DOE OFFICE OF INDIAN ENERGY

Renewable Energy Project Development and Financing: Commercial Scale

Detailed Hypothetical Example of How to Sell the Power and to Whom



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

Course Outline

What we will cover…

- About the DOE Office of Indian Energy Education Initiative

- Commercial-Scale Process: Hypothetical Example
  - Project development and financing **concepts**
  - Project development and financing **process and decision points**
  - Commercial project as an **investment**
  - **How to pay** for commercial project

- Additional Information and Resources

Introduction

The U.S. Department of Energy (DOE) Office of Indian Energy Policy and Programs is responsible for assisting Tribes with energy planning and development, infrastructure, energy costs, and electrification of Indian lands and homes.

As part of this commitment and on behalf of DOE, the Office of Indian Energy is leading ***education*** and ***capacity building*** efforts in Indian Country.

Training Program Objective and Approach

A specially designed curriculum was created to give tribal leaders and professionals background information in renewable energy development to:

- *Present foundational information on strategic energy planning, grid basics, and renewable energy technologies*
- *Break down the components of the project development process on the facility, commercial, and community scale*
- *Explain how the various financing structures can be practical for projects on tribal lands.*

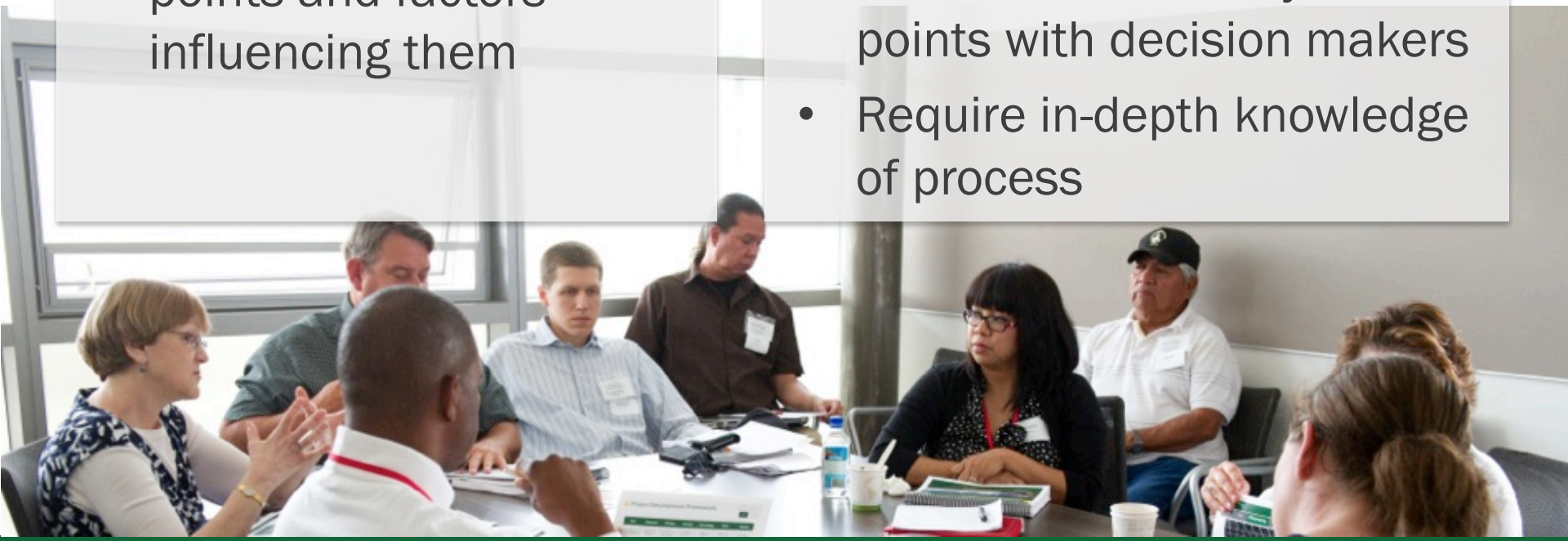
Course Audiences

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



How This Advanced/In-Depth Course Fits

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
Audience: Decision makers and project and contract managers

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 It 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

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

About the Speaker

Karlynn Cory

- Senior Analyst at the National Renewable Energy Laboratory (NREL)
- Creator of the Renewable Energy Project Finance Analysis team at NREL that identifies, analyzes, and communicates project financing innovations
- Nationally recognized tax and incentive policy expert with more than 17 years of experience on renewable policies and markets

