Trends in Power and Energy Commercialization Based on Patent Filings and Grants

IEEE Power and Energy Society - San Francisco Chapter

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Lewis and Roca LLP
• Agenda
  – Patents 101
  – Patents and Commercialization
  – Renewable Energy
    ▪ patent applications and filings
  – Energy Storage
    ▪ patent applications and filings
  – Smart Grid
  – Summary
  – Questions
• Patents 101
  – A patent provides the right to exclude others from making, using, selling and importing what is claimed in the patent.
  – Patents are examined by the USPTO determine if an invention is novel, non-obvious, and useful.
  – USPTO backlog for first examination – 18-30 months.
    ▪ Accelerated examination possible for power saving technology
  – Patents are published by default at 18 months from earliest priority date (usually filing date of application)
    ▪ Applicant can request non-publication at time of filing
• Patents and Commercialization
  – To stay competitive, companies need to protect their technologies.
    ▪ Protect market share
  – Patents vs. trade secrets
  – Patents have many uses
    ▪ Reward innovation (prevent competitors from copying)
    ▪ Revenue source (licensing)
    ▪ Marketing (patented technology)
Renewable Energy

- International Energy Agency definition
  - First Generation technologies
    - Industrial revolution
    - Hydropower, biomass combustion, geothermal power, heat
  - Second Generation technologies
    - R&D since 1980s, recently in markets
    - Solar heating, wind power, photovoltaic
  - Third Generation technologies
    - Still under R&D, not widely available
    - Biomass gasification, biorefinery, ocean energy
• Renewable Energy
  – Most patent activity is for second generation technology
    ▪ Most R&D performed in recent years
    ▪ First generation has considerable prior art
    ▪ Third generation is still underway, early in process
  – Most active second generation technologies in patents:
    ▪ Wind Power
    ▪ Photovoltaic
    ▪ Biofuels
- Renewable Energy
  - Second Generation issued patents

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2008</th>
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<tr>
<td>Wind Power</td>
<td>48</td>
<td>43</td>
<td>66</td>
<td>103</td>
<td>69 (118)</td>
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<tr>
<td>Photovoltaic</td>
<td>14</td>
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<td>Biofuels</td>
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<tr>
<td>Solar Heating</td>
<td>13</td>
<td>5</td>
<td>6</td>
<td>16</td>
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- **Renewable Energy**
  - Second Generation published patent applications

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<tr>
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<tr>
<td><strong>Wind Power</strong></td>
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<td>144</td>
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<td><strong>Photovoltaic</strong></td>
<td>48</td>
<td>91</td>
<td>142</td>
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<td>119</td>
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<td><strong>Solar Heating</strong></td>
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<td>72</td>
<td>89</td>
<td>120</td>
<td>74 (127)</td>
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### Renewable Energy

- Third Generation technologies

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<tbody>
<tr>
<td>BioRefinery – issued patent</td>
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<td>BioRefinery – pub. App.</td>
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<td>Ocean power – issued patent</td>
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</tbody>
</table>
• Energy Storage

  – Very active area in patents issued and filed applications
    ▪ High number of filings
    ▪ Increasing trends

  – Most activity is in batteries
    ▪ Automobile, mobile device
• Energy Storage
  – Issued patents

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<td>Battery – auto</td>
<td>94</td>
<td>95</td>
<td>149</td>
<td>200</td>
<td>109 (187)</td>
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<tr>
<td>Battery – mobile device</td>
<td>88</td>
<td>107</td>
<td>127</td>
<td>139</td>
<td>105 (180)</td>
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<tr>
<td>Fuel Cells</td>
<td>137</td>
<td>126</td>
<td>157</td>
<td>251</td>
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**Energy Storage**

- Published patent applications

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<tr>
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<th>2011</th>
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<tbody>
<tr>
<td><strong>Battery – auto</strong></td>
<td>239</td>
<td>293</td>
<td>353</td>
<td>414</td>
<td>334 (573)</td>
</tr>
<tr>
<td><strong>Battery – mobile device</strong></td>
<td>260</td>
<td>307</td>
<td>311</td>
<td>353</td>
<td>212 (363)</td>
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<tr>
<td><strong>Fuel Cells</strong></td>
<td>403</td>
<td>380</td>
<td>367</td>
<td>352</td>
<td>193 (331)</td>
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• **Smart Grid**
  
  – Introduction to market is recent
    
    - Not much patent data to identify trends in US
    - Minimal prior art – large potential for patent protection

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<td>control systems</td>
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• Summary
  – Most patent Activity
    ▪ Energy Storage
    ▪ Highest level of commercialization
  – Highest rate of increase in patent activity
    ▪ Second Generation Renewable Energy
    ▪ Hottest increase in commercialization
  – Foreseeable increase in Patent activity
    ▪ Smart Grid
    ▪ Third Generation Renewable Energy
    ▪ Future commercialization
Thank you!

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