Six Recommendations for COP27

Prepared for ACP Energies (France)

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Main recommendations

- Favor local land energy production by giving a central role to biomass (R1)
- Empower fossil fuel producer-consumer chains (R2)

Supplementary recommendations

- Restore the fundamental geochemical cycles necessary for Life (R3)
- Support the industrial transition of fossil fuel producers (R4)
- Finance R&D that will accelerate the implementation of R1 and R2 (R5)
- Raise awareness and inform stakeholders (R6)

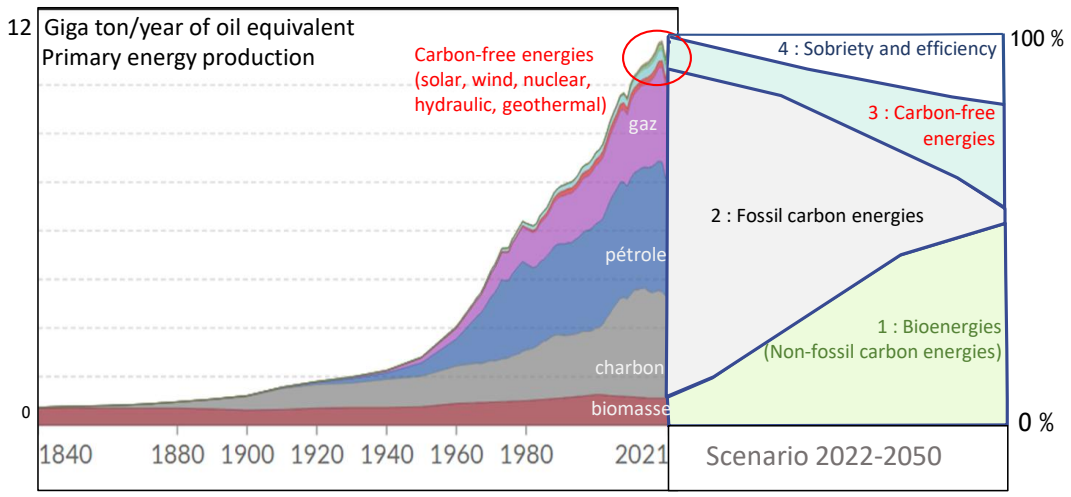
Context

2022 has already shown that, in different areas of the world, some of the worst climate scenarios envisaged by the IPCC for 2050 are already happening. Noting this, Antonio Guterres, Secretary-General of the United Nations, sounded the alarm in August. For the United Nations, it is at COP27 that decisions must be taken that will reverse the current trends in the increase in greenhouse gases.

Since June 2022, a group of experts from the French ACP Energies association, concerned about the palpable acceleration of the climate crisis, has been reflecting on what could be recommended to the parties involved in COP27 so that effective measures are taken without delay.

Climate emergency : a plan B to decarbonize emissions?

The climate emergency requires the immediate management of carbon energies, which represent 91% of primary energies!



"Plan B" Primary Energy Production Scenario

Where energy reductions(4) or substitutions with non-carbon energies(3) cannot be made within the required timeframes, there are 2 important levers:

- increase bioenergies (1)
- decarbonize fossil fuels (2)

This can be done by promoting virtuous carbon circles, which, like vegetation, absorb more CO2 than they emit.

1/ Increase bioenergy (non-fossil carbon-based energies)

- Replacing carbon-based fossil fuels with non-fossil carbon-based energies

Example: Replacing diesel with bio-diesel or biogas

2 / Decarbonizing fossil fuels

- Reducing the atmospheric impact of the use of carbon-based energies

Example: Replacing diesel with blue hydrogen

3 / Increase carbon-free energies

- Replacing carbon-based energies

Examples: solar, wind, , nuclear, hydroelectric

Recommendations

It is possible to act immediately in two powerful ways at the scale of the climate problem by:

- Drastically reducing greenhouse gas (GHG) emissions into the atmosphere emitted by burning fossil carbon: every ton of fossil carbon extracted and burned only worsens the climate situation.
- Absorbing excess atmospheric CO_2

In both cases, it is possible to implement immediate measures that will act at scale on the global carbon cycles.

