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Disclosure of climate risks and ESG information

Executive Summary

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Disclosure of climate risks and ESG information

Report by Commission
"Fundamental Analysis"

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Mission Intangibles is a work team of Aiaf whose role is to guide, motivate and compare analysis on methods for measuring and communicate intangible assets, the value drivers of the Sustainability and the enhancement of Environment, Social and Governance information (ESG).

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Disclosure of climate risks and ESG information

ETF fossil free and low carbon investment

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After his degree in Economics, obtained with the highest honours in Italy at the University of Verona and the qualification of chartered accountant, he began his professional career in 1987 in a leading International Company operating in IT sector (IBM Italia). Later, he worked for a Consulting and Financial Audit Company (Arthur Andersen & co.), for a Real Estate Brokerage Company (Gabetti Holding) and Senior Credit Officer for an international banking group (Banca Leonardo SpA).
Since 1993 is Italian Association of Financial Consultants and Analysts member, head of Sustainability and in charge of research projects and study of the working group Aiaf "Mission Intangibles®" whose role is to guide, motivate and critical compare analysis on methods for measuring and communicate intangible assets and liabilities and enhancement of Environment, Social and Governance information (ESG).
Since 2006, he is member of EFFAS CIC (now CESG) Commission Environment Social and Governance and since 2016, he is responsible for the AIAF's ESG Observatory.
He is author of three books: "Il vero Bilancio Integrato – Storie di creazione del valore a breve, medio e lungo termine" (2013), "Capitale Umano e performance di business. Misurare il ROI del capitale umano" (2008) and "Il valore del Capitale Intellettuale. Aspetti teorici e casi aziendali di reporting" (2006), published by Ipsoa Wolters Kluwer. He published over one hundred articles and essays for important business and management issues, on intangible resources, sustainability, ESG factors, responsible investments (SRI), United Nations Sustainable Development Goals (SDGs), financial analysis and acting as a teacher in masters and training courses and as a speaker at conferences organized on these topics.

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Foreward

Introducing an energy transition

Massimo Nicolazzi
President Centrex Italia SpA
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It started with food as fuel, and muscle as engine/prime mover. Food was multiplied through agriculture; and muscles through animal domestication. Except for mills and the contribution of wind and water, the source and the mover remained strictly organic for most of human history. The Agricultural Revolution translated in growth of wealth and population. But there was an implied cap (the finiteness of earth as organic energy source provider) in the ability to grow. And once it was approached, Europe's economy and population remained substantially stagnant through centuries.

Then came the great energy transition. Fossil met Technology, and was turned into fuel. The source turned fossil; and the engine a true (and inorganic) machine. In the shift the ability to produce useful work, which is what energy is all about, became virtually unlimited. Classical economists and their idea of the economy leading to a stationary state (Stuart Mill for the definition; but Ricardo and Malthus for the concept) went good for academic reference only. In a century world, population multiplied by 700%; and (consolidated) GNP by an even superior magnitude. You may in part thank (as far as population is concerned) penycilline. You may then thank finance, and its ability to multiply money and therefore capital available for investment. But take the energy transition, i.e. fossil fuels, off the picture, and very little if any of the Schumpeterian embarrass de richesse would remain on the XX Century table.

Today we are discussing a new energy transition. From fossil to renewables. To sun, water, wind, organic fuels. A backwrd transition, so to speak. For the first time in history a transition from a higher (fossil) to a lower energy density source. Which implies more room (earth, classical economists would say…) needed for production; and an inherently less efficient energy process. We need T (as "Technology") to develop fast to be able to avoid the gap.

There is nothing in the market that mandates the transition. The lower density of the "new" sources make them, gross of their direct and indirect infrastructure costs, marginally more expensive than fossils. A strong argument could be made that this is so simply because historically we have failed (or refused) to incorporate fossil negative externalities into fossil sources price. True, but the fact remains that (over 100 years after the publishing of Pigou's Economics of Welfare) negative externalities, except for so far marginal cap and trade/ carbon tax schemes, are still not priced[1] and that therefor price signals, left alone, would bend in favor of fossils.

Here comes the second feature of the transition to be. At this stage of T, it cannot be a market byproduct. We cannot as a rule predict the timing and the direction of the improvements in Technology (which largely explains the ex post inability of business as usual models to explain anything). But the energy density gap should allow us to predict that the increase in sector investments and consumption which would be needed to drive the process, and the size thereof, will not properly materialise unless regulation and public intervention will massively intervene.

The transition, we are told, is mandated by climate change. Except for a small minority (less than 5% of the existing literature may be defined as "negationist") peers do endorse the idea that anthropogenic emissions be primarily responsible for the increase in the atmospheric concentration of carbon dioxide that has been recorded since the blossoming of the Industrial Revolution; and that this concentration as part of the overall concentration of GHG be a primary actor of the global warming drama. Herefrom the push towards a transition out of fossil fuels as the main primary energy source.

To get there the governments, or rather the States need to intervene.

