



BANCA D'ITALIA

EUROSISTEMA

Rischi climatici e rischi finanziari

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Sviluppo sostenibile, finanza e rischio climatico

Roma, 3 luglio 2019

** Dipartimento economia e statistica. Le opinioni espresse sono personali e non implicano in alcun modo quelle della Banca d'Italia*



Why central banks should care about climate change?

A Central Bank can be engaged in the assessment of climate-related financial risk along 5 dimensions ...

1. **micro-prudential regulation**, requiring banks and other financial institutions to adopt environmental and social risk-management standards to assess and disclose climate-related risks, or to adjust reserve holdings;
2. **macro-prudential regulation**, for example using climate-related stress testing and adopting differentiated capital requirements;
3. **financial market development**, such as establishing information disclosure requirements or encouraging the issuance and trading of “climate-resilient” securities;
4. **credit allocation**, for example adopting preferred interest or credit quotas for “climate-resilient” sectors;
5. **soft power and guidelines**, such as developing capacity-building initiatives in order to inform bankers and investors.

In the next minutes I am going to talk of ...

1. ... what are **climate change effects** on the real economy
2. ... how these can translate to the financial system (**climate-related financial risk - CRFR**)
3. ... a quick reminder of the **many initiatives on CRFR**
4. ... is the **Italian financial system ready** to deal with CRFR?
5. ... **some studies** carried out at the Bank of Italy

Climate change in ITALY in the past

More heat ...

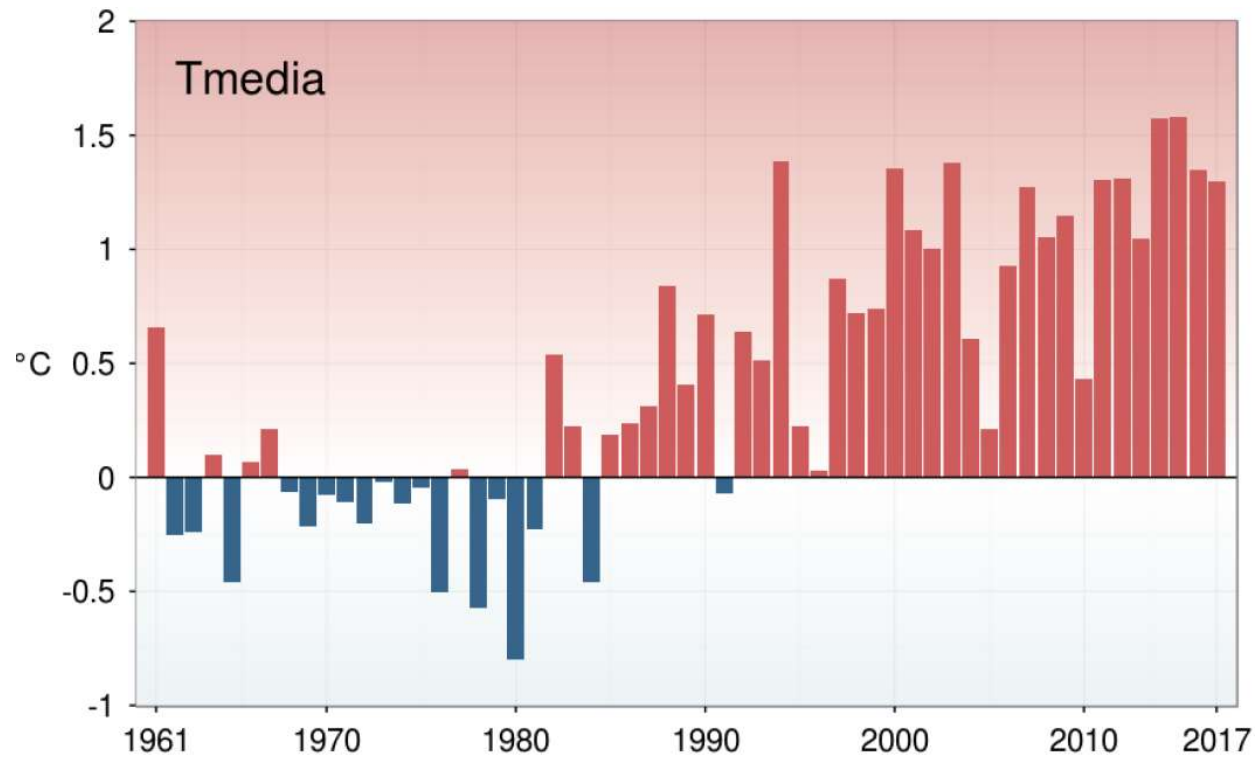
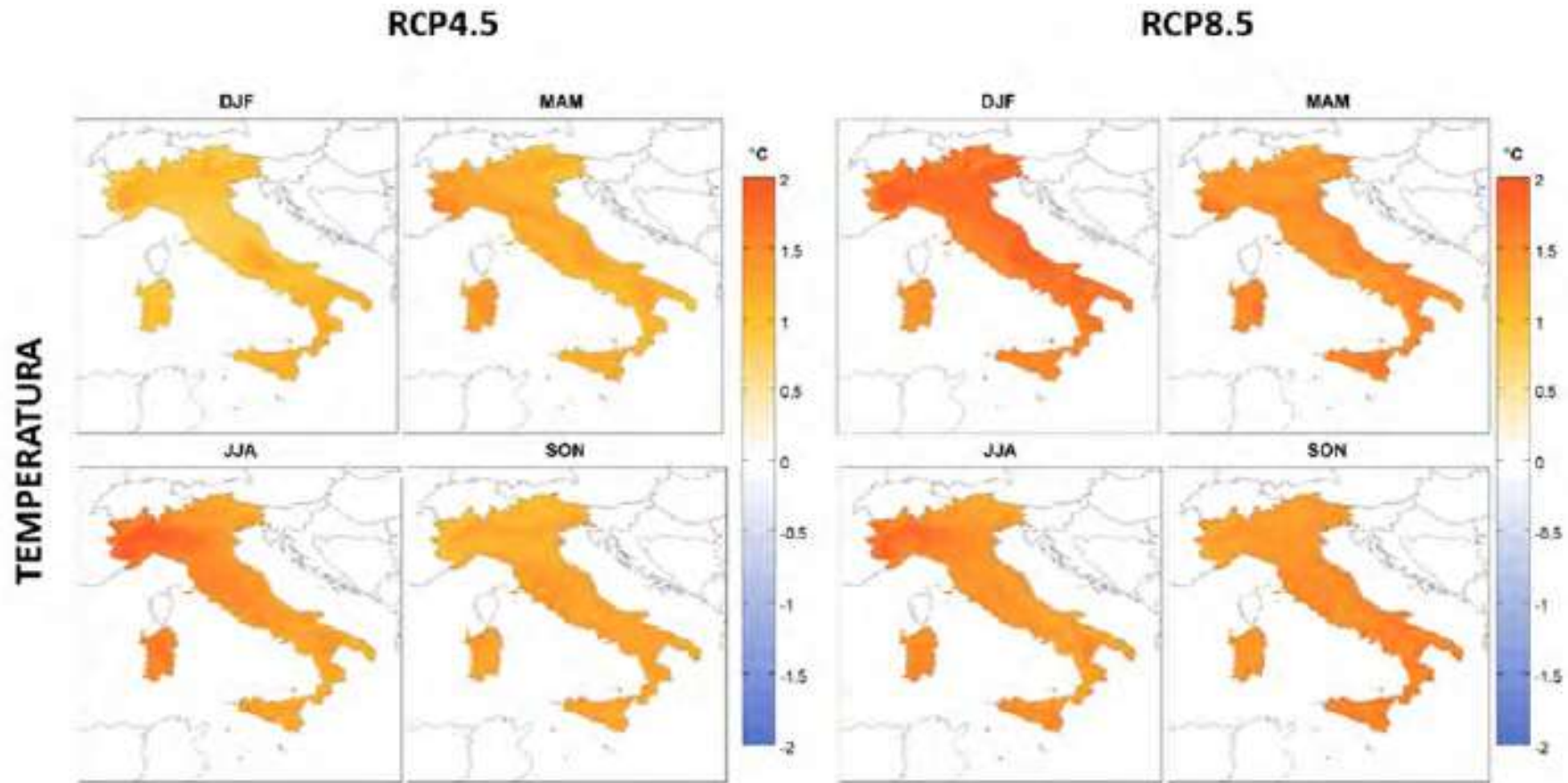


Figura 3.8: Serie delle anomalie medie in Italia della temperatura media rispetto al valore normale 1961-1990.

