

THE ROLE OF THE FINANCIAL SECTOR IN CLIMATE CHANGE

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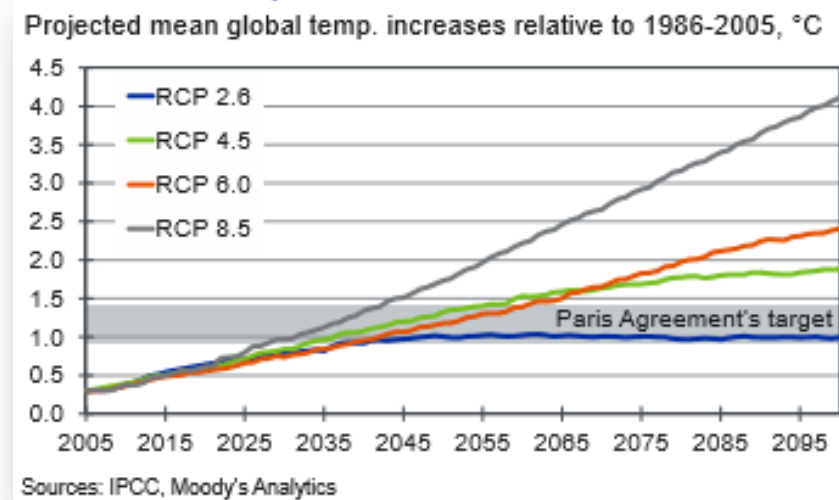
11 de Diciembre, 2019



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 - Phase 1: Access to data.
 - Phase 2: Integrating ESG metrics in financial risk.
 - Phase 3: A new sustainable financial ecosystem.

- **Climate change is clearly harming human well being and potentially affecting economic growth.**
- Scientific evidence shows an increase of extreme weather events, both chronic and acute. Hurricanes, droughts, and longer heat waves are just some examples. The consequences are observable today with a current **global warming close to 1.5°C** with respect to pre-industrial levels.
- If no measure is taken global warming is estimated to reach in average above 3,3°C by the end of the sicle, which would put us in front of uncharted territory and at risk surpassing the “*tipping points*” (Stern, 2019).



- The big question for economists is to understand how the impact on the ecosystems will affect the economy.

Which are the transmission mechanisms?

- Desertification, increase in sea levels, or death of coral reefs ... Everything points to shocks in production and business models of the companies and mass migration.
- In Europe one third of the population lives 50 km far from the sea coast, which represents around 30% of european GDP (EC, 2019).
- In economics this is a so-called “**negative externality**”, which is a market failure which happens when free markets do to assign a fair price to goods and services because they do not internalize the social cost to the whole population, creating inefficiencies.

- **Which tools do we have available to solve this inefficiency?**

Price: e.g. tax **GHG** emitters, making supply and demand internalize the costs derived from their activity to the remaining population.

Quantity: e.g. allowances systems like the European **ETS cap-and-trade** to limit the quantity of carbon emitted by the companies into the system.

- In both cases, **how can we measure the costs to the whole population?**
- Current scientific consensus relies on **IAM** – *Integrated Assessment Models*.
- **William Nordhaus** received as recently as in 2018 the Nobel Prize for its DICE model – *Dynamic Integrated Climate-Economy model*.

Potential uses:

- Impact of **Monetary Policy**.
- Recommendations of **Macro** impact of Public Policies.
- Understanding **sovereign credit risk**.
- Contagion mechanism for **Financial Stability**.
- Etc ...

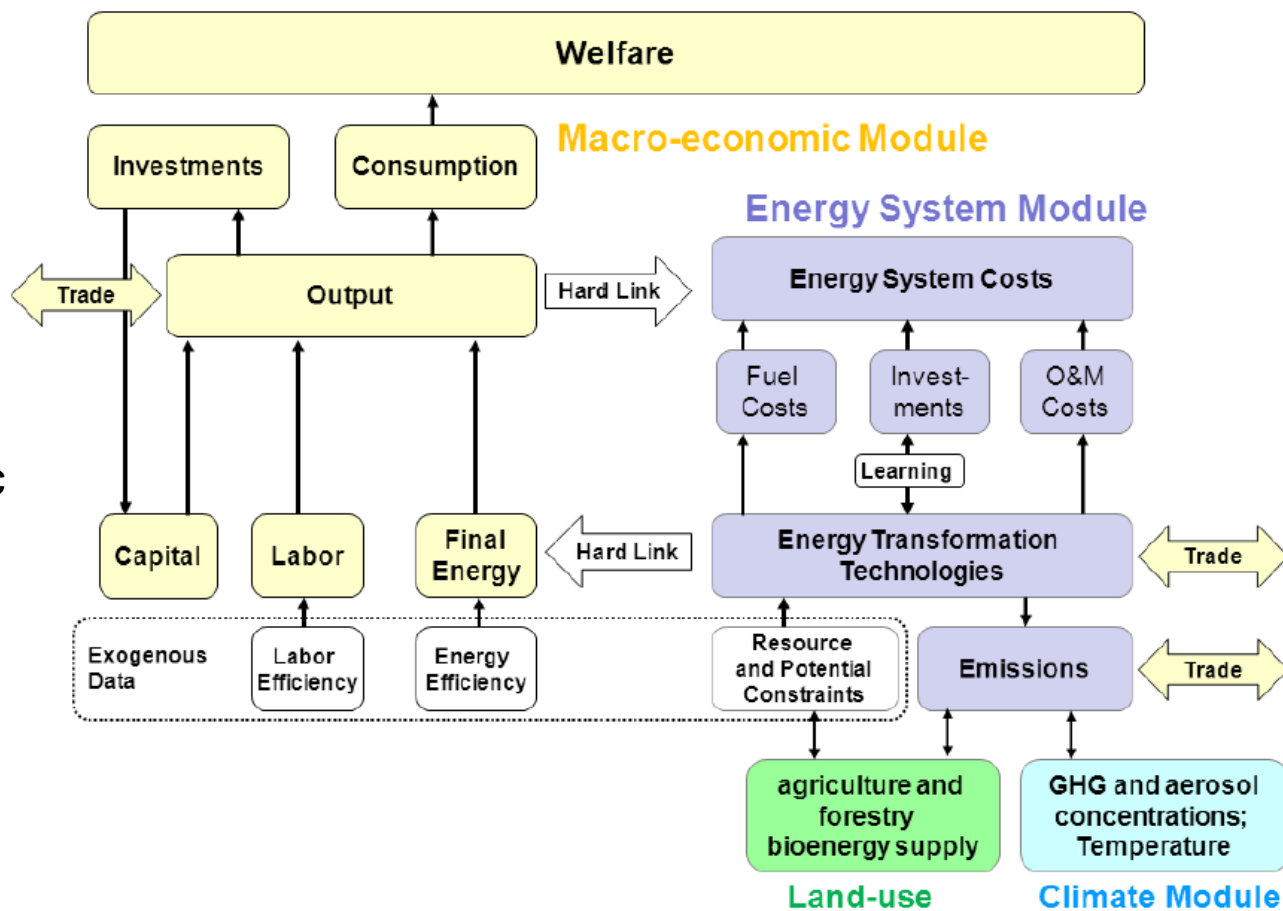