This leads to the following two main recommendations:

- **Favor local land energy production by giving a central role to biomass** (R1)
  - The restoration of the "planetary biofilm" is a priority. This is overall the best way to reduce the CO_2 content of the atmosphere, to ensure food security for all and to offer a carbon neutral or even carbon negative local energy stock that strengthens local resilience (more details in Annex 1).

- **Empowering fossil fuel producer-consumer chains** (R2)
  - The aim is to curb the increase in greenhouse gases of fossil origin by making fossil fuel producer-consumer chains responsible for the life cycle of the fossil carbon they currently emit into the atmosphere. It is proposed that a "fossil carbon" chain empowerment (detailed in Annex 2) be established from producer to consumer, the result of which would be that for every tonne of fossil carbon extracted, one tonne of carbon otherwise emitted into or already in the atmosphere is captured and geologically sequestered in the same year. This would be done gradually with voluntary producer-consumer chains at the beginning to lead in a few years to a situation where this concept would become widespread and would be the required by the laws in most countries (more details in Annex 2).

These two main recommendations are accompanied by supplementary recommendations:

- **Restoring the fundamental geochemical cycles necessary for Life** (R3)
  - This recommendation is a generalization of the R1 recommendation applied to other biogeochemical cycles necessary for sustaining Life on Earth. It supports R1 but is not as urgent at this stage regarding the decrease in GHG levels in the atmosphere.

- **Supporting the industrial transition of fossil fuel producers** (R4)
  - This recommendation aims to accelerate the transition of fossil fuel production regions into regions of carbon-free hydrogen production, carbon sequestration and geothermal energy supply. It will mitigate the economic shock that these regions will suffer when their fossil carbon

assets must be downgraded or abandoned and should encourage them to be drivers of the energy transition.

- **Finance R&D that will accelerate the implementation of R1 and R2** (R5)
  - Several priority research and development (R&D) actions have been identified to accelerate the implementation of R1 and R2. They concern the production of carbon-free energies, blue hydrogen, carbon sequestration from small-scale biomass, the potential for underground primary biomass and the implementation of biogeoreactor pilots for hydrogen production.
  - In view of the enormous financial impact of current and future climate damage, large budgets should be devoted without delay to these R&D actions.

- **Raise awareness and inform stakeholders about the previous five recommendations** (R6)
  - This educational measure naturally accompanies recommendations R1 to R5 so that a consensus is quickly reached in the process of their implementation.

Annex 1
Recommendation R1
Favor local land energy production by giving a central role to biomass

Interest of biomass

Biomass allows the capture of CO_2, its storage, or even its sequestration in soils and aquifers, the production of hydrogen or some of its vectors, of biofuels, and of basic organic compounds for chemical/biochemical industries.
The restoration of local biomass must be a priority because it provides food energy and allows along with geothermal and hydro-electric energy the constitution of a local capacity of controllable and resilient energies.
It makes it possible to manage the intermittency of non-carbon-based renewable energies more efficiently than hydrogen obtained by electrolysis of water as hydrogen can be produced at a lower energy cost.
Well managed, the increase in photosynthetic biomass reduces atmospheric carbon by the same amount and constitutes a temporary carbon stock. In the longer term, photosynthetic biomass plays the role of a pump for atmospheric carbon pump that it stores or transfers to soils, aquifers or lake or marine sediments.
Its use for energy purposes comes in substitution for fossil fuels.

