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Ackom, Emmanuel

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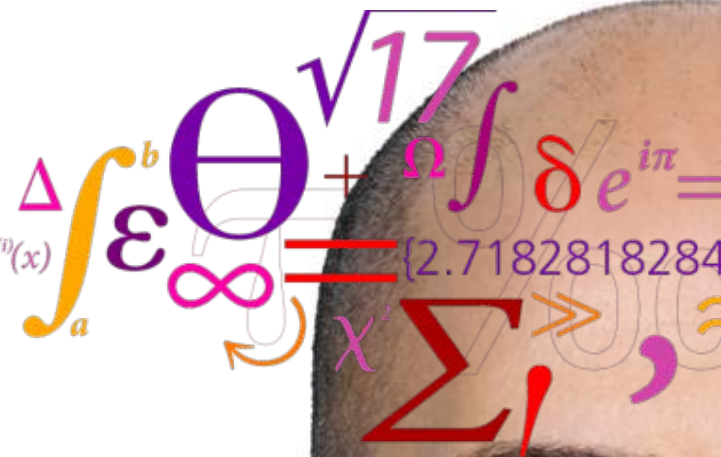
Expanding Energy Access by Scaling Up Energy Efficiency in Sub-Saharan Africa

Emmanuel Kofi Ackom, PhD

Senior Scientist & GNESD Manager

UNEP DTU Partnership

$$f(x+\Delta x) = \sum_{i=0}^{\infty} \frac{(\Delta x)^i}{i!} f^{(i)}(x)$$



IEA Energy Efficiency COP21 Side Event
(Energy Efficient Prosperity)

