Energy, Climate and Tourism

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A Dynamic Standardization Process for the Planet

By

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CONTENTS

PREFACE

As early as 2007, the UN's World Tourism Organisation estimated that 5% of CO_2 emissions worldwide originated from tourism. This was equivalent to a little over 1.3 billion metric tons of CO_2 per year.

The Paris Climate Agreement adopted at the end of 2015 and aimed to maintain the increase in global average temperature to less than 2°C above pre-industrial levels failed to take into account the fields of aviation and tourism.

Tourists are already responsible for 10% of anthropogenic greenhouse gases. In the absence of regulation, their carbon footprint may well grow. In addition, the airline industry accounts for nearly 2% of CO_2 emissions by human activities.

With low-cost flights and the slashing of long-stay prices, tourism has become a prominent activity as far as emitting greenhouse gases is concerned. This trend looks likely to continue in the next few years if we keep on travelling so much. The spectacular growth of tourism shows no sign of stopping.

According to an article by Manfred Lenzen, Ya-Yen Sun, Futu Faturay, Yuan-Peng Ting, Arne Geschke and Arunima Malik published in the scientific journal [1]between 2009 and 2013, the sector's footprint worldwide went up from 3.9 to 4.5 gigatons of CO_2 equivalent, representing a 15% increase – four times more than previous estimates. In those five years, tourism spending went from 2.5 billion dollars to 4.7 billion dollars. In 2013, the United States had the largest tourism-related carbon footprint, ahead of China, Germany, India, Mexico, and Brazil. The impact is also caused by transport and the goods and services consumed (accommodation, food, etc.). "It is in the interest of the tourism industry". The authors, who studied the case of 160 countries, found that the impact of tourism at national and international levels is largely caused by countries with a high level of income (notably because of air travel, which accounts for 12% of the tourism global carbon footprint).

This book sheds new light on standards produced by institutions such as ISO and Eurostat by putting forward powerful approaches, methods and tools. We propose, for example, an energy audit, calculation of energy savings in projects and the European System of Accounts, which provides

[1] *Nature Climate Change,* (2018).

sectoral macroeconomic accounting of sustainable development. In addition, the various ISO standards must contribute to a better understanding of how to deal with global warming in the tourism sector. Finally, the various terms we use are listed in the appendix.

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GENERAL INTRODUCTION

Energy, Climate, Tourism

A dynamic standardisation process for the planet for a more sustainable development of cities and local or regional geographical areas.

By this title, we wish to address the issue of standardisation through various aspects related to energy and illustrate them with examples from tourism activities. Tourism's long-term growth trend has been robust and continuous since the fifties, with an average annual rate of increase close to four per cent in volume (referring to the number of international visitors) and over seven per cent per annum in value (in current US$). The general economic growth rate – including tourism's growth rate – exerts pressure on cities and local and regional geographical areas through a broad range of activities as well as by the significant energy consumption necessary for the activities of visitor transportation, especially by air, together with tourist accommodation, which have noticeable consequences and generate a significant impact on the climate.

One wonders if such a pace of growth remains reasonable today, when we want to move decisively towards a more responsible, sustainable, less-carbonated economy, whose impact on the climate must be drastically reduced, and if possible, eliminated. These questions and many tentative answers are addressed in this book, around the key theme of **energy**.

What role can (hopefully sustainable) cities and other local or regional geographical areas actually play? How can we deal with and value the increasing amounts of information becoming progressively available to better understand the current issues and developments?

What data can be trusted to conduct processes of mitigation of adverse environmental effects as well as processes of adaptation to climate change? How can we better understand the parameters of the processes of major cycles of CO_2 and major greenhouse gases (GHGs), and how can we gradually integrate microeconomic, mesoeconomic and macroeconomic data (of accounting or other origin), with global data on GHG emissions, whose sources are diversifying and refining themselves thanks to new tools carried by satellites already existing or in project?

How can we take advantage of the convergence that is emerging between world management standards and other standards, guidelines, satellite accounts, and externalities tables to better utilise the increasing volume of data available by public or private sector policymakers wishing to reduce their GHG emissions and engage in the ecological transition process?

In this context, what role and dynamics should be given to standardisation, applied to all energy-related fields, and what hierarchy of standards should be put in place to accompany actors, both public and private, of quality development and more sustainability in the future?

These are the stakes and the main themes addressed in this book through a wide selection of ISO, EN, and AFNOR standards, as well as some standards originated in other countries.

PART 1:

HISTORICAL CONTEXT OF THE CLIMATE, ENERGY AND ENVIRONMENTAL ISSUE: A REMINDER

Although we do not want to go over the entire recent history of sustainable development, we do feel it is necessary at the beginning of this book to contextualise the climate, energy and environmental concern in its geographical and historical context. The global issue of energy is better analysed in conjunction with time, going as deeply as possible, thus leading to the consideration of climate-related factors. To this temporal dimension a geographical dimension is added: in so doing, the local or regional geographical areas and "the environment", in the broadest sense, can be considered and analysed (the latter concept includes not only aspects related to nature but also those related to humans, with their history, their culture, their economy, etc.).