Agenda

- Project development and financing *concepts* for a **commercial-scale** project
- Project development and financing *process and decision points* for a **commercial-scale** project
- Commercial project as an investment
- How to pay for a commercial project

PROJECT DEVELOPMENT AND FINANCING CONCEPTS: COMMERCIAL SCALE

Terminology: Project Scale

Facility

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

Community

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

Commercial

Definition: stand-alone project
Primary purpose: *sale of power generation, financial benefits*

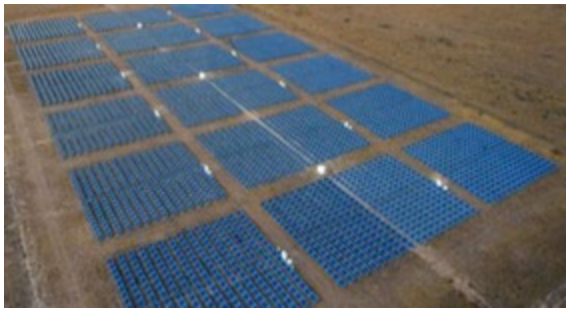


Photo credits: (top to bottom): NC Solar Center, NREL 09373; Orange County Convention Center, NREL 18077; Tucson Electric Power, NREL 13327

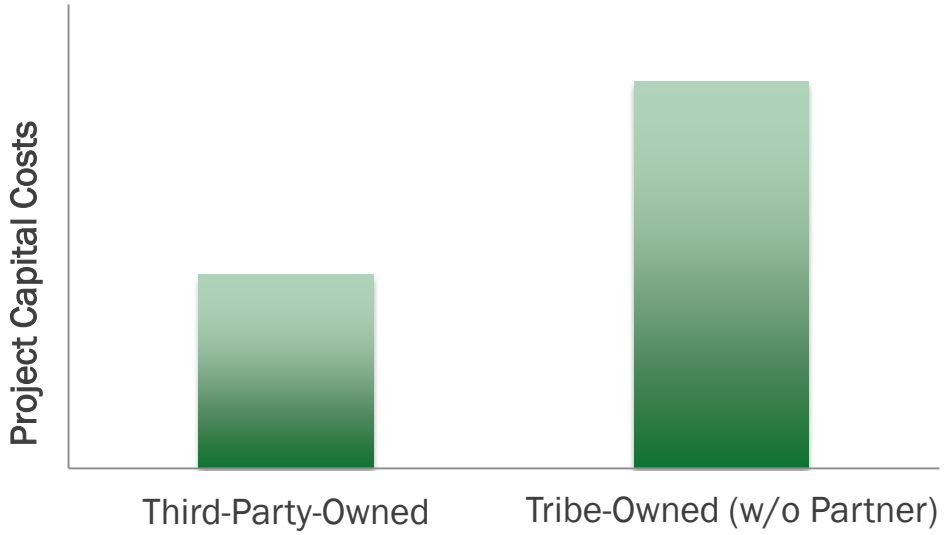
Why Elect to Do a Commercial-Scale Project?

- Available, Tribe-controlled, appropriate location
  - May/may not be Tribe-owned
- Tribe has significant capital in-hand
- Tribe has identified a potential off-taker that will buy the power and renewable energy credits (RECs)
- Tribe wants to get into renewable project development *for more than one project* (higher risk/ higher return)
- Job development (construction and maintenance)
- Diversify energy supply with local, renewable sources

Photo by Dennis Schroeder, NREL 20097

So Why Seek a Tax-Equity Finance Partner?

- Tax incentives (MACRS and either PTC or ITC) can represent up to half the project value or reduce project's capital costs by ~50%



- Tax incentives can help to achieve a competitive price of power
- Many projects also require state-level incentives to be economic

Project Scale Decision Factors

	Facility	Community	Commercial
Definition	Project serves one tribal facility/building	Project serves more than one tribal facility/building	Project power is sold to a third-party off-taker
Value Proposition	Save $$, reduce electricity cost, energy independence	Save $$, reduce electricity cost, energy independence	Sale of power at competitive market terms whereby Tribe benefits
Tribe's Success Measurement	Cost avoidance	Cost avoidance	Revenue
LCOE Comparison	Retail electricity price	Retail electricity price	Wholesale electricity price
Key Decision Point	Savings/security of supply	Savings/security of supply	Revenue streams

The Competitive Power Business

Role: Independent power producer (IPP)/non-utility generator (NUG)

Commercial-scale: Long-term, revenue-generating facility on tribal land that sells power to one or more utilities

