Renewable Energy Toolkit

a work in progress

Presented to REEEAC 5/4/17
Cora Dickson, Senior International Trade Specialist
Office of Energy and Environmental Industries
The U.S. Environmental Solutions Toolkit is a buyer’s resource guide that marries EPA expertise on solving environmental challenges with a catalogue of U.S. providers of related technologies. The U.S. Environmental Solutions Toolkit supports the President’s National Export Initiative by fostering export opportunities for the U.S. environmental industry as well as advancing environmental protection goals.

Disclaimer: The information on this website is intended to assist buyers seeking to identify U.S. businesses providing technologies designed to solve the designated environmental challenge under which they are listed. Any business in this industry sector may request listing by contacting the International Trade Administration (ITA) at envirotech@trade.gov and submitting the required information. The list is not exhaustive of all U.S. businesses in this sector. Listing does not constitute endorsement of the business or its products, services or technology by ITA. ITA has performed limited due diligence; but recommends strongly that parties perform their own due diligence, investigation, and background research before entering into a commercial relationship with any listed business or business contact facilitated through this product. ITA assumes no responsibility or liability for the actions users may take based on the information provided. ITA reserves the right not to list any particular business.
Next Generation Industry Toolkits

- Industry Toolkits being produced for Environmental Technologies, Renewable Energy, Smart Grid, Civil Nuclear, Oil & Gas and Aerospace
- Will enhance ITA’s client engagement, export promotion and metrics tracking
- Easily scalable to other industry sectors

1. **Toolkit Website** – U.S. exporters apply to be included in the provider directory. Buyers search for U.S. solution providers (products and services)

2. **Application** – U.S. company visits a toolkit on the export.gov industry website, and applies to be listed in the solution provider directory

3. **Vetting** – U.S. company collaborates with industry specialists and USEAC staff on reviewing its application

4. **Account Management** – U.S. company manages its company and solutions information. Buyer manages its company info and contacts

5. **Matchmaking** – Buyers sign on to their accounts to view company’s sales and contact information. Contact is made through Salesforce, and facilitated by USEAC, commercial, and industry specialists

6. **Translation**: Toolkit interface and data can be presented in Arabic, English, Russian, French, Mandarin, Spanish and Portuguese

7. **Metrics** – U.S. companies provide regular updates to ITA on outcome of contacts from potential buyers generated via the Toolkit as requirement for Toolkit membership
Development of RE Taxonomy

Consulting with:
• Industry associations
• U.S. Department of Energy experts
• Exhibitors at Conferences

Coordinating with OCIO
• Usability of the registration process
• Search parameters that make sense to the international buyer

Structure based on “Project” type
• Trade leads from Commercial Service tend to be “project focused” and based on a type of renewable energy resource
• Buyer’s HQ and/or nationality less important than location of the project
• Equipment, services tend to vary based on project type
• T&D, energy storage solutions will be located in the Smart Grid toolkit

Beta testing
• June time frame
• Seeking participants via advisory committees, associations, etc.
For each module, buyers can search by:

- Equipment,
- Services, or
- Equipment AND services
INDUSTRY TOOLKIT: WIND PROJECT TYPES

Onshore Utility
Scale

**Equipment**
- Towers
- Blades & Rotors
- Safety Equipment
- Foundations & Moorings
- Nacelle Components
- Nacelle Covers & Accessories
- Refurbished Turbine & Parts
- Performance Software

**Services**
- Project Development
- Construction
- Operations
- Design & Engineering
- Legal & Financial

Offshore Utility
Scale

**Equipment**
- Towers
- Blades & Rotors
- Safety Equipment
- Foundations & Moorings
- Nacelle Components
- Submarine Cables
- Nacelle Covers & Accessories
- Nacelle Components
- Performance Software

**Services**
- Project Development
- Construction
- Operations
- Design & Engineering
- Financial & Legal

Distributed Wind
(100 kw – 2 mw)

**Equipment**
- Towers
- Blades & Rotors
- Safety Equipment
- Foundations & Moorings
- Nacelle Covers & Accessories
- Nacelle Components
- Refurbished Turbines & Parts
- Performance Software

**Services**
- Project Development
- Construction
- Operations
- Design & Engineering
- Financial & Legal

Small-scale Wind
(2 kw – 100 kw)

**Equipment**
- Towers
- Blades & Rotors
- Safety Equipment
- Foundations & Moorings
- Nacelle Covers & Accessories
- Nacelle Components
- Refurbished Turbines & Parts
- Performance Software

**Services**
- Project Development
- Construction
- Operations
- Design & Engineering
- Financial & Legal
After selecting the categories of equipment, companies will be provided these options or they can specify “other.” Additional options will be added during beta version testing.

**Onshore Utility Scale**
*Towers* – Segmented steel, concrete, pre-cast concrete, steel lattice, hybrid, guyed poles
*Blades & Rotors* – Horizontal axis blades
*Safety Equipment* – Lighting, fall prevention, lifts, climb assists
*Foundations & Moorings* – Plate, shallow, pile
*Nacelle Components* – Generators, motors, bearings, gearboxes, couplings, hydraulic systems, brakes, shafts, yaw motors & drives, hubs
*Nacelle Covers & Accessories* - Fiberglass covers, carbon fiber covers, wind vanes, anemometers
*Refurbished Turbines & Parts* – Towers, blades & rotors, nacelle components, nacelle covers & accessories
*Performance Software* – Component modeling, aerodynamics analysis, wind prediction & reaction, system monitoring

**Offshore Utility Scale**
*Towers* – Segmented steel, concrete, pre-cast concrete, steel lattice, hybrid, guyed poles
*Blades & Rotors* – Horizontal axis blades
*Safety Equipment* – Lighting, fall prevention, lifts, climb assists
*Foundations & Moorings* – Gravity anchors, mono pile anchors, tripod anchors, suction bucket anchor, jacket anchor, floating anchor
*Nacelle Components* – Generators, motors, bearings, gearboxes, couplings, hydraulic systems, brakes, shafts, yaw motors & drives, hubs
*Nacelle Covers & Accessories* – Fiberglass covers, carbon fiber covers, wind vanes, anemometers
*Refurbished Turbines & Parts* – Towers, blades & rotors, nacelle components, nacelle covers & accessories
*Performance Software* – Component modeling, aerodynamics analysis, wind prediction & reaction, system monitoring
Distributed Wind (100 kw – 2 MW)
*Towers* – Segmented steel, concrete, pre-cast concrete, steel lattice, hybrid, guyed poles
*Blades & Rotors* – Horizontal axis blades
*Foundations & Moorings* – Plate, shallow, pile
*Safety Equipment* – Lighting, fall prevention, lifts, climb assists
*Nacelle Components* – Generators, motors, bearings, gearboxes, couplings, hydraulic systems, brakes, shafts, yaw motors & drives, hubs
*Nacelle Covers & Accessories* – Fiberglass covers, carbon fiber covers, wind vanes, anemometers
*Refurbished Turbines & Parts* – Towers, blades & rotors, nacelle components, nacelle covers & accessories
*Performance Software* – Component modeling, aerodynamics analysis, wind prediction & reaction, system monitoring

Small-scale Wind (2 kw – 100 kw)
*Towers* – Concrete, pre-cast concrete, steel lattice, hybrid, guyed poles
*Blades & Rotors* – Horizontal axis and vertical axis blades
*Foundations & Moorings* – Plate, shallow, pile
*Safety Equipment* – Lighting, fall prevention, lifts, climb assists
*Nacelle Components* – Generators, motors, bearings, gearboxes, couplings, hydraulic systems, brakes, shafts, yaw motors & drives, hubs
*Nacelle Covers & Accessories* – Fiberglass covers, carbon fiber covers, wind vanes, anemometers
*Refurbished Turbines & Parts* – Towers, blades & rotors, nacelle components, nacelle covers & accessories
*Performance Software* – Component modeling, aerodynamics analysis, wind prediction & reaction, system monitoring
After selecting the categories of equipment, companies will be provided these options or they can specify “other.” Additional options will be added during beta version testing.