Source: ISPRA (2018).

Climate change in ITALY in 2021-2050 (vs 1981-2010)

More heat in all seasons ...

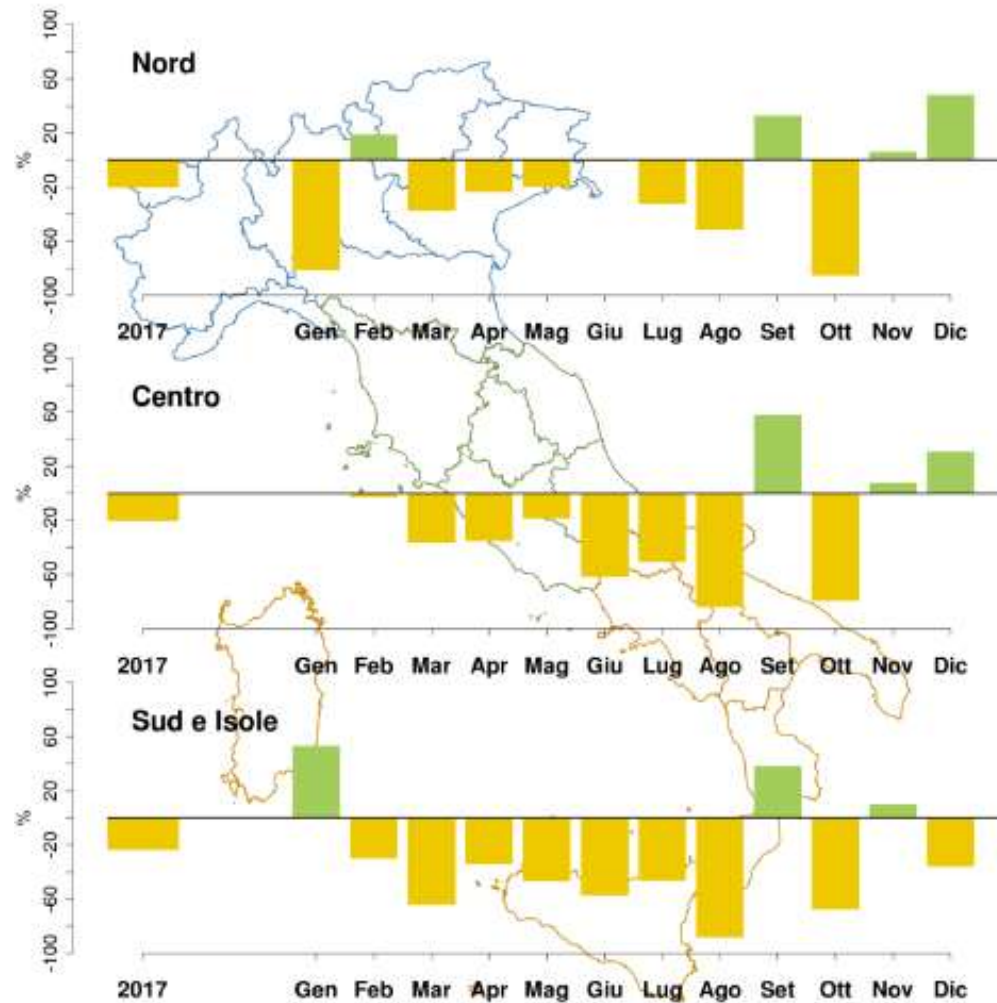


RCP=Representative Concentration Pathway
DJF - winter , MAM - spring ,
JJA - summer, SON - autumn

Source: MATTM (2018).

Climate change in ITALY in the past

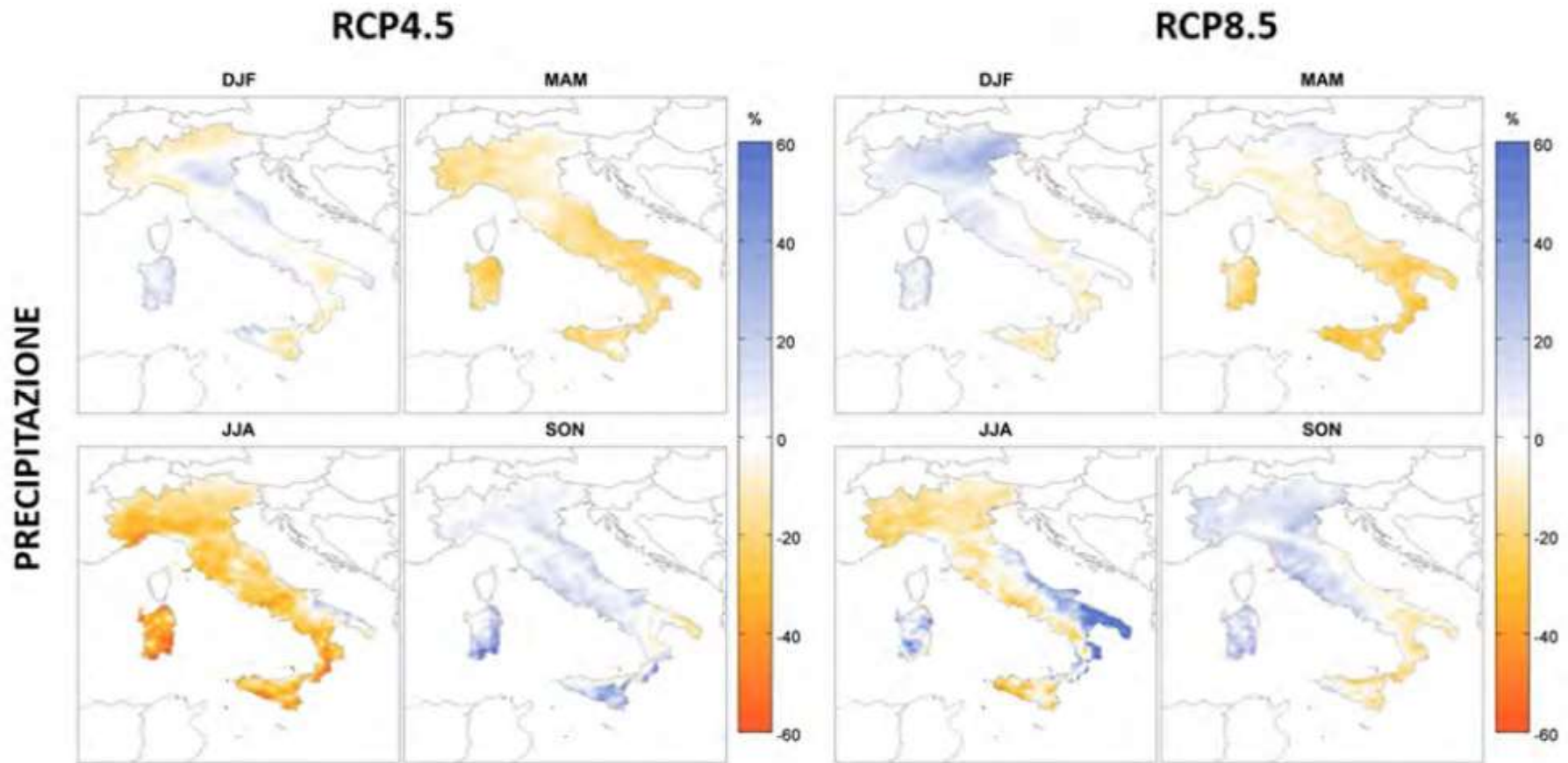
...less rain



Source: ISPRA (2018).

