



ORDEM
DOS
ENGENHEIROS



**WORLD
ENGINEERING
DAY**
FOR SUSTAINABLE
DEVELOPMENT



In support of UNESCO
World Engineering Day



Com o Alto Patrocínio
de Sua Excelência
Under the High Patronage of the
President of the Portuguese Republic



O Presidente da República

Lisbon
March 4th 2024

The Role of Engineering and Engineers in Energy Transition

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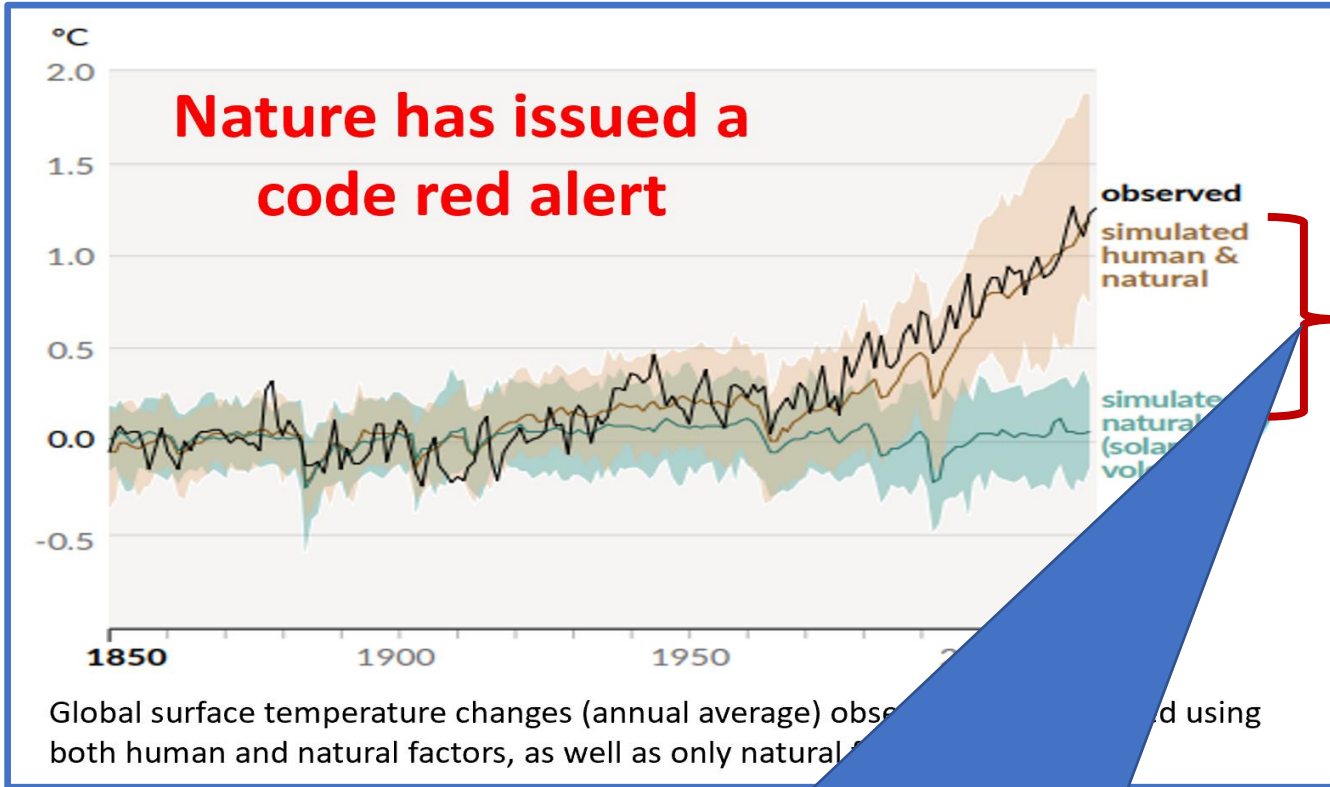
World Federation of Engineering Organizations (WFEO)

