Special Session: The GlobalABC Africa Roadmap

Buildings: Maxine Jordan, IEA and Ian Hamilton, UCL Energy Institute

Pretoria, Tuesday 15th October 2019

Buildings energy efficiency sessions in partnership with:

UCL ENERGY INSTITUTE
Energy Efficiency Training Week: Buildings programme

1. Where to start: Energy use in buildings
2. Where to start: Energy efficiency potential in buildings
   - Special session: GlobalABC Regional Roadmaps
3. Toolkit: Energy efficient building design technologies
4. Toolkit: Energy efficient building system technologies
   - Special session: Green Building in Africa – Elizabeth Chege, KGBS
   - Special session: The GlobalABC Africa Roadmap for buildings and construction
5. What are the steps? Determining the current status of policies
6. Toolkit: Energy efficiency policies and target setting with guest speaker: Hlompho Vivian, GBC SA
7. What are the steps? Implementing codes and standards
8. What are the steps? Building operations and procurement with guest speaker: Christelle Van Vuuren, Carbon Trust
   - Special session: The multiple benefits of energy efficiency
9. Did it work? Evaluation and energy efficiency indicators
   - Special session: Financing energy efficiency in buildings
10. Buildings quiz
Why regional roadmaps?

Global Roadmap, 2016

Template and methodology, 2018-2020

3 Regional Roadmaps, 2018-2020

Meaningful targets and timelines to achieve low emission, efficient and resilient buildings in three major regions.
Roadmap outputs include targets for 8 key areas

|-----------------------------|------------------------|-------------------|--------------------|------------------|
| Urban planning              | Minimal sustainable buildings planning | Achieve: 25% sustainability plans  
Aspire: 50% sustainability plans | Achieve: 50% sustainability plans  
Aspire: 75% sustainability plans | Achieve: 75% sustainability plans  
Aspire: 100% sustainability plans |
| New buildings               | <5% net zero ready buildings | Achieve: 50% net zero ready  
Aspire: 50% net zero buildings | Achieve: 75% net zero ready  
Aspire: 75% net zero buildings | Achieve: 100% net zero ready  
Aspire: 100% net zero buildings |
| Building retrofits          | <10% sustainable building renovation | Achieve: 30% renovation  
Aspire: 50% renovation | Achieve: 50% renovation  
Aspire: near zero renovation | Achieve: near zero renovation  
Aspire: net zero renovation |
| Building operations         | Minimal use of energy and sustainability management | Achieve: 20% coverage  
Aspire: 40% coverage | Achieve: 40% coverage  
Aspire: 60% coverage | Achieve: 75% coverage  
Aspire: 100% coverage |
| Systems                     | Less-efficient lighting, appliances and equipment | Achieve: 50% MEPS coverage  
Aspire: >25% of current BAT | Achieve: 75% MEPS coverage  
Aspire: >50% of current BAT | Achieve: 100% MEPS coverage  
Aspire: >100% of current BAT |
| Materials                   | Significant energy, emissions and global warming potential | Achieve: 10% GHG + GWP decrease  
Aspire: 50% GHG + GWP decrease | Achieve: 30% GHG + GWP decrease  
Aspire: 80% GHG + GWP decrease | Achieve: 50% GHG + GWP decrease  
Aspire: 100% GHG + GWP decrease |
| Resilience                  | Minimal adaptation | Achieve: 50% of new buildings  
Aspire: 50% of all buildings | Achieve: 75% of new buildings  
Aspire: 75% of all buildings | Achieve: 100% of new buildings  
Aspire: 100% of all buildings |
| Clean energy                | Significant use of fossil fuels and carbon-based electricity | Achieve: 33% zero on-site emissions  
Aspire: 33% clean energy | Achieve: 66% zero on-site emissions  
Aspire: 66% clean energy | Achieve: 100% zero on-site emissions  
Aspire: 100% clean energy |

- Key actions and targets
  - Overall
  - Technologies
  - Policies
  - Capacity Building
  - Finance
  - Multiple benefits

- Achievable & Aspirational targets
- Definition of indicators and metrics
The process: the importance of collective discussion and input

- IEA data
- Introduction, socialisation of process
- Identification of key experts
- Focused calls, webinars, workshops
- Questionnaire for data input
- Follow up and feedback
- Circulation of drafts
### Insulation
- **(countries where insulation is uncommon)**
  - Insulation is not commonly available
  - Achieve: insulate 20% of new build
  - Aspire: insulate 75% of new build
  - Achieve: 40% (2030)
  - Aspire: 100% (2040)
  - Achieve: 60% (2050)
  - Aspire: 100% (2050)

- **(countries where insulation is common)**
  - Insulation is commonly available
  - Achieve: insulate 50% of new build
  - Aspire: insulate 100% of new build
  - Achieve: 70% (2030)
  - Aspire: 100% (2040)
  - Achieve: 90% (2050)
  - Aspire: 100% (2050)

### Windows
- **(countries where low-e windows are uncommon)**
  - Low-e windows are not commonly available
  - Achieve: low-e for 5% of new build
  - Aspire: low-e for 20% of new build
  - Achieve: 20% (2030)
  - Aspire: 40% (2040)
  - Achieve: 40% (2050)
  - Aspire: 60% (2050)