Rewards: Typical Goals

- Generate revenue for Tribe
- Job creation (construction, O&M)
- Available, Tribe-controlled location
  - May/may not be Tribe-owned
- Found interested party to off-take/purchase power
- Have enough capital for a large-scale project
- Environmental sustainability
- Self-sufficiency, pride

Challenges

- Capital intense
- Development risk and time
- Involves external players
- Combination of market forces

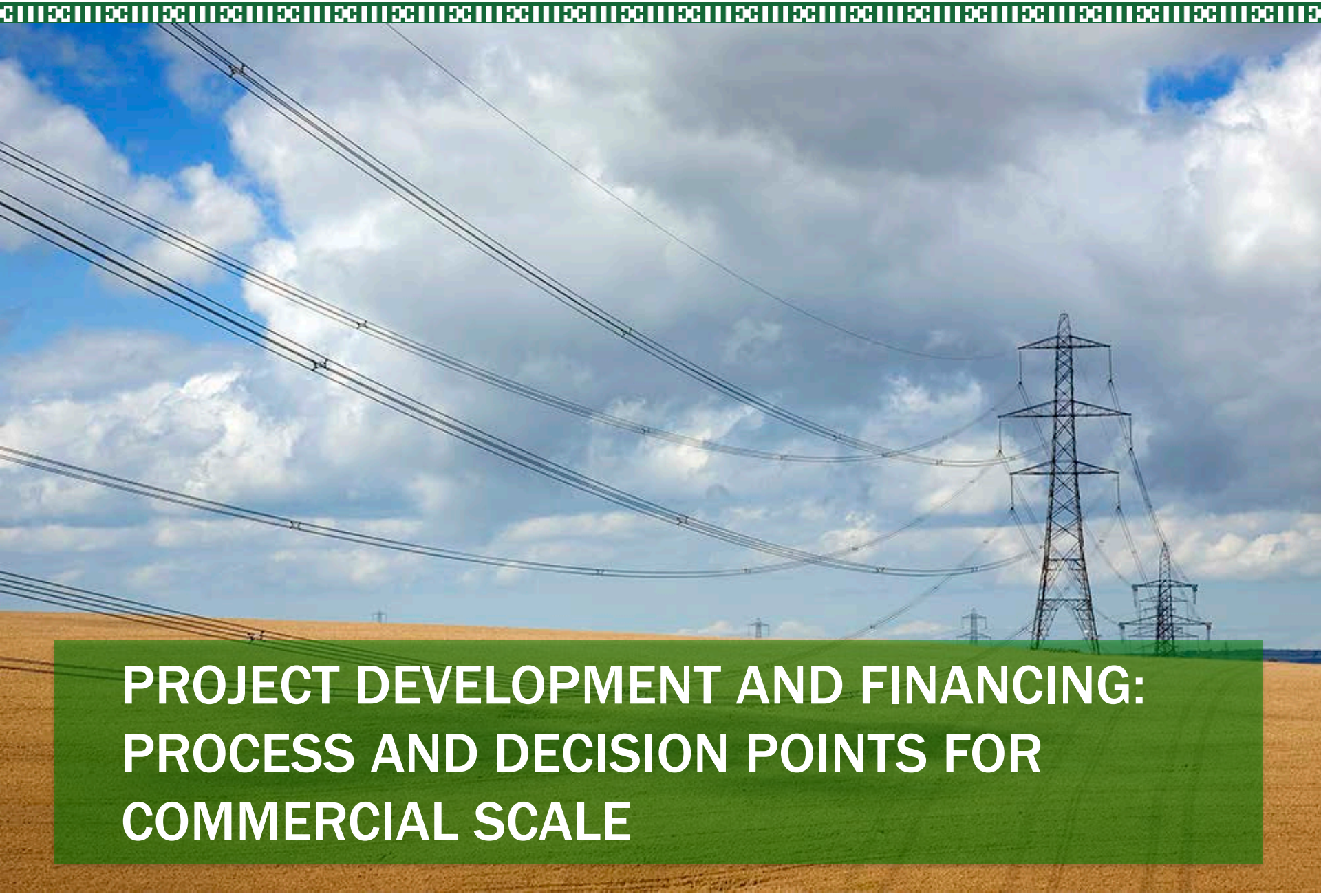
A commercial project is dependent upon market forces. The project needs to be competitive with non-tribal projects and/or provide a clear differentiator.