United Nations (UN) Climate Change Conference, Paris, France,
1st December 2015

Outline

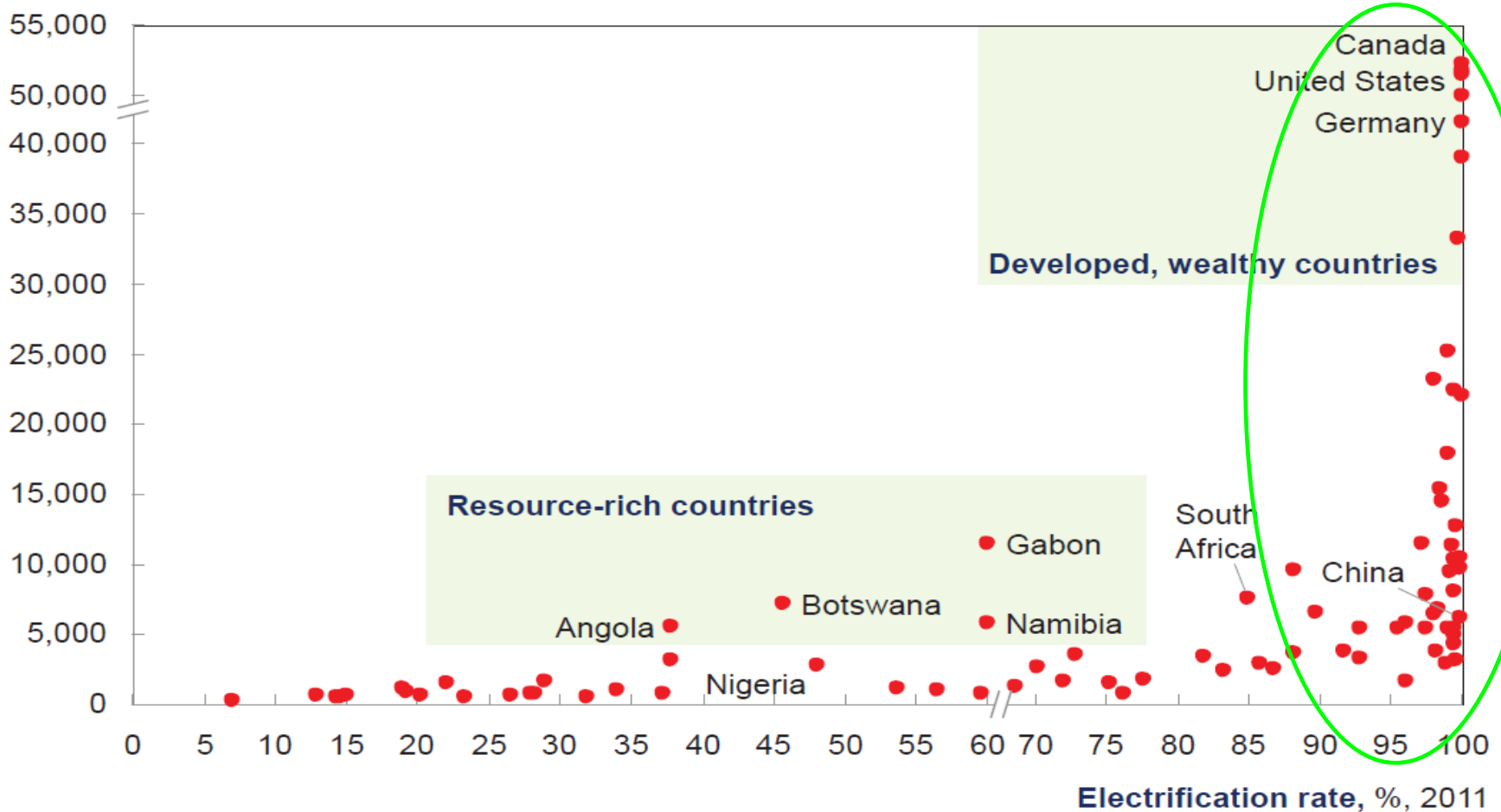


UN City, Copenhagen

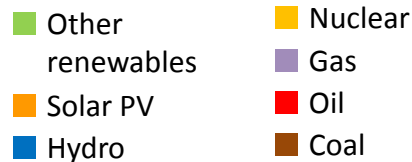
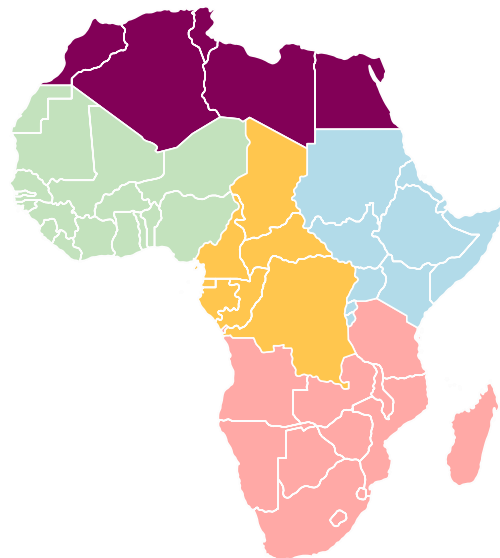
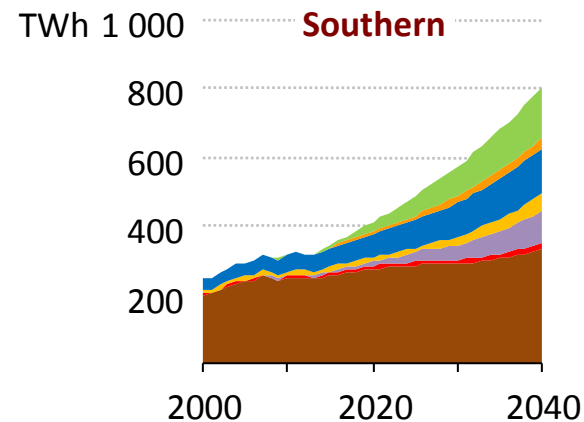
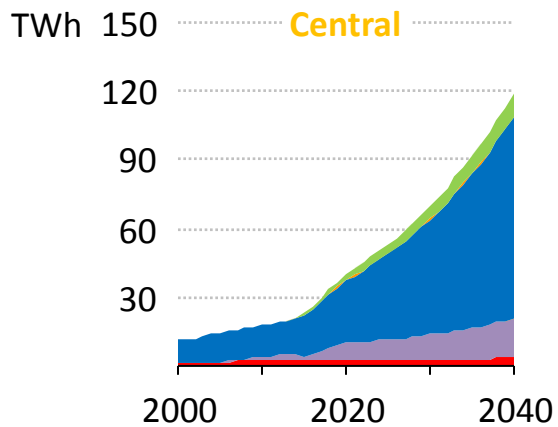
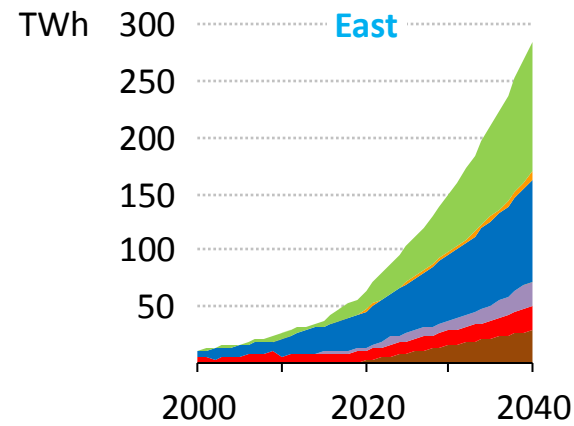
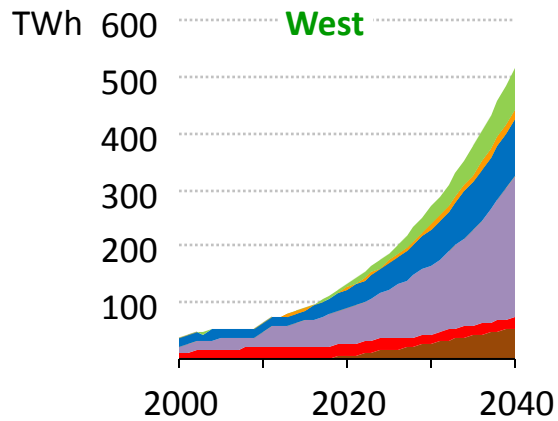
- Establishing the link between Energy Access & Prosperity