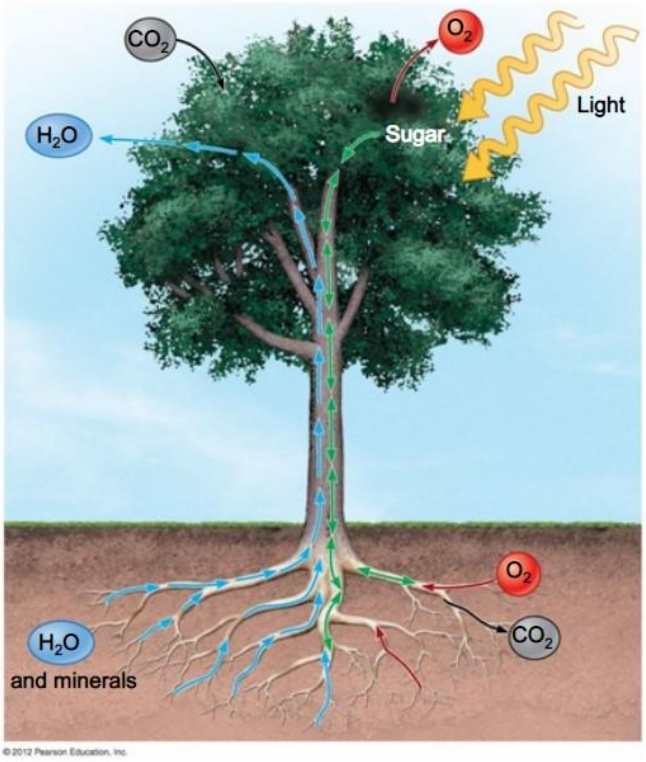


Figure 1: Photosynthetic biomass, which regulates oxygen, water vapor and carbon levels in the atmosphere, contributes to the decrease in surface temperatures while producing and accumulating energetic organic substances (source Pearson Education)

Implementation details

To avoid the "mining" of ecosystems and making the most of the productivity of endemic species, it is important to be able to work with biomass at the scale at which the biodiversity of vegetation develops, i.e. at the scale of agricultural or forest plots. To this end, it is necessary to provide individuals and small farms with means of production and recovery of biological, chemical or energy compounds from biomass at the appropriate scale. Small local productions with high energy density or high added value can then be consolidated to supply industrial sites or urban areas.

This requires the adaptation and miniaturisation of processes and technologies currently used at industrial level in sectors such as refining, chemicals or agri-food.