See *Tribal Business Structure Handbook* www.irs.gov/pub/irs-tege/tribal_business_structure_handbook.pdf

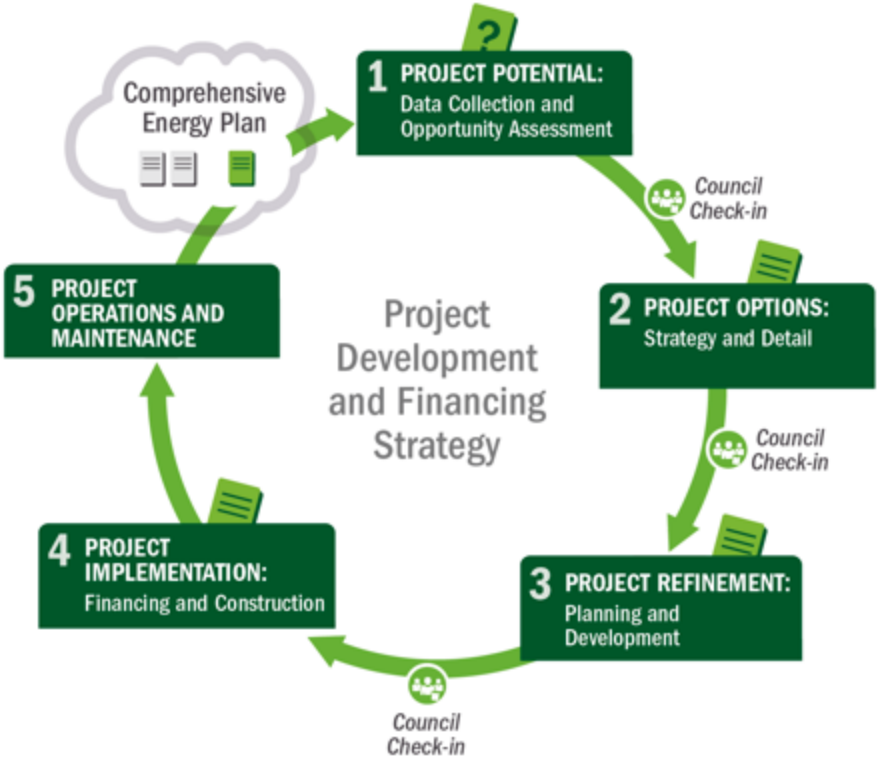
Key Concepts Throughout Steps

- Risk and Uncertainty
- LCOE
- Tax-Equity Partnership
- Roles of the Tribe
- The Project Team

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



PROJECT DEVELOPMENT AND FINANCING: PROCESS AND DECISION POINTS FOR COMMERCIAL SCALE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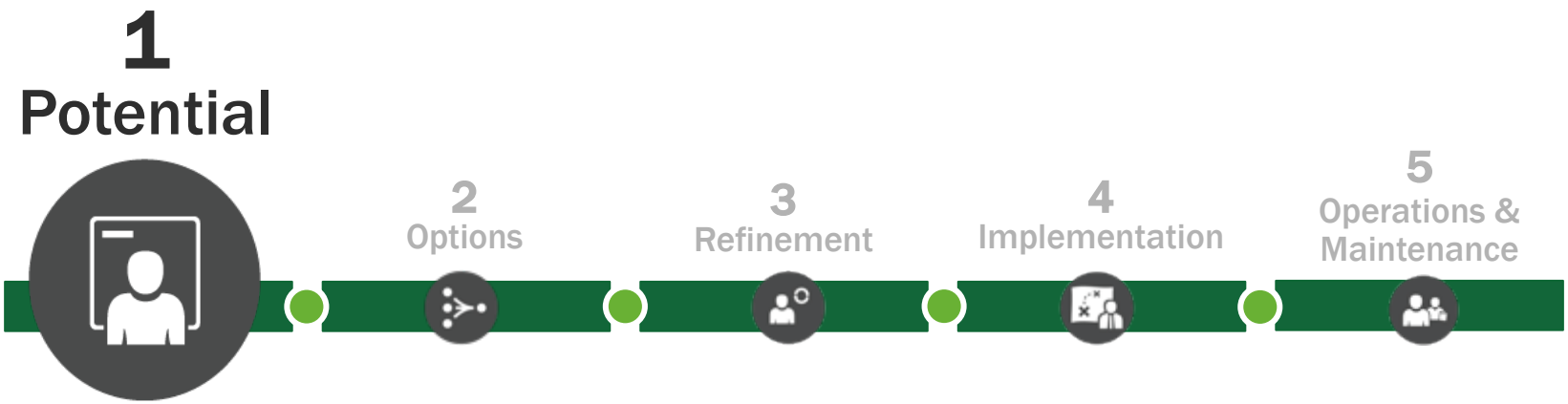
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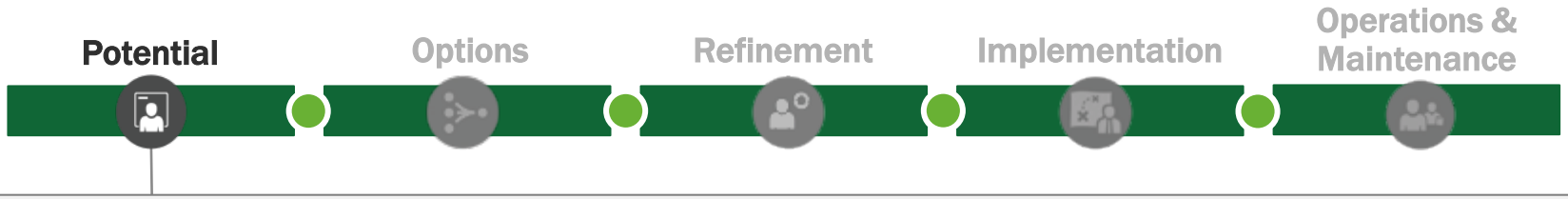
Step 1: Site, Scale, Resource and Market Potential