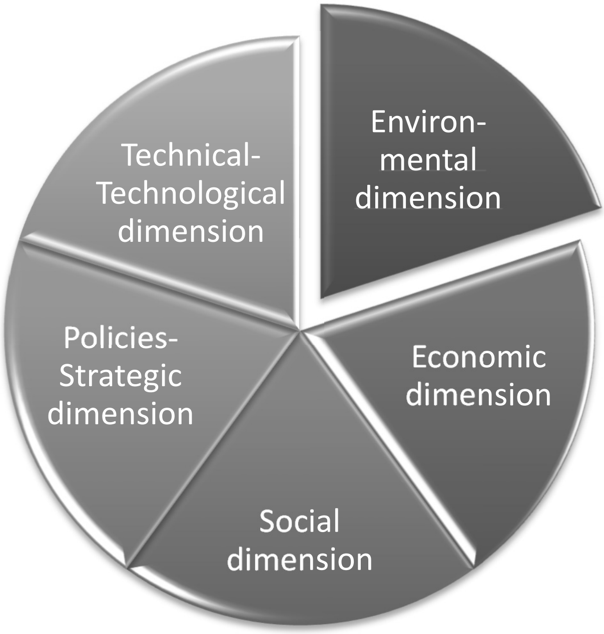
It is therefore necessary to grasp all the dimensions of the global concept of *sustainable development* that have been identified today and to no longer stick, by habit or ignorance, to only the three "historical" dimensions that go back to the eighties. The following graph identifies the main dimensions that now need to be apprehended in this field, as a minimum, (this point will be developed further in the course of the book).

In the 2000s, the European Union proposed *two new dimensions:*

(i) to complement the three historical dimensions of SD (Environmental – Economic – Social) and
(ii) to be able to carry out an enlarged analysis and define follow-up actions fully relevant to sustainable development:

- **The strategic policies dimension**,
- **The technical–technological dimension**.

From three to five sustainable development dimensions



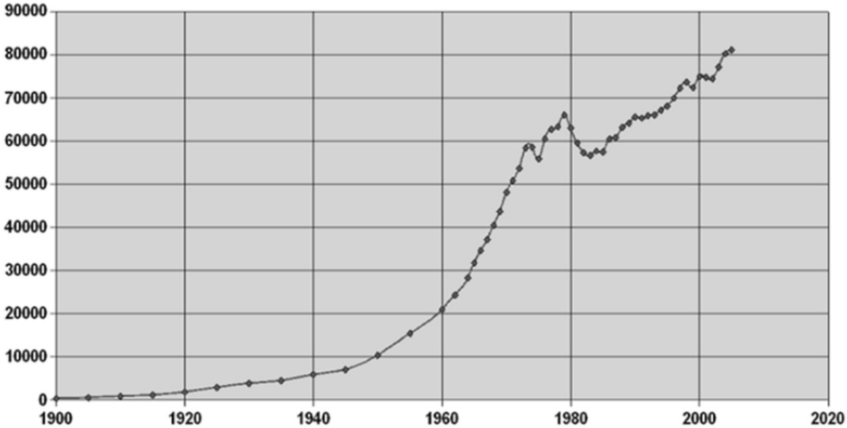
In its great wisdom, the European Union has rightly considered that **technical and technological** changes are shaping the potential capacity to implement solutions for energy production and consumption with fewer emissions of greenhouse gas (GHG). It also considered that, in the face of climate change, only **policies and strategies** coordinated for the long-term could result in a significant reduction in the consumption of non-renewable energies, in accordance with the globally negotiated deadlines. This broadening of the viewpoint on sustainable development has had a major impact on standardisation and certification processes. We will see this in more detail in the following chapters.

Let us now take a little step back to consider the evolution of the vision regarding energy production and consumption and their effects on the planet.

Oil Shocks and the Normative Consideration of the Energy Problem

The graph below gives a simple and very clear illustration of the dynamics of world oil production in over one century (averages given only for every five years between 1900 and 1960; afterwards more data were available), depending on the dominant oil qualities over these periods, in thousands of barrels per day.

