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.

**Tier 0**
- no access
- 20 Wh/d

**Tier 1**
- task lighting & charging
- 20 Wh/d
- 275 Wh/d

**Tier 2**
- general lighting, TV & fan
- 274 Wh/d
- 1 kWh/d

**Tier 3**
- tier 2 & low power appliances
- 1 kWh/d
- 3.4 kWh/d

**Tier 4**
- tier 3 & medium power appliances
- 3.4 kWh/d
- 8.2 kWh/d

**Tier 5**
- tier 4 & high power appliances
- 8.2 kWh/d

**BUT**

There are varying levels of electricity access. How does required investment 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
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)

Global Annual Investment Required to Achieve Access Tier (BUSD)

Tier 1 Tier 2 Tier 3 Tier 4 Tier 5


Tier 1 Tier 2 Tier 3 Tier 4 Tier 5
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)
  - 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.

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

- Framework for grid electrification
- Framework for mini-grids
- Framework for stand-alone systems
- Consumer affordability of electricity
- Utility Transparency and Monitoring
- Utility Creditworthiness
- Scope of officially approved electrification plan
- Existence and monitoring of officially approved electrification plan

South Asia
Sub-Saharan Africa
### Multi-Tier Framework for Clean Cooking (1/2)

#### Framework developed in close discussion with WHO, Berkley Air Monitoring Group and Global Alliance

<table>
<thead>
<tr>
<th>1. Indoor Air Quality</th>
<th>Level-0</th>
<th>Level-1</th>
<th>Level-2</th>
<th>Level-3</th>
<th>Level-4</th>
<th>Level-5</th>
</tr>
</thead>
<tbody>
<tr>
<td>PM$_{2.5}$ ($\mu$g/m$^3$)</td>
<td>[To be specified by a competent agency such as WHO based on health risks]</td>
<td>[To be specified by a competent agency such as WHO based on health risks]</td>
<td>[To be specified by a competent agency such as WHO based on health risks]</td>
<td>&lt;35 (WHO Guideline)</td>
<td>&lt;10 (WHO Guideline)</td>
<td></td>
</tr>
<tr>
<td>CO (mg/m$^3$)</td>
<td>[To be specified by a competent agency such as WHO based on health risks]</td>
<td>[To be specified by a competent agency such as WHO based on health risks]</td>
<td>[To be specified by a competent agency such as WHO based on health risks]</td>
<td>&lt;7 (WHO Guideline)</td>
<td>&lt;7 (WHO Guideline)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. Cook-stove Efficiency (Not to be applied if cooking solution is also used for space heating)</th>
<th>Level-0</th>
<th>Level-1</th>
<th>Level-2</th>
<th>Level-3</th>
<th>Level-4</th>
<th>Level-5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary solution meets Tier-1 efficiency requirements to be specified by a competent agency consistent with local cooking conditions.</td>
<td>Primary solution meets Tier-2 efficiency requirements to be specified by a competent agency consistent with local cooking conditions.</td>
<td>Primary solution meets Tier-3 efficiency requirements to be specified by a competent agency consistent with local cooking conditions.</td>
<td>Primary solution meets Tier-4 efficiency requirements to be specified by a competent agency consistent with local cooking conditions.</td>
<td>Primary solution meets Tier-4 efficiency requirements to be specified by a competent agency consistent with local cooking conditions.</td>
<td>Primary solution meets Tier-4 efficiency requirements to be specified by a competent agency consistent with local cooking conditions.</td>
<td>Primary solution meets Tier-4 efficiency requirements to be specified by a competent agency consistent with local cooking conditions.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3. Convenience</th>
<th>Level-0</th>
<th>Level-1</th>
<th>Level-2</th>
<th>Level-3</th>
<th>Level-4</th>
<th>Level-5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel Acquisition and Preparation Time (Hrs / wk)</td>
<td>&lt; 7</td>
<td>&lt; 3</td>
<td>&lt; 1.5</td>
<td>&lt; 0.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stove Preparation Time (Min/meal)</td>
<td>&lt; 15</td>
<td>&lt; 10</td>
<td>&lt; 5</td>
<td>&lt; 2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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)

<table>
<thead>
<tr>
<th>3. Safety of Primary</th>
<th>Level-0</th>
<th>Level-1</th>
<th>Level-2</th>
<th>Level-3</th>
<th>Level-4</th>
<th>Level-5</th>
</tr>
</thead>
<tbody>
<tr>
<td>IWA Safety Tiers</td>
<td></td>
<td></td>
<td>Primary solution meets (Provisional) ISO Tier-2</td>
<td>Primary solution meets (Provisional) ISO Tier-3</td>
<td>Primary solution meets (Provisional) ISO Tier-4</td>
<td>No accidents over the last one year that required professional medical attention.</td>
</tr>
<tr>
<td>OR, Past Accidents (Burns and Unintended fires)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| 4. Affordability |         |         |         |         | Levelized Cost of Cooking Solution (incl. cook-stove and fuel) <5% of HH Income |         |

| 6. Quality of Primary Fuel Variations in heat rate due to fuel quality that affects ease of cooking |         |         |         |         | No Major 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