DOE OFFICE OF INDIAN ENERGY

Renewable Energy Project Development and Financing Essentials

Oklahoma Tribal Leader Forum
Oklahoma City, Oklahoma
August 13, 2012



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

About DOE Office of Indian Energy

Goals and objectives:

- Promote Indian tribal energy development, efficiency, and use
- Reduce or stabilize energy costs
- Enhance and strengthen Indian tribal energy and economic infrastructure relating to natural resource development and electrification
- Bring electrical power and service to Indian land and the homes of tribal members

Energy Policy Act of 2005, Title V, Sec. 502

Why Complete a Renewable Energy Project?

- Income
- Jobs
- Experience
- Cost savings
- Cost stabilization
- Tax revenue
- Industry exposure
- Energy reliability
- Self reliance
- Environmental sustainability

Benefits vary based on the type and scale of projects

Agenda

- Overview of training purpose and structure
- Project development and financing key concepts (addressed in context)
- Project development process and decision points

PROJECT DEVELOPMENT AND FINANCING COURSES OVERVIEW: PURPOSE AND STRUCTURE

Purpose of Courses

- Provide a **framework** for renewable energy project development and financing for Tribes
- Set and manage **expectations** of project development
- Identify **decision points** and the information needed to effectively make **decisions**
- Identify available **tools** for use in project development
- Provide **examples** of relevant projects

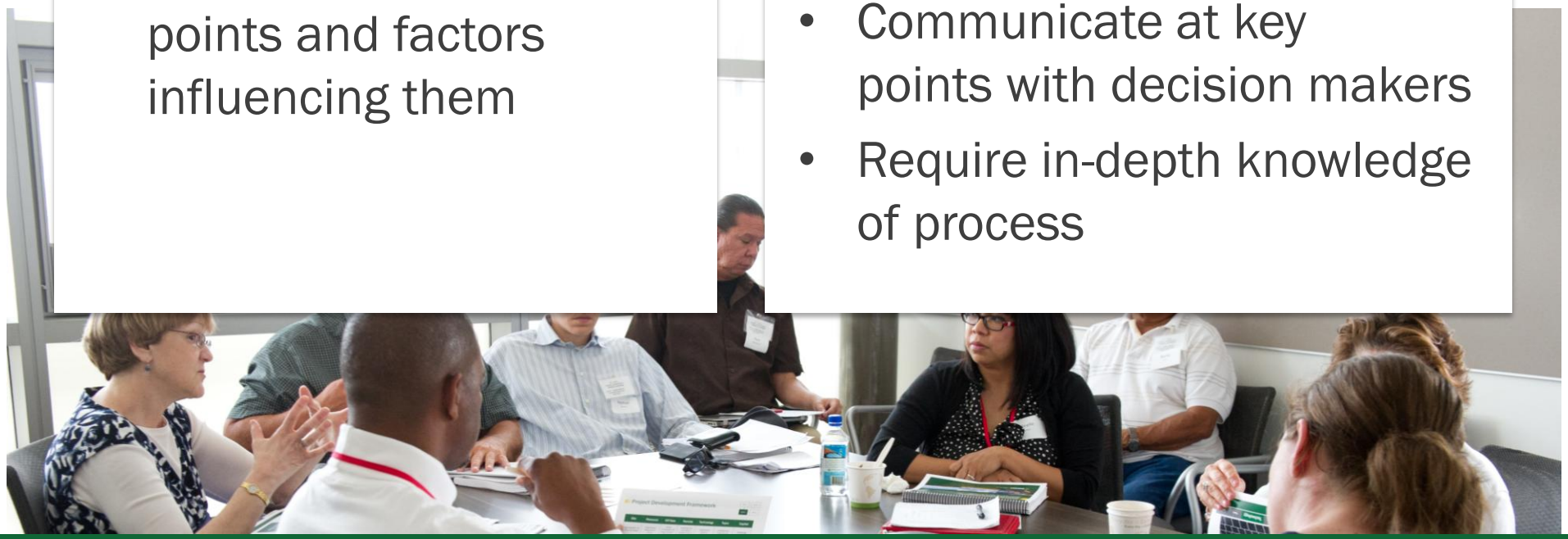
Course Audiences

Tribal Leaders

- Primary decision makers
- Understand terminology
- Understand key decision points and factors influencing them

Staff/Project Management

- May be self-managing project or managing consultants
- Communicate at key points with decision makers
- Require in-depth knowledge of process



Course Structure

Essentials

Basic process, decisions, and concepts for project development
Audience: All involved in project

Advanced/In-Depth

Detailed, academic information for deep understanding of concepts
Audience: Project and contract managers

Facility

Comprehensive, in-depth process pathways for project development and financing by project scale
Audience: Decision makers and project and contract managers

Community

Comprehensive, in-depth process pathways for project development and financing by project scale
Audience: Decision makers and project and contract managers

Commercial

Comprehensive, in-depth process pathways for project development and financing by project scale
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Terminology in These Courses

Why is it important?

- Provides common language for internal discussion
- Assists in interaction with external organizations
- Increases credibility in project development

What does is include?

- Common terms and language for project development
- Acronyms for and roles of:
  - Federal agencies
  - Common federal and state policies

Your resource for reference: DOE-IE Course Terminology Guide

Terminology: Project Scale

Facility

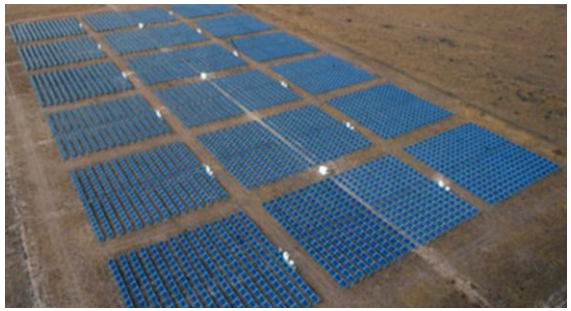
Definition: single building system
Primary purpose: offset building energy use

Community

Definition: multiple buildings, campuses
Primary purpose: offset community energy costs, energy self-sufficiency

Commercial

Definition: stand-alone project
Primary purpose: revenue generation, financial self-sufficiency



Photos by NREL (top to bottom): PIX 09373, PIX 18077, PIX 13327

Determining Project Scale: What is the goal?

Goal Options:

- Price Offset/Energy Self Generation
- Revenue Generation

Information Needed:

Facility	Community	Commercial
• Savings opportunity • Self-power opportunity • Utility interconnection • 1 month to 1 year	• Savings opportunity • Self-power opportunity • Utility interconnection • 6 months to 2 years	• Competing power price • Offtaker options • Transmission options • 3 to 5 years

Today's Courses

Essentials

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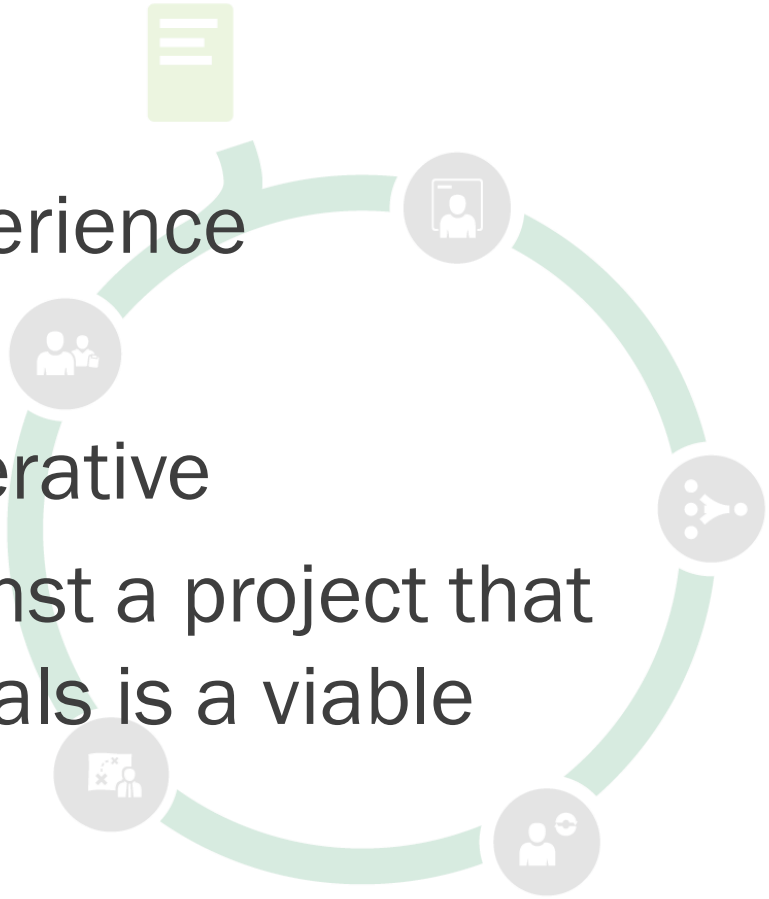
Curriculum History and Expectations for Today

- Provide information on project development
- Your feedback on each course structure and content

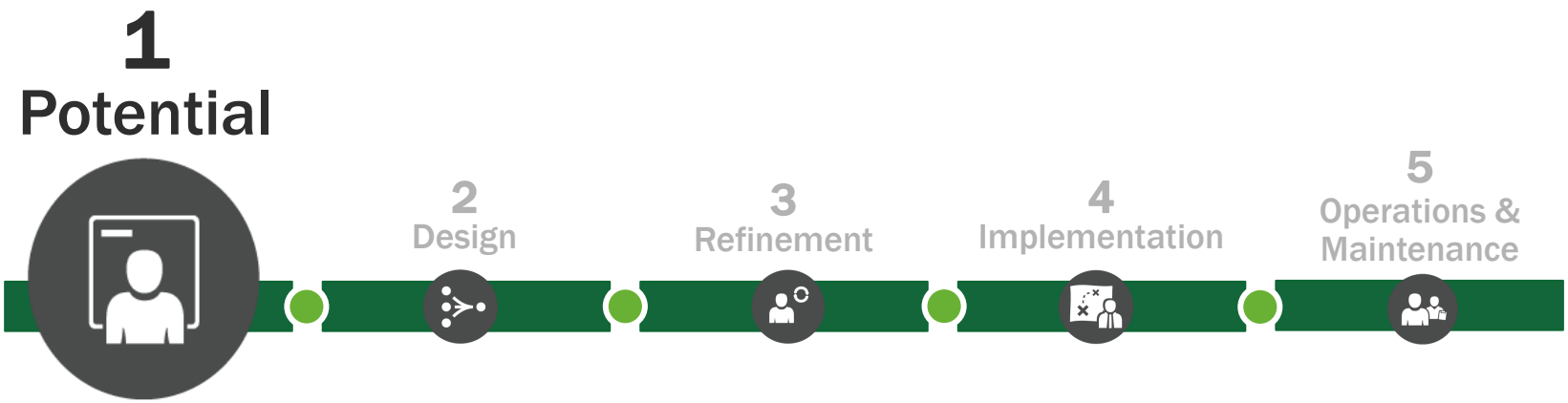
PROJECT DEVELOPMENT PROCESS

Project Development Process: What is it?



