EAST AFRICAN CIVIL SOCIETY FOR SUSTAINABLE ENERGY AND CLIMATE ACTION (EASE&CA)

100% RENEWABLE ENERGY PLAN FOR KENYA BY 2050

AUGUST 2020

Supported by CISU

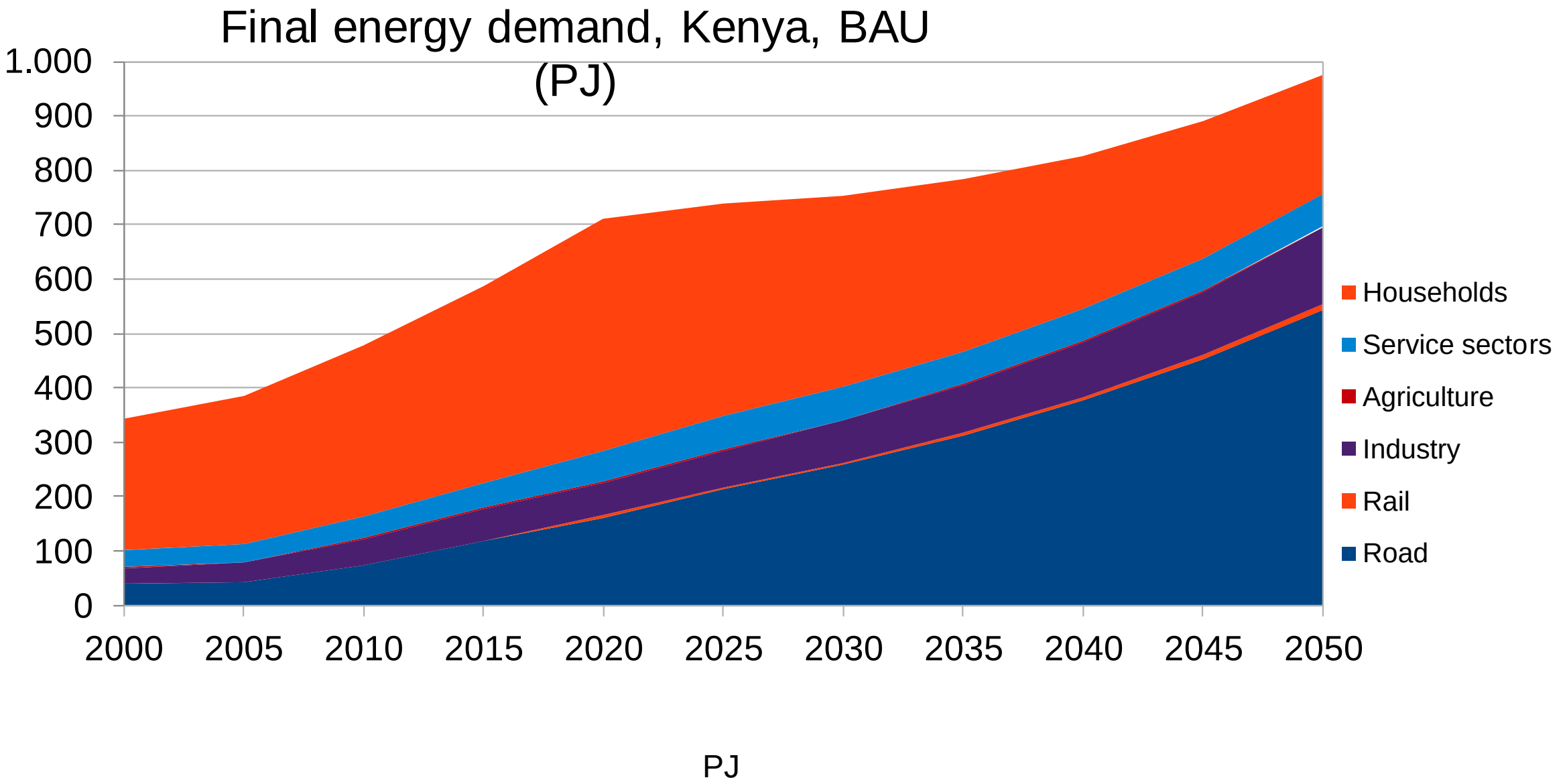
How Kenya can become 100% renewable

- How will Kenyas energy demand and system develop?
- How can energy efficiency help to meet demand?
- What renewable energy sources can energise Kenya?
- How can Kenyas biomass use become sustainable?
- What will it cost?

