Innovation and Dissemination of Renewable Energy Technologies

Role of Standardisation and IPR

Workshop on Environmental Technology Dissemination
World Trade Organization
12 November 2012, Geneva
THE AGENCY
**International Renewable Energy Agency**

**Founding Conference:** January 2009, Bonn, Germany  
**1st Assembly:** April 2011, Abu Dhabi, UAE

The intergovernmental RE agency

**Location:** Headquarters in Abu Dhabi, United Arab Emirates  
Innovation and Technology Centre, Bonn, Germany

**Mandate:** Sustainable deployment of the six RE resources  
(Biomass, Geothermal, Hydro, Ocean, Solar, Wind)

**Mission:** Accelerate deployment of renewable energy
IRENA Membership

Members: 159 affiliates - 102 ratified
2 INNOVATION FRAMEWORK
Policy Functions and Tools In Technology Life Cycle

- Basic Science and R&D
- Applied R&D
- Demonstration
- Market Development
- Commercial Deployment

**Building Competence and Human Capital**
Subsidies and incentives for education and training, fellowships, scholarships, visas for advanced degree candidates

**Creating and Sharing New Knowledge**
RE resource assessment dissemination, subsidies and incentives for new research, contests and prizes, intellectual property protection and enforcement measures

**Knowledge Diffusion / Creating Collaborative Networks**
Joining or initiating international cooperation, supporting industry associations, intellectual property protection and enforcement measures that provide confidence for network participants

**Establishing Governance and the Regulatory Environment**
Setting standards, setting targets, taxing negative externalities, subsidizing positive externalities, eco-labeling and other voluntary approaches, tradable permits

**Developing Infrastructure**
Public-private partnerships, incentivizing private development, planning for public development, investment in public infrastructure

**Providing Finance**
Loan guarantees, ‘green’ banks, public venture capital-style funds

**Creating Markets**
Feed-in tariffs, energy portfolio standards, public procurement, media campaigns, setting government requirements, taxing negative externalities, subsidizing positive externalities

- LCOE
- Technology Risk
3

STANDARDISATION
Standardisation across the technology life cycle

The Innovation System

Supply
- Academia
- Research centres
- Business

Innovation policy frameworks

Technology standards
- Product cost-decreasing effect
- Reduction of transaction costs
- Improved market access
- Increased quality and safety for consumers
- Codify and spread information
- Facilitate technology transfer

Framework conditions: macro economic stability, education and skills development, innovative business climate, IP protection etc.

Technology life cycle

Source: - Adapted from IEA - ETP 2008
Standardisation bridging RD&D and Implementation

- Level playing field
- New standards to accompany the emergence of new markets
- Use of standards to disseminate knowledge and technology application
- Gain market acceptance by complying
- Underpin a technological platform
- Increased innovative efficiency (focused instead of fragmented R&D)
- Innovation build upon best technology

Source: Blind (2009), *Powerpoint presentation on Standardisation as a Catalyst for Innovation*
### Macro-economic benefits of standardisation

<table>
<thead>
<tr>
<th></th>
<th>DIN - Germany</th>
<th>DTI - UK</th>
<th>Organization</th>
<th>Standards Australia</th>
<th>AFNOR</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Title</strong></td>
<td>“The Economics Benefits of Standardization”</td>
<td>“The Empirical Economics of Standards”</td>
<td>“Valeur économique de la normalisation”</td>
<td>“Standards, Innovation and the Australian Economy”</td>
<td>“Impact économique de la normalisation”</td>
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<tr>
<td><strong>Year</strong></td>
<td>1999</td>
<td>2005</td>
<td>2007</td>
<td>2007</td>
<td>2008</td>
</tr>
<tr>
<td><strong>Estimated function</strong></td>
<td>Q</td>
<td>(Q-L)</td>
<td>(Q-L)</td>
<td>PTF</td>
<td>PTF</td>
</tr>
<tr>
<td><strong>Elasticity of stock of standards</strong></td>
<td>0.070</td>
<td>0.054</td>
<td>0.356</td>
<td>0.170</td>
<td>0.120</td>
</tr>
<tr>
<td><strong>Growth rate of standards (%)</strong></td>
<td>12.9</td>
<td>5.1</td>
<td>0.7</td>
<td>4.6</td>
<td>6.8</td>
</tr>
<tr>
<td><strong>Impact in % points on GDP growth</strong></td>
<td>0.9</td>
<td>0.3</td>
<td>0.2</td>
<td>0.8</td>
<td>0.8</td>
</tr>
<tr>
<td><strong>Growth rate of GDP (%)</strong></td>
<td>3.3</td>
<td>2.5</td>
<td>2.7</td>
<td>3.6</td>
<td>3.4</td>
</tr>
<tr>
<td><strong>Contribution to growth of GDP (%)</strong></td>
<td>27.3</td>
<td>11.0</td>
<td>9.0</td>
<td>21.8</td>
<td>23.8</td>
</tr>
<tr>
<td><strong>Growth rate of the productivity of work (%)</strong></td>
<td>3.0</td>
<td>2.1</td>
<td>1.4</td>
<td>NC</td>
<td>3.0</td>
</tr>
<tr>
<td><strong>Contribution to the productivity of work (%)</strong></td>
<td>30.1</td>
<td>13.0</td>
<td>17.0</td>
<td>NC</td>
<td>27.1</td>
</tr>
</tbody>
</table>

Use of standards within RE regulatory framework

- Law (RE deployment plan)
- Regulation (Grid code incorporating PV systems)
- Standard (International standard on PV grid integration)
- Corporate good practice
- Technical specification (PV installation guidelines)

Source: CEN (2008), Powerpoint presentation “The Strategic Importance of Standardization”
INTELLECTUAL PROPERTY RIGHTS
Technology life cycle and IPRs

- IPRs are one of the group of instruments that can be deployed to promote innovation in the technology life cycle.

- Patents are part of IPRs that can play prominent roles mainly in the technology development and market introduction stages.
Implication of patents

- Outputs of invention - rich source of state-of-the-art technology knowledge
- Encourage the advancement of science and technology
- Monitor the innovation of technologies and forecast innovation, i.e., R&D trends, technology competitiveness of a company or country, flow of knowledge over time
- Licensing is one of the channels for incentivising technology markets and technology transfers
- Need to tap into this public source of technology information
Renewable energy technology patents

- 77,813 filed patents found relevant to renewable energy technologies globally (WIPO, 2011)
- 80% of all patent applications are seen in Japan, US, Germany, the Republic of Korea, UK, France
- Some emerging economies like China are showing specialisation in certain fields.
- Correlation between the patenting growth and the rate of deployment in wind energy technology and PV cell production.
- Developing countries are low in their patenting activities but it does not imply that they do not have access to the technologies.
Innovation is essential for the accelerated deployment of renewable energy technologies

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