The Five-Step Development Process

Step 1: Identify Project Potential
1 Potential

2 Options

3 Refinement

4 Implementation

5 Operations & Maintenance

Comprehensive Energy Plan

1 PROJECT POTENTIAL: Data Collection and Opportunity Assessment

Council Check-in

2 PROJECT OPTIONS: Strategy and Detail

Council Check-in

3 PROJECT REFINEMENT: Planning and Development

Council Check-in

4 PROJECT IMPLEMENTATION: Financing and Construction

5 PROJECT OPERATIONS AND MAINTENANCE

Project Development and Financing Strategy
Step 1: Site, Scale, Resource, and Community Market Potential

**Potential**

**Purpose:** Determine whether basic elements for a successful project are in place

**Tasks:**

1. Identify possible **sites** for project locations
2. Determine the **energy load/demand** for these sites using past electric bills for these facilities
3. Confirm renewable energy **resource**
4. Review tribal facility electric cost data, regulations, and transmission and interconnection requirements
5. Evaluate community market potential for renewable sales. **Your community is the marketplace/energy – user.**
6. Assemble or communicate with the right team—those in positions or with knowledge to facilitate, approve, and champion the project
Understanding Community Market Potential

• **Who is your market?**
  — Tribal community

• **What do you need to know?**
  — Current energy loads and demand
  — Expected future energy loads and demand of the system
  — Condition of buildings and availability of roof space and land
  — Consider energy efficiency/weatherization first (typically the most cost-effective)

<table>
<thead>
<tr>
<th></th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy (kWh)</td>
<td>#</td>
<td>#</td>
<td>#</td>
</tr>
<tr>
<td>Demand (avg kW)</td>
<td>#</td>
<td>#</td>
<td>#</td>
</tr>
</tbody>
</table>
**Sizing Your Renewable Energy System**

**Current Load**
- Use your past monthly energy bills to determine the demand. Start with your strategic energy plan.
- Consider your scale: residential, commercial, or industrial.
- Consider the current tariff structure (how the energy is metered and billed).

**Future Load**
- At which energy scale does your community expect the most growth in energy demand?
- How much will you need?

**Other Limiting Factors**
- Interconnection
- Net metering cap
- Rebate limits

<table>
<thead>
<tr>
<th></th>
<th>2015</th>
<th>2017</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy (kWh)</td>
<td>#</td>
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<tr>
<td>Demand (avg kW)</td>
<td>#</td>
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<td>#</td>
</tr>
</tbody>
</table>
Solar Resources in California
Wind Resources in California
Average Wind Speed in California
Biomass Resources in California

This study estimates the technical biomass resources currently available in the United States by county. It includes the following feedstock categories:
- Agricultural residues (crop and animal manure).
- Wood residues (Forest, primary mill, secondary mill, and urban wood).
- Municipal discards (methane emissions from landfills and domestic wastewater treatment).
- Dedicated energy crops (swingle/switchgrass Conservation Reserve Program land).

See additional documentation for more information at http://www.nrel.gov/docs/fy08osti/39818.pdf
Local Site Considerations
Local Site Considerations — Urban Centers

Suitable Land Type

Town

Road

River

Town
Local Site Considerations — Rivers
Local Site Considerations — Road Access
Local Site Considerations — Suitable Area
## Project Risk: Facility/Community-Scale Post Step 1

<table>
<thead>
<tr>
<th>Risks</th>
<th>Risk Assessment Post Step 1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Development</strong></td>
<td></td>
</tr>
<tr>
<td>• Loss/waste of development resources</td>
<td>Low but rising: “calculated”</td>
</tr>
<tr>
<td><strong>Site</strong></td>
<td></td>
</tr>
<tr>
<td>• Improper orientation or project affected by shade</td>
<td>Reduced</td>
</tr>
<tr>
<td>• Inadequate foundation or structural integrity</td>
<td>Assumed low</td>
</tr>
<tr>
<td>• Site control challenges for safety/security purposes</td>
<td>Assumed low</td>
</tr>
<tr>
<td><strong>Permitting</strong></td>
<td></td>
</tr>
<tr>
<td>• Tribe-adopted codes and permitting requirements</td>
<td>Unchanged</td>
</tr>
<tr>
<td>• Utility interconnection requirements</td>
<td>Unchanged</td>
</tr>
<tr>
<td><strong>Finance</strong></td>
<td></td>
</tr>
<tr>
<td>• Capital constraints</td>
<td>Assumed low</td>
</tr>
<tr>
<td>• Incentive unavailability or insufficiency</td>
<td>Reduced</td>
</tr>
<tr>
<td><strong>Construction/Completion</strong></td>
<td></td>
</tr>
<tr>
<td>• Engineering, procurement, and construction difficulties</td>
<td>Assumed low, mitigable, or allocatable</td>
</tr>
<tr>
<td>• Cost overruns</td>
<td>Assumed low, mitigable, or allocatable</td>
</tr>
<tr>
<td>• Schedule overruns</td>
<td>Assumed low, mitigable, or allocatable</td>
</tr>
<tr>
<td><strong>Operating</strong></td>
<td></td>
</tr>
<tr>
<td>• Output shortfall from expected</td>
<td>Assumed low, mitigable, or allocatable</td>
</tr>
<tr>
<td>• Operations &amp; maintenance (O&amp;M) issues</td>
<td>Assumed low, mitigable, or allocatable</td>
</tr>
</tbody>
</table>