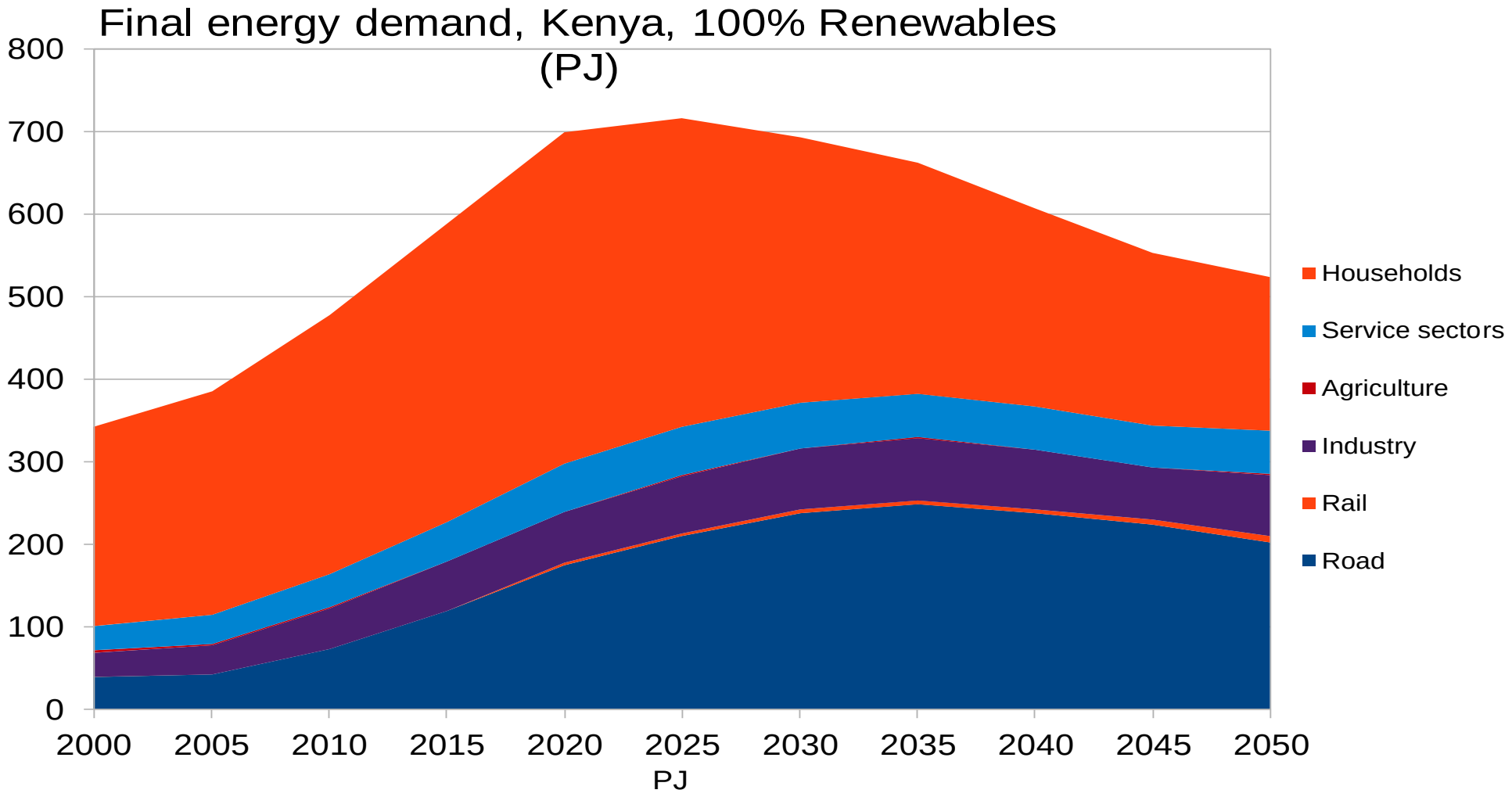
Kenya’s Demand for Energy

- Population grows, from 53 mill. today, to (maybe) 91 mill in 2050
- GDP continue to grow, 5,7%/year in average, GDP 5 times bigger in 2050 than in 2020
- Demand for cooking, transport, light, industry etc. will grow with population and GDP
- Increasing energy efficiency will limit growth in energy demand for cooking, transport, light, industry etc.; but energy demand will still grow
- With new, efficient technology, large demands for fuel can be replaced with much smaller demands for electricity: smart cooking, electric vehicles etc.