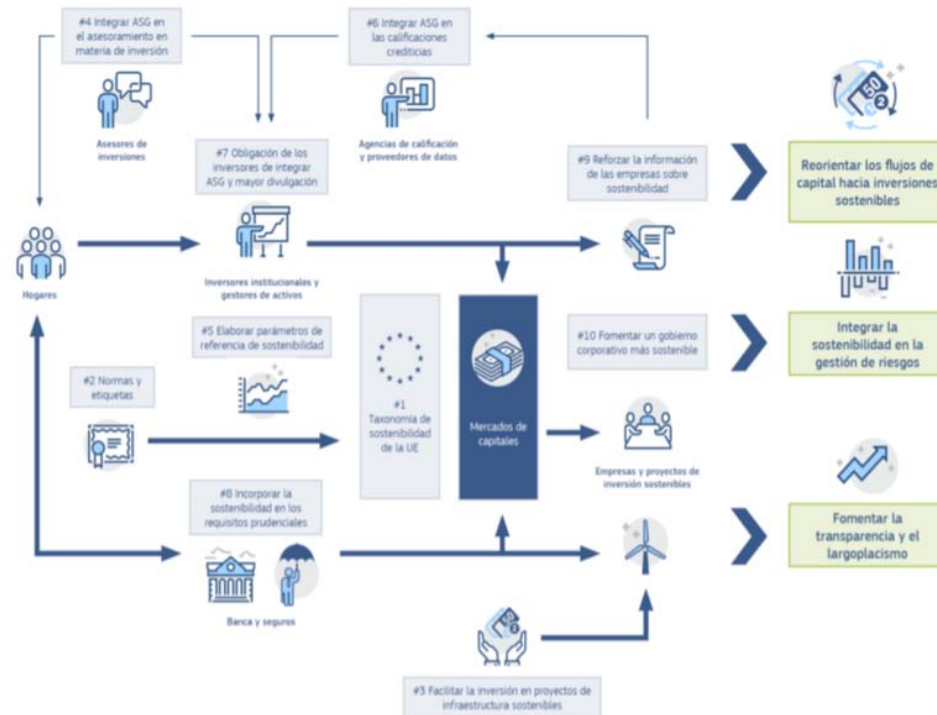