Climate change in ITALY in 2021-2050 (vs 1981-2010)

More rain in winter/autumn; less rain in spring summer



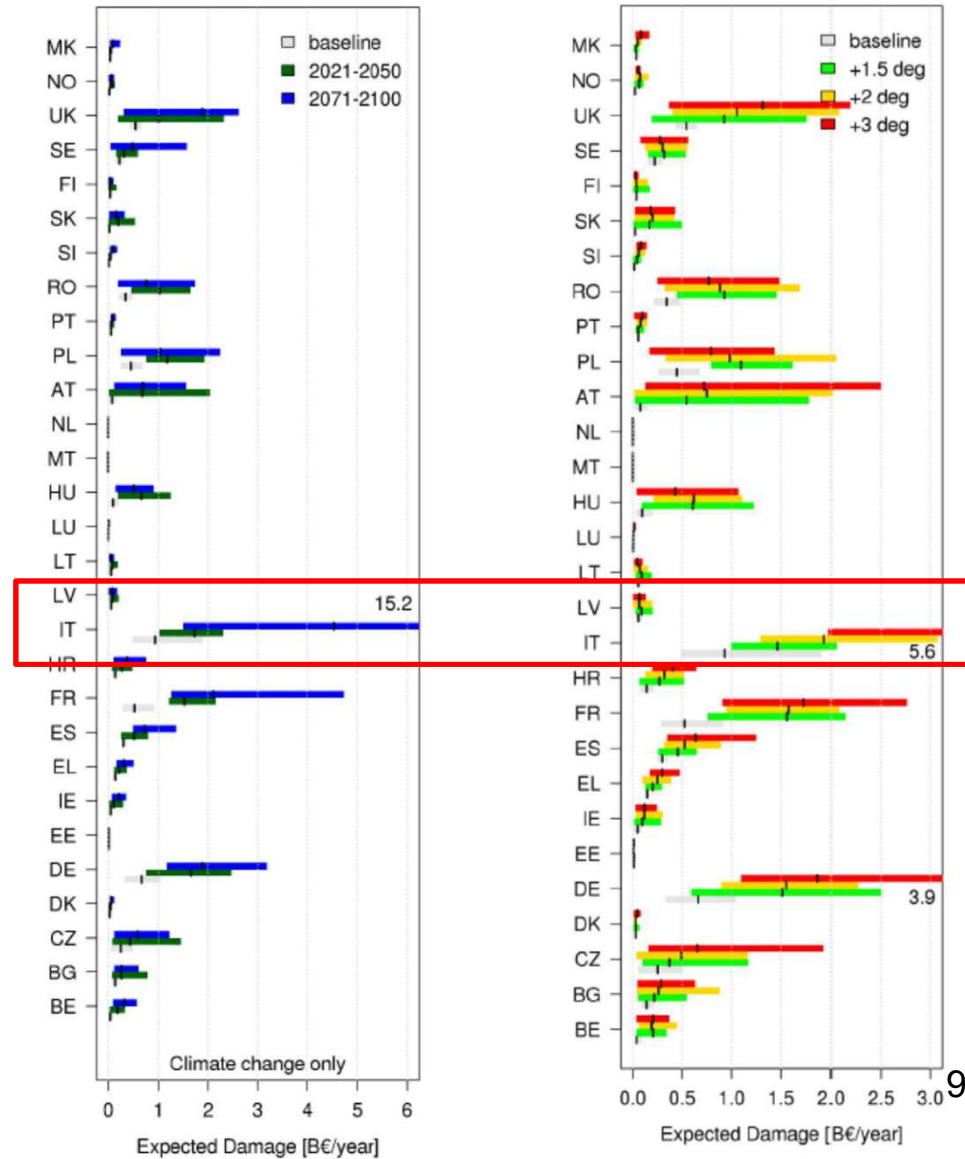
Source: MATTM (2018).

RCP=Representative Concentration Pathway
DJF - winter , MAM - spring ,
JJA - summer, SON - autumn

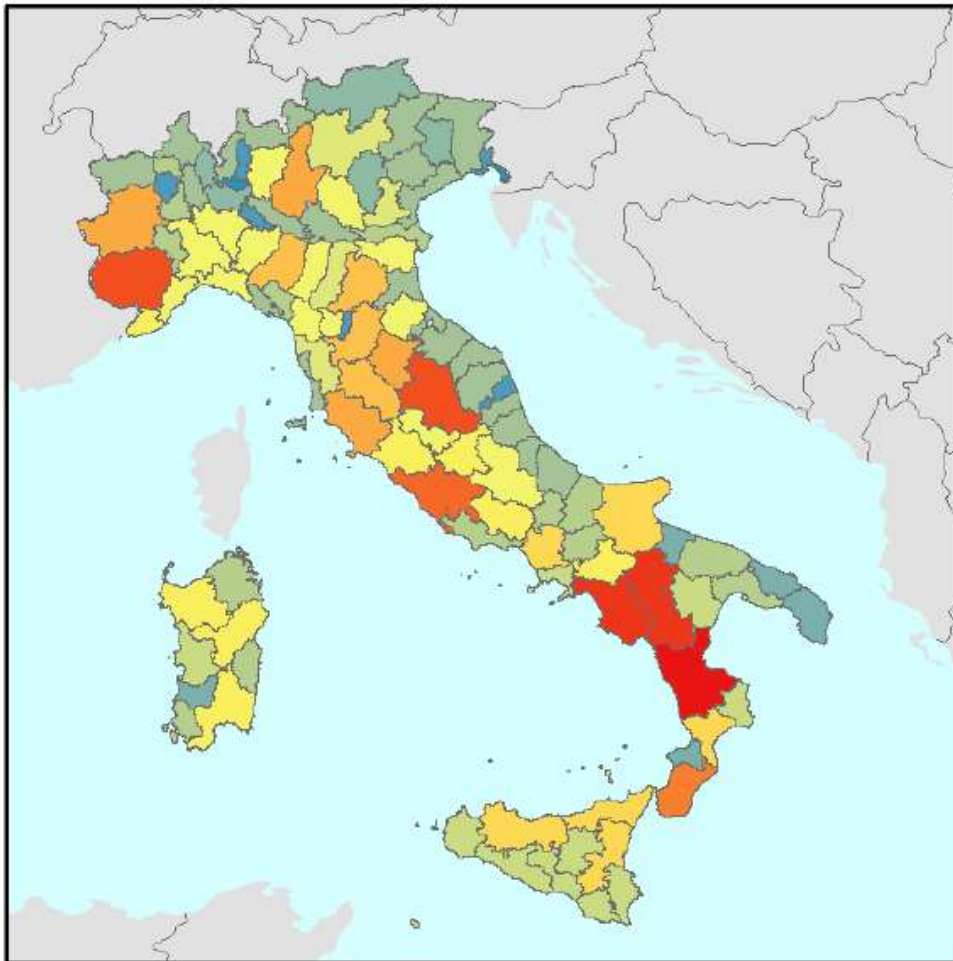
Climate change in ITALY in 2021-2050 and 2071-2100

Expected annual damages from floods in Italy top other EU countries in every scenario

Left graphs: expected annual damage for the baseline and for the future periods 2021-2050 and 2071-2100 (high warming scenario).
Right graphs: expected annual damage for different levels of warming. Figures show flood impacts under future climate conditions on present European society (static).