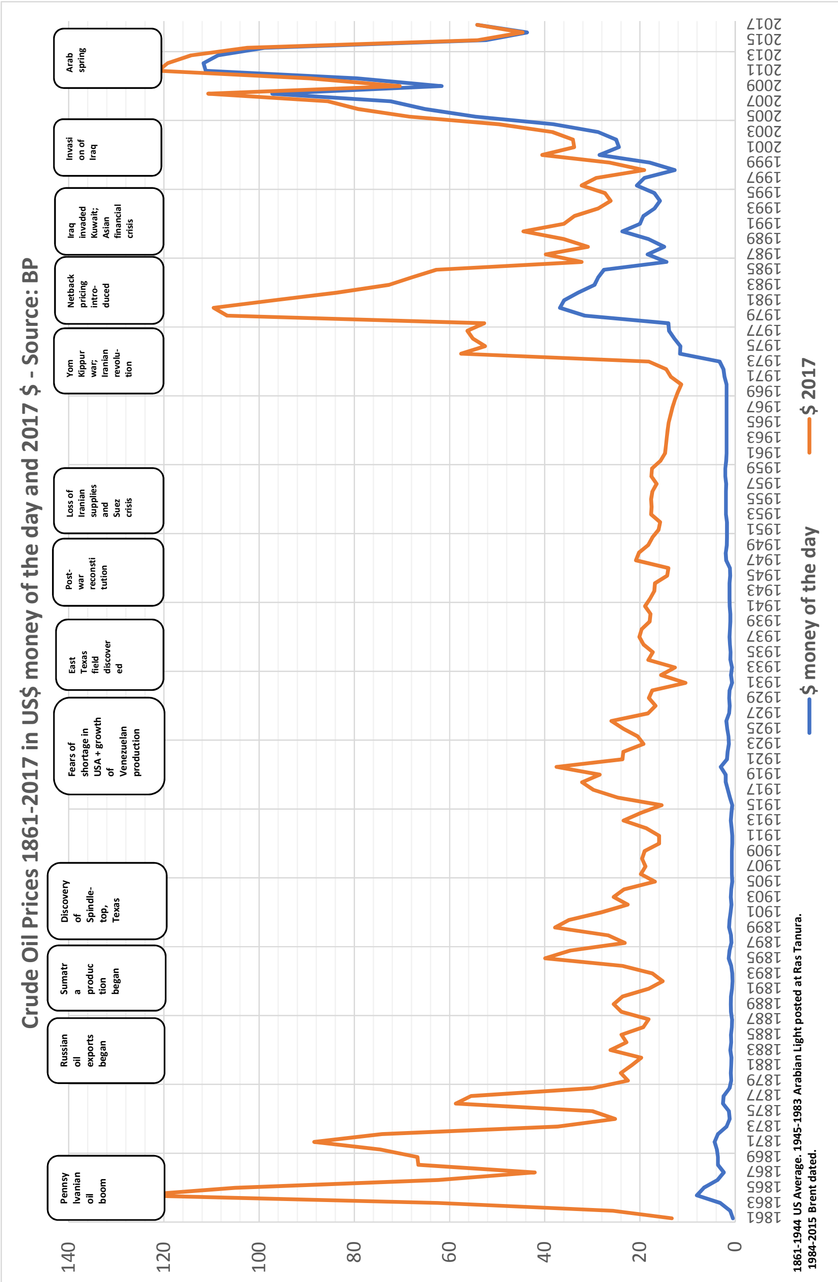
World oil production since 1900 (in thousands of barrels per day)



Source: https://fr.wikipedia.org/wiki/Histoire_du_p%C3%A9trole

This graph clearly shows the oil production decrease in the first half of the 1980s. It is supplemented by the following data for 2014: 88,834 thousand barrels/day (Kbbls/D), and for 2015: 91,670 thousand barrels/day (Kbbls/D). It indicates that the rate of growth followed since 1985 continues steadily today, irrespective of oil crises, wars affecting certain production areas, or even price crises.

If one looks for causes to explain this growth, one might consider for example an influence from the price curve, itself conditioned by a certain number of beacons or landmark events. For example, the following graph shows the links between the evolution of crude oil prices (in US dollars of the day, but also in *constant* 2015 US dollars) and the history of major global events since 1860.


Crude Oil Prices 1861-2017 in US$ money of the day and 2017 $ - Source: BP
Pennsylvanian oil boom
Russian oil exports began
Sumatra production began
Discovery of Spindle-top, Texas
Fears of shortage in USA + growth of Venezuelan production
East Texas field discovered
Post-war reconstitution
Loss of Iranian supplies and Suez crisis
Yom Kippur war; Iranian revolution
Netback pricing introduced
Iraq invaded Kuwait; Asian financial crisis
Invasion of Iraq
Arab spring
$ money of the day
$ 2017
1861-1944 US Average. 1945-1983 Arabian Light posted at Ras Tanura.
1984-2015 Brent dated.

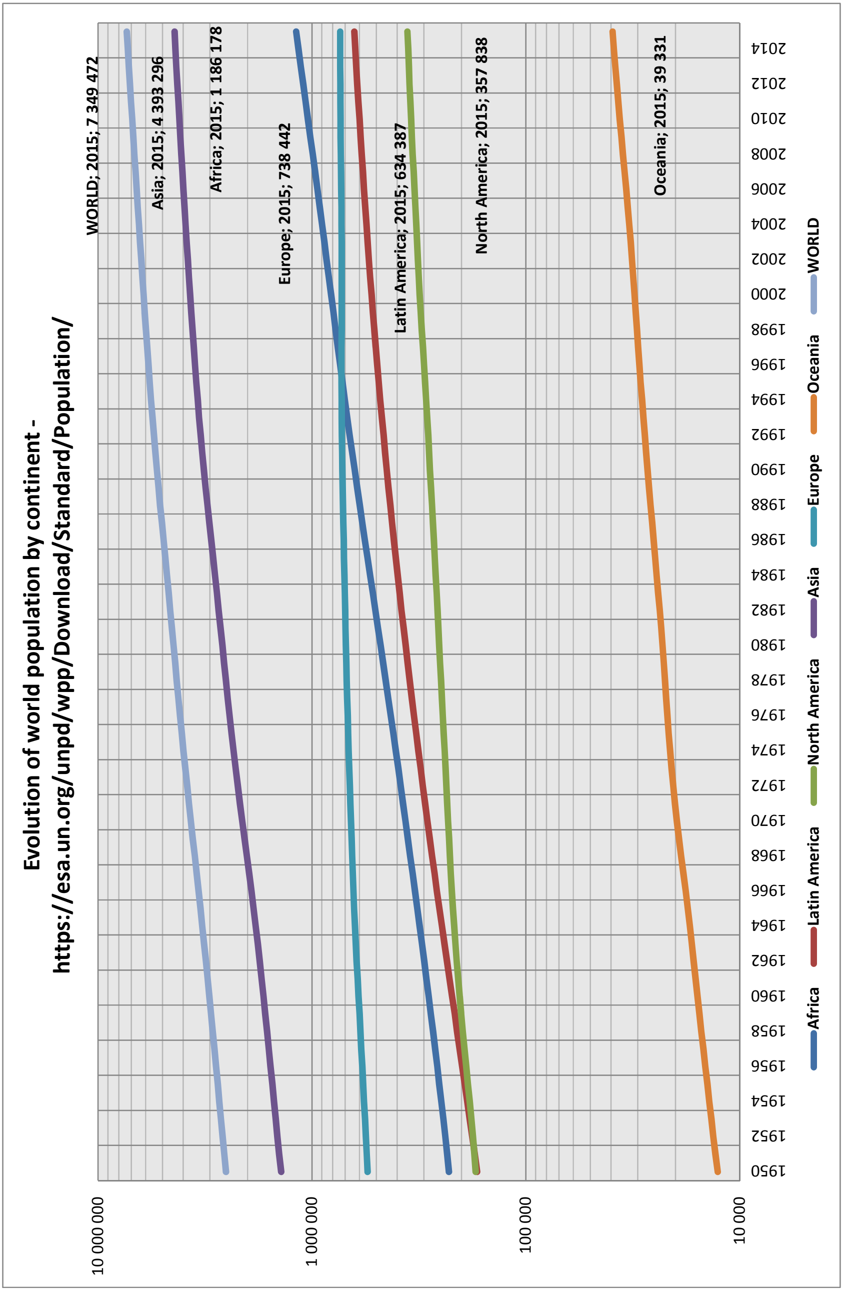
Note 1: Please note that a correlation does not necessarily mean that there is a causal relationship between two time-series;

