DOE OFFICE OF INDIAN ENERGY

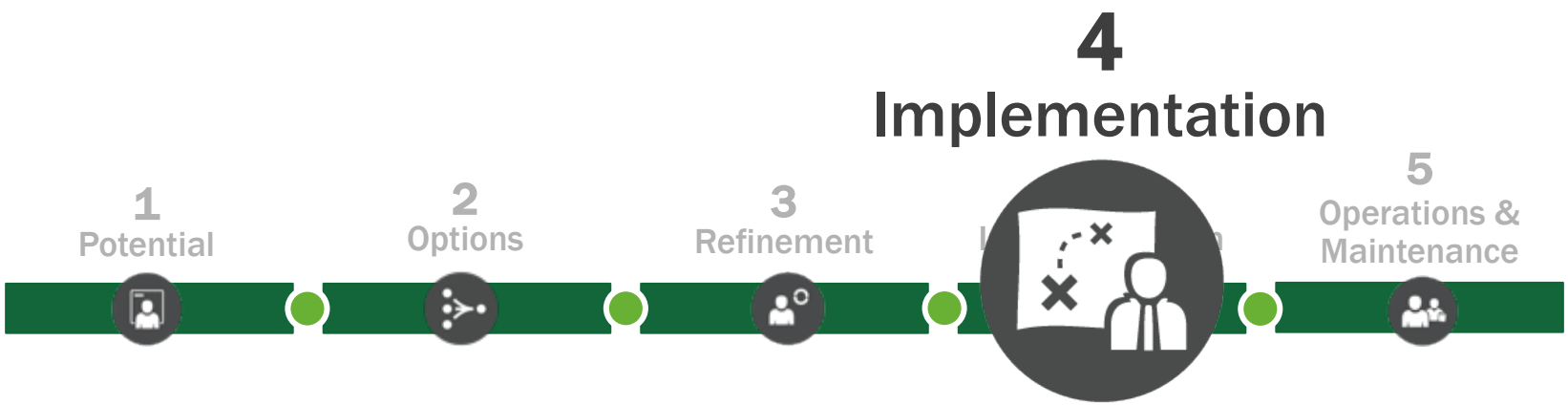
The Five-Step Development Process
Step 4: Project Implementation

U.S. DEPARTMENT OF ENERGY | Office of Indian Energy

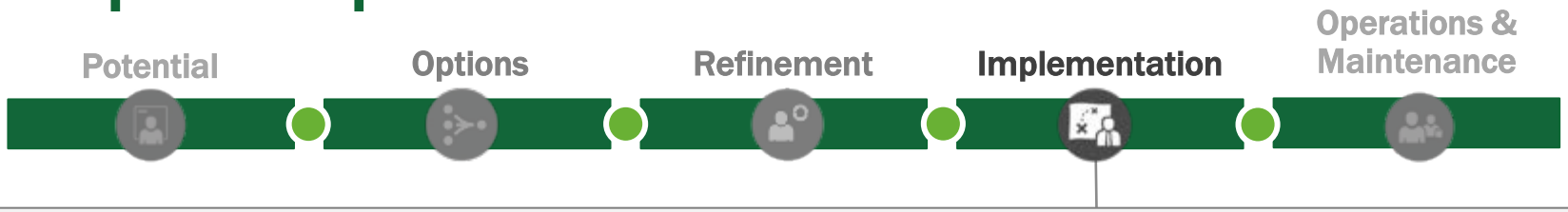
Presentation Agenda

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


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


4
Implementation
1
Potential
2
Options
3
Refinement
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

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

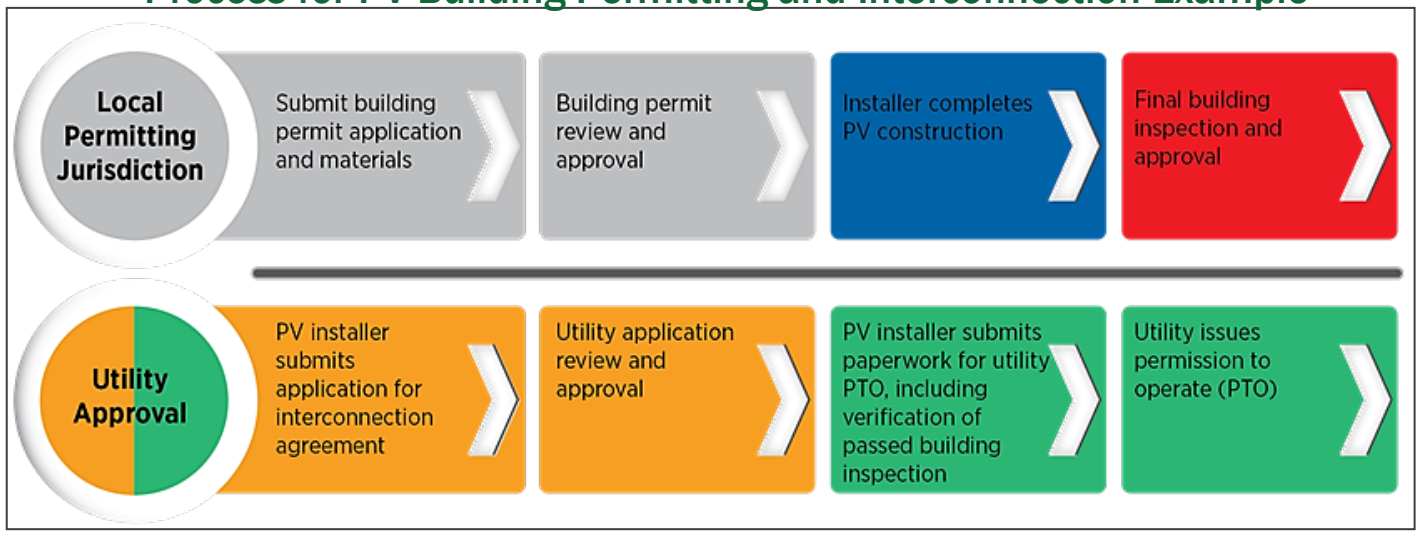
Contract Execution

- 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

Planning

- Determine objectives and strategies
- Assemble project team
- Compile and review documentation

Investigation

- Conduct site assessment
- Develop functional test and monitoring plans
- Analyze test results
- Compile master list of deficiencies and recommend improvements

Implementation

- Implement accepted recommendations
- Make repairs and improvements
- Retest and remonitor
- Fine-tune

Hand-off and Integration

- Present final documentation of commissioning effort

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