**Project Development** – Siting & staging, strategic planning, surveys and analysis, environmental evaluations & statements

**Construction** – materials and services, transport & shipping, set up, supervision & management, component placement

**Operations** – site services, management, advanced engineering, advanced technology, performance monitoring, maintenance, inspection

**Design & Engineering** – Resource assessment, mapping, turbine sizing & selection, turbine design, energy yield assessment, feasibility studies, conceptual design, civil engineering

**Legal & Financial** – Interconnectivity, permitting, negotiations, contract procurement, financial modeling, cost planning, licensing
Your company wishes to export:  
☑ Goods  ☐ Services

Manufacturer must register separately for each sector and project type if its equipment can be used in multiple sectors or multiple types of projects.

Select one:
☐ Solar  ☑ Wind  ☐ Hydro  ☐ Geothermal  ☐ Biomass  ☐ Renewable Fuels

Select project type:
☐ Onshore Utility Scale  ☑ Offshore Utility-Scale  ☐ Distributed  ☐ Small Scale

Select equipment category:
☐ Towers
☐ Blades & Rotors
☐ Safety
☑ Foundations & Moorings
☐ Nacelle Components
☐ Nacelle Covers & Accessories
☐ Performance Software

Specific Products - Check all that apply:
☐ gravity anchors
☑ mono pile anchors
☑ tripod anchors
☐ suction bucket anchor
☐ jacket anchor
☑ floating anchor

Manufacturer does NOT have to register each product that it offers in the category.
Your company wishes to export:  
- Goods  
- Services

Service provider must register separately for each sector and project type according to their service category.

Select one:
- Solar
- Wind
- Hydro
- Geothermal
- Biomass Power
- Waste to Energy

Select project type:
- Onshore Utility Scale
- Offshore Utility-Scale
- Distributed
- Small Scale

Select service category:
- Project Development
- Construction
- Operations
- Design & Engineering
- Financial & Legal

Specializations - Check all that apply:
- Interconnectivity
- Permitting
- Negotiations
- Contract Procurement
- Financial Modeling
- Project Finance
Equipment and services may vary according to the type of project. For example, towers for onshore, offshore, and small wind are different. Thus, the buyer must choose project type before proceeding to the next search stage.
# Buyer’s Search Options: Step 2

<table>
<thead>
<tr>
<th>Equipment or Material Solution</th>
<th>Select an option</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service Solution</td>
<td>Select an option</td>
</tr>
<tr>
<td>Product or Specialization</td>
<td>Select an option</td>
</tr>
</tbody>
</table>

- Equipment and Service Categories from the sector will be displayed in the pull down menus. Products and specializations will filter accordingly.
# Project Type

**Wind: Offshore**

- A paragraph describing salient features of the project type
- Link to the Smart Grid toolkit for energy storage, transmission equipment, etc. as relevant

## Additional Information

- Link to DOE page about offshore wind
- Link to trade association page

## Solutions and Providers

<table>
<thead>
<tr>
<th>Solution Category</th>
<th>Providers</th>
<th>Products/Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development</td>
<td>Adanta, Inc.</td>
<td>Consulting, Financial</td>
</tr>
<tr>
<td></td>
<td>AEEC</td>
<td>Siting &amp; Staging</td>
</tr>
<tr>
<td></td>
<td>AMO Environmental Decisions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AMS, Inc.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cardno EBI</td>
<td></td>
</tr>
</tbody>
</table>

Clicking on the company will bring up contact card; buyer can submit contact request via a form that also notifies ITA field offices.

These links specific to project type will be offered to buyer after the contact form has been submitted.

Products and Services selected by the company (associated with the solution category) will be listed in 3rd column.
Category examples such as the ones below will be provided on the top page for the module. Company will specify these details in their description. (red indicates categories/equipment unique to the project type)

**Conventional Hydropower**
*Generators* – Synchronous generators & parts, Induction generators & parts, Vertical type generators & Safety Equipment
*Intake & passage systems* – Gates, hydraulic systems, penstocks, spillways, fish passage
*Refurbished Equipment & Technology* – Bearings, turbine parts, generator parts, intake, piping, controls, coating & sealant, gates, rings, nozzles
*Performance Software* – Controls, operations analysis, prediction & reaction technology, system monitoring