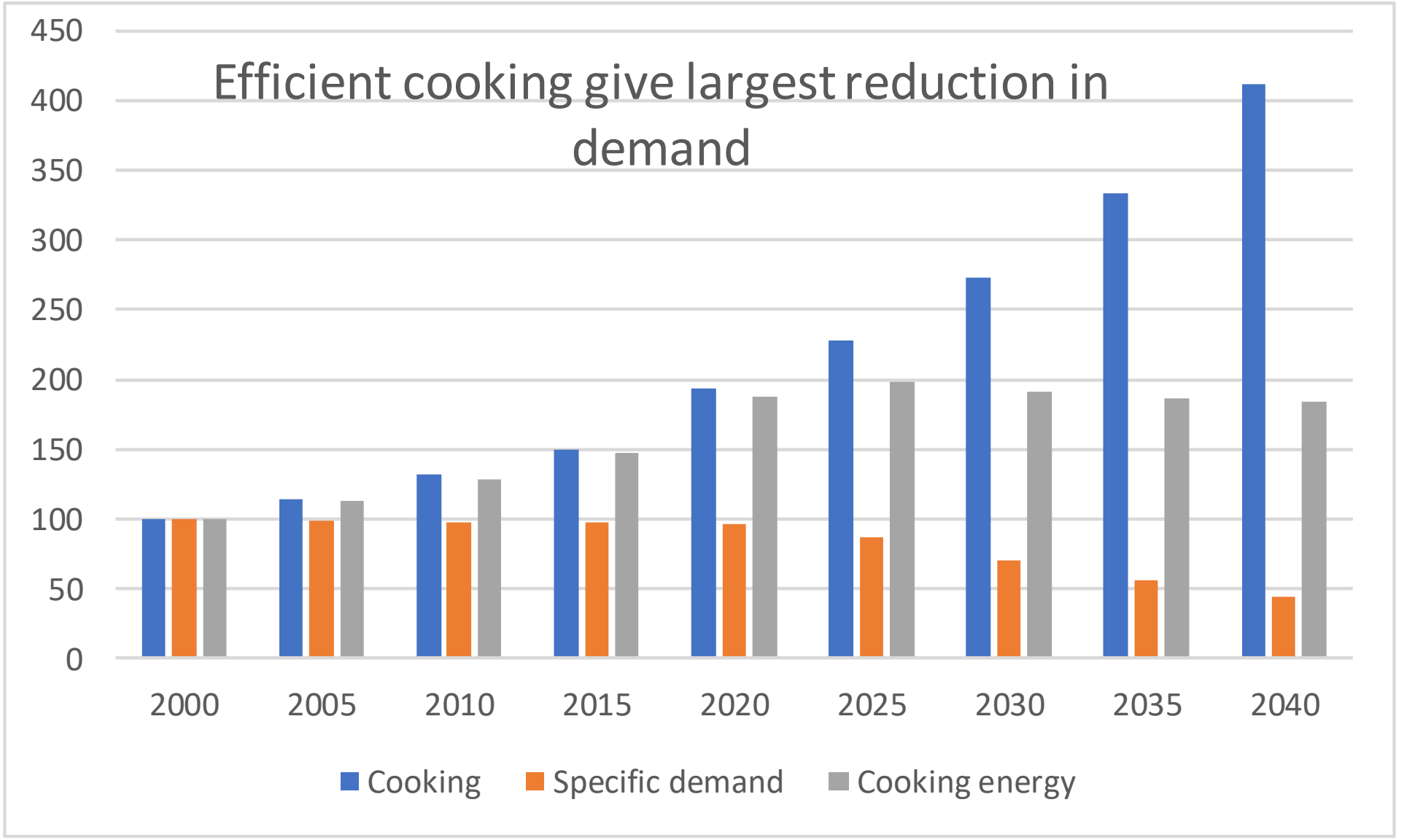
Growing demand, in particular in transport



With high eff. and electricity, less demand



The big change: cookstoves, smart cooking



How to to reduce energy for a meal 71%?

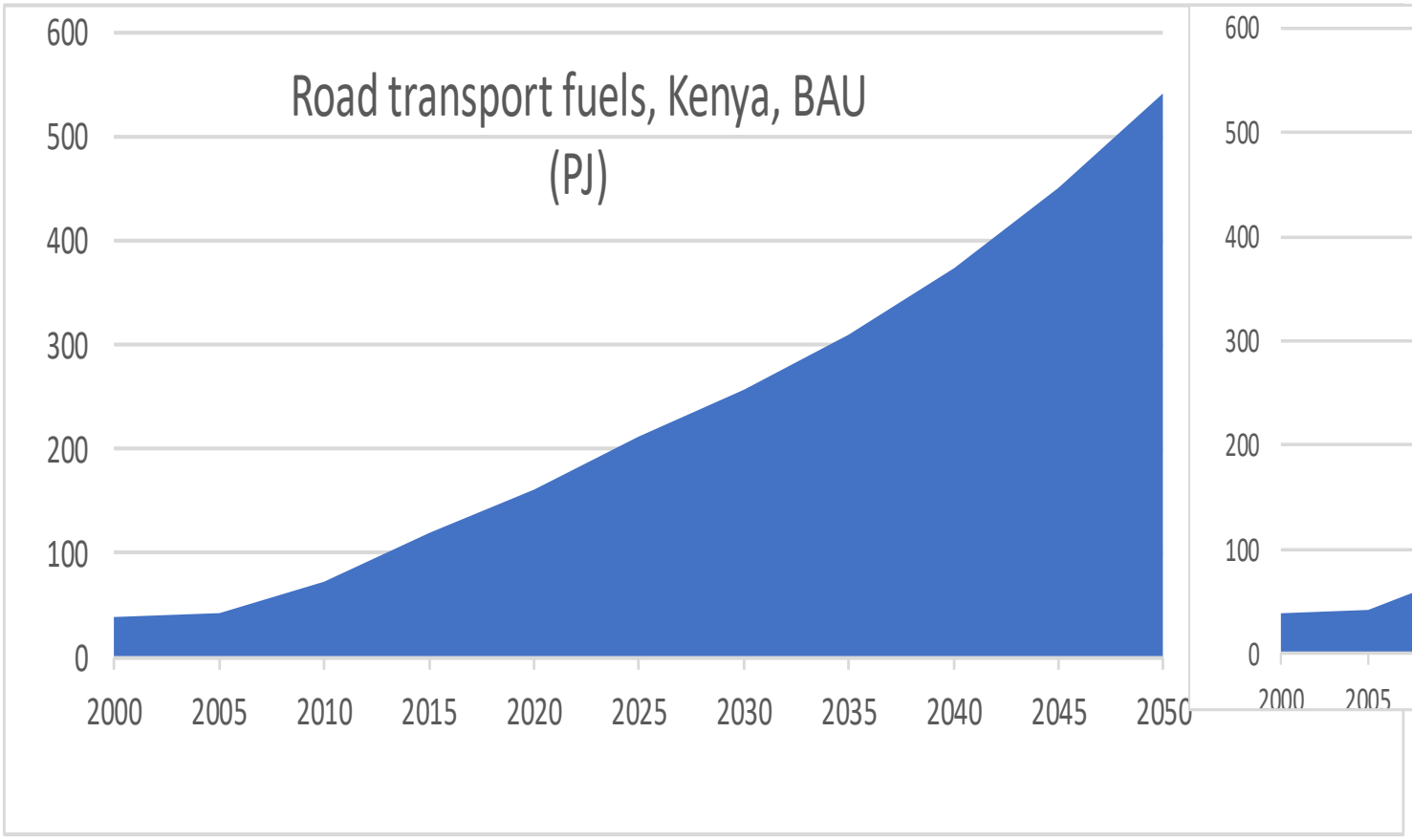
- Improved cookstoves can cut wood & charcoal demand by half
- New generation cookstoves can cut demand by half once again (75% reduction from traditional fire)
- Smart cookers: Super efficient electric pressure cookers use only 10% of the energy of a traditional fire (but need electricity)
- Kenyan NDC include 4 million improved cookstoves by 2022 + ¼ mill. biogas stoves.
- We propose to include 100,000 “Smart cookers” by 2022, ½ mill. by 2025.
- The NDC should be implemented on time, and development should continue with same speed after 2022. Then average meal can be cooked 71% more efficient in 2050 than in year 2000