Climate change in ITALY : expected impacts and adaptation capacity



Indice di rischio bi-dimensionale:

La legenda è composta da due indici e il colore indica la combinazione di entrambi: impatti potenziali (sinistra) e capacità di adattamento (destra).



Source: MATTM (2018).



How climate change affects the real economy

Climate change impacts

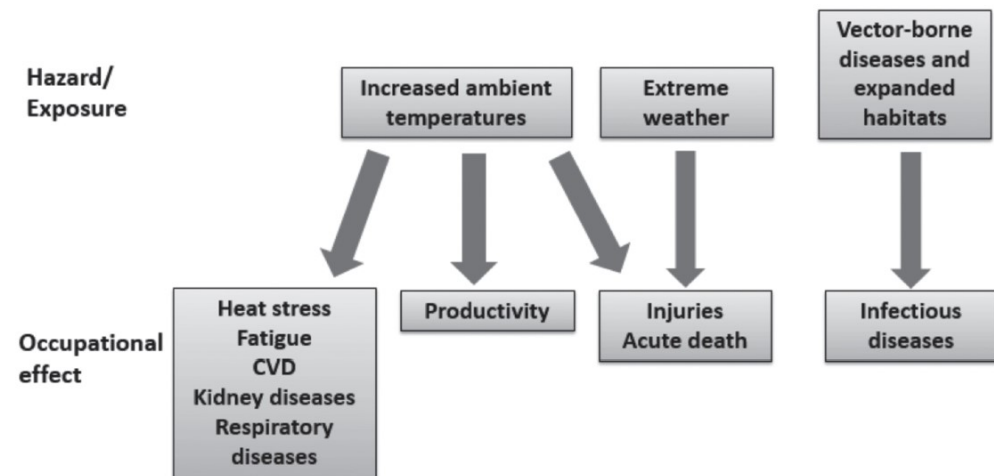
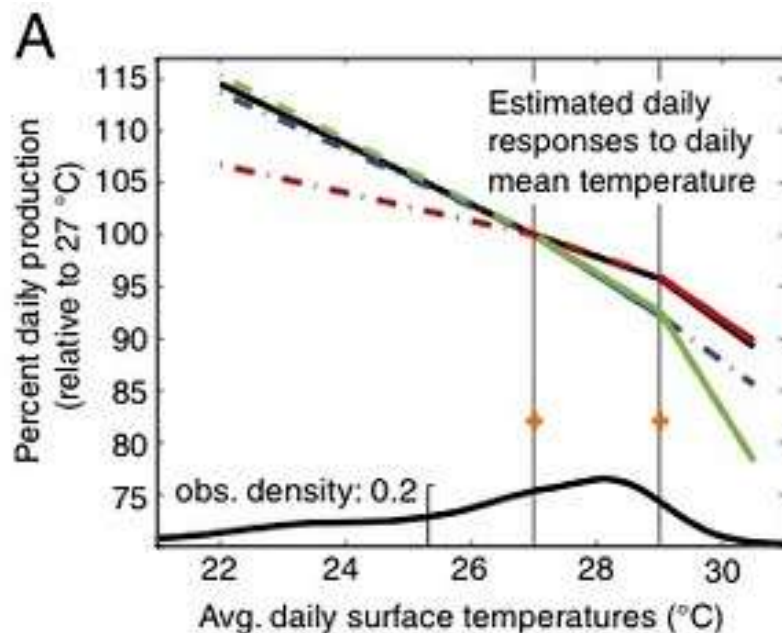
Type of shock	From gradual global warming	From extreme weather events	
Demand	Investment	Declining productive capacity of affected regions (e.g. agricultural productivity / health, etc)	Uncertainty about climate events; capital constraints on productive investments for reconstruction costs
	Consumption	Changes in consumption patterns, e.g. more savings for hard times	Increased risk of flooding to residential property
	Trade	Changing/declining agricultural productivity	Disruption to import/export flows due to extreme weather events

Climate change impacts

Type of shock	From gradual global warming	From extreme weather events	
Supply	Labour supply	Loss of hours worked due to extreme heat/increased morbidity	Loss of hours worked due to natural disasters, or mortality in an extreme case
	Energy, food, other inputs	Decrease in agricultural productivity/ hydroelectricity	Food, energy and other input shortages
	Capital stock	Diversion of resources from productive investment to adaptation capital	Damage due to extreme weather
	Technology	Diversion of resources from innovation to adaptation	Diversion of resources from innovation to reconstruction

What does mean in practice: lower productivity

- Persistently **reduced labor productivity** may be one of the largest economic impacts of anthropogenic climate change. . . .
- Hsiang (2010) found **that labor-intensive sectors of national economies decreased output by roughly 2.4% per degree C (above 27 C) ...**



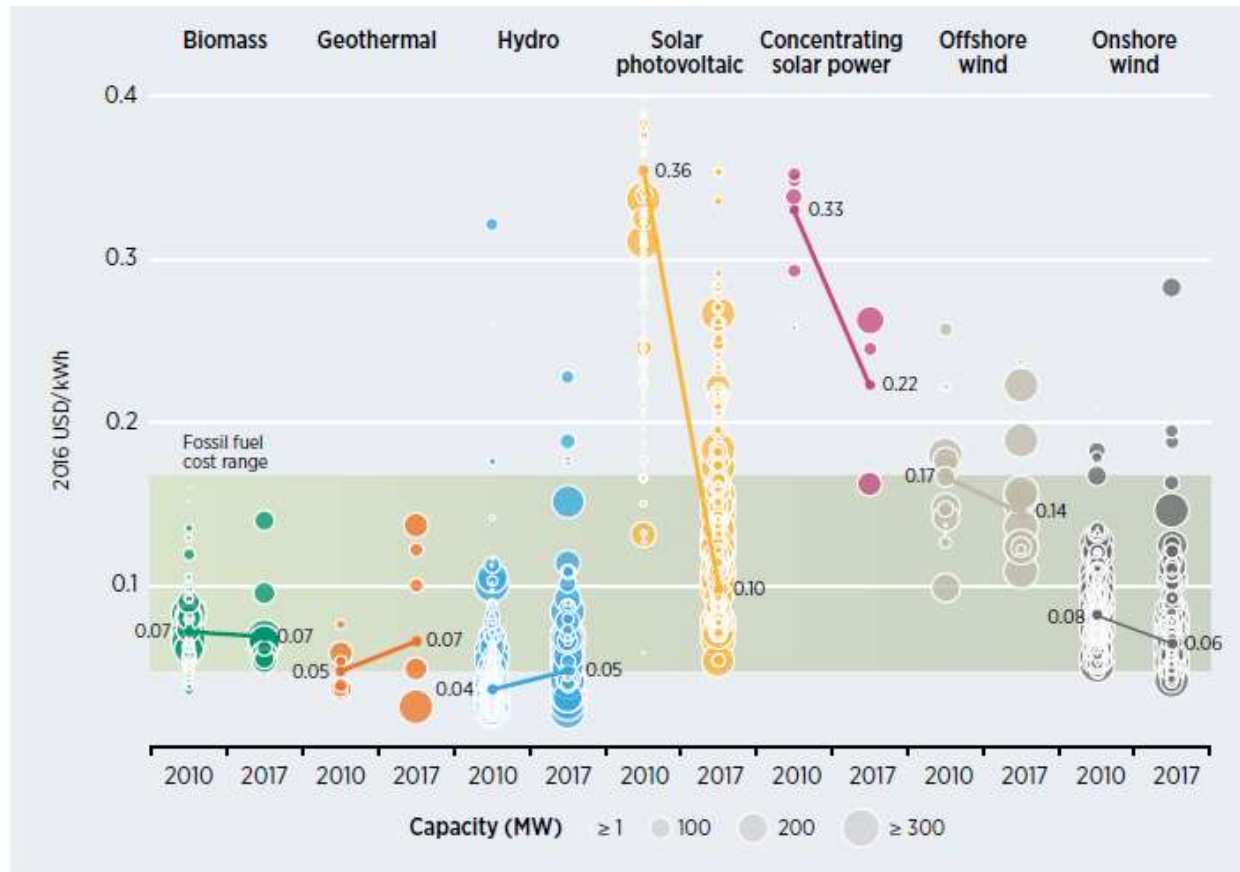
Source: Hsiang (2010)