- **(countries where low-e windows are common)**
  - Low-e windows are commonly available
  - Achieve: low-e for 40% of new build
  - Aspire: low-e for 70% of new build
  - Achieve: 60% (2030)
  - Aspire: 85% (2040)
  - Achieve: 80% (2050)
  - Aspire: 100% (2050)

### External shading
- Countries with external shading uncommon
  - Achieve: 15% plan circular economy
  - Aspire: 45% plan circular economy
  - Achieve: 40% plan circular economy
  - Aspire: 65% plan circular economy
  - Achieve: 60% plan circular economy
  - Aspire: 100% plan circular economy

### Circular economy
- Minimal lifecycle information and adaptation
  - Achieve: __% plan circular economy
  - Aspire: __% plan circular economy
  - Achieve: __% plan circular economy
  - Aspire: __% plan circular economy
  - Achieve: __% plan circular economy
  - Aspire: __% plan circular economy

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**Select materials based on life cycle assessment of the energy and emissions of the materials. Design for long life and adaptation.**
### Technologies for heating, cooling, and lighting

<table>
<thead>
<tr>
<th>Use of efficient heating equipment and distribution system to reduce energy use</th>
<th>Space heating</th>
<th>Achieve: __ COP</th>
<th>Aspire: __ COP</th>
<th>Achieve: __ COP</th>
<th>Aspire: __ COP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical: __ COP</td>
<td>Exceptional: &gt;__ COP</td>
<td>Achieve: __ COP</td>
<td>Aspire: __ COP</td>
<td>Achieve: __ COP</td>
<td>Aspire: __ COP</td>
</tr>
<tr>
<td>Use of efficient cooling equipment and distribution system to reduce energy use</td>
<td>Space cooling (room air conditioners)</td>
<td>Achieve: 4 SEER average</td>
<td>Aspire: 6 SEER average</td>
<td>Achieve: 6 SEER average</td>
<td>Aspire: 8 SEER average</td>
</tr>
<tr>
<td>Typical: 3 to 4 W/W SEER</td>
<td>Exceptional: ≥ 6 SEER</td>
<td>Achieve: 6 SEER average</td>
<td>Aspire: 8 SEER average</td>
<td>Achieve: 8 SEER average</td>
<td>Aspire: 10 SEER average</td>
</tr>
<tr>
<td>Use of efficient cooling equipment and distribution system to reduce energy use</td>
<td>Space cooling (centralised cooling systems)</td>
<td>Achieve: __ W/W SEER average</td>
<td>Aspire: __ SEER average</td>
<td>Achieve: __ SEER average</td>
<td>Aspire: __ SEER average</td>
</tr>
<tr>
<td>Incorporate efficient solutions such as hybrid cooling or energy recovery for mechanical ventilation system</td>
<td>Ventilation</td>
<td>Typical: no energy recovery</td>
<td>Aspire: 50% energy recovery</td>
<td>Achieve: 10% energy recovery</td>
<td>Aspire: 75% energy recovery</td>
</tr>
<tr>
<td>Exceptional: natural</td>
<td></td>
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<tr>
<td>High efficiency systems can be implemented by using renewable energy, using waste heat or cogeneration</td>
<td>Water heating</td>
<td>Typical: __ COP</td>
<td>Aspire: __ COP</td>
<td>Achieve: __ COP</td>
<td>Aspire: __ COP</td>
</tr>
<tr>
<td>Exceptional: &gt;__ COP</td>
<td>Achieve: __ COP</td>
<td>Aspire: __ COP</td>
<td>Achieve: __ COP</td>
<td>Aspire: __ COP</td>
<td></td>
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<tr>
<td>More efficient lighting with improved lumens/watt to reduce energy consumption</td>
<td>Lighting</td>
<td>Typical: &lt;100 lumens/watt</td>
<td>Aspire: __ lm/w</td>
<td>Achieve: __ lm/w</td>
<td>Aspire: __ lm/w</td>
</tr>
<tr>
<td>Exceptional: &gt;200 lumens/watt</td>
<td>Achieve: __ lm/w</td>
<td>Aspire: __ lm/w</td>
<td>Achieve: __ lm/w</td>
<td>Aspire: __ lm/w</td>
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**Baseline status (2019)**

**Medium-term (2040)**

**Long-term (2050)**

**Short-term (2030)**

**Urban Planning**

**New Buildings**

**Building Retrofits**

**Building Operations**

**Materials**

**Resilience**

**Clean Energy**
A collaborative process

• Workshops, webinars, surveys

Access the Google Forms here
Where are these technologies at today

Technologies for:
• New buildings
• Retrofits
• Systems

> Think about the status of the key technologies you identified as they are today, in terms of performance and availability.

<table>
<thead>
<tr>
<th>Technology 1</th>
<th>Building design</th>
<th>Commonly available</th>
<th>Better</th>
<th>Best</th>
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<tbody>
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</table>

<table>
<thead>
<tr>
<th>Technology 2</th>
<th>System</th>
<th>Commonly available</th>
<th>Better</th>
<th>Best</th>
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