- Current situation of Energy Access in SSA & Outlook
- Energy Efficiency in SSA: Activities & outcomes
 - Country case study
- Required Investments: Energy Access & Energy Efficiency
- Concluding Recommendations

Relationship between Energy Access & Prosperity

GDP/capita, \$ thousand, 2012



Energy Resource Potential in SSA



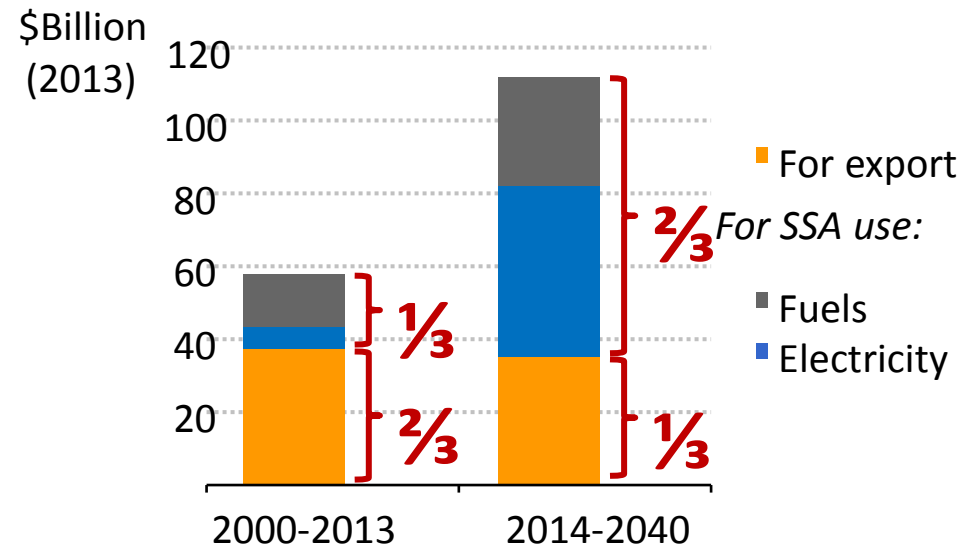
Reversing the current '66% situation' of Energy Access & Investments in SSA