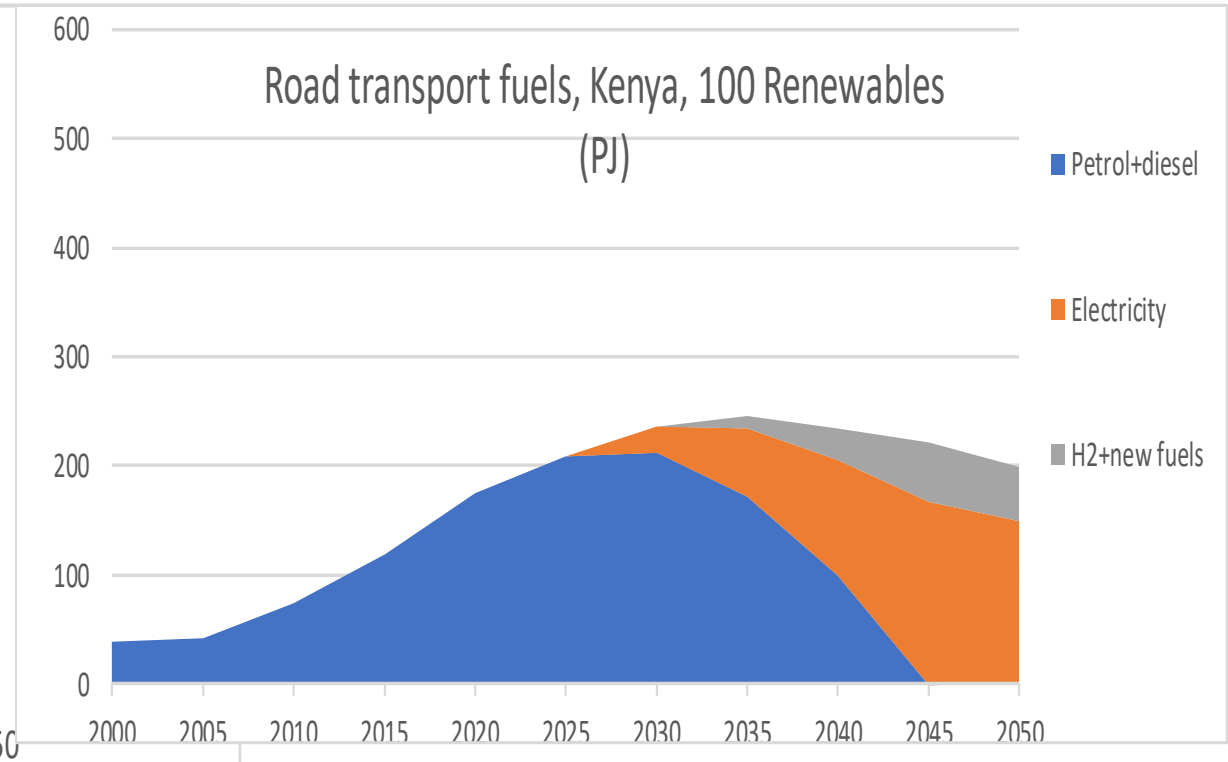
Efficient cooking

- Improved cookstoves, efficiency 20-30%
- New generation cookstove, above 50% efficiency
- ”Smart cookers” can reach 80-90% efficiency + short cooking with pressure cooking effect, in total 10 times as efficient as traditional fires

Transport is the new big energy demand

- With electric 75% electric vehicles in 2050 and 25% hydrogen + new fuels, it can be energy efficient and renewable