Source: Levi, Kjellstrom and Baldasseroni (2018)



Energy transition(s)

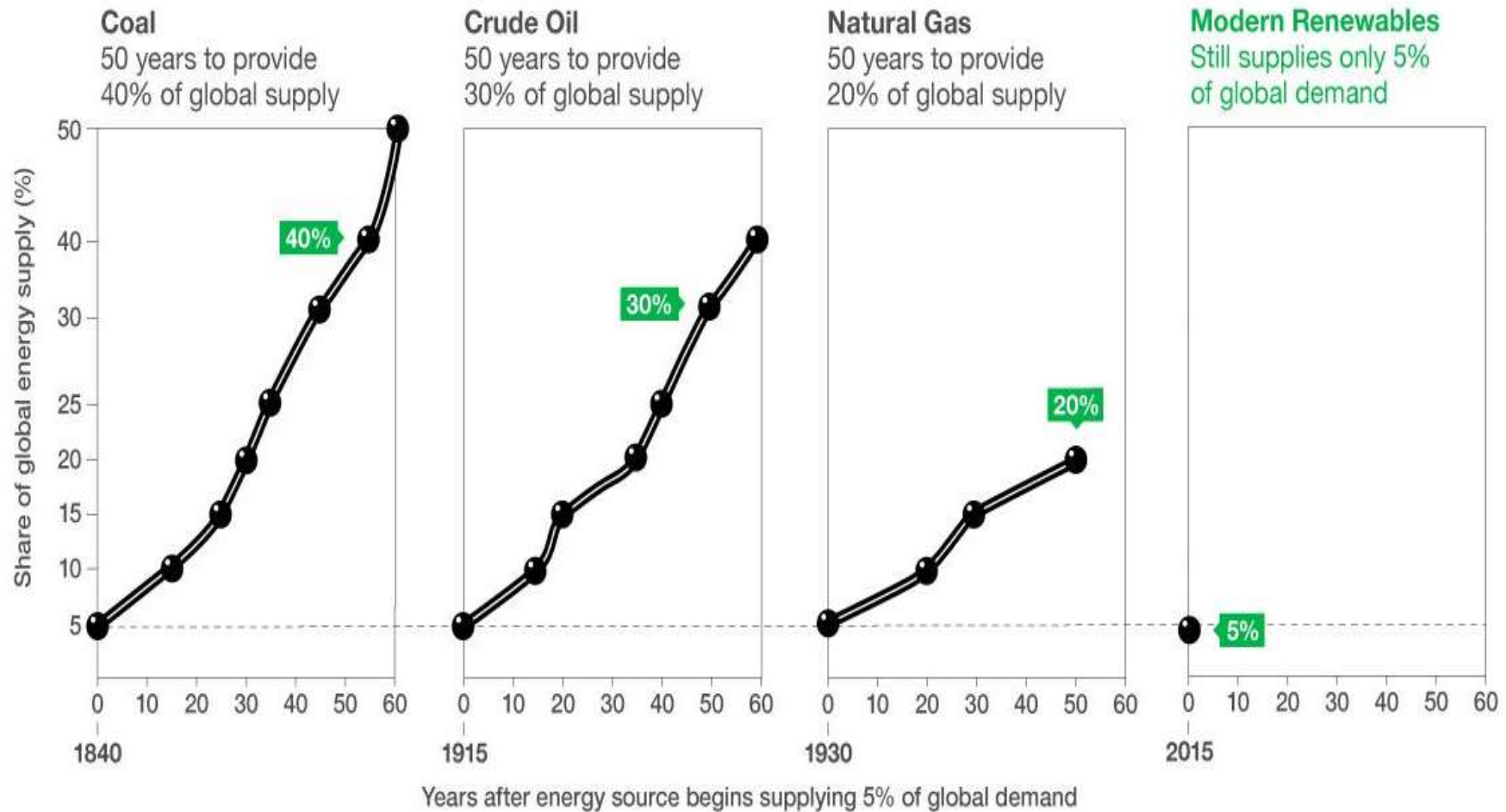
Renewables (with energy efficiency) can fuel the transition. But...



Source: IRENA Renewable Cost Database.

Note: The diameter of the circle represents the size of the project, with its centre the value for the cost of each project on the Y axis. The thick lines are the global weighted average LCOE value for plants commissioned in each year. Real weighted average cost of capital is 7.5% for OECD countries and China and 10% for the rest of the world. The band represents the fossil fuel-fired power generation cost range.

...Energy transitions take time



The «heart» of transition risk

Implied future emissions if we don't build any more fossil-fuel-burning infrastructures from 2018 (658 GtCO₂, 78 GtCO₂ more than the number needed to have a 50 percent chance of stabilizing temperatures at 1.5°C)

