

DOE OFFICE OF INDIAN ENERGY

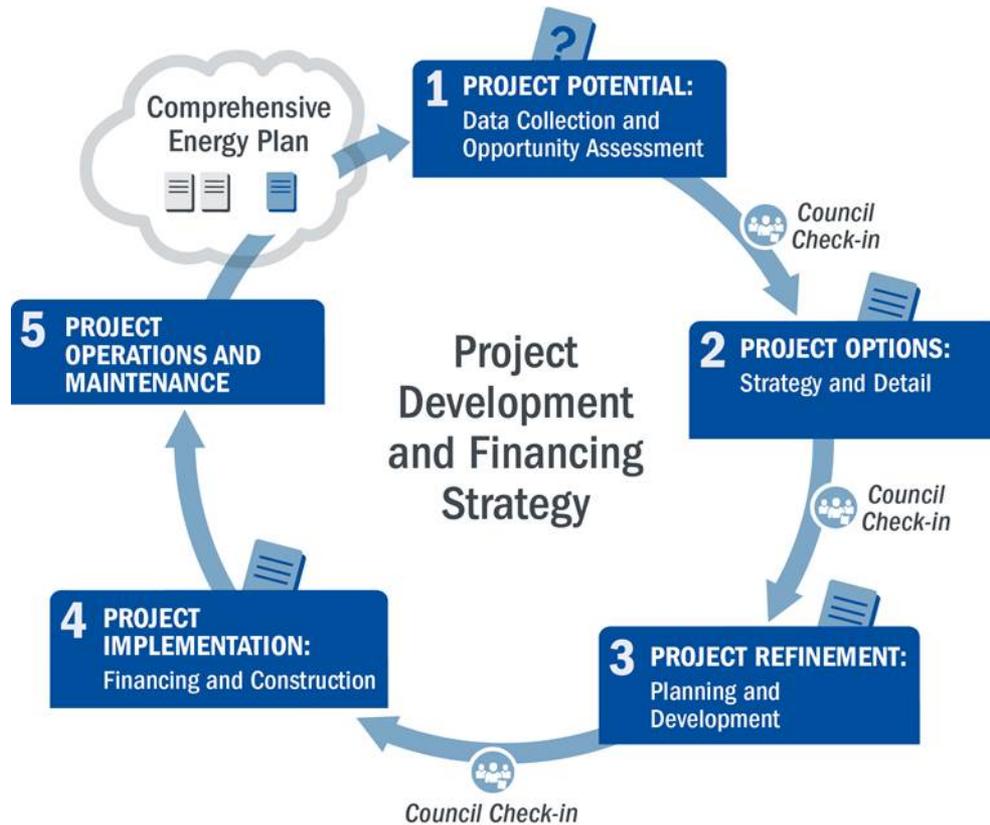
The Five-Step Development Process

Step 1: Identify Project Potential



U.S. DEPARTMENT OF
ENERGY

Office of
Indian Energy



1 Potential



Step 1: Site, Scale, Resource, and Community Market 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)

	2015	2016	2017
Energy (kWh)	#	#	#
Demand (avg kW)	#	#	#

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

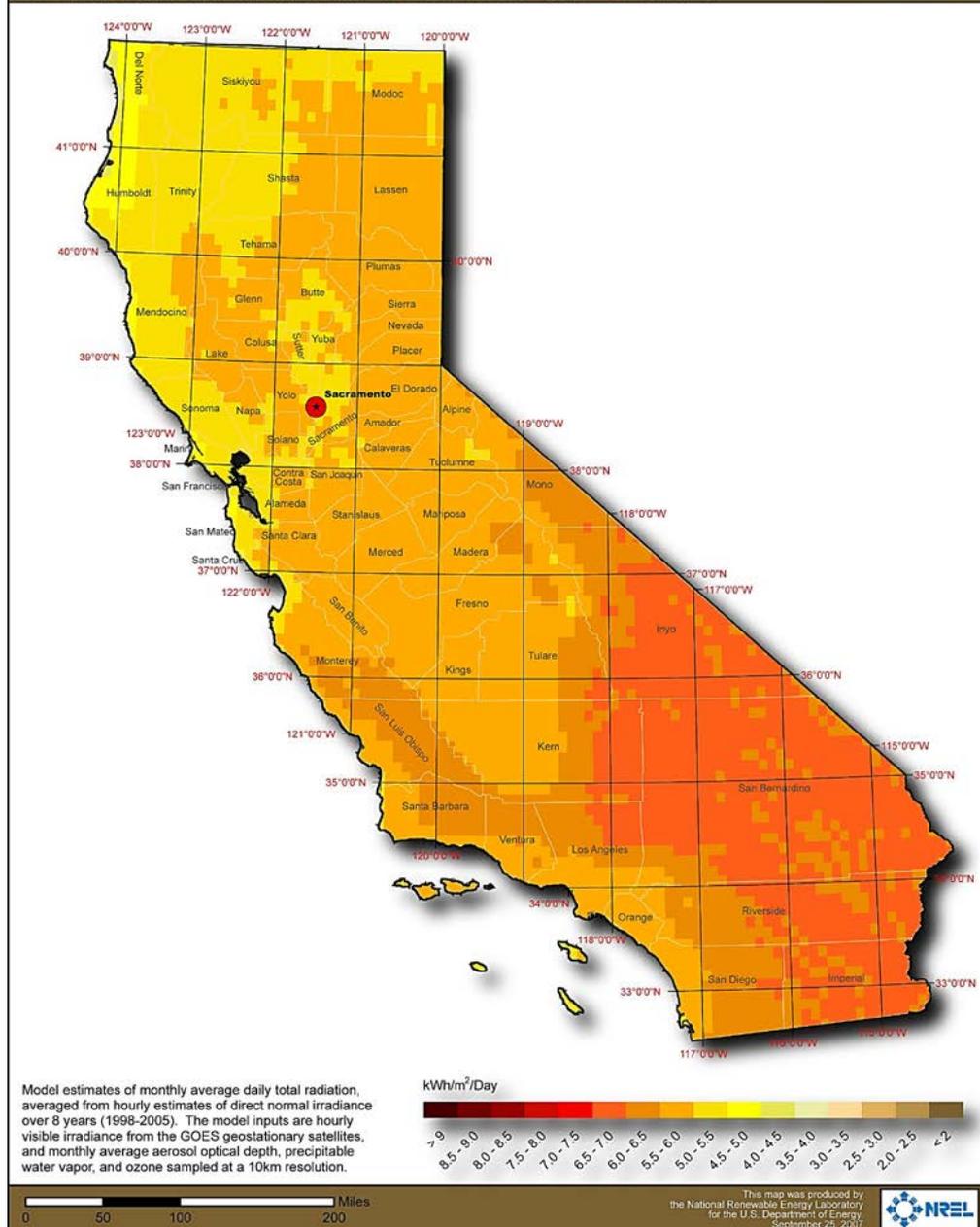
- At which energy scale does your community expect the most growth in energy demand?
- How much will you need?

Other Limiting Factors

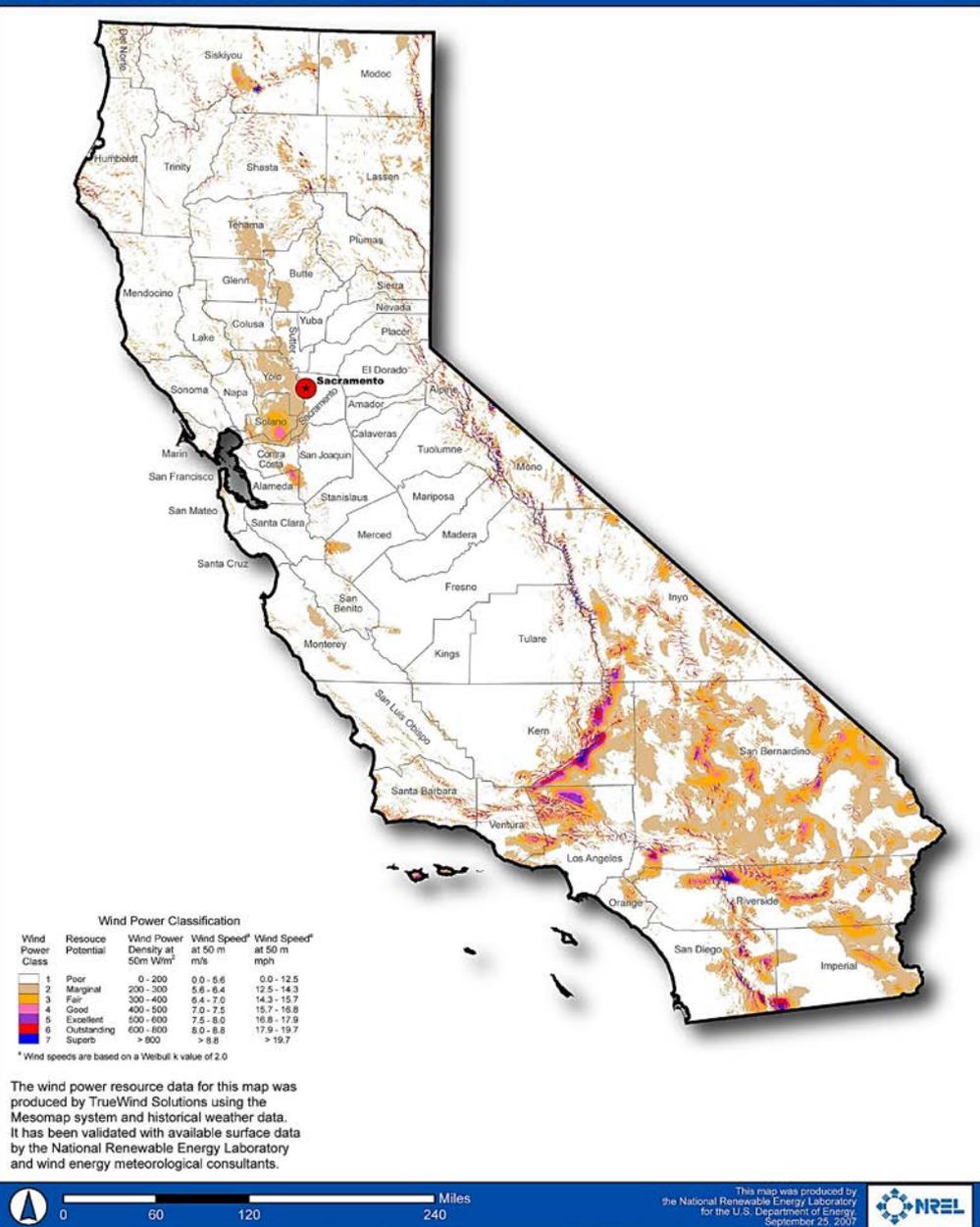
- Interconnection
- Net metering cap
- Rebate limits