- Framework based on experience
- Decision-point based
- Project development is iterative
- Delaying or deciding against a project that does not meet current goals is a viable outcome and option


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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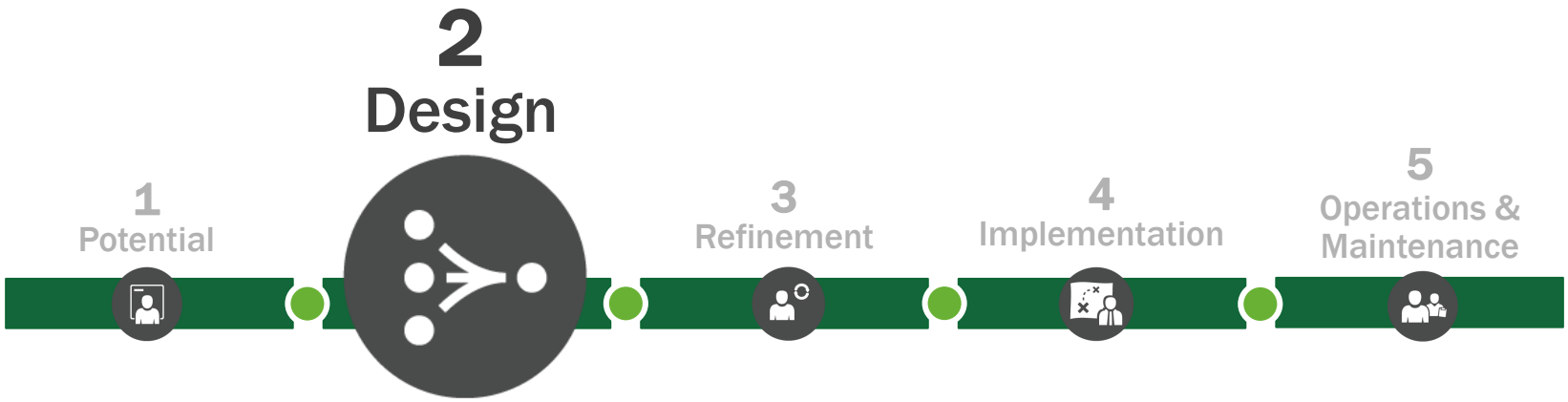
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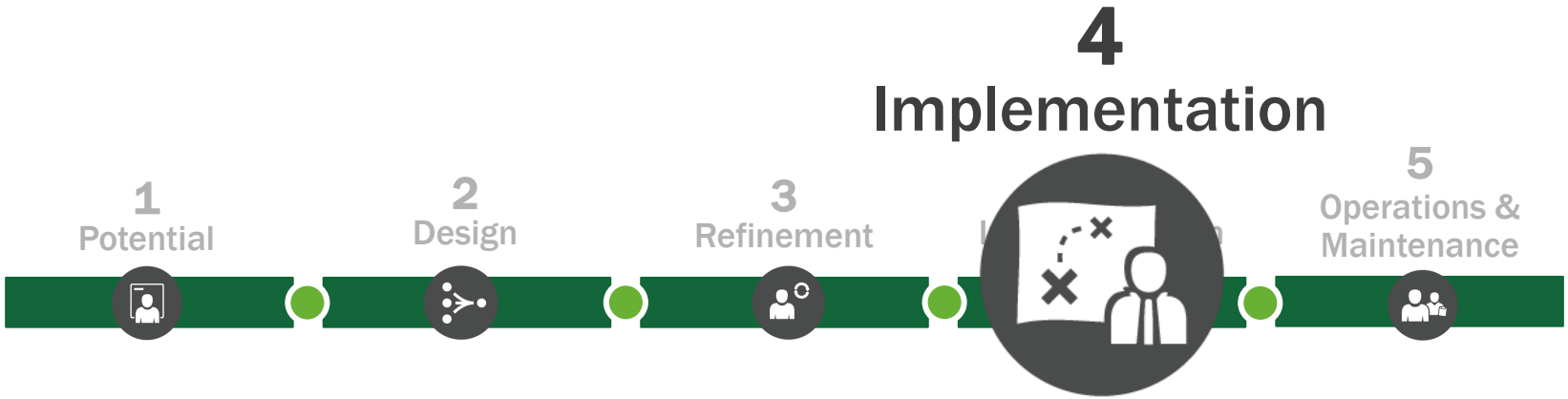
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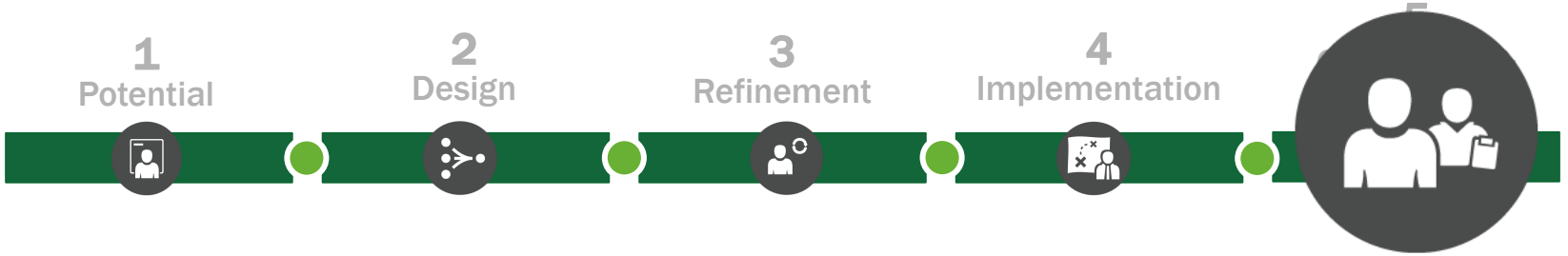
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Key Concepts

- Risk and Uncertainty
- Levelized Cost of Energy (LCOE)
- Tax Equity Partnership
- Roles of the Tribe
- The Project Team

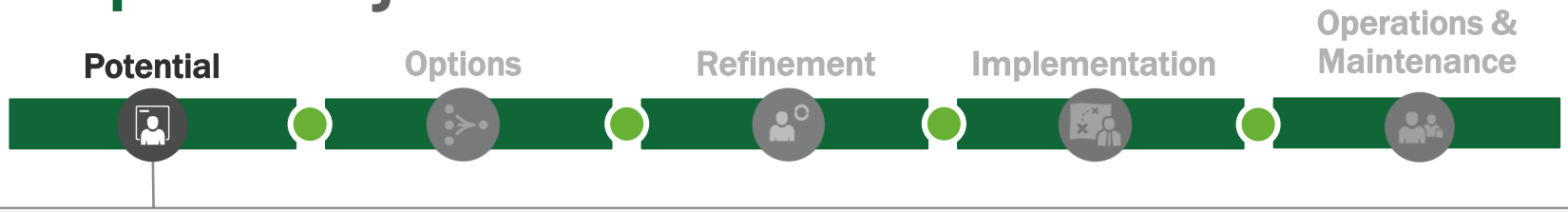
In-depth information on each key concept available in Advanced Courses

Key Risks in Project Development

	Risks
Development	•Concept and scoping •Power pricing •Access to power markets (adequacy and availability of transmission)
Site	•Site control •NIMBY/BANANA
Permitting	•Environmental studies •Archaeological, historical, cultural significance •Federal Aviation Administration restrictions
Finance	•Capital availability •Credit-worthy offtaker •Incentive availability risk and regulatory risk
Construction/Completion	•Engineering, procurement, and construction difficulties •Cost overruns •Schedule
Operating	•Output shortfall •Technology O&M •Transmission/curtailment

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

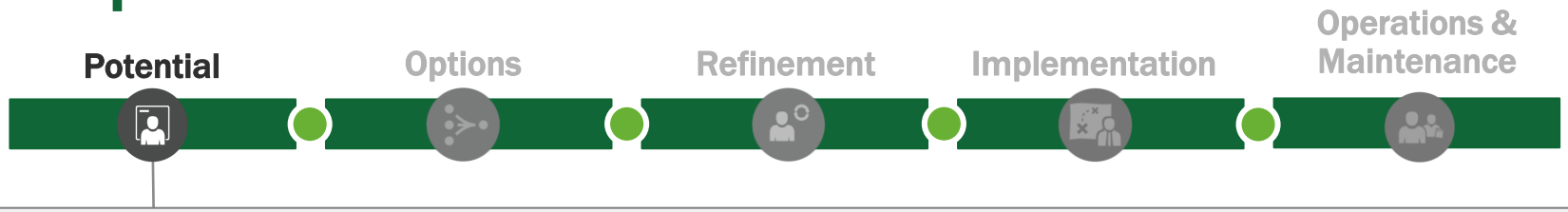
Step 1: Project Potential



Gather all relevant data in order to make an educated decision about pursuing projects:

- Energy resources
- Technology options
- Possible sites for project locations
- Tribal facility electric cost data, regulations, and interconnection requirements
- Potential markets and paths to market for project power and renewable sales
- Tribal role options

Step 1: Decisions

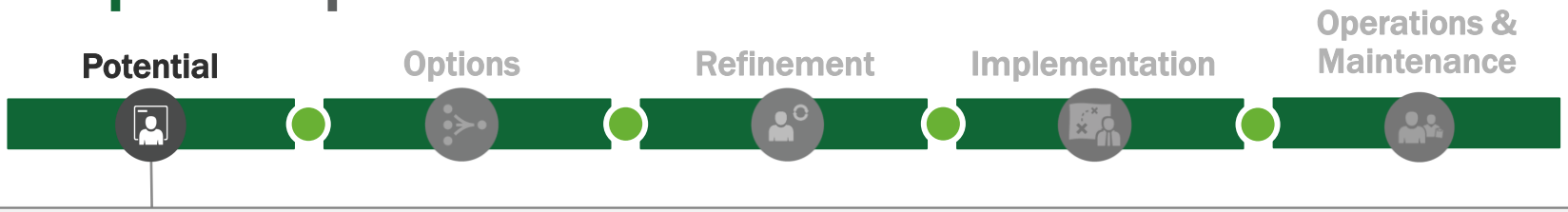


Major Decision:

Proceed with in-depth project analysis or abandon/change project?

Decisions:	Inputs:
Why do a project?	Project Goal
	Powers Users
What is the energy environment?	Energy Context
	Energy Costs
What would a project look like?	Site Options
	Resource Options
	Technology Options & Costs
What is the Tribe's role?	Role Options
	Tribal Resources

Step 1: Inputs and Actions

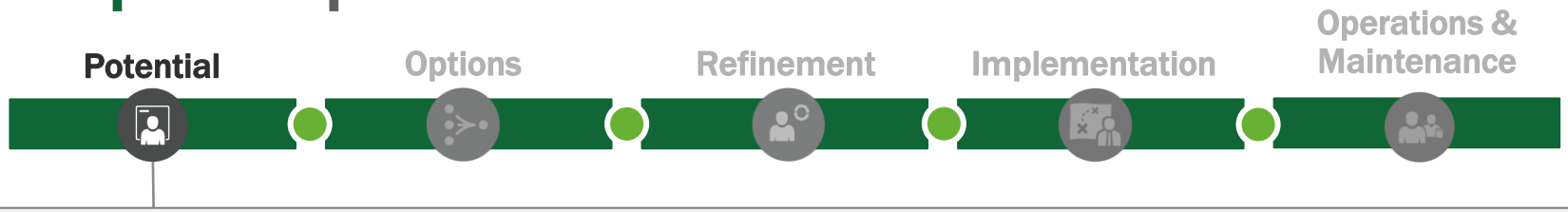


Why do a project?