Note 2: You can notice that the rise in oil prices, following the war in Iraq and the "Arab Spring" in the late 2000s, in constant US dollars (light brown curve), is of the same order of magnitude as that associated with two events: the crisis of the Yom Kippur War and the Iranian revolution in the late 1970s, and the historical crisis following the oil boom in Pennsylvania in the 1860s. These constant US dollar data give a good measure of the so-called “very rare or exceptional events” and this is what makes their worth from an analytical point of view if one wishes to study, in particular, the parameters of resilience to economic and monetary changes. This remains valid and gives valuable indications, although the technical and economic conditions have naturally changed over the long period.

Note 3: There is, however, no obvious correlation between the two previous graphs; other causes or explanations are certainly to be sought elsewhere (international agreements, crude oil production quotas, technological disruption, climate change legislation, political geo-strategy, etc.);

Note 4: These graphs and data come from the excellent work of the British Petroleum company: BP Statistical Review of World Energy – June 2018, which compiles data from several dozen international official sources.

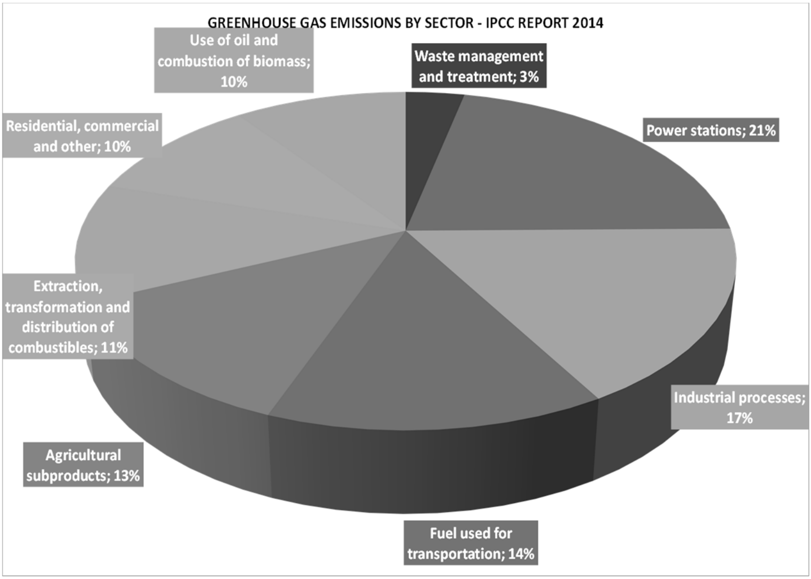
What other causes to look for? Could population growth be evoked to explain the pace of growth in crude oil production and consumption, in the context of a technology that has not yet undergone a real transition, with the corollary of increasing emissions of greenhouse gases, of which CO_2 is the most abundant?