**Pumped Storage**
*Generators* - Synchronous generators & parts, induction generators & parts, vertical type generators & parts
*Turbines* – Governors, Reversible pump turbine & parts, Inclined-jet turbine & parts, tubular turbine & parts, Pelton turbine & parts, Francis turbine & parts, Kaplan turbine & parts, Straflo turbine & parts, cross-flow turbine & parts
*Intake & passage systems* - Gates, hydraulic systems, penstocks, spillways, fish passage
*Refurbished Equipment & Technology* – Bearings, turbine parts, generator parts, intake, piping, controls, coating & sealant, gates, rings, nozzles
*Performance Software* – Controls, component modeling, operations analysis, prediction & reaction, system monitoring

**Conduit Hydropower**
*Generators* - Vertical type generators & parts, horizontal type generators & parts, induction generators & parts, synchronous generators & parts
*Turbines* - Governors, Kaplan turbine & parts, Francis turbine & parts, zero head turbine & parts, in-stream turbine & parts, Pelton turbine & parts, tubular turbine & parts, inclined-jet turbine & parts, cross-flow turbine & parts, Straflo turbine & parts, kinetic turbine & parts, Archimedean screw & parts
*Intake & passage systems* - Gates, screens, penstocks, spillways, fish passage
*Refurbished Equipment & Technology* – Bearings, turbine parts, generator parts, intake, piping, controls, coating & sealant, gates, rings, nozzles
*Performance Software* – Controls, component modeling, operations analysis, prediction & reaction, system monitoring
Small Hydro

*Generators* - Synchronous generators & parts, induction generators & parts, vertical type generators & parts, horizontal generators & parts

*Turbines* - Governors, Open-flume Francis turbine & parts, spiral-case Francis turbine & parts, propeller turbine & parts, Kaplan turbine & parts, cross-flow turbine & parts, zero head turbine & parts, in-stream turbine & parts, Archimedean screw & parts

*Intake & passage systems* - Gates, screens, siphon intake, spillways, penstocks

*Refurbished Equipment & Technology* – Bearings, turbine parts, generator parts, intake, piping, controls, coating & sealant, gates, rings, nozzles

*Performance Software* – Controls, component modeling, operations analysis, prediction & reaction, system monitoring

---

Marine & Hydrokinetic Power

*Generators* - Vertical type generator & parts, horizontal type generator & parts, induction generator & parts, synchronous generator & parts

*Turbines* - Governors, Kaplan turbine & parts, Francis turbine & parts, zero head turbine & parts, in-stream turbine & parts, Pelton turbine & parts, tubular turbine & parts, cross-flow turbine & parts, kinetic turbine & parts, propeller turbine & parts

*Intake & passage systems* - screens, fish passage

*Kinetic Systems* - Oscillating water columns, attenuators, overtopping devices, point absorbers

*Refurbished Equipment & Technology* – Bearings, turbine parts, generator parts, intake, piping, controls, coating & sealant, gates, rings, nozzles

*Performance Software* – Controls, component modeling, operations analysis, prediction & reaction, system monitoring
Category examples such as the ones below will be provided on the top page for the module. Company will specify these details in their description. *(red indicates categories/equipment unique to the project type)*

**Project Management**—Siting & staging, strategic planning, surveys and analysis, environmental evaluations & statements, risk management

**Construction, design, and installation**—Materials and services, component modeling, transport & shipping, component placement, impoundment, underwater construction, cofferdam services, concrete placement, engineering, modeling, pipe fitting & placement

**Operations**—site services, management, advanced engineering, performance monitoring, maintenance, inspection

**Assessment & Consulting**—Resource assessment, mapping, turbine sizing and selection, energy yield assessment, feasibility studies, conceptual design, civil engineering, hydrology

**Advanced Technology**—control replacement and modernization, performance software, monitoring software, digitization, systems optimization

**Legal & Financial**—Interconnectivity, regulatory compliance, permitting, negotiations, contract procurement, financial modeling, cost planning, licensing

**Repairs and Modernization**—Concrete repair, scour & erosion services, underwater repair, turbine repair and replacement, component replacement, corrosion protection & maintenance
GEOTHERMAL MODULE: PROJECT TYPES

High Temperature Power Plants

Equipment
- Turbines
- Pumps and Motors
- Vessels
- Heat Exchange Equipment
- Piping Systems
- Electrical – Instrumentation
- Working Fluids
- Abatement Systems
- Safety/Personnel Protection
- Injection Well
- Production Well
- Ancillary Equipment

Services
- Consulting
- Project Development
- Exploration
- Pre-Construction
- Design
- Siting & Staging
- O&M
- Financial & Legal