	2015	2017	2019
Energy (kWh)	#	#	#
Demand (avg kW)	#	#	#

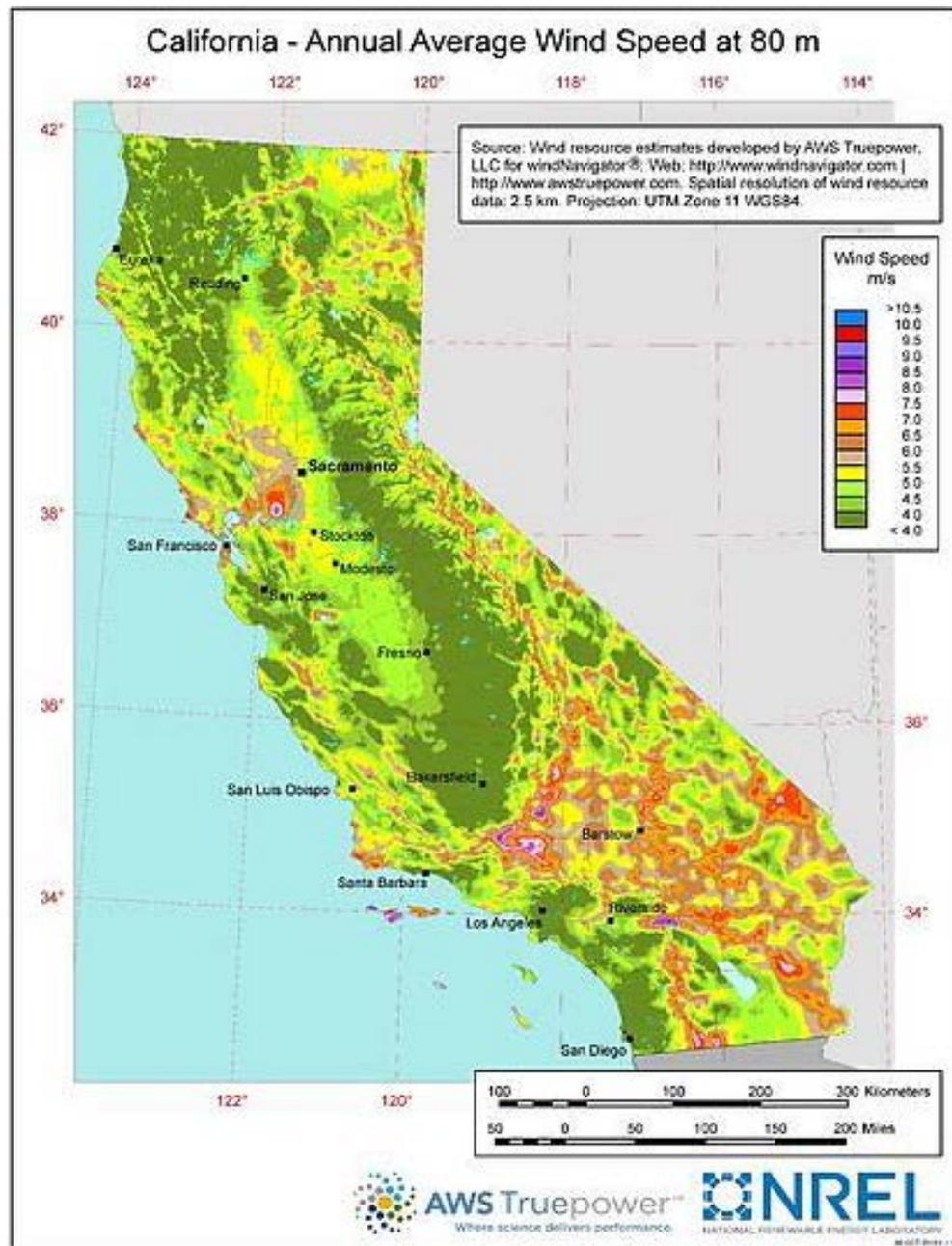
Solar Resources in California



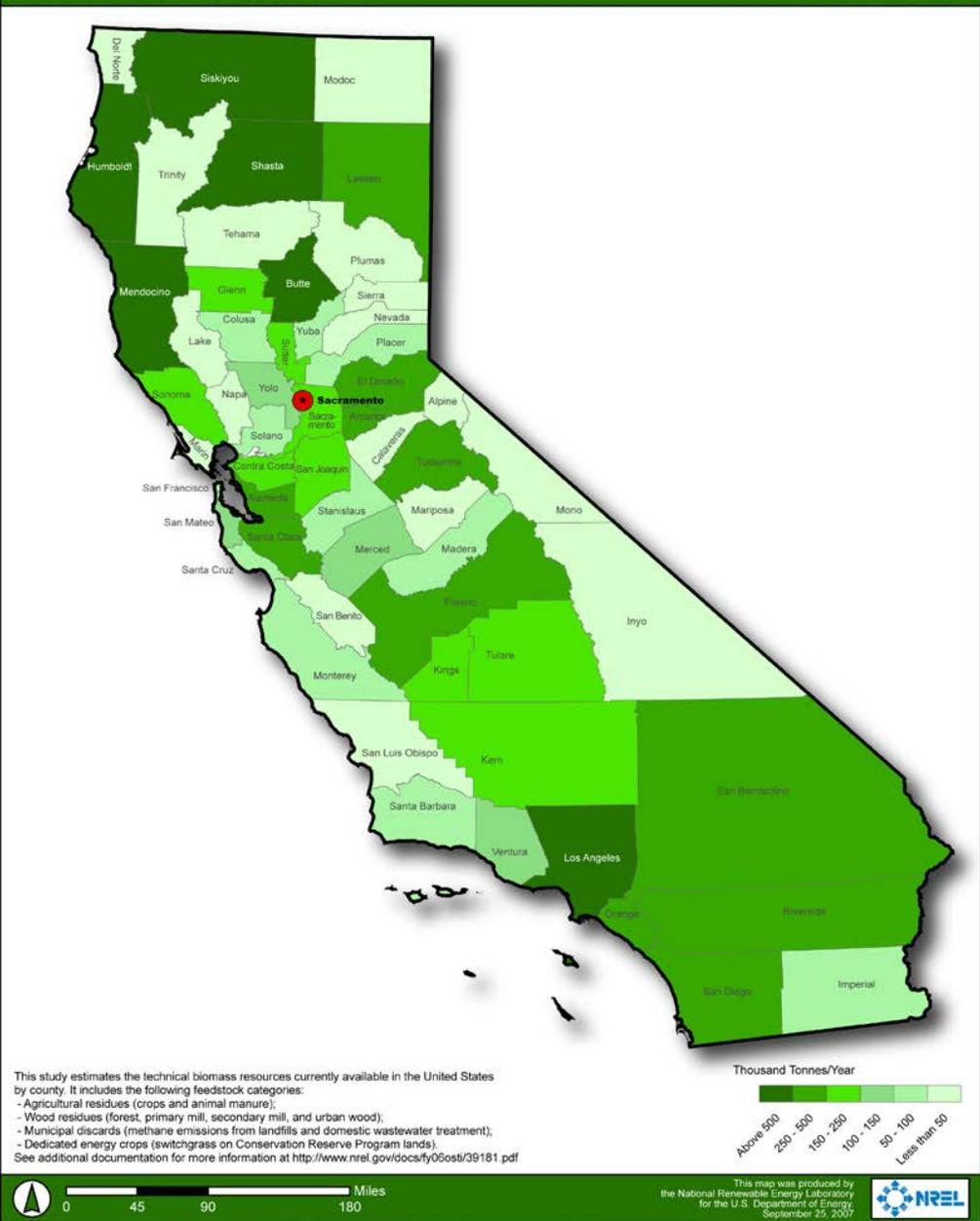