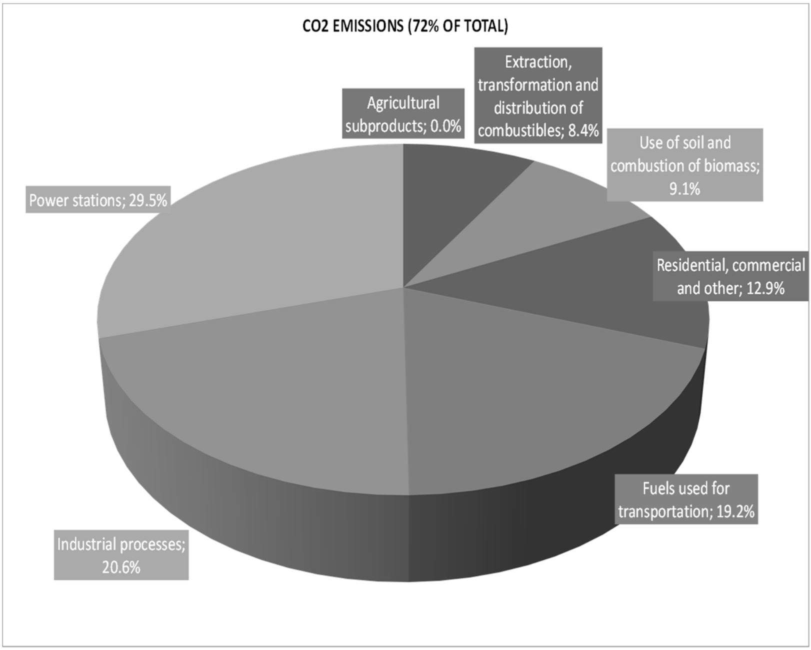

Evolution of world population by continent -
https://esa.un.org/unpd/wpp/Download/Standard/Population/
WORLD; 2015; 7 349 472
Asia; 2015; 4 393 296
Africa; 2015; 1 186 178
Europe; 2015; 738 442
Latin America; 2015; 634 387
North America; 2015; 357 838
Oceania; 2015; 39 331
10 000 000
1 000 000
100 000
10 000
1950
1952
1954
1956
1958
1960
1962
1964
1966
1968
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
Africa
Latin America
North America
Asia
Europe
Oceania
WORLD

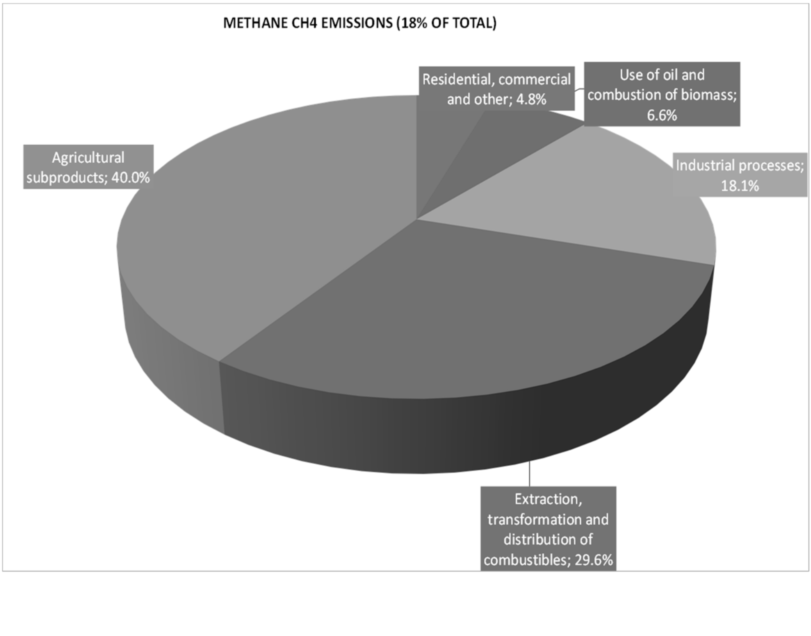
Please note that the left-hand scale is logarithmic.

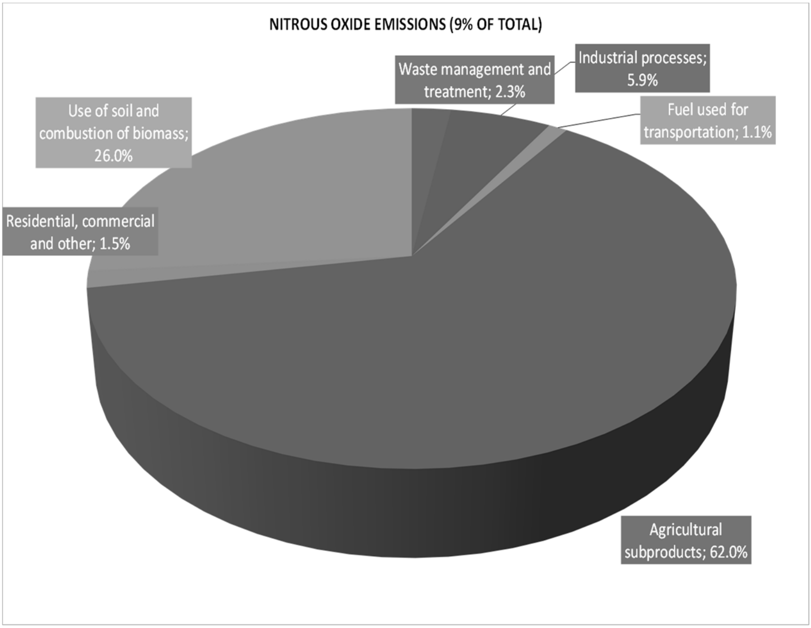
This graph shows differential population growth rates between large regions of the world. There does not seem to be a simple and obvious correlation between population growth and global crude oil production: it is therefore appropriate to remain very cautious because there is certainly not a single unique cause to the long-term phenomenon of increasing crude oil production and consumption.

After mining data from the best official global energy data sources, the latest report (2014) from the Intergovernmental Panel on Climate Change (IPCC) provides a set of global data that makes it possible to clarify, and to raise, the problem of greenhouse gas (GHG) emissions in both quantitative and qualitative ways: some of these aggregated data are presented in the summary diagrams below.