NOTE

1 The amounts at stake are difficult to estimate. A 2015 IMF working paper labels the refusal to price fossil negative externalities as a "subsidy" to the industry ("post tax consumer subsidies") and estimates the 2015 yearly worldwide subsidy (i.e. the amount that should be captured through a proper carbon tax) at $ 5,3 trillion. Coady D.; Parry I; Sears, L; and Shang, B., *How Large Are Global Energy Subsidies*?, IMF Working Paper, 15/105

The density and (in case of sun, water and wind) the intermittency gap must be pricewise closed. The energy transition is (also) a matter of appropriate public policies.

The State armamentary available for this purpose is customarily composed of three main tools. Taxes, incentives and prohibition.

Prohibition has mainly to do with environmental standards. Zeroing i.e. the allowance for sulphur dioxide emissions at sea, where implemented, has the secondary effect to promote gas (lng) propelleded engines over traditional fuel oil diesel; i.e. to substitute oil with a less polluting (although hydrocarbon) fuel. Incentives are what made photovoltaic possible, and sometimes like in Italy even too possible. Taxes in turn could and should be used as the tool to incorporate externalities in pricing.

The tools are there. But the will to use them in a coordinated manner, and towards accountable goals, is apparently below expectations. COP 21 execution is predicated upon a voluntary non-enforceable mechanism of Nationally Determined Contributions (NCD).[2] But the tendering of the actual Contributions since appears to be less than enthusiastic.

The issue with government action on climate change has much to do with what Governor Mark Carney in 2015 defined "The tragedy of horizons". "The catastrophic impacts of climate change will be felt beyond the traditional horizon of most actors – imposing a cost on future generations that the current generation has no incentive to fix".[3] Damage will materialise in years to come; but to prevent it you must spend money today. Investing in prevention implies asking your constituency to have their taxation spent to avoid something they do not (yet) suffer from; or else (i.e. via carbon tax) to pay more to buy what they are used to buy for less. The climate drama will take some decades; and elections are tomorrow. Worse, and more, if you apply to your model a high discount rate you may even end up showing that fixing the climate change damage in 2050 will be less expensive than preventing it today.

Which is exactly the argument that English conservatives opposed to the findings of the 2006 Stern Review.[4]

Deciding over a policy that needs to arbitrate between today and tomorrow is ultimately a decision as to a selected discount rate. Applying (underlying) high discount rates is a popular electoral exercise. Discounting low is one of the conditions for the transition to materially progress.

Can a majority constituency gather around a low discount rate policy, i.e. take on itself instead of delegating to future generations?

There are, contrary to expectations, some indications that this may start to happen.

The first is that the tragedy of horizons is already coming on stage; and so in the form of issues for today. The combined growth of population and GNP worldwide is multiplying the impact of fossil's negative externalities; and imposing a cost on budget not for preventing the evil of tomorrow, but just to remedy the evil of today. China at COP 21 has not "converted" to the environmental

NOTE

2 Under the system, the plan to contribute to emission reduction and the specific targets thereof are decided at individual State level. Control and enforcement are thereafter also fully in the hands of the individual State, with no mechanism for international sanctioning.

3 Speech given by Mark Carney, Governor of the Bank of England, to the Lloyd's of London, 29 September 2015, www.bankofengland.co.uk
Mark Carney as Chairman of the Financial Stability Board has promoted the Task Force on Climate-Related Financial Disclosures, which aims at developing "voluntary, consistent climate-related financial risks disclosures for use by companies in providing information to investors, lenders, insurers and other stakeholders".

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cause; it simply cannot withstand the consequences and potential further growth of the pollution it suffers today. President Trump election may not necessarily contradict this trend. It is too early to call; but even the "America First Energy Plan" of his administration recognizes that "our need for energy must go hand in hand with responsible stewardship of the environment". Whether this recognition will then in practice translate into an oxymoron only time can tell. In all likehood, the transition process may just come forward slower than it would have been with the support of a proactive policy; but still leaving room for a manageable process.[5]

An energy policy is for a constituency to endorse. Not even the Trump Energy policy can go immune from endorsement. And here comes the second indication that a proper transition policy may still be a politically viable possibility. The indication is ultimately an issue of "mood". A mood that in segments of the western societies seems to gradually shift, to put it rhetorically, towards the acceptance of the idea to pay more today to win a better planet tomorrow. And a mood that extends so far as to buy widgets on the market on the basis of considerations other than just the price or the efficiency or the specific product. When i.e. the Tesla Powerwall hit the market, it did generate a pile of literature pretending to demonstrate its economic inefficiency. Nonetheless, it sold. True, like other storage appliances in some countries it was made economically efficient through preferential tax treatment. But in the States it did find a market niche also in the absence of public support.

There are thus in the "green sector" market niches that, even in the absence of public policies, are being established and growing. Supply, apparently, is starting to create demand. Alone it may not suffice. But it may help establishing consensus for a transition policy.

Still, however, the path we are on is doubtful. The targets for GHG emission reduction may be met, but also and still (failing a massive public action) largely missed. The potential scenarios are virtually unlimited; and the winners and the losers impossible to identify. The lesser the mitigation of climate change, the stricter in principle the look we should keep amongst others on the insurance sector, in terms of its ability to cover the increasing wheater related liabilities allegedly associated with progressive global warming. The quickest the transition, the highest the danger for the carbon industry, who may inter alia face the necessity to write off its net worth reserves that are no more producible ("stranded assets"). As there is not, however such thing as a long-term portfolio (the rule being still that operators just act opportunistically…) these issues are mostly still too early to call.

Transitions need time. Changing the energy source implies in most cases changing its prime mover; and building the infrastructure needed for the change. "Energy transitions taking place in large economies are inherently protracted affairs".[6] Take as an example electric cars. Today we are still below 1% worldwide. The International Energy Agency calls for reaching 1,7 in 2020, and 10% in 2030. Others are less optimistic. Crude oil energy density seems difficult to displace from the transport sector; and if you want to change the source, you need to change the car.

The good news here are that reaching the COP 21 emission targets does not call for a too accelerated transition.

NOTE

5 There are a number of assumptions that should be factored in before passing judgment and forecasting future impacts. The call for energy independence is a call for maximising fossil production, i.e. to sustain an industry which has always been playing an upfront role in the economy of a number of US States both in terms of workforce and of magnitude of the stakeholders; but trying to boost production may not and does not translate automatically into an increase of (national) consumption. Coal production has been environmentally rehabilitated; but gas in recent years has materially displaced coal in US power generation not because it was cleaner but simply because it was cheaper, and the "rehabilitation" will not by itself revert the process. Individual States, further, will in the absence of Federal standards retain an ability to regulate at State level; and it is difficult to see how the Federal Energy Plan may impact upon, i.e., California environmental policy and standards, And so on…

6 SMIL,V, Energy Transitions, Praeger 2010, viii.

The 2016 World Energy Outlook 450 scenario (which is deemed to be consistent with the objective of limiting the average global temperature increase in 2100 to 2 degrees Celsius above pre-industrial levels) projects fossil source as still representing 74% of world's primary energy sources in 2025, and to progressively decrease thereafter to 58% in 2040. We still seem to have room to drive a process made up of progressive steps, and avoid the brutality of sudden change.

Step one. While and before substituting for fossils, we have still wide room to consume less by consuming more efficiently.

Energy intensity (i.e., energy consumption per unit of Gross Domestic Product) has decreased on world average by 32% between 1990 and 2015; and historically the trend appears as a continuum with rare yearly exceptions. In practical terms, this implies that i.e. within EU 28 GDP may increase by almost 2% per annum without increasing year over year our energy consumption.

We can do more. The decrease in energy intensity has been so far largely market driven. But there is still a lot that public policies may do to stimulate energy efficiency, i.e. our ability to reduce the energy consumption of a system in the performance of a specific function. Transportation, housing and industries have each still large room for improvement even under already existing technology. The time of the improvement is however largely a function of the financial availabilities of the final user. Here, too, we have a prime mover issue. To make your heating more efficient you must invest in changing your boiler. Public policies here seem responsive, or at least so in Europe; and tax incentives (via tax credits) have been elected as the favorite policy tool. Investing in energy efficiency may induce a positive economic stimulus; and makes for an emission reduction policy where the tragedy of the horizon is of no or at least limited application.

Step two. We can for the time being substitute fossils with (lower emission) fossils. Here we have a priority issue crossing both sectors and sources. As to sectors, the priority is mandated by existing technology. We can compress quite substantially the share of carbon sources in power generation (by resorting to nuclear generation, we could in fact technically already do without fossils); while the energy density issue makes it a long way to go in the transportation sector.

As to source priority, natural gas is the obvious choice. The transition power generation mix would ideally be natural gas plus renewables, with natural gas fully substituting coal as the flexible provider. The substitution costs would in principle be sustainable by the consumer; but this notwithstanding nothing or little seems so far to materialize in this direction. In principle, graduating a carbon tax so as to tilt consumers choices towards the less emissive source would do the priority job. But it is nowhere to be seen.

In "green" Germany, just by way of example, in 2016 over 40% of the electricity was coal produced (with lignite accounting for 60% of it) while gas was at 12,4%. Renewable expansion is constant (in 2016 up to 29%); but notwithstanding the Energiewelde in the choice of the base fuel price so far takes over environment. It may not be a straight example of tragedy of the horizons; but compared with the public policies applied to energy efficiency it looks at least like a next akin.

Transportation, whatever the policy, will be a longer business. Attempts are made to favor substitution of oil with gas as transportation fuel; but they are basically for bulk cargoes (ships and heavy trucks) and are subject, at least in Europe, to a favorable taxation bridging the implied cost gap with diesel. Electric cars are here to stay; but it may take decades before their spreading becomes emissions-wise material (and so provided they are not fueled with coal generated electricity). Policy here is (partially) impotent if not matched by a substantial technology development.

Which takes us to the last but first driver. Step three. Technology will have a great say in the timing and the feasibility itself of the transition to come. Where it will go is by far impredictable. But one of the game changers will be its ability to economically overcome the shortfalls of renewables intermittency. Electricity storage progress will mark the transition progress. So far, the last years learning curve has been

impressive. But it was also a creaming curve. Further progress may thus prove slower; and harder.

Mix public policy with technology, wrap into energy efficiency, season with the less emissive of fossils, and you have the receipt for the energy transition. Except that, there being no free lunches, the receipt needs to be financed. Guesses about the bill are proliferating. The authority of Professor Paul Ekins[7] suggests that we are talking about generating some 3 trillion USD per year in low carbon investments. The recipe, in other words, does not work without finance.

Public policy will not make up. It can facilitate low carbon investments; but in no scenario these may be sustained only or even predominantly via States budget. Private investment is already playing and will play a major role. But to be generated, private investments needs the perspective of a reasonable and risk commensurated rate of return. Which in turn calls for the State tools to be deployed so as to accelerate the bridging of the cost/price gap and create a framework for low carbon sources to become price winners.

This is where the energy amateur must leave the floor to the finance professionals. Within an appropriate framework, the technology of choice as well as the infrastructure of choice or the small/distributed generation of choice will be neither priced nor prized according just to their technical merit. Marketing, consumers inclinations, affordability, integrability into existing systems and other factors will play a role in the beauty contest. The ability to attract capital will ultimately decide; i.e., like it or not, it will be for finance to pick up the winners.

Author

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Graduated in law at the University of Turin (1976), he obtained the Master of Laws at the Michigan Law School (1980). From 1980 to 2001 he worked in the ENI Group as Director of Legal Affairs and then General Manager for negotiations and legal affairs of Agip S.P.A. and later of ENI Senior Vice President Exploration and Production for activities in the Russian Federation, Central Asia and Eastern Europe.

From 2002 to 2004 he was Vice President of Business Development of Lukoil Overseas, based in Moscow.

From 2005 to 2009 he carried out consultancy and advising activities in the energy sector, also taking on direct assignments for the development of infrastructural initiatives in Italy and abroad. From 2009 to 2014 he was CEO of Centrex Europe Energy & Gas, based in Vienna.

President of Centrex Italia S.p.A. he works as a consultant and is a member of the Boards of Directors of some companies in the sector.

He is professor of economics of energy sources at the University of Turin and author of numerous publications on energy, including the monograph “The price of oil”.

NOTE

7 UCL – Institute for Sustainable Resources.

Executive Summary

This study is the result of a research project carried out by Dr. Andrea Gasperini, chartered accountant and Aiaf member and Dr.ssa Federica Doni, Assistant Professor at the University of Milano-Bicocca, started in 2016 to analyze the issue of climate risks and environmental, social and governance information (ESG) in the operational and professional context, with a specific focus on Sustainable Finance and business.

The preliminary results have been presented at four conferences, two of which were international events, indicated below:

- In Manchester, UK, at the Manchester Metropolitan University (MMU), on 5-7 April 2017 at the World Symposium on Sustainability Science and Research Implementing the 2030 United Nations Agenda for Sustainable Development;
- In , Milan, Italy at the University of Milano-Bicocca on 3 May 2017, at the conference organized by the authors entitled "Climate risks disclosure and socially responsible investment strategies";
- In Skiathos Island Greece, at the School of Mechanical Engineering, the National Technical University of Athens, at the 18th European Roundtable on Sustainable Consumption and Production, ERSCP 2017, 1-5 October 2017;
- In Italy, at the Chamber of Commerce of Rome, on 16 October 2017 at the conference organized by Prioritalia, Manageritalia, Fondo Mario Negri and AIAF, entitled "Strategies of sustainable businesses and the increase in their financial value".

Today we live in a world where environmental, social and governance factors (ESG) and its impact on Sustainability are gaining ever greater attention from financial markets, are less niche and more mainstream for asset managers and financial analysts therefore, there is a growing interest in sustainable finance by institutional investors who have a long-term vision, such as pension funds, sovereign wealth funds, insurance companies and, more recently, also by religious orders.

Long-term investors, who have always paid attention to the value creation, now require information also on climate risks and natural capital[8] as these issue are affecting their investment decisions and failing the initial skepticism about the linkage between Socially Responsible Investments (SRI) and unfavorable performance[9] [10].

Many investors are focusing their attention on those companies whose management helps mitigate the effects of climate change currently underway, adopt disinvestment strategies from fossil fuels, are aware of the risks and opportunities that a transition to a low-carbon economy can cause and whose production processes are therefore not the cause of high emissions of greenhouse gases (GHG)[11] and investments in financial instruments such as low-carbon ETF[12] and environmental thematic funds are beginning to attract interest.

Since the '50s, many impacts on human and natural systems generated by global warming are unprecedented as several studies confirmed[13]. This aspect is shown in the graph below (see Table 1) by indicating CO2 levels during the last three glacial cycles, reconstructed by an analysis of the surface of the ice carried out by NASA during the project “Global climate changes - Vital signs of the planet”.[14]

In the report published in 2014, the Intergovernmental Panel on Climate Change (IPCC) the leading international organization for the assessment of climate change, highlights that human influence on the climate is clear and the recent

NOTE

8 IIRC - “all renewable and non-renewable environmental resources and processes that provide goods or services that support the past, current or future prosperity of an organization. It includes air, water, land, minerals and forests, biodiversity and eco-system health”.

9 European Fund and Asset Management Association (EFAMA), “EFAMA Report on Responsible Investment”, “… There is no statistically relevant outperformance or underperformance of Responsible Investment strategies”, September 2016, http://www.efama.org/Publications/EFAMA_Responsible%20Investment%20Report_September%202016.pdf

10 FRIEDE G., BUSCH T. and BASSEN A. 2015, “ESG and financial performance aggregated evidence from more than 2000 empirical studies”. Journal of Sustainable Finance & Investment. Vol. 5, No 4.

11 Among GHGs besides CO2 carbon dioxide, also N2O nitrous oxide, CH4 methane and fluorinated gases (F-gases)

anthropogenic emissions of GHG are the highest in the history. IPCC also emphasizes a scientific evidence that an unequivocal global warming is taking place because of many observed events that have a widespread impact on human and natural systems.

A continuous increase in GHG emissions will be the cause of further warming and lasting changes in all components of the climate system, increasing the likelihood of acute, pervasive and irreversible risks for people and ecosystems. Limiting climate change is possible through a substantial reduction in GHG emissions that, together with adaptation, leads to a reduction in the impacts on human and natural systems.[15]

Anthropogenic GHG emissions are mainly determined by population size, economic activities, lifestyles, energy use, land use, technology and climate policy. The IPCC institute has therefore

NOTE

12 AMUNDI, "an ETF (Exchange Traded Fund), also called "tracker", is a publicly traded fund whose objective is to replicate as closely as possible the performance of an index, both upwards and downwards. It is a simple and liquid investment product, which combines the advantages of a traditional indexed fund as well as benefits of a stock. Like any financial instrument, ETFs still entail risks. After their creation in the United States in the 1990s, ETFs are launched in Europe in 2001. " https://www.amundietf.it/private/Investire-in-ETF/FAQ.

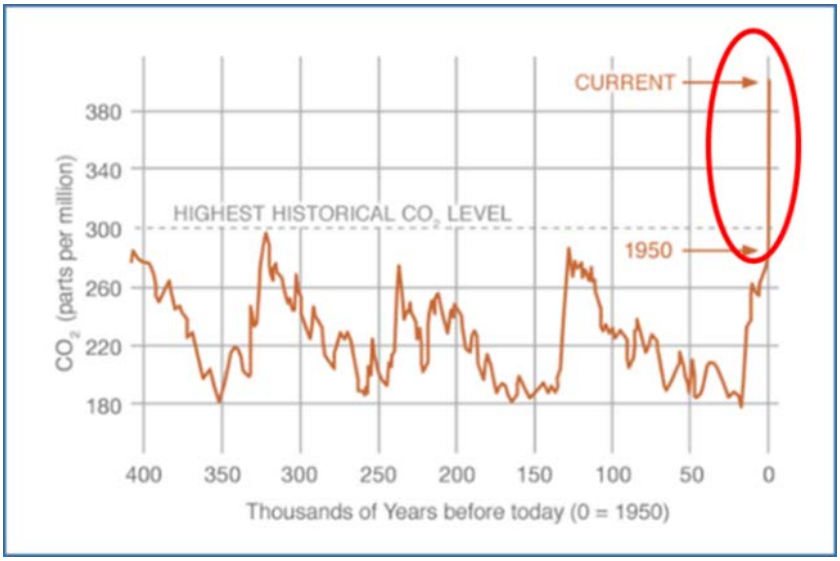
13 The main impacts on the human and natural systems generated by the climate warming are:

- **Sea level**: a sea level rise of about 17 centimeters (6.7 inches) in the last century and an increase in global temperature whose rate in the last decade is almost twice that of the previous century (Church, JA and NJ White (2006), "A 20th century acceleration in global sea level rise", Geophysical Research Letters, 33, L01602, doi: 10.1029 / 2005GL024826);
- **Global temperature**: from various temperature reconstructions it appears that the global surface of the earth has undergone an increase since 1880 and since 1970 the greatest increase has occurred, with the 20 warmer years since 1981 and the following ten years have been the hottest in these last 12 years (TC Peterson et.al., "State of the Climate in 2008" Special Supplement to the Bulletin of the American Meteorological Society, v. 90, No. 8, August 2009, pp. S17- S18)
- **Oceans heat**: oceans absorbed much of this increase in heat, with the first 700 meters (about 2,300 feet), which show a warming of 0.302 degrees Fahrenheit since 1969 (Levitus, et al, "Global Ocean Heat Content 1955- 2008 in light of recently revealed instrumentation problems "Geophys Res. Lett. 36, L07608 (2009))
- **Ice caps:** the mass of Greenland and the Antarctic ice sheets have decreased. According to NASA's Gravity Recovery and Climate Experiment research data, Greenland lost from 150 to 250 cubic kilometers (36 to 60 cubic miles) of ice in the years between 2002 and 2006, while Antarctica lost about 152 cubic kilometers (36 cubic miles) of ice between 2002 and 2005;
- **Arctic sea ice:** both the extent and thickness of Arctic sea ice have decreased considerably over the past few decades (L. Polyak, et al., "History of Sea Ice in the Arctic" in Past Climate Variability and Change in the Arctic and at the High Latitudes, the US Geological Survey, the Climate Change Science Program, and the Evaluation Product 1.2, January 2009, chapter 7);
- **Glacier retreat**: Glaciers are retreating almost anywhere in the world - including in the Alps, the Himalayas, the Andes, the Rocky Mountains, Alaska and Africa (the National Snow and Ice Data Center World Glacier Monitoring Service);
- Extreme events: the number of high temperature events in the United States is growing, while the number of low temperature events has been decreasing since 1950. In America there was an increase in the intensity of rainy events (http: / /lwf.ncdc.noaa.gov/extremes/cei.html)
- **Ocean acidification**: From the beginning of the industrial revolution, the acidity of the surface of ocean waters has increased by about 30%. This increase is the result of activities that emit more carbon dioxide into the atmosphere and therefore a larger share is absorbed by the oceans. The amount of carbon dioxide absorbed by the upper layer of the oceans increases by about 2 billion tons per year (C. L. Sabine et al., "The Oceanic Sink for Anthropogenic CO2" Science vol 305 (16 July 2004), 367-371)
- **Reduction of snow cover**: satellite observations have revealed that the amount of snow cover in the northern hemisphere has decreased over the past five decades due to snow melting (National Snow and Ice Data Center, C. Derksen and R. Brown, "Spring snow cover extent reductions in the 2008-2012 period exceeding climate model projections" GRL, 39: L19504 http://nsidc.org/cryosphere/sotc/snow_extent.html, Rutgers University Global Snow Lab, Data History Accessed August 29, 2011.