Figure 4.5: provides an overview of the general structure of IAM REMIND. Source: PIK (2018)

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- El IPCC (AR5) gives robust scientific evidence of **anthropogenic climate change**, and the limited time available to act.
- Therefore, the Paris Accord (2015) incorporates **the financial sector as a key player for de-carbonizing the economy**.
- **Financial authorities are aware** of this challenge, and are coordinating and discussing the measures to be taken based on the agreement that climate change is a major **source of risk** for financial institutions.
- **Sustainable Finance Action Plan** (EC).
- **NGFS**: Central Banks and Supervisors & **BISIP Green Fund**.

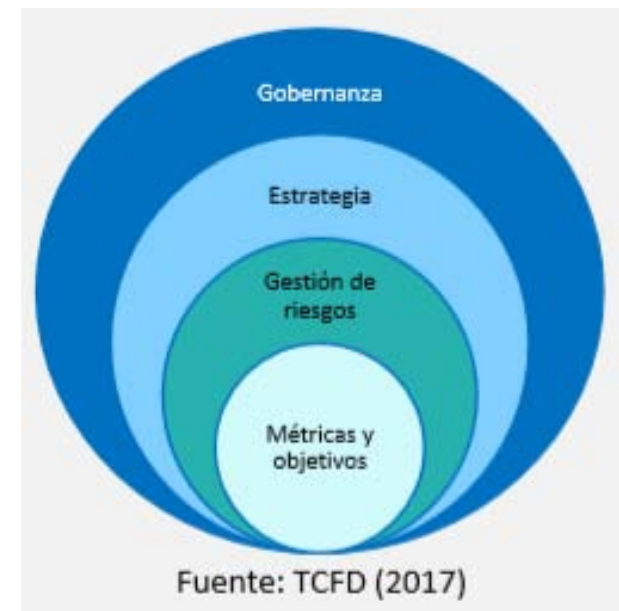


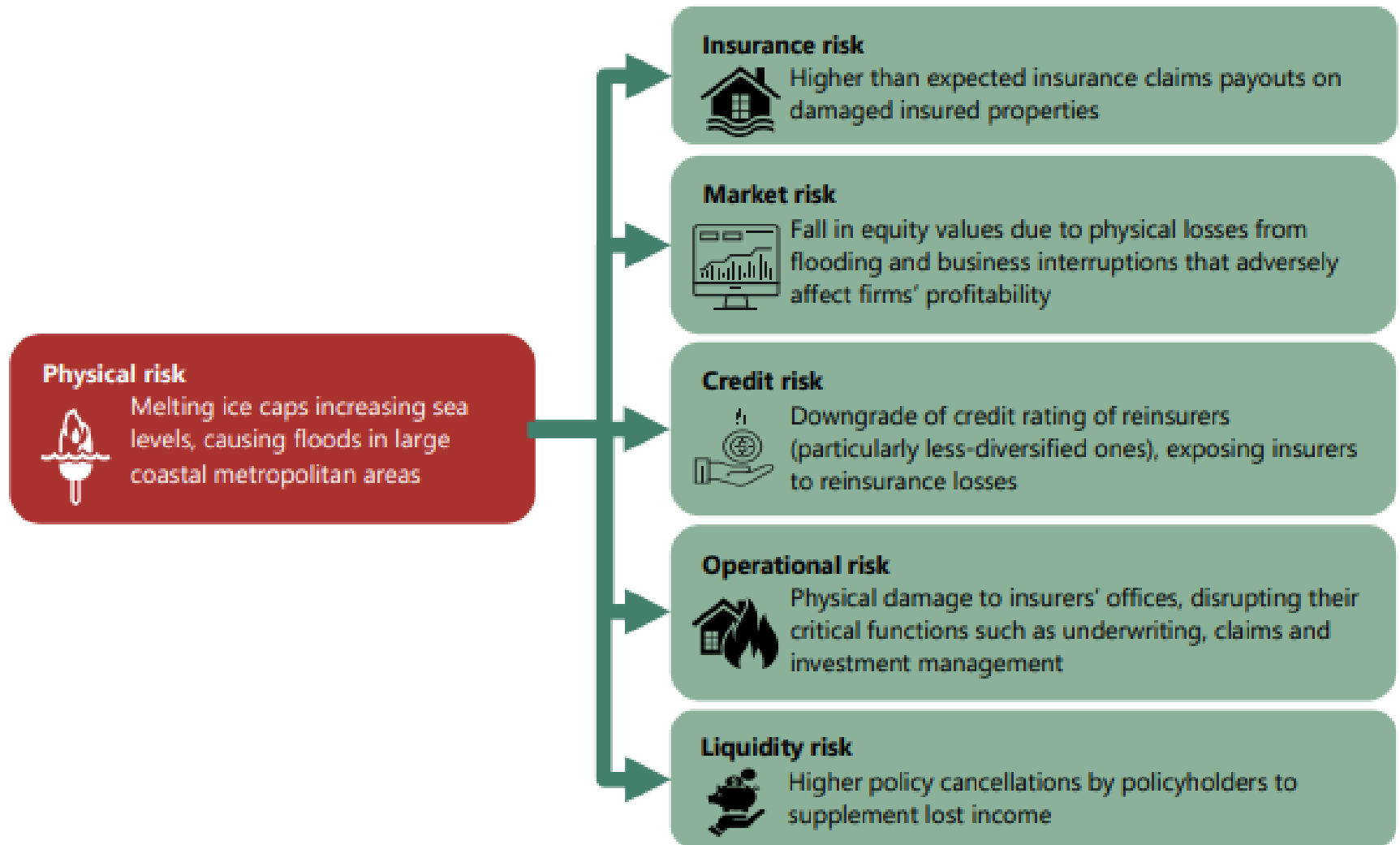
Fuente: European Commission (2018)

- In order to develop new regulation, we must start from the data.
- From Mark Carney, Governor of the Bank of England (2019):