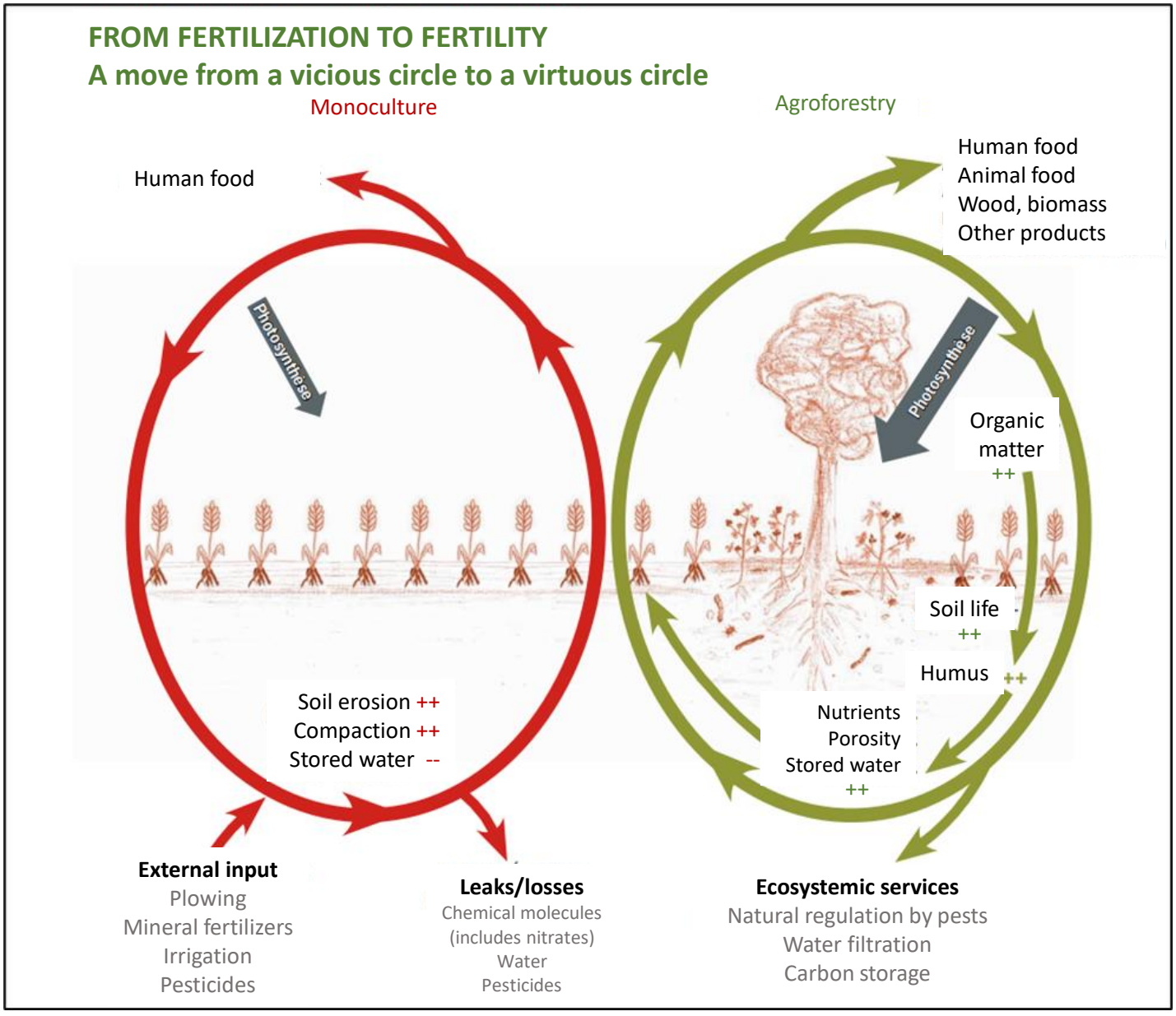


Figure 2 Principle of Agroforestry (*Source L'agro-foresterie – Arbres et Paysages 32*)

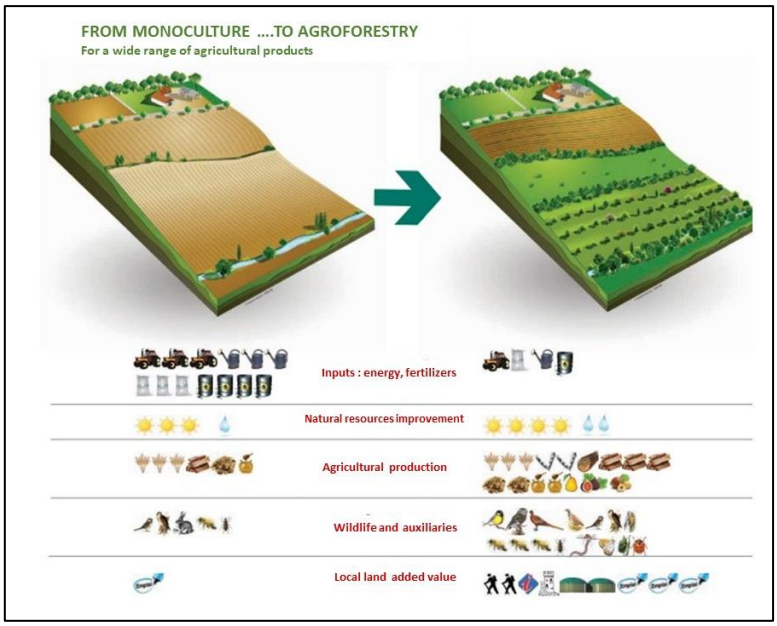


Figure 3 Comparison of monoculture and agroforestry (*Source L'agro-foresterie – Arbres et Paysages 32*)

Objectives and impact

The first achievable short-term objective would be to double locally and globally the photosynthetic biomass. A new service sector could develop regarding the dissemination, implementation, and maintenance of these technologies.

This will make it possible to take advantage of the high productivity and biodiversity of endemic species whose growth will be encouraged and will have the effects of restoring biodiversity and the planetary biofilm.