14https://climate.nasa.gov/vitalsigns/carbon-dioxide/

15 Intergovernmental Panel on Climate Change (IPCC), “Climate Change 2014. Syntesis Report”, http://ipcc.ch/pdf/assessmentreport/ar5/syr/SYR_AR5_FINAL_full_wcover.pdf

Proxy (indirect) of CO2 measurement



Source: Vostok ice core data/J.R. Petit et al; NOAA Manua Loa CO2 record

Table I

indicated several Representative Concentration Paths (RCPs) of greenhouse gases used to make projections based on these factors that describe four different trajectories in the 21st century for atmospheric concentration, pollutant gas emissions and the use of soil (Table 2).

The different RCP pathways were defined using integrated assessment models (IAMs)[16] as input into a wide range of simulations used to project the consequences on the climate system. These climate projections, in turn, make it possible to define impacts and evaluate adaptation.

Approximately 300 basic scenarios and 900 mitigation scenarios classified by CO2 equivalent (CO2-eq) have been defined by the year 2100, including a strict mitigation scenario (RCP2.6), two intermediate scenarios (RCP4.5 and RCP6.0) and a scenario with very high GHG emissions (RCP8.5). Scenarios without further efforts to limit emissions ("basic scenarios") lead to pathways ranging from RCP6.0 to RCP8.5.

RCP2.6 is representative of a scenario that aims to maintain global warming below 2° C compared to pre-industrial temperatures. Most models indicate that meeting scenarios forcing RCP2.6-like levels are characterized by net negative emissions by the year 2100, on average around 2 GtCO2 / yr.

The attention also from the world of finance for environmental issues was stimulated by the Encyclical Letter "Laudato Si" written by Pope Francis on the care of common house published on June 18, 2015 which deals directly with the issues of the world of finance, its operation, its practices, its relationship with the real economy and its impact in terms of social justice and environmental protection. This document is not aimed to study and classify phenomena (even in moral terms), but to highlight the urgency of change and to push for action.

This encyclical highlights (paragraph n. 23)[17] that an energy supply system based on fossil fuels is primarily responsible for global warming and therefore for climate change. The

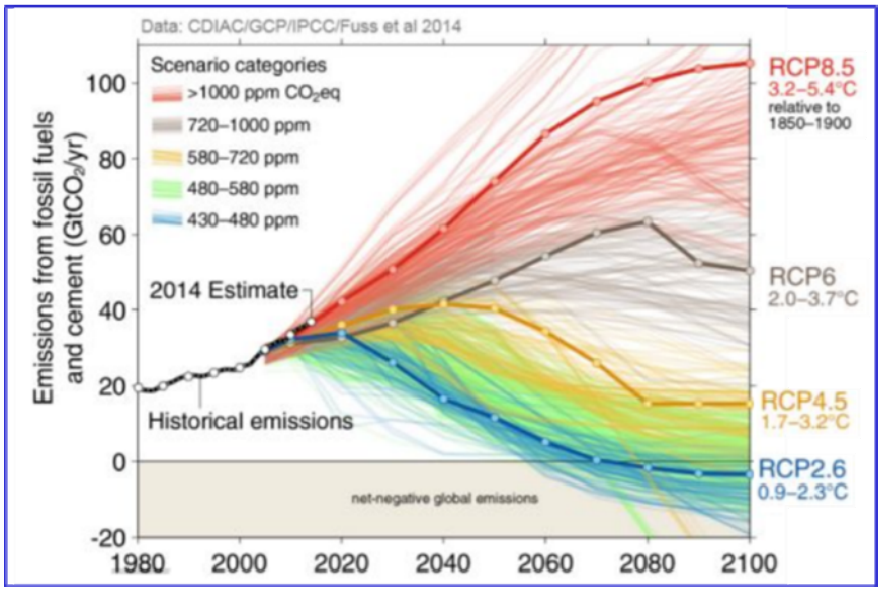
NOTE

16http://sedac.ciesin.columbia.edu/mva/iamcc.tg/TGHP.html

17 *The climate is a common good, belonging to all and meant for all. At the global level, it is a complex system linked to many of the essential conditions for human life. A very solid scientific consensus indicates that we are presently witnessing a disturbing warming of the climatic system. In recent decades, this warming has been accompanied by a constant rise in the sea level and, it would appear, by an increase of extreme weather events, even if a scientifically determinable cause cannot be assigned to each particular phenomenon. Humanity is stimulated to recognize the need for changes of lifestyle, production and consumption, in order to combat this warming or at least the human causes which produce or aggravate it.*

...

