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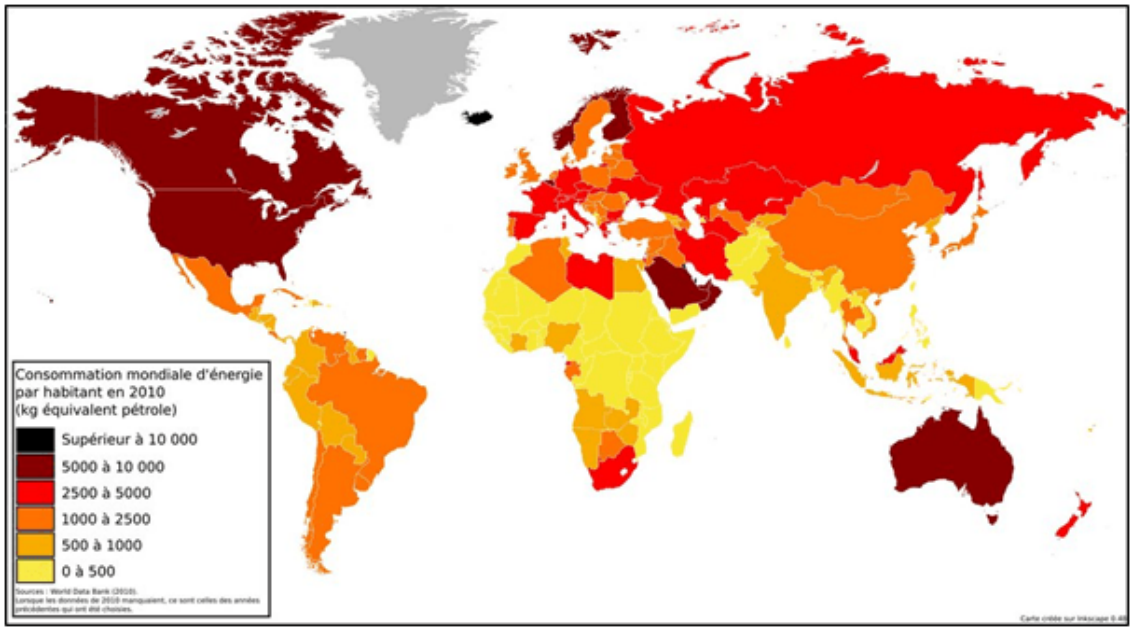
“Sustainability and Energy Issues”



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GEOPROGRESS EDITIONS

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GeoProgress Journal

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Editorial Note

The 2nd Geoprogress Global Forum

This issue of the journal publishes some first contributions proposed for the international conference, held in Brussels on 7 September 2017, whose poster is shown at the bottom of this note. This conference is the starting event of the 2nd Geoprogress Global Forum (GGF) which focuses on "Sustainability and Energy Issues", assuming energy the key issue for a sustainable global development.

The question of how to achieve a global development which guarantees a sound, better and more equitable living environment for future generations, is not reduced to the energy issue, namely the issue of how to ensure sufficient energy and ecological security for all. Certainly, however, the energy issue is a large part of the question and is also the essential part.

The "energy", which is the ability of a body or physical system to work, has its first source in food, which gives the energy for life and human action. This physical energy and human intelligence, of which the physical one is a condition, are subordinate to other forms of energy produced by human action and the sources that generate it.

The previous Global Forum promoted by the GeoProgress Journal has already focused on food issues and especially on the global issue of ensuring healthy and sufficient food for all the people of the planet who will reach mid-century their maximum number, estimated at about 9.1 billion people.

In this Forum, whose initiatives will continue at least throughout the 2018, intends instead dwell on the other forms of energy that, applied to machines, multiply the ability of man to work, to act and to move, to satisfy better multiple needs, including food and other recreational needs (culture, sports, fun, rest) of their strength and intelligence.

Energy will not be consider in itself but in relation to the natural environment: to the global need to ensure a healthy environment, which is - and has to be recognize - a fundamental right of all beings. The problem is to increase energy production without increasing environment degradation - that really is dictated not only by fuels, but also by the food production itself and in particular meat. Therefore, food production will continue to be an important issue and the question of how to ensure sustainable energy for everyone will largely identify how to achieve sustainable world-wide development, which technologies, financial resources and cultural approaches.

This GGF anyhow intends to focus on energy security and sustainability needs facing the present market and resistances to change. In particular, it - and consequently this and the next issues of this journal - aims:

- to analyse current energy geography, which involves great differences in energy problems in different territories and requires different solutions and overall a new re-launch of cooperation among people for a sustainable development;
- to discuss the strategies of energy security for humanity in sustainability and put forward policies and regulations, nationally and internationally.

Its purpose is not only to give continuity to the debate concerning global environment issues that should be constantly in the spotlight of the scholars and public decision makers; but also to try to further involve the scientific community in the global problems.

This community should not only contribute to find techniques, of production and organization, that are to be increasingly sustainable, but also contribute to identify and remove resistances and obstacles toward the diffusion of such techniques and toward the satisfaction the energy needs of billions of people.

The conference of Brussels, as first initiative of the new Forum on Energy and Environment, was aiming to give a first picture of the main issues to be addressed to ensure sustainable energy for all by the middle of the century. These problems, together with the needed policies, development strategies and technologies, will be developed later on in new meetings and debates with all stakeholders and in specific studies.

I am convinced that, in order to ensure sustainable energy for all, there are enough both physical and financial resources and technologies - as is evident from studies by physicists, geographers and geologists, and by engineers and technologists in general, and how it will also result from contributions that will follow in this conference. What is lacking and needs to be built is a multilateral political willing together with an international shared strategy for sustainable development. For this purpose, in my paper in this issue on the I.E.F (International Environment Fund) I question the fundamentals of the current funding mechanisms and reiterate the need to build a more stable "international environmental system" based on more solid political bases and therefore legal ones.

At the end of the Brussels Conference, in this regard the participants urged Geoprogress to set up a study group to update the proposal of the IEF constitution and to take initiatives to create the necessary consensus to be approved internationally. Furthermore, they have adopted the conclusions and recommendations of Dario Chello's paper.

Emer. Prof. Francesco Adamo, Editor in Chief

AN INTERNATIONAL ENVIRONMENT FUND (IEF) FOR SUSTAINABLE ENERGY AND SOCIAL PROGRESS FOR ALL

Francesco Adamo[1]

1. **"Sustainable energy for all"- a must which needs the recognition of the fundamental human right on our common environment.**

Atmospheric pollution is certainly the cause of the degradation of the planet natural environment, in particular of its health condition that is indispensable to the existence of human life. It is so linked to the modes of production and energy consumption that makes the environmental issue one with energy, although it is also caused by processes of pollution of waters not connected to energy, waste and destruction of fundamental resources such as soils, and although the same conditions of the atmosphere may be deteriorated or improved by deforestation or reforestation and more generally by changes in ecosystems.

As the Earth, beyond its regional differences, is one, unitary, ecosystem - as natural geographers have highlighted since the western classic antiquity - local effects of environmental degradation, and particularly of air and water pollution, become regional and world-wide. Ecologically damaging actions of a given community, such as energy consumption from fossil fuels, can produce, and in fact have long been producing, adverse effects on nearby communities and changing the composition of the atmosphere on all communities in the world, from those of the most technologically developed cities (many of which cannot be breathed) to those of the African savannah villages or the archipelagos of the Pacific. From this simple observation of the terrestrial unity and ecological interdependence of the territories occupied by the various human communities, and in particular by the nations in which the Earth has been divided by human occupation, derives the following.

1) National sovereignty is necessarily limited: every nation (like every community) can do in its own territory what it wants, unless its action does not undermine the interests of others (specifically in the use of the common earthly atmosphere, as well as in keeping their own waters sound and fishy). So the use of the planet's environment must be well-regulated internationally.

2) Supposing, moreover, that each human being, and every child who is born, wherever he is on the map of the world, must have - as is morally and politically sacrosanct - the same fundamental human rights, and also the right to Enjoy the same share of the planetary environment.

The individual dimension of the atmosphere and the natural environment on the whole used by the inhabitants of the various nations is highly unequal: it is the result of a long historical process and a rebalancing is certainly not easy, and perhaps not even an

[1] Emeritus Professor of Economic and Political Geography at Università del Piemonte Orientale – DISEI, Novara; President of Geoprogress ONLUS.

achievable goal, nor is it fundamental. However, compensations are possible and necessary: between those who take too much advantage of the common good, the planetary environment, and those who enjoy too little. The aim is not only to reduce these disparities, as is clearly evident from energy consumption or carbon dioxide emissions data, but mainly to provide sustainable energy for everyone - as enough energy, as well as a healthy natural environment, is a basic need for all humans - and gradually to contribute to a sustainable development of the planet.

Despite the recent United States position on the Paris (2016) commitments to reduce greenhouse gas emissions, a position that other states will have to refuse while increasing their commitments, I repeat here - and I hope the European Parliament will accept the proposal and support it internationally - the establishment of an ***International Environmental Fund (IEF),*** intended as compensation fund between debtors and creditors environmentally speaking: between countries with an average per capita consumption per inhabitant below the world average (or, better, at the desired target level) and countries with consumption above this level. It is a regulator of the environmental balance between nations based upon a criteria of equity and international justice. This is the key difference from the current international funding mechanisms for environmental protection and development cooperation projects, at present mainly focused on "climate finance"[2]. In fact, "in accordance with the principle of 'common but differentiated responsibility and respective capabilities' set out in the UNFCCC (United Nations Framework Convention on Climate Change), developed country Parties are supposed to provide financial resources to assist developing country Parties in implementing the objectives of the UNFCCC. Even if there are these general obligations of developed countries, reaffirmed in the Paris Agreement, also the mechanisms of climate finance largely rely on gifts, on voluntary contributions and the contributions from public sources are mainly related to the 'capability' of the country that is its production.

The proposal of IEF is based mainly on principles of social justice and respect of human rights, which should also be the foundations of international law and particularly of international environmental law. Nevertheless, it does not disregard the role of charity, not only because this is an important financial source among the inputs of the proposed Fund, but also because the values of charity and more generally of human solidarity are the premise of the justice principles adopted. In the absence of these human values, it would be very difficult or impossible to agree on the parameters proposed and on the criteria of identification and share of the environmental costs and benefits among all the members of the ***International Environment Systems.***

The implementation of this proposal, which is certainly to be upgraded but which I consider to be important for achieving the objective of sustainable energy for all, particularly in poor countries, firstly requires the removal of obstacles preventing the assertion of these rights. These obstacles are above all cultural, moral and political, although they are in large part a cause and consequence of economic obstacles.

It's been years since "Earth Justice is involved in an effort to persuade the United Nations that the right to a safe, healthy, and healthful environment is a basic human right and, as such, is protected by various existing human rights agreements and conventions. Considerable progress has been made" (Rebecca Bratspies, 2015), but the human right to

[2] They are mainly focused on problems of the climate change and are included in "climate finance", which "refers to local, national or transnational financing - drawn from public, private and alternative sources of financing - that seeks to support mitigation and adaptation actions that will address climate change

a healthy environment has not been yet recognized. At international level, the recognition of this fundamental right, implying the recognition that all human beings, wherever they live, are entitled to equal shares of the atmosphere and the natural environment of the planet, finds an enormous obstacle in the great international economic disparities, in egoisms, not only individual but also national, which mainly in periods of generalized economic difficulties intensify.

Attempts to remedy, with nationalist closures, the recession that has hit the wealthiest countries over the last ten years, so long as to be a true depression, have already been clearly as illusory as unrealistic. The globalized economy is no longer the dream of some economists or the expression of the strategy of large multinational corporations and the will of some powerful nations to support them. It is a reality that individual nations and individual businesses and individuals have to deal with, and it demands to be governed by multilateral bodies, a world sovereignty defined by international conventions such that they can limit the sovereignty of individual nations: they must therefore be equipped with a political power such to enforce rules even to the most powerful nations, mainly isolating them. There is no point in discussing what might be a possible organization of the world's government in its multiple aspects, although such discussion is urgent and fundamental, given that the current organization has not worked for a long time either on the political-military level or on the economic one. Suffice is to recall here that the Atlantic Alliance, with no sense during the fall of the Berlin Wall, induced US allies to assume the friendships and the enmities of the rotating President of that great country. This, while wanting to be grateful to those who have pacified Europe for two times, is no longer acceptable.

In addition, it is equally indispensable to "democratize" the governing bodies of the economic and financial system in order to provide them with autonomous decision-making capacity in order to stabilize the economic system and to be safe from speculation and monopoly control.

These changes are essential to ensure energy security, which requires not least the stability of the market, that is to say, its regulation and control of its main protagonists. Economic stability is an essential condition for ensuring sustainable development, peace and well-being for all, together with meeting the needs of energy needs.

2. The International Environment Fund, as originally proposed[3].

This proposal set as its aim the satisfaction of two fundamental requirements:

- to regulate the international environmental system;
- to fund the protection of the natural environment, the sustainable development and particularly the creation and diffusion of environmentally sound technologies; especially in developing countries, where the development of sustainable technologies is difficult or impossible, mainly because of the lack of the necessary finance

[3] It was first presented and discussed at the "U.N. Workshop on Creative Financing for Environmentally Sound Technologies" held in Belèm (Brazil) in December 1990. See: Adamo, 1990; UNCSTD, 1990.

"The proposed I.E.F. would be a global fund dedicated to our common heritage as originally conceived by the Commission on Environment and Development under Norwegian Prime Minister Margaret Gro Harlem Brundtland. The Fund should be administered by an authority delegated by the World Bank who in turn should be asked to convene a conference of the various funding sources such as the IMF, the regional development banks, the central banks of industrialised countries, the development assistance agencies of industrialised countries, including those which devote funds to international non-governmental organisations." (UNCSTD, 1990)

It would act as a compensation fund and regulator of environmental balance between nations, based upon a criterion of equity and international justice. This would be supplied by countries that are, environmentally speaking, debtors (essentially the industrialised nations) in proportion to their environmental deficit and per-capita income, and should finance the relevant projects and environmental policies of countries that are environmental creditors, in relation to their environmental surplus, to their per-capita income, and to their efforts in favour of protecting the environment for all humanity.

For the immediate **constitution** of the I.E.F., it is proposed to use:

1. the funds pledged to the "Global Environmental Facility" (GEF) and the two funds managed by the same GEF

2. the sources arising from the mechanisms of debt conversion: firstly, of the debt conversion into a multilateral institution, but also the bilateral public loans. The management of these funds should be entrusted immediately to the I.E.F.

3. part of public aid or, better still, the equivalent of its possible increase. The part we propose to use immediately for the I.E.F. could be equal to 0.25% of the Gross National Product (G.N.P.) of the developed countries; if these countries finally decide to keep their promises, and to rapidly bring their aid up to a minimum of 0.70% of the G.N.P., as required by the same Development Aid Committee of the O.E.C.D.

4. private donations which could be stimulated by international investment in eco-bonds, launched by the United Nations with the collaboration of Non-Government Organisations (NGOs)

Revenues should then be represented under the following headings:

A) voluntary private contributions, such as direct donations and the possibility in rich countries of deducting a small tax-free amount from profits and personal income;

B) rent and royalties, paid by rich states and private companies (such as biochemical and pharmaceutical industries): respectively for the concessions of use of vast regions of tropical rain forests - to be conceived as biological (and climatic) "mines" and water supplies, and to be cared for as scientific parks - for research purposes, for the gathering of natural substances and the economic exploitation of research results.