	DECISION MAKER	INFORMATION NEEDED	TOOLS/RESOURCES	STAFF
Project Goal	Deliver project goal parameters to staff	• Strategic Energy Plan • Specific goal for project	Jobs & Economic Development Impact Models	Identify potential roles for tribe in project

	STAFF	INFORMATION NEEDED	TOOLS/RESOURCES	DECISION MAKER
Power Users	Identify potential power users	• Facility and community: Determine onsite load/need • Commercial: Identify potential power buyers in area • Identify potential transmission capability • Outline utility rules related to power sales	• Facility and community: – Energy bill analysis – Current energy costs – Current energy fuels • Commercial – Regional buyers – utilities, military, private companies	Select and meet with potential power purchasers to discuss project opportunities

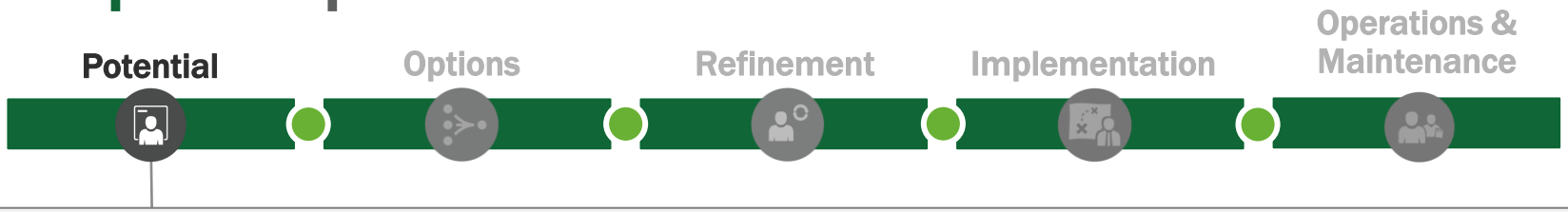
Step 1: Inputs and Actions



What is the project environment?

	STAFF	INFORMATION NEEDED	TOOLS/RESOURCES	DECISION MAKER
Energy Context	Develop (or contract) market context	• Utility costs • Utility rules regarding interconnection/net metering/transmission • Regional power market • Policy context: federal/state/local applicable rules, incentive, grant opportunities	DOE-IE template for market context (resources packet)	Review report, understand primary market drivers

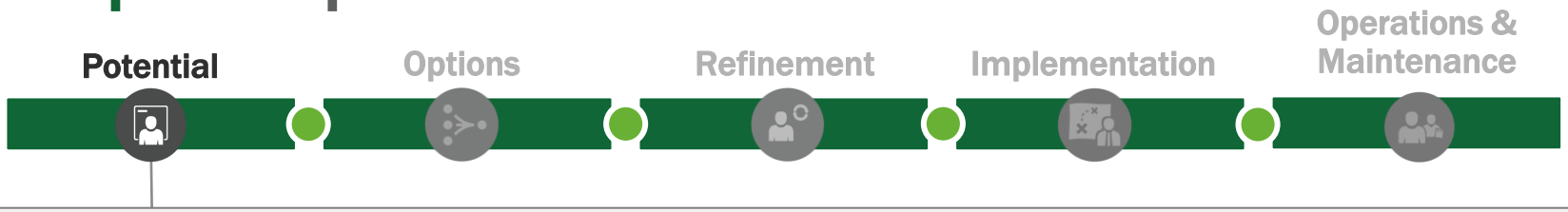
Step 1: Inputs and Actions



What would a project look like?

	STAFF	INFORMATION NEEDED	TOOLS/RESOURCES	DECISION MAKER
Resource Options	Assess resource and site options	• Energy resources available • Available sites • Alternative use options	Existing resource assessment Renewable Energy Atlas In My Back Yard	Preliminary selection of project location and type
	STAFF	**INFORMATION NEEDED**	**TOOLS/RESOURCES**	**DECISION MAKER**
Technology Options & Costs	Identify and price potential technology options	• Tribal role in project • Technology costs	• www.nrel.gov/learning/re_solar.html • www.nrel.gov/analysis/tech_costs.html • Request for proposals for developer	Select appropriate technologies, approve

Step 1: Inputs and Actions



What is the Tribe's role?

	STAFF	INFORMATION NEEDED	TOOLS/RESOURCES	DECISION MAKER
Tribal Resources	Evaluate tribal role options relative to goals	Tribal goals and resources	• Key Concept: Tax Equity Partnership • Key Concept: Tribal Role Options	Decide on appropriate tribal role

Key Concept: Tribal Role Options

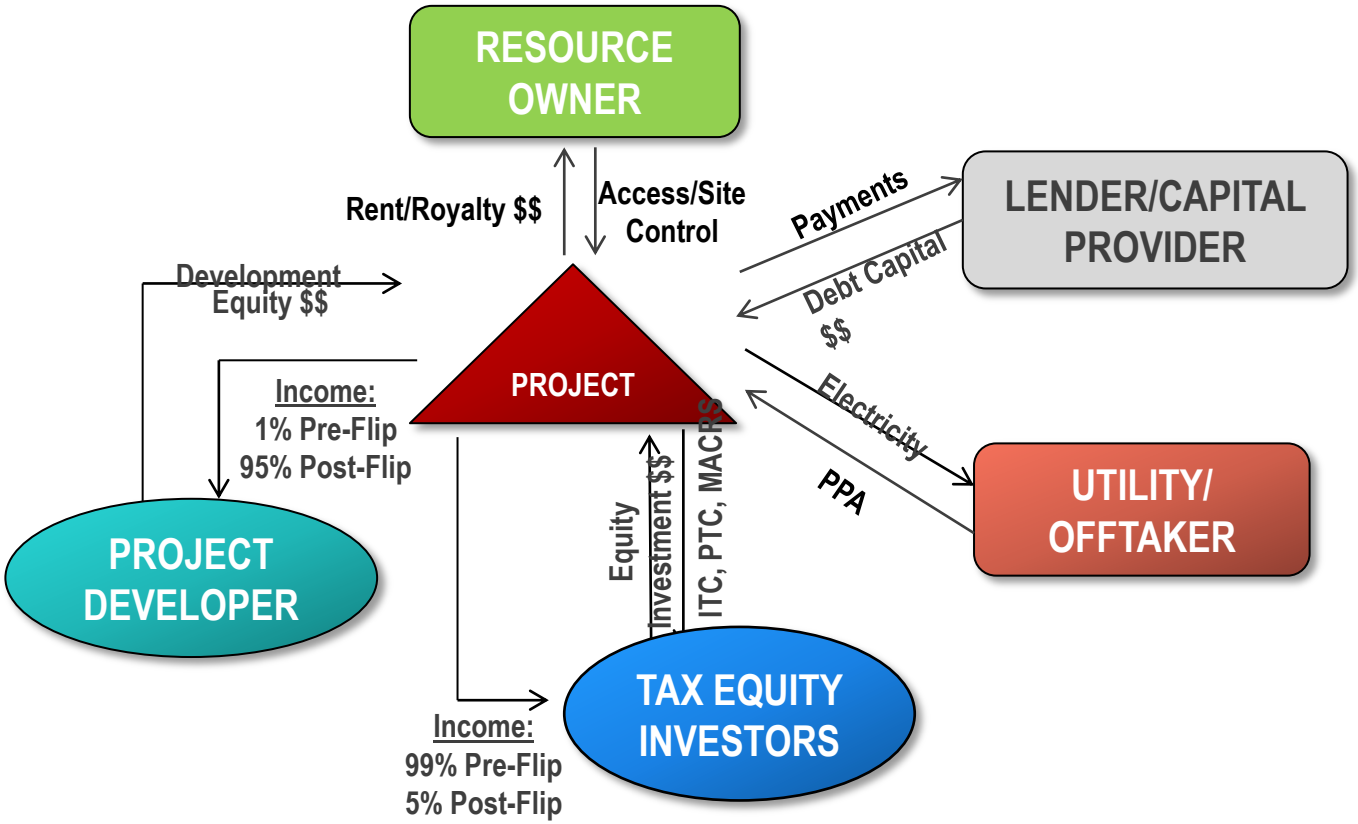
Title	Role
Project Company	Legal entity that owns the project
Landowner/Site Owner	Legal and/or beneficial owner of land and natural resources
Sponsor/Developer	Organizes all of the other parties and typically controls and makes an equity investment in the company or other entity that owns the project
Engineering Procurement and Construction Contractor (EPC)	Construction contractor provides design, engineering, and construction of the project
Operator	Provider of the day-to-day O&M of the project
Feedstock Supplier	Provider of the supply of feedstock (i.e., energy, raw materials) to the project (e.g., for a power plant, the feedstock supplier will supply fuel)
Product Offtaker	Generally enters into a long-term agreement with the project company for the purchase of all the energy
Lender	A single or group of financial institutions that provide a loan to the project company to develop and construct the project and that take a security interest in all of the project assets
Tribal Host	Primary sovereign of project site

Key Concept: Tribal Role Options

Role	Opportunity	Constraints	Comments
Project Developer	Control and self-determination of project; potential for profits	• Investors require experience • Development risks without portfolio diversification may not make business sense • Community investment portfolio may not seek high risk/return investments	• Tribal interests may be best served by outsourcing this risk • Assembling a portfolio of projects is a typical method to mitigate risk
Lender/ Capital Provider	Participate financially in project with lower risk	• Requires ready capital • May be cost prohibitive to document and manage a single debt transaction	Requires knowledge of lending practices
Investor	Provide cash for project development	Requires ready capital, or unique source of capital that provides market advantage (like NMTC)	• Must compete with other investment opportunities • Option for Tribes with limited lands
Resource Owner (Lessor)	Low risk, known reward, consistent income	Limited project control	Limited upside, limited risk
Off-Taker	Purchasing clean energy from an "on-site" provider; security	Limited investment, economic development, and capacity building opportunity	Implies load-serving entity (utility), or some other purchasing demand

Key Concept: Tribal Role Options

Project Participants



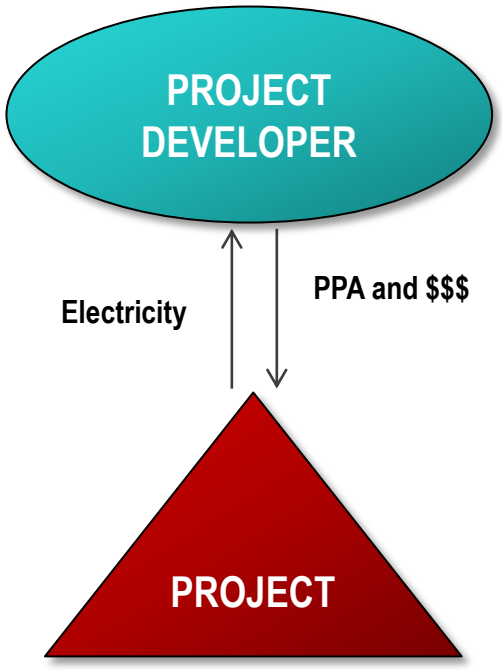
Source: Graphs adapted from 'Renewable Energy Project Finance in the U.S.: An Overview and Midterm Outlook' (Mintz Levin Green Paper , 2010)

Key Concept: Tax Equity Partnerships

- Tribe can benefit from tax equity incentives without being taxable
- Tax equity can lower capital costs for a qualifying project significantly (40%-50%)
- Tribe benefits by either reduced electricity costs from the renewable project, or offering a more competitive price for energy/RECs from the project
- Tribes can partner with 3rd party tax investors and/or developers to gain this advantage

Key Concept: Tribal Role Options

Project Developer



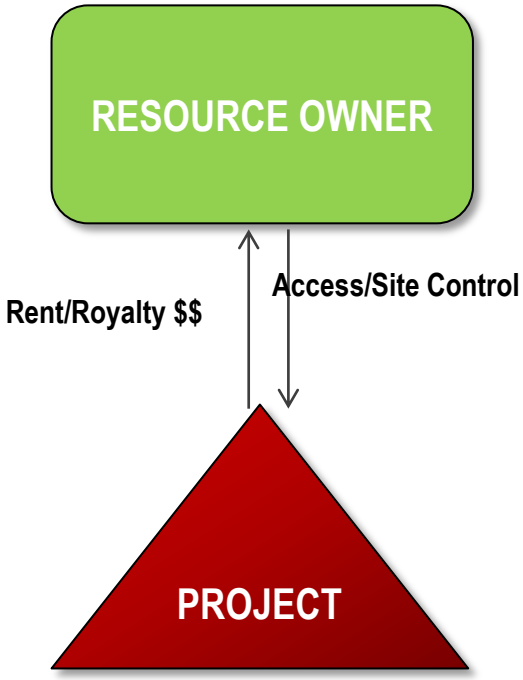
- Risk and complexity increases with project scale *(seek experienced legal counsel)*
- Developing projects is a specialized, high risk venture
- Typically, developers mitigate risk through project portfolios (diversification) and use of 3rd party equity investment *(Business risks must be considered and mitigated)*

Tribal Examples:
Few, if any examples exist—and for good reason considering the risk and cost of entering a project without a development partner. It can be done, but must be carefully considered.