CO2 EMISSIONS (72% OF TOTAL)
Agricultural subproducts; 0.0%
Extraction, transformation and distribution of combustibles; 8.4%
Use of soil and combustion of biomass; 9.1%
Residential, commercial and other; 12.9%
Fuels used for transportation; 19.2%
Industrial processes; 20.6%
Power stations; 29.5%


METHANE CH4 EMISSIONS (18% OF TOTAL)
Residential, commercial and other; 4.8%
Use of oil and combustion of biomass; 6.6%
Industrial processes; 18.1%
Extraction, transformation and distribution of combustibles; 29.6%
Agricultural subproducts; 40.0%

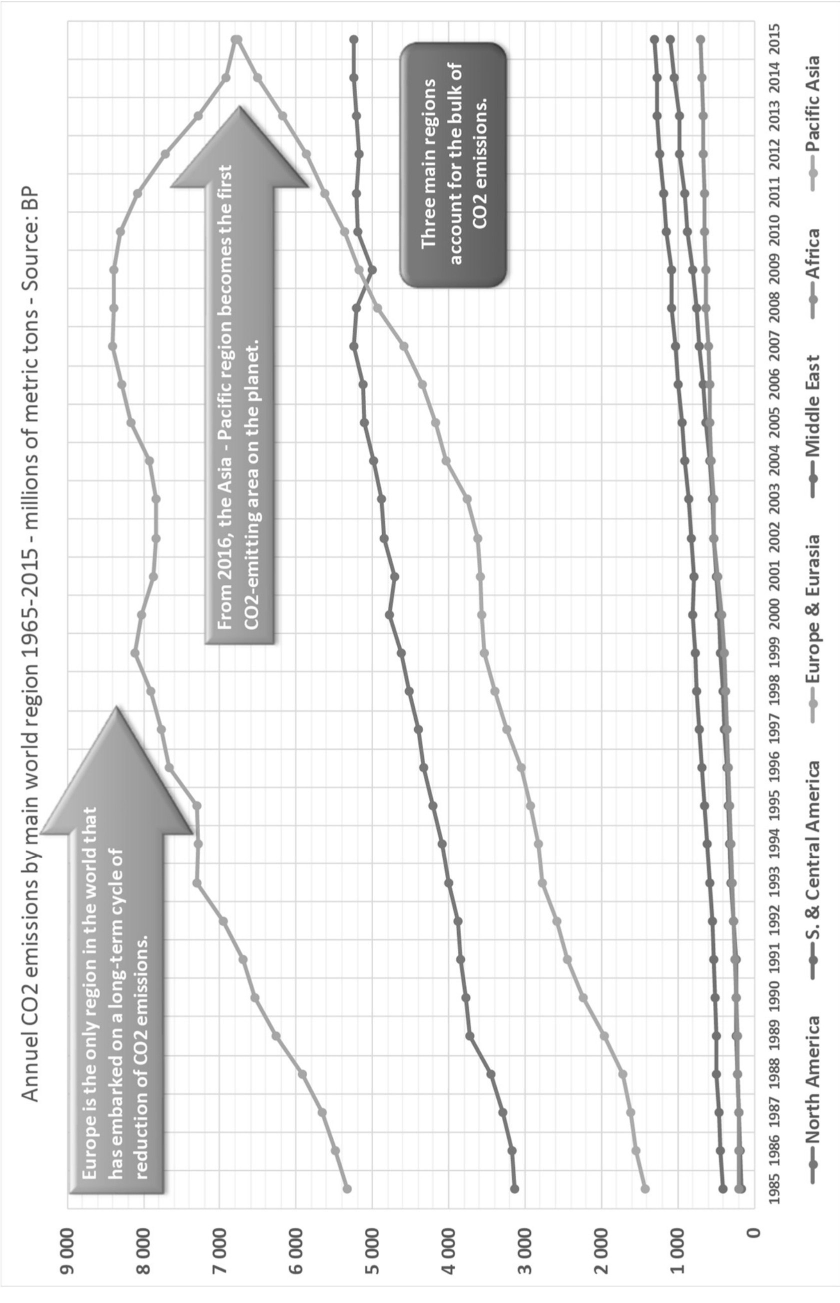


Source : IPCC 2014 Report

The first pie chart gives the global distribution of GHG emissions, by source, and the other three diagrams show the breakdown of the origin of their source activities for each of the three main GHGs. So much for the general framework of the situation regarding GHG emissions at a global level.