C) part of the revenue from individual states, generated by the eco-tax, an indirect tax which is gradually making headway in industrialised countries (at least in some of them) and which is under discussion in the European Parliament. The eco-taxes should concern the consumption of the following categories of goods:

C.1) noxious products (eliminable and non-eliminable), taxation to be restricted, for the moment, to fossil and other fuels (carbon tax), and to some heavy metals (such as cadmium);

C.2) goods which are under-priced by the market and do not reflect the physical scarcity of non-renewable natural resources used in their manufacture, such as certain rare minerals (for which the taxable sum should be shared between the fund and the producing country);

C.3) goods which are under-priced with reference to the physical quantity of the renewable natural resources employed (for example, the extension of occupied soils); for the moment we could cite some agricultural products typical of tropical countries (or even a product prevailingly exported by developing countries) and in particular products for which trade terms have deteriorated (e.g. coffee, cocoa, leather, cotton, etc.) and whose demand is not very elastic;

C.4) goods produced in rich countries with the aid of customs duties and states subsidies, to the detriment of the economies of poor countries and the environment; in particular, this proposal of a swing away from economic protectionism towards nature protection, might concern some of the products over which the Uruguay Round was in deadlock and the W.T.O. still finds obstacles, and help to get the situation moving.

Evidently the sum payable to the I.E.F. differs according to each type of product taxed and to the category of each country. With regard to the much-discussed carbon tax (Pearce, 1989a; Brown, 1990), I.E.F. debtors should be those countries with a net per-capita emission of carbon that exceeds one ton per annum. Their payments, in proportion to quantities in excess of these limits, could be defined with reference to the rough cost of reforestation which would, in theory, allow the absorption of a corresponding quantity of carbon-dioxide.

Outgoings are represented by various forms of financing, the distribution of which is based upon criteria which can be inferred from proposals for revenues and, besides a sense of fairness, also take into account the policies practised by environmental creditor countries.

The following financial supports should not be neglected:

I) public and private companies' projects: tax relief on loans and export guarantees, respectively for various forms of investment directly in the sector of sustainable technologies (better still if through international joint ventures) and for the transfer of such technologies;

II) projects and programmes of governments of said states, of international bodies and of NGOs: for research into sustainable technologies, the environment in its geographical aspects and in its relationship to development; for research into preventive measures and environmental recovery, for the diffusion of sustainable technologies, training programmes and projects of sustainable development.

III) transfer to tropical countries of rents and royalties for pluvial forests destined to be scientific parks and transfer in any case of yearly loans (obtained from the carbon tax) proportional to the environmental benefits coming from reduction in deforestation (taking 1991 as a basis). The above would represent such a financial flow as to discourage alternative uses. Its assessment would imply an appropriate geographical classification of forest regions, as we have to keep into account the different "marginal opportunity costs" (Warford, 1989; Pearce, 1989b).

IV) loans at special rates to states and extra funds to firms for the reconversion, diversification and economic development of those countries that will be subject to

economic loss due to environmental policies of industrialised countries and also due to the implementation of the above proposals. The latter can only be carried out gradually.

This proposal is to be adapted to the new world conditions and to the present financial mechanisms for sustainable development,

3. Assumptions and implications of the I.E.F.

It may be useful, in conclusion, to make explicit some other aspects of the background implicit in the proposal of the I.E.F. and some of its ramifications. The institution of this fund - finalised to regulate international environmental relations and to finance the environment in its plurality of aspects and in its different geographical scales - bases itself on a systemic conception of the world and in particular on the principle of interaction between the different phenomena of the earth's reality and between the earth's regions. In other words, from this conception, a foundation of the geographical sciences since the first half of the 1800s, there arise some points for consideration.

1. Problems occurring on a "global" scale, privileged by multilateral conventions, resulting from the interaction of local, regional, national, and continental problems and actions. Therefore, solutions would imply plans of intervention on all levels, starting from a local scale.

2. The problems of each of the kingdoms of nature or "spheres" (atmosphere, hydrosphere, lithosphere, biosphere) in which we divide the geosphere (the earth as a whole), are often the result of processes that are developed also in the other spheres. Therefore, the implementation of most of the international conventions on the environment (already or yet to be approved - each in general related to one sphere only), implies integrated projects regarding many different aspects of the interconnected world.

3. In particular, we cannot afford global problems unless we solve those related to poor countries. These countries comprise a great part of the world territorially, and in terms of population; moreover, it is here that future demographic growth is concentrated. It is therefore evident that the protection of our common earth and human progress does not only involve a greater degree of co-operation between the countries of the north and the south, but the latter also need more solidarity and resources from the former. We have to understand that the countries of the south cannot realise alone the necessary investments for the development and diffusion of technology (of product, of process, of organisation) that is environmentally sounder than we have at present.

This is why, to establish a definition of a first environmental budget between nations (in order to proportion the payments from each nation to the I.E.F.), we cannot afford to wait and make elaborate measurements and sophisticated indexes. If the governments of countries that are environmentally in debt have the will, it is sufficient for now to use the data of the net emission of carbon per inhabitant, integrated with that of the average income. We have to adjust this data on the basis of the annual variation tax of the forestry biomass - so that we can encourage the reduction of de-forestation, or even better so that we can increase forestation.

However, it has to be clearly underlined that the planet's environmental problems need at the same time a strong effort, even if not financial, from the developing countries, in the pursuit of policies of sustainable development and in complying with their international commitments. Without this commitment the international co-operation and

financial sacrifice that this entails for the consumers of the north would make no sense, nor would it find the necessary consensus. Regarding this last theme it must be clearly understood that it is also necessary that the consumers of the rich countries have complete trust in the management of the fund and that they can effectively check and see the concrete results obtained. It is therefore indispensable that before and after the implementation of environmental plans there is a careful evaluation, and a more widespread diffusion of information.

On the other hand, environmental political action and all the financial effort that is necessary to put it into effect would make no sense if it was not established that all the investment projects, especially those financed with public help, should be consistent with the concept of sustainable development and should therefore be submitted to a preventive evaluation of environmental impact.

The programmes and financing for the environment would be in vain without a gradual but radical change of economic policies (which, at present, are made of fiscal and credit incentives, and customs barriers), that artificially increase the possibility of profitable activities, distort the markets, and end up generating waste and degradation of the natural resources and environment both in developed and developing countries (Repetto, 1988).

Such efforts would be equally in vain if the diffusion of unsustainable technology or, at least, technology not allowed by the environmental norms of the country of origin, is not impeded in developing countries (through strict control of investments and international transfers of technologies, incoming and out-going).

Regarding this theme, we must underline that "Tradable Permits" are unacceptable, although they are indicated as one of the useful potential mechanisms for funding sustainable technology and development as is outlined in the Report of the UNCSTD (1990). Without counting the fact that these Tradable Permits could suggest a new macro-regional vision of a neo-colonial type, they do not at all discourage the reduction of waste and consumption of rich countries. This reduction should be one of the fundamental directions of a really sustainable development on a world scale. Tradable Permits do not encourage in the developing countries a policy of environmental protection and especially of useful investments in the increase of productivity (of soil, of work and of energy used), which is the other fundamental direction of sustainable development on a world scale.

The mechanism of Tradable Permits and also that of consumption rights (which are based on the logic of who can afford to pay for it, can dirty as and how much he likes) are however in contrast to the proposal of the I.E.F., taking from this fund a crucial part of the revenues on which it counts.

According to the proposal of the I.E.F., the environmental debts (which belong to the whole world community and not to one or more chosen countries) have to be put in a common fund and managed multi-laterally, utilised for the financing of the environment and sustainable technologies in the creditor countries, to the advantage of the whole world community.

4. Why re-launching the IEF proposal?

I am re-launching the political proposal to constitute the International Environment Fund (I.E.F.), hoping the European Parliament and the Governments of the States will discuss it, because this global fund aims to give the right answer, in my opinion, to

problems referring to environmental protection and at the same time poverty, lack of energy and other means to meet the basic needs. In fact, poverty and environment degradation are closely related in many "peripheral countries"[4] of the world economic system. The opportunity to relaunch the proposal of the I.E.F. and, more generally, a political commitment for a fairer international order and democratic government of the world geosystem is given by the process of UN restructuring which I hope will accelerate in the post-2015 period.

The academic and research world, as well, has to participate actively in this process. It is time to overcome the very evident contradiction that has characterised the last fifty years: the contradiction between the indubitable growth of environmental knowledge and the continual growth of environmental degradation of our unique and shared planet. (The good performances of some countries and regions do not count if overall the world situation worsens). This is the first requirement that future UN Conferences will have to meet: objectively, because the environmental threat does not allow us time for delay; subjectively, because the people of the Earth would not accept further failures.

Therefore, presenting the IEF proposal, I would like to make some recommendations for the success of future conferences and summits.

1) We must not be too ambitious or vague: we must define the possible objectives, taking account of the rhythm of nature, on the one hand, and of human action on the other, and especially taking account of the financial (and human) resources available, and of the effective will of the governments of the states involved.

2) We must give priority, in the work of political conferences, to the environmental problems recognised by all of us, or at least to the problems for which there is a high consensus, regarding their diagnosis and cure, and the need for agreed multi-lateral intervention.

3) We must set aside environmental problems and processes which are controversial in the scientific world. They would lead to unproductive disagreement between the proponents of different theories, and this would lead to nothing. It would only be an excuse to avoid concrete political decisions.

Talking about these things, we have in any case to consider that some controversial phenomena (such as, the increase of carbon dioxide in the atmosphere, some experts disagreeing with the greenhouse effect theory) are due to processes (like the high consumption of fossil fuels by rich countries, and particularly intense de-forestation in a lot of poor countries) that have however other negative consequences for the entire world eco-system, and for the humanity as a whole (air pollution, acid rain), not only for the regions from which these misdeeds originate (natural regions do not respect territorial borders between states!). Leaving aside the effects of the increase in carbon dioxide, de-forestation produces profound climatic modifications and effects on the soil so devastating that induce the necessity to intervene to change the processes which caused it, and to allow sound management of the world's forests. Regarding the native tropical rain forests, their destruction has to be stopped because humanity cannot allow the most important "biological mines" of the earth to go up in smoke. Regarding emissions into

[4] Also called the South or underdeveloped countries or "developing countries", the expression used by international organisations and so the most common, even if it is not only euphemistic for many countries but also wrong because practically all countries (included the so-called central, northern or developed countries) are developing.

the atmosphere of carbon and of other toxic substances that endanger the life of humans and all other living things, it is not only a question of reducing the level (in addition, reduction made until now has been voluntary) but also of regulations and international controls because whoever pollutes and damages the atmosphere (an indivisible part of the geosphere) damages the fundamental right of all countries or people to a healthy environment. The rapid rise of polluting energy consumption that modifies the atmosphere destroys the possibility of an adaptation of the respiratory apparatus of humans. We must realise that if rational man does not change the model of economic and social development, he will destroy the natural man. If all nations, which have an equal right to use the atmosphere, emitted the same amount of carbon as that of the richest countries, human life on earth would perish.

Therefore, it is evident that the net emission of carbon dioxide must be contained and regulated, and so it is important at a world level to introduce a mechanism of international justice that takes account of the inequality of the net emissions of carbon dioxide, that give a good general indication of the consumption of natural resources and of the damage wreaked upon our environment.

4) Regarding this theme, however, one must avoid a sterile disagreement between poor countries and rich countries, between the south and the north of the world. Such disagreement would only lead to vengeful behaviour from the south and would lead the north to close ranks, and the efforts of people who really want to find positive answers to environmental needs would be vain.

As a preliminary consideration, it is important to recognise that the responsibility for environmental misdeeds, and the state of the planet, although natural resources have been unequally appropriated by different countries, cannot only be attributed to the ruling classes of the north but also to those of the south. We must in fact think that the serious processes of environmental degradation which occur in developing countries are not only due to unsustainable imported technologies (these are nowadays imported with the consensus and often evident co-operation of the local upper class); but they are often, and in certain cases mainly, caused by inadequate, environmentally inappropriate, traditional technology which the growth of population and its needs have long since outgrown. In fact, the most specific environmental problems of the countries of the South - such as de-forestation, erosion and degradation of soils, over-grazing, desertification, flooding, and lack of water, etc - find their prime cause in poverty itself, which is not only the fault of external factors (like the inequality of the international financial and commercial system). This poverty is also due to internal factors (like, for example, the unequal partition of land ownership and of other unjust social relationships that block the coming of a model of internal development), which are no less important than external factors.

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SETTING THE SCENE. GLOBAL ENERGY TRENDS

Valeria Palmisano[5]

Abstract

This introductory paper to the energy global market and particularly to its trends - based on world statistical data and scenarios given by international organization, as IEA, WEC - highlights the main transformations which are changing the prospects for production, distribution and consumption of energy and, consequently, the terms of the global ecological issue. The new prospects, made possible by the growing technological innovations, are due to new market trends and new entrepreneurial strategies and certainly also in response to policy initiatives and the challenge of Climate Change. Despite the certainly positive trends, such as the growth of renewable energy, the long term evolution may prove to be more challenging than estimated, due to the social aspects and the economic policies required for a sustainable energy transition from both an environmental and an economic point of view. Global and regional models for the energy governance will therefore play a crucial role.

The energy world is undergoing a vertiginous transformation, which inevitably shows in the way the energy vocabulary has evolved, to include now new terms such as *decarbonization, prosumer, innovation, internet-of-things, digitalization* and *smart,* next to more vintage ones such as *baseload.*

In fact, even the most distracted observer could not help but notice a change in the energy consumption and production paradigm, while the most attentive ones would not fail in remarking that such a change has a twofold set of causes, some of which are internal, some other exogenous of - if one prefers - global or systemic. Technology has certainly played a major role as key enabler, but technology is a matter of choice, among several different options and solutions. Global trends and dynamics on the other hand play a crucial role in shaping the relevant energy patterns, broadening and diversifying options for both energy consumers and producers.

Renewable technologies have increased the possibility of producing energy on site, without having to rely on the fuel transport and logistics to the power stations. So that around large scale fossil (or fissile) power stations a myriad of smaller renewable ones have appeared pretty much everywhere. Then internet, and its unstoppable pervasiveness. Last but not least transport (be it aerial, terrestrial or maritime transport) has reached an unprecedented level of development and intensity[6], thus making goods and service basically global, just consider Amazon.

Hence, for those in charge of flagging the main energy global trends, few references remain still important, and can be helpful while navigating in these uncharted waters.

On one hand technology, consumers and business models remain somehow in the realm of the individual choice for both energy producers and consumers. We can choose the technology as part of a certain public or industrial strategy, consumers (both as

[5] Head of EU Affairs, EDISON
[6] OECD - ITF Transport Outlook (2017)

individuals and as groups) determine their choices out of necessity or preference, and business models are the result of strategies which are up to the relevant economic and financial players.