Electric vehicles are coming fast

800 USD, 50-100 km/charge

1150 USD, 180 km/charge

350 USD, 25 km/charge

Prices from New Delhi, INDIA
https://www.zigwheels.com

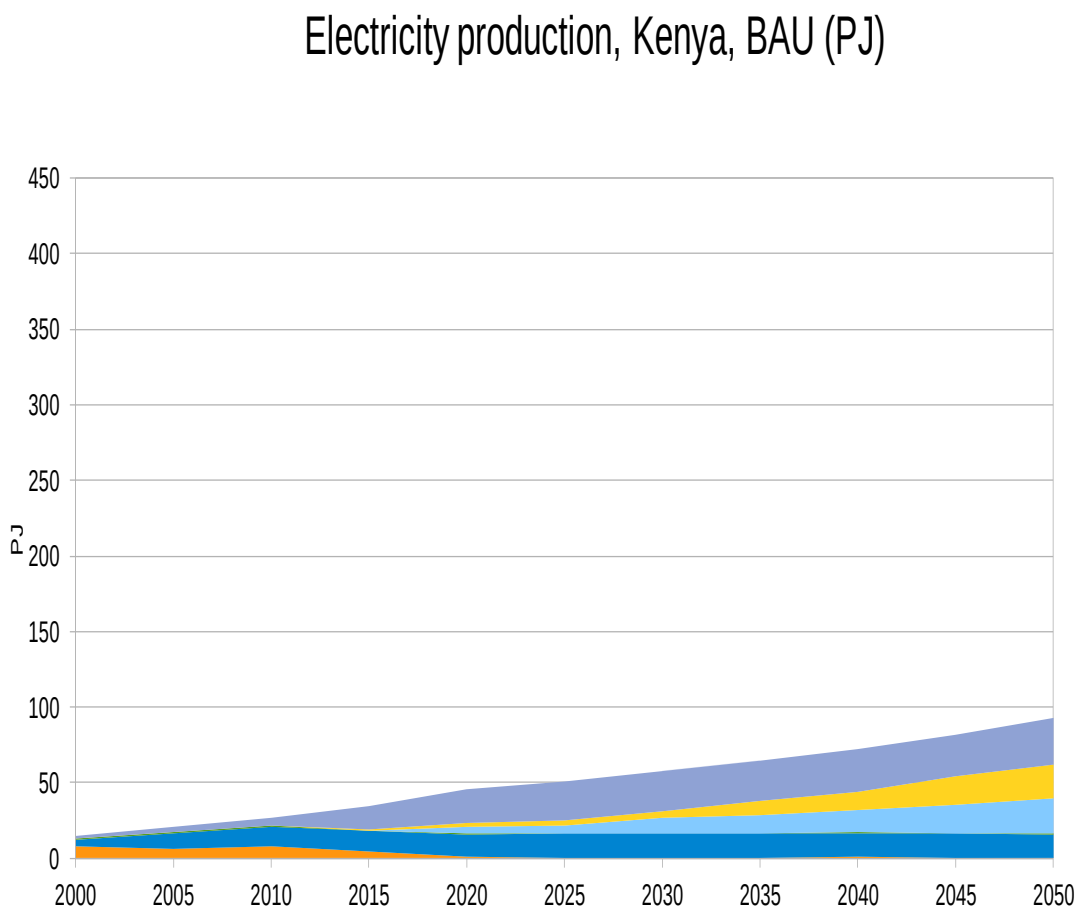
Large potentials for Renewables in Kenya

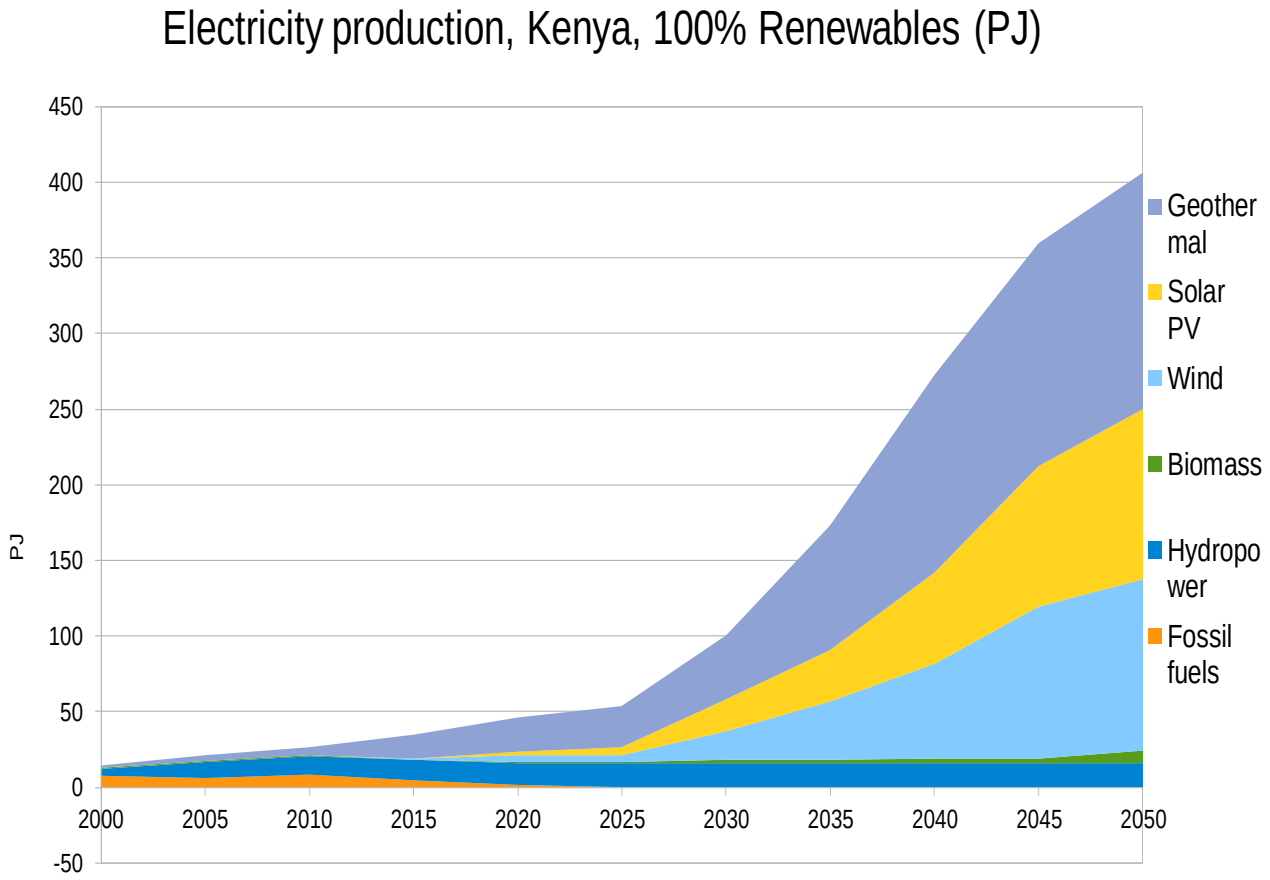
- Geothermal power 8500 MW, around 250 MW developed today
- Windpower, 650,000 MW in best wind class (I+II), 300 MW today
- Solar power > 100,000 MW, around 50 MW developed today (off-grid)
- Hydro power 1100-1200 MW, 823 MW developed today
- **BUT** Biomass (wood, etc.) resource is with sustainable use around 20 mio. ton/year, is overused, cunnret consumption som 50 mio. ton/year. **Biomass use must be reduced**