Wind Resources in California



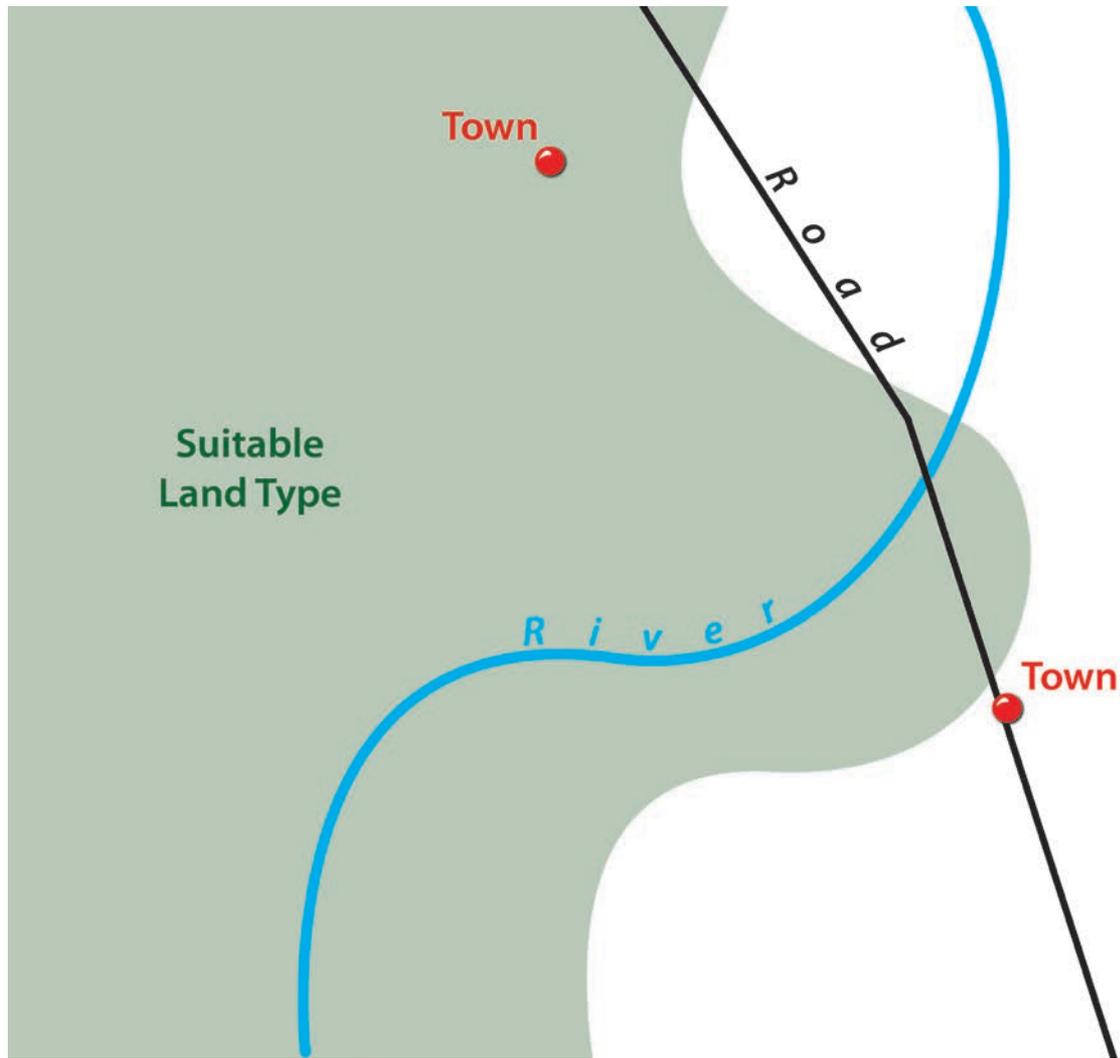
Average Wind Speed in California



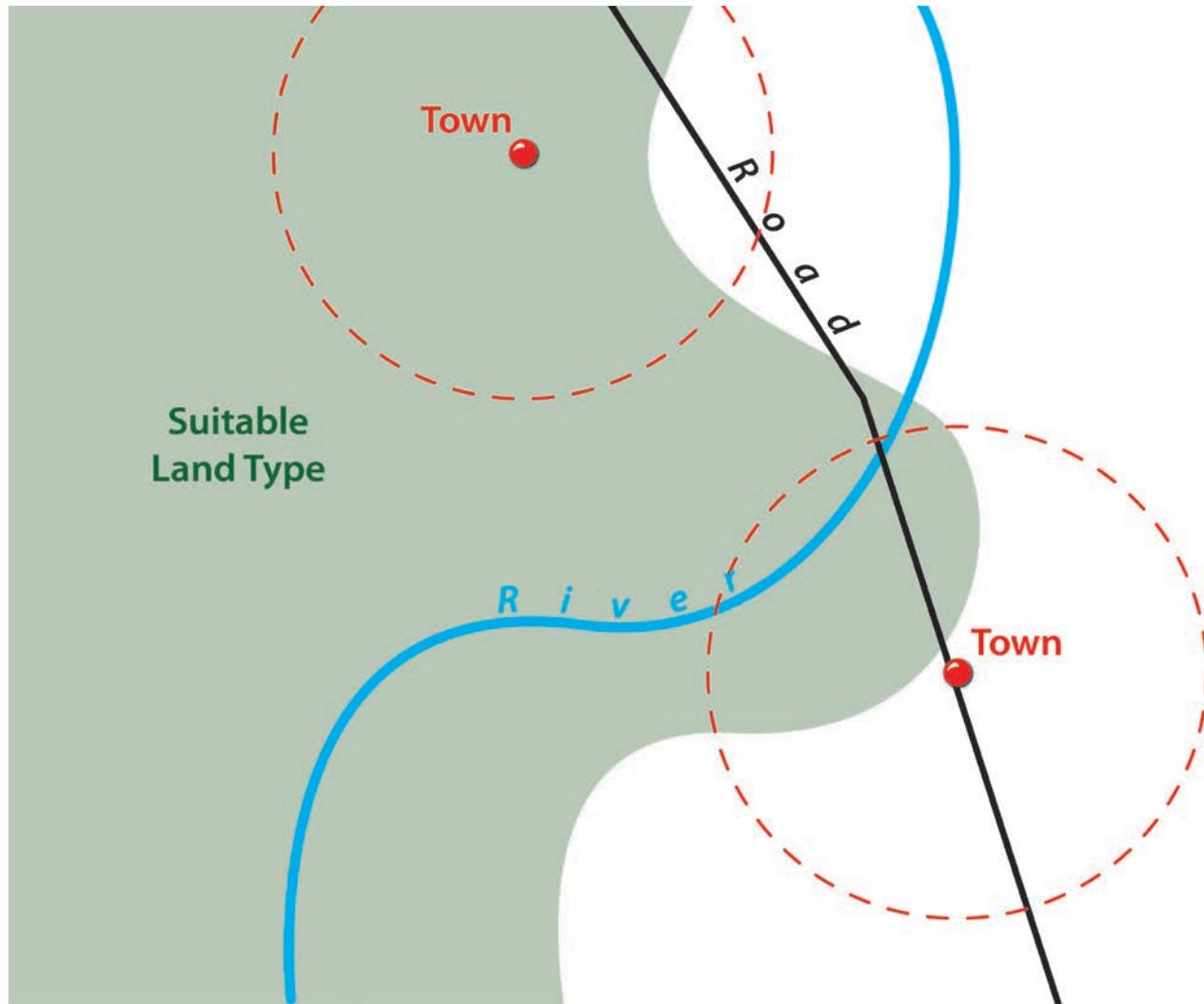
Biomass Resources in California



