Evening on September 9, 2011
Photographer: Chuichi
ARAKAWA
Noon on September 10, 2011
Photographer: Chuichi
ARAKAWA
Wind Power Plant of Near-Shore in Tokyo

- Vernacular to Tokyo
- Light-up with Tokyo style
- Internet access
- Education of environment
## Total Capacity of Wind Power

### Top 10 Countries by Total Capacity [MW]

<table>
<thead>
<tr>
<th>Country</th>
<th>2010</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>44,733,0</td>
<td>25,810,0</td>
</tr>
<tr>
<td>USA</td>
<td>40,180,0</td>
<td>35,159,0</td>
</tr>
<tr>
<td>Germany</td>
<td>27,215,0</td>
<td>25,777,0</td>
</tr>
<tr>
<td>Spain</td>
<td>20,676,0</td>
<td>19,149,0</td>
</tr>
<tr>
<td>India</td>
<td>13,065,8</td>
<td>11,807,0</td>
</tr>
<tr>
<td>Italy</td>
<td>5,797,0</td>
<td>4,850,0</td>
</tr>
<tr>
<td>France</td>
<td>5,660,0</td>
<td>4,574,0</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>5,203,8</td>
<td>4,092,0</td>
</tr>
<tr>
<td>Canada</td>
<td>4,008,0</td>
<td>3,319,0</td>
</tr>
<tr>
<td>Denmark</td>
<td>3,734,0</td>
<td>3,465,0</td>
</tr>
</tbody>
</table>

### Top 20 Installed Capacity [MW]

- China
- USA
- Germany
- Spain
- India
- Italy
- France
- United Kingdom
- Canada
- Denmark
- Sweden
- Australia
- Ireland
- Turkey
- Greece
- Poland
- Austria

From WWEA Annual Report
Offshore Wind

Middelgrunden, Copenhagen / 2MW x 20
Schematic View of Offshore Wind

- **Onshore**
- **Offshore A** (~20m depth) - Mono pile
- **Offshore B** (~50m depth) - Jacket
- **Offshore C** (~200m depth) - Floating

**Present**

**Future**
Deep Offshore (1) : Alpha Ventus

Germany, 30m depth, 12 units of 5MW

From alpha ventus brochure
Photo: Matthias Ibeler, DOTI 2009/2010
Deep Offshore (2): Hywind

Norway; the most advanced; floating type; 2009
Depth; 200m (120—700m), Spar; 100m length, Turbine 2.4 MW

Photo: Øyvind Hagen / Statoil
Domestic Project of Deep Offshore

Spar type; Prof. Suzuki in Uni. of Tokyo

Sailing type; Environment Institute & Prof. Kinoshita in Uni. of Tokyo

Semi-sub type; Prof. Ishihara in Uni. of Tokyo, TEPC O, etc

Scale model of Spar type: Prof. Utsunomiya in Kyoto Uni., Toda-Kensetsu, etc
Wind Power “Kamisu”
Semi-Offshore

- 7 units of 2MW Wind Turbine
- This wind farm withstood Tsunami on 3.11
- Being developed as private sector for future such as more 7 units and Giga-watt farm
Potential Map of Wind Power in Japan

- Report of investigation for renewable energy in Ministry of Environment in 2011
- 280 GW for onshore, 1600 GW for offshore as potential value
- 273 GW for onshore, 141 GW for offshore under some scenario such as half-price