Proposal for a 100% renewable development

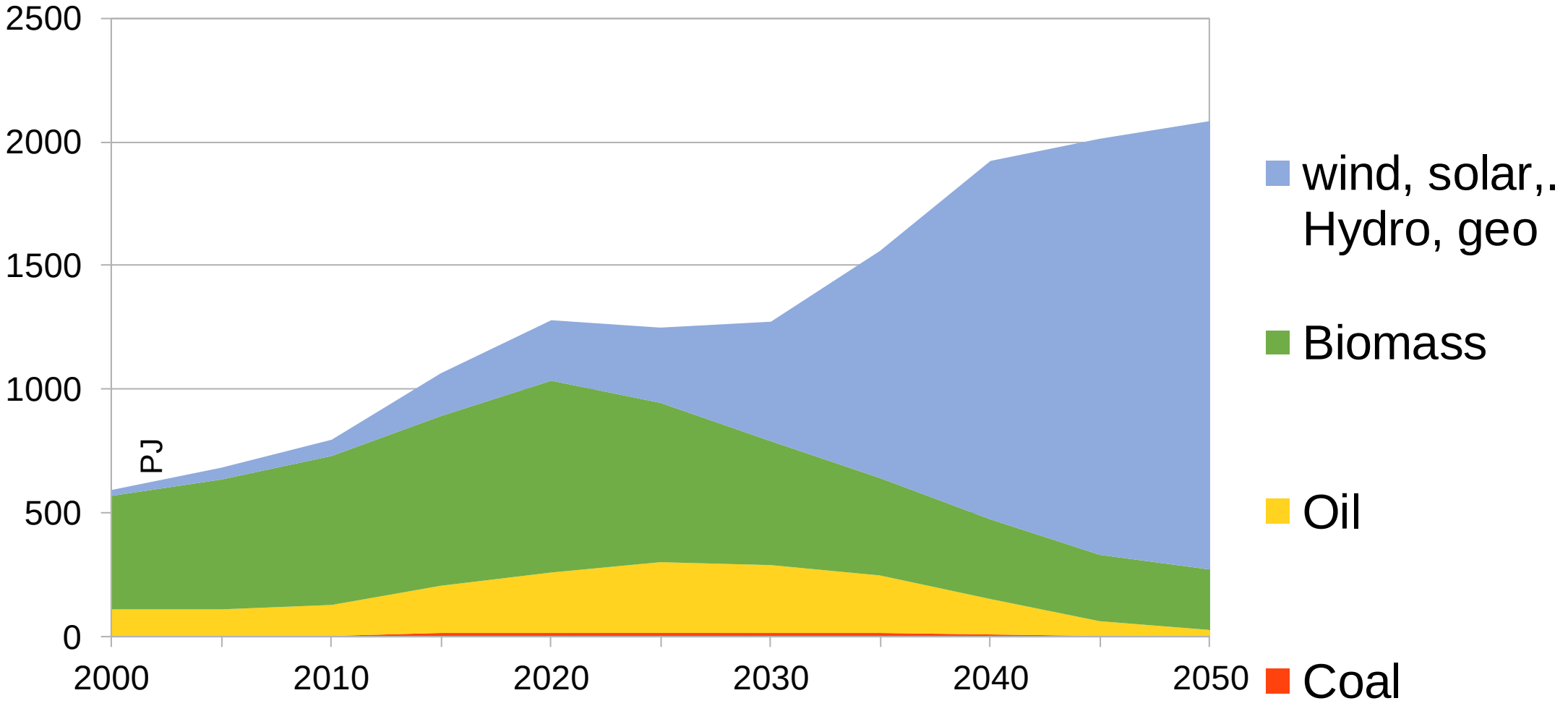
- Efficient cooking
- Change transport gradually to electricity, hydrogen and new fuels
- Make charcoal production much more efficient, from <15% today to 33%
- Expand windpower to 9,000 MW
- Expand solar power to 17,000 MW
- Expand geothermal power to 5,600 MW
- Expand electric interconnectors to 3,000 MW capacity
- Biomass power plants to balance demand and supply

