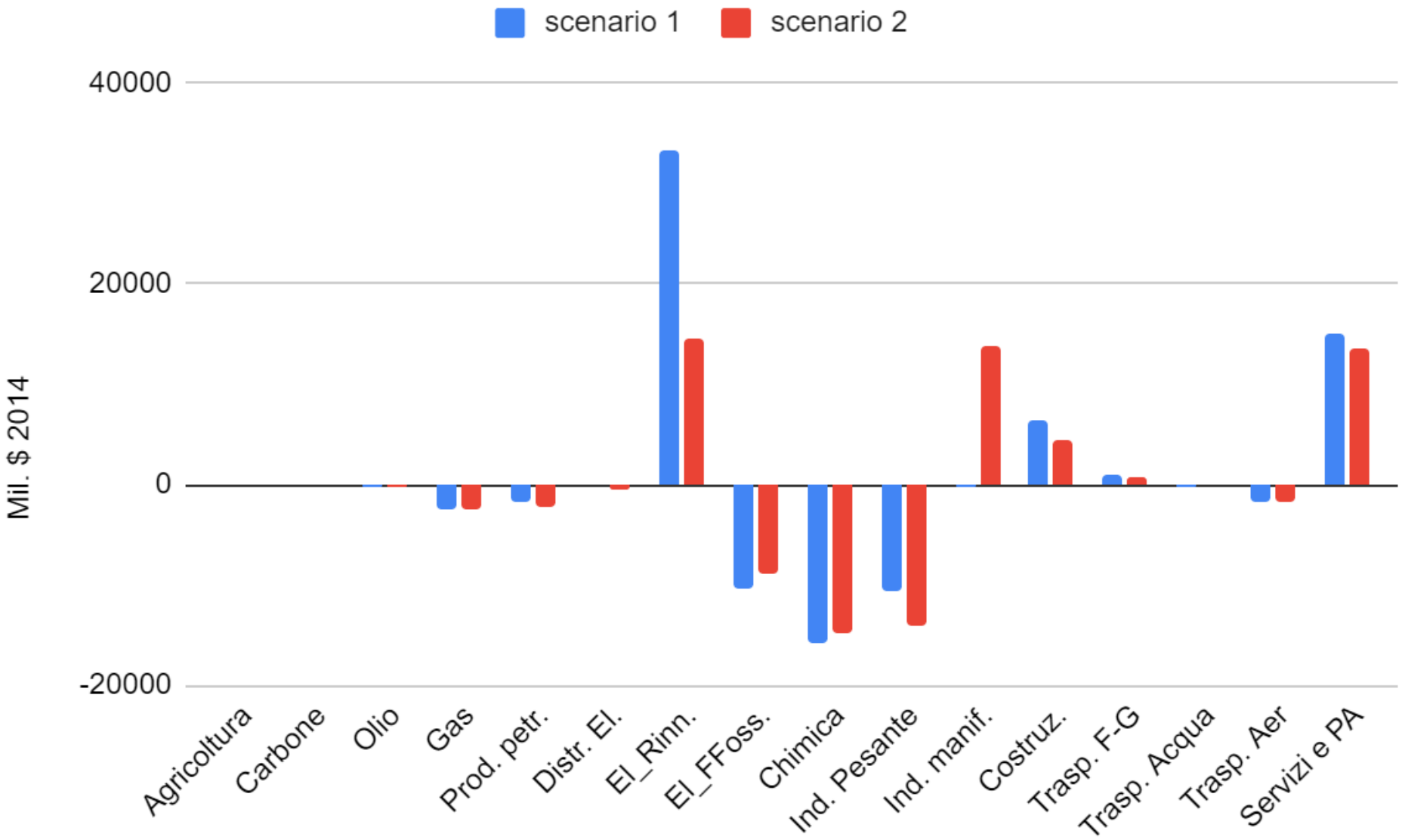
Impatti su PIL e Occupazione in Italia al 2030

	Scenario 1	Scenario 2
PIL (var % rispetto alla baseline)	**+ 0.25%**	**+0.31%**
PIL (tasso crescita medio annuo 2020-2030):	**1.38% (+0.02%)***	**1.39% (+0.03%)***
Occupazione (var. ass. rispetto baseline in 1000)	**+214.000 (+0.8%)****	**+170.000 (+0,7%)****

*Tra parentesi, la variazione media annua del tasso di crescita del PIL

**Tra parentesi, il tasso di crescita dell'occupazione

Impatti sul valore settoriale della produzione in Italia al 2030



Impatti su occupazione in Italia per settori al 2030

	scenario 1	scenario 2
Agricoltura	0.2	0.9
Carbone	0.0	0.0
Olio	-0.5	-0.5
Gas	-5.7	-5.7
Prod. petr.	-4.2	-4.9
Distr. El.	0.3	-2.1
El_Rinn.	175.4	76.3
El_FFoss.	-18.3	-15.7
Chimica	-64.6	-60.9
Ind. Pesante	-96.2	-129.3
Ind. manif.	-1.7	118.7
Costruz.	48.8	32.8
Trasp. F-G	5.6	3.9
Trasp. Acqua	-0.6	-0.5
Trasp. Aer	-7.7	-8.2
Servizi e PA	183.2	165.3
TOT	**213.8**	**170.2**

Utilizzando i risultati del modello ICES, applicando i moltiplicatori occupazionali stimati da Bivens e ISTAT, si ottengono le variazioni settoriali dell'occupazione presentate nella tabella.

Da sottolineare, l' incremento per i settori delle **rinnovabili** e dei **servizi**, oltre che quello delle **costruzioni**. Il **manifatturiero** ha una crescita occupazionale significativa nello scenario 2. Riduzione invece nei settori dei combustibili **fossili** e dell' **industria pesante**

L'effetto netto complessivo è un possibile **incremento dell'occupazione di circa 200 mila posti di lavoro nel 2030.** Questo numero (**+0.7%**) è in linea con le previsioni della Commissione Europea che per l'Europa stima un aumento occupazionale del +0.6 - +0.9%.

Le conclusioni di questa analisi

Come detto, il design della policy e' cruciale. Gli impatti positivi su crescita e occupazione si ottengono riciclando le risorse provenienti dal gettito fiscale in modo da favorire la trasformazione energetica ed industriale:

- Con investimenti in rinnovabili o favorendo investimenti in rinnovabili
- Aiutando le imprese nei settori energy intensive e più in generale in tutti i processi di innovazione/trasformazione

La politica climatica è innanzitutto una politica industriale

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IN DOMO FOSCARI
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EVANGELISTA MEUS

Grazie!