Committee on Energy (CE)

> The objective of the Committee on Energy is to be the engineering reference for programs, strategies and policies aiming to move toward sustainable -that is to say clean, resilient and inclusive - energy systems around the world.
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> As energy is intimately linked to transitions in societies and economies, the Committee's considerations include the consequences of major global events as Covid-19 pandemic, wars or adaptation to climate change.
>
> **Jean Eudes Moncomble,**
> **Chair of CE,**
> **Ingénieurs et Scientifiques de France**

For the past two years , the Committee on Energy has been meeting once a quarter by videoconference. In addition to these plenary meetings, the Task Groups dedicated to a theme meet regularly.

Since the last report, the number of Task Groups has increased from seven to eight: one Task Group has completed its work, and two others have been created.

The "*Climate Change*" Task Group, led by Jorge Spitalnik, held intensive discussions to draft a concise text for the 2022 Sharm el-Sheikh Conference on Climate Change, known as *COP 27*. The text gives the engineering community's point of view, asserting the urgency of implementing mitigation and adaptation policies in the face of climate change.

The two main levers are the quest for greater energy efficiency and the decarbonization of energy systems through the development of renewable energies and nuclear power. Fossil fuels, which will be in use for the time being, must be combined with carbon capture and storage technologies.

The massive use of electricity will be crucial; the resilience of energy systems raises questions about the use of land, water and certain raw materials. Realistic national energy policies must be combined with greater international cooperation, and must take greater account of adaptation to the consequences of climate change.

Energy choices must take account of the Sustainable Development Goals, and be based on a systemic approach that favors mature technologies without neglecting research and innovation efforts. The balance between economic progress, social justice and environmental preservation is a sine qua non for public acceptance of energy policies.

This WFEO "*Energy and Climate*" statement has been presented on several occasions, including at a side event organized by WFEO at the UNFCCC meetings in Bonn in June 2022.

Five other Task Groups have continued their work and, for the most part, completed it with the drafting of a note.

SUSTAINABLE DEVELOPMENT GOALS

The SDG#7 is obviously closely linked to energy issues and highlights two major challenges: physical and economic access to energy, because billions of people do not have access to satisfactory cooking modes or to electricity; the consequent environmental damage has a negative impact on our planet and its inhabitants.

One of the causes of global warming is the use of fossil fuels, which highlights the major relationship between energy and SDG#13. It is essential to promote decarbonized energy sources (renewable and nuclear) or technologies like carbon capture. But the adaptation of energy systems to the consequences of climate change is more and more a major challenge.

The Task Groups and their chairs are:

- Energy storage (Philip Pascall),
- Energy internet (Sun Hongbin),
- Hydrogen (Massimiliano Capezzali),
- Solar (Carsten Ahrens),
- Electrification (Abubakar Sambo).

These five topics will be presented at the session organized by the Committee on Energy at WEC 2023.

In addition, two new Task Groups have been created: the first, devoted to e-mobility, is chaired by Bakr Bahaj; the second, dealing with energy efficiency, is chaired by Ruomei Li.

A number of other themes were addressed by the Committee: these did not give rise to a report, but rather to presentations. These included: cities and energy, the vulnerability of energy systems, and energy sovereignty. In addition, the link between the SDGs and energy was further explored.

Among the public events at which this work was presented were the following:

- *"The engineer, a player in the sustainable city"* during the *"Engineering the Cities of the Future"* event, associated to the WED 2023, 2 March 2023 in Madrid, Spain.
- *"Energy and Climate Change: Global Stocktake"*, Side event, Bonn Climate Change Conference, UNFCCC, 5 June 2023.
- *The right use of energy sovereignty*, Engineers Europe Annual Business Meeting, 9 June 2023, Cannes, France.
- Keynote speech by the Committee Chair, organization of a session dedicated to energy and participation in the session on climate change at WEC 2023, October 2023.