Total GHG emissions in ICPP scenarios



Source: http://www.globalcarbonproject.org/carbonbudget/archive/2014/GCP_budget_2014_lowres_v1.02.pdf

Table 2

document emphasizes the crucial role played by finance in starting a transition to a low-carbon economy, as it can support the development of initiatives in the field of renewable energy, using carefully the margins of gradualness necessary to avoid imbalances and shock as indicated by Pope Francis in favor of the energy transition perspective.[19]

Subsequently, in September 2015, the world leaders of 193 countries met at the UN to approve 17 Sustainable Development Goals (SDGs) and 169 targets indicated in the UN Agenda 2030[20] aimed at promoting prosperity by the end of the year 2030 for everyone and a more sustainable path for our planet and our economy.

In particular, SDG No. 13 "Climate Action" focuses on climate change by defining five critical objectives that each country must recognize to represent their specific responsibilities:

13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries

13.2 Integrate climate change measures into national policies, strategies and planning

13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning

13.a Implement the commitment undertaken by developed-country parties to the United Nations 13.5 Framework Convention on Climate Change to a goal of mobilizing jointly $100 billion annually by 2020 from all sources to address the needs of developing countries in the context of meaningful mitigation actions and transparency on implementation and fully operationalize the Green Climate Fund through its capitalization as soon as possible

13.b Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities.

Finally, in December 2015, the agreement on climate change (COP21) was signed in Paris by 196 States

NOTE

17. *It is true that there are other factors (such as volcanic activity, variations in the earth's orbit and axis, the solar cycle), yet a number of scientific studies indicate that most global warming in recent decades is due to the great concentration of greenhouse gases (carbon dioxide, methane, nitrogen oxides and others) released mainly as a result of human activity. Concentrated in the atmosphere, these gases do not allow the warmth of the sun's rays reflected by the earth to be dispersed in space. The problem has been exacerbated by a model of development based on the intensive use of fossil fuels, which is at the heart of the worldwide* energy system. Another determining factor has been an increase in changed uses of the soil, principally deforestation for agricultural purposes **(LS23).**

Sustainable Development Goals (SDGs)

Source: Sustainable Development Goals (SDGs)[18]

Table 3

inviting all countries to accelerate and intensify the actions and investments necessary for a sustainable future, low -carbon and resilient climate change.[21]

The agreement on the climate reached in Paris has set itself the ambitious objective of maintaining [...] the increase in the average global temperature well below 2 ° C compared to pre-industrial levels and to continue efforts to limit this increase 1.5 ° C compared to pre-industrial levels and is certainly an unprecedented agreement in an attempt to limit global warming by reducing greenhouse gas emissions (GHG).[22]

COP21 is also an important step in the transition towards a better and more exhaustive non-financial reporting that companies can use to communicate - to investors, rating agencies, insurance companies, credit institutions and other stakeholders - further standardized information on their exposure to climatic risks.

It is therefore necessary to integrate the existing corporate reporting models including non-financial information on environmental and social impacts and to connect financial capital with natural capital. To do this, it is possible to use a framework that allows communication also "investment grade" environmental and social data, namely complete, consistent, reliable, comparable and transparent, with the same consistency as financial ones. In turn, this framework helps to provide investors with useful and usable information for the decision-making process on sustainability, thus improving the value creation process.

Companies must communicate clear and concise non-financial information to investors, who increasingly also consider climate risks as a critical factor that has an impact on corporate value and their decisions. Investment decisions that could have serious

NOTE

18 https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf

19 *We know that technology based on the use of highly polluting fossil fuels – especially coal, but also oil and, to a lesser degree, gas – needs to be replaced immediately. Until greater progress is made in developing widely accessible sources of renewable energy, it is legitimate to choose the lesser of two evils or to find short-term solutions.* **(LS 165).**

20 http://www.un.org/sustainabledevelopment/sustainable-development-goals/

21 http://www.accordodiparigi.it/

22 **Carbon dioxide (CO2) 82%**: Carbon dioxide enters the atmosphere through the combustion of fossil fuels (coal, natural gas and oil), solid waste, trees and wood products. It is the result of certain chemical reactions (for example cement manufacture). Carbon dioxide is removed from the atmosphere when it is absorbed by plants through the biological carbon cycle.

Methane (CH4) 10%: Methane is emitted during the production and transportation of coal, natural gas and oil. Methane emissions also derive from livestock, other agricultural practices and the decay of organic waste in urban solid waste landfills.

