The Global Energy Assessment
Towards a More Sustainable Future

IIASA
International Institute for Applied Systems Analysis
and its international partners present the

www.GlobalEnergyAssessment.org

Energy is a crucial development goal for responding to challenges in the 21st century

Universal access is a pre-condition for overcoming poverty and feasible if all stakeholders work together.

Energy transformation will bring multiple co-benefits for health, security, climate change

Financing requirements are huge but achievable with right and sustained policies
Sponsoring Organizations

**International Organizations**
- GEF
- IIASA
- UNDESA
- UNDP
- UNEP
- UNIDO
- ESMAP (World Bank)

**Governments/Agencies**
- Austria - multi-year
- European Union
- Germany
- Italy
- Norway
- Sweden - multi-year
- USA (EPA, DoE)

**Industry groups**
- First Solar
- Petrobras
- WBCSD
- WEC

**Foundations**
- UN Foundation
- Climate Works Foundation
- Global Environment & Technology Foundation

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**www.GlobalEnergyAssessment.org**
Towards a more Sustainable Future

- Initiated in 2006 and involves >300 CLAs, LAs and ERs and >200 Anonymous Reviewers
- Peer-review coordinated by Review Editors is complete - ongoing responses and revisions.
- Final report (Cambridge Univ. Press) with launch on 21-23 June 2011 at Vienna Energy Forum followed by vigorous dissemination
The Natomo Family
6:30am March 27, 1993 Kouakourou, Mali

The Ukita Family
4:30pm December 16, 1992 Tokyo, Japan
Access to energy and ecosystem services (a prerequisite for MDGs & wellbeing)

Resources and potentials not a constraint; but transformation and decarbonization

Energy transformations require R&D and rapid technology diffusion & deployment

Sustained energy investments are needed and would result in multiple co-benefits
Billions of people:
- Abject poverty: 1.3
- Poor: 0.6
- Less poor: 1.4
- Middle class: 1.6
- Rich: 1.2

Mapping Energy Access
Final energy access (non-commercial share) in relation to population density

Source: Gruebler et al, 2009

Europe Population vs. Energy Demand Density
WEU: 21% of demand below renewable density threshold
EEU: 34% of demand below renewable density threshold
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Global Primary Energy

and from Danube to Caucasus

1. Renewable energy sources:
   - Other renewables
   - Nuclear
   - Gas
   - Oil
   - Coal
   - Biomass

2. Global Primary Energy

Advanced transportation vs. Conventional transportation:
- Advanced transportation
- Conventional transportation
- Geothermal
- Solar
- Wind
- Hydro
- Nuclear
- Gas w/CCS
- Gas w/o CCS
- Oil
- Coal w/CCS
- Coal w/o CCS
- Biomass w/CCS
- Biomass w/o CCS

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Final Energy Intensity and Per Capita Energy Use

Example of savings by reconstruction

Before reconstruction

Reconstruction according to the passive house principle

-90%

over 150 kWh/(m²a) 15 kWh/(m²a)

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### Global Energy Transformations

<table>
<thead>
<tr>
<th>Innovation (RD&amp;D)</th>
<th>Market Formation</th>
<th>Diffusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>End-use &amp; efficiency</td>
<td>&gt;&gt;8</td>
<td>5</td>
</tr>
<tr>
<td>Fossil fuel supply</td>
<td>&gt;12</td>
<td>&gt;&gt;2</td>
</tr>
<tr>
<td>Nuclear</td>
<td>&gt;10</td>
<td>0</td>
</tr>
<tr>
<td>Renewables</td>
<td>&gt;12</td>
<td>~20</td>
</tr>
<tr>
<td>Electricity (Gen+T&amp;D)</td>
<td>&gt;&gt;1</td>
<td>~100</td>
</tr>
<tr>
<td>Other* and unspecified</td>
<td>&gt;&gt;4</td>
<td>&lt;15</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>&gt;50</td>
<td>&lt;150</td>
</tr>
</tbody>
</table>

Notes: * hydrogen, fuel cells, other power & storage technologies, basic energy research
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