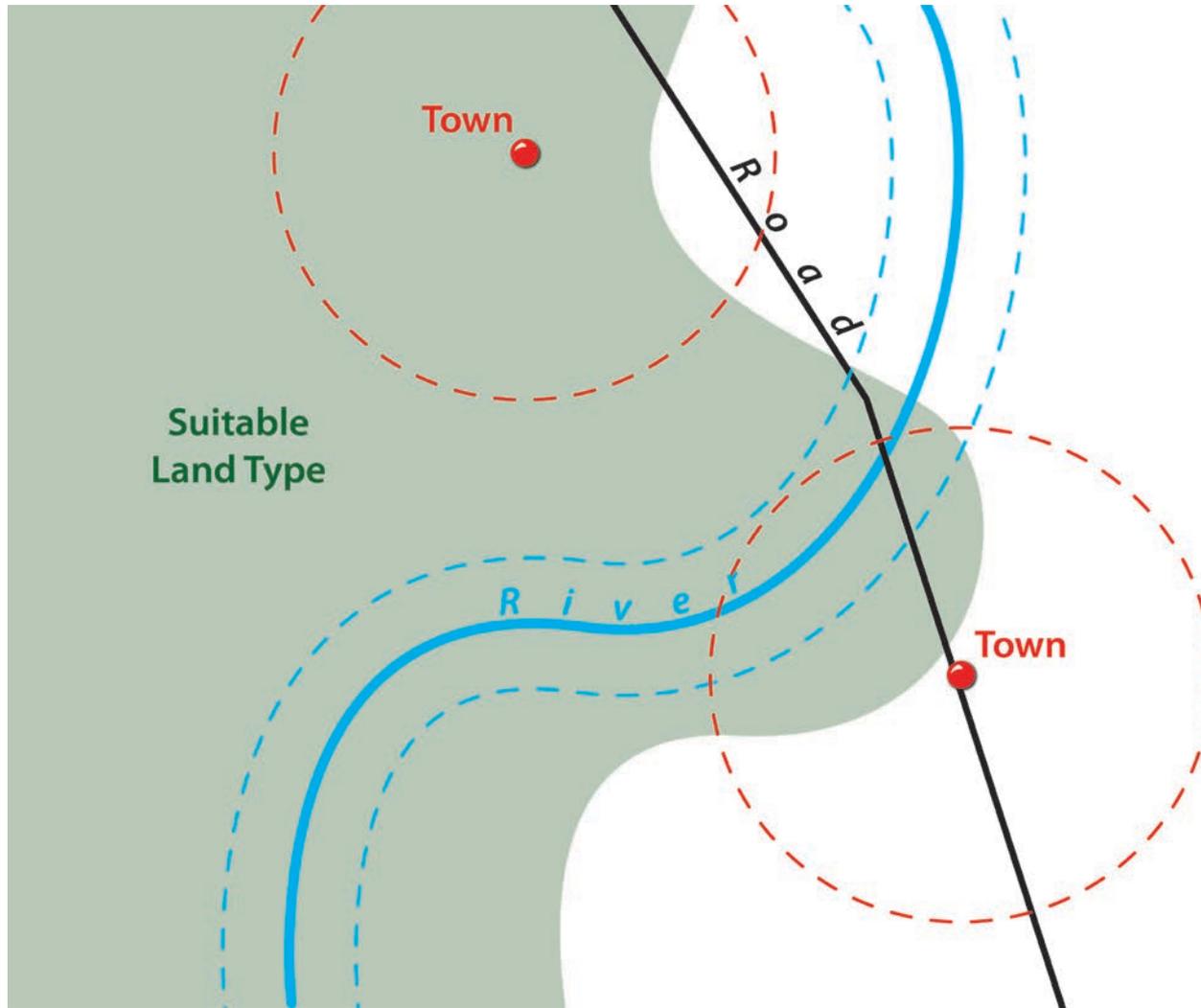
Local Site Considerations



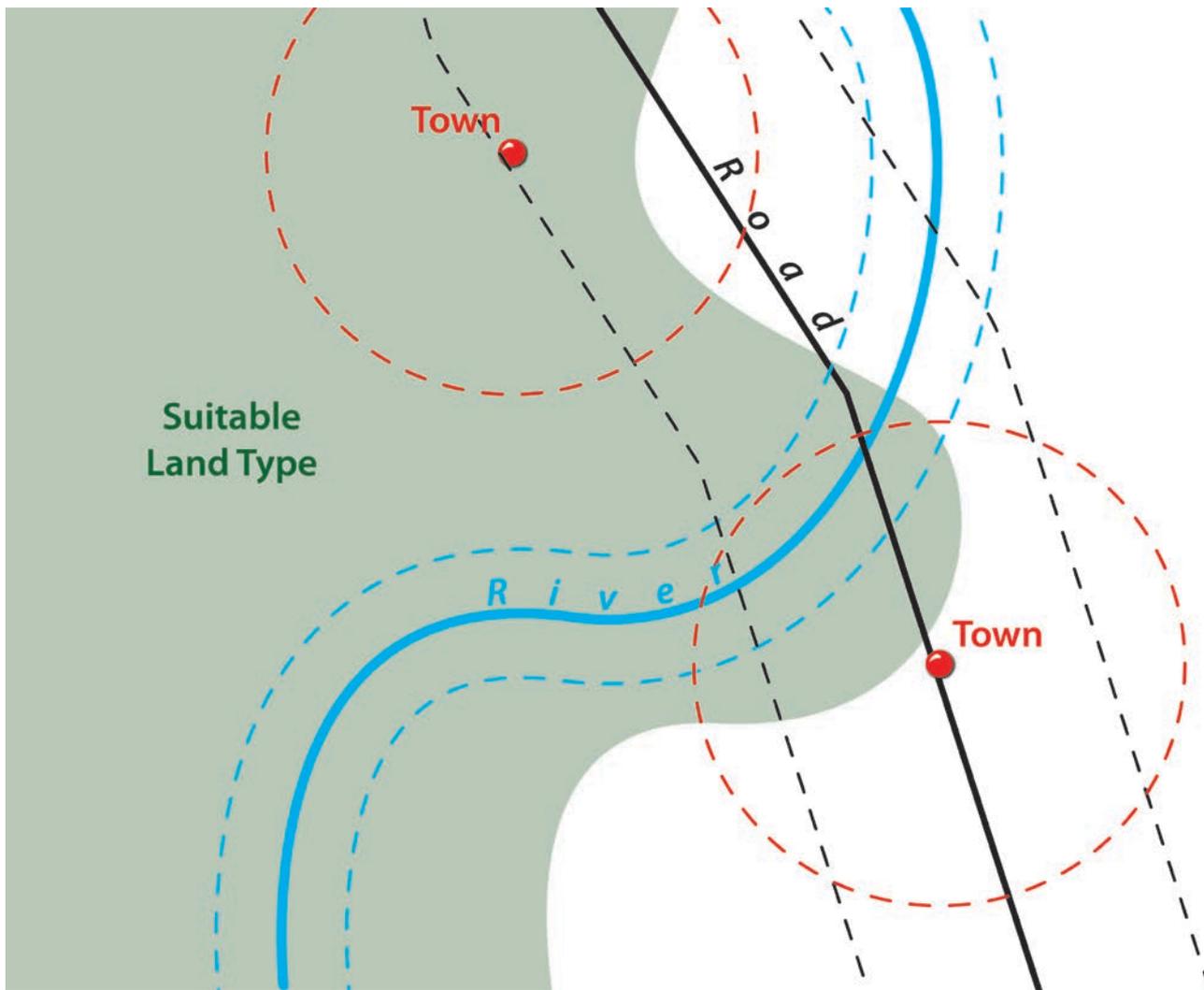
Local Site Considerations — Urban Centers