Still all of these actors have to refer to a certain environment, where all other actors and players, in their cultural, social, political and economic dimension – a massive exogenous macro-phenomenon - influence their behavior, by offering risks and opportunities. So that global trends can either be searched in the schemes of geopolitics or geoeconomics and specifically in the "geopetitiveness" schemes (as a country's ability to attract investment and provide at the same time a competitive hedge for its companies abroad), or otherwise by measuring Foreign Direct Investment[7], both inflow and outflow, and these are numbers that can really matter.

Defining the right legal and regulatory framework for the energy sector, with all the right incentives to ensure secure, sustainable and affordable energy supplies, becomes an exercise than needs to take into account, in a genuine spirit of balance, all of the above considerations.

The International Energy Agency "World Energy Outlook" of 2016 (IEA, 2017) offers a good snapshot of the most compelling issues on the table for the energy sector at global level, and few highlights can be drawn from it.

Climate Change has become a genuinely global issue, and the Paris Agreement[8] – a commitment with the highest number of signatories ever reached in the history of multilateralism – has sanctioned an irreversible change in the mindset of policymakers. The science-based evidence of Climate Change leaves no room for inaction, and terms have to be agreed now not on the IF but on HOW and WHEN.

Renewable energies are a widespread reality which has brought a profound change in the economics of the energy sector (J. William, 2017). The shift towards more capital intensive models at nearly-zero marginal costs has triggered a rethinking of energy investment, both for public and private actors.

Fossil fuel subsidies and renewable subsidies will have to be managed in the transition within intelligent public policies to be both economically and socially acceptable, and the financial dimension will certainly play a crucial and delicate role.

Markets have to adapt accordingly. Zero-marginal cost renewable production units have entered the merit order. Wholesale prices decrease, investment signals are perturbed, network costs increase as to ensure the necessary network stability, as variable generation increases its share in the energy mix. Electricity storage appears on the scene together with new market actors, service providers and data managers. Block-chain and Bitcoin gradually lose their original lurky reputation and start becoming interesting, if not fascinating. In the meantime energy security remains high in the agenda so that adapting the market functioning certainly cannot happen at the expenses of the system security and reliability.

The geography of the energy demand keeps changing at global level (Adamo, F. & M., 2015), with entire new areas witnessing skyrocketing demographic trends, consumption patterns and - as a consequence for the economies heavily relying on carbon intensive energy sources - emissions.

[7] OECD, FDI Flows https://data.oecd.org/fdi/fdi-flows.htm
[8] UNFCC, Paris Agreement (2015)

The dynamics affecting oil prices, like it or not still a crucial reference, remain highly unpredictable with a *boom-and-bust* risk that might affect that (very) large part of the global economy that still relies on it and will (very) much likely continue to do so in the decades to come (Robert Papier, 2015).

LNG has spread substantially the commercial reach of gas as a commodity, thus breaking the geographical boundaries of the pipeline network.

To quote Fatih Birol, the IEA's Executive Director *"We see clear winners for the next 25 years – natural gas but especially wind and solar – replacing the champion of the previous 25 years, coal. But there is no single story about the future of global energy: in practice, government policies will determine where we go from here."* (IEA, 2016)

Another interesting prism to look at the complex and uncertain environment in which the energy sector is evolving is offered by the latest edition of the WEC 'World Energy Issues Monitor'. The survey offers a ranking for energy issues by impact, level of uncertainty and urgency as perceived in Italy, in Europe and at Global level. In the World Energy Council own words: *a snapshot of what keeps CEOs, Ministers and experts awake at night in over 90 countries.*

Out of the 2017 'World Energy Issues Monitor' edition[9] three main common issues emerge from the aforementioned geographical areas: commodity price volatility, energy efficiency and renewable energy.

While European and Italian leaders are concerned by regional and geopolitical dynamics, Europe remains highly committed to Climate Change[10] and struggles to identify the most adequate approach for a large-scale deployment of energy storages and batteries. Finally, at global level, leaders converge on the common challenge to agree on energy governance models catering for regional cooperation. In the meantime, the surrounding atmosphere sees an increasing attention for cyberthreats and cybersecurity.

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DOES SUSTAINABILITY NEED INTERNATIONAL CO-OPERATION?

Dario Chello[11]

Abstract

A unilateral commitment and a limited involvement of countries in addressing two current major issues involving the Mediterranean region, Climate Change and Migration, have been proven to be ineffective and hardly decisive. Despite Mr Trump's recent declarations on the excessive 'costs' of committing to Paris Agreement, the necessity of an international cooperative approach toward such global challenges seems incontestable.

Introduction

The intention of this intervention is to provide a perspective from the MEDENER association on the Energy Transition issues, highlighting how this approach can be useful and affordable to the two major global problems in the Mediterranean region: Climate Change and Migration.

Established in 1997 (April 11th) as an international non-profit organisation, MEDENER brings together 12 national energy agencies from both northern and southern shores of the Mediterranean, acting in the region for the Energy Transition.

The Energy Transition is here defined as a multipurpose approach which will contribute to realise energy security of supply, Climate change mitigation and adaptation, economic growth and job creation in the Region, which in turn will contribute to reduce migration flows. My role as President is to assist the member Agencies in enhancing the share of *renewable energy sources* (RES) in the regional energy mix as well as in promoting energy efficiency (EE) policies and measures, which represent the two main tools to realise the Energy Transition.

Firstly, we have at least two questions to address:

1) Why has the Trump's new presidency first act been the withdrawal of the United States from the Paris Agreement?
2) Is it possible to operate the energy transition in the Mediterranean region by acting bilaterally on the energy issue as self-consistent matter?

1. The withdrawal of the United States from the Paris Agreement

The Paris Agreement entered into force on 4 November 2016, thirty days after at least 55 Parties to the Convention have deposited their instruments of ratification, acceptance, approval or accession with the Depositary.

[11] President of MEDENER

In June 2017, Donald Trump[12] informed about his will to withdraw the USA from the Paris Agreement, declaring:

"As President, I can put no other consideration before the wellbeing of American citizens. The Paris Climate Accord is simply the latest example of Washington entering into an agreement that disadvantages the United States to the exclusive benefit of other countries, leaving American workers -- who I love -- and taxpayers to absorb the cost in terms of lost jobs, lower wages, shuttered factories, and vastly diminished economic production.

Thus, as of today, the United States will cease all implementation of the non-binding Paris Accord and the draconian financial and economic burdens the agreement imposes on our country. This includes ending the implementation of the nationally determined contribution and, very importantly, the Green Climate Fund, which is costing the United States a vast fortune.

Compliance with the terms of the Paris Accord and the onerous energy restrictions it has placed on the United States could cost America as much as 2.7 million lost jobs by 2025 according to the National Economic Research Associates."

Nonetheless, if you look closely at the annual reports on Renewable Energy and Energy Efficiency prepared by many International Organizations active on these matters[13], it can be seen that energy policies for Climate Change have produced good results for the USA in recent years.

Both energy efficiency and renewable energy sources are living a golden age, wherever in the world and, namely in the USA.

In electricity generation, momentum is with the greens. By the end of 2016, the top countries for total installed renewable electric capacity continued to be China, the United States, Brazil, Germany and Canada. China detects more than one-quarter of the world's renewable power capacity, approximately 564 GW, including about 305 GW of hydropower. Considering only non-hydro capacity, the top countries were China, the United States and Germany; they were followed by Japan, India and Italy, and by Spain and the United Kingdom.

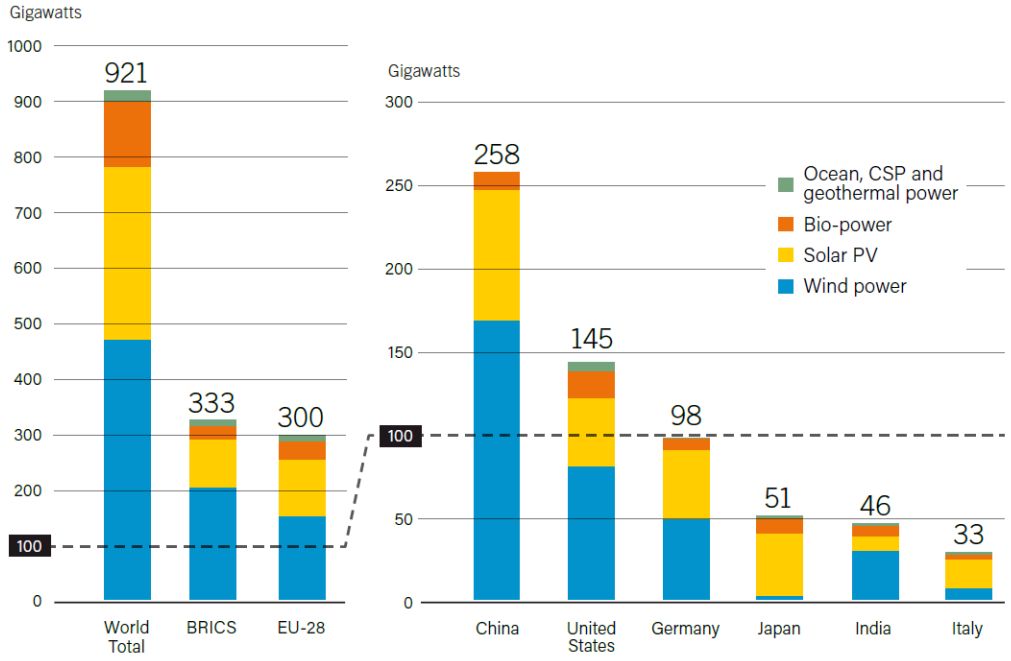
The ongoing growth and geographical expansion of renewable energy was driven by the continuing decline in prices for renewable energy technologies (in particular, for solar PV and wind power), by rising power demand in some countries and by targeted renewable energy support mechanisms.

In the United States, renewable energy accounted for over 15% of total electricity generation, up from 13.7% in 2015. Bio-power generation was down in 2016, while electricity generated by wind energy and solar PV increased substantially. More solar PV capacity was installed in the United States in 2016 than any other power source. Operation of the country's first offshore wind farm also began during last year (REN21, 2017).

[12] June, 01, 2017, The White House Office of the Press Secretary

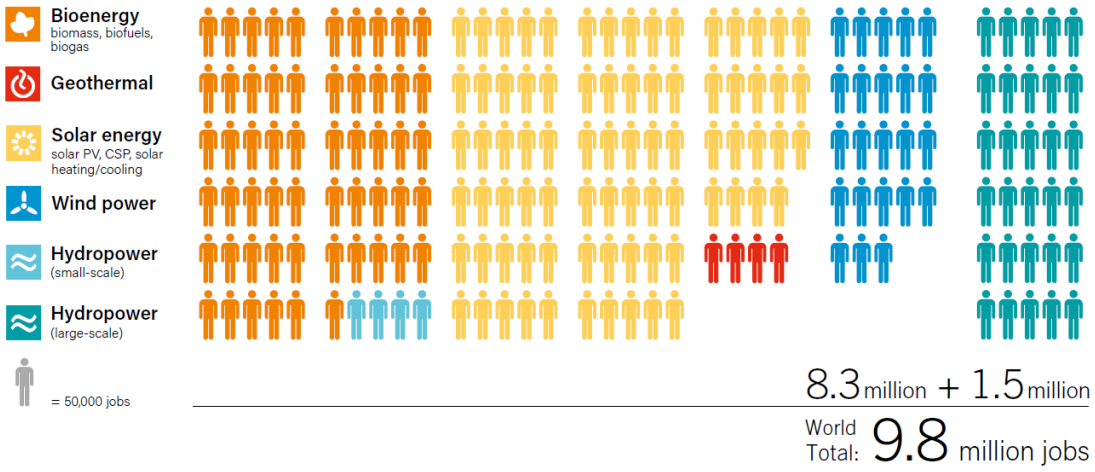
[13] REN21 (2017) ; IEA (2016) ; IEA and IRENA (2017)

ıre 5. Renewable Power Capacities in World, BRICS, EU-28 and Top 6 Countries, 2016



With regard to the jobs in the renewable energy sector, according to the REN21 Report (2017), the sector employed 9.8 million people in 2016. Jobs in renewables, excluding large-scale hydropower, increased of about 2.8% to 8.3 million in 2016 with respect to 2015. The leading employers countries continued to be China, Brazil, the United States, India, Japan and Germany.

Figure 6. Jobs in Renewable Energy



Energy efficiency policies are the main driver of investment in energy efficiency, with innovations in technology and finance also playing important roles. Thus, despite lower oil prices in 2015 and much of 2016, households, businesses and governments continued to invest strongly in energy efficiency. As policies have expanded, so has investment in energy efficiency. The IEA estimates that global investment in energy efficiency was USD 221 billion in 2015, an increase of 6% from 2014 (IEA, 2016). Investment in efficiency was two-thirds greater than investment in conventional power generation in

2015. Investment growth was strongest in the buildings sector, at 9%, with the United States making up close to a quarter of all efficiency investment in the sector. China has emerged as the largest energy efficient vehicle market, with 41% of efficient vehicle investments worldwide.

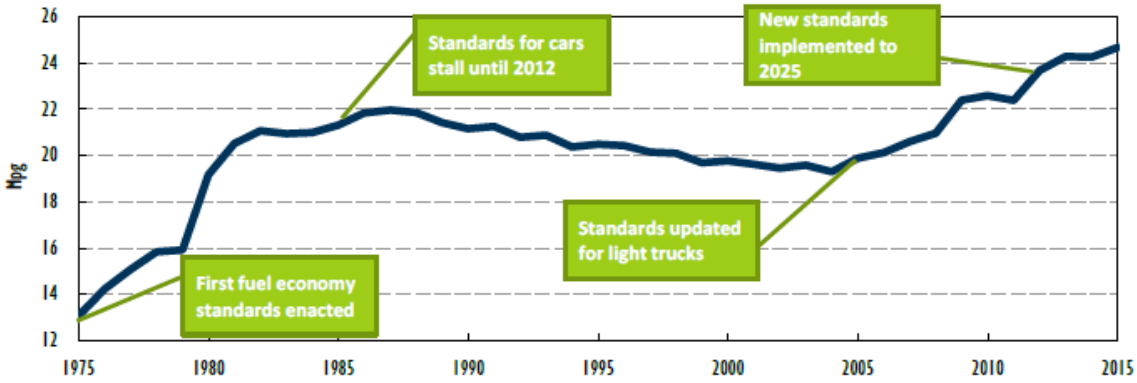
Referring to demand side, in 2016 the United States updated standards for commercial building conditioning including chillers, air conditioners, heat pumps and warm air furnaces. By 2023, new air conditioners will have to be approximately 30% more efficient than the 2010 standard. Cumulative savings from the standards over the next 30 years are estimated at 15,600 PJ (a 24% annual energy consumption savings compared with a reference case). The net present value of these savings is estimated at between USD 15 billion and USD 50 billion. The updated standards are estimated to reduce greenhouse gas (GHG) emissions by 77 Mt compared with the reference case .

In 2015, the US Environmental Protection Agency proposed new regulations under Phase 2 of its GHG emissions standards for heavy-duty vehicles (HDVs). The regulations, which will be implemented in 2018 and extend to 2027, will deliver between 0.5 mb/d and 1 mb/d in oil consumption savings between 2035 and 2050 – equivalent to 2.5-5% of current US daily oil consumption. Consumers would save up to USD 170 billion in fuel costs by 2050, and avoided fuel costs would pay back vehicle owners in only two years (ICCT, 2015).

Mandatory fuel economy standards now cover more than 74% of global vehicle sales and have gradually increased the fuel economy of the LDV (Light Duty Vehicle) fleet.

To evaluate the energy savings from vehicle fuel economy standards, a counter-factual scenario needs to be developed where standards are not implemented in order to estimate what the efficiency of the vehicle fleet would be in the absence of standards.

Figure 3.12 Average fuel economy of passenger vehicles sold in the United States

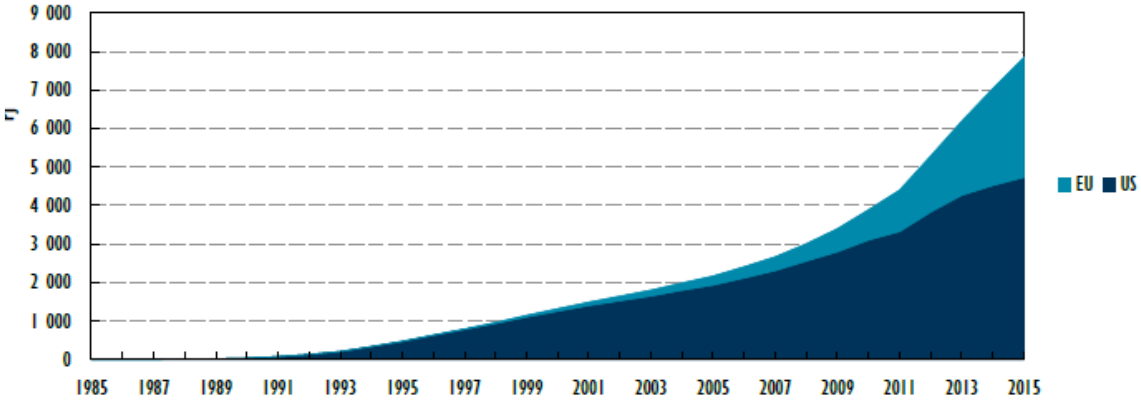


Notes: Mpg = miles per gallon. Context boxes were added to this figure by the IEA. Vehicle fuel economy presented in this chart is the average of all cars and trucks sold based on their adjusted combined fuel economy value. This value combines the fuel economy of city and highway driving in order to adjust vehicle efficiencies to real-world duty cycles.
Source: United States Environmental Protection Agency (2015). 2015 FE Trends Report. Appendix D: Fuel Economy Data Stratified by Vehicle Type. Office of Transportation and Air Quality. Retrieved from: www3.epa.gov/fueleconomy/fetrends/1975-2015/420r15016-appendix-d.xlsx

The number of electric vehicles, which reached 1 million in 2015, last year reached 2 million. Countries like France and firms like Volvo are looking ahead to the demise of the internal combustion engine (*The Economist*, 2017).

With regard to Energy savings from appliances and product standards the United States and the European Union are two of the largest consumer product markets in the world and energy savings from standards and labels have proven to be sizeable. In the United States, more than 65 product types are regulated. In 2015, standards in the two regions combined saved 4.7 exajoule (EJ), or 57% of US and EU appliance energy use. This represented USD 63 billion in avoided energy expenditure, approximately 15% of total expenditure on energy in buildings. By 2030, cumulative energy expenditure savings associated with energy efficiency standards are estimated at USD 2 trillion, reflecting a demand reduction in excess of one year of US energy consumption. In the European Union, policies enacted between the 1990s and 2015 (Ecodesign and energy labelling) resulted in 3.1 EJ of primary energy savings in 2015, representing 4.5% of EU primary energy demand. Cumulative primary energy savings since 1990 are 13 EJ (Figure 3.14).

Figure 3.14 Energy savings from appliance standards in the United States and the European Union



Source: REN21 - 2017

Finally, what it the reason for a negative evaluation of the Paris Accord, when all the indicators and data of the last few years show, without any doubt, that RES and EE are keeping all their promises?

Climate Change is an inconvenient truth for nationalism; it is a problem that cannot be solved at national level. It requires collective action among states and all actors in society at all levels. And it calls for a global governance. So, if the policy you want to implement is to go back in the direction of the State-Nation, you must first deny any cross cutting and complex problem and, consequently, any attempt for a global approach to governance. Of course, proposing simplistic and short-sighted solutions to complex long-term problems is a dangerous populist attitude, but often, populism and nationalism run together.

That is, in my humble opinion, the rationale for the withdrawal of USA from the Paris Accord. Mrs May's battle cry of *"No deal is better than a bad deal"* has already been abandoned, after the election defeat (Giles Merritt, Friends of Europe); this could also happen for Mr. Trump.

2. Is it possible to operate the energy transition in the Mediterranean region by acting bilaterally on the energy issue as self-consistent matter?

Climate change and migration are among the most pressing policy issues of our time. However, the international community has been slow to recognize the many ways in which the two phenomena are interrelated.

The 2016 "New York Declaration for Refugees and Migrants" (UN, 2016) recognizes the environment as a driver of migration and proposes several policy options in addressing how the environment, climate change and disasters can affect human movements at large-scale.

The preliminary results of the *"Migration, environment and climate change: Evidence for policy"* (MECLEP) project, founded by the European Union and implemented by the International Organization for Migration finds that **migration can be a positive adaptation strategy**.

At the end of 2014, during the seminar "Changing Migration Patterns and Migration Governance in the Mediterranean Region" in Rome (IAI, 2015), Daniela Huber pointed out that migration in the Mediterranean lacks a coherent international governance mechanism, while Sarah Wolf noticed that two main problems for the EU action in migration matters are, on the one hand, the limits of EU competence and, on the other, the European Neighbourhood Policy bilateral approach that is clearly unfit to address a complex and regional phenomenon such as migration.

Concerning energy, which remains the most relevant motor drive for Climate Change, already more than 30 years ago Hans H. Landsberg and his colleagues of the Resources for the Future (Washington) have clearly explained the reasons against the Energy Independency of State Nation, in their "Energy Today and Tomorrow: Living with Uncertainty" (Darmsdadter, 1983). Namely, the above-mentioned authors pointed out that even if the USA were able to produce all the energy they need in their country, this full energy independency would not be sufficient to isolate their country from external events.

At least for four different reasons:

1) A huge interruption of hydrocarbons production in the Middle East, or where ever in the World, could oblige the USA to share their indigenous production with their allies.

2) Many enterprises and banks in the USA are implicated as buyers, financing institutions or suppliers in all transactions linked to the energy outside the USA.

3) The USA is trying to avoid that energy constraints become terrible obstacles to the economic progress of the developing countries.

4) Being one of the most important exporters of nuclear energy technologies, plants and materials, the USA is deeply concerned that civil nuclear programmes of other countries do not implicate any enhanced nuclear proliferation.

Of course this list is not exhaustive and we could add other reasons in order to sustain our thesis.

Since then, a vast literature on the subject has developed almost anywhere in the world, and the aptitude for energy independence has been abandoned.

3. Conclusions and recommendations.

To sum up, we have to face two relevant global problems within the Mediterranean Region: at first Climate Change and Migration as the second, although often they can interfere each other.

We consider also that Energy Transition could be a powerful multipurpose political approach which can fit both the two global problems, using RES and EE as bottom up instruments to ensure energy security of supply, climate change mitigation and adaptation, economic growth and job creation in the Region, at same time contributing to reduce the migration flows.

I am glad to say there is a consensus in the EU institutions in considering the Renewable Energy Sources and Energy Efficiency a priority, once more in a broader, global approach.

We need to establish partnership policies with countries on the southern shore of the Mediterranean and Africa that involve these countries in concrete projects. Certainly, direct financial aid to governments in these countries is to be avoided. Likewise, claiming that our best practices in the sector should be adopted *sic and simpliciter* by the countries benefiting from the co-operation, is an attitude we cannot follow any more. Our approach should not retrace step by step the same path followed in Europe from the nationalization of the energy system to its liberalization. Bearing in mind the availability of new technologies of information and communication as well as the relevant improvement in the electronics components and systems, we have now some affordable alternatives to design and implement electrical and energy systems for the better integration of renewable energy in the energy mix trough a large number of producers/consumers spread in the territory, namely in medium and big cities.

This approach emphasises once again, the need for the three Union for Mediterranean (UfM) thematic Platforms (Natural gas, regional electricity market and RES & EE[14]) to work together in close collaboration, in order to enable cost-effective technological solutions within an adequate legislative and regulatory framework. The sustainable approach to energy policy is the key for the success of our society dealing with two relevant global problems, Climate Change and Migration.

Looking backwards, what is lost must be lost; looking ahead, a global governance is necessary to deal whit these two relevant issues at world level.

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ANGLOPHONE LEGAL CULTURE, HUMAN RECALICTRANCE, MALTHUSIAN CATASTROPHES, AND THE IRREFUTABLE PREMISE OF GLOBAL WARMING

Joseph P Garske[15]

Abstract:

This paper will not directly engage the question of global warming. It will neither attempt to confirm nor deny the reality of such an atmospheric condition. Instead, this paper has to do with an architecture of authority intended to preside over all peoples in all localities of the earth. It examines the necessity of a transcendent law to curb the excesses and impulses of humankind.

In its approach, the paper will discuss the present-day idea of global warming as a successor to the eighteenth century idea of the Malthusian Catastrophe. Viewed that way, the question actually becomes whether the human race, as a whole, has the capacity for ethical progress, or whether human nature is so inherently defective that, if unrestrained, it will destroy itself.

That topic arose in the eighteenth century when Continental jurists ridiculed the Common law as a medieval relic tied to the interests of hereditary privilege and merchant wealth. The Europeans asserted that both its harsh legal method and its pejorative view of human nature were vestiges of Medievalism and Puritanism. This affront to English ways called for a rebuttal.

An exchange began in 1795 with the publication of a book by Nicolas de Condorcet, *Progress of the Human Mind*, perhaps the single most influential summation of ideas from the Age of Reason and its Optimistic view of human capacity. Thomas Malthus answered that hopeful view with a more pessimistic appraisal set forth in his *Essay on Population*, published in 1798.

In his book, Malthus attempted to prove that the natural greed and depravity of human beings would eventually end—not in a world utopia—but in a tragedy of despair and death. The widely understood implication of his thesis was that the only way to forestall such a fate was to impose on the perverse appetites of humankind the strictures of transcending legal authority.

This paper will conclude that, whatever the facts about global warming, there are fundamentally two types of solution: those imposed from the top down by coercive authority, and those from the bottom up by public cultivation and learning. The Anglophone solution for a Malthusian Catastrophe is to impose upon humankind an elevated global Rule of Law.

KEY WORDS: Condorcet, Malthus, global warming, population.

1. The question

There are many ways to understand and address the issue of global warming. It may be engaged as an environmental issue, as a matter of public health, as an economic question, or as a political issue. But aside from the practical and scientific frame in which conventional discussions of this question usually take place, it has important and deeper implications as well. It has moral and ethical dimensions that run to the basic assumptions and methods on which a twenty-first century way of life is being constructed, a way of life that potentially includes all peoples and all regions of the earth.

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Taken on that level, the question of global warming has a great deal to do with attitudes, habits, and values that provide both the foundation and the rationale for a regimen of living that has come to be thought of as normal and conventional. Viewed from this perspective, the question also has to do with a choice between two alternatives in the Western approach to ordering human life and shaping human thought, alternatives that have, jointly, come to predominate around the world. Those two foundations can be described as the philosophic versus the empiric, the principled versus the pragmatic, or in legal terms, the Civilian versus the Anglophone.

The idea of an impending worldwide catastrophe brought on by the excesses of human rapacity and recalcitrance has a precedent in Christian theology. But it also has antecedents in a debate from the nineteenth century that further set apart the two Western traditions of law, Continental and English. That debate, which posed the promise of future hope against an expectation of impending doom, ultimately turned on assumptions about human nature. One side posited the human capacity for individual growth and development, and the importance of cultivation and learning as the basis of human society. The other side asserted a need for the coercive power of law to bring oversight and authority to tendencies of human behavior that could eventually bring a massive self-destruction.

However, that debate was only superficially about whether such a massive catastrophe actually threatened human existence. Nor was it primarily concerned with gaining consensus among world leaders and agreement among the public, to have them see an immediate and obvious threat. Instead, unlike discussions of global warming today, discussion of the actual form and substance of that catastrophe was of less importance, and of less immediate urgency. What that encounter did confront on a deeper level, unlike discussions in the present situation, was a difference that separated two alternative foundations for modern life. It made clear a distinction between two possible choices for bringing peace and order to a troubled world.

The first discussion of a possible catastrophic episode facing humankind was the *Essay on Population* set forth by an English writer, Thomas Malthus in 1798. His immediate purpose for writing it was as a response to the recent book by the French writer Nicolas de Condorcet, who, in his *Progress of the Human Mind*, in 1795, had celebrated the bountiful future to which mankind might aspire. What ensued in this contest of ideas was not so much the beginning of a useful exchange, as it was a clarification of the division between two wholly disparate legal realms that were coming into conflict with one another. The work of Condorcet, still considered to be a monumental summation of eighteenth century ideas, was philosophical in its approach, while the countering polemic set forth by Malthus was wholly empiric.

In the grim future he predicted, Malthus made clear the urgent and practical need for coercive oversight to protect all peoples in all localities of the world from their own excesses and impulses. In fact, the legal importance of his work was not restricted to the problem of population, but instead, to any catastrophic event brought on by the natural greed and depravity of human beings. This underlying purpose can be seen in the legal significance that surrounds the question of global warming today. Viewed from the Malthusian perspective it is useful to view global warming, not so much as a specific type of threat, but rather as a crisis being caused by the specific source of human recalcitrance.

In discussing this legal importance, the purpose here is not to directly engage the question of global warming. It is not necessary to examine its various scientific dimensions and implications. Nor is it even necessary to discuss the question of whether

such atmospheric conditions actually exist, or if they do exist, whether they warrant the level of concern widely expressed. Instead, what is addressed here is the differing nature of two legal cultures, their application to human life, especially to understand the logic of a transcendent English law by comparing it with a universal Continental law. In such an approach, it becomes a discussion about human nature as the basis upon which a regimen of global order will necessarily be constructed: will it be an atmosphere of cultivation and learning from the bottom up, or will it be by a coercive authority from the top down.

2. Religion and retribution

The two predominant legal traditions of the West were born at almost the same moment during the eleventh century, nearly a thousand years ago. Historians mark the beginning of the Civil law tradition with the founding of the University of Bologna in 1088, and the origin of its Anglophone counterpart with the Norman Conquest of England in 1066. But the circumstances of their two origins were very different, just as the nature of the two legal regimes would be equally disparate. Those differences remained fundamental throughout their parallel development insulated from one another, over centuries and to the nineteenth century.

There are many ways to understand the great gulf that separated the two legal regimes. Perhaps it is easiest to think of the Continental tradition as being philosophically based, evolving from the scholarship at the center of its development. It purported to adhere to rational principles, with a strong claim to being predictable and logical in its operation. By contrast, the English method, founded as a guild of trade, was collegial in its makeup, operating under the oracular authority of its judges. Because its methods were guided by the principle of consensus among its members, its great virtue was its flexibility and adaptability to changing circumstance.