Source: Graphs adapted from 'Renewable Energy Project Finance in the U.S.: An Overview and Midterm Outlook' (Mintz Levin Green Paper, 2010)

Key Concept: Tribal Role Options

Resource Owner



- Right to "capture" the resource. A project might pay a rent and/or royalty payment to the landowner in exchange for land access *(subject to market conditions)*
- The Tribe may also have the right, and choose to levy taxes on the project, generating tax revenue *(subject to market conditions)*
- This is a low-risk, and fairly straightforward method for a tribal entity to participate in a project *(seek experienced legal counsel)*

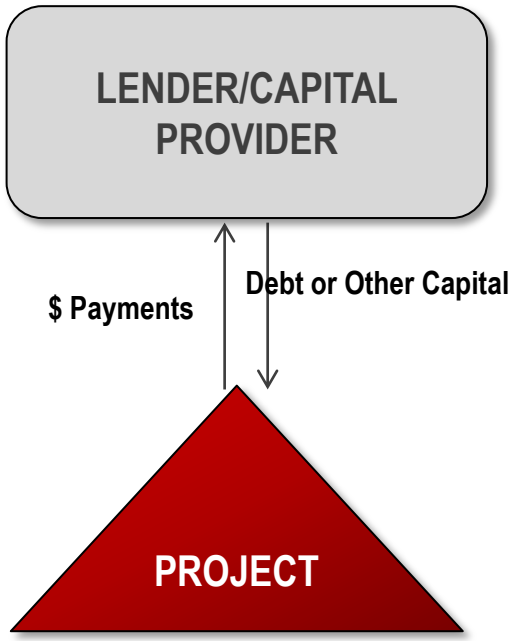
Tribal Examples:

- Tribe in the SW leases land to a wind project for rent and tax revenue (CA)
- Nevada Tribe considering Rent/Royalty structure and tax revenue for Geothermal project (NV)
- Solar projects under consideration by several Tribes in AZ and NM, who can participate in this way

Source: Graphs adapted from 'Renewable Energy Project Finance in the U.S.: An Overview and Midterm Outlook' (Mintz Levin Green Paper, 2010)

Key Concept: Tribal Role Options

Tribal Participation Options: Lender/Capital Provider



- Lending money to the project, or other capital such as a New Markets Tax Credit (NMTC) allocation is possible given tribal capacity to do so *(subject to market conditions)*
- Compensation to the Tribe or tribal entity for use of capital provides greater financial exposure—also incurs risk *(risks must be considered and mitigated)*
- This is a medium-risk, more complex method for a Tribal entity to participate in a commercial scale project *(seek experienced legal counsel)*

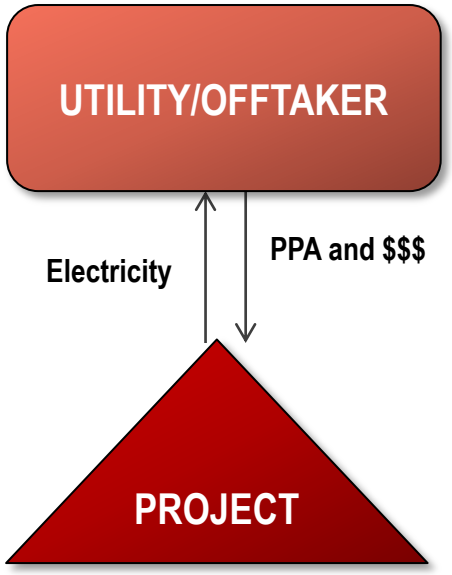
Tribal Examples:

- A Tribe in the NE is considering using a NMTC allocation to purchase a majority percent ownership of project equity
- California Tribe has option to provide equity capital to purchase a minority project interest

Source: Graphs adapted from 'Renewable Energy Project Finance in the U.S.: An Overview and Midterm Outlook' (Mintz Levin Green Paper, 2010)

Key Concept: Tribal Role Options

Utility or Offtaker



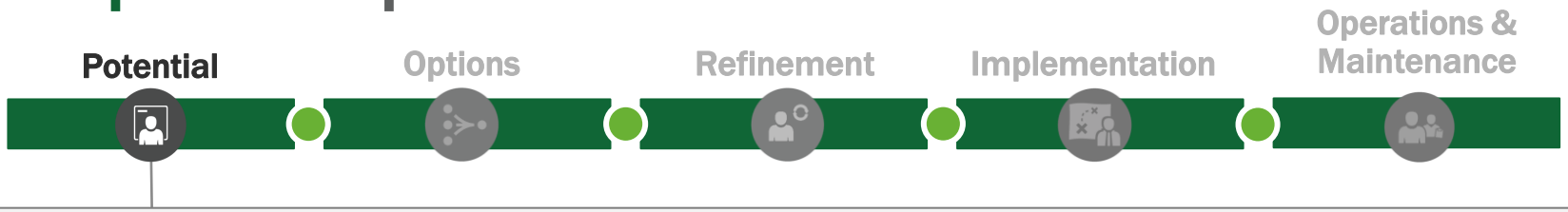
- Being a long-term purchaser of a commercial scale project is likely limited to Tribes with utilities, or a future tribal utility with sufficient demand *(subject to market conditions)*
- Benefits may accrue to the purchaser of energy by fixing supply costs (hedge against rising prices), security *(risks must be considered and mitigated)*
- This is a medium-risk, more complex method for a tribal entity to participate in a commercial scale project *(seek experienced legal counsel)*

Tribal Examples:

- An Arizona Tribe has the potential to purchase energy through a tribally-owned utility from future solar projects
- Fewer Tribes have electricity demand sufficient to warrant being the offtaker of a commercial scale project

Source: Graphs adapted from 'Renewable Energy Project Finance in the U.S.: An Overview and Midterm Outlook' (Mintz Levin Green Paper, 2010)

Step 1: Outputs



- ✓Project Scale
- ✓Resource and Market Context
- ✓Savings/Production Potential
- ✓Preliminary Sites Options
- ✓Tribal Role Options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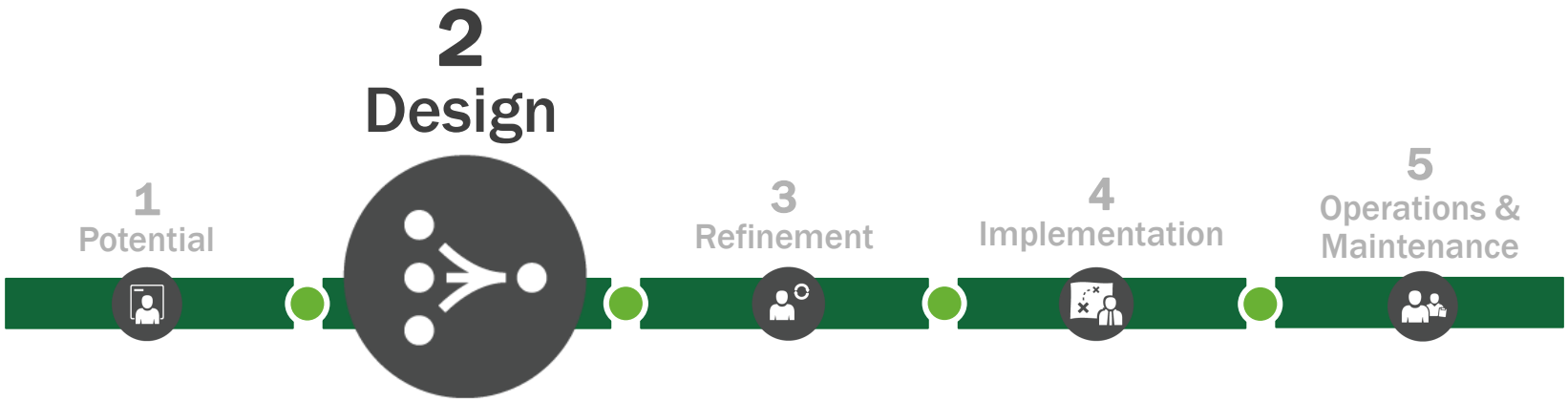
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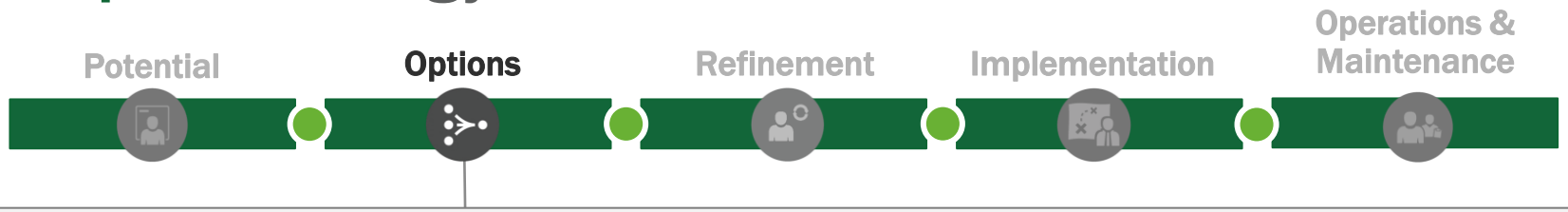
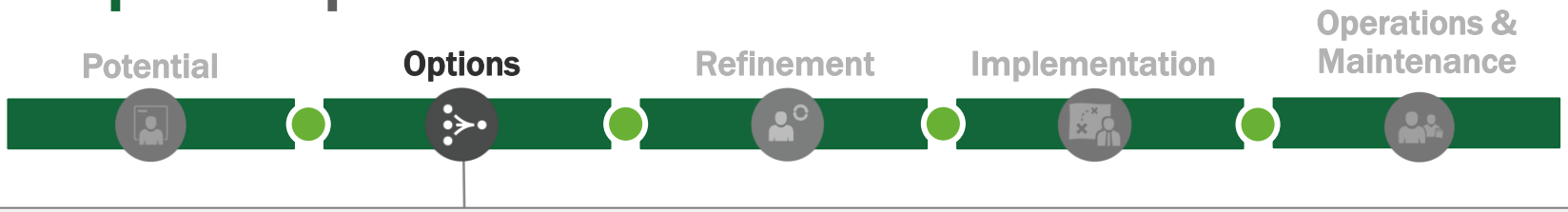
Step 2: Strategy and Detail



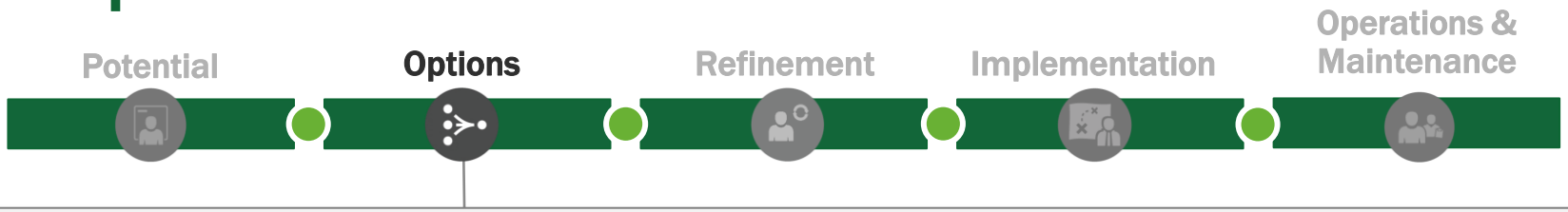
- Identify technology and start procurement process
- Identify final offtaker and start agreement process
- Identify financing options
- Estimate potential value to the Tribe
- Initiate necessary permits
- Determine whether development on specific project concepts should be stopped

Step 2: Inputs



- Project Scale
- Resource and Market Context
- Savings/Production Potential
- Preliminary Sites Options
- Tribal Role Options

Step 2: Decisions



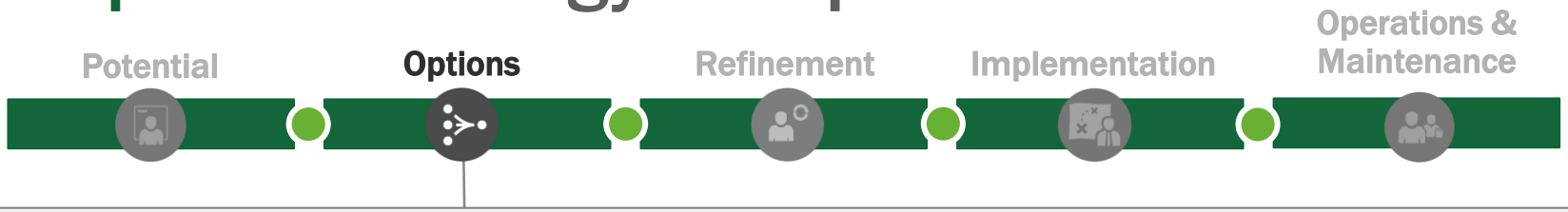
Major Decision:

Pursue development of specific project?