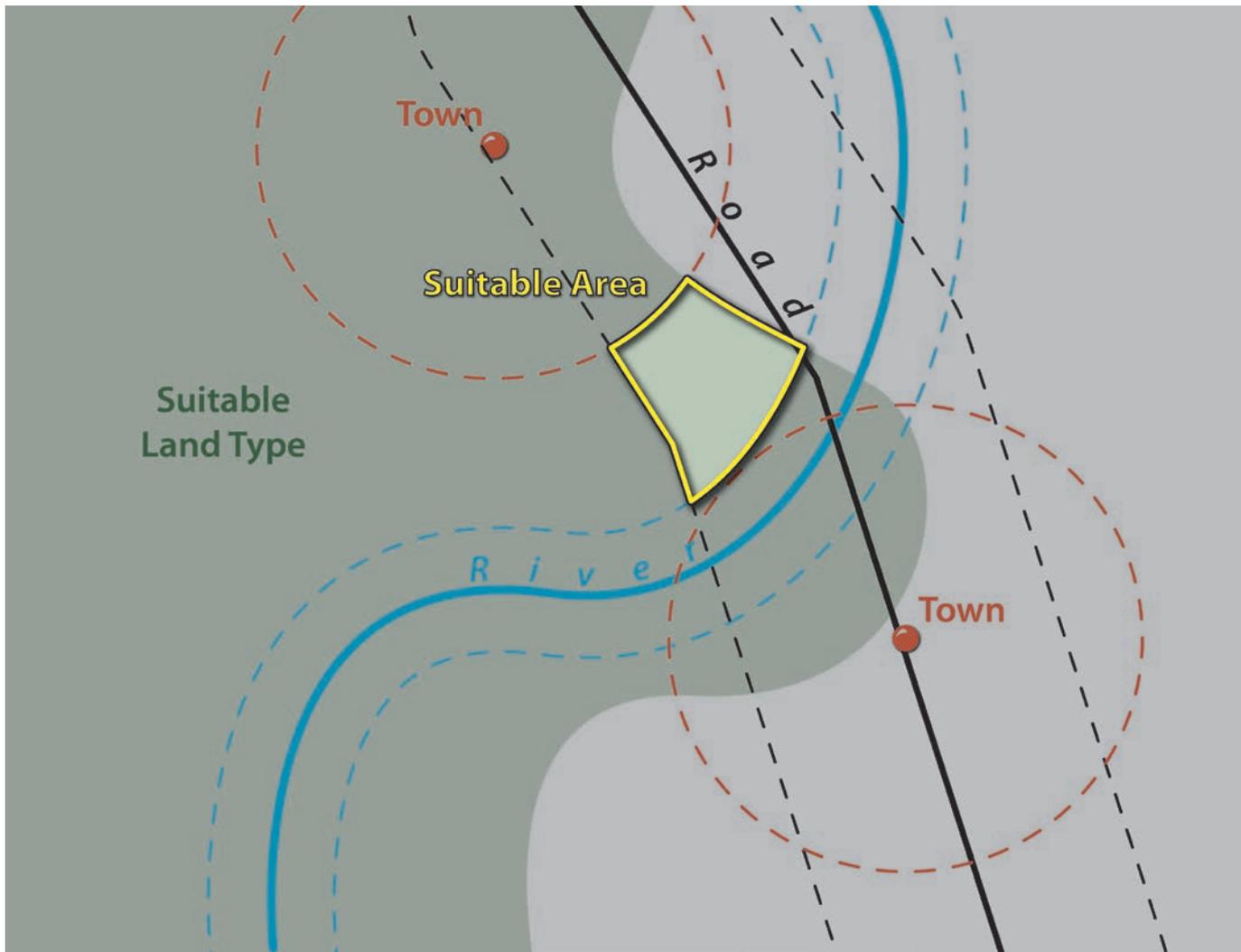
Local Site Considerations — Rivers



Local Site Considerations — Road Access



Local Site Considerations — Suitable Area

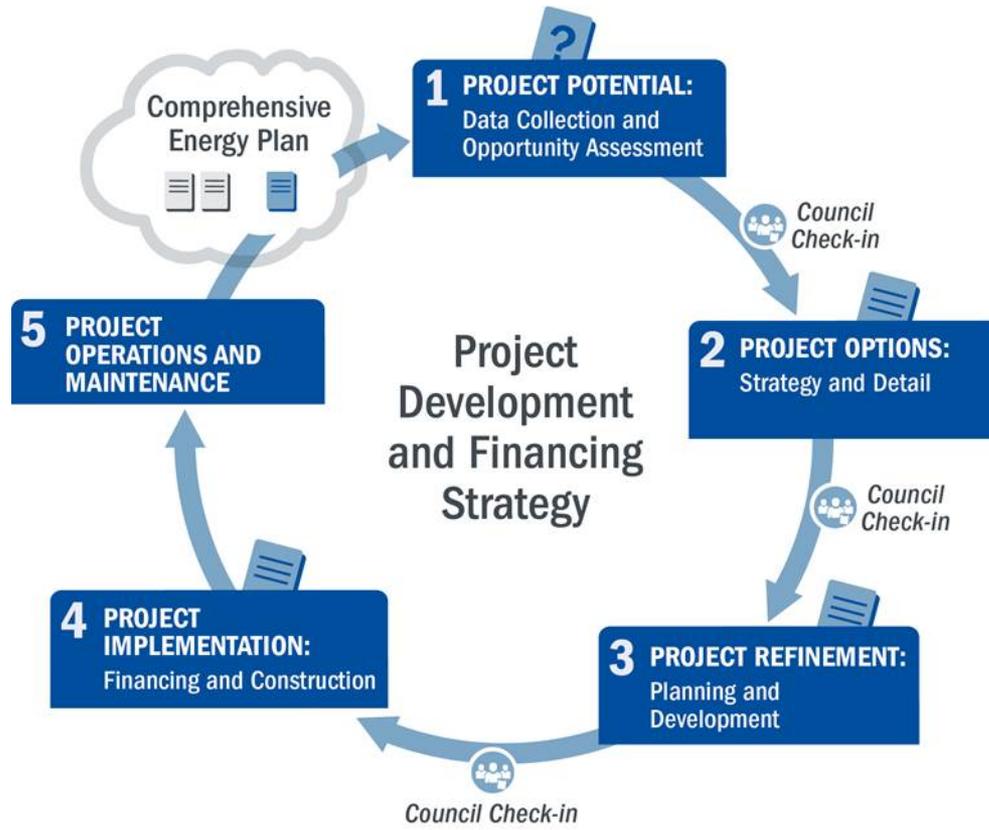


Project Risk: Facility/Community-Scale Post Step 1

	Risks	Risk Assessment Post Step 1	✓
Development	<ul style="list-style-type: none"> Loss/waste of development resources 	<u>Low but rising: “calculated”</u>	
Site	<ul style="list-style-type: none"> Improper orientation or project affected by shade 	<u>Reduced</u>	✓
	<ul style="list-style-type: none"> Inadequate foundation or structural integrity 	Assumed low	✓
	<ul style="list-style-type: none"> Site control challenges for safety/security purposes 	Assumed low	✓
Permitting	<ul style="list-style-type: none"> Tribe-adopted codes and permitting requirements 	Unchanged	
	<ul style="list-style-type: none"> Utility interconnection requirements 	Unchanged	
Finance	<ul style="list-style-type: none"> Capital constraints 	Assumed low	
	<ul style="list-style-type: none"> Incentive unavailability or insufficiency 	<u>Reduced</u>	
Construction/Completion	<ul style="list-style-type: none"> Engineering, procurement, and construction difficulties 	Assumed low, mitigable, or allocatable	
	<ul style="list-style-type: none"> Cost overruns 	Assumed low, mitigable, or allocatable	
	<ul style="list-style-type: none"> Schedule overruns 	Assumed low, mitigable, or allocatable	
Operating	<ul style="list-style-type: none"> Output shortfall from expected 	Assumed low, mitigable, or allocatable	
	<ul style="list-style-type: none"> Operations & maintenance (O&M) issues 	Assumed low, mitigable, or allocatable	

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



Options



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

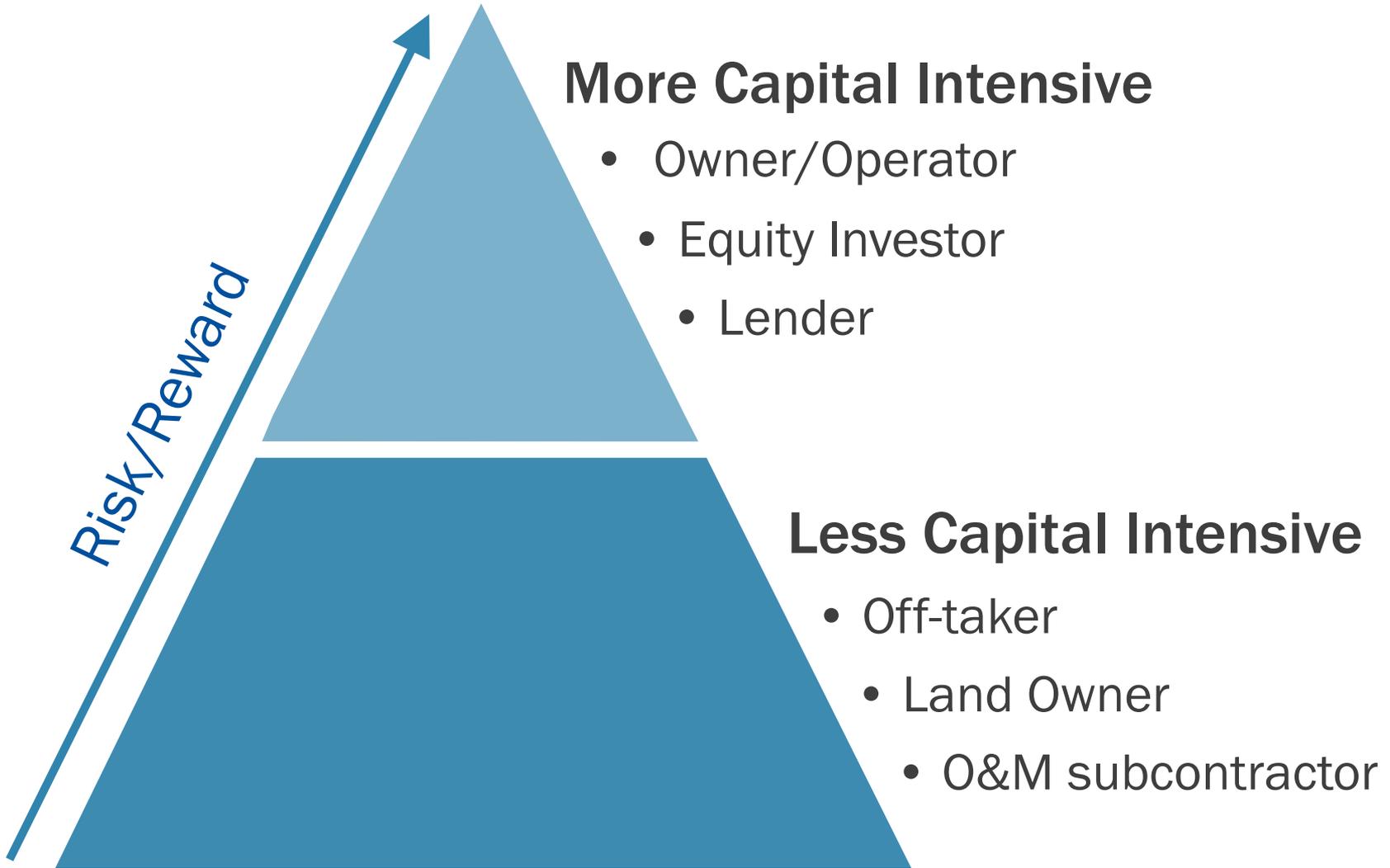
Outputs:

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



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

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

(*Can be protected by tribal sovereign immunity)

Permitting and Regulatory Key Considerations

Action	Applicability	Timeline	Contacts
Interconnection	If on grid (with a utility)	Communicate with utility early; this should be one of the first topics that is discussed and finalized before construction	Local utility
Net metering	If available in state (check)	Communicate with utility before construction	Local utility
Local tribal permitting	<ul style="list-style-type: none"> Internal tribal process approvals For off-reservation projects, state permits may apply 	Determine permitting requirements early	Tribal Historic Preservation Office (THPO) and local tribal government
Environmental	Impacts to: <ul style="list-style-type: none"> Wetlands/waterways Wildlife, habitat, flora Cultural resources 	<ul style="list-style-type: none"> May not be necessary Determine applicability early 	Applicable federal agency

Permitting and Regulatory Key Considerations Cont.