- 66% of SSA population have no access to electricity
- 66% of energy investment in SSA is for export rather than internal utilization



World Bank 2011

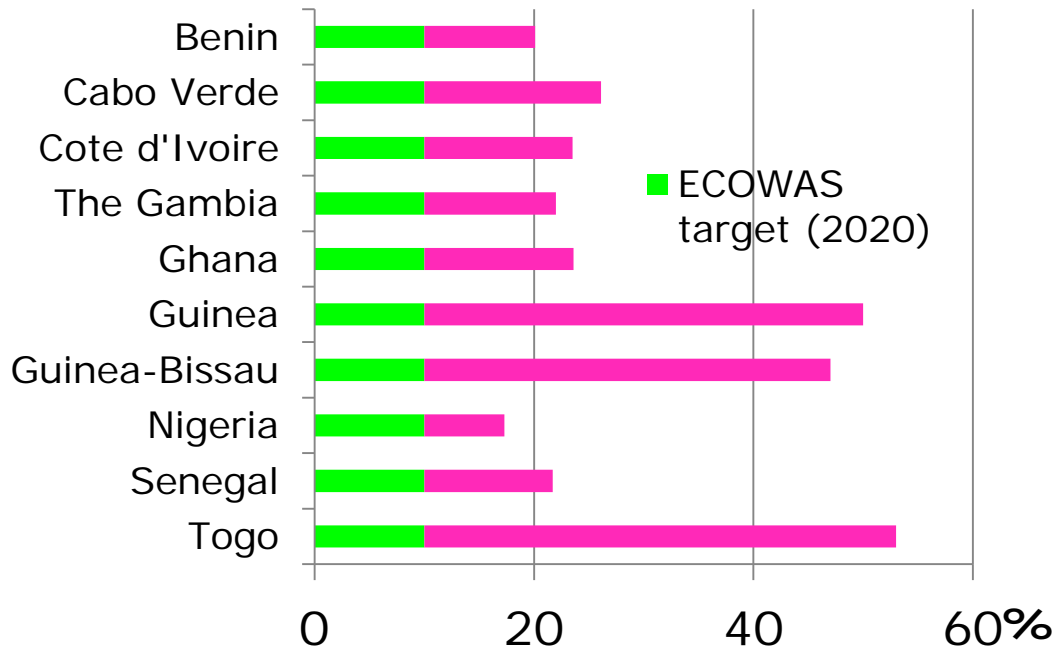
Average annual investment in SSA energy supply



High Electricity Tariff – barrier & (opportunity?)

- Obsolete and/or inefficient power generation facilities (GNESD 2009)
- High Transmission & Distribution (T&D) losses are among key factors for the high tariffs in SSA.

Losses as share of total generation in W. Africa



ECREEE, 2014

Losses transferred to consumers

Current Tariff:

- \$130 – 140 /MWh

Year 2030:

- \$70 /MWh

Year 2040:

- \$60 /MWh

IEA 2014, McKinsey, 2015

- A barrier to increased Energy Access.
- Opportunity to educate & promote energy efficient behaviour/attitude

Jobs & Economic Benefits form Energy Access

- Estimated ~ **2.5 million jobs (direct)** by 2040 for achieving 70% Energy Access in SSA (McKinsey, 2015)
 - **1.9 million** construction of power plants (temporal but skills can be transferred to other construction or related industries afterwards)
 - **300,000 – 450, 0000** day-to-day operation and maintenance of the generation, transmission & distribution management
 - Increased jobs in the supply industries i.e. cement industry
- **Indirect:** value chain e.g. pipelines, rails etc)
- Additionally, **every \$1** invested in Energy Access yields **>\$15** in incremental GDP (IEA WEO, 2014)