Nitric oxide (N2O) 5%: Nitric oxide is emitted during agricultural and industrial activities, as well as during the combustion of fossil fuels and solid waste

Fluorinated gases 3%: Hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride and nitrogen trifluoride are synthetic and powerful gases are emitted by a series of industrial processes. These gases are typically emitted in few amounts, but since they are powerful greenhouse gases, they are sometimes referred to as high-power gas global warming ("Gas High GWP").

consequences on the environment, particularly as regards water consumption, waste generation and GHG emissions can cause value destruction in the medium and long term.

However, not all institutional investors are convinced that climate change is significantly affects the value of their investments. While others recognizing that carbon intensive investments may be subject to permanent erosion of value, they have not taken any initiative because they consider such risks still very far.

Today these risks may seem even more remote considering the commitment expressed by the American president Donald Trump in favor of the exploitation of fossil fuels to support economic growth and the announcement on 1 June 2017 about the exit of the United States from the climate agreement signed in Paris in 2015.[23]

Therefore, Trump's position entails potential doubts for investors who already integrate environmental, social and governance factors in their decision-making processes. Their greater fear is to achieve lower performance than those represented by a large number of other indices for as long as climate mitigation policies are deferred and the expectation by the financial markets for their introduction remains low.

The transition to technologies and infrastructures "environmental-friendly" is unstoppable[24] however if the new path of the American economy will entail a slowdown in environmental regulation, extreme attention must be paid to the "timing" in which to take certain disinvestment / reinvestment decisions.

The main topics described in the Aiaf White Paper No. 173 focused on:

- the role played by the Task Force Climate-related Financial Disclosure (TCFD) for the communication of risks related to the transition to a low carbon economy and the physical impacts linked to climate change;
- the “materiality” of non-financial information, in particular on Environmental, Social and Governance issues (ESG);
- the evolution of the “Sustainability Report” as a voluntary disclosure tool to communicate ESG information to a mandatory communication of environmental issues regulated by law (Directive 2014/95 / EU, D.Lgs. 30 December, 2016 No. 254, Loi n. 2015-992 du 17 aout 2015 relative a la transition energetique pour la croissance verte, Directive EU 2341/2016);
- an increasing focus on the carbon emission disclosure;
- the methods used to understand the Sustainable Finance;
- an in-depth analysis of stranded assets;
- Exchange Traded Funds (ETF) inspired by the "Encyclical Letter Laudato Si" of Pope Francis on the care of the common home ".

Thirty-nine organizations including qualified operators in the finance and sustainable investment sectors, belonging to the industrial and service sectors, pension funds, foundations, think tanks, insurance companies, ESG

NOTE

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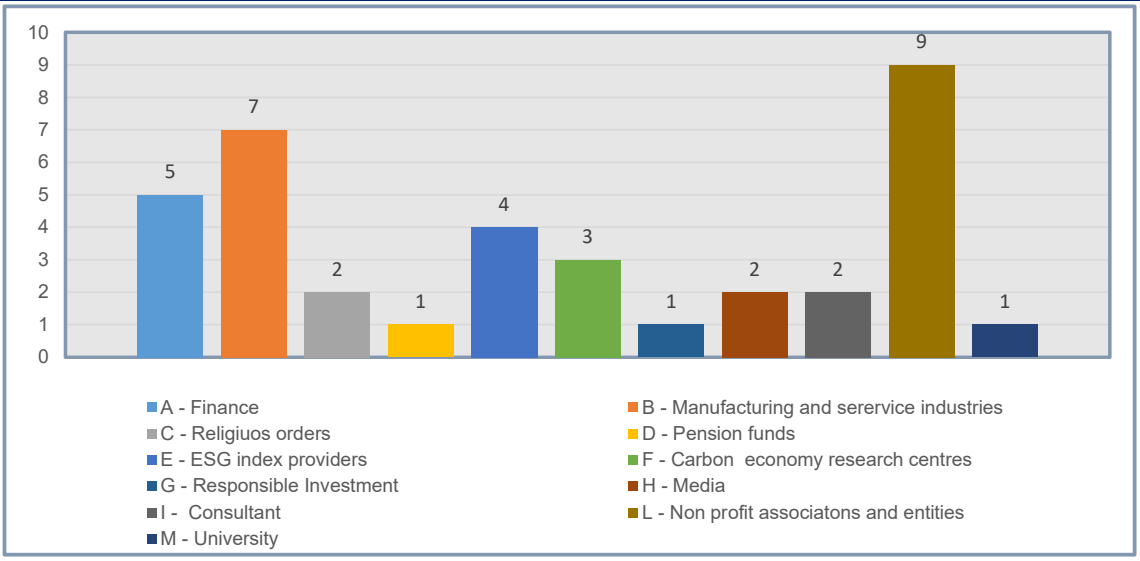
23 https://sptnkne.ws/fdUw.

24 Georgina Laird, Kames Capital's sustainable investment analyst, "... from solar energy, to electric vehicles, through wind power: this is a revolution that has been developing for too long time, given that the barriers have deteriorated and returns on investments have increased so much as to make subsidies superfluous ". Plus24 - Il Sole 24 Ore June 10th, 2017

index providers, Carbon economy research centers and religious orders, talked about their experiences describing how they are monitoring the climate related risks, the ongoing transition to a low carbon economy and the management of ESG issues.

Thought leaders' perspectives



Source: Authors' elaboration

Table 4