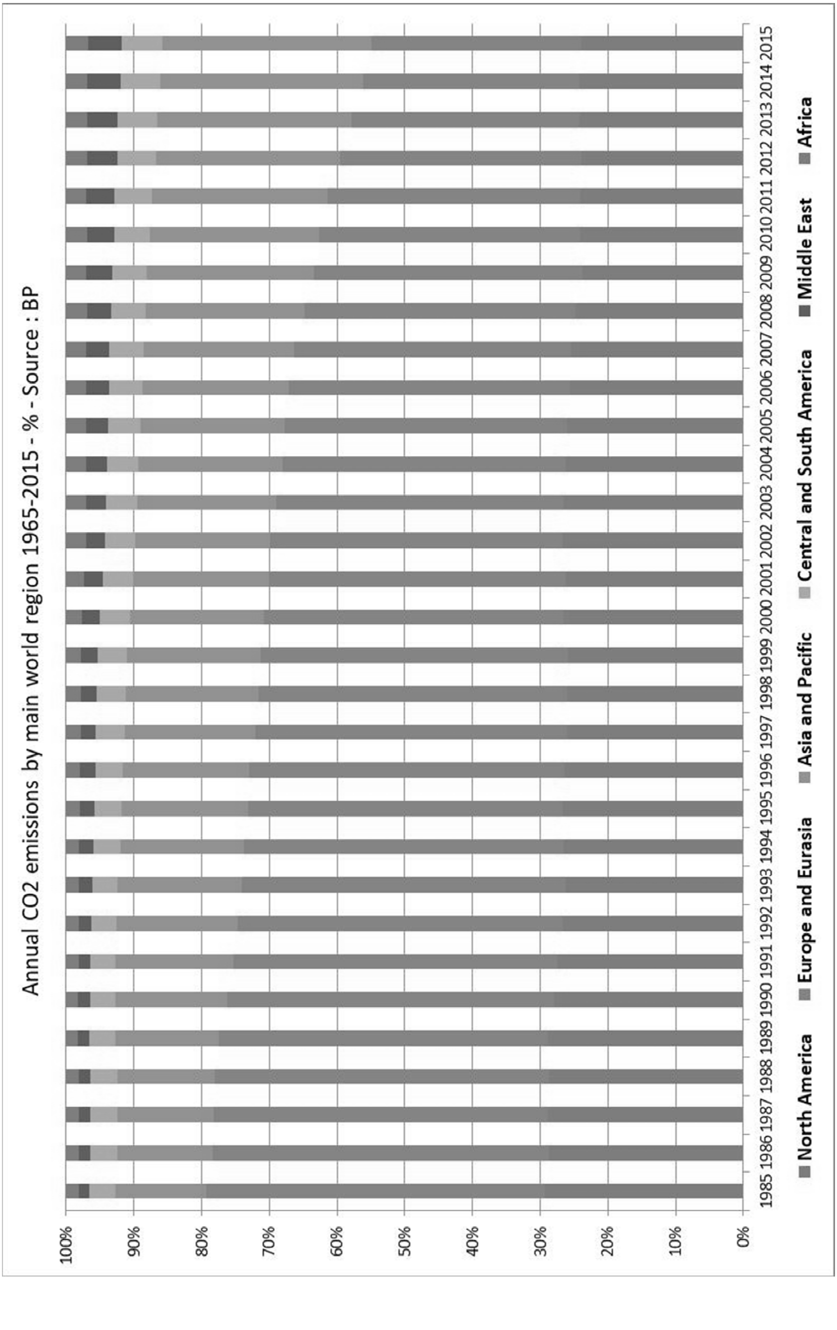
We therefore observe that the global trend of energy consumption and correlatively GHG emissions at our current technological level seem irretrievably on the increase. However, not all regions of the world are concerned in the same way.

With respect to anthropogenic emissions (that is, caused by human activity) of the main GHG, CO_2, different regions of the world are evolving in their own way, and one is in fact already engaged in a GHG emission reduction process. The following graph provides a recent illustration of this very significant and enlightening evolution.