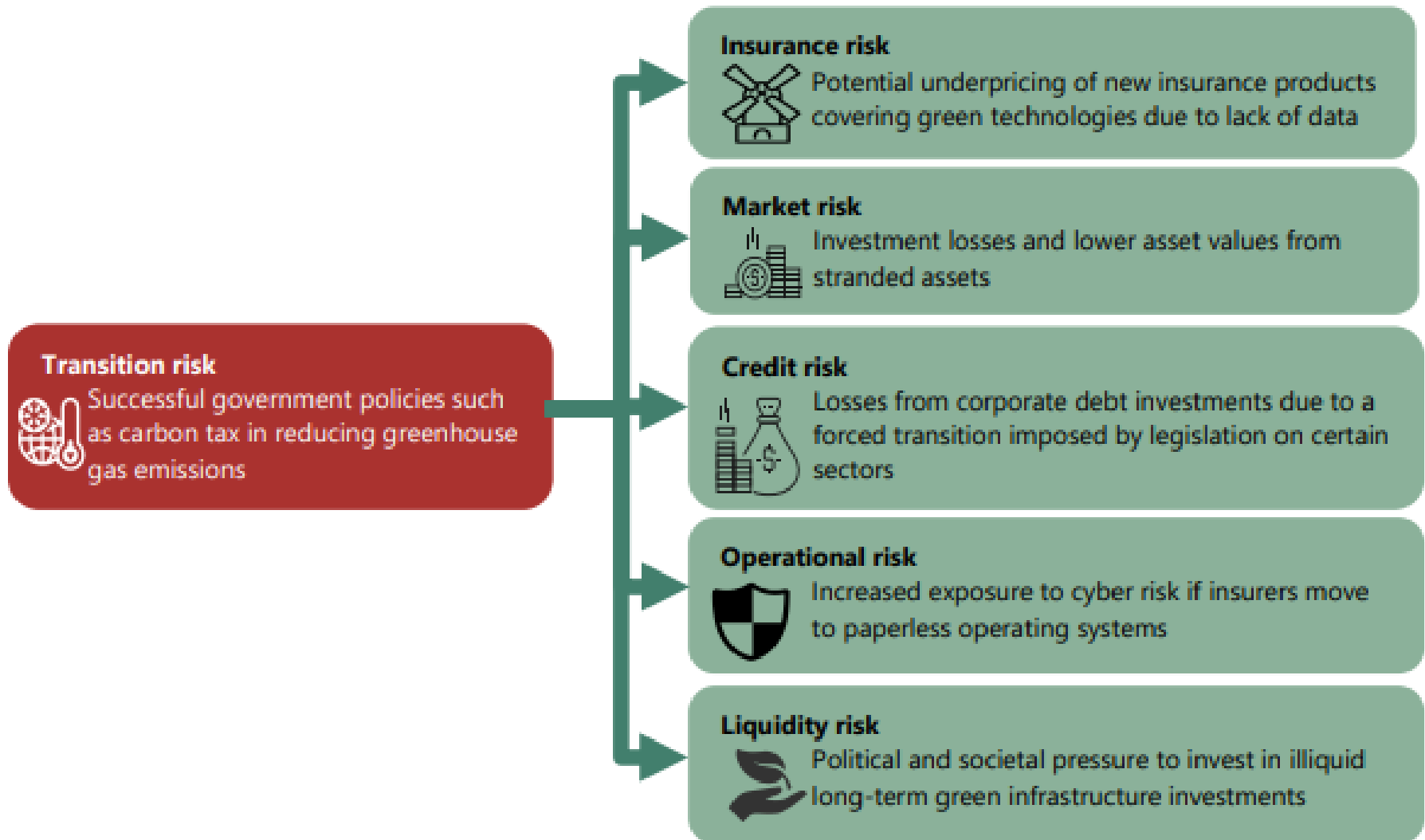
“In order to watch we must be able to see”

- In 2015, set up by the FSB, the **Task Force on Climate Related Financial Disclosures (TCFD)** is composed by industry leaders to promote a **voluntary disclosure** on climate related information. Its main objective is to fill the gap on the economic impact on companies of climate change (**financial materiality**).





Source: FSI.



Source: FSI.