**NOTE:** Underlining signifies that the risk assessment outcome changes during the step at hand.

Sources: Adapted from Holland & Hart, RE Project Development & Finance & Infocast, Advanced RE Project Finance & Analysis
Design Potential Refinement Implementation

Options

1 Potential
2 Project Options: Strategy and Detail
3 Project Refinement: Planning and Development
4 Project Implementation: Financing and Construction
5 Project Operations and Maintenance
Step 2: Roles, Business Structures, & Regulatory Considerations

**Purpose:** Determine ownership structure and permitting considerations if any. (Note: It is likely that internal tribal permitting is required if developed on tribal lands, however, state and federal permitting may be required if the Tribe is dealing with fee or trust land outside the tribal land holdings.)

**Tasks:**
1. Understand tribal role(s) and risk allocations/business structure
2. Identify permitting needs and site use considerations
3. Identify interconnection rules and net metering options with the local utility

**Outputs:**
1. Clarify tribal roles
2. Decide on business structure
3. Understand the permit needs and process
4. Understand interconnection and net-metering options
Potential Team Members

• Tribal Members
  – Leadership, staff, community members
  – Attorneys, engineers, professionals
  – Energy champions (key success component)

• Developer
  – Business managers, engineers, permitting specialists, investors, banks

• Utility
  – Attorneys, planning specialists, operations specialists, regulatory specialists, finance.

• Government
  – Tribal government, federal, state and local entities, regulating bodies (public utilities commission), Bureau of Indian Affairs, DOE.
Tribal Roles

More Capital Intensive
- Owner/Operator
- Equity Investor
- Lender

Less Capital Intensive
- Off-taker
- Land Owner
- O&M subcontractor
Importance of Choosing the Right Ownership Structure

• Protect tribal assets
• Preserve tribal sovereignty
• Minimize potential liability
• Facilitate project construction

Photo by Brian Hirsch, NREL 20893
## Evaluating Ownership Options

<table>
<thead>
<tr>
<th>Business Structure Option</th>
<th>Simplicity and Quick Formation</th>
<th>Shield Tribal Assets from Business Liabilities</th>
<th>Avoid Federal Income Taxes</th>
<th>Separate Business from Tribal Control</th>
<th>Ability to Secure Financing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tribal Instrumentality*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Political Subdivision*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Section 17 Corporation*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tribal Law Corporation*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>State Law Corporation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LLCs/Joint Venture</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LLC (only if Tribe is sole member)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(*Can be protected by tribal sovereign immunity)
## Permitting and Regulatory Key Considerations

<table>
<thead>
<tr>
<th>Action</th>
<th>Applicability</th>
<th>Timeline</th>
<th>Contacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interconnection</td>
<td>If on grid (with a utility)</td>
<td>Communicate with utility early; this should be one of the first topics that is discussed and finalized before construction</td>
<td>Local utility</td>
</tr>
<tr>
<td>Net metering</td>
<td>If available in state (check)</td>
<td>Communicate with utility before construction</td>
<td>Local utility</td>
</tr>
<tr>
<td>Local tribal permitting</td>
<td>• Internal tribal process approvals</td>
<td>Determine permitting requirements early</td>
<td>Tribal Historic Preservation Office (THPO) and local tribal government</td>
</tr>
<tr>
<td></td>
<td>• For off-reservation projects, state permits may apply</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental</td>
<td>Impacts to:</td>
<td>• May not be necessary</td>
<td>Applicable federal agency</td>
</tr>
<tr>
<td></td>
<td>• Wetlands/waterways</td>
<td>• Determine applicability early</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Wildlife, habitat, flora</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Cultural resources</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Outside Tribal Boundaries

- In general, if located on private, nontribal land, or state properties, local and state land-use policies do apply.
- If located on tribal-owned fee land outside of reservation boundaries, then project is subject to state and local land-use, permitting jurisdiction.