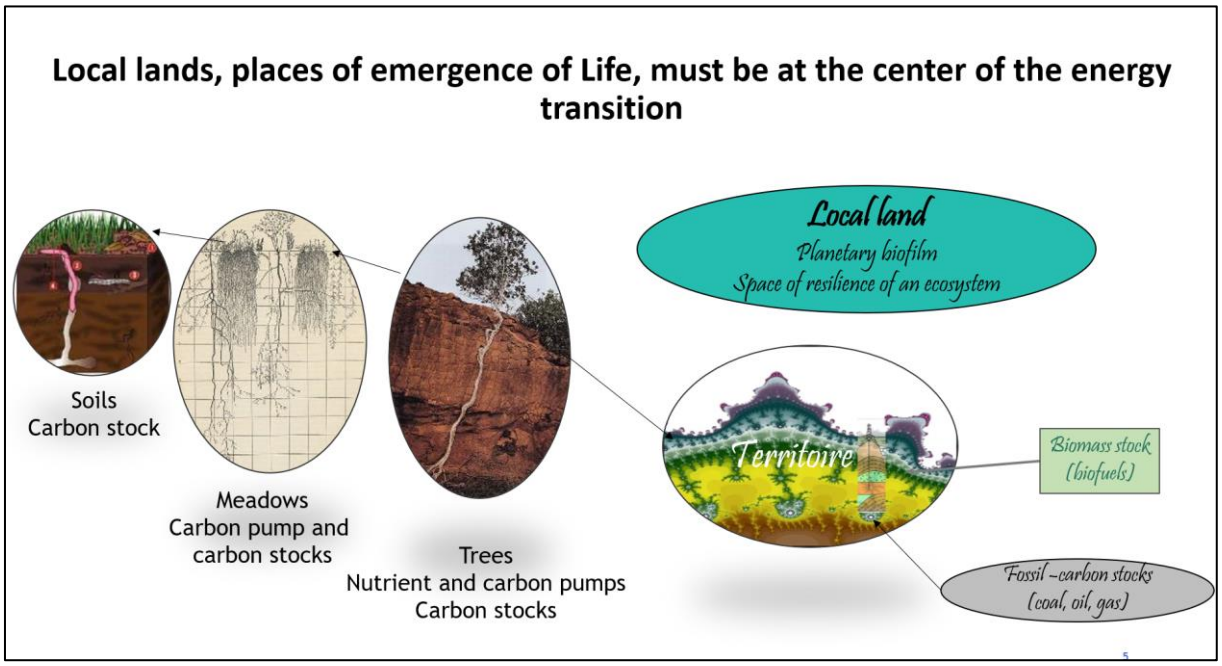


Figure 4 : Local lands, places of emergence of Life, at the center of the energy transition (*source EOSYS*)

Annex 2

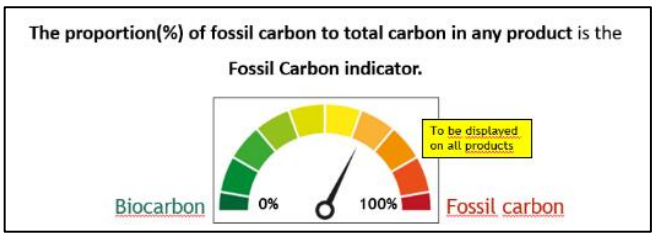
Recommendation R2

Empowering fossil fuel producer-consumer chains

Implementation details

ACP Energies, Oxford Net Zero and MKC(*) have been working on these concepts for over a year and have developed elements of a methodology proposed here that could be quickly implemented.

- The Geological Net Zero (GNZ) principle applies automatically to any entity that extracts fossil carbon, which immediately takes on the obligation to geologically sequester the same amount in the same year.
- This responsibility is passed on to all links in the chain to the final consumer.
- Any link can be freed from this by ensuring that the upstream link has already done what is necessary to capture and sequester an equivalent amount of carbon within one year, in which case it has no special obligation. Otherwise, he has an obligation to sequester the fossil carbon he has obtained himself, to find a contractor who does it for him or a buyer to whom he transfers this responsibility. In the case of the final consumer, the state may, if necessary, take responsibility for the management of fossil carbon by taxing the consumer for this service rendered, to the extent that it has the means to geologically sequester this carbon.
- A Carbon Take Back Obligation (CTBO) mechanism based on these same principles is proposed to hydrocarbon operators.
- A fossil carbon indicator makes it possible to trace the fossil carbon extracted throughout the consumption chain. The information infrastructure is almost already constituted: accounting firms and carbon NGOs, European databases of the carbon load of consumer products, implementation of blockchain in industry.



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(*) Margriet Kuijper Consultancy, De Gemeynt and Royal Haskoning DHV : CTBO Final Report Jan 2021

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