However, major changes began to occur within both traditions at the onset of the modern age. Beginning around 1500 the educative unity of all Christendom began to break down, as the primacy of the Roman Church and Empire was challenged. Kingdoms and states began to reconstitute themselves as independent polities, often with their own national religions. One of the most influential forces in this national transformation was that of Calvinism. In the pattern of the era, its doctrines combined the realm of jurisprudence with the realm of theology. Its fundamental premise was twofold: first was a pejorative view of human nature as being inherently corrupt and predestined to hell. But along with that condemnation, it sought to establish a *Republica Hebraeorum* with a Chosen Elect of ministers and magistrates. They would fulfill the Divine Plan of human redemption by the punitive methods of a Biblical legalism.

The effects of its dogmatic, often merciless, approach to maintaining public order, however, led to a general revulsion against religion as the educative instrument of governance. During the seventeenth century, when the religious wars finally ended with a settlement at Westphalia in 1648, public sentiment on this matter had already begun to change. By the turn of the eighteenth century, governments on the Continent began to abandon the old ways, and instead began to construct an approach to governing based on secular principles of philosophy and science. But among the English, where the teachings of John Calvin took the form of Puritanism, that religion had established a permanent hold.

Just as Westphalia had been the turning point for Europe, the Glorious Revolution of 1688 was a turning point for England. Although the monarchy was re-established on a

new foundation, its new frame of governance retained many of the unitary elements of Norman Kingship, just as it retained the spirit of Puritanism. England continued as a dynastic monarchy with a hereditary peerage, but it also included both the Common law and a national church as basic constituents. The new form of rule with its famously Unwritten Constitution and its omnipotent High Court of Parliament became deeply rooted in the island realm and eventually became the center of a world empire.

The rationale for this new basis of rule was given expression most famously by the legal philosophers Thomas Hobbes, John Locke, and Bernard Mandeville. In the Hobbesian view human beings were by nature brute and savage, and required a strict discipline. For Locke, the common man was best conceived of, for purposes of rule, not so much a human being, but as an objective composite, an aggregate of abstract legal rights. Finally, because the strength of the Kingdom was the accumulated landed and monetary wealth held by the ruling classes, the role of incentives and production by the laboring multitude was set forth by Mandeville. Taken as a whole, rather than lamenting the wayward tendencies of humankind, the British attempted to harness those impulses to impose a more complete and stable basis of rule.

3. Rational progress

However, during the eighteenth century, England became to some extent an object of ridicule among observers on the Continent. They looked with disdain upon the English combination of a medieval law, hereditary opulence, together with a large and destitute population living in squalor and disease. Even within the ruling hierarchy there was deep division about the methods of law and a system of rule and its effect on the vast and impoverished multitude. In the spirit of the times, the discussion went to fundamental ideas of existence and the nature of man. Those ideas put forth in England by the Earl of Shaftesbury, Lord Bolingbroke and later, in Scotland, by Francis Hutcheson and Thomas Reid closely resembled philosophical ideas that were prevalent on the Continent.

Although varying in detail, numerous philosophers and writers set forth an affirmative view of human potential that characterized the eighteenth century Age of Reason. It was a belief in the common humanity of all races, a belief in the human capacity to learn and develop, and a belief in the faculty of reason shared by all persons. It asserted that if a people were favored with cultivation and learning they would be able to enjoy a prosperous and peaceful existence and be competent to order their own affairs. These ideas were expressed variously as the Optimism of Leibnitz and Wolff, the General Will of Rousseau, the Common Sense philosophy of Thomas Reid and Thomas Paine, and the *Sensus Communis* of Kant.

The optimistic philosophy of Common Sense, in fact, had many similarities to its ancient precursor, Roman Stoicism, and even had traces of Confucian influence, a philosophical view widely admired in eighteenth century Europe. Like those ancient Roman and Oriental teachings, this new Humanist view, although not religious in itself, had a religious sensibility, given expression in the teachings of Deism. Like the ancient Stoics, its followers recognized a divine source of all natural phenomena, while it asserted the potential for human development toward a prosperous and peaceful world. This attitude was sometimes expressed and sometimes ridiculed as the principle of Perfectibility.

However, the single most influential discussion of these ideas came at the end of the eighteenth century by Nicolas de Condorcet in his seminal work on the *Progress of the*

Human Mind, published in 1795, he set forth what he thought was a realistic hope for humankind based on principles of humanity and reason. He affirmed the notion of an enlightened people able to arrive at a state of existence less troubled by sectarian strife, diplomatic intrigue, and wars of mass destruction. He proposed a universal instruction among all persons in all locations. In his view, like that of the Stoics and the Confucians, all of humankind could be lifted by a universal process of cultivation and learning.

4. Emprical reality

These ideas, of course, were an affront to the practical and pragmatic English jurists who sought to be transcendent in their application of law. As a legal regime they comprised a hierarchy that, despite the spirit of the times, worked as a medieval guild of trade within the courts. It was premised on a pejorative view of human nature as requiring strict and continuous oversight. It assumed the necessity of a ruling strata held together and imposing an order on an otherwise anarchic population. With the unsettling impact that followed the publication of Condorcet's book in England, Malthus was compelled to provide an answer.

Malthus was not interested in lofty speculations about the possibility of elevating the traits of the mass of men by instruction. Nor was he interested in abstract speculations about nature or philosophical niceties, or ideals and principles by which men could be taught to govern themselves. Instead, he was able to provide a clear rationale for the necessity of an overarching rule based on what would be the provable and inevitable fate of humanity, if men were left to their own devices. It was that human beings unrestrained, driven by their own compulsions would eventually destroy themselves in a crush of overpopulation and the inability of nature to provide them with subsistence.

If the premise set forth by Malthus was accepted, the question would then move to a practical consideration of when such necessary restraints should be placed on the world multitude to forestall and prevent such a bleak ending. Certainly, the foreboding depiction set forth would only be realized far into the distant future. Yet, for the sake of prudence, the application of restraint should not be postponed, but, instead, should begin immediately. With one stroke Malthus had seemingly eradicated the thought of a legal regimen based on an idealized human capacity for good, and he did so by setting forth an irrefutable argument.

However, viewed another way, the impending population crisis was only one potential outcome of the real underlying problem. If persons were allowed to live uncontrolled they would inevitably come to meet a catastrophic end of their own making, that fate had already been determined by their own fallen makeup, their natural depravity. The Essay became one of the most important books in the history of the English legal tradition. It set forth a premise that demonstrated how the ordering of human life and the shaping of human thought was required by an imposed authority, what came to be called a Rule of Law. Malthus was often condemned for his bleak pessimism, even by the English, but his logic concerning the crisis of population could not be denied.

5. Universal and transcendent

There are many ways to compare and contrast the two Western traditions of law in relation to the encounter between Condorcet and Malthus. But in the time of a global age perhaps the most useful is to view them in relation to the means by which they each might become applicable to all regions and all peoples across the world. That is, to examine the way each is capable of extending not merely an order of authority, but also the way it would engender an atmosphere of understanding in a regimen of global life.

In fact, the two would accomplish such a purpose in very different ways. Although it would not be accurate to pose them as precise opposites, taken in the aggregate and according to what is basic to the nature of each method, they can be described as being dramatically and fundamentally unalike. Their essential differences are related to their historic origins and connected to their differing compositions: one is philosophically based and the other is collegial in nature. One is universal in its perspective, the other is transcendent. One operates on a unity of knowledge while the other operates on a division of knowledge.

The Continental approach, despite its current secular composition, follows on its historically theological past. It was so in that it was fundamentally universal in its outlook, and it was so in two ways. First, its principles and ideals, its conception of humanity was intended to be applicable to all persons of every race, of every rank and status. Second, for its method of law to work, all persons, high and low, rich and poor, had to be schooled in that structure of theological or Humanist principles in which it was based. These included the essential equal humanness of all persons, the potential for growth and development of all persons, and the faculty of reason possessed by all persons.

The educative half of the Civilian legal tradition entailed, therefore, a high level of instruction among the public generally. The Continental method of legal oversight could not function without a general understanding of its principles by all members of the public—including both those in authority and those of the public. Hence, unsurprisingly, Europe became known across the world as a center of culture and learning, as this educational premise in its many forms distinguished the various peoples on the Continent. In such a way of life the philosopher who shaped this inclusive basis of learning was a central figure in its perpetuation. At the same time, the secular university came to be the central institution in its operation. The Civilian tradition prided itself on being a rationally self-existent mode of law, applicable to all persons. It required no external or supernatural doctrine to support it.

By contrast the Anglophone tradition was transcendent in its outlook. The realm of law, of judicial knowledge and authority, occupied a place elevated above the public generally. From this high place it was able to act independently and confer an impartial form of justice upon all persons within its jurisdiction. This overarching construction would make it possible to provide an umbrella of authority over the many localities and peoples of the earth, regardless of ethnic or cultural differences. Because the basis of public order rested on the strength and stability of its legal institutions, a high level of cultivation and widespread learning was not as important for the purpose of legal rule.

What was important, however, was a framework of understanding that connected the realm of unified privilege and authority above with the realm of conflicting rights and obedience below. Historically that frame of understanding was supplied by religion and by that device the workings of each law court was surrounded by an aura of sanctity. Equally important, just as their legitimacy was based on a religious faith, the vestige of Calvinism also provided a logic for the punitive measures they employed. Even into the

global and secular age of the twenty-first century the importance of religion in the Anglophone legal regimen remained crucially important. This religious element has conventionally taken the form of the Christian or Judeo-Christian tradition.

6. Technology and governance

Both legal traditions, Civilian and Anglophone, began within a medieval atmosphere, a simple, rustic, and agrarian way of life. During the sixteenth century a wave of technical and scientific innovations provided the means for transforming the legal and religious order of Christendom into its modern form. Then during the nineteenth century, a new period of invention and discovery provided ways of transporting and imposing the Western modes of law and learning on every continent of the world. In the twenty-first century, with seemingly miraculous technological advances, the way is now opening to once again transform human life around the globe. It is now possible to extend the authority of law, and its necessary correlate, a standardized atmosphere of understanding, across every nation and people of the earth.

For purposes of legal rule, however, it is no longer necessary to instill a uniform structure of knowledge, to shape the thinking of a vast global public. It is not necessary to indoctrinate with a fixed and complicated framework of ideas about either theology or ideology, or even history and government. That old approach to education, with its laborious process of inculcating a fixed pattern of knowledge by rote learning, is no longer necessary. Instead, it is now possible to provide a continuous and immersive atmosphere of electronically transmitted sound and image. By this means a constant flow of information can shape the understanding of a worldwide public, efficiently, with minimal effort, and in the normal transactions of everyday life.

Moreover, the European tradition of culture and learning, its respect for human brotherhood, its confidence in human possibility, the importance it attached to human reason, no longer seems relevant. In fact, those ideas from the eighteenth century seem almost quaint in the post-human or trans-human discussions of the twenty-first century. Instead, attention has moved away from an innate human nature and its capacity for development and improvement. Focus has instead shifted to the mechanical topic of cognition, and a search for how the technical and the human might be made to converge—or at least replicate one another. The aspiration to a future destiny built on the cultivation of human attitude and habit, as Condorcet saw it, has little place in an era when even the cognitive architecture of the human mind might be mechanically recalibrated.

In the age of Big Data, algorithms, and Deep Learning, questions of human volition become overshadowed by the more urgent and immediate hope that the next generation of technical development, combined with measures of enforcement, will alleviate the problems of the present—including the problem of global warming. The world is a very different one from that inhabited by Malthus and Condorcet, and its challenges are much different. That is to say, the challenges of the mediated reality which has come to circumscribe human life are unique. But viewed another way, the prevailing mode of understanding through the lens of technology and legality, is an artificial one, created and constructed. Condorcet might assert that there is a pre-existing and natural perspective large enough to see that this combination of instrumentality and authority represents merely one alternative among many.

7. A climate of understanding

Public discourse occurring around the world today generally includes two assumptions on which there is widespread agreement. First, that there is an increase in temperature across the globe caused by the many factors inherent to a modern Western way of life, a way of life that has been adopted by peoples in all regions of the earth. Moreover, the effects of this rising temperature will almost certainly be catastrophic, possibly very soon. The second point of agreement involves an almost uniformly agreed upon answer to this problem. That is, to construct a regimen of oversight and enforcement that, with the mobilization of technical advance, can bring a correction. Ultimately, this solution rests on the legal instruments of a transcendent adjudicative authority able to compel peoples, industries, and governments into a uniform compliance.

What is less emphasized, or is perhaps dismissed as an unrealistic alterative, is a program of change in habits and attitudes, in the material and commercial values that have come to prevail among the global population. The conventional remedy offered does not rely on the cultivation of thought and deed, the human potential for assuming responsibility. It is not based on confidence that a dramatic change in human behavior is possible. To the extent there is an appeal for the public to turn away from habits of consumption and waste, it might be introduced as a symbolic gesture, as an aside to the more realistic and central legal-technical solution.

This shift from the *Sensus Communis* of the eighteenth century, away from the Optimistic potential of human beings—to the extent Global Warming is viewed in immediate practical terms, instead of ultimate and ethical terms—shows a change in the atmosphere of world opinion. The current set of assumptions and conclusions demonstrates a clear abandonment of the values of the eighteenth century and its affirmation of the potentials of humankind. That is, a confidence in the idea of culture as cultivation in thought, word, and deed. The guiding object of that time, as summarized by Condorcet, was the progress of a world public to more enlightened ways of ordering human life and shaping human thought. It presupposed a universal atmosphere of learning, not merely information, and an assumption of human strength and capacity, not merely weakness.

An enforced legal approach will not necessarily elevate the level of cultivation and learning among a global population. Nor can it be claimed, with certainty, that legal and technical measures can be trusted to actually solve the problem of global warming. After all, the existing combination of legality and technology was fundamentally complicit in bringing the imbalance between human beings and nature in the first place. The one outcome of certainty--in the prevailing answer to global warming--will be the construction of a transcendent mode of enforcement, in the form of an enveloping legality and technology. By contrast, the other approach might bring much wider benefits, not only in the matter of global temperature, but in the atmosphere of human development. Taken on this level, the question of global warming becomes a moral and ethical question, a question of cultivation and learning, more than a scientific or legal question.

The purpose here is not to address the scientific question of global warming. It is not to advocate for any political position in regard to that question. Nor is it an attempt to argue against any combination of legality and technology as a solution to this question. Finally, and especially, this is not an attempt to advocate for ideas and attitudes that were prevalent two hundred years ago. Instead, the purpose here is to show an alternative or enlarged approach to a public question, an approach that goes deeper than the merely pragmatic terms in which it is normally framed.

That is, to pose the question as it might have been understood in the atmosphere of profundity that made the eighteenth century so unique—its overriding discourse began with matters of human capacity and human potential. Taken in that light, perhaps the question becomes, will human understanding solve the problems of the world, or will technology and law solve the problem of humans. That could be the twenty-first century version of the debate between Malthus and Condorcet, and it could be the larger question in the matter of global warming. Taking one approach might only result in an expanded Rule of Law. Taking the other approach, might work a transformation in human existence around the globe.