Source: Fitch Ratings

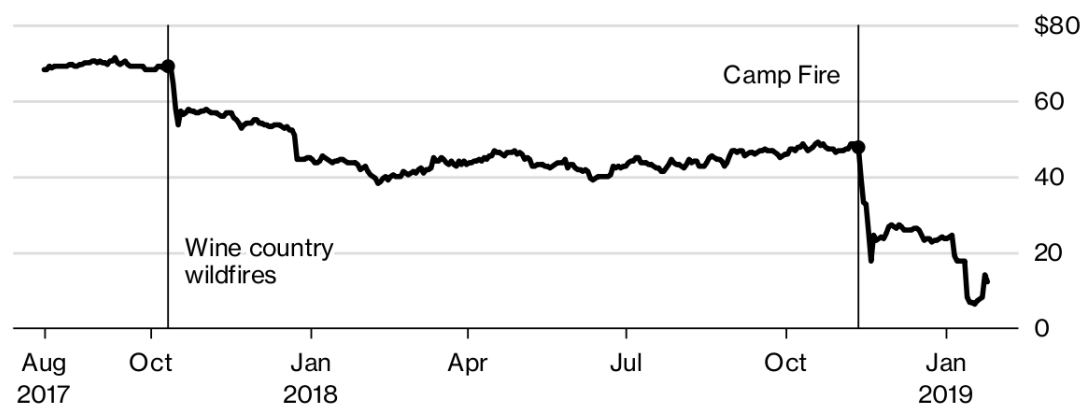
- From risk/ return investment.
 - Towards **risk/ return/ sustainability**.
- If we manage our investment portfolio based only on integrating ESG risks, most **vulnerable** countries would fall out of our investment universe, failing us on our mission: a sustainable planet.

- **First climate change default**: Pacific Gas & Electric (PG&E).