March 2024

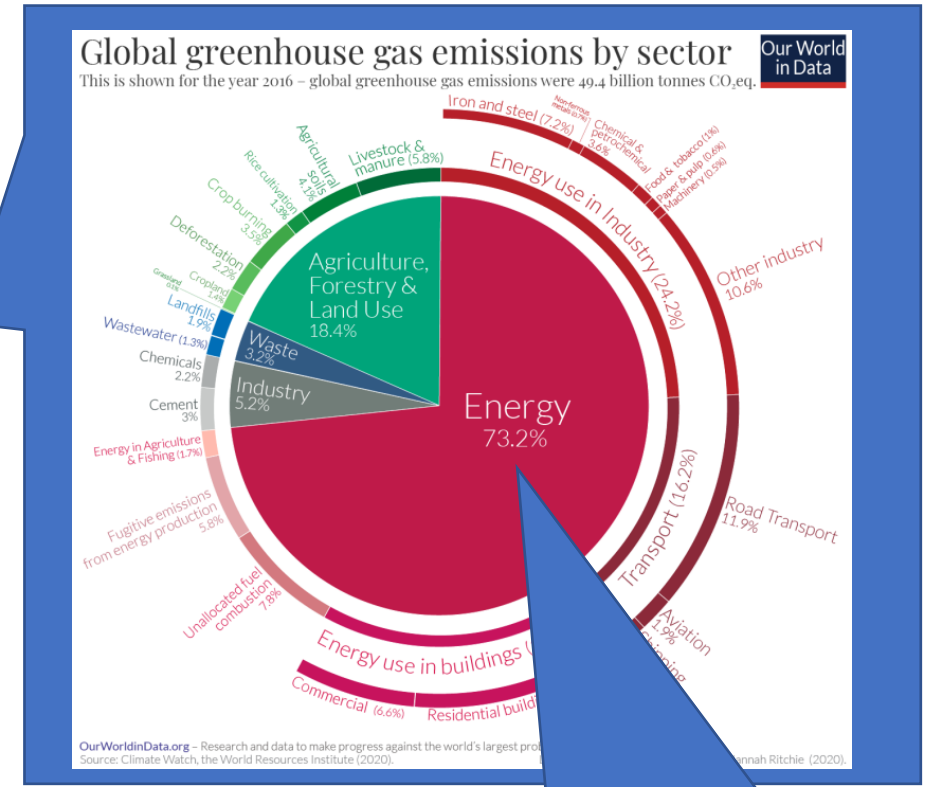
Engineering Solutions for a Sustainable World

Ordem dos Engenheiros

Energy related human activities (most of which are Engineering related) are responsible to climate change






Engineering activities are a significant part of the “HUMAN ACTIVITIES” increasing the Global surface temperature.



All engineering activities are dealing with energy

Engineers' role is crucial in energy transition

- 
 - Because engineers are crucial in energy generation, transmission, distribution and application.
- 
 - Because engineering practices are dealing with energy and related greenhouse gas emission.
- 
 - While engineering works rely on energy, energy transition relies on engineering and engineers.

Engineers' contributions in transforming energy



Engineers are essential for designing, building and maintaining power infrastructure.

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- **Electrical, mechanical and environmental engineers** have been central to the development of low-cost renewable energy solutions, including wind, solar, wave and geothermal energy, all of which provide access to electricity in remote regions while mitigating the impacts of climate change.
- Household energy generation and distribution, mini-grids and smart grids are all innovations developed by **electrical, electronics, mechanical and telecommunications engineers** that are transforming access to energy while reducing environmental impacts.
- Advances in energy storage are making sources of reliable energy accessible and affordable.

- the UNESCO Engineering Report: *Engineering for Sustainable Development*

However, for transition away from fossils, engineers need to do more.

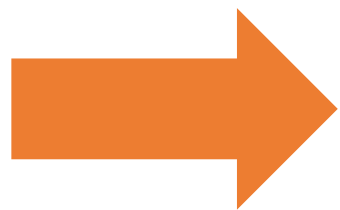
Engineers are to increase our awareness of the goal of energy transition

➤ The UN SDG 7: ***Ensure access to affordable, reliable, sustainable and modern energy for all***

7.1 By 2030, ensure universal access to affordable, reliable and modern energy services

7.2 By 2030, increase substantially the share of renewable energy in the global energy mix

7.3 By 2030, double the global rate of improvement in energy efficiency.



To meet the challenge of ensuring the energy transition benefiting of all the people, especially those 800 million people without modern energy services.

Engineers are to integrate digital technologies in electrification to empower the energy transition

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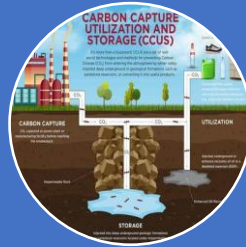
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High efficient and cheaper renewable energy



Safe, reliable and efficient long-term storage



Scalable and economic CCUS and negative emissions technologies



Smart, resilient and effective transmission, distribution and operation



Widely and clean electrification of end uses and efficient usages

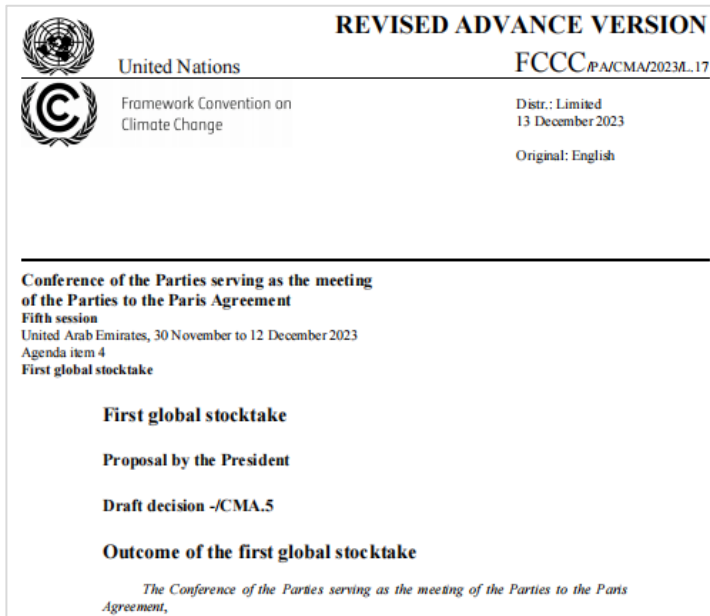


And much more

Digital technology has great potential in increasing the efficiency, stability, safety and reliability

Engineers should have the capability to make full use the proper digital technologies to increase the efficiency, stability, safety and reliability in energy services and applications.

Engineers are to further leveraging zero- and low-emission technologies to deepen the transition



The first global stocktake presented on the COP 28

- “further recognizes the need for deep, rapid and sustained reductions in greenhouse gas emissions in line with 1.5 °C pathways and calls on Parties to contribute to the following global efforts,...
- Accelerating **zero- and low-emission technologies**, including, inter alia, renewables, nuclear, abatement and removal technologies such as carbon capture and utilization and storage, particularly in hard-to-abate sectors, and low-carbon hydrogen production;.....
- Accelerating the reduction of emissions from road transport on a range of pathways, including through **development of infrastructure and rapid deployment of zero and low-emission vehicles**”.

Engineers should understand the carbon footprint of his/her engineering practice and master related skills to achieve zero or low-emission.

Furthermore, Engineers are to

ensure safe and stable energy supply during the transition

- The challenges come from
 - Volatility of **renewable energy supply**;
 - Complexity of **coordinating online supply, consumption and maintenance systems of renewable energy**.

ensure the transition adapting to regional circumstances and contexts

- Regional contexts differ in natural resources, disasters and risks;
- COP28 stressed “that strategies related to just transition and economic diversification should be implemented **taking into account different national circumstances and contexts**”.

And,

Engineers' role is to make the energy transition away from Fossil Fuels a reality

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- On the COP28, nearly 200 countries for the first time recognized the need to transition away from fossil fuels.
- **“Rapid and far-reaching transitions across all sectors and systems** are necessary to achieve deep and sustained emissions reductions and secure a liveable and sustainable future for all.”

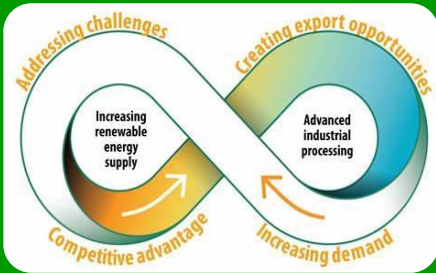
--CLIMATE CHANGE 2023 Synthesis Report Summary for Policymakers-IPCC



<https://www.un.org/sg/en/content/sg/press-encounter/2023-12-11/un-secretary-generals-press-encounter-cop28>

➤ UN SG António Guterres emphasized that the era of fossil fuels must end with justice and equity. “The Global Stocktake must **offer a clear plan for a tripling of renewables, a doubling of energy efficiency** and a single-minded focus on tackling the root cause of the climate crisis – fossil fuel production and consumption.”

Engineers' role is to implement the plan, and to solve the problem by engineering practices!



Energy transition is imperative and of great urgent to sustain humankind and the planet. All engineers are responsible to this comprehensive energy revolution in every engineering position.



To take on their role in energy transition, Engineers should have a strong sense of social responsibility to fully understand their role in energy transition, and strive to improve their professional capabilities.



WFEO unites all engineers, men and women, to engage into the energy transition with responsible and innovative engineering practices.





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Transition away from fossil fuels: Starting from ourself, starting now!

Engineering Solutions for a Sustainable World

Lisbon, March 4th 2024