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THE TECHNOLOGY MECHANISM UNDER THE UNFCCC AS A TRANSFORMATIONAL POLICY TO HELP ACHIEVING LOW CARBON SOCIETIES

Mario Jorizzo and Sergio La Motta [16]

Abstract

The goal of this report is to analyse the Technology Mechanism (TM) established under UNFCCC in 2010 at COP16 in Cancun, to highlight the process behind its conception, its current status of implementation, its efficacy to fostering Low Carbon Transition and the way forward according to the Paris Agreement of COP21. TM is organized in two branches: the Technology Executive Committee – TEC, responsible for setting the strategies and the Climate Technology Centre and Network – CTCN for the implementation of specific mitigation and adaptation projects in Developing Countries. The Technology Mechanism represents a discontinuity in the traditional way of conceiving cooperation towards Developing Countries as it acts as "a 'dynamic' arrangement geared towards fostering public-private partnerships; promoting innovation; catalysing the use of technology road maps or action plans; mobilizing national, regional and international technology centres and network; and facilitating joint R&D activities" on a "Country-driven basis". Moreover, after analysing the main characteristics of CTCN projects implemented so far, we will propose an evaluation approach of such projects based on the social network analysis in order to capture also the "local self-empowerment" aspects for the achievement of the Sustainable Development Goals (SDGs).

1. Introduction

The 2015 Paris Agreement calls for a common goal of capping the planet average temperature increase since pre-industrial level to well below 2 degrees Celsius; this would imply, for developed countries, a near zero emission target for 2050 and a substantial deviation from business as usual scenario for developing countries[17].

This process towards the achievement of low carbon societies would imply a radical change in the way energy is produced and consumed and can be described in its dynamics as a transitional process.

The role of technology transfer in helping the transition towards Low Carbon Societies (LCS) is described in this article highlighting the importance of achieving greenhouse gas emissions reduction together with the entire set of the Sustainable Development Goals (SDGs) decided in New York in 2015.

2. The UNFCCC Technology Mechanism

The Conference of the Parties (COP) at its 16th meeting held in Cancun (Mexico) in 2010 agreed, through its decision 1/CP.16, to establish a Technology Mechanism to facilitate the implementation of actions on technology development and transfer for achieving the full implementation of the Convention on Climate Change. The Paris

[16] ENEA

[17] See G8 Aquila Summit final declaration on climate change (2009) and the resulting Deep Decarbonization strategies in Industrialized countries (http://deepdecarbonization.org/)

Agreement confirmed the importance of technology development and diffusion to achieve the 1,5-2°C target.

The Technology Mechanism consists of the following components:

a) the Technology Executive Committee (TEC)
b) The Climate Technology Centre and Network (CTCN)

The TEC is the Technology Mechanism's policy body. It analyses issues and provides policy recommendations that support country efforts to enhance climate technology development and transfer. The TEC consists of 20 technology experts representing both developed and developing countries. It meets several times a year and holds climate technology events that support efforts to address key technology policy issues.

The implementation body of the Technology Mechanism is the CTCN. It facilitates the transfer of technologies through the following three services:

- Providing technical assistance at the request of developing countries to accelerate the transfer of climate technologies
- Creating access to information and knowledge on climate technologies, particularly through its knowledge management system
- Fostering collaboration among climate technology stakeholders via its network of regional and sectorial experts

The CTCN is hosted by the United Nations Environment Programme in collaboration with the United Nations Industrial Development Organization, and is supported by 11 partner institutions. The Centre facilitates a network of national, regional, sectorial and international technology centres, networks, organizations and private sector entities. The CTCN is accountable to and under the guidance of the Conference of the Parties through the CTCN Advisory Board.

TEC and the CTCN work together and support developing country efforts to address both policy and implementation aspects of climate technology development and transfer. They work to enrich coherence and synergy in the delivery of climate technology support and respond effectively to the needs of countries.

3. The CTCN mandate

The CTCN mandate has been defined, in 2010, in COP decision 1/CP.16 in which it is stated that CTCN shall facilitate a network of national, regional, sectorial and international technology networks, organization and initiatives with a view to engaging the participants of the network effectively in the following functions:

a) At the request of a developing country Party:
   i. Providing advice and support related to the identification of technology needs and the implementation of environmentally sound technologies, practices and processes;
   ii. Facilitating the provision of information, training and support for programmes to build or strengthen capacity of developing countries to identify technology options, make technology choices and operate, maintain and adapt technology;
   iii. Facilitating prompt action on the deployment of existing technology in developing country Parties based on identified needs;

b) Stimulating and encouraging, through collaboration with the private sector, public institutions, academia and research institutions, the development and transfer of existing and emerging environmentally sound technologies, as well as opportunities for North–South, South–South and triangular technology cooperation;
c) Facilitating a network of national, regional, sectorial and international technology centres, networks, organization and initiatives with a view to:
   i. Enhancing cooperation with national, regional and international technology centres and relevant national institutions;
   ii. Facilitating international partnerships among public and private stakeholders to accelerate the innovation and diffusion of environmentally sound technologies to developing country Parties;

4. Arrangements to make CTCN fully operational

The CTCN is built around the Climate Technology Centre (CTC), which consists of the CTC Core Centre and the Technical Resource Pool (TRP). The TRP includes the so-called Consortium Partners[18], which support the CTCN and its activities as the main strategic partners besides the Advisory Board (AB) that ensures the efficiency of the action of CTCN in respect of the COP mandate.

The Technical Resource Pool will mainly be engaged in the initial appraisal, refinement, and technical support for requests received through the National Designated Entities - NDEs from developing countries, and contribute to the Knowledge Management System. The CTC Core Centre can ask for their support (e.g. in form of a respond to a project request by a developing country) if the network cannot yet, or in general deliver the needed services.

The National Designated Entity (NDE) acts as the focal point to the CTCN and is an intermediary between the national actors and the CTCN. NDEs are to be determined by the national governments. They can be located in varying (existing) offices with relevance to the targets of CTCN. In this case the political mandate by the UNFCCC asks all Parties to determine an NDE, even though the CTCN services are intended for developing countries. However, each member state is supposed to have a public focal point to the CTCN.

The CTC network provides the pool of expertise, knowledge and resources that are supposed to respond to the requests of the developing countries. This network needs to encompass a broad range of skills and expertise to support the mission of the CTCN. "Considering the wide range of adaptation and mitigation expertise required across sectors, regions and sub-regions and technologies, a wide and diverse Network of regional and national institutions is required as a delivery mechanism that can respond effectively and efficiently" (CTCN, 2013, p. 16). Therefore, the members ideally include varying

[18] In particular, the Consortium Partners are: 1) Asian Institute of Technology (AIT – Thailand); 2) Bariloche Foundation (Argentina); 3) Council for Scientific and Industrial Research (South Africa); 4) Deutsche Gesellschaft fur Internationale Zusammenarbeit (GIZ – Germany); 5) Energy Research Centre of the Netherlands (ECN); 6) Environment and Development Action in the Third World (ENDA – Senegal); 7) National Renewable Energy Laboratory (NREL – United States); 8) The Energy and Resources Institute (TERI – India); 9) Tropical Agricultural Research and Higher Education Centre (CATIE – Costarica); 10) UNEP DTU; 11) UNEP-DHI – Centre on Water and Environment (DK); 12) United Nations Environment Programme (UNEP); 13) United Nations Industrial Development Organization (UNIDO); 14) World Agroforestry Centre (ICRAF - Kenia).

stakeholders such as regional climate technology centres, international and regional organizations, (private) technology and other service providers, project developer, research/academic institutions as well as financial institutions and nongovernmental organizations. The selection of network members follows certain criteria and the CTC Core Centre screens each potential member before the membership is approved.

5. An overview of the CTCN technical assistance projects

So far, up to January 2018, the CTCN has received almost 194 requests for technical assistance. Of these about 30 are completed and 53 are in the implementation phase[19].

CTCN received most of its request for technical assistance from low and lower-middle income countries[20] and Africa is the main geographic destination followed by Asia and Latin America.

The technical assistance projects financed by the CTCN cover a wide range of activities by sector of application, in the mitigation and adaptation area, and by stage of the technology cycle. There are also numerous requests asking support for strengthening enabling framework for technology deployment and scale up (institutional straightening, legal and financial framework, etc.).

Energy related projects are the most requested projects, moreover most of the time the "cross sectoral" requests include an action on renewable energy within the activities.

The characteristics of the provided assistance in terms of its scope and the size of the financial commitment for single action (from 50.000 to 250.000 $), suggest that it is important to consider the wide contribution to the future sustainable development and the local community involvement when evaluating the effectiveness of the CTCN technology assistance activities besides measuring the direct effect of the specific action implemented in terms of its mere contribution to the global reduction of CO2 emission. The promotion of technical innovation in low developed areas is delayed by the scarcity of human capital (i.e. the lack of high technological skills and capabilities), and limited access to financial capital.

In such a context, the CTCN technical assistance is unavoidable to assist promotion of innovative sector.

These elements, i.e. the characteristics of the CTCN projects and its mandate together with the local obstacle towards systemic innovation, suggest the Transition Theory (as articulated in the multilevel approach and technology niche) as a proper instrument to analyze and evaluate the achievement of the CTCN.

[19] A detailed description of specific projects financed by CTCN is available at https://www.ctc-n.org/technical-assistance/data

[20] According to the World Bank classification of the world's economies are currently divided into four income groupings: low, lower-middle, upper-middle, and high. Income is measured using gross national income (GNI) per capita, in U.S. dollars. As of 1 July 2016, low-income economies are those with a GNI per capita of $1,025 or less in 2015; lower middle-income economies are those with a GNI per capita between $1,026 and $4,035; upper middle-income economies are those with a GNI per capita between $4,036 and $12,475; high-income economies are those with a GNI per capita of $12,476 or more. https://datahelpdesk.worldbank.org/knowledgebase/articles/378834-how-does-the-world-bank-classify-countries

6. The theoretical framework of the socio economic transition of technological system in a nutshell and its relation to the CTCN

In order to be able to cope with a transition it is crucial to understand, in anticipation, evolutionary pathways and key drivers of change. In this framework the socio-technical change, i.e. innovation, is of particular interest.

The processes that lead to innovation has been investigated from different point of view, one of the most interesting one is the approach of evolutionary school of innovation (Nelson and Winter, 1982, Dosi, 1982). Here innovation is analysed as a "solution of problems", not as an exogenous process. The difference between incremental and radical innovation is also introduced. Incremental innovation is the one that rests on a knowledge base and infrastructure accumulated over time, and allows improvements within a defined technological system, which reduces the scope of problems, the knowledge base needed to solve them, the range of possible solutions, the research methodologies, the actors involved in the innovation process.

The incremental innovation path produces innovation quickly and cheaply, but this is why it sometimes locks in innovation by preventing the activation of new paths. The "radical" innovation places the foundations of a new technological system, as it identifies several problems to answer, adopt new knowledge bases, revolutionize research methodologies, identify new solutions, involving new actors.

Starting from the concepts of the evolutionary school, the school of technological transition extends the concept of innovation to all socio-economic spectra that can influence the emergence of new ways of production, such as consumption, research, institutions, (Rip and Kemp, 1998; Bijker et al., 1987; Geels, 2004). Similarly to the evolutionist approach, there is radical innovation when it creates a new socio-technical regime. Therefore an innovation policy is a policy that leads to new socio-economical regimes.

The transition school analyses the social and economic organization by distinguishing three levels of complexity interacting among them. The first level, the "micro", is the level where the niches are formed, starting with novelty (i.e. breaks in the routines of the regime), consolidating through a progressive definition of their internal components (rules, networks, structures) that brings the novelty to merge into a stabilized system; in the second level, that "meso", the stabilized niches interact with the regime and work in it, starting building new regimes; Different regimes can thus coexist to a "macro" level called "landscape" characterized by global factors, which can cause pressure to create conditions conducive to the initiation of change processes and thus the emergence of new regimes.

Applied to climate change and decarbonisation, this approach builds responses to the growing problem of transition to sustainable production and consumption systems. Niches, in other words, are the areas for experimenting with new rules of consumption, production, research, and social organization that may prove to be winning as soon as the context conditions change or that can help change the context through size growth.

The figure below provides an illustrative picture of this dynamic process. In the predevelopment phase different niches emerge (e.g. First Photovoltaic field; biomass energy production etc) and, in order to survive, they need to gain critical mass also cooperating with each other. In this phase the incumbent stakeholders (e.g. the fossil fuel resources technologies, which represent the regime level) are defending their position either by preventing the development of the niche solution or by locking their

technologies in by the so called the "end of pipe" solutions which improve the environmental impact of fossil technology, allow new technology as ancillary solution the incumbent fossil technology. If the niches technology are supported by additional forces (e.g. public opinion and/or international cooperation and support, i.e. the Landscape level) they will be able to overcome the incumbent position and start a reconfiguration process of the overall system that will lead to a stable new "low carbon" regime.

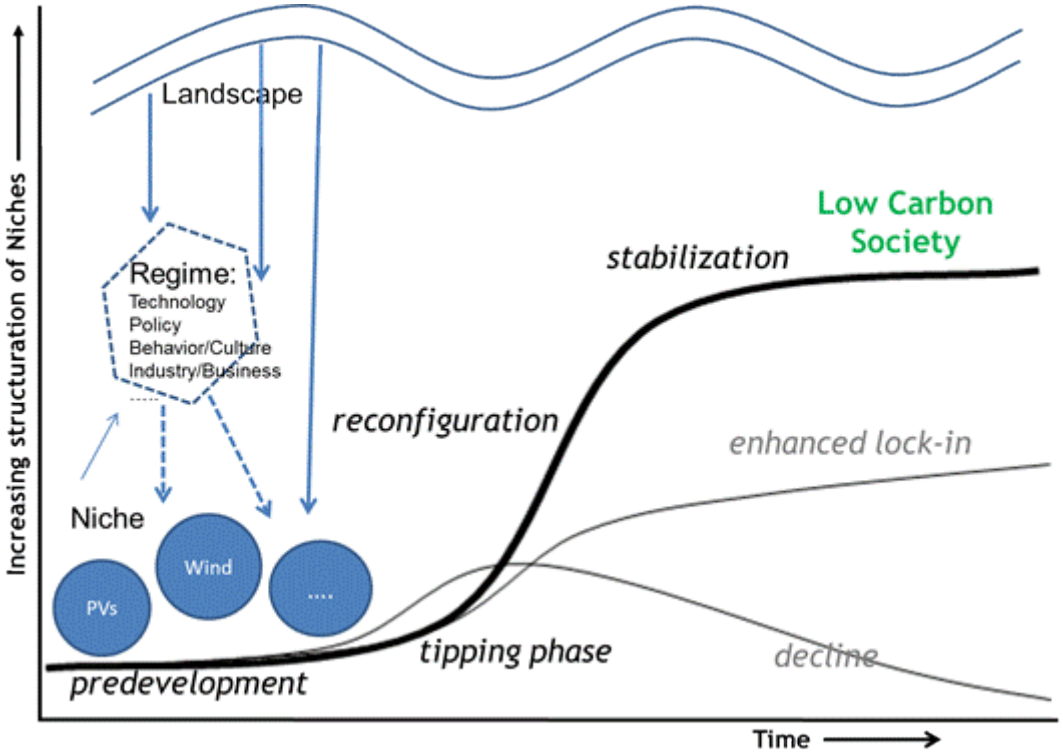

Figure 1: based on Loorback, Rotmans et al. 2001 and Schot and Geels 2008

As mentioned before, transition happens when the combined forces at Landscape and Niche level are able to force a change at Regime level. The transition is a co-evolution of the three levels. Radical innovations emerge from the niches when processes in progress at the meso and macro level create "windows of opportunities" (Glees and Schot, 2007).

