Where is renewable energy innovation heading? – What patents data can tell us

Presenters:
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• Francisco Boshell, Team lead Renewable Energy Technology, Standards and Markets

TUESDAY, 4 FEBRUARY 2020 • 10:00 – 10:30 CET
Many innovations emerging in the energy transition

What type of indicators do we have to monitor and analyse innovation trends?

Source: https://www.irena.org/publications/2019/Feb/Innovation-landscape-for-a-renewable-powered-future
Patents are part of IPRs that can play prominent roles mainly at the technology development and market introduction stages.

Publicly Available Interactive Web Tool – “INSPIRE”

Source: http://inspire.irena.org/
Patent Development in Renewables

• Close to 600,000 patents in RE by end of 2016

• A compound annual growth rate of 17% between 2006 and 2016

• Solar, Wind and Bioenergy accounts for 90% of the patents in renewable Energy in 2016

• Solar is the leading technology with 55% of patents in 2016

• All the renewable energy technologies have at least tripled the quantity of patents in comparison to 2006

Source: inspire.irena.org
Source: http://inspire.irena.org/
Innovation in the electricity sector - now moving to enabling technologies

Patents in Renewable Energy

- Solar: 6 fold growth in last 10 years
- EV Charging: 16 fold growth in last 10 years

Source: http://inspire.irena.org/
Example - Patent filing in liquid biofuels

Annual filing of patent liquid biofuels

Annual investments in liquid biofuels

Top patent applicants in liquid biofuels

Top 10 Applicants

<table>
<thead>
<tr>
<th>Applicant</th>
<th>Patent filings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Xyleco, Inc.</td>
<td>547</td>
</tr>
<tr>
<td>Medoff, Marshall</td>
<td>464</td>
</tr>
<tr>
<td>Novozymes A/S</td>
<td>460</td>
</tr>
</tbody>
</table>

Innovation and production do not always occur in the same place - the case of liquid biofuels

**Patents (2000-2017)**

- **USA**: 11,207
- **Canada**: 3,720
- **Europe**: 11,529
- **Russia**: 1,063
- **China**: 14,074
- **Japan**: 5,012
- **Korea**: 3,884
- **Australia**: 2,432
- **Mexico**: 1,233
- **Brazil**: 2,895
- **South Africa**: 781

**Production 2017 (Billion Litres)**

- **USA**: 79
- **Canada**: 2
- **Europe**: 21
- **China**: 4
- **Indonesia**: 3
- **Thailand**: 3
- **Brazil**: 32

**Interesting cases**

- Japan, Korea, Australia and Mexico
- Thailand and Indonesia


Disclaimer: Boundaries and names shown on this map do not imply any official endorsement or acceptance by IRENA.

Takeaways - Patent data is valuable to monitor and foster innovation in renewables

Facilitating access and sharing patent data in a user friendly manner can provide useful information to decision-makers on:

- Evidence on trends for technology developments
- International research and co-operation as indicated by co-invention
- Which countries and innovators are active
- Which countries are potential markets


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Countries using INSPIRE
» EU
» Germany
» Spain
» Chile
» Belgium
» United Arab Emirates
» Norway
» Greece

Private Sector
✓ KPMG

Associations/Institutes
✓ Institute for Advanced Sustainability Studies e.V. (IASS)
✓ Association for the Protection of Intellectual Property (AIPPI)
Overview: IRENA Innovation Work

Innovation Outlooks
Forthcoming: Thermal Storage

Reports in innovation:
energy transition, policy,
IP, RD&D cooperation mechanisms

Interactive dashboards displaying RE
patent data
Ongoing update - will
expand classifications

Innovation Landscape
for the Power Sector
Transformation
IRENA INNOVATION WEEK 2020

Save-the-date | IRENA Innovation Week 2020 | 8-10 September 2020 | Bonn, Germany

innovationweek@irena.org

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Questions & Answers

Please use the ‘Questions’ feature on the webinar panel
TUESDAY, 21 February 2020 • 10:00 – 10:30 CET
“Grid Stability with High Share of Renewables - Transforming Small Island Power Systems”

TUESDAY, 3 March 2020 • 10:00 – 10:30 CET
“Planning for the renewable future: improving use and development of long-term energy scenarios”
Thank you!

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