Supporting decisions:

- Determine specific technology options (staff)
- Set aside land for project development (decision maker)
- Select appropriate structure (decision maker)
- Pursue partnership or funding (staff)
- Pursue appropriate organizational structure (staff)

Step 2: Technology Comparisons

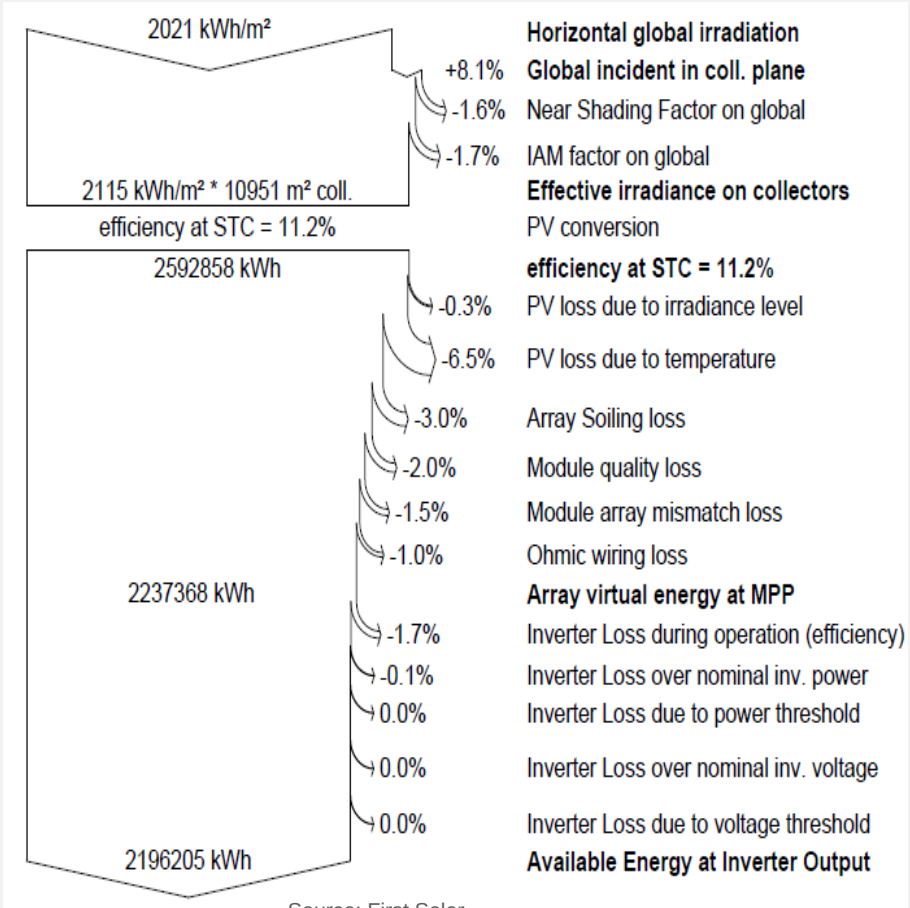


Technology Characteristics

- Output (over time)
- Initial Cost
- Operation and Maintenance Cost
- Land use per output
- Commercially available

Step 2: Technology Choice Matters

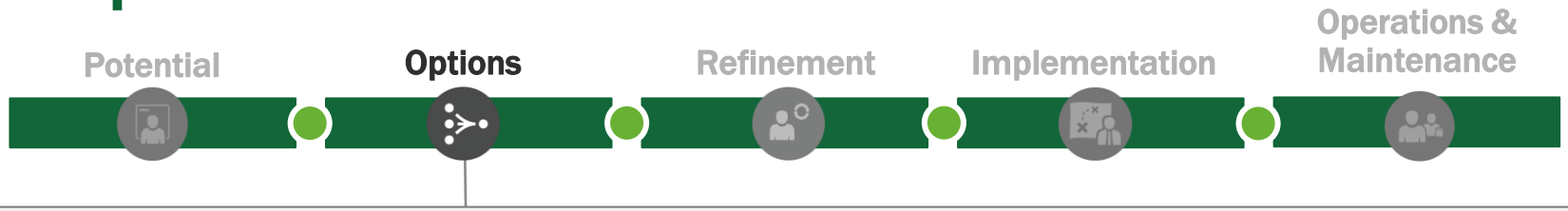
Potential | **Options** | Refinement | Implementation | Operations & Maintenance



Source: First Solar

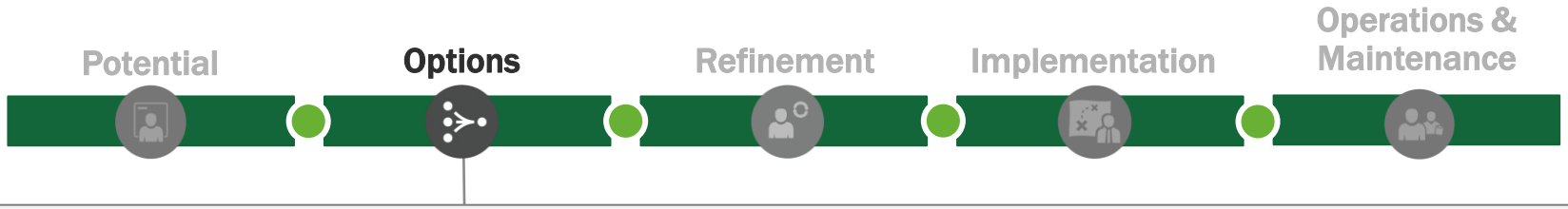
- DOE-IE technology specific webinars: www.energy.gov/indianenergy/resources/education-and-training
- Procurement specifications detailed in advanced course

Step 2: Offtaker Identification



- Identify who/what will use the power
- Varies depending on project scale
- Agreements can be simple or complicated
- Need to understand early on in order to determine project economics and because agreement times can be lengthy

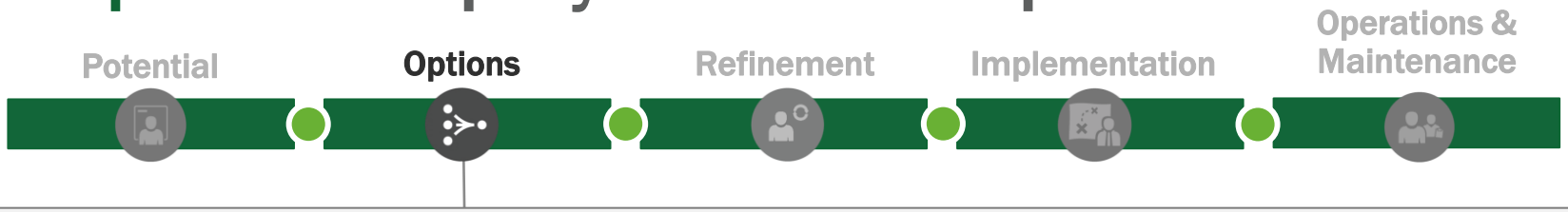
Step 2: Ownership Structure Options



- Direct ownership
- Traditional lease/royalty structure
- Partnering
  - Flip
  - Sale Leaseback
  - Lease Pass-Through

Key Question: What viable ownership structure options are attractive to the community?

Step 2: Tax Equity Structure Options



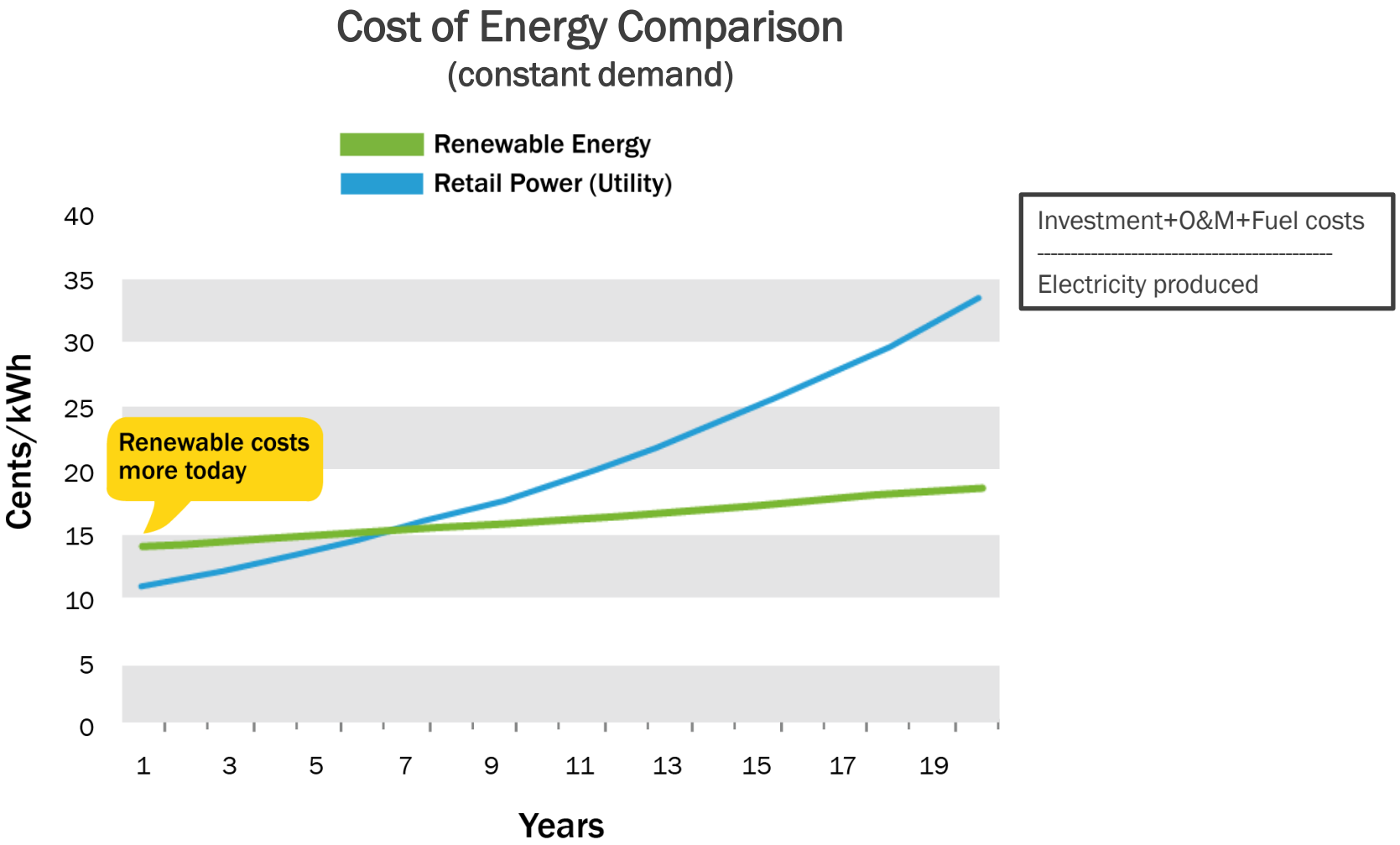
Structures	Overview	Characteristics
Flip	Simple, two participants (Tax Equity and Developer)	99%/1% allocations until Flip (approx. 6 years) then 5%/95%
Sale Leaseback	More complex, at least two participants (Owner/Tax Equity, Lessee)	Developer sells completed project to Tax Equity, leases it back
Lease Pass-Through	More complex, at least two participants (Tenant/Tax Equity, Land lord)	Land Lord majority owned by Developer, leases to Tenant, majority owned by tax equity

Partner identification and evaluation strategies available in Advanced Courses

Key Concept: Levelized Cost of Energy (LCOE)

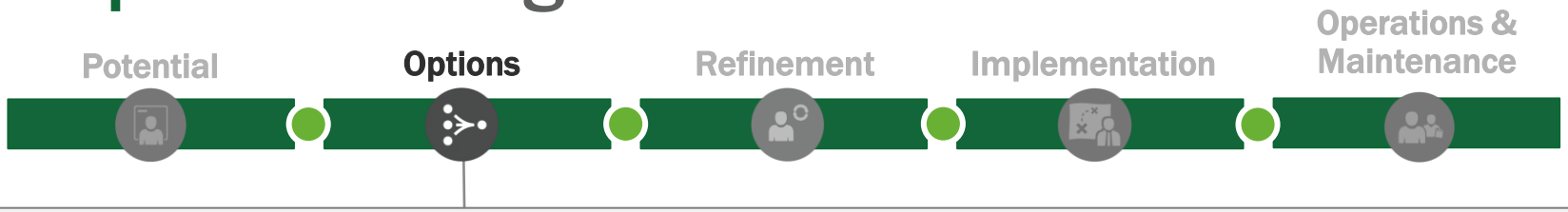
- Calculates present value of total cost of building and operating a power plant over an assumed life cycle, expressed in real dollars to remove the impact of inflation
- Allows the comparison of different technologies (i.e. wind, solar, natural gas) of unequal life spans, different capital cost, risk, return, and capacities
- Critical to making an informed decision to proceed with development of facility-, community-, or commercial-scale project

Key Concept: Levelized Cost of Energy (LCOE)



Renewable has a lower LCOE, compared to retail LCOE. How much lower depends on project specifics.

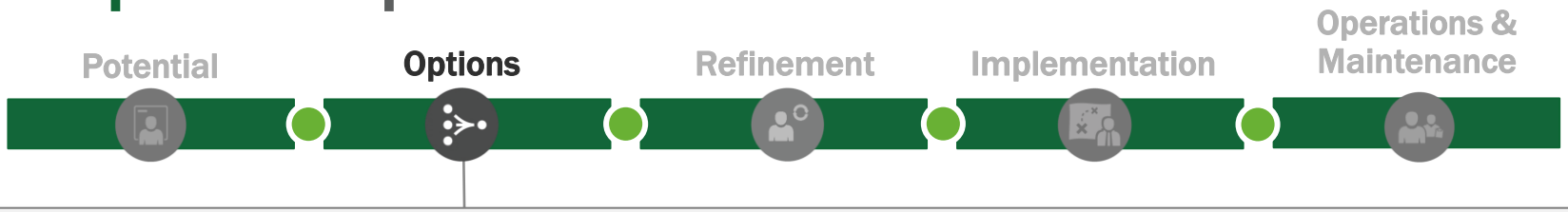
Step 2: Initiating Permits



- Identify necessary permits, varying by scale
- Can be local, state, federal
- Can be costly and time intensive

Scale specific courses offer detail on permit types

Step 2: Outputs



- ✓ Decision on resource type
- ✓ Decision on ownership structure
- ✓ Understanding the permit needs and process
- ✓ Narrowing of technology options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Potential
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Design
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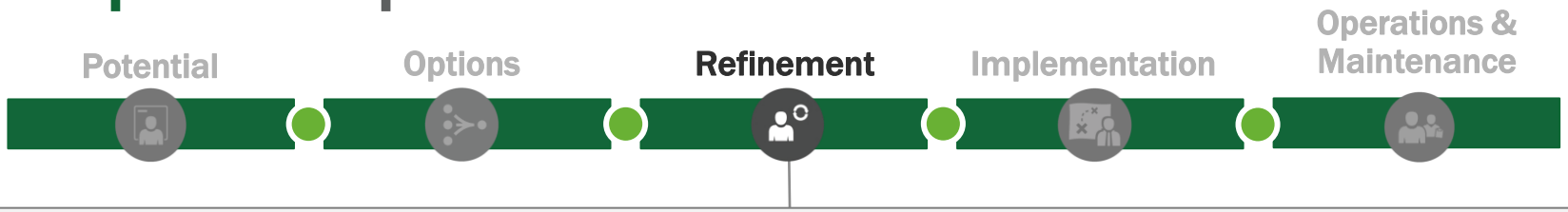
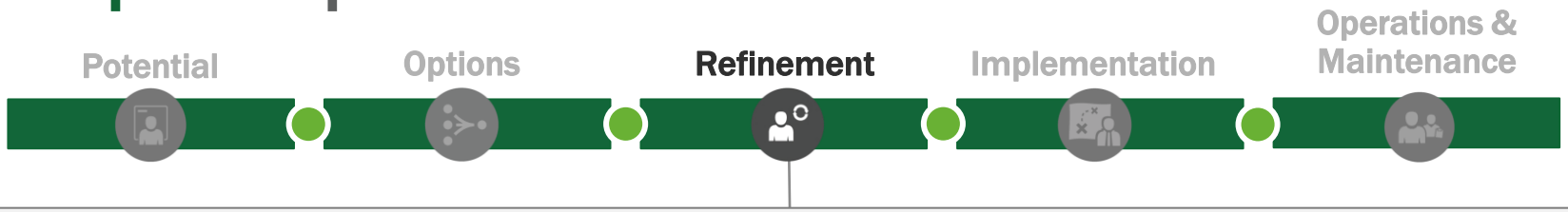
Implementation
5
Operations & Maintenance

Step 3: Purpose



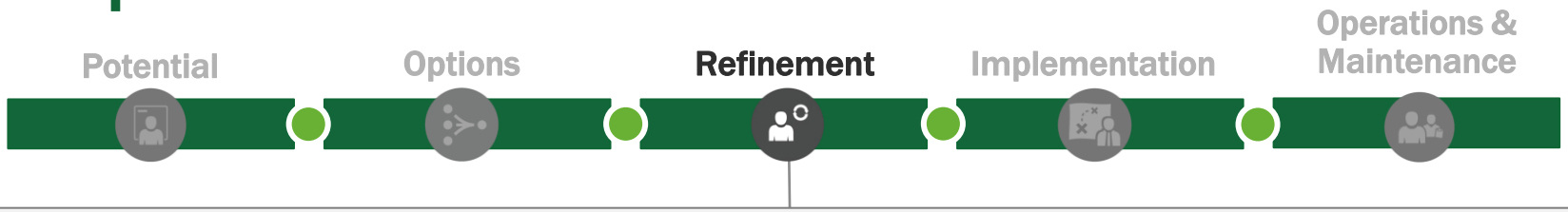
- Confirm or update initial assumptions for projects
- Identify project team (select partners)
- Complete necessary fundraising tasks required for financing and construction
- Confirm potential success, or eliminate project from further consideration

Step 3: Inputs



- Decision on resource type
- Decision on ownership structure
- Understanding the permit needs and process
- Narrowing of technology options

Step 3: Decisions



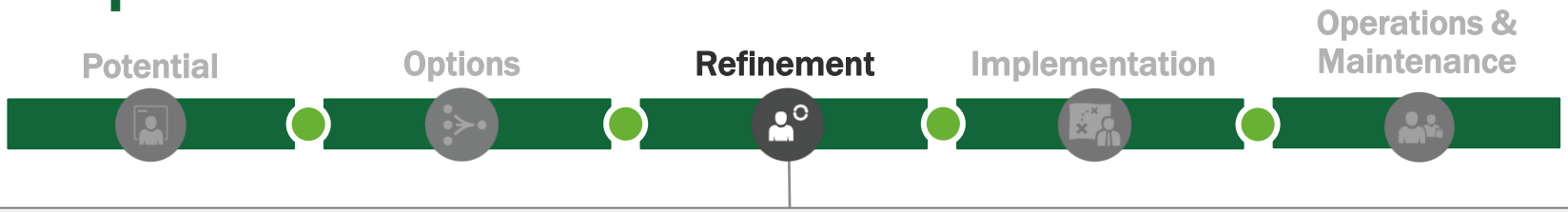
Major Decision: Start construction of project?

- Supporting Decisions and Actions
  - Project Team Identification
  - Vendor Identification/Procurement

Key Concept: Project Team

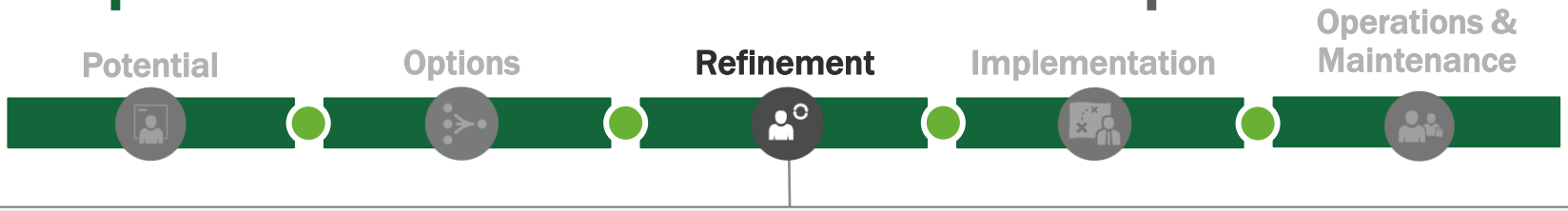
- Project team includes everyone in project development, construction, and operations
- Can include people involved in planning process

Step 3: Team Member Skills



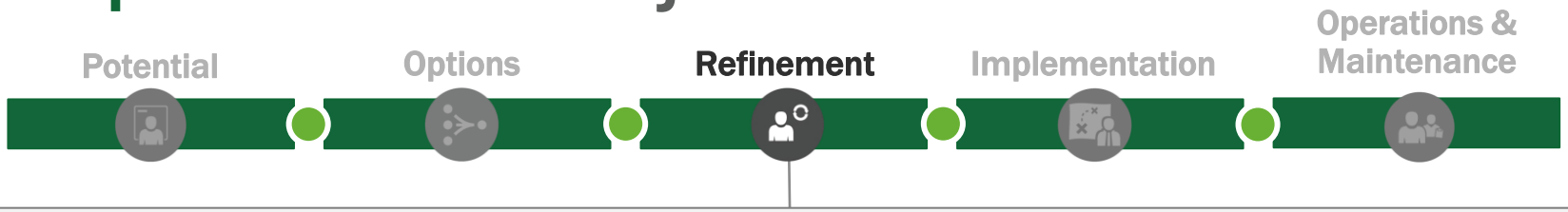
- Tribal Members
  - Leadership, staff, community members
  - Attorneys, engineers, professionals,
- Developer
  - Business managers, engineers, permitting specialists, investors, banks, attorneys, accountants, power marketers, procurement specialists, communications, public relations, government relations, corporate finance, project finance, construction managers, O&M specialists, asset managers, etc.
- Utility
  - Engineers, attorneys, planning specialists, operations specialists, regulatory specialists, finance, accounting, public relations, communications, systems operators, construction and field personnel, maintenance and emergency operations, etc.