### Inside Tribal Boundaries

- In general, state and local land-use laws do not apply.
- In addition, the extent to which federal rules and regulations apply depends on the type of project, its location, and size.
- Tribal law, regulations, and policies will apply.
- Tribes may “self-regulate” under federal law (e.g., Tribal Energy Resource Agreements, Hearth Act).
NEPA Decision Making Process

Is BIA funding or approval necessary to implement the action? Yes

Will the action affect the human environment? No

Is the action exempt from NEPA? No

NEPA Documentation Required

## Project Risk: Facility/Community-Scale Post Step 2

<table>
<thead>
<tr>
<th>Phases</th>
<th>Risks</th>
<th>Risk Assessment Post Step 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Development</strong></td>
<td>• Poor or no renewable energy resource assessment</td>
<td>Finalized resource</td>
</tr>
<tr>
<td></td>
<td>• Not identifying all possible costs</td>
<td>Reduced</td>
</tr>
<tr>
<td></td>
<td>• Unrealistic estimation of all costs</td>
<td>Reduced</td>
</tr>
<tr>
<td></td>
<td>• Incorrect estimation of long-term “community” energy use (energy efficiency first)</td>
<td>Finalized projection</td>
</tr>
<tr>
<td></td>
<td>• Utility rules and ability to offset use</td>
<td>Reduced</td>
</tr>
<tr>
<td><strong>Site</strong></td>
<td>• Structural (e.g., rooftop solar, wind loading, soil conditions)</td>
<td>Unchanged</td>
</tr>
<tr>
<td></td>
<td>• Installation safety (e.g., wind tower, hazard for adjacent sites)</td>
<td>Unchanged</td>
</tr>
<tr>
<td></td>
<td>• Site control for safety/security purposes</td>
<td>Reduced</td>
</tr>
<tr>
<td><strong>Permitting</strong></td>
<td>• Tribe-adopted codes and permitting requirements</td>
<td>Reduced</td>
</tr>
<tr>
<td></td>
<td>• Utility interconnection requirements</td>
<td>Reduced</td>
</tr>
<tr>
<td><strong>Finance</strong></td>
<td>• Capital availability</td>
<td>High risk, reduced</td>
</tr>
<tr>
<td></td>
<td>• Incentive availability risk</td>
<td>Reduced</td>
</tr>
<tr>
<td><strong>Construction/Completion</strong></td>
<td>• EPC difficulties</td>
<td>Low; allocate to EPC or developer</td>
</tr>
<tr>
<td></td>
<td>• Cost overruns</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Schedule</td>
<td></td>
</tr>
<tr>
<td><strong>Operating</strong></td>
<td>• Output shortfall from expected</td>
<td>Assumed low, mitigable or allocatable</td>
</tr>
<tr>
<td></td>
<td>• Technology O&amp;M</td>
<td></td>
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</table>

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*U.S. Department of Energy*

Office of Indian Energy

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Project Development and Financing Strategy

1. PROJECT POTENTIAL: Data Collection and Opportunity Assessment

2. PROJECT OPTIONS: Strategy and Detail

3. PROJECT REFINEMENT: Planning and Development

4. PROJECT IMPLEMENTATION: Financing and Construction

5. PROJECT OPERATIONS AND MAINTENANCE

Refinement

1. Potential
2. Options
4. Implementation
5. Operations & Maintenance
Project Ownership

Financing structure is highly dependent on size of the project and the capital available for a given project:

• Tribe owns the project (cash purchase or debt)
• Tribe hosts the project and buys the electricity (power purchase agreement)
• Tribe partners with private sector and co-owns the project (uncertainties about receipt of tax benefits)
Financing Options and Sources of Capital

- Cash on hand (e.g., reserves, trust, cash flow from other activities)
- Grants from third parties
- Renewable energy incentives (e.g., Single-family Affordable Solar Homes Program [SASH])
- Monetizing green attributes (e.g., renewable energy certificates [RECs])
- Debt
- Energy savings performance contracts (ESPCs) and utility energy savings contracts (UESCs)
- Tax equity investors seeking tax incentives
Direct Ownership Structure

Primarily for facility- and community-scale projects

Tribe purchases a renewable energy system with its own funding and possibly other sources like grants

Over time, investment recouped from utility bill savings

Project

Tribe and Electricity Users

Payments

Remaining Energy Needs

Utility

The tribe is the owner in this structure and self-generates its electricity
Ownership with Debt

Tribe finances portion or all of project with a loan. Can be recourse or nonrecourse debt.