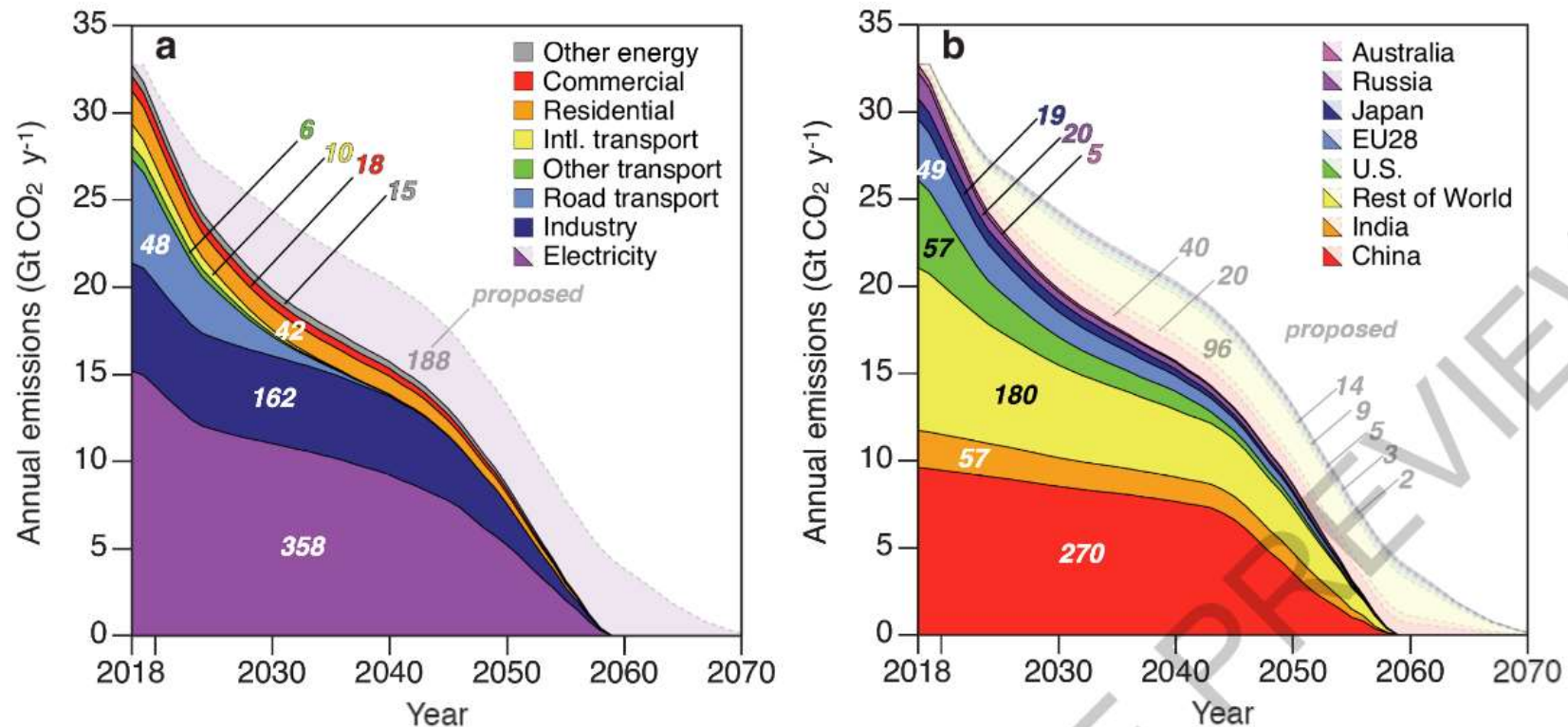


Fig. 1 | Committed CO₂ emissions from existing and proposed energy infrastructure. Estimates of future CO₂ emissions by industry sector (a; see also Tables S1 and S2) and country/region (b), assuming historical

lifetimes and utilization rates. Emissions from existing infrastructure are shown by darker shading, and emissions from proposed power plants (i.e. electricity) are more lightly shaded.

Climate *uncertainty*

Uncertainty about

1. Emissions (GHG cycles)
2. Climate change (climate sensitivity)
3. Vulnerability to climate change (scenarios)
4. Impacts of climate change (scenarios)
5. Value of impacts (discount rate)
6. Present and future climate policies



How climate change affects the financial system



Climate-related financial risk - CRFR

1. **Physical risks**, direct (e.g. on property and casualties) and indirect (e.g. on economic activity) effects of climate-related events, such as floods and storms;
2. **Transition risks**, sudden (unexpected) devaluation of carbon-intensive financial assets and infrastructure as a consequence of climate policies that aim at the decarbonization of the energy sector (the so-called Carbon Bubble/Stranded Assets issue);
3. **Liability risks**, insured parties having suffered loss from climate-related events seek to recover losses from insurance firms under third-party liability contracts (e.g. Tobacco, Asbestos, Deepwater horizon accident).

Examples of CRFR* for Italian banks

	Market risk	Credit risk
Physical risk	<ul style="list-style-type: none"> • Losses from a reduction in the value of assets owned by the bank (dwellings, land, etc) and damaged by climate-induced extreme weather events • Losses from a reduction in the value of shares/bonds in the bank portfolio issued by firms whose performance is affected by climate change material effects (eg. because less productive, energy-water dependent, etc...) 	<ul style="list-style-type: none"> • Extreme weather events affect the output of firms/households and make them more financial vulnerable therefore reducing their ability to repay their debts • Extreme weather events affect the value of the collateral of indebted firms/households. If losses are uninsured possible systemic effects in the affected areas with spillover on the local banking system
Transition risk	<ul style="list-style-type: none"> • Losses/Profits from a reduction/increase in the value of shares/bonds/assets in the bank portfolio issued by firms whose future performance is affected by climate change policies (eg. Coal generating utilities, energy intensive companies, companies operating in the oil and gas sector, Recent policies to limit land use) 	<ul style="list-style-type: none"> • Losses from due to the non-performing loans from firms whose future performance is affected by climate change policies (eg. Coal generating utilities, energy intensive companies, companies operating in the oil and gas sector).
<i>Systemic risk</i>	<ul style="list-style-type: none"> • If the effects (in particular of transition risk) are affecting a whole sector (constructions, energy production and distribution, agriculture, etc) there is a risk of spillover effect across all the financial system 	