Step 3: Revisit and Finalize All Aspects



- Timing
- Funding
- Site
- Technology
- Offtaker
- Interconnection
- Environmental reviews
- Permitting
- Financing
- Agreements

Step 3: Finalize Project Costs

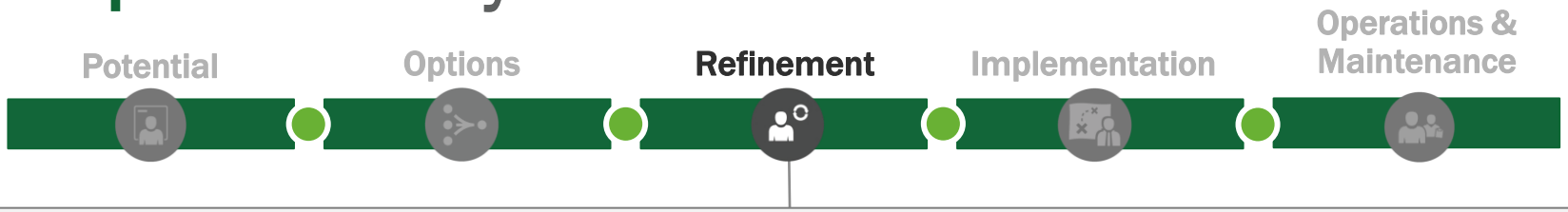


Technology Costs
- Solar equipment and construction
- PV Maintenance Service
- Monitoring in out years
- Inverter Warranty

Financing Costs
- Loan interest
- Initial operating expenses
- Payments

Development Costs
- Interconnection Studies
- Site Survey
- Legal Consulting (PPA)
- Geotechnical Study
- Financing Support
- Legal (Lease)
- Legal (financing)
- Environmental Studies

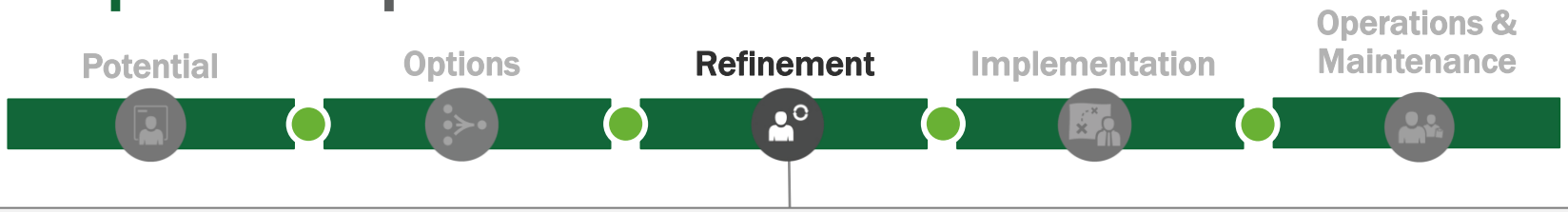
Step 3: Identify Vendors



Evaluation of vendors includes:

- System size
- First year output
- Derate factor
- Total costs of project
- Levelized cost of energy
- Fencing
- Site preparation
- Operations and maintenance plan
- Type of technology and other parts

Step 3: Outputs



- ✓ Proposed financing/commitments and organization structure
- ✓ Detailed economic models
- ✓ Vendors selected
- ✓ Completed environmental reviews and finalized permits
- ✓ Offtake and transmission/interconnection agreement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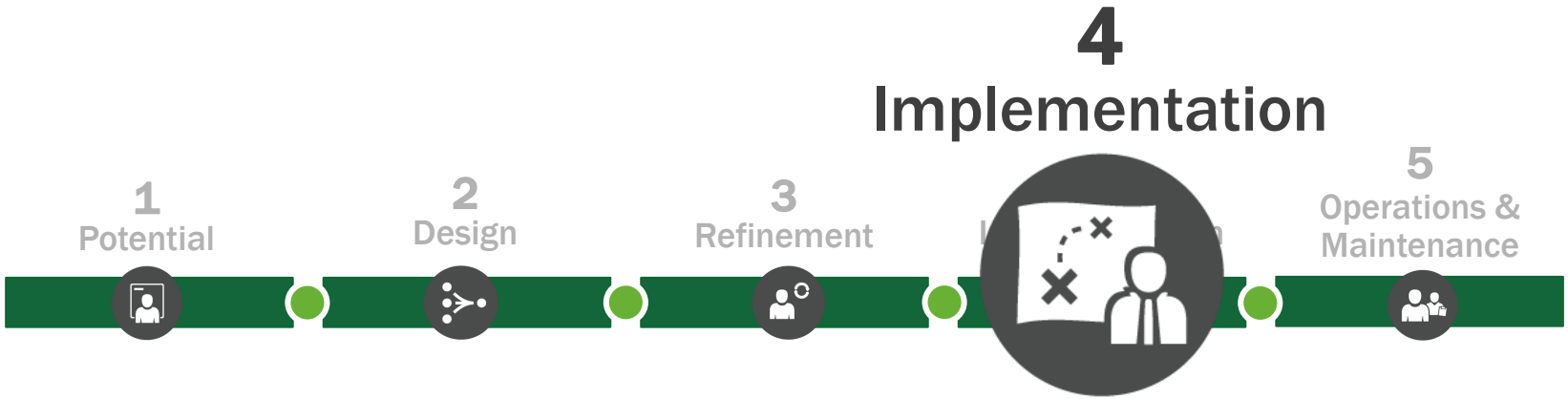
4
Implementation
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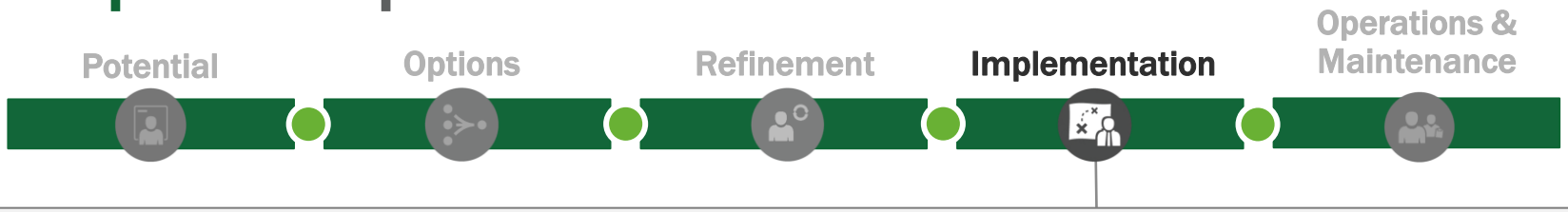
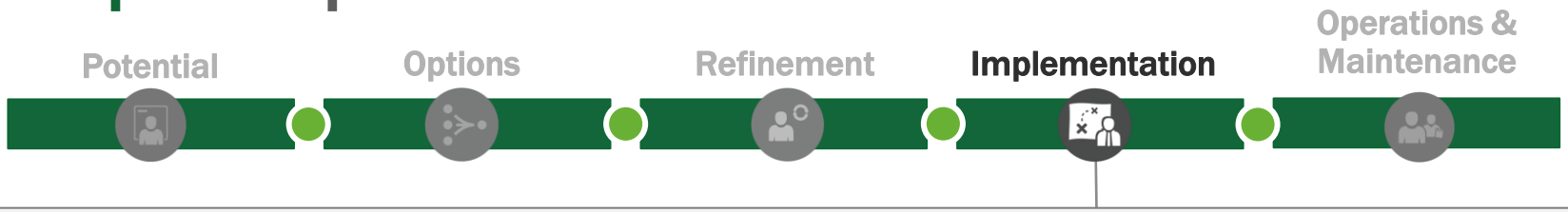
Step 4: Purpose



- Financial close
- Finalize project agreements in anticipation of financial close and construction
- Complete design
- Finalize vendor contracting process prior to construction
- Finalize design and complete pre-construction tasks
- Complete construction and equipment installation
- Complete interconnection
- Commission project leading to commercial operations

Step 4: Inputs



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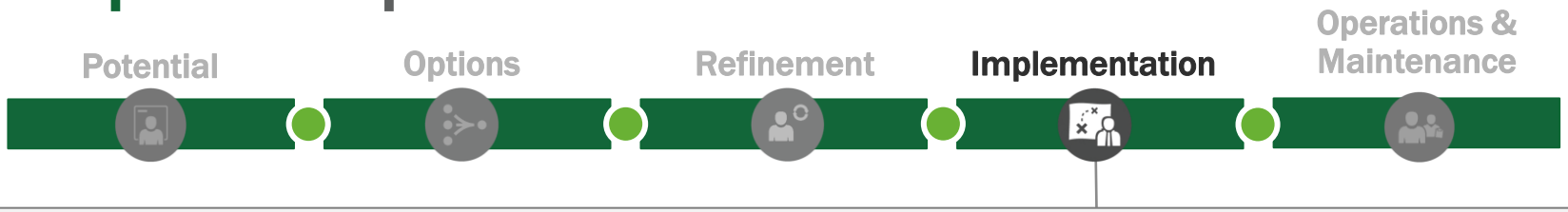
Step 4: Outputs



- ✓ Completed project (Commercial Operation)
- ✓ New ownership organization completed (if needed)

Photo by Dennis Schroeder, NREL/PIX 21512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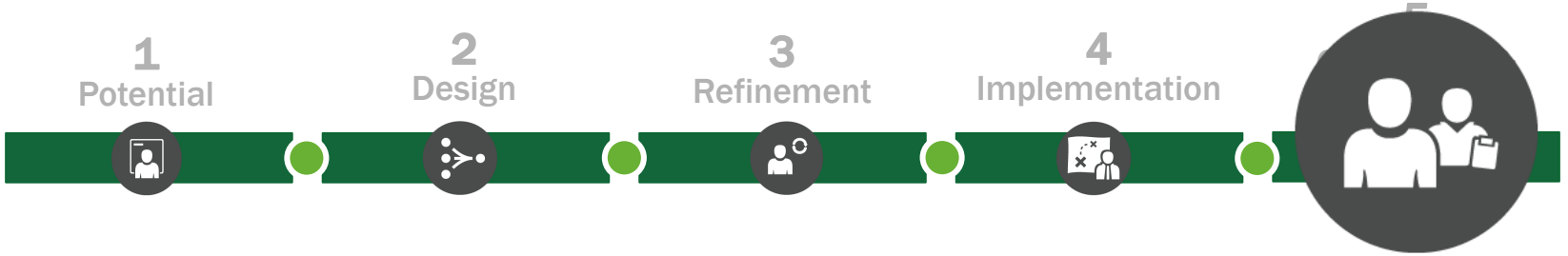
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Step 5: Operations and Maintenance

