

Sustainable Energy Transition

Shifting Supply Chain Dependencies Following the Energy Transition and the Role of Circular Economy

Arnaldo Walter
Universidade de Campinas (Unicamp)
May 2023

General thoughts, not necessarily fully linked to the subject of this session. None of these points are reasons to postpone the efforts to move forward energy transition.



- First crucial point, the **energy transition will be different for different countries**, and each one must identify its way of contributing to drastically reduce the use of fossil fuels.
- Almost as important as drastically reducing fossil fuel consumption is **how to reach the main target**: in the next 30 years, the disputes and tensions should be enormous, and dependencies on some countries can be problematic.
- **The risk of changing from one dependence to another**: from fossils to rare materials; dependence on imported fuels to technological dependence.
- **Brazil** has a lot of potential to leverage the use of renewable energy sources, but, in my view, it **should consider its own interests** - in a broad sense (for example, environmental, social, economic and security aspects) - when defining its path.

The role of intermittent renewables and green hydrogen



- These are the clearest options to decarbonize the energy matrix. **Brazil has huge potential**, and there are on-going initiatives. The issue is **how to make this a reality**.
- Questions to consider: (1) How to keep **the stability of the electrical system**; (2) Which **power storage alternatives** would be most appropriate; (3) **How to avoid the status of being (only) a commodity exporter** (and water exporter)?

Electric mobility and the dependence on road transport



- In Brazil, **the bulk of GHG emissions related to the energy sector are due to the transport. The main issue is related to freight transport.**
- **Deep and fast electric mobility of light duty vehicles will not solve the problem above mentioned. And what about the sides effects?**
- **Is there a compromise solution between biofuels and electric vehicles? How to manage to set our own way?**

The role of bioenergy

- **Brazil is a worldwide a reference on bioenergy, but it is not exactly an example to be followed.**
- **The so-called 2G biofuels will not be a reality if the 1G industry is phased out.** Obviously the reality is different between countries.
- **So far, BECCS is the only concrete strategy for having negative emissions.**

Circular economy – the role of residues

- Avoiding wastes and the use of residues is **the rationality to be followed**.
- But, consider the energetic use, there is boarder constraints:
(1) **How scattered the wastes/residues are?** (2) **Are there infrastructure restrictions?** (3) How to take advantage of **local opportunities** and create the **necessary conditions?**

Opportunities in Brazil

- The production of **green hydrogen**.
- The production of **sustainable aviation fuels (SAF)**.
- Identify opportunities and **make BECCS a reality**.
- Identify and take advantage of the **existing potential of residues/wastes**.
- Let's go to **public transport**, instead of putting much more resources to keep people stuck in traffic jams.

The way forward

- An interesting and necessary debate is **how much, and for how long**, Brazil must keep its **fossil fuels production**.
- Brazil needs **to plan its energy system** that will be more based on intermittent renewables, and **define which role wants to play in green hydrogen production**.
- To set its own **energy transition** path, Brazil needs to have a **holistic approach**.
- To be an active player, and reduce dependence risks, Brazil needs to effectively be an actor in **science and technology**, and have stable **policies and regulations**.