Electricity increase for 100% Renewables

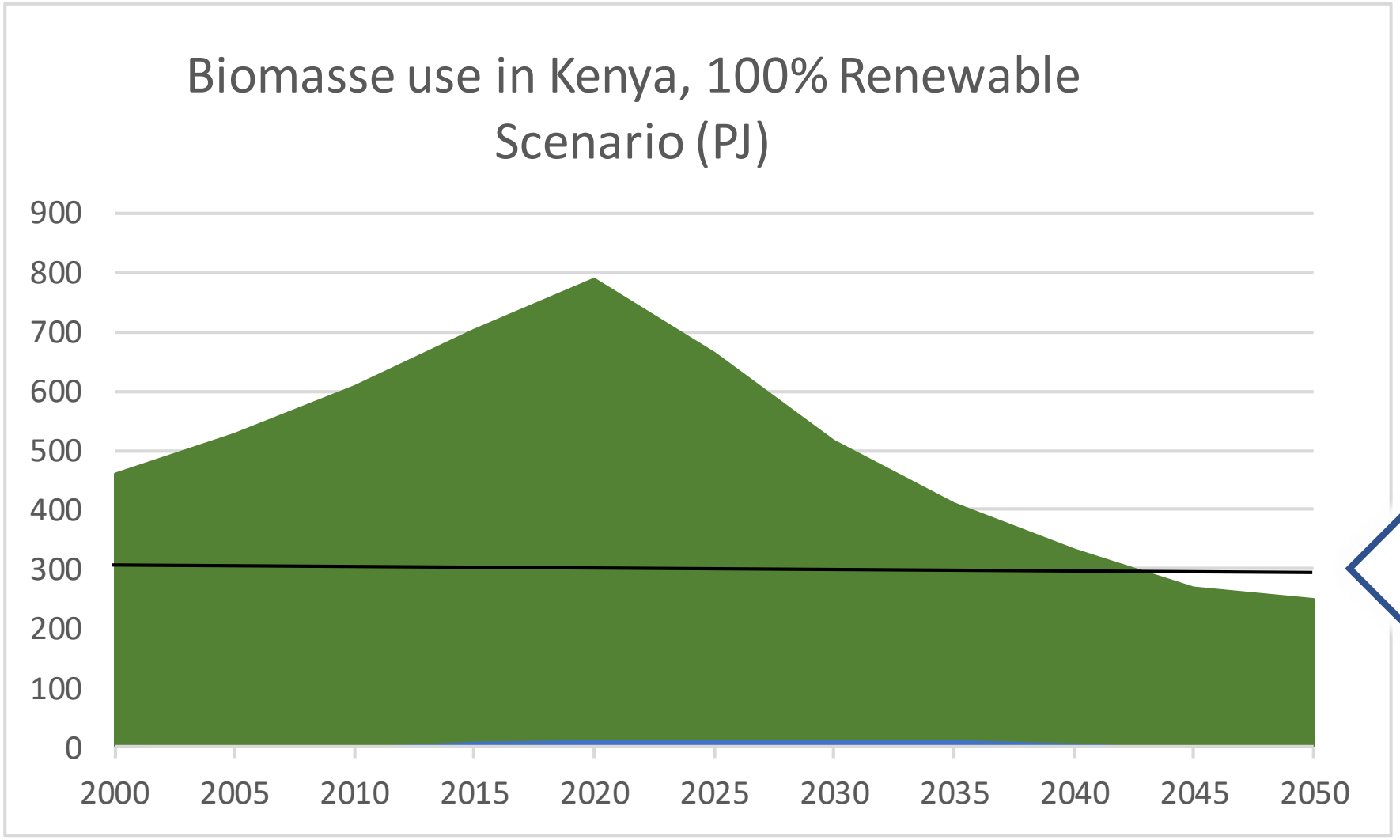




Total primary energy demand, Kenya, 100% Renewables (PJ)