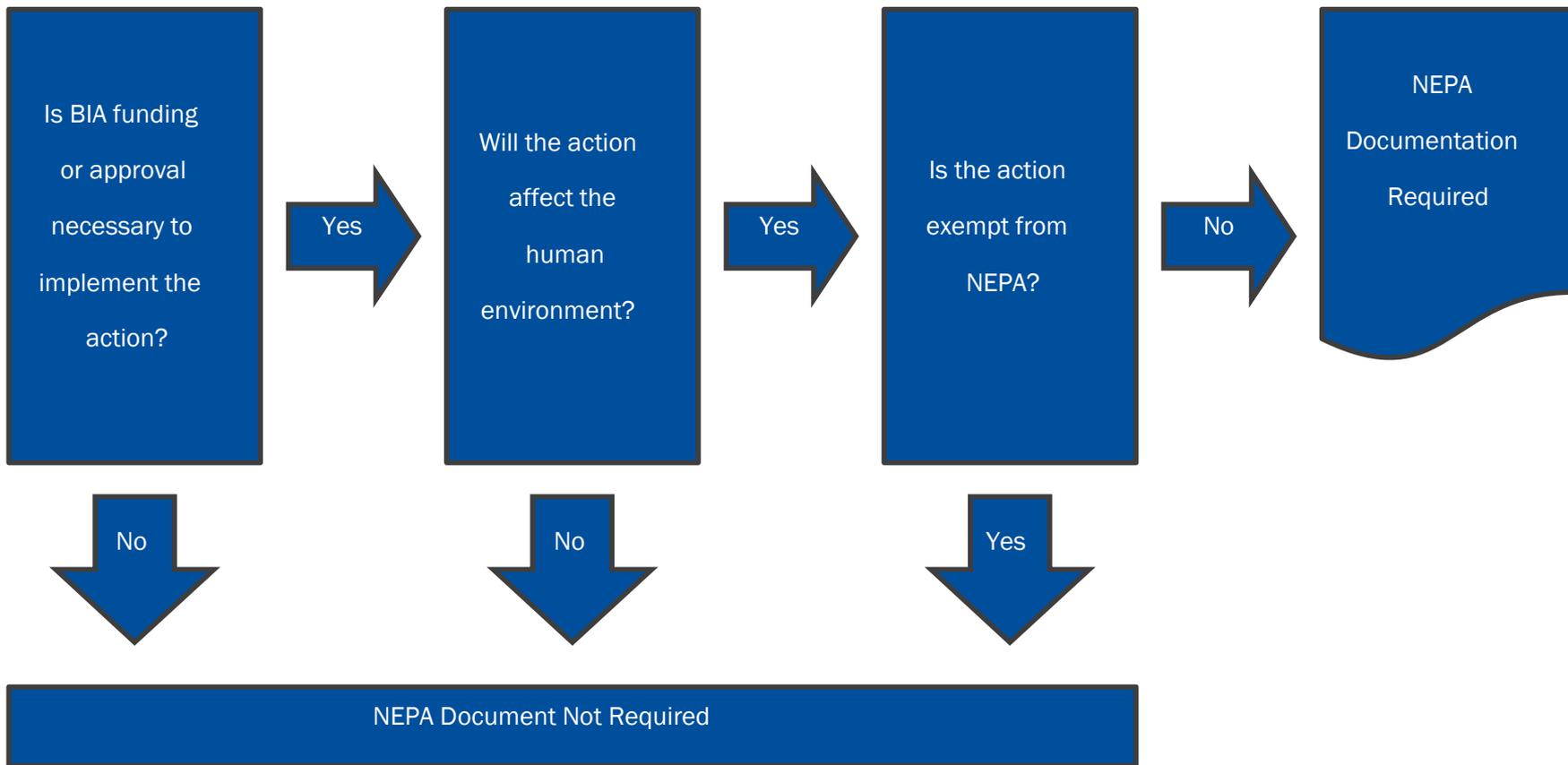
Outside Tribal Boundaries

- 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



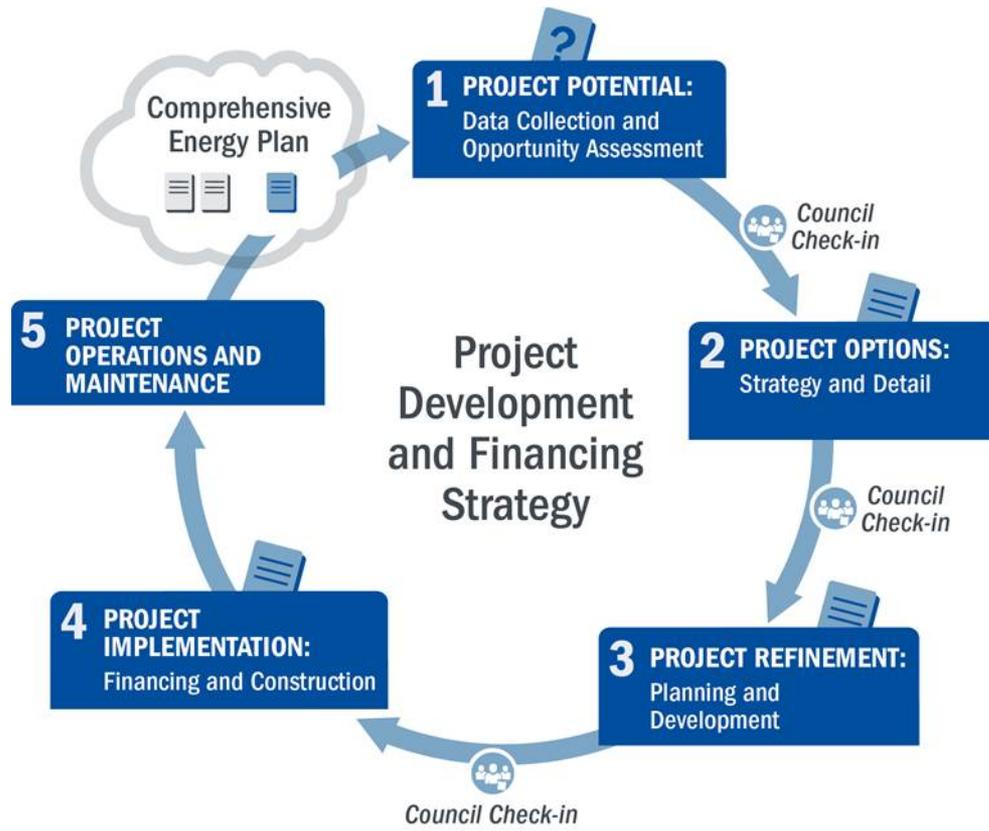
Adapted from <http://www.bia.gov/cs/groups/xraca/documents/text/idc009157.pdf>

Project Risk: Facility/Community-Scale Post Step 2

Phases	Risks	Risk Assessment Post Step 2	✓
Development	• Poor or no renewable energy resource assessment	Finalized resource	✓
	• Not identifying all possible costs	Reduced	✓
	• Unrealistic estimation of all costs	Reduced	✓
	• Incorrect estimation of long-term “community” energy use (energy efficiency first)	Finalized projection	✓
	• Utility rules and ability to offset use	Reduced	✓
Site	• Structural (e.g. rooftop solar, wind loading, soil conditions)	Unchanged	✓
	• Installation safety (e.g., wind tower, hazard for adjacent sites)	Unchanged	✓
	• Site control for safety/security purposes	Reduced	✓
Permitting	• Tribe-adopted codes and permitting requirements	Reduced	✓
	• Utility interconnection requirements	Reduced	✓
Finance	• Capital availability	High risk, reduced	
	• Incentive availability risk	Reduced	
Construction/ Completion	• EPC difficulties	Low; allocate to EPC or developer	
	• Cost overruns		
	• 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.

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



3 Refinement



Project Ownership

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

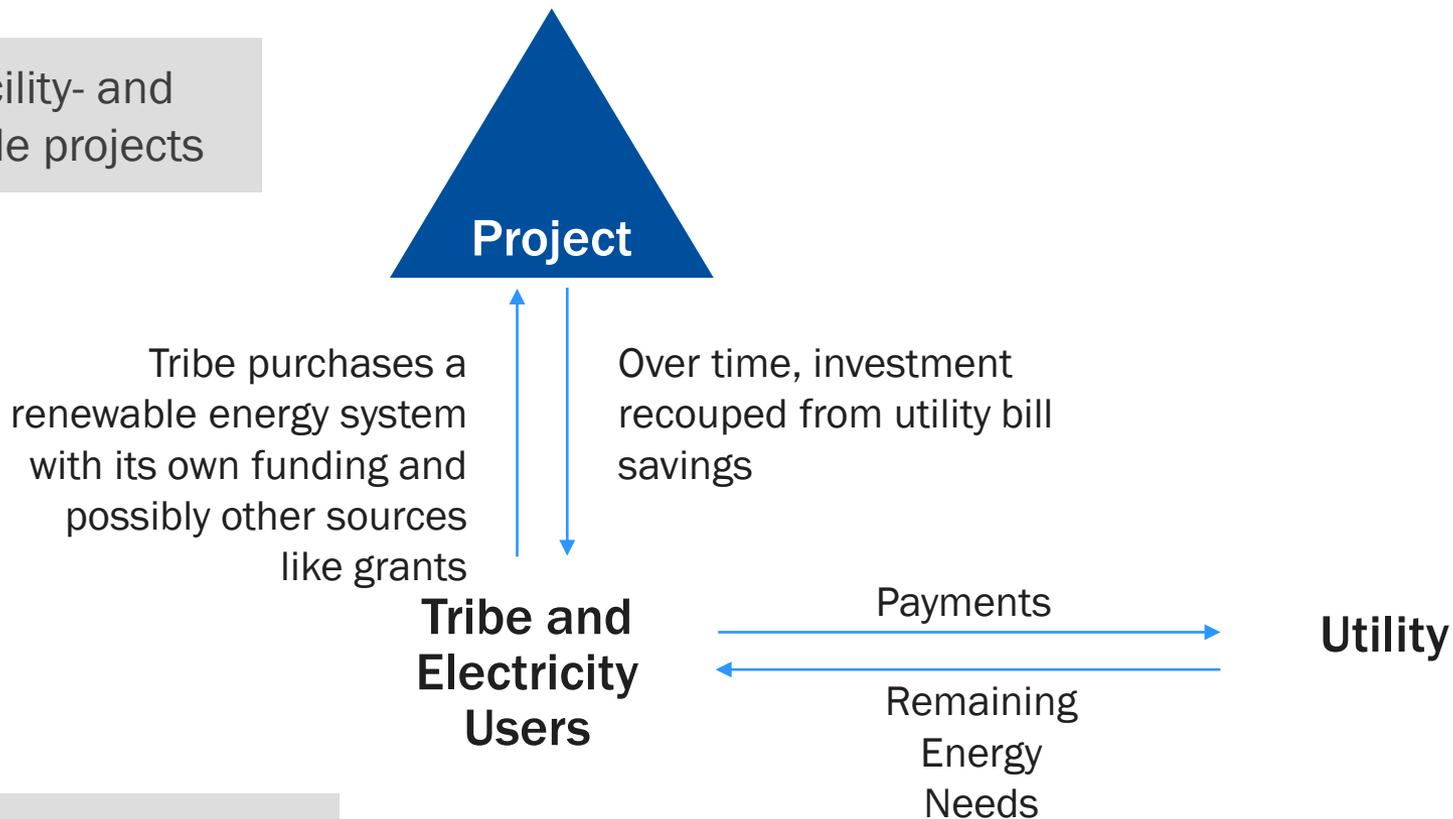
- Tribe owns the project (cash purchase or debt)
- Tribe hosts the project and buys the electricity (power purchase agreement)
- Tribe partners with private sector and co-owns the project (uncertainties about receipt of tax benefits)