* I skip liability risk



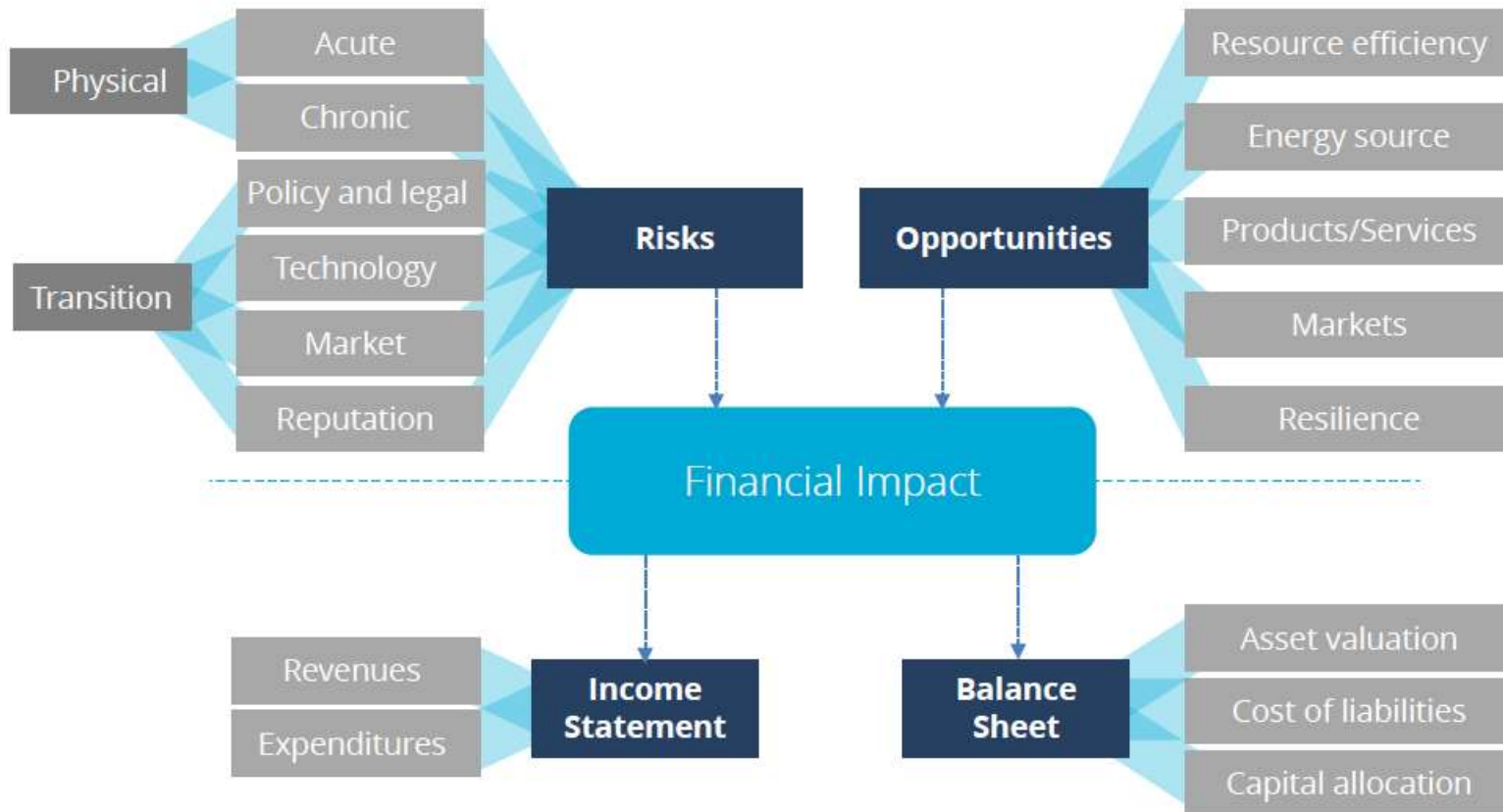
International and National Initiatives

Carbon risk disclosure



EVALUATING FINANCIAL IMPACT

Climate-related risks and opportunities can impact organizations' financial performance.










HLEG and *Sustainable Finance Action plan*

EU HIGH-LEVEL EXPERT GROUP ON
SUSTAINABLE FINANCE



WHAT CHALLENGES DOES THE ACTION PLAN ADDRESS?

 KEY CHALLENGES	 ACTIONS	
No common definition of 'sustainable investment'	EU classification (taxonomy) for sustainable activities	 RELIABLE INFORMATION
Risk of 'greenwashing' of investment products	Standards and labels for 'green' financial products give investors certainty	
Banks and insurers often give insufficient consideration to climate and environmental risks	Study if capital requirements should reflect exposure to climate change and environmental risks	 SUSTAINABILITY AND RISK MANAGEMENT
Investors often disregard sustainability factors or underestimate their impact	Clarify institutional investor duties to consider sustainable finance when allocating assets	
Too little information on corporate sustainability-related activities	Enhancing non-financial information disclosure	 LONG-TERMISM IN GOVERNANCE



Network for Greening the Financial System (NGFS)

Functioning of the NGFS

The NGFS aims to accelerate the work of central banks and supervisors on climate and environmental risk and on scaling up green finance. The NGFS' work could feed into the work of existing international regulatory bodies. It does not aim to replicate the work conducted elsewhere, but to build on and enrich it where necessary. The NGFS' diverse membership allows for close coordination between the various ongoing international initiatives on issues of common interest. To this end, the NGFS has kept close contact with the Sustainable Banking Network (SBN), the Sustainable Insurance Forum (SIF) and the recently created Sustainable Finance Network (SFN), initiated by IOSCO, and the UNEP Financial Initiative.

The NGFS has structured its work into **three workstreams** dedicated to:

- **supervising of climate and environmental risks** (WS1, chaired by Ma Jun from the People's Bank of China);
- **analysing the macrofinancial impact of climate change** (WS2, chaired by Sarah Breeden from the Bank of England);
- **scaling up green finance** (WS3, chaired by Joachim Wuermeling from the Deutsche Bundesbank).²

² Joachim Wuermeling will be replaced by Sabine Mauderer, Member of the Executive Board of the Deutsche Bundesbank, as chair of the WS3 as of April 2019.

Il gruppo di lavoro Bankitalia sulla Finanza Sostenibile (GLFS)

Il GLFS è composto da esponenti dei Dipartimenti Vigilanza Bancaria e Finanziaria, Economia e Statistica, Mercati e Sistemi di pagamento. a natura interdipartimentale gruppo permette di esplorare il tema della finanza sostenibile e di fornire risposte coerenti **nelle tre dimensioni del fenomeno rilevanti per il nostro Istituto:**

- 1) attraverso **quali canali gli effetti dei cambiamenti climatici** agiscono sull'economia reale e si trasmettono al sistema finanziario;
- 2) quali debbano essere le **risposte dei regolatori** ai fini della corretta individuazione dei rischi da parte degli intermediari e della loro sana e prudente gestione;
- 3) come **tali fattori vadano integrati anche all'interno delle attività istituzionali** e delle politiche di gestione degli investimenti finanziari delle banche centrali .

Osservatorio italiano sulla Finanza Sostenibile (OIFS)



LOOKING AHEAD

The National Dialogue on Sustainable Finance has generated a broad-based agenda for market innovation and policy reform.

At the domestic level, it is important to maintain and deepen the momentum. This can be done by establishing a National Observatory on Sustainable Finance, which could assure the continuation of the work started by the Dialogue, particularly through the promotion, coordination and monitoring of suggested options. It would also encourage all actors in the financial community to make the Italian

FINANCING THE FUTURE

Report of the Italian
National Dialogue on
Sustainable Finance



Nel 2018 l'OIFS ha costituito 4 gruppi di lavoro

- 1 - Financial Centres for Sustainability
- 2 - Green Finance for Reindustrialization
- 3 - International Dimension**
- 4 - Monitoring progress



Is the Italian financial system prepared?



I lavori dell'Osservatorio italiano sulla finanza sostenibile

IL RISCHIO CLIMATICO PER LA FINANZA IN ITALIA

Rapporto del Gruppo di lavoro 3 dell'Osservatorio italiano sulla finanza sostenibile

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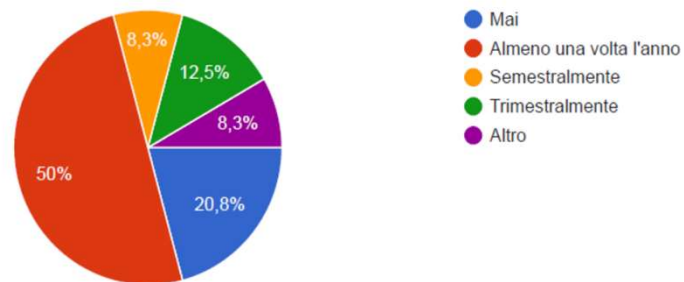
Caratteristiche e i risultati della rilevazione

- L'adesione era su base volontaria ed hanno preso parte alla consultazione 25 diversi soggetti tra cui 16 banche, 4 assicurazioni e 5 società di investimento.
- Questionario strutturato sulle aree individuate dalla TFCD
- i) **processo di Governance legato al CRFR** (ad es. con quale frequenza gli organi societari discutono dei potenziali effetti dei cambiamenti climatici sul loro business) – 5 domande;
- ii) **Strategie adottate per difendersi dai rischi e cogliere le opportunità** legate alle diverse dimensioni dei cambiamenti climatici (ad es. per limitare le proprie emissioni o per definire politiche di pressione nei confronti delle società in cui si investe) – 8 domande;
- iii) **Gestione del rischio dell'operatore** (ad es. se si tenga conto del CRFR quando si decide di effettuare un investimento o di erogare credito) – 41 domande;
- iv) **Metriche ed obiettivi** si tengono in considerazione per portare a termine le strategie delineate nel punto ii) – 20 domande.

Sezione A - Governance

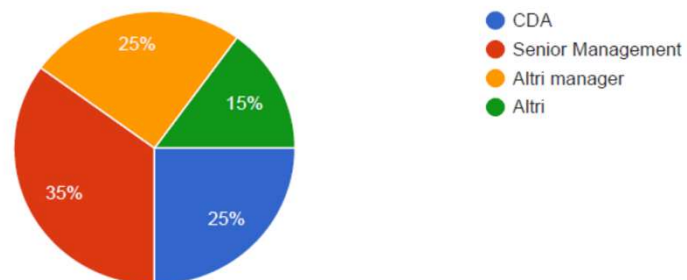
A1 . Con quale frequenza il CDA, o altro organo di governo, viene informato su questioni legate al cambiamento climatico?

24 risposte



A5. A quale livello è attribuita la responsabilità diretta sulle questioni legate al cambiamento climatico?

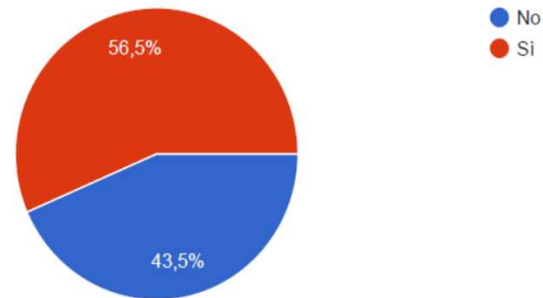
20 risposte



Sezione B - Strategia

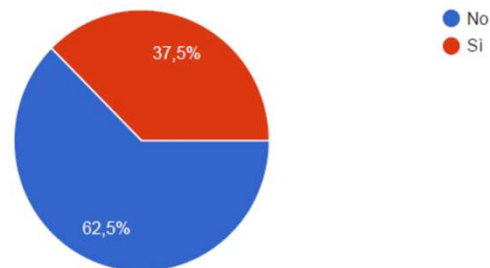
B3 Avete definito degli obiettivi di riduzione delle emissioni di CO2 in atmosfera da parte della società?

23 risposte



B5. La società è impegnata attivamente nei confronti degli emittenti nei quali investe per promuovere una migliore gestione dei rischi correlati al cambiamento climatico?

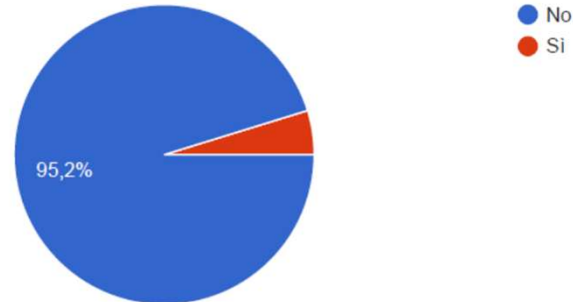
24 risposte



Sezione C - Gestione del rischio

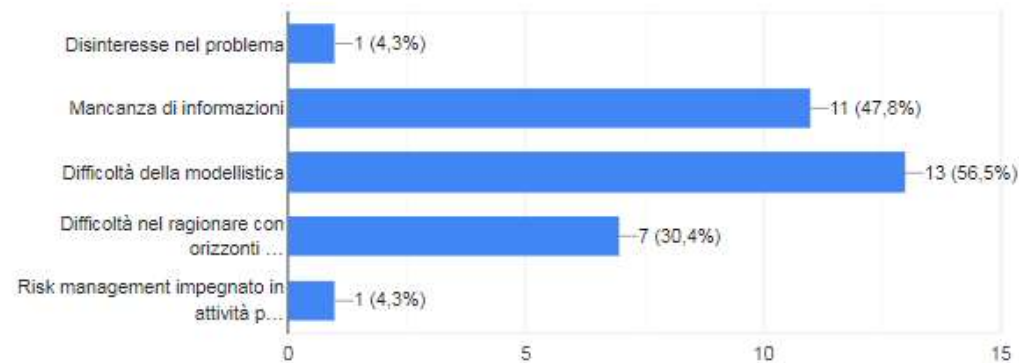
C11. Nell'ambito della gestione del vostro portafoglio viene valutato l'impatto sui vostri investimenti di diversi scenari emissivi (come ad es. uno scenario che ipotizzi che si attuino politiche per mantenere l'aumento delle temperature entro i 2°C rispetto ai valori preindustriali)?

21 risposte



C15. Quali sono le maggiori difficoltà incontrate nel fare questo esercizio (sugli scenari?) o nel decidere di non farlo?

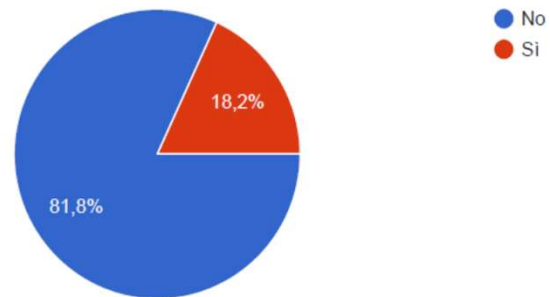
23 risposte



Sezione D - Metriche e obiettivi.

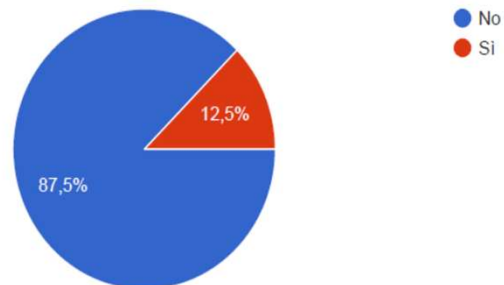
D1. Avete informazione sulle emissioni totali attribuibili alle aziende su cui avete fatto investimenti (livello totale delle emissioni di CO2 delle società inserite nell'asset allocation in rapporto con le azioni detenute in portafoglio rispetto al totale delle azioni)

22 risposte



(SOLO PER LE BANCHE) D8. Avete informazione sulle emissioni totali attribuibili alle aziende a cui avete erogato credito?

16 risposte



What have we learnt?

- The first report published in October 2018 by the Prudential Regulation Authority on the climate risk for the United Kingdom banking system and a report published in September 2018 by the TCFD on the application of its recommendations highlighted that **so far no adequate progress has been recorded in terms of increased awareness of the risk inherent in climate change and the opportunities associated with the transition to a low-carbon economy.**
- Considerable efforts are still needed. In particular, the assessment of climate impacts on the financial system still suffers **from a lack of information availability and a difficulty in conceptualizing** how environmental impacts - and policies for mitigating them - are transmitted to the real economy and the financial system.
- **The questionnaire prepared by our working group provided evidence that confirms the same conclusions**, highlighting the concrete need, on the part of companies and investors, to understand more fully the potential financial consequences associated with climate change.



Alcuni studi condotti da ricercatori della Banca d'Italia

Un esempio di *climate intelligence* con due studi empirici

1. In che modo il **rischio idrogeologico** influisce sull'offerta di credito alle imprese (Faiella and Natoli, *Natural catastrophes and bank lending: the case of flood risk in Italy*, Occasional paper n. 457, Oct. 2018) → **Effetti del rischio fisico**
2. In che modo il *carbon risk* influisce sul **valore delle utility europee che generano elettricità** (Bernardini, Di Giampaolo, Faiella and Poli, *Gli investimenti nelle utilities del settore elettrico: implicazioni del carbon risk*, Journal of Sustainable Finance & Investment, N.26, 2019) → **Effetti del rischio di transizione**



Grazie dell'attenzione!