Debt is serviced from utility bill savings.

The tribe is still the owner in this structure and self-generates its electricity. Cash flows/savings go partially or entirely to debt service.
Potential Sources of Debt/Loans

- Tribal Economic Development Bonds (TEDB)
- Commercial bank loans
  - Credit enhancements (e.g., loan guarantees)
- Other Tax Credit Bonds (Qualified Energy Conservation Bond [QECB]/Clean Renewable Energy Bond [CREB])
- Other
Third-Party PPA

The customer agrees to **host** the system and **purchase** the electricity

- **“Host” of Renewable Energy Generation Equipment**
  - Remaining electricity needs

  ![Diagram](https://via.placeholder.com/150)

  - Renewable electricity at fixed prices
  - Revenue from electricity sales

- **Renewable Energy Developer and Financial Partner**
  - Various project finance structures
  - Tax Benefits

  Worth ~50% of the cost of a solar system
PPA Considerations to Weigh

**Advantages**
- No/low up-front costs
- No O&M
- Benefit from tax incentives
- Locked-in energy price
- Path to ownership

**Disadvantages**
- May not beat current electricity rates
- Tough economics for small projects
- Higher transaction costs
- REC and project ownership requirements
Procurement Process for Facility- and Community-Scale Projects

Step 1: Develop and Issue RFP
Step 2: Make Selection
Step 3: Negotiate Contracts

Potential Project Partners to Procure

- Consider GSA as a resource for procurement: http://www.gsa.gov/portal/category/20998
- Project developer
- Engineering, procurement, and construction (EPC) contractor
- Environmental permits contractor
  – May apply to some community projects, but not to others
# Project Risk: Community- and Facility-Scale

<table>
<thead>
<tr>
<th>Phases</th>
<th>Risks</th>
<th>Risk Assessment Post Step 3</th>
<th>✔️</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Development</strong></td>
<td>• Poor or no renewable energy resource assessment</td>
<td>Low; site picked</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>• Not identifying all possible costs</td>
<td>Low; detailed model</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>• Incorrect estimation of long-term “community” energy use (energy efficiency first)</td>
<td>Low; final projection</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>• Utility rules and ability to offset use with centralized production</td>
<td>Reduced</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Site</strong></td>
<td>• Structural (e.g. rooftop solar, wind loading, soil conditions)</td>
<td>Assumed low; assessed</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>• Installation safety (e.g., wind tower, hazard for adjacent sites)</td>
<td>EPC assumes risk</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>• Site control for safety/security purposes</td>
<td>Low; site secure</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Permitting</strong></td>
<td>• Tribe-adopted codes and permitting requirements</td>
<td>Low; complete</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>• Utility interconnection requirements</td>
<td>Low; complete</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Finance</strong></td>
<td>• Capital availability</td>
<td>Low; PPA complete</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>• Incentive availability risk</td>
<td>Low; risk on developer</td>
<td>✓</td>
</tr>
<tr>
<td>**Construction/</td>
<td>• EPC difficulties</td>
<td>Low; allocate to EPC or developer</td>
<td></td>
</tr>
<tr>
<td>Completion**</td>
<td>• Cost overruns</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Schedule</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Operating</strong></td>
<td>• Output shortfall from expected</td>
<td>Assumed low, mitigable or allocatable</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Technology O&amp;M</td>
<td></td>
<td></td>
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Project Development and Financing Strategy

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2. PROJECT OPTIONS: Strategy and Detail
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5. PROJECT OPERATIONS AND MAINTENANCE

Implementation

1. Potential
2. Options
3. Refinement
4. Implementation
5. Operations & Maintenance
Step 4: Implementation

Purpose: Contract and begin physical construction of project

Tasks:
- Finalize pre-construction activities including project agreements—financial, contractual, and interconnection
- Realize construction and equipment installation
- Realize interconnection
- Realize project commissioning leading to facility/community project operation

Output: Completed project (operation)
Implementation Activities

• Pre-construction
  — Financial closing (if applicable)
  — Project kickoff
  — Design and construction documents, plans/schedules, submittals

• Contract execution
  — Contract oversight/quality control
  — Change control

• Interconnection
  — Application review and approval process
  — Final building inspection
  — Paperwork submittal to utility

• Project Construction
  — Contract oversight/quality control
  — Change control

• Commissioning
  — Testing and verification
  — Interconnection verification (utility)
  — Utility permission to operate
Project Development Process

1. Potential
2. Options
3. Refinement
4. Implementation
5. Operations & Maintenance
Step 5: Operations & Maintenance

**Purpose:** Conduct or ensure ongoing operations and maintenance (O&M), including repair and replacement (R&R)*

**Task:**
- O&M agreements
- Warranties
- Monitoring system
- System performance
- Production guarantees
- Buyout Options

**Outputs:**
- Ensure responsible party carries out O&M/R&R*
- Measuring and tracking success
- Correlate with business plan and strategic energy plan
- Contract compliance
- Reporting of generation
- Met or exceeded energy and financial performance

*Especially if owner – role of highest O&M risk*
Drivers for Improved O&M

• Increase efficiency and energy delivery (kWh/kW)
• Decrease downtime (hours/year)
• Extend system lifetime (25–40 years)
• Reduce cost of O&M ($/kW/year)
• Ensure safety and reduce risk
• Enhance appearance and image
• Often required in financing and warranty
## Project Risk: Community- and Facility-Scale

<table>
<thead>
<tr>
<th>Phases</th>
<th>Risks</th>
<th>Risk Assessment Post Step 5</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Development</strong></td>
<td>• Poor or no renewable energy resource assessment</td>
<td>Low; site picked</td>
</tr>
<tr>
<td></td>
<td>• Not identifying all possible costs</td>
<td>Low; detailed model</td>
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<td></td>
<td>• Unrealistic estimation of all costs</td>
<td>Low; detailed model</td>
</tr>
<tr>
<td></td>
<td>• Incorrect estimation of long-term “community” energy use (energy efficiency first)</td>
<td>Low; final projection</td>
</tr>
<tr>
<td></td>
<td>• Utility rules and ability to offset use with centralized production</td>
<td>None; executed</td>
</tr>
<tr>
<td><strong>Site</strong></td>
<td>• Structural (e.g. rooftop solar, wind loading, soil conditions)</td>
<td>None; addressed</td>
</tr>
<tr>
<td></td>
<td>• Installation safety (e.g., wind tower, hazard)</td>
<td>None; addressed</td>
</tr>
<tr>
<td></td>
<td>• Site control for safety/security purposes</td>
<td>Low; site secure</td>
</tr>
<tr>
<td><strong>Permitting</strong></td>
<td>• Tribe-adopted codes and permitting requirements</td>
<td>Low; complete</td>
</tr>
<tr>
<td></td>
<td>• Utility interconnection requirements</td>
<td>None; complete</td>
</tr>
<tr>
<td><strong>Finance</strong></td>
<td>• Capital availability</td>
<td>None; finalized</td>
</tr>
<tr>
<td></td>
<td>• Incentive availability risk</td>
<td>None; finalized</td>
</tr>
<tr>
<td><strong>Construction/Completion</strong></td>
<td>• EPC difficulties</td>
<td>None; contracted</td>
</tr>
<tr>
<td></td>
<td>• Cost overruns</td>
<td>None; construction complete</td>
</tr>
<tr>
<td></td>
<td>• Schedule</td>
<td></td>
</tr>
<tr>
<td><strong>Operating</strong></td>
<td>• Output shortfall from expected</td>
<td>Being managed by appropriate party</td>
</tr>
<tr>
<td></td>
<td>• Technology O&amp;M</td>
<td></td>
</tr>
</tbody>
</table>

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Not Quite Done!

- Check back in with planning document—update as necessary
- Identify next potential project from plan
**Step 1:** Gather all relevant data in order to make first pass at potential project, understand tribal role options

**Step 2:** Estimate value to Tribe, consider ownership approach, begin to identify off-takers, partners, vendors, begin planning permitting and site use

**Step 3:** Finalize economic assumptions and tribal roles, finalize permitting, interconnection, transmission and off-take agreements, and determine financial partnerships, ownership structure

**Step 4:** Finalize agreements (including vendor contracting); financial close and construction; project commissioning, begin operation

  **Celebrate!**

**Step 5:** Maintenance plan implementation (conduct or ensure ongoing O&M)