The alignment of the CTCN mandate and structure with the Transition Theory can be summarized in relation to the three level of analysis and to the success factors of a technology niche (TN):

Landscape: International cooperation and aid against climate change. Today technology for mitigation and adaptation are almost standard product. CTCN provides Technical assistance in response at the requests of Developing countries to accelerate the transfer of climate technologies[21]

- Regime: It is the local area where the CTCN support is focused. The region is characterized by limited technology, knowledge and finance availability. CTCN provides outreach, networking and private sector engagement

[21] Developing countries agreed on a shared vision and commitments with the Paris Agreement which contains a collaboration on climate technology transfer (art. 10 of the Paris Agreement).

- Niche: The specific technology project developed under the CTCN that provides knowledge management, peer learning, capacity building

The CTCN can support developing countries in the instructional transition directly via its technical assistance projects on "Policy and regulatory reform design" and indirectly via the virtuous self-regulating conducts arising from the involvement in an international network.

7. CTCN Technical Assistance and its impact on transition towards Low Carbon Societies, resilient to climate change in respect of SDGs attainment

CTCN activities have a high potential to help developing countries to implement their roadmaps towards low carbon resilient societies transition. To unleash this potential, CTCN activities should strive for implementing only those projects that can have both a large potential for scaling up and can gather sufficient financing resources coming from different financing institution such as the Green Climate Fund, Global Environmental Facility and the Developing Banks. Those projects should also be coherent with the general developing goals of the recipient Developing Country and should be consistent with the most important national documents already agreed at Country level such as the Technology Need Assessment Report – TNA and its implementation document i.e. the Technology Action Plan – TAP.

An extract of projects completed by CTCN up to December 2017 is provided in the following table. All these projects are in line with the TNAs and TAPs of the recipient countries.

Recipient Country	Project Title	Impact on SDGs[22]
Afghanistan	Identification of technology needs	6, 7, 13
Algeria	Design and Construction of a ground based photovoltaic plant	7, 9, 13
Antigua and Barbuda	Workforce development strategy for priority energy sectors	7, 9, 13

[22] Goal 1. End poverty in all its forms everywhere; Goal 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture; Goal 3. Ensure healthy lives and promote well-being for all at all ages; Goal 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all; Goal 5. Achieve gender equality and empower all women and girls; Goal 6. Ensure availability and sustainable management of water and sanitation for all; Goal 7 Ensure access to affordable, reliable, sustainable and modern energy for all; Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all; Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation; Goal 10. Reduce inequality within and among countries; Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable; Goal 12. Ensure sustainable consumption and production patterns: Goal 13. Take urgent action to combat climate change and its impacts; Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development; Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss; Goal 16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels; Goal 17. Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development.

Bosnia and Herzegovina	Modernization of Banjia Luka's district heating system	7, 9, 11, 13
Chile	Design of a national network for monitoring ecosystem resilience	13, 14, 15
Colombia	National system to monitor impact of adaptation efforts	11, 13, 15
Colombia	Policies for energy efficiency and renewable energy in industrial and transport sectors	7, 9, 13
Ivory Coast	Development of an environmental information system	6, 13, 15
Guinea	Optimizing Guinea's access to climate change adaptation funding	10, 13, 17
Iran	Technical assistance for Photovoltaic Solar Cell Design and Manufacturing	7, 9, 13
Jordan	Strengthening capacity to access international financing	1, 2, 13
Mali	Identification of climate adaptation solutions in rural communities	2, 7, 13
Mali	Technology design and private sector investment in climate resilient crop productivity	2, 8, 13
Mozambique	Feasibility study to use waste as fuel for cement factories	7, 13
Swaziland	Building capacity for climate change science	4, 13, 17
Uganda	Developing a policy, legal and regulatory framework for geothermal energy	7, 9, 13

Table 1: a list of projects already implemented by CTCN.

From the list of implemented projects, it can be seen that CTCN interventions cover almost the entire technology cycle, spanning from the initial identification of climate solution, as in the case of Mali, to the developing of a policy, legal and regulatory framework for the development and diffusion of specific technologies as in the case of Uganda. All these projects come from specific requests by Developing Countries and are in line with their transformational objectives. Furthermore, it can be stressed that CTCN action is not limited to the specific technical project but it strives for a long-term assistance to help the niche markets to emerge and building climate resilient societies (CTCN Progress Report 2017, introduction by the Director J. Uosukainen) in line with the transitional theory framework. Moreover it is highlighted how the CTCN considers the impact of its operation not limited to mere technology transfer but against all the targets and indicators of SDGs. The figure below highlights the capability of CTCN to implement projects to attain the overall set of SDGs. In the figure, the percentage of implemented CTCN projects that have impact on specific sustainable development goal is indicated.

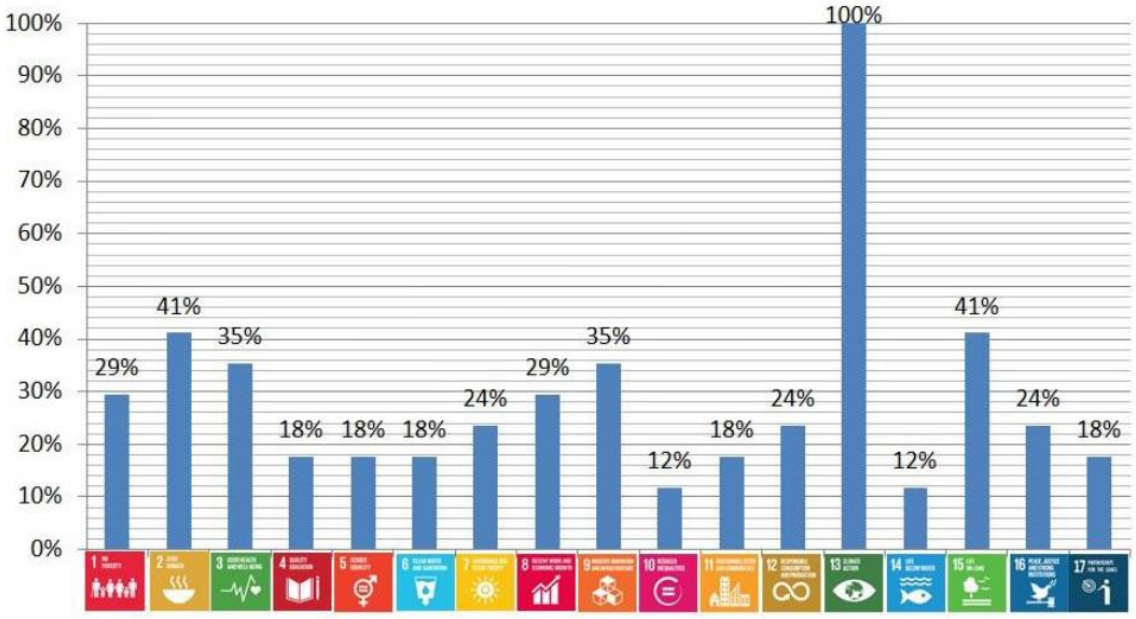

***Figure 2**: percentage of CTCN implemented projects that have impact on specific SDGs (Source: CTCN, 8° Advisory Board Meeting)*

The Algerian case can be seen as a typical case study in which the CTCN action matches the transition dynamics and the aspirational national objectives. Algeria is the leading natural gas producer and one of the top three oil producers in Africa (OPEC member since 1969). The oil and gas revenues are the backbone of the Algerian economy and its hydrocarbon-based growth model. Algeria represents one of the top three gas suppliers for the European Union (EU). Today, the energy demand of Algeria is completely covered by its own production, which is almost fully based on fossil fuels. Natural gas is the primary source of power generation contributing to over 93% of installed power capacity. The share of RE in the energy mix is only around 3.4% and until recently was largely dominated by hydropower. Algeria introduced a Law on Renewable Energy Promotion in the Framework of Sustainable Development already in 2004. Then it emphasized its commitment to expand the use of RE in February 2011, when the Renewable Energy and Energy Efficiency Development Plan 2011-2030 was published. In 2015, the Plan was revised resulting in some adjustment of the RE targets. According to the revised strategy, Algeria aims to add 22 GW of power generation capacity from RE by 2030, with more than 4.5 GW to be realized before 2020. The share of RE in electricity generation should thereby reach 27% (previously 20%) by 2030. These targets have been included in the National Determined Contribution, which Algeria has sent to the UNFCCC secretariat as a contribution to attain the Paris Agreement. In this case, the CTCN intervention goes in the direction of helping the photovoltaic market in Algeria with a specific project on the design and construction of a ground bases 1 MW photovoltaic plant and with a project still in its implementation phase focused on the establishment of a laboratory for accreditation and quality control of photovoltaic modules. It is clear that a successful implementation of CTCN technical assistance will help Algeria to attaining the goals of its renewable energy national program, also by reinforcing the national RE niche by increase national knowhow and competence in the specific sector.

8. Conclusion and final remark

Low Carbon Society transition needs radical innovation in order to change the overall system framework and avoid technical lock-in, the bitter fruit of incremental innovation.

A radical innovation it is not only a technological issue, but it has a larger scope, including the change of the socio-economic framework and the interaction of different actors (production, consumption, civil society, institutions).

The CTCN is not only a new way of cooperation, including south-south technology transfer, but, through the capacity building activities, it is also a clear example of a policy tool that fosters radical innovation in the framework of socio-technical transition. This characteristic of the CTCN will be enhanced in the Paris Agreement implementation effort as specifically stated in article 10 of the Paris Agreement itself.

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DOCUMENTS

Geoprogress

Global Forum

n. 2

"SUSTAINABILITY AND ENERGY ISSUES"

Some contributions from speakers invited to

the conference held in Brussels, September 7th, 2017

EUROPEAN ENERGY ISSUES.

DO ENERGY TRANSITIONS LEAD TO LOW CARBON ECONOMIES?

Marat Terterov[23]

Good morning everybody. Allow me to begin with a short remark on the title of my presentation and then to speak about sustainability and energy transition issues in more detail.

The topic of my brief intervention this morning is "do energy transitions lead to low carbon economies?" I ask this question due to the view that sustainability as a concept and the idea of transition to low carbon economies are in many ways becoming the dominant narratives and the most fashionable terms in our discussions about energy. That said, if we briefly glance at the 'energy experiences' of some of the countries I tend to visit for professional purposes, then I am not entirely sure that all international stakeholders are on the same page when it comes to these important topics. In the European energy discussion, which has implications on policy making, the idea of an energy transition has become somewhat of an 'ideology'. Indeed, to reinforce the view from Europe, a top level British decision maker stated a few weeks ago that in "30 years from now there will be no more combustion engine vehicles in the United Kingdom". This is a very provocative statement but does reflect a European narrative on the energy transition (he did not clarify as to which cars we will be driving in the future, however).

What does this really mean and how are these ideas embraced by different sets of countries, particularly those outside of Europe? To begin with, there is substantial confusion, or lack of consensus, about the concept of decarbonization. From my perspective, the idea of decarbonization does not correspond to the end of conventional fuels. We certainly can make fuels more efficient, but can we fly a plane on energy efficiency? Energy efficiency makes for great energy policy, in both producer and consumer countries, but neither energy efficiency nor decarbonization equate to the end of fossil fuels.

That said, it is clear to me that we are going somewhere, for sure, as we cannot deny that renewable energy is playing a greater role in our lives today than it has been in the past. Many changes are taking place in the manner that we produce and consume energy at the international level. At this point I would like to say that we live in a world of profound energy diversity: the energy balance of many countries is dependent on a very diverse set of fuels. Indeed, as the centuries passed, the world shifted from conventional energy forms such as wood, then coal, to oil, to renewables in the 21st century: we are currently in the era of diversity.

We can also note that a North-South 'energy policy priorities gap' emerges: on the one hand, while Europe and the OECD countries are leading a surge towards 'environmentally friendly' usage of energy, many developing countries, which are more interested in energy access and alleviation of energy poverty, continue to go for cheaper, easier and invariably dirtier options such as coal and petroleum products. The shale revolution represented a major game breaking development as it drove prices down and led to an oversupply of hydrocarbons for the first time in a decade, creating in turn a situation in which there is much more primary fuel available. Consequently security of supply became

[23] Brussels Energy Club (BrEC).

less of a problem and also gas prices fell fostering higher levels of consumption especially in developing countries. All of this seems to have led to a larger volume of CO2 emissions.

There is some sense of unity on sustainability and energy transitions in the countries of the North, which utilize instruments such as the G-7 in order to promote policy level change in favour of the energy transition. There is recognition that energy needs to remain affordable, but there is an increasing consensus now on the need to evaluate the harmful effects of low oil prices more closely. Increasingly, we came to a situation in which it is necessary to act concretely at the global level and to establish a framework through which to shape the policy debate.

European leaders fully realize that Europe cannot go it alone and global level cooperation is necessary to achieve global objectives. There is a view within the EU that CO2 emissions can be managed by acting together. This is not necessarily the view from the developing countries. One interesting caveat to note here is what one could refer to as the German Paradox within the EU: the Germans see themselves as the leaders in Europe when it comes to the energy transition but at the same time they are the largest consumer of coal within the European Union. This begs the question as to the type of energy transition that Europe is really moving towards and whether 'energy transitions lead to low carbon economies'

So, on this last point, when it comes to the idea of the energy transition, I hope that our children are not going to be engaged in the same debate in 30 years' time from now as we are at present.

Thank you for your attention.

EUROPEAN POLICIES FOR ENERGY SUSTAINABILITY

Mercedes Bresso[24]

Distinguished guests,

Dear friends,

Good morning everyone and welcome to Brussels.

It is a pleasure to be with you today, and I would like to thank Professor Adamo and the Geoprogress network for organising this event and inviting me to speak.

Energy sustainability is an issue that I have always considered a priority, even before coming to Brussels.

Nowadays, many European funds are dedicated to energy efficiency, but I remember when I was President of the Piemonte region that we decided to dedicate one third of the regional funds to energy efficiency and clean energy policies before it was mandatory.

I firmly believe that the necessary answers to the challenges posed by the future of energy sustainability will come from a coordinated efforts made by the local and regional authorities, together with the vital efforts from the European and national levels.

Frameworks and common rules must be found at EU level, but then they will have to be implemented on the different territories of our continent by the institutions which are closer to the citizens.

We have reached an historical achievement when the EU launched the Energy Union in 2015.

We created a new momentum, trying to drive towards the necessary transition to a low-carbon, secure and competitive economy.

The Energy Union was important, of course, from an environmental point of view, because we owe this to the future generations. We are responsible to deliver a greener and environmentally friendly society to our children. But this is not the only reason: from economic benefits to security issues, there are many other reasons why we should act as Europeans in this sector.

