

Impacts of Rural Electrification Revisited – The African Context



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Purposes of this comment

Confirm Baron/Torero: solid analysis and robust findings

“Challenge” Baron/Torero: findings on positive impacts are not easily transferable to Africa

Extend Baron/Torero’s scope: open up discussion about on-grid vs. off-grid electrification



Our work on electrification in Africa

Evaluation studies of electrification projects in different African countries (and Indonesia) on behalf of Dutch Ministry of Foreign Affairs, FMO, World Bank, GIZ, and UNIDO

Country	Survey Year	Technology	Survey Focus
Benin	2009	On-grid	Enterprises
Burkina Faso	2010, 2012	SHS	Households
Mozambique	2007, 2011	On-grid/Micro-hydro	Households
Rwanda (periphery)	2011, 2012, 2015	Pico-PV/SHS	Households
Rwanda	2006, 2011, 2013	On-grid/Micro-hydro	Households, enterprises
Senegal	2011, 2014	SHS	Households
Uganda	2009	On-grid	Enterprises
Zambia	2011	On-grid	Households
Tanzania	2014/15	On-grid	Households, enterprises

Income and productive use of electricity:

- No evidence for shifts from agricultural to non-agricultural activities
- No evidence for an increase in total working hours
- Very modest evidence for effects on firm performance or firm creation

Study time of school children

- School kids do in fact study more after nightfall – however they shift study time from day time to night time.

Decrease of respiratory diseases

- Sooty kerosene lamps are replaced already before electrification

Side note: LED is making kerosene history

Hand-crafted torch



Ready made LED lamp



Fixed hand-crafted torches



Kerosene and dry-cell battery usage for lighting in non-electrified rural areas

Country	Year	Kerosene usage	LED usage
Burkina Faso	2012	10 %	99 %
Rwanda	2013	36 %	47 %
Senegal	2011	20 %	99 %
Zambia	2011	19 %	41 %
Tanzania	2014/15	45 %	53 %

Is there anything good?



- Despite the absence of “hard” socio-economic impacts electricity has a high priority for rural population
- Clearly it has a direct effect on people’s well-being
- Some indication for subtle effects on “softer” impact dimensions such as risk attitudes and gender

Extend the scope: on-grid vs. off grid electrification

- Electricity consumption in rural Africa is low (typically < 10 kWh/month)
- Low peak demand (lighting, radio, TV, mobile phone charging, no refrigeration, no cooking)

A comparison of costs per connection (very rough numbers):

On-grid: 1000 – 1500 USD

- ✓ All low consumption services (lighting, mobile phone charging, radio etc.)
- ✓ Television
- ✓ Rice cookers
- ✓ Refrigeration

SHS: 250-500 USD

- ✓ 2-3 room lights
- ✓ Mobile phone charging
- ✓ Radio
- ✓ (b/w) television
- ✓ Fan

Pico-PV: 20-80 USD

- ✓ 1-2 tasklights
- ✓ Mobile phone charging
- ✓ (Radio)

Concluding Remarks

- **Calibrate impact expectations:** electricity is highly desired and improves people's living conditions – but not the panacea for economic growth
- High investment costs of on-grid electrification call for research and discussions about
 - On-grid electrification vs. off-grid electrification
 - Electrification vs. other more basic-need oriented technologies (to stay within our agenda: improved cookstoves for example)