DOE OFFICE OF INDIAN ENERGY

The Five-Step Development Process
Step 4: Project Implementation

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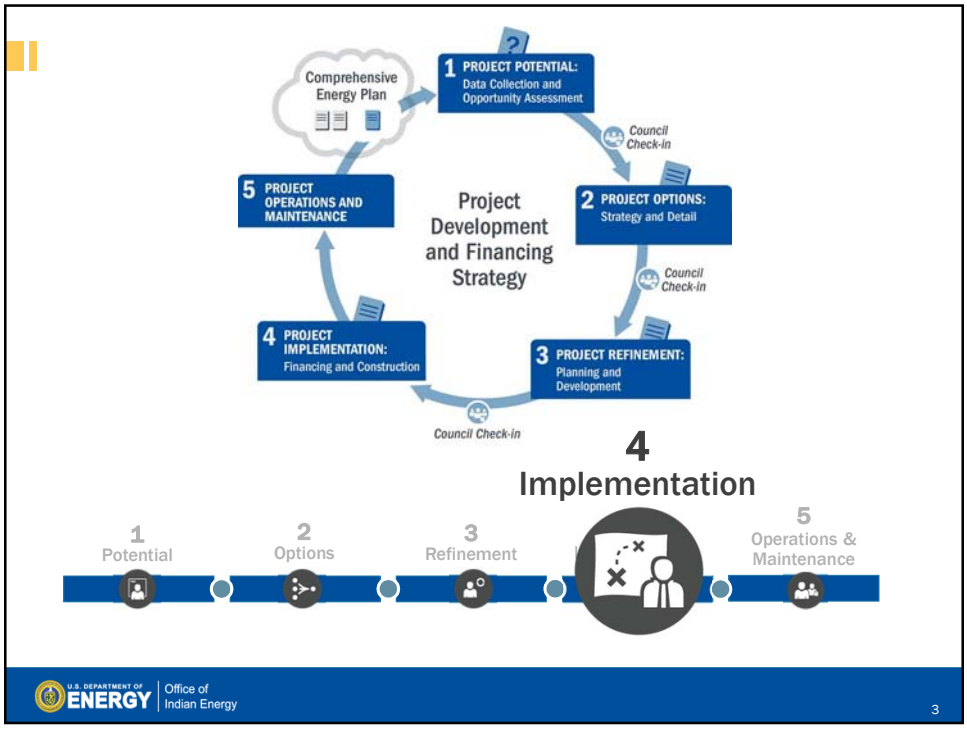
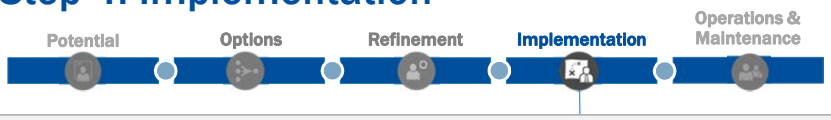
Presentation Agenda

- Step 4: Project Implementation
  - Pre-construction
  - Contract execution
  - Interconnection
  - Project construction
  - Commissioning
- Project Example



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

Pre-construction: Financial Closing

The process of completing all project-related financial transactions, finalizing and closing the project financial accounts, disposing of project assets, and releasing the work site.

A few key steps:

- Establish and communicate final date for all financial transactions and account closings ***well before closing***
- Verify all items from the statement of work have been completed before disbursing final payments
- Collect all financial records and verify that all financial obligations have been satisfied
- Close all financial accounts
- Transfer or dispose of assets according to the acquisition plan.

Pre-construction: Project Kickoff and Design and Construction Documents

- Kickoff meeting
- Checklists for schedules and each activity based on contract and project documents
- Utility interconnection process and agreement
- Design (often in stages) and design approvals
- Other possible plans:
  - Utility
  - Construction
  - Management
  - Quality control
  - Commissioning
  - Environmental protection
  - Security

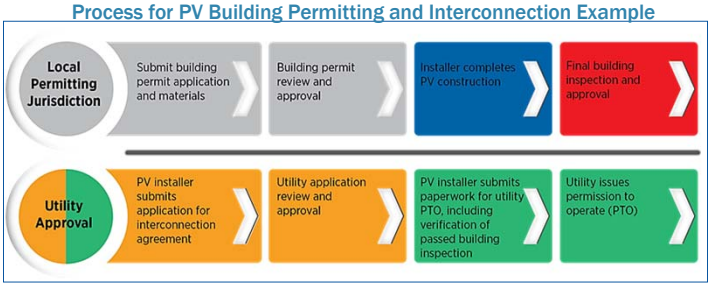
Contract Execution

- Verify contract documentation
- Obtain contract approvals
- Book the contract
- Transfer project responsibility to project manager

Interconnection

- Installing a renewable energy project requires multiple approval and process steps, including local permitting jurisdiction, installer, and utility.
- Four distinct steps:
  1. Utility interconnection application review and approval process
  2. Construction
  3. Final building inspection and paperwork submittal to utility
  4. Utility permission to operate
- Usually takes approximately 15–20 days for residential and/or small commercial projects.
- Typically, one must obtain a building permit from the local jurisdiction and sign an interconnection agreement with the local utility.

Process for PV Building Permitting and Interconnection Example



Retrieved from Ardani et al., "A state-level comparison of processes and timelines for distributed photovoltaic interconnection in the United States." http://www.nrel.gov/docs/fy15osti/63556.pdf

Interconnection cont.

- Utilities prefer installers to submit an application for interconnection early on in project development before construction
- Some utilities are allowing systems that are 30 kW or less to be fast-tracked without any pre-construction utility application reviews or approvals
- Smaller systems pose fewer risks of adverse system impacts
- Different utilities have different thresholds (i.e., system sizes) for modeling and mitigation

Project Construction

- The system has received building approval from the local permitting authority housing jurisdiction, but has not yet received final authorization for interconnection or permission to operate
- Project developer orders equipment and begins construction or installation
- Construction manager coordinates work of various trades
- Close coordination with tenants if site or building is occupied
- Frequent communication between all parties to minimize possible issues

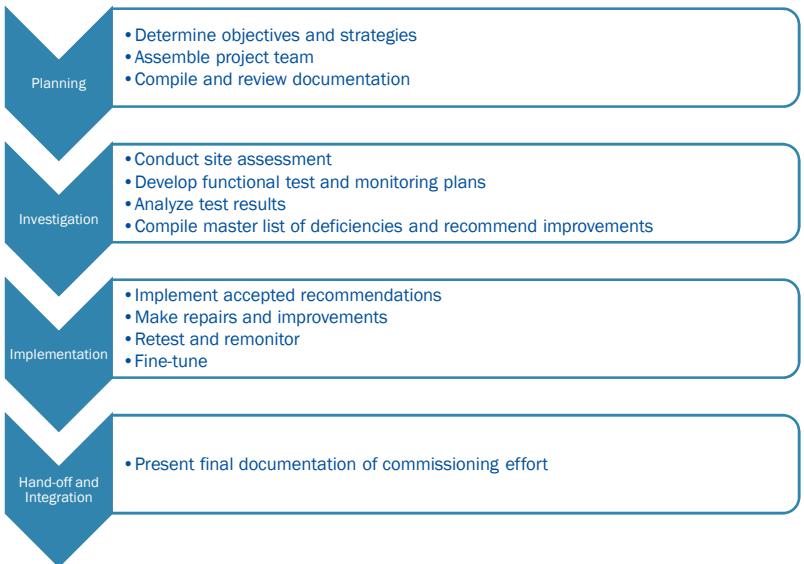
Commissioning

- To receive final interconnection authorization from a utility, the installer must first submit verification of passed final building inspection
- Project interconnected according to utility interconnection agreement and utility process
- Plan may be standardized by developer and technology and may be refined according to individual system design
- Witnessing and/or third party independent commissioning may be stipulated
- Commissioning
  - Physical inspection
  - Component Testing
  - Whole system performance testing

Commissioning cont.

- Once the building inspections and commissioning process are complete, all required paperwork is submitted to the utility (e.g., relay settings, as-built drawings, etc.)
- Upon approval of all paperwork, the utility will likely install a net meter (for net-metered systems) and finally issue a permission to operate letter.
- After permission is granted, the installer is allowed to energize the system.

Commissioning Process Example



Project Risk: Community- and Facility-Scale

Phases	Risks	Risk Assessment Post Step 4	✓
Development	• Poor or no renewable energy resource assessment	Low; site picked	✓
	• Not identifying or unrealistic estimation of all possible costs	Low; detailed model	✓
	• Incorrect estimation of long-term "community" energy use	Low; detailed model	✓
	• Utility rules and ability to offset use with centralized production	Low; final projection	✓
Site	• Structural (e.g. rooftop solar, wind loading, soil conditions)	None; addressed	✓
	• Installation safety (e.g., wind tower, hazard)	None; addressed	✓
	• Site control for safety/security purposes	Low; site secure	✓
Permitting	• Tribe-adopted codes and permitting requirements	Low; complete	✓
	• Utility interconnection requirements	None; complete	✓
Finance	• Capital availability	None; finalized	✓
	• Incentive availability risk	None; finalized	✓
Construction/ Completion	• EPC difficulties	None; contracted	✓
	• Cost overruns	None; construction complete	✓
	• Schedule		
Operating	• Output shortfall from expected	Assumed low, mitigable or allocatable	
	• Technology O&M		

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

Adapted from Holland & Hart, RE Project Development & Finance & Infocast, Advanced RE Project Finance & Analysis

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Community & Facility-Scale Renewable Energy
Project Development and Finance
Rancho Mirage, CA | February 9-11, 2016

1. List two things you liked about workshop activities (specific discussion or presentations).

2. List three things that you think need improvement or need more emphasis.

3. What could be added to the curriculum to assist your tribe in the development or implementation of renewable energy projects?

4. What is your preference for delivery of this type of information? Please circle one…
   a. Workshop (like this one)
   b. Live webinars with Q&A
   c. One-on-one technical assistance
   d. Other

5. How do you plan to apply this information when you return home? (e.g. specific project planning, proposal to tribal council, strategic energy planning)

6. Were your project development and finance questions answered at this workshop?

7. How did you hear about the workshop?

8. Other suggestions/feedback?

Continued on second page…

On a scale of 1 (lowest) to 5 (highest), please rate the overall usefulness of the workshop.

Question/Rating	Describe the reason for the rating:
1. Overall Workshop Rating. 1 2 3 4 5	
2. The speakers' ability to communicate relevant information. 1 2 3 4 5	
3. Your knowledge gained of the Five Step Project Development Process 1 2 3 4 5	
4. How much has this workshop contributed to your ability to begin a renewable energy or energy efficiency project? 1 2 3 4 5	
5. How valuable was the workbook and materials offered? 1 2 3 4 5	
6. How was the pace of the workshop? 1 2 3 4 5	
7. How likely are you to recommend this workshop to others? 1 2 3 4 5	

Notes

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