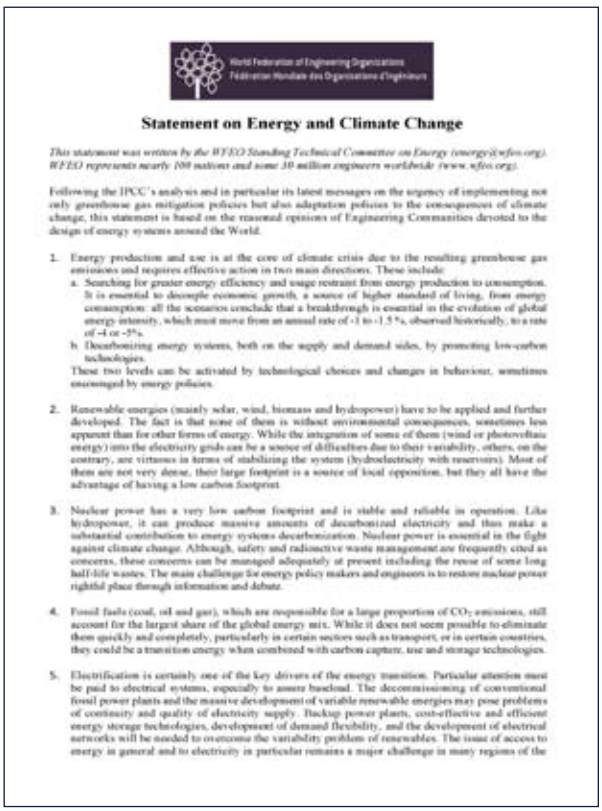
Key achievements

Two key achievements are representative of the work of the Committee on Energy during the last two years: on the one hand the WFEO Statement *"Energy and Climate Change"* because it offers a concrete contribution from the engineering community to the definition of energy and climate policies, by emphasizing the effectiveness and realism of solutions; and secondly, the broader reflection on the SDGs, because it shows how energy, far from being an obstacle, can be a real asset in moving towards clean, resilient and inclusive energy systems that are acceptable to citizens.

Jean Eudes Moncomble presenting at the "Engineering the cities of the future" event, during the "Energy and Raw materials, dependency of cities" segment, Madrid, Spain, 3 March 2023

Jean Eudes Moncomble (second right) at the Engineers Europe national members forum meeting, during the round table on SDG#7: Affordable and clean energy, Cannes, France, 8 June 2023

Jean Eudes Moncomble presenting at the "Energy and Climate Change: Global Stocktake – the Engineering Community Perspective" event at the UNFCCC Conference in Bonn, Germany, 5 June 2023



Statement on Energy and Climate Change

This statement was written by the WFEO Standing Technical Committee on Energy (energy@wfeo.org). WFEO represents nearly 100 nations and some 30 million engineers worldwide (www.wfeo.org).

Following the IPCC's analysis and in particular its latest messages on the urgency of implementing not only greenhouse gas mitigation policies but also adaptation policies to the consequences of climate change, this statement is based on the reasoned opinions of Engineering Communities devoted to the design of energy systems around the World.

1. Energy production and use is at the core of climate crisis due to the resulting greenhouse gas emissions and requires effective action in two main directions. These include:
   a. Searching for greater energy efficiency and usage restraint from energy production to consumption. It is essential to decouple economic growth, a source of higher standard of living, from energy consumption: all the scenarios conclude that a breakthrough is essential in the evolution of global energy intensity, which must move from an annual rate of -1 to -1.5 %, observed historically, to a rate of -4 or -5%.
   b. Decarbonizing energy systems, both on the supply and demand sides, by promoting low-carbon technologies.
   These two levels can be activated by technological choices and changes in behaviour, sometimes encouraged by energy policies.
2. Renewable energies (mainly solar, wind, biomass and hydropower) have to be applied and further developed. The fact is that none of them is without environmental consequences, sometimes less apparent than for other forms of energy. While the integration of some of them (wind or photovoltaic energy) into the electricity grids can be a source of difficulties due to their variability, others, on the contrary, are virtuous in terms of stabilizing the system (hydroelectricity with reservoirs). Most of them are not very dense, their large footprint is a source of local opposition, but they all have the advantage of having a low carbon footprint.
3. Nuclear power has a very low carbon footprint and is stable and reliable in operation. Like hydropower, it can produce massive amounts of decarbonized electricity and thus make a substantial contribution to energy systems decarbonization. Nuclear power is essential in the fight against climate change. Although, safety and radioactive waste management are frequently cited as concerns, these concerns can be managed adequately at present including the reuse of some long half-life wastes. The main challenge for energy policy makers and engineers is to restore nuclear power rightful place through information and debate.
4. Fossil fuels (coal, oil and gas), which are responsible for a large proportion of CO_2 emissions, still account for the largest share of the global energy mix. While it does not seem possible to eliminate them quickly and completely, particularly in certain sectors such as transport, or in certain countries, they could be a transition energy when combined with carbon capture, use and storage technologies.
5. Electrification is certainly one of the key drivers of the energy transition. Particular attention must be paid to electrical systems, especially to assure baseload. The decommissioning of conventional fossil power plants and the massive development of variable renewable energies may pose problems of continuity and quality of electricity supply. Backup power plants, cost-effective and efficient energy storage technologies, development of demand flexibility, and the development of electrical networks will be needed to overcome the variability problem of renewables. The issue of access to energy in general and to electricity in particular remains a major challenge in many regions of the

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