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A New Approach to Measuring Low Carbon Energy Innovation in Developing Countries

10 February 2010, Graz

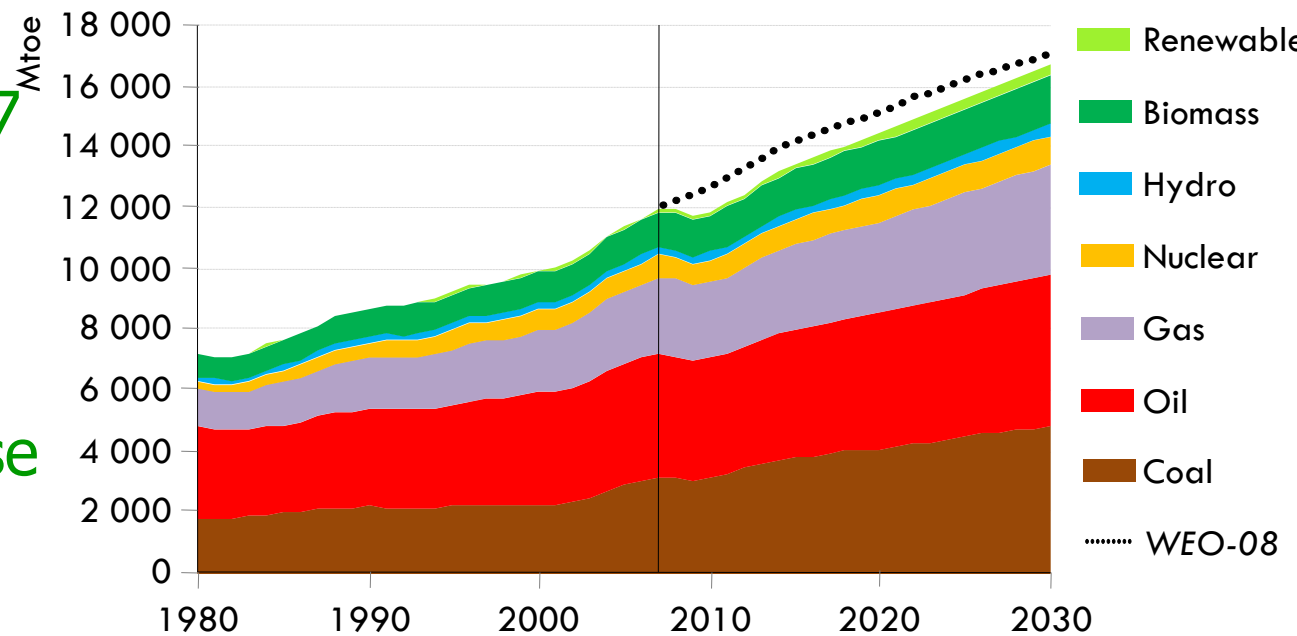
Binu K Parthan and Udo Bachhiesl

REEEP and IEE, TU Graz

EnInnov2010, 10-12 Feb.2010, Graz

Developing Countries and Low-Carbon Energy

- World Energy Demand increases 40% between 2007 and 2030;
- Annual average increase of 1.5%;
- 90% of the increase in developing countries;
- Low-carbon energy innovation applied in developing countries



(Source: OECD/IEA - 2009)

Measuring Energy Innovation

- Energy Innovation – no physical form, price definition;
- Indirect measurement approaches
- Number of approaches;
 - Governments – Public Policies
 - Business – process and decisions



Factors and Indicators

- Patents;
- R&D expenditures;
- Scientific Publications;
- Royalties & License fees;
- Infrastructure indicators;
- Trade indicators;
- Human resources
- Economic Indicators





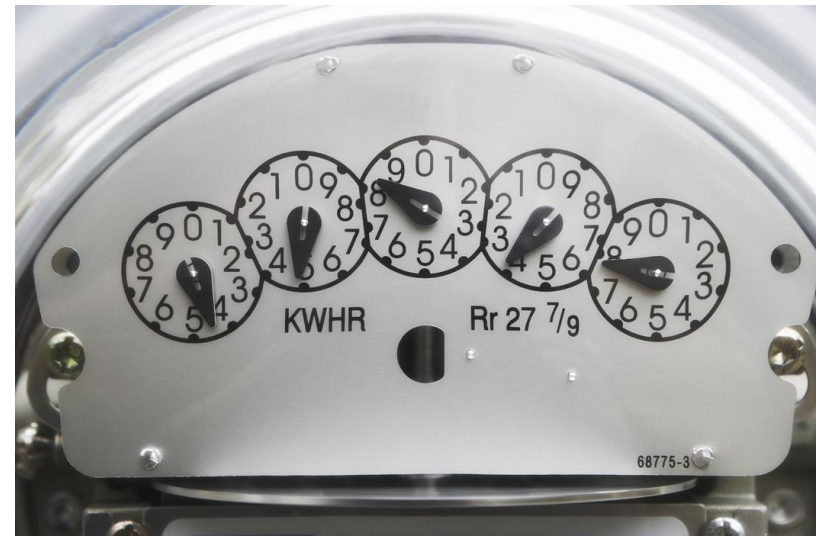
Current Approaches

- Technology Achievement Index
 - UNDP, 2001;
 - Tech creation, diffusion of innovations, diffusion of existing techs, human skills
 - Leaders, potential leaders, dynamic adopters, marginalised;
 - TAI and HDI similar
- Knowledge Economy Index
 - World Bank;
 - Generate, adopt and diffuse knowledge;
 - Economic and institutional regime, edn/skill, info infrastructure, innovation system,



Current Approaches -II

- UNCTAD Innovation Capability Index
 - UNCTAD, 2005;
 - Technological activity, human capital (weighted), innovation capability
- Competitive Industrial Performance Index
 - UNIDO, 2002;
 - Industrial capability, mfrd export, industrialisation intensity, export quality



Limitations

- General treatment of all techs – KEI, TAI - ICTs;
- Potential to apply innovation not considered;
- All countries – industrialised and developing – data availability, relevance



Low-Carbon Energy Innovation (LEI) Index

- Innovation System
 - Royalty payments/receipts
 - Tech journal articles
 - Patents
- Low-carbon energy potential;
 - Energy emissions;
 - Emissions/capita
- Normalised – 81 countries





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LEI Index

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Country	LEI Index
UAE	100
South Africa	98.77
Qatar	97.53
Trinidad & Tobago	96.30
Kuwait	95.06
Malaysia	95.06
Oman	92.59
Bahrain	91.36
Guyana	91.36
China	88.89

Conclusions

- LEI Index a new way to look at low-carbon energy investments in developing countries;
- Asian countries (64); Latin America and Caribbean (51), Africa (41);
- Asia – Middle-east countries;
- LAC- Carribbean.
- **LEI- Potential + Innovation system**
- **More work on technology and institutions**





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Thank You

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