The Akosombo Dam

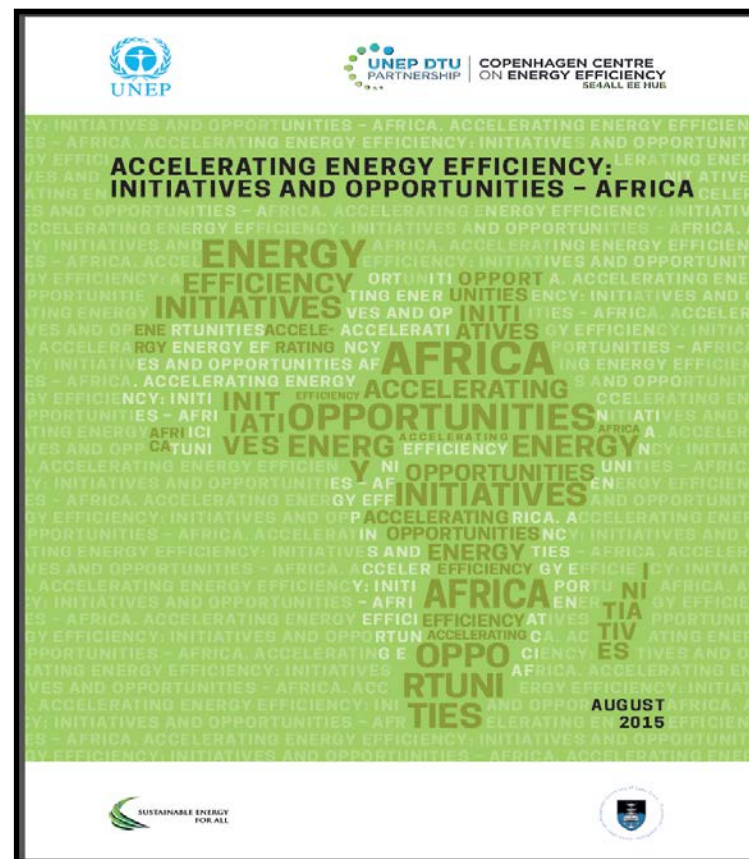
Source: www.travel-to-discover-ghana.com

Copenhagen Centre on Energy Efficiency (C2E2)

- Energy Efficiency hub for SE4All
- Global Energy Efficiency Accelerator Platform for SE4All

Activities in SSA

- Provide technical support to Uganda, Zambia and Tanzania with Cape Town University as regional experts
- Support African Development Bank work on SE4ALL Action Agendas and IPs
- 2015 report on energy efficiency opportunities in Africa