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

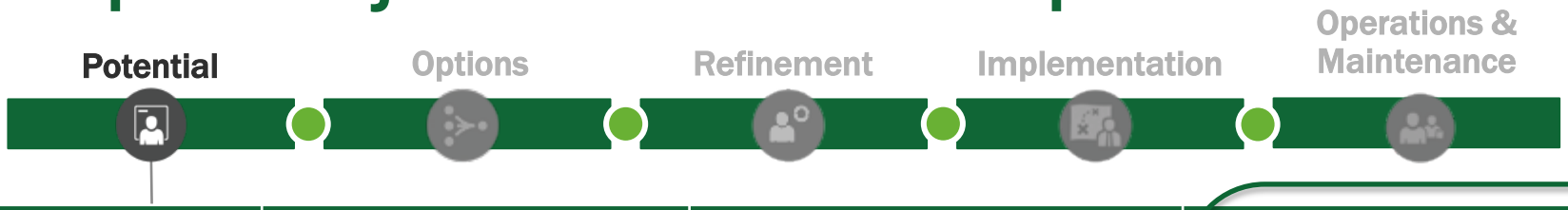
Tasks:

- Identify possible **sites** for project locations
- Confirm renewable energy **resource**
- Review Tribal facility electric cost data, regulations, and transmission and interconnection requirements
- Evaluate potential **markets and paths** for renewable sales; identify potential partners/**off-takers** to sell the project's power
- Assemble or communicate with the right team, those in positions or with knowledge to facilitate, approve, champion the project

→ Analyze risks: financing, permitting, construction costs

→ Analyze utility rules: interconnection and transmission

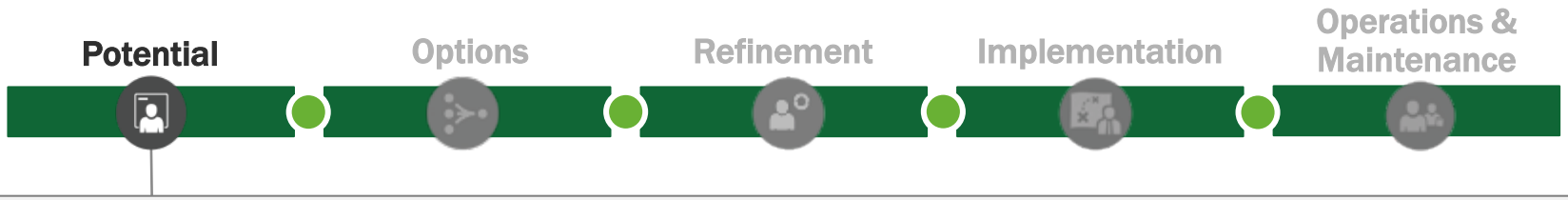
Step 1: Project Potential Example



	Facility: California	Community: Minnesota	Commercial: Arizona
Baseline	Solar for peak demand! Solid San Diego market	Large facility (e.g., casino) or many small buildings	Resource size vs. market size
Economics	High cost/kWh Time of use Com, Res: ~16¢/kWh	Mid cost/kWh Retail Ind., Com, Res: 6.5¢–11.0¢/kWh *(Wholesale: 3.75¢/kWh)*	Low cost/kWh Wholesale: 3.54¢/kWh *(if BTM, retail Ind, Com: 6.6¢-9.5¢/kWh)*
Policy	RPS: 33% (2020 GