

# PROGRESS TOWARD SUSTAINABLE ENERGY Global Tracking Framework 2015

#### The Scale of the Access Challenge

# 1.1 billion people lack access to electricity, and It is believed that \$45 billion is needed annually to connect them by 2030

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	0 20 Wh/d	275 Wh/d	1 kWh/d	3.4 kWh/d	8.2 kWh/d
Tier 0 no access	Tier 1 task lighting & charging 20 Wh/d	<b>Tier 2</b> general lighting, TV & fan 274 Wh/d	<b>Tier 3</b> tier 2 & low power appliances 1 kWh/d	<b>Tier 4</b> tier 3 & medium power appliances 3.4 kWh/d	<b>Tier 5</b> tier 4 & high power appliances 8.2 kWh/d

#### BUT

There are varying levels of electricity access. How does requiredworld BANK GROUPinvestment change with tiers?

## **Access Investment Model (AIM)**

AIM is a non-prescriptive tool that can be used by governments and stakeholders to estimate costs of and simulate pathways to universal access in a specific country or region.

- Electricity access tiers incorporated
- Nuanced demand representation
- Detailed supply cost formulation
- Complete sector value chain captured
- Scenario and sensitivity analysis possible

RLD BANK GROUP



User Input / Characteristics of System / Model Calculation

### **Advantages of AIM**

#### It is a tool developed specifically for decision-makers:

- Transparent and accessible
- Incorporates electricity access tiers
- Enables users to make realistic demand assumptions specific to context and consumer type; demand can change over time
- Includes detailed formulation of capital and recurrent generation, transmission & distribution costs
- Is county-specific and considers geography & population density
- A portfolio of different supply options for each region, electrification method, and tier can be specified
- Enables users to test various scenarios and conduct sensitivity analysis
   NOTE: AIM should not be used to replace detailed geospatial sector analysis



#### Investment needs in high impact countries

Annual Investment Required for Varying Levels of Access (BUSD)



#### **Countries need to define universal access**

- Globally, the investment required to achieve universal electricity access ranges from \$1.5 billion to \$52 billion per year
- Investment requirements vary significantly per tier & per country
  - This is largely impacted by factors such as land area and topography, population density, supply resources & technologies, and cost of transmission & distribution
  - Options exists for a wide range of investment budgets, and Tier 1 to Tier 5 access investment requirements can differ by as much as 35X

#### AIM can be used to help:

- Policy-makers transparently quantify the investment needed to achieve varying levels of electricity access most appropriate for their aspirations and political will
- Countries set access targets for themselves considering budgetary constraints



### **RISE: Investment climate for energy access**

#### **Policies and Regulations**

- Existence and implementation of electrification plan
- Existence of an officially approved electrification plan
- Public availability of electrification plan
- Regular update of electrification plan (< 5 yrs)</li>
- Entity responsible to tracking progress of electrification plan
- Timeframe
- Scope of electrification plan
  - Existence of service level target
  - Inclusion of off-grid solutions
  - Inclusion of community facilities and productive users
  - Inclusion of informally settled people
  - Inclusion of geo-spatial mapping



- Grid electrification
  - Funding support to capital cost
  - Funding support for consumer connections
  - Standards of performance on quality of supply
- Mini-grids
  - · Legal framework for operation
  - · Ability to charge tariffs freely
  - · Financial incentives
- Standards and certification
   programs
- Stand-alone systems
- Existence of a national program
- Financial incentives
- Standards, certification, and environmental regulations
- Affordability of electricity
  - Cost of subsistence consumption
- Policy to support low-volume consumers

#### **Cross Cutting**

- Utility transparency and monitoring
- Public availability of financial statements
- Public availability of annual reports
- Public availability of reliability data
- Usage of outage recording system
- Utility financial performance
- Operational cost recovery
- System losses
- Bill collection rate
- Operating margin (EBIDTA)
- Debt service coverage ratio
- Current ratio
- Days payable outstanding

#### Procedural Efficiency

- Time and Cost of Establishing a new household grid connection
  - Rural customers
  - Urban customers
- Time and Cost of permitting a new mini-grid facility

### **RISE:** Preliminary findings for energy access

South Asian countries score higher than those in Sub-Saharan Africa on nearly all indicators



systems

Average scores for each indicator for South Asia, Sub-Saharan



### Multi-Tier Framework for Clean Cooking (1/2)

		Level-0	Level-1	Level-2	Level-3	Level-4	Level-5
1. Indoor Air Quality	PM <sub>2.5</sub> (μg/m³)		[To be specified by a competent agency such as	[To be specified by a competent agency such as	[To be specified by a competent agency such as	<35 (WHO IT-1)	<10 (WHO Guideline)
	CO (mg/m³)		WHO based on health risks]	WHO based on health risks]	WHO based on health risks]	<7 (WHO Guideline)	<7 (WHO Guideline)
2. Cook-stove Efficiency (Not to be applied if cooking solution is also used for space heating)			Primary solution meets Tier-1 efficiency requirements to be specified by a competent agency consistent with local cooking conditions.	Primary solution meets Tier-2 efficiency requirements to be specified by a competent agency consistent with local cooking conditions.	Primary solution meets Tier-3 efficiency requirements to be specified by a competent agency consistent with local cooking conditions.	Primary solution meets Tier-4 efficiency requirements to be specified by a competent agency consistent with local cooking conditions.	
<ul> <li>3. Convenience</li> <li>Fuel Acquisition and</li> <li>Preparation Time (Hrs / wk)</li> <li>Stove Preparation Time (Min/meal)</li> </ul>				< 7 < 15	< 3 < 10	< 1.5 < 5	< 0.5 < 2

Framework developed in close discussion with WHO, Berkley Air Monitoring Group and Global Alliance Framework is conducive to nationally different standards for cook-stoves, as well as development of a framework for DALYs



### Multi-Tier Framework for Clean Cooking (2/2)

		Level-0	Level-1	Level-2	Level-3	Level-4	Level-5
3. Safety of Primary	IWA Safety Tiers			Primary solution meets (Provisional) ISO Tier-2	Primary solution meets (Provisional) ISO Tier-3	Primary solu (Provis ISO T	ution meets sional) ier-4
	OR, Past Accidents (Burns and Un- intended fires)			No accidents over the last one year that required professional medical attention.			
4. Affordability						Levelized Cos Solution (incld. fuel) <5% of	st of Cooking cook-stove and HH Income
6. Quality of Primary Fuel Variations in heat rate due to fuel quality that affects ease of cooking						No Majo	or Affect
7. Availability of Primary Fuel						Primary fuel is readily available for at least 80% of the year	Primary fuel is readily available throughout the year

# Tier-rating for the household is calculated by applying the lowest of the tier-ratings across all attributes.





## Thank You

