M-FIELD Inc.
Introduction of small and medium wind turbine power plants

Link With The Green Life

M-FIELD Inc.
The following information is provided by m-FIELD.
“CLASSIFIED”
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About M-FIELD

- Basic Information
  - Founded, 2009 (Taipei, Hsinchu)
- Main Product
  - Fuel cell system energy storage system
  - Wind and solar power system
  - Microgrid system, renewable energy and mains power integration system
  - To promise our children a better living environment and life, m-FIELD is committed to a clean sustainable energy business by providing green power solutions, such as the cutting-edge Fuel Cell solutions in reducing Greenhouse gas emission globally.

Consultancy and project evaluation
Professional programs, business investment assessments, and renewable energy intelligence, even at home and abroad.

Development sales and case engineering
According to the information of each case, we plan advanced energy investment plans and arrange engineering design and energy equipment entry.

Power plant maintenance and after-sales service
Recurrent power plant equipment maintenance, monitoring services, warranty, insurance and planning financial financing.
20kw small wind turbine build by m-FIELD

Coastal build plan in Taiwan:
FX16-18 20KW can be installed in hundreds, single 19.8KW

Italiana ESPE Group
44 years profession Wind Turbine
IEC Class 1 (High Wind Speed)
Wind speed up to 70m/s

Other supplier can only provide small wind turbine with IEC Class3 (52m/s~59m/s)
Taiwan's renewable energy development status

2025 各類再生能源目標裝置容量

<table>
<thead>
<tr>
<th>能源別</th>
<th>2015</th>
<th>2016</th>
<th>2020</th>
<th>2025</th>
</tr>
</thead>
<tbody>
<tr>
<td>太陽光電</td>
<td>842</td>
<td>1,342</td>
<td>8,776</td>
<td>20,000</td>
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<tr>
<td>陸域風力</td>
<td>647</td>
<td>747</td>
<td>1,200</td>
<td>1,200</td>
</tr>
<tr>
<td>離岸風力</td>
<td>0</td>
<td>8</td>
<td>520</td>
<td>3,000</td>
</tr>
<tr>
<td>地熱能</td>
<td>0</td>
<td>1</td>
<td>150</td>
<td>200</td>
</tr>
<tr>
<td>生質能</td>
<td>741</td>
<td>742</td>
<td>768</td>
<td>813</td>
</tr>
<tr>
<td>水力</td>
<td>2,089</td>
<td>2,089</td>
<td>2,100</td>
<td>2,150</td>
</tr>
</tbody>
</table>

Unit: MW

News report: Wind power will become one of the major development projects in Taiwan

18個最佳海上風力發電風場  有16個在台灣海峽

台電今(10)日引述國際工程顧問公司4C Offshore數據表示, 全球18個最適合設置離岸風力發電的最佳風場，就有16個在台灣海峽，台電位於彰化外海的離岸風力第1期計畫，預計最快2019年商轉，目標2025年設置200部風機，打造裝置容量達1GW（100萬瓩）的「海上風力發電廠」。

台電說明，台灣海峽位於中央山脈與中國福建武夷山之間，受兩國地形影響，具備強劲的東北季風，因而在全世界評估最適合設置離岸海域風力發電的18個最佳風場之中，就占了16個，而彰化外海又處在東北季風經過的狹窄尾端，更可匯集最大風能，
**General information**

Changhua wind speed: 6.36 m/s

Annual Energy Production Net: 85,000~90,000 kWh

**Wind Speed:**

The coastal of Taiwan is 6m/s~6.5m/s

The coastal of island is 7m/s~7.5m/s

Short-term target of 100 units

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<table>
<thead>
<tr>
<th>Wind Speed</th>
<th>Average Wind Speed [m/s]</th>
<th>Annual Energy Production NET [kWh]*</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>37.850</td>
<td>49,863</td>
</tr>
<tr>
<td>4.5</td>
<td>41.588</td>
<td>51.579</td>
</tr>
<tr>
<td>5</td>
<td>61.588</td>
<td>72.590</td>
</tr>
<tr>
<td>5.5</td>
<td>72.359</td>
<td>82.614</td>
</tr>
<tr>
<td>6</td>
<td>82.614</td>
<td>91.614</td>
</tr>
<tr>
<td>6.5</td>
<td>99.631</td>
<td>106.700</td>
</tr>
<tr>
<td>7</td>
<td>112.911</td>
<td>119.110</td>
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</table>

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<table>
<thead>
<tr>
<th>Wind Speed</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>靜，微風</td>
</tr>
<tr>
<td>1</td>
<td>0.3-1.5</td>
</tr>
<tr>
<td>2</td>
<td>1.6-3.3</td>
</tr>
<tr>
<td>3</td>
<td>3.4-5.4</td>
</tr>
<tr>
<td>4</td>
<td>5.5-7.9</td>
</tr>
<tr>
<td>5</td>
<td>8.0-10.7</td>
</tr>
<tr>
<td>6</td>
<td>10.8-13.8</td>
</tr>
<tr>
<td>7</td>
<td>13.9-17.1</td>
</tr>
<tr>
<td>8</td>
<td>17.2-20.7</td>
</tr>
<tr>
<td>9</td>
<td>20.8-24.4</td>
</tr>
<tr>
<td>10</td>
<td>24.5-28.4</td>
</tr>
<tr>
<td>11</td>
<td>28.5-32.6</td>
</tr>
<tr>
<td>12</td>
<td>32.7-36.9</td>
</tr>
<tr>
<td>13</td>
<td>37.0-41.4</td>
</tr>
<tr>
<td>14</td>
<td>41.5-46.1</td>
</tr>
<tr>
<td>15</td>
<td>46.2-50.9</td>
</tr>
<tr>
<td>16</td>
<td>51.0-56.0</td>
</tr>
<tr>
<td>17</td>
<td>56.1-61.2</td>
</tr>
</tbody>
</table>

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Note: The wind speed categories and descriptions are based on a scale from 0 to 17, with 0 being the calmest and 17 being the strongest. Each category describes the wind conditions and their implications for navigating and other activities.
### Taipower Feed Capacity

**107 annual renewable energy procurement rate**

<table>
<thead>
<tr>
<th>再生能源類別</th>
<th>分類</th>
<th>裝置容量級距</th>
<th>舊購電費(元/度)</th>
</tr>
</thead>
<tbody>
<tr>
<td>風力</td>
<td>陸域</td>
<td>15期以上及不滿30期</td>
<td>8.6685</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30期以上</td>
<td>有安裝或具備LVRT者 2.7669</td>
</tr>
<tr>
<td></td>
<td>離岸</td>
<td>1期以上</td>
<td>無安裝或具備LVRT者 2.7315</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>固定20期購電費 (上限電費) 5.8141</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>階梯式購電費</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>後10年 3.5685</td>
</tr>
<tr>
<td>川流式水力</td>
<td>無區分</td>
<td>1期以上</td>
<td>2.7988</td>
</tr>
<tr>
<td>地熱能</td>
<td>無區分</td>
<td>1期以上</td>
<td>固定20期購電費 5.1956</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>階梯式購電費</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>後10年 4.4465</td>
</tr>
<tr>
<td>生質能</td>
<td>無區分</td>
<td>1期以上</td>
<td>2.5765</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>無廢棄物處理設施 5.0161</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>有廢棄物處理設施 3.8945</td>
</tr>
<tr>
<td>其他 (海洋能、氫能或其他經中央主管部門認定可永續利用之能源)</td>
<td>無區分</td>
<td>1期以上</td>
<td>2.3226</td>
</tr>
</tbody>
</table>
Suitable area for installing wind turbines in Taiwan

Taoyuan Coastal

Hsinchu Coastal

Miaoli Coastal
Suitable area for installing wind turbines in Taiwan

Yunlin Coastal

Taichung Port Coastal

Changhua Coastal
Height: 18 m.
Annual average wind speed: 6.36 m/s (AWS wind measurement system)

Site Characteristics

Latitude: 23.08404  Longitude: 120.33813

Wind Speed (18.0 m): 6.36 m/s

Roughness: 0.0010 m  Elevation: 0.0 m (0.0 ft)

Air Density: 1.178 kg/m³

Mean Power Density: 506 W/m²

Uncertainty Value: 0.75 +/- m/s

Weibull A: 7.02  Weibull k: 1.50
Wind turbine 3D schematic
Wind turbine has a small surface area and does not affect the use of the original agricultural and fishery.
ESPE Group 歷史沿革

ESPE 研發生產的風力發電機通過空氣動力學、流體流動學和電子學的完美結合，提供優良的安全性和最佳發電量的性能。增加應用端的靈活性，ESPE根據各類風型選擇風機葉片通過優良測試，我們依循大型風電的系統採用最具創新性的風機技術實現空氣動力學和結構優化。與歐洲著名大...
Wind Turbine Install

Ground foundation/structure

- Nacelle weight (including rotor) 4400 kg
- Rotor 3800 kg, 3 of Blades 900 kg, Tower Height 17.9m
- Blades length 8m, Swept area 199.5㎡

- A geological/geotechnical survey
- A seismic and geoelectric survey

These must be carried out by a qualified technician, as required by local laws and codes.
Wind Turbine Install
Base tower section / Inverter elevation and assembly
Wind Turbine Install
Blades / Rotor elevation and assembly.
### Application process and engineering operations

#### Section 1 (Six months)
1. Signing data collection (0.5 months)
2. Case investigation plan (0.5 months)
3. Taipower parallel review (1-2 months)
4. Energy Bureau and County Government Record (2 months)
5. Supplier production test (4 months)

#### Section 2 (2 months)
6. Shipped to Taiwan (1.5 months)
7. Install stage:
   7.1 civil construction: 1 month
   7.2 the main body work (1 week)
   7.3 the motor system settings (1 week)

#### Section 3 (2 months)
8. Wind turbine complete (Electricity to Grid) (application for 1 month)
9. Wind power plant began to operate for 20 years
10. Energy Bureau final confirmation letter (application for 1 month)

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**Taiwan Small Wind Turbine Application Procedure**

- **Review Process**
  - Applications for utility-scale wind turbines: 15/25 days
  - Applications for small wind turbines: 15 days
  - Applications for microwind turbines: 25 days

- **Steps**
  1. Application submission
  2. Consent submission
  3. Contract signing
  4. Construction
  5. Connection
  6. Equipment registration

- **Timelines**
  - 15 days
  - 25 days
  - 15 days
  - 25 days
  - 2 days
  - 7 days
Wind Turbine Production

Research and Development, Quality control, Produce, Product
Thank you
Thank you for your participation.
If you have any advice, please contact m-FIELD.