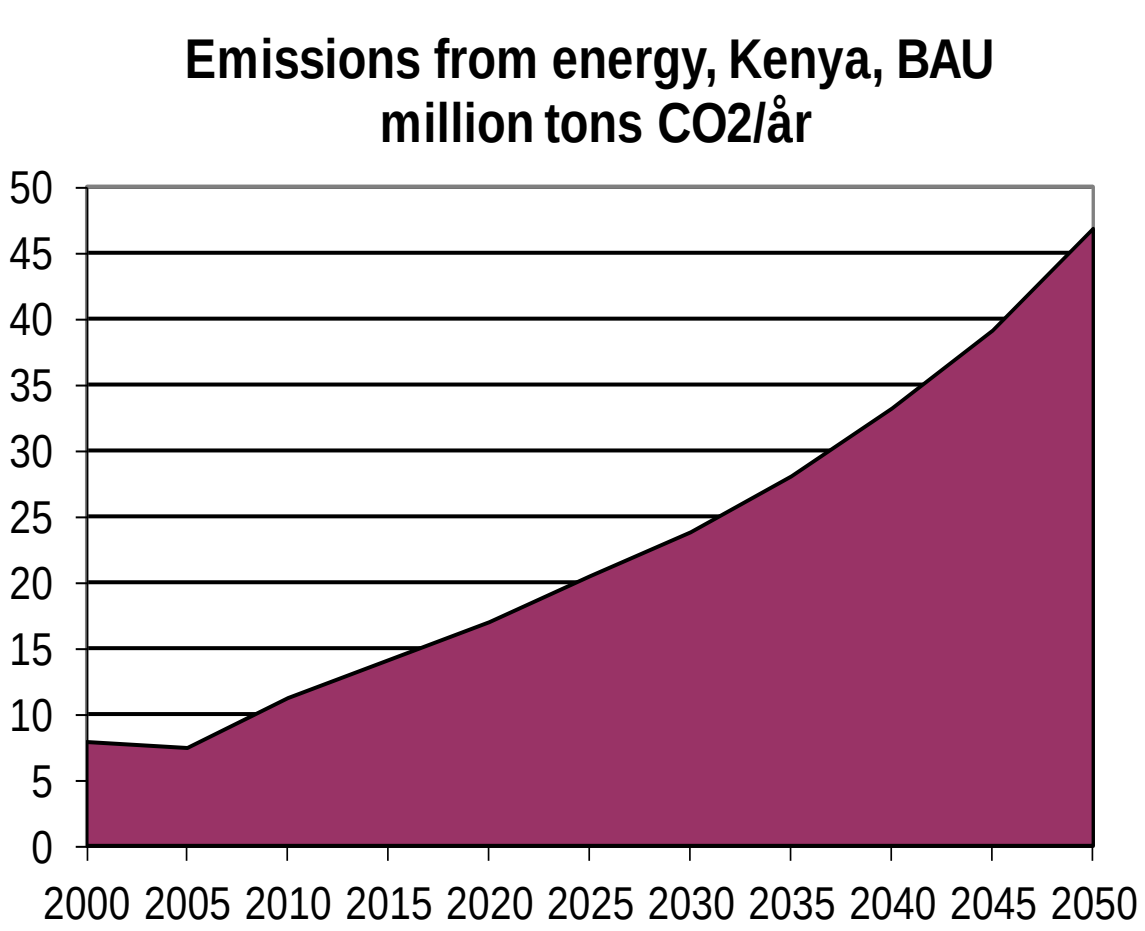


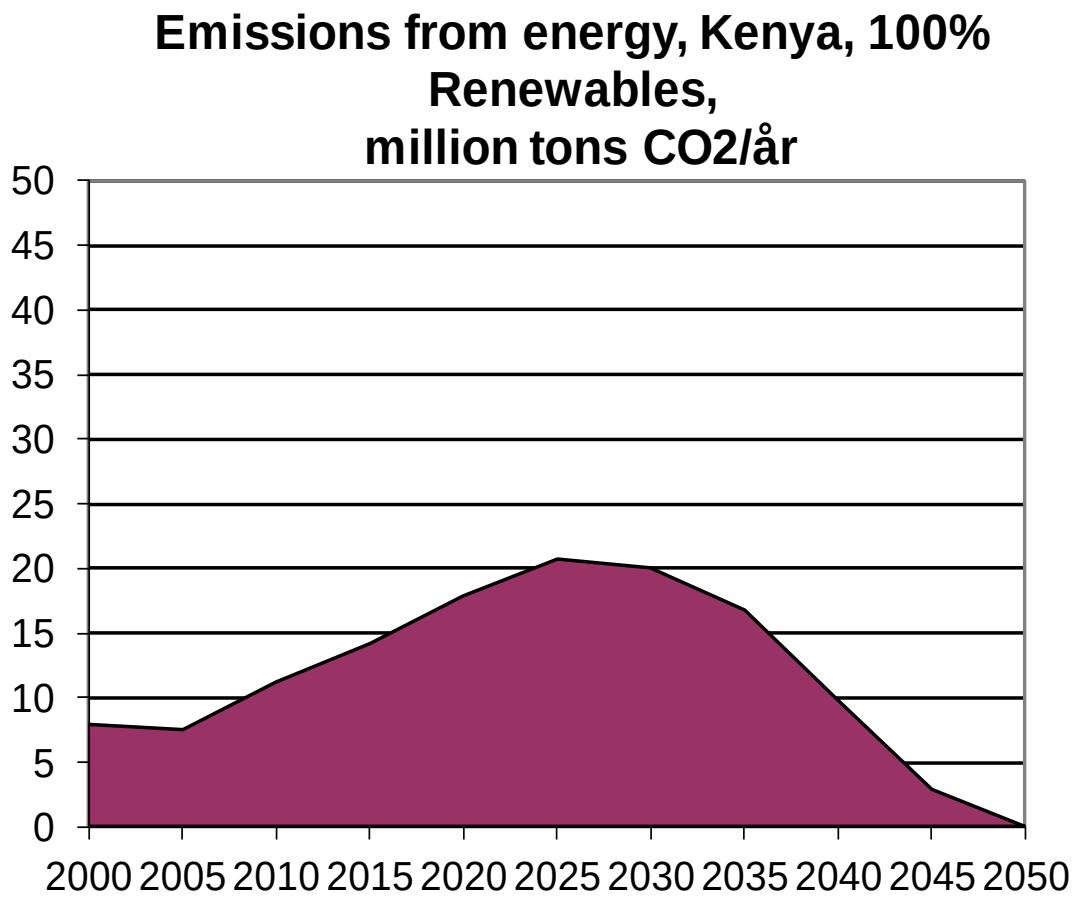
Biomass becomes sustainable



Sustainable level 295 PJ

CO_2 from energy phases out





What will it cost?

Renewable scenario is cheaper