Moderate Temperature Power Plants

Equipment
- Turbines
- Pumps and Motors
- Vessels
- Heat Exchange Equipment
- Piping Systems
- Electrical – Instrumentation
- Working Fluids
- Abatement Systems
- Safety/Personnel Protection
- Injection Well
- Production Well
- Ancillary Equipment

Services
- Consulting
- Project Development
- Exploration
- Pre-Construction
- Design
- Siting & Staging
- O&M
- Financial & Legal

Heating & Cooling

Equipment
- Ground Loop Systems
- Heat Pumps
- Distribution Unit
- Control Systems

Services
- Project Development
- Installation
- Service & Maintenance
After selecting the categories of equipment, companies will be provided these options or they can specify “other.” Additional options will be added during beta version testing.

**High Temperature Power Plant**
- **Turbines** – steam turbine, binary turbine, speed reducer/gearbox, lubrication systems, replacement box
- **Pumps and Motors** – working fluid pumps, production pumps, injection pumps, cooling water pumps, condensate pumps, chemical treatment pumps, compressors, fans and motors, steam ejectors
- **Vessels** – condensate tanks, steam separators, storage tanks, process vessels and receivers
- **Heat Exchange Equipment** – vaporizer/boilers, shell and tube heat exchangers, air coolers, air-cooled condensers, condenser, cooling tower
- **Piping Systems** – steam pipes (steel), valves and fittings, specialty alloy piping/fitting/valves, insulation, mist separator
- **Electrical – Instrumentation** – generator, controls, circuit breakers, wiring, transformers, instrument sensors, switchgear, motor control center
- **Working Fluids** - refrigerants
- **Abatement Systems** – hydrogen sulfide, corrosion, scaling
- **Safety/Personnel Protection** – above-ground access (ladder, railing, etc.), fire protection systems
- **Injection Well**: well, casing, cement
- **Production Well**: well, casing cement
- **Ancillary Equipment** – Transmission lines, Compressor stations, Electrical substations, Lighting, Fencing
GEOTHERMAL EQUIPMENT (CONTINUED)

Moderate Temperature Power Plant
- **Turbines** – steam turbine, binary turbine, speed reducer/gearbox, lubrication systems, replacement box
- **Pumps and Motors** – working fluid pumps, production pumps, injection pumps, cooling water pumps, condensate pumps, chemical treatment pumps, compressors, fans and motors, steam ejectors
- **Vessels** – condensate tanks, steam separators, storage tanks, process vessels and receivers
- **Heat Exchange Equipment** – vaporizer/boilers, shell and tube heat exchangers, air coolers, air-cooled condensers, condenser, cooling tower
- **Piping Systems** – steam pipes (steel), valves and fittings, specialty alloy piping/fitting/valves, insulation, mist separator
- **Electrical – Instrumentation** – generator, controls, circuit breakers, wiring, transformers, instrument sensors, switchgear, motor control center
- **Working Fluids** - refrigerants
- **Abatement Systems** – hydrogen sulfide, corrosion, scaling
- **Safety/Personnel Protection** – above-ground access (ladder, railing, etc.), fire protection systems
- **Injection Well** - well, casing cement
- **Production Well** - well, casing cement
- **Ancillary Equipment**– Transmission lines, Compressor stations, Electrical substations, Lighting, Fencing

Heating & Cooling
- **Ground Loop** – Closed-Loop Horizontal, Closed-Loop Vertical, Closed-Loop Pond/Lake, Open-Loop/Ground Water, Hybrid
- **Heat Pumps** – Compressors, refrigerant reversing valve, air heat exchanger/air coil, electrical controls
- **Distribution Unit** – ducts, registers
- **Control Systems**
Your Feedback is Welcome

The RE Taxonomy is still being finalized.

Coming soon:
• Fleshing out the solar sector equip/services solutions (esp. heating & cooling)
• More research needed for Biomass Power & Renewable Fuels

For the sectors we have developed so far: did we miss any...
• Project types?
• Equipment Categories?
• Services Categories?
• Specific equipment or service specializations?

Will YOU participate in beta testing?

Cora.Dickson@trade.gov
Office (202) 482-6083
Work Cell (202) 603-5475