Fires Burn PG&E

Two years of deadly fires pushed company to bankruptcy

Share price

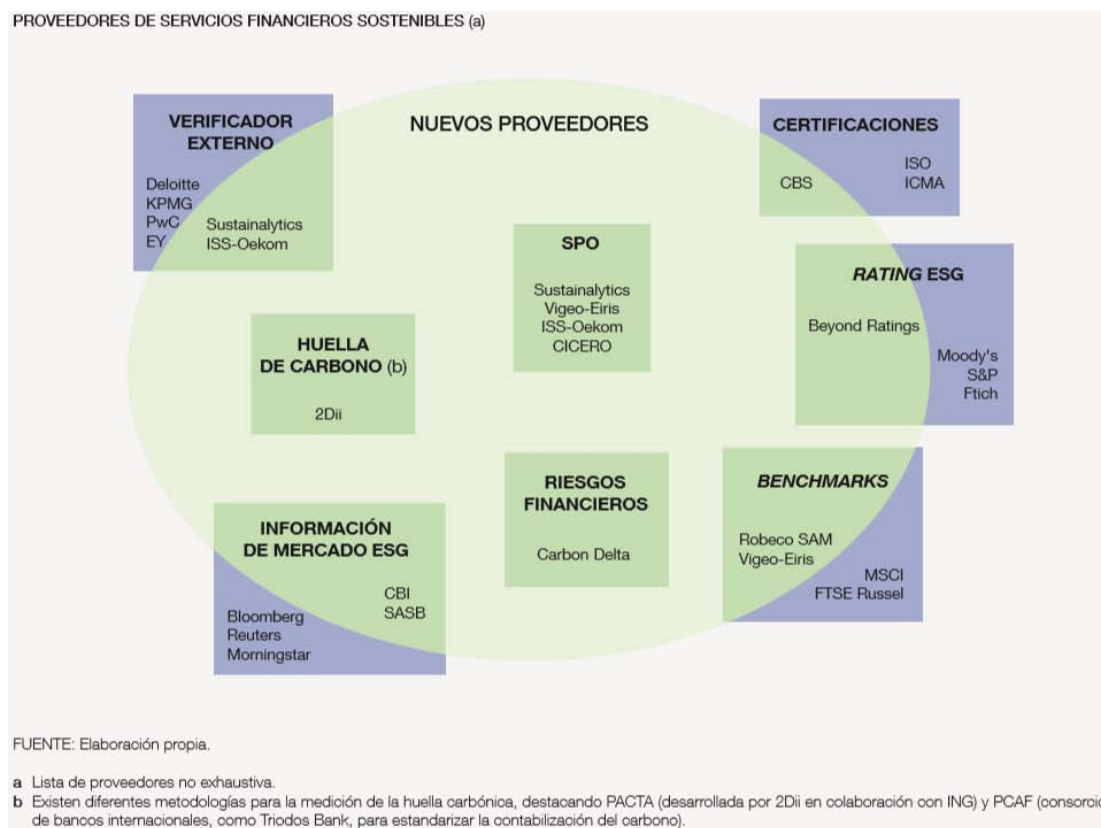


Source: Bloomberg

Bloomberg

- In January 2019 **PG&E files for reorganization under *Chapter 11*** of the US Bankruptcy Law, due to the financial impact of the wildfires in California in November 2018. As owner of the biggest utility of the State is was sued for not being adapted to the current heat waves and droughts (***liability risk!***) having been considered its equipment as material cause of the fire and the destruction of thousands of houses (total losses estimated in USD 6,9 bn).

- In the path to **sustainable finance**, a new ecosystem pops up.
- This constitutes a radical **transformation** of the market: Vigeo-Eiris is acquired by Moody's, Morningstar (40% Sustainalytics) gets DBRS, S&P buys RobecoSAM, and new *fintechs* consolidate their solutions (e.g: 2Dii – transition risk with PACTA tool), etc ...



In Banco de España we have hosted two Workshops on Green Finance:

- **4-10-2019:** Climate alignment methodologies for investment portfolios.
- **15-11-2019:** Integrating ESG metrics into credit ratings.

- **This transformation process comes with restrictions.** For instance, new technologies like Artificial Intelligence (AI) may have a big carbon footprint.
- Recent studies like Strubell (2019) estimate the carbon footprint due to **electric consumption required to calibrate complex AI models** to be up to 6x the average carbon footprint of a diesel car during its life cycle.

EMISIONES ESTIMADAS DE CO₂ POR ENTRENAMIENTO DE MODELOS DE NLP, COMPARADAS CON CONSUMOS FAMILIARES

	CO ₂ (lbs)
Consumo	
Viaje en avión, un pasajero NY-SF	1.984
Vida humana, promedio mundial, un año	11.023
Vida humana, promedio en Estados Unidos, un año	36.156
Coche, promedio incluyendo combustible, un ciclo de vida	126.000
Entrenamiento de un modelo (GPU)	
NLP pipeline (parsing SRL)	39
Con calibración y experimentación	78.468
Transformer (grande)	192
Con búsqueda en arquitectura neuronal	626.155

FUENTE: Elaboración propia a partir de Strubell, Ganesh y McCallum (2019).

- After the publication in Sept 2018 of the report “*Strategy for Financing the 2030 Agenda for Sustainable Development*” from the Secretary General of United Nations (UN), it is created the **Task Force on Digital Financing of the SDGs** under UN Environmental Program (**UNEP**) with the mandate to answer the following question:

How can we unblock the potential of the digitalization of finance and risk management?

- Its last report will be published by mid-2020 and it will have two building blocks: (1) high level recommendations; y (2) creating a “**Sustainable Digital Finance Benchmark**” at country level.
- For this last objective, the *Task Force* counts with the help of **the Sustainable Digital Finance Alliance (SDFA)**.
- **Banco de España will collaborate with the inclusion of the spanish case in the Benchmark**, playing a role as coordinator with financial institutions, *fintech* industry and the regulator; and contact point with the SDFA, who will draft the report.

THANK YOU!