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

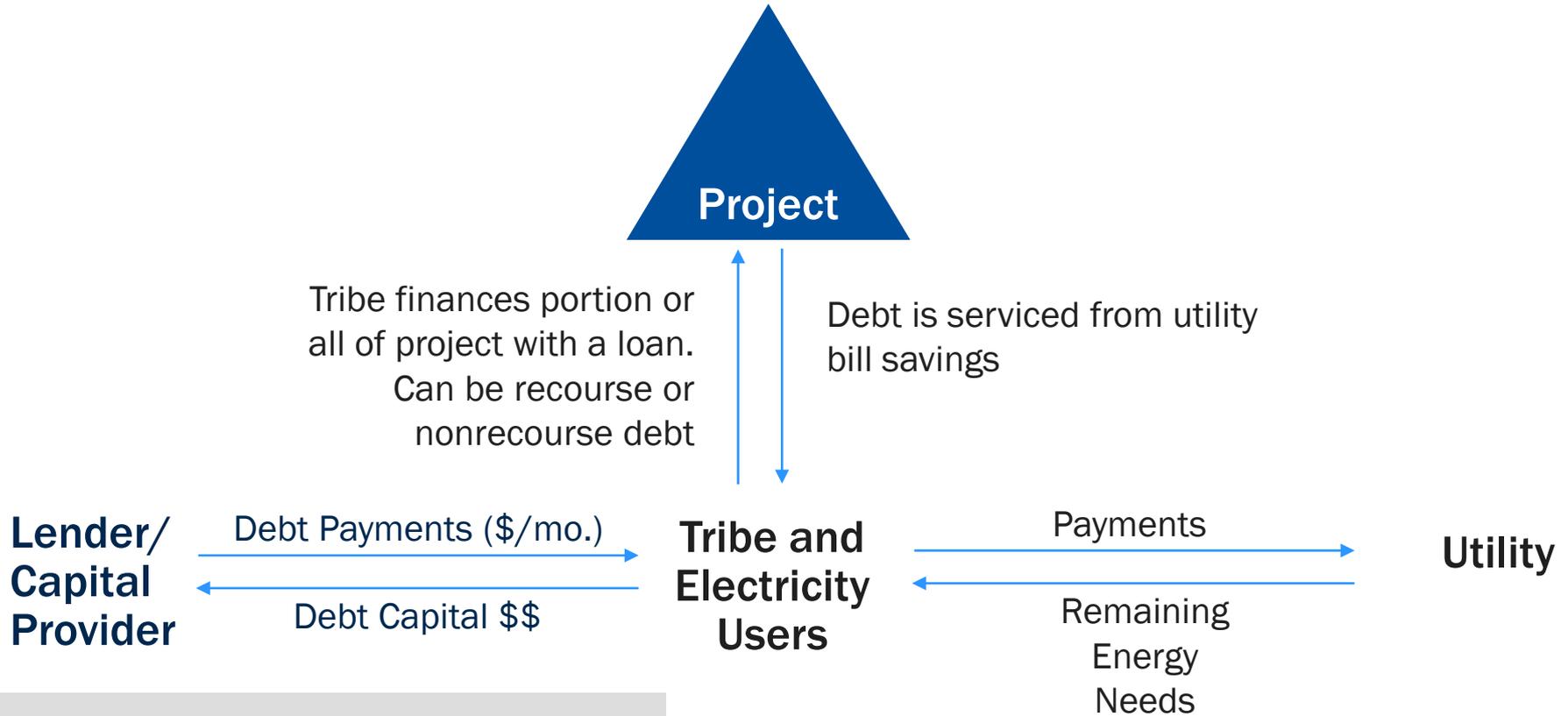
Direct Ownership Structure

Primarily for facility- and community-scale projects



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

Ownership with Debt

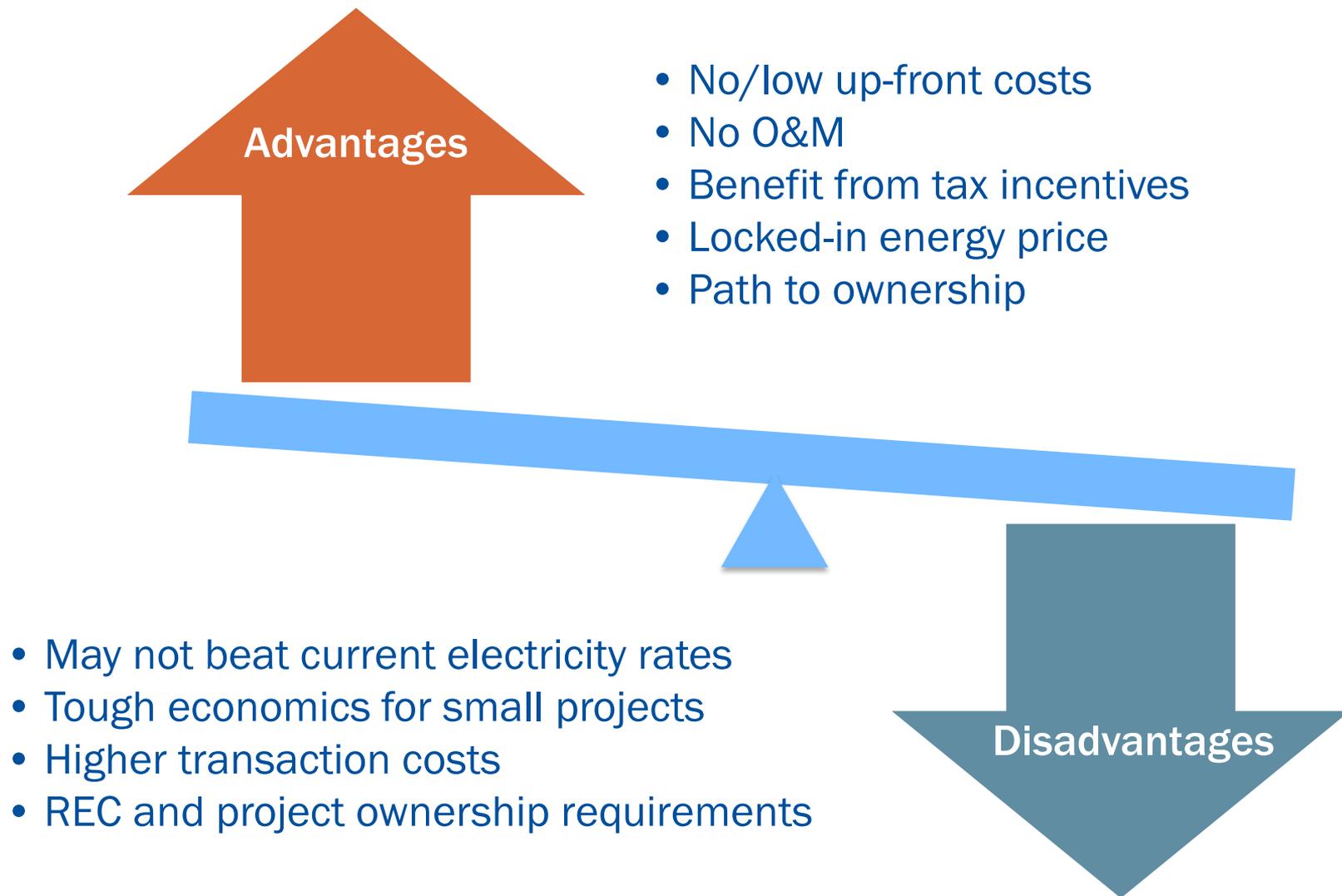


The tribe is still the owner in this structure and self-generates its electricity. Cash flows/savings go partially or entirely to debt service

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 [QECCB]/Clean Renewable Energy Bond [CREB])
- Other

