CLEWs and specific infrastructure policy integration

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Zimbabwe

• Ambitious NDC’s
• However, a sector specific view blinkers development
• Power sector analysis, is blind to water planning
• In dry periods:
  • Water is extracted from rivers for irrigation reducing flows
  • More power is needed for irrigation pumping
  • BUT less water is available for hydro power
    • as there is less rainfall
    • And increased withdrawals
• That results in strain and emergency adaptive actions to supply power
An ambitious NDC profile in the power sector

• The country needs reliable power
• And currently suffers crippling shortages
• Its NDC focuses predominantly on hydro
• Large emissions reductions are anticipated
But there are important interconnections

And a dry future is forecast ....
A no adaptation leads to massive economic damage. Zimbabwe’s current NDC and system development plan is oblivious to this.

Coal based adaptation leads to massive emissions increases (dwarfing the intended NDC saving).

CLEWs adaptation reduces emissions by changing the way hydro power is operated.

Note that CLEWs adaptation is:
- Cheaper than coal adaptation
- With lower GHG emissions than the original NDC scenario
Bolivia – Integrated development and biofuel

• Ethanol blending was introduced in 2018 to reduce dependence on gasoline imports
• Blending mandates and production targets are provided to 2025
• This impacts:
  – Energy (electricity generation and oil for cars)
  – Balance of payments as gasoline imports are reduced
  – Emissions as gas and oil are replaced
  – Agriculture as limited crop land is available
  – Irrigation as rainfall patterns may not be optimal
• CLEWs allows you to capture all of these impacts simultaneously
System representation

Agricultural production

IRRIGATED

High Inputs | Intermediate Inputs | Low Inputs

RAINFED

High Inputs | Intermediate Inputs | Low Inputs

Industrial production

Main processes:
- Sugarcane mill
- Cane juice treatment, fermentation, distillation and dehydration

Source icons: Free web icons; www.shutterstock.com
System representation

Spatial zonation
27 regions
Results for Agricultural production

• Increased sugarcane production can be achieved cost-effectively with increased high-input production and irrigation.

• Demands for ethanol and sugar production can be met by increasing yields from the current country-average of 55 tc/ha to 86 tc/ha by 2030

• The cost-optimal agricultural production is allocated in five regions of the 27 modelled regions.
Results for industrial production

- The **least-cost industrial expansion** is achieved by investments in biorefineries with advanced cogeneration EtOH 1G+ELC.
- The accumulated investment costs account for **615 million USD** in the period 2018-2030.
- Investments in advanced cogeneration EtOH 1G+2G require biofuel support schemes of at least 7 US$/GJ to be cost-competitive.
Accumulated effects in other systems 2018-2030

- The accumulated avoided emissions due to ethanol blending accounts for 5 million tCO₂,eq (2.5% total emissions of the transport sector)
- The accumulated blue water footprint accounts for 1.6 billion m³ (6% of total blue water withdrawals)
- The accumulated bioelectricity generated accounts for 7.4 TWh (4% of total generation)
- Etc …

CLEWs allows you to harmonize and optimize integrated policy
Why is CLEWs different?

- It breaks down specific resource and infrastructure needs
  - What to invest in, when, where and how to operate it
- To meet specific policy goals
  - Minimize load on the fiscus, ensure resilience, consistent mitigation, climate compatible growth
- It’s detail and focus is flexible
  - From cropping patterns to power trades
- It’s design can be co-created to meet national needs
  - Taking advantage of multiple policy needs etc
- It is set up with a community of practice:
  - regional (and global) summer schools
  - no vendor lock in
- It is designed for national capacity building, ownership and support
- It can be linked with university teaching and research activities to ensure national longevity