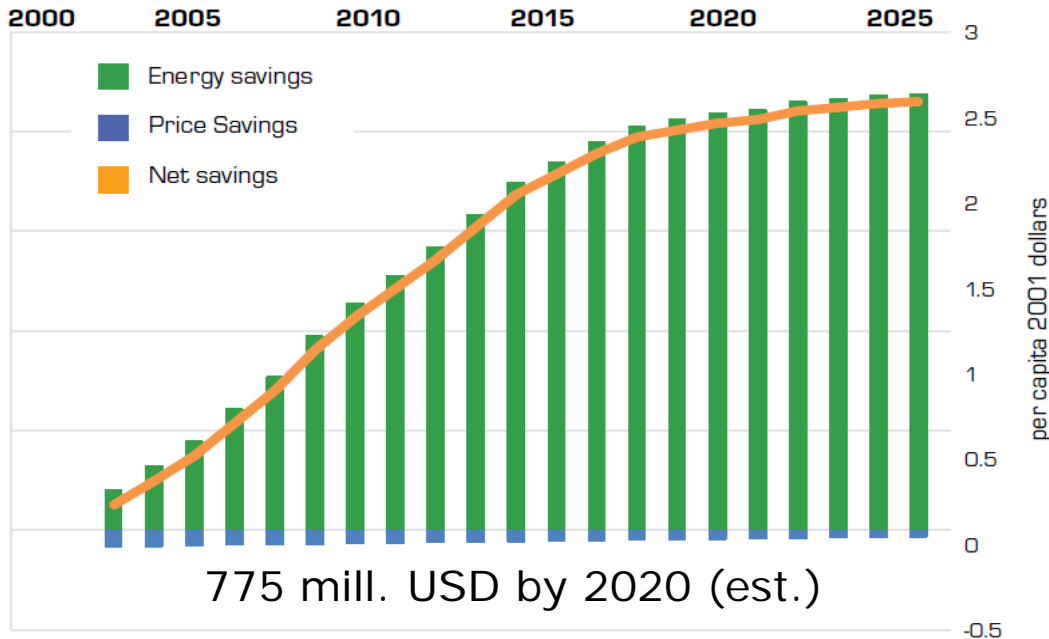


EE Activities in SSA (excerpts from C2E2, 2015 study)

| | National EE Strategy | S&L | Mass Rollouts of Technology | Legislation | Subsidized Energy Audits | Financing & soft loan schemes | Awareness & Promotion |
|--------------|----------------------|-----|-----------------------------|-------------|--------------------------|-------------------------------|-----------------------|
| Botswana | √ | | | | | √ | |
| Cameroon | √ | | | | | | |
| Chad | √ | | | | | | |
| Ethiopia | √ | | | | | | |
| Ghana | | √ | √ | √ | | | √ |
| Kenya | | | | | √ | √ | √ |
| Lesotho | √ | | | | | | |
| Malawi | √ | √ | | | | | |
| Mauritius | √ | √ | √ | | | | √ |
| Nigeria | | | √ | | | | |
| Rwanda | | | √ | | | | |
| Sierra Leone | √ | | | | | | |
| South Africa | √ | √ | √ | | √ | √ | |
| Sudan | √ | | | | | | |
| Zambia | √ | | √ | | √ | | √ |
| Zimbabwe | | | √ | | | | |

Country Example: Energy & cost savings, Ghana

Ghana's room air conditioners



Source: CLASP 2015; Agyarko, 2014

Estimated cost savings/year for Ghana

- Room air conditioners – **30 mill. USD**
- Refrigerators – **72 mill. USD**
- CFLs – **39.5 mill. USD**
- **Additionally, 100 Jobs (2 CFL factories)**

- **Strong political will & target setting was a key driver**

Investment (US \$ cummulative)

| | Global | | SSA |
|--|-------------------|--------------|---|
| | Now | Year 2040 | Year 2040 |
| Energy Supply & Access | 1.6 trillion | 24 trillion | 835 - 958 billion (for >70% energy access) |
| Energy Efficiency | 130 – 310 billion | 5-8 trillion | 25 – 29 billion |
| McKinsey 2015; IEA WEO 2014; IEA Energy Efficiency Market Report 2014; | | | |

- \$40 billion in Energy Access capital savings from regionalization & power pooling (McKinsey, 2015)

Concluding Recommendations

- Strong **political will** and **target setting** will drive Energy Access & Energy Efficiency goals
- Increased access to finance (domestic, private, international)
- Reversing the 66% situation
- Increased regional integration and power pooling
- Identification and mitigation of losses
- Productive uses and enterprise development from energy access, to create wealth and reduce poverty
- Energy efficiency should be considered as important energy RESOURCE and not an 'add-on'
- Energy efficiency has potential to enhance energy access (i.e. reliability, expansion), save money and create jobs

'It always seems impossible until it's done'

– Nelson Mandela

Thank you

Global Network on Energy for Sustainable Development (GNESD)

Emmanuel Kofi Ackom

Email: emac@dtu.dk;

emmackom@gmail.com