For example, we all know that the Energy Union is more than just energy and climate. It is also a unique opportunity to modernise Europe's economy, making it low carbon and more efficient with regards to the use of resources. Investing in clean energy is an investment for the future, one that can create new jobs and produce positive effects on workers and business together.

Another key aspect is the security of supply, which is quite relevant given the international situation we face today. In the current unstable geopolitical conditions, it is crucial for the European Union to have the necessary elements in order to be independent and secure in terms of energy supply. And this result can be achieved only if European countries work together closely and with a common strategy.

[24] Member of The European Parliament

We are starting to see some results: in 2016 for example wind has overtaken coal as the second main source of energy in Europe (after gas) and the EU remains the second largest market for wind power (after China).

Solar energy is rapidly reaching its economic sustainability, and low-enthalpy geothermic energy has been sustainable in that sense for a while now. Also, we still have space to explore different sustainable sources of energy, such as tidal power.

Once the amount of energy necessary for the European needs is secured, the next step will be to be able to manage it appropriately and efficiently. In this sense, an important role can be played by the development of a modern system of smart grid: this would allow us to have an energy market reliable, flexible, efficient and able to support both the citizen's needs and the business ones.

This is why one of the main chapter of the Energy Union is dedicated to research, innovation and competitiveness. A better European system, up to date with the latest research development, is what we need in order to compete with other players on the global scale.

We have some good news: the data show how we started to change the pattern of the relations between energy consumption and growth.

In the past, a rise of the GDP was only possible through an increase in energy consumption: in recent times, we have changed this with more efficiency and a more relevant use of renewables. While GDP between 2005 and 2015 **grew** by around 10%, the primary energy consumption **decreased** by 11% in the same period.

Economic growth and a more efficient, secure, and sustainable use of energy can walk together and Europe is the proof of it.

As I was saying before, we should acknowledge the role that can be played by cities and local authorities in this contest. I remember when I was President of the Committee of the Regions the precious work we done through the Covenant of Mayors. Today we have also the **Global Covenant of Mayors** for climate change, bringing together the experiences at the EU and UN levels.

In terms of financing, the European Union is making concrete efforts. If we take the opportunities given by EFSI, we can see that already 24% of the total financing has been approved in the field of energy – with a priority on energy efficiency, renewable energy and energy infrastructure. And the trend is set to increase significantly in the future.

Also, we cannot forget the contribution made the **European Structural and Investment Funds where for the** 2014-2020 period around 17 (seventeen) billion euro will be available for energy efficiency.

As you can probably feel by my words today, I am confident that Europe can be protagonist in the future of energy sustainability and in the fight to climate change. We should all be well aware of the proportion of the challenge, but also ready to use the many strong points we have.

Together and with coordinated efforts we can be the leader of a global energy revolution!

Thanks for inviting me and I wish you all an interesting debate!

EUROPEAN ENERGY TRANSITION

Flavio Zanonato [25]

In its most diverse forms, energy is the pivot of every social and productive community. In fact, it contributes to determining the prospects for development and the degree of competitiveness of our societies. And energy is also a powerful element of influence and conditioning in international policy orientations, as well as being the primary sector through which global warming objectives can be achieved.

Today, the EU is the largest importer of energy in the world: every year 400 billion euros are spent to ensure adequate levels of energy supply, especially for the benefit of major polluters, fossil fuel oligopolists. In addition, energy prices in Europe are 30% higher than in the US, and 94% of transport is dependent on petroleum products (for 90% imported).

The framework, therefore, is that of an energy sector that is still poorly competitive on the international level, inadequate for interconnections and infrastructures, expensive for businesses and individuals, and which is likely to compromise the achievement of the EU commitments undertaken under the Paris on climate change. We are now fully aware of it, that is certain, and in fact in 2009 the European Union launched the Third Energy Package aimed precisely at adapting the market design to the needs of a profoundly transforming society.

On the first point, poor competitiveness in the world, it is necessary to overcome national backdrops. The implementation of the Third Energy Package, where it was completed, has opened energy markets to new actors, as well as disciplining, differentiating and making energy supply more transparent. But it is not enough, because the energy market remains today mainly nationally dominated, in a context where paradoxically everything else, or almost, circulates freely in the EU and among the Schengen countries. National borders in the EU are still and too often normative barriers, with the result that energy - for example - does not come where it is needed

and demanded, but where and when norms and infrastructures allow that to happen. The total cost of these system constraints, between insufficient interconnections (east-west or the still missing of the Pyrenees, between France and Spain), congestion and network interruptions (the January 2017 energy crisis between Greece, Bulgaria and Romania, to cite the last of a long series) and imbalances in the degree of openness of national markets (discipline of capacity mechanisms and other market designs still dominated by national protectionism) are great for the European energy sector as a whole. Indeed, they adversely affect European performance on production, distribution and energy consumption.

Even with regard to energy costs, the problem must be resolved at European level. As national governments are titled to charge excise tax bills, exceptional fees, and special contributions, it's hard to believe that living costs, those for private individuals and businesses, may eventually fall. Proposals on the energy market discipline presented by the European Commission in the framework of the "Clean energy for all Europeans" legislative package at the end of 2016 are in the right

[25] Member of European Parliament . *EP Rapporteur for the proposed Regulation on Risk Preparedness.*

direction because they introduce transparent information elements to the consumer, uniform between EU countries. However, the next step, the harmonization of additional bill charges, conflicts with the principle of the exclusive competence of the Member States on tax matters, enshrined in the Treaties. The costs of energy transition are also, and above all, social costs, starting with those sustained by economies, such as ours, and even more so in eastern countries, where intensive and heavy industry continues to play a prominent role. Here, we must leave behind the mantra that wants the energy transition to be an enemy of employment: for years the EU is at the forefront in technologies for production, storage and distribution of renewable energy. In this regard, it is estimated that this new step will foster the creation of new 700,000 jobs in the next 10 years. And where the transition affects conventional manufacturing, starting with oil and its derivatives, transitional measures must be proportionate, gradual and above all they must be able to count on the positive role of Europe (funds to adapt to modernization and globalization should be strengthened under the next EU financial framework 2020-2027).

On the third point, the adherence of the system and the European energy market to the climate-energy targets, and more specifically to the emission reduction commitments, the EU is setting an ambitious challenge for a profound revision of legislation in this field. In November 2016, the "Clean Energy for All Europeans" has put forward a set of legislative proposals to drive the energy transition by 2030. Among them, the amendment to the Renewable Energy Directive, which currently aims to a 20% target, sets the Commission's proposal to the 27% of energy from renewable energy sources by 2030 and without binding obligations for the Member States. These are still cautious measures, not sufficient to meet the roadmap of commitments signed with international partners in Paris, and which the socialist, social democratic and progressive forces in the European Parliament should aim to increase before the final approval of the texts. At the same time, however, a growing number of renewable generation technologies have reached a degree of maturity that can compete on the free market without resorting to national subsidies. Here, for mature technologies such as photovoltaic and wind power, I believe that the European legislator's commitment must be in favor of a gradual phase-out of national schemes, in order to finally achieve a truly open and competitive internal market.

The Clean Energy for All Europeans package now includes a thorough review of the rules governing electricity markets. It is necessary to set up a sufficiently flexible and integrated market that can remunerate appropriately those virtuous consumers who decide to self-produce and limit their consumption; A market that can also absorb a significant share of energy produced from renewable sources that have profoundly different characteristics from traditional ones (intermittence and decentralization).

A fully integrated market would allow Europe to benefit from photovoltaic energy production. For example, through the installed capacity in the south of the continent, and when for meteorological reasons this is not available, taking advantage of the winds installed in the North Sea. This would trigger a reduction in energy prices, the downsizing of the role of fossil imports and the significant containment of greenhouse gas emissions. But to achieve these goals, first of all, we need to work on a European energy market design, which the Commission outlines timidly in its proposal, but that should be truly open and competitive beyond national protectionism and geared towards full integration (particularly in short and very long period) of energy production from renewable sources.

The adaptation and relaunch of the internal energy market affects all the actors of

society, yet it meets the first resistance by the Member States, which, as I have already argued, are afraid of losing their prerogatives. The theme is complex because energy security - for example - is therefore of exclusive national competence under the European Treaties, but in the EU legislative practice of these years has become increasingly shared responsibility between Member States and the Union. For the last case to be mentioned, we refer to the Regulation on the Safety of Gas Supply (the so-called Buzek Report, by the name of its Parliamentary Rapporteur), in which - and even with the agreement of a majority of the Member States sitting in the Council - the EU through the European Commission establishes macro-energy regions, each of which consists of several neighboring countries and are intended to facilitate, assist and consolidate the technical and operational integration of their respective gas networks. At the same level, the energy package of December 2016 proposes the establishment of regional operational centers for the electricity market as well, and it is difficult to argue that the progressive macro-regionalization of our national energy models will not bring benefits to the performance of Network, streamlining flows, increasing interconnections and, first and foremost, providing energy security.

In February 2017 I was appointed Parliament's rapporteur for the European Commission's Proposal for a Regulation on the Safety of Electricity ('Preparing and Managing Risks in the Electricity'). Since it is a regulation, it will come into full force in the Member States without having to be transposed into national law in advance. And if we consider the EU decision-making process, the amendment and approval of the regulation will take place in stages: firstly, at the end of 2017, with the Parliament having to decide on the basis of my parliamentary report.

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"EU SUSTAINABLE ENERGY COOPERATION: POLICIES AND INSTRUMENTS"

Boldrini Claudia, European Commission, DG for International Cooperation and Development

I will give you an overview of DEVCO operations, my Directorate General, of our policies and instruments for cooperation in the sustainable energy sector with our partner countries and for all the developing countries that are not in EU neighborhood.

Currently there exist some world challenges

1) From an estimate of the International Energy Agency (IEA,)that there are approximately 1.8 billion people that still do not have access to electricity, or better do not rely on electricity.

2) 3 billion people that do not have access to clean cooking solutions, this means that they cook and heat their homes with solid fuels (natural bio-masses) normally not collected in a sustainable way. This creates a problem in terms of deforestation and big health issues (leading often to death). Basically, my unit and my directorate, deal with energy and the issues of providing energy to all those people. Of course we cannot do it without keeping in mind that there are also climatic issues to take into account.

3) A third challenge refers to financial needs, which really are huge: International Energy Agency estimates that only to solve the issue of energy access about 50 billion $ per-year could be necessary

1. Overview of the Initiatives.

EU defined a Global Vision and a list of the main policies framework outlining our work.

We have an energy partnership with the African continent (with African Union Commission) for which we are active since the beginning especially dealing with sustainable energy initiatives: Africa – EU Energy Partnership (AEEP).

In 2011 an instrumental initiative was launched by the UN Secretary General (consistent with 2030 UN Agenda) relating to the definition of sustainable energy and the development of energy access by G7 countries. This crucial step made possible the reach, in 2015, of the Paris Agreements.

There exists also an initiative lunched by African partners: Africa Renewable Energy Initiative (2015). It aims at increasing production of renewable energy within the

African continent. The EU decided to support AREI objectives, guiding principles and criteria pledging 1.5 billion Euros to implement it. The first goal refers to the achievement of 5GW of new renewable energy by 2020.

2. Energy Cooperation

In terms of energy cooperation, EU set three interlinked main objectives: increase the access to sustainable energy of people who do not currently have this benefit, increase renewable energy generation and energy efficiency, contributing to the fight against climate change. There are also some internal policy documents relevant to setting those objectives, in particular: the Council Conclusions on Energy and Climate Diplomacies of November 2017, which set the objectives to all the EU members. Climate change is both an objective and a thematic sector itself. There is a specific budget allocated for fighting climate change activities as it represents a cross-country issue that the Commission tries to mainstream in all the opeartions. In addition, climate change has direct links not only with the sustainable energy theme but also to rural development, food security, sanity and many others.
Climate change features have also been highlighted in the New European Consensus on Development which has established five areas (People, Planet, Prosperity, Peace, and Partnership) where EU will be operative. To cope with the issue, EU has committed 20% of 2014-2020 budget to climate related actions.

The European Commission established three pillars of cooperation with three related categories of instruments: political ownership of reform agenda, technical assistance and capacity building, investments. The first operates through the policy of dialogue especially with the contributes of the National Indicative Programmes (30 countries) and the Regional Indicative Programmes. We discussed and agreed with countries to create partnerships and implement initiatives: the idea is to have a better working and developed energy sector being more attractive to private sector operators.
We are working hard on reforms agenda of Sub-Saharan countries, and to support these operations we have a technical assistance facilities putted in place. Approximately 40 million Euros are spent for technical assistance in Sub-Saharan Africa and 10 million in the rest of the world. This technical assistance aims at increasing the expertise in tailoring a reform agenda and implementing legislative and regulative frameworks (an enabling environment) in the region energy sector.
The expertise offered covers a large number of segments in order to improve the efficiency of the energy sector: policy advisory, capacity building, increase mobilization of funding, technology transfer. The final overall objective is the creation of a conducive environment for private investors.

Referring to the financial tools: 3.7 billion euros have been allocated from 2014-2020 to the sustainable energy sector and they will be spent through different financial instruments. The main one concerns blending facilities: a strategic use of a limited amount of grants to mobilize additional investments from financial institution and private sector, to enhance the development impact of investment projects.
For large energy infrastructure projects the main facility is the regional investment facility. There are seven different regional investment facilities set up for different world regions (Latin America, Caribbean, Asia, Pacific, Central Asia, Africa and neighbor region).
The EU contribution in blending facilities for Africa is already 1 billion euro on more than one hundred projects, since 2007. Energy is the biggest share and, during last year,

there have been acceleration in investments. This EU 1 billion contribution made possible a total investment of 12 billion euros, with a leverage ratio of 12 to 1 (meaning that 1 euro invested from EU commission is able to unlock 12 euros from other investors).
There exist also other financial tolls tailored for different means. For small projects and high privately participated ones we created ElectriFI. Its objective is the boosting of private sector investments, giving financial supports like guarantees and other financial services tailored for specific investors and specific countries. In 2016 132 million were allocated. The implementation of this initiative budget has been delegated to a Dutch development financial institution and the European Commission is still launching regular calls for proposals. Until now, two calls were launched which received a very high number of application, showing the interest of the private sector to such initiative.

A specific program, launched in 2016, tries to fill the gaps between women and men in the energy sector in developing countries. The program wants to reinforce the role of women both as active users and as entrepreneurs. So far, 20 million have been allocated to the proposal call. The project covers different areas: the component of access (for women) to financial instruments, sustainable dedicated services to strengthen skills, political advocacy and social awareness campaigns.

A major initiative related to the political ownership and reform agenda instruments is the Covenant of Mayors for Sub-Saharan Africa, launched in 2008. It is designed to work on mitigation, adaptation and energy access objectives (depending on the region the focus is different). This initiative major concern refers to the boost of energy efficiency and the use of efficient fuels at city level. It widely expanded reaching 7000 cities around the world.

Finally, there are upcoming external investment plans aiming at bringing together financial instruments, technical assistance and policy making in a single comprehensive instrument. 4.1 billion are allocated in a guarantee fund by EU Fund for Sustainable Development and other private operators. The plan covers Africa and neighbor countries and it is divided into thematic windows (cultural issues, cities environment, sustainable cities, and private sector development) linked to economic developments.