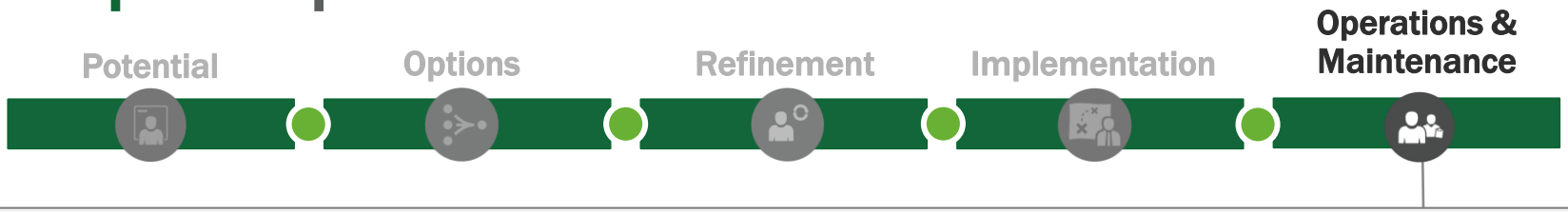
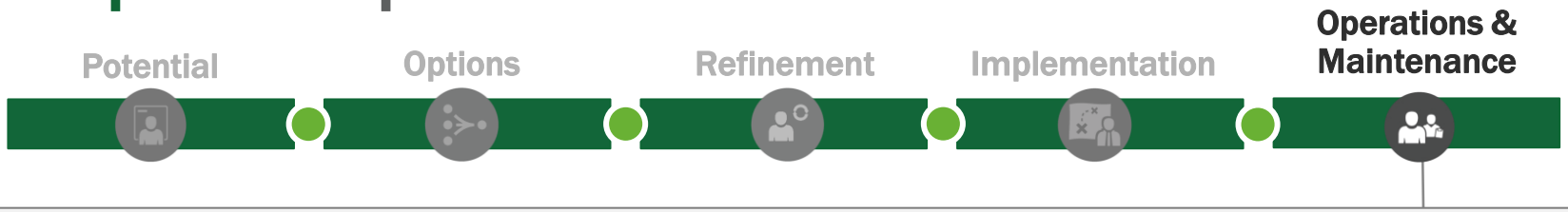


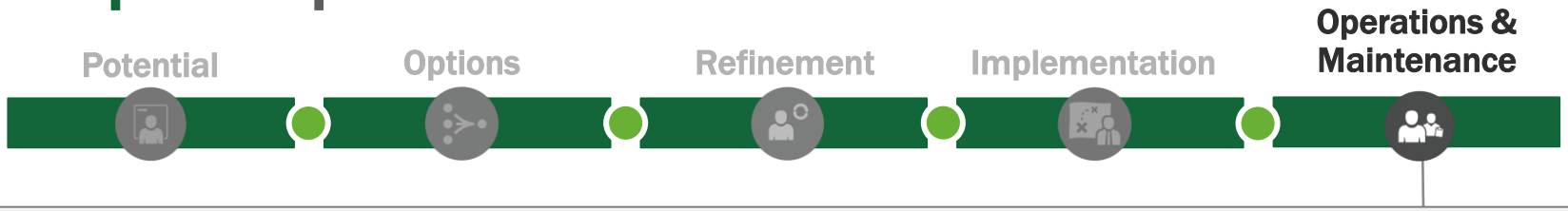
Photo by Dennis Schroeder, NREL/PIX 20340

Step 5: Purpose



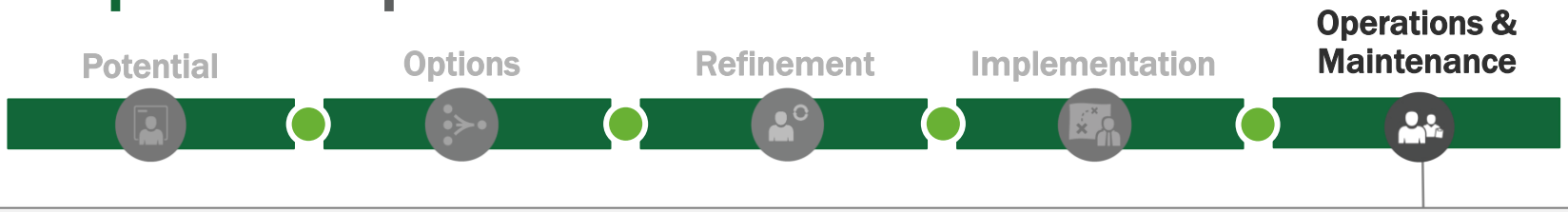
- Implement operations and maintenance plan (contract or self)

Step 5: Operations and Maintenance Costs



- Equipment maintenance and upkeep
- Inverter replacement
- Insurance
- Labor and staffing
- Extended warranty agreements

Step 5: Outputs



Maintenance Plan Implementation

Photo by NREL/PIX 14952

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, begin to identify offtakers, partners, vendors

Step 3: Finalize economic assumptions and roles, interconnection and offtake agreements, partnerships, ownership structure

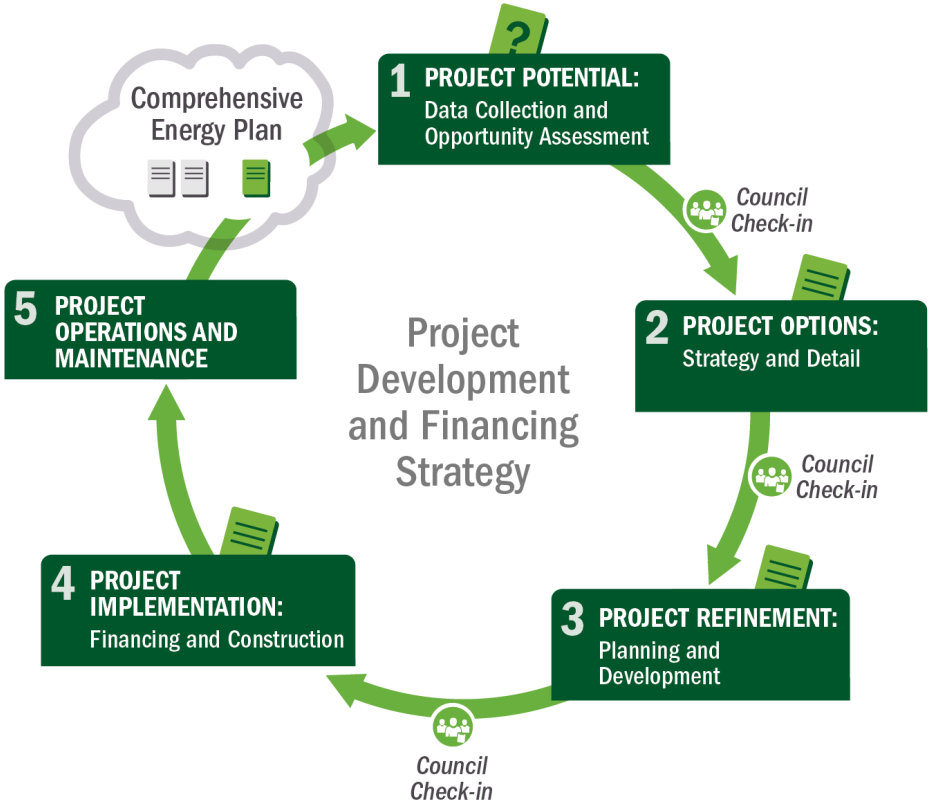
Step 4: Financial close and construction; vendor contracting completion; project commercially delivered

Step 5: Maintenance plan implementation

Celebrate!

Not quite done!

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

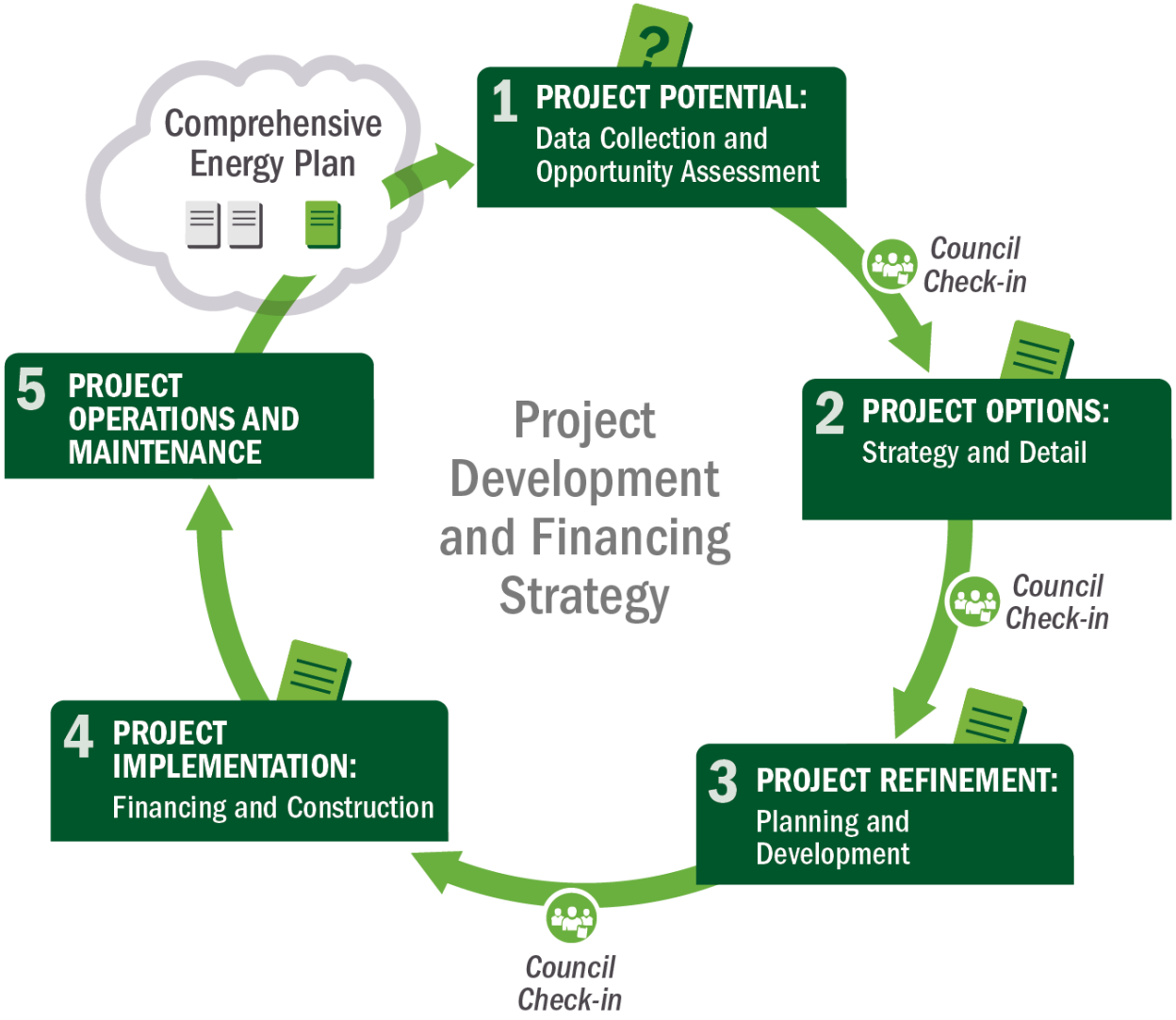


Key Concepts Review

- Risk and Uncertainty
- Levelized Cost of Energy (LCOE)
- Tax Equity Partnership
- Roles of the Tribe
- The Project Team

In-Depth information on each key concept available in Advanced Courses

Wrap Up: Project Development Process



These courses were designed in coordination with Tracey LeBeau and Pilar Thomas of the DOE Office of Indian Energy, by a team including Dan Beckley, Elizabeth Doris, Paul Schwabe, and Bob Springer of the National Renewable Energy Laboratory; Joe Cruz and Matt Ferguson of The Reznick Group; Paul Dearhouse of the Dearhouse Group; and Carolyn Stewart of Red Mountain Energy Partners.

Questions, Comments: indianenergy@hq.doe.gov

THANK YOU