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## How a production subsidy can boost Nigeria's renewable energy sector, growth and employment

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### Key messages

- A production subsidy for the renewable energy sector can promote the development and use of renewable electricity in Nigeria.
- Financing the incentive through fiscal deficit is the best way to develop the renewable energy sector compared to revenue- or budget-neutral funding.
- CO<sub>2</sub> emissions would decline, particularly from residential electricity-users.

### Production and poverty: Nigeria's energy paradox

Despite Nigeria's status as a major global energy producer, access to electricity is severely limited and much of the country's population is energy poor. A lack of reliable electricity forces homes and businesses to rely on non-eco-friendly private generators to create their own supply.

Nigeria is often referred to as a diesel-powered economy, which has hindered its growth and development. The country's energy mix is dominated by hydro and natural gas sources, and fossil fuel exports are the primary source of government revenue and foreign exchange.

Mitigating the consequences of climate change caused by CO<sub>2</sub> emissions is a priority for Nigeria, along with reducing energy poverty by developing renewable energy sources and meeting international requirements, including the UN's Sustainable Development Goals and the Paris Climate Agreement.

To address these concerns, the Nigerian government launched the National Renewable Energy and Energy Efficiency Policy (NREEEP) in 2015.

### NREEEP and energy sector development

NREEEP sets ambitious objectives for renewable energy sources including solar, biomass, hydro and wind.

To achieve these targets, the government has introduced a range of incentives and initiatives, including: power production tax incentives; offering tax incentives to renewable energy consumers and producers; capital grants for the sector; legal frameworks and regulations; financial aid from financial institutions, and preferred feed-in tariff pricing.

Given the current status of Nigeria's renewable energy sector, **production tax incentives are touted as the most practicable and administratively feasible fiscal incentive.**

As other countries have shown, fiscal incentives can be critical in enhancing the development of renewable energy, if correctly designed. However, these incentives can also have unexpected effects on the national economy. Understanding these impacts is important for policymaking and planning in Nigeria.



## The analysis

**A team of local PEP researchers investigated the country-level economic effects of a 20% production subsidy for Nigeria's renewable energy sector.** The researchers evaluated the impacts under two financing options proposed in the NREEEP by simulating both scenarios:

Scenario 1: The subsidy is financed by deficit or borrowing

Scenario 2: The subsidy is financed by reducing government expenditure

To do so, they employed the PEP static Computable General Equilibrium (CGE) model calibrated to the 2006 Social Accounting Matrix (SAM) for Nigeria, which the team updated using national accounts data from 2013. The 2013 SAM provided the baseline data for the simulation comparisons.

## Key findings

Across both scenarios, **the production subsidy is effective in enhancing the development of the renewable electricity sector.** It results in:

- A significant increase in the use of renewable electricity across all sectors of the economy
- An increase in household consumption of renewable electricity
- A decline in household use of fossil fuel and refined oil
- An increase in the output of the renewable electricity sector

However, the incentive **does not significantly reduce the use of fossil fuel electricity and self-generated electricity** at the sectoral level. This was consistent across both scenarios.

### Scenario 1

**The subsidy financed by deficit or borrowing leads to an increase in government expenditure and ultimately government deficit,** as expected.

- Real gross fixed-capital formation and total investment expenditure drop by 0.60% and 0.42% respectively
  - Due to a crowding-out effect.
- But the overall negative impact on government income was modest (0.71%)
  - Due to the mitigating effects of income from other sources, including household taxes and indirect taxes on commodities.

Additionally:

- **Real GDP increases**
- **Unemployment falls by 2.81%**
- Household savings increase by 0.82%
- An increase in the wage rate of 0.66% led to an increase in household labour income

### Scenario 2

**The subsidy financed by reducing government expenditure is more favorable to exports.**

- As the price of domestic commodities falls, locally produced commodities become more competitive on the world market.

It also provided a **bigger reduction in CO<sub>2</sub> emissions.**

- A reduction of 7.36% compared with 4.12% in Scenario 1.

However, **reducing government recurrent government expenditures to finance the subsidy has many negative economic effects:**

- The decline in economic output in most sectors leads to a **fall in GDP**
- **Unemployment increases by 10.31%**
- Government expenditure on goods and services falls by 16.9%
- Total government income falls by 5.65%
- A 7.47% decrease in the wage rate sees household labour income decline by 8.53%
- A significant decline in total investment expenditure (8.73%) and gross fixed-capital formation (3.17%)
  - Due to the decline in savings, driven by the drop in household and business savings.



## Conclusions and policy implications

Both scenarios show that a **production subsidy for the renewable energy sector is effective in promoting the development and use of renewable electricity, regardless of how it is financed.**

However, the way the incentive is financed substantially determines its macroeconomic impacts.

Scenario 1 shows that **renewable energy and environmental policies are compatible with growth and job creation.** In this scenario, household income and consumption budgets also increased, suggesting a welfare improvement.

Therefore, **the production subsidy proposed in the NREEEP should be financed by government deficit to ensure that the objective of developing Nigeria's renewable energy sector is achieved without undermining economic growth and welfare.**



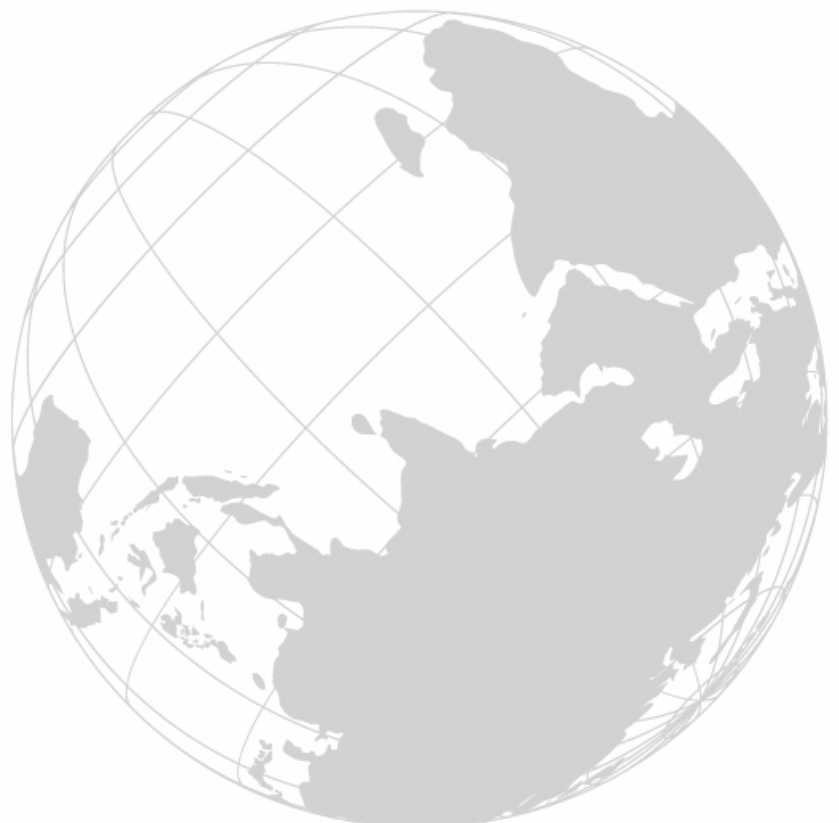
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