Integrating energy access, efficiency and renewable energy policies in Sub-Saharan Africa: a model-based analysis
Introduction

• Energy plays an important role in sustainable development and climate policies
• Energy access is a priority for several countries
• Current policy projections show that the number of people without access in SSA doesn’t decline

“Electrification through decentralized renewable-based solutions in particular gained momentum. The number of people connected to mini grids has more than doubled between 2010 and 2019, growing from 5 to 11 million people.” The World Bank
Introduction

Core targets of SDG7
- ensure universal access to affordable, reliable and modern energy services
- increase substantially the share of renewable energy in the global energy mix
- double the global rate of improvement in energy efficiency

- Policies are often not coordinated or coherent
- usually, different organizations take the lead
- more efficient appliances = energy services to more consumers
- Effective efficiency interventions can reduce peak demand, reduce the need for fuel imports, and increase the value of decentralized systems
Methodology

- We used IMAGE and MESSAGE as main methodology
  - Architecture
  - Socio-economic heterogeneity
  - Useful energy demand estimation
  - Supply option availability

- Scenarios
  - Baseline – current and planned policies
  - UNIV-ACC – Universal access only
  - ACC-EFF – Universal access with efficiency
  - ACC-REN – Universal access with renewable energy
  - ACC-EFF-REN – Universal access with efficiency and renewable energy
Cooking energy mix

- IMAGE – 80% of biomass in 2030 is traditional
- MESSAGE – 80% of biomass in 2030 is improved
- 350+ use modern fuels

- IMAGE – electricity, LPG, natural gas, biogas for universal access, accompanied by improved and advanced biomass stoves
- MESSAGE – Electricity, LPG, dominated by improved stoves
- Integration increases the role of electricity
Final energy

- IMAGE – efficiency gains counter increase in demand
- MESSAGE – rebound effect stronger than efficiency gain

- Integration results in up to 25% lower per capita demand relative to universal access
Electricity mix and Renewable energy shares

- Electricity is dominated by renewable energy except of RSA
- Final energy is dominated by biomass
- Integration results in 70-75% RE share in electricity
- Efficient appliances allow deployment of SHS
Investment

- Baseline investment in the range of 11-19 billion USD per year
- Universal access requires additional 14-37 billion USD
- Integrated approach requires additional 14-28 billion USD
- Results in up to 30% avoided investment
Residential emissions

- IMAGE – in general efficiency gains deliver more emission savings than renewables
- MESSAGE – efficiency is countered by increasing consumption
- Integrated approach provides more emission savings than a silo approach to access
Conclusion

• There is a significant difference between the models, but the general trend shows synergies between the targets

• Productive uses of energy could change the picture

• Large potential for efficiency improvement in SSA

• Integration stimulates the expansion of energy services, reduces the investment requirements and the impact on the climate
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Thank you