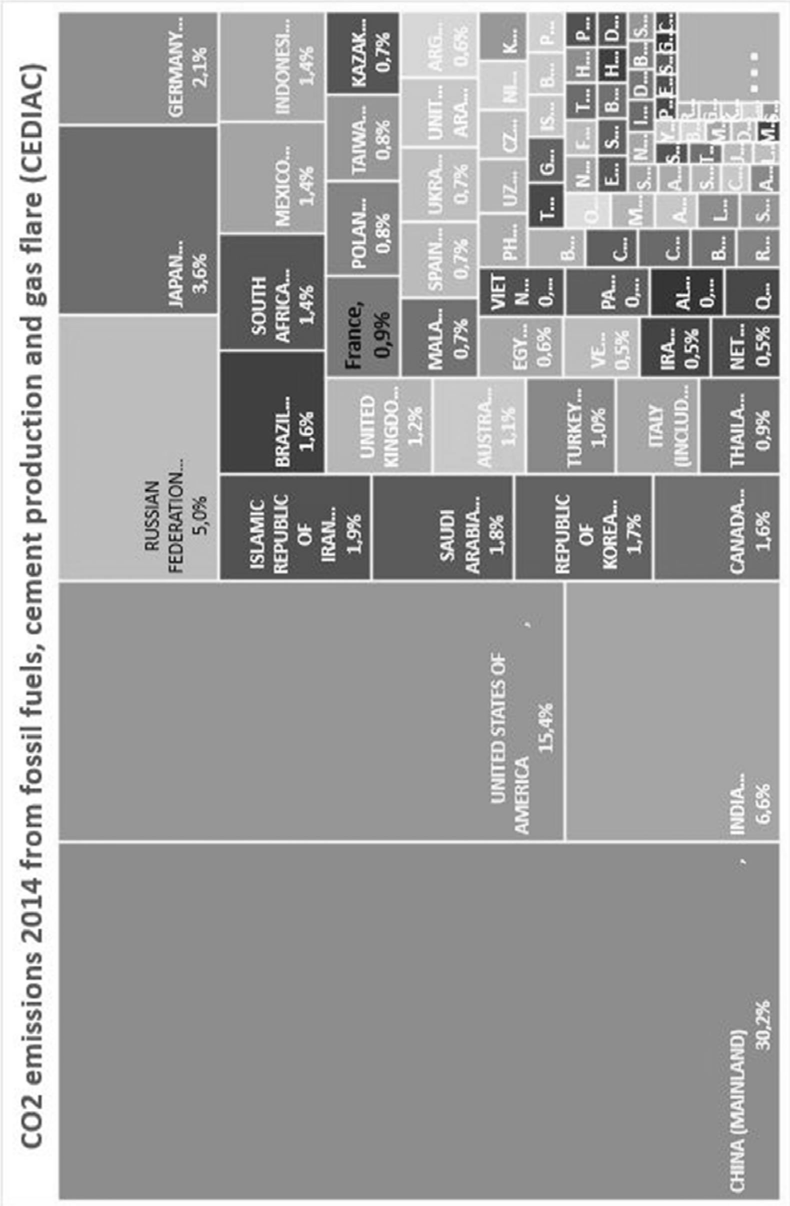

Annuel CO2 emissions by main world region 1965-2015 - millions of metric tons - Source: BP
Europe is the only region in the world that has embarked on a long-term cycle of reduction of CO2 emissions.
From 2016, the Asia - Pacific region becomes the first CO2-emitting area on the planet.
Three main regions account for the bulk of CO2 emissions.
9 000
8 000
7 000
6 000
5 000
4 000
3 000
2 000
1 000
0
1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015
North America
S. & Central America
Europe & Eurasia
Middle East
Africa
Pacific Asia

The following graph completes the previous one by taking its data as cumulative percentages. It gives a clear picture of the measure of the relative weight taken by the first three CO_2-emitting regions, which are North America (23.6%), Europe & Eurasia (30.6%) and Pacific-Asia (30.5%), corresponding to 84.7% of the world total.

This graph also highlights a phenomenon that is still little known but highly significant, and which must now be fully considered; namely that since 2016, the Pacific-Asia region has become the first CO2-emitting region of the planet, overtaking Europe. This is a major point which we will come back to later.


Annual CO2 emissions by main world region 1965-2015 - % - Source : BP
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015
North America
Europe and Eurasia
Asia and Pacific
Central and South America
Middle East
Africa

To complement this very general overview, the following graph presents the world hierarchy of the most CO2-emitting countries in 2014. It is easy to understand that these emissions are very concentrated in a small number of countries, China being the worst offender with 30.2% of the world total CO2 emissions, before the USA with 15.4% and India with 6.6%.



Source: CEDIAC – Carbon Dioxide Information Analysis Center; Author’s graph.

Note 1: Germany ranks 6th with 2.1%, while UK ranks 11th with 1.2% and France ranks 20th with 0.9%;

Note 2: Only *20 countries* (out of 220) total about *80% of* CO_2 *emissions*.

From the Brundtland Report to the 2015 Paris Climate Agreement

Historically, the global reflection on the limits that mankind should impose on the growth of emissions related to the (over) consumption of energy or raw materials started in 1972 with the "Limits to Growth" Report, also known as the Meadows Report, issued by the Club of Rome in conjunction with the United Nations Conference on the Human Environment in Stockholm. Since then, nine main dates are to be remembered.

Year	**Main sustainable development events and reference reports:**
1987	Brundtland Report "**Our Common Future**"
1992	**Agenda 21** of the Earth Summit in Rio
1995	**Barnier Law**: First Law on sustainable development in France
1997	**Kyoto Protocol** and the New York Earth Summit
2002	**Rio + Ten**: Johannesburg Summit
2007	**Grenelle 1 and 2**: New attempt to help create world environment policy
2012	**Rio + Twenty**: Rio Summit
2016	**COP 21** Summit in Paris and Paris Agreements
2017	**COP 22** Summit in Marrakech... and now a COP every year

It should be noted, however, that, except perhaps for the 2016 Paris Agreements, these decisions only apply to a restricted list of voluntary countries and the measures recommended are based mainly on thresholds to be achieved by sometimes distant deadlines, some of which do not guarantee a reasonable limit on global warming. These points will be analysed in parallel with the relevant standards.

Henceforth, any public or private decision-maker, any individual, and any company or administration must consider the effects of uncontrolled growth in their consumption of energy and GHG emissions. A Social and Environmental Responsibility (SER) approach is potentially necessary for all of us. However, there is still only one "SER" World Standard, **ISO**

26000:2010, currently in the process of being revised; it is also to be noted that it is not a certifiable standard. This contradiction will be briefly addressed and an attempt to clarify it will be further developed in this book. The fully detailed theme of SER will be dealt with in a forthcoming book.

Sustainable Development Goals (SDG): A Reminder of the Key Issues

The UN's 2030 Agenda for sustainable development, adopted in 2015 by 192 countries, defines the seventeen SDGs and their 169 specific priority targets. This Agenda is a repository of goals and targets that engages governments and aims to better coincide the protection of the environment and the fight against poverty, *balancing the environmental, human and economic dimensions*, which are not directly covered by this book.

The 2030 Agenda had to be implemented by the international community in January 1, 2016, i.e. over a period of 15 years.

Only two of these objectives directly concern better energy management and the limitation of their climatic effects:

- **Objective No. 7**: Clean and affordable energy;
- **Objective No. 13**: Measures relating to the fight against climate warming.

This gives a measure of the poor relative importance given today to better energy management in the United Nations' long-term agenda. A presentation of the **SD Guide 21000** designed to help France's local governments implement these SDGs will be made in paragraph 2.5.1.