PPA Considerations to Weigh



Procurement Process for Facility- and Community-Scale Projects



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

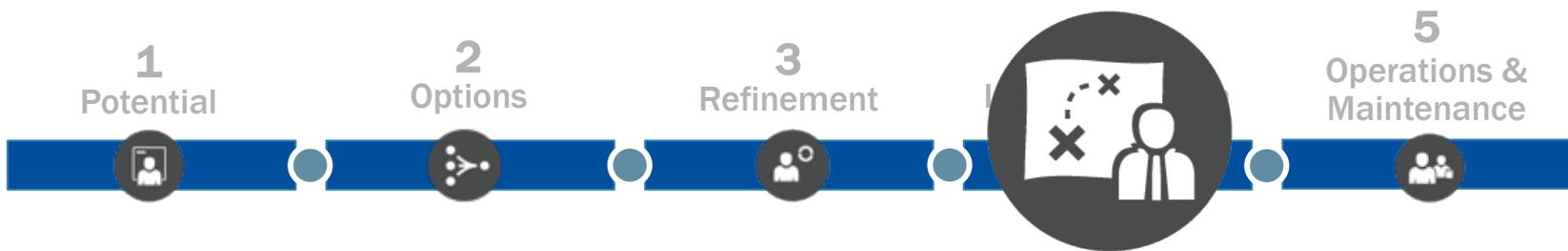
Phases	Risks	Risk Assessment Post Step 3	✓
Development	• Poor or no renewable energy resource assessment	Low; site picked	✓
	• Not identifying all possible costs	Low; detailed model	✓
	• Incorrect estimation of long-term “community” energy use (energy efficiency first)	Low; final projection	✓
	• Utility rules and ability to offset use with centralized production	Reduced	✓
Site	• Structural (e.g. rooftop solar, wind loading, soil conditions)	Assumed low; assessed	✓
	• Installation safety (e.g., wind tower, hazard for adjacent sites)	EPC assumes risk	✓
	• Site control for safety/security purposes	Low; site secure	✓
Permitting	• Tribe-adopted codes and permitting requirements	Low; complete	✓
	• Utility interconnection requirements	Low; complete	✓
Finance	• Capital availability	Low; PPA complete	✓
	• Incentive availability risk	Low; risk on developer	✓
Construction/ Completion	• EPC difficulties	Low; allocate to EPC or developer	
	• Cost overruns		
	• 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.

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



4 Implementation



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

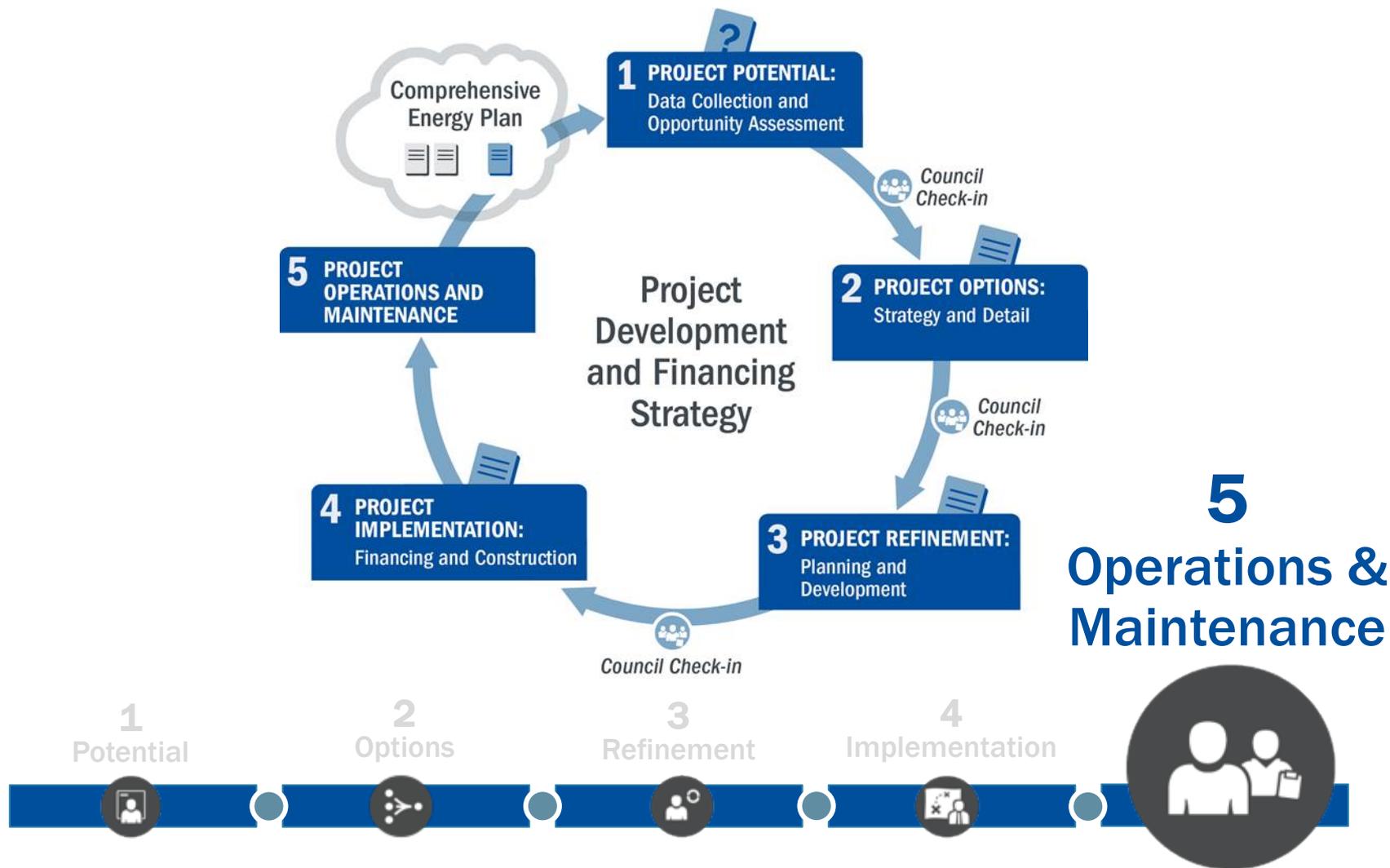
Output: Completed project (operation)

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



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



Photo by Warren Getz, NREL 00180

Drivers for Improved O&M

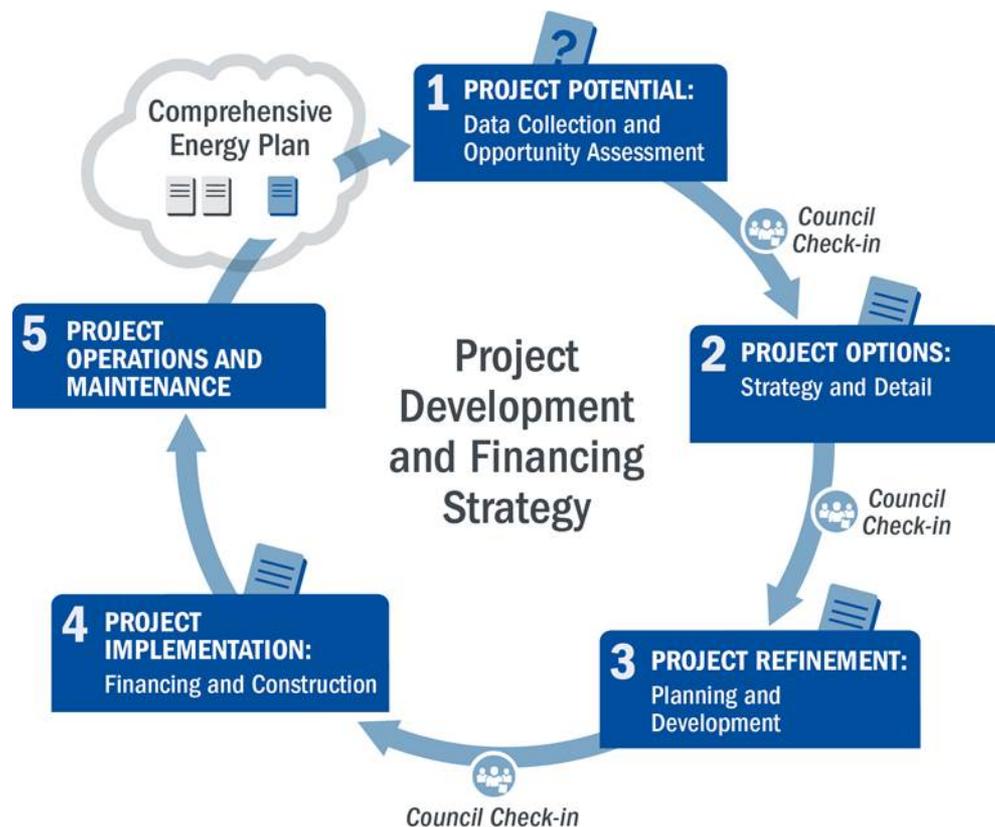
- Increase efficiency and energy delivery (kWh/kW)
- Decrease downtime (hours/year)
- Extend system lifetime (25–40 years)
- Reduce cost of O&M (\$/kW/year)
- Ensure safety and reduce risk
- Enhance appearance and image
- Often required in financing and warranty

Project Risk: Community- and Facility-Scale

Phases	Risks	Risk Assessment Post Step 5	✓
Development	• Poor or no renewable energy resource assessment	Low; site picked	✓
	• Not identifying all possible costs	Low; detailed model	✓
	• Unrealistic estimation of all costs	Low; detailed model	✓
	• Incorrect estimation of long-term “community” energy use (energy efficiency first)	Low; final projection	✓
	• Utility rules and ability to offset use with centralized production	None; executed	✓
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	Being managed by appropriate party	✓
	• Technology O&M		

Not Quite Done!

- Check back in with planning document—update as necessary
- Identify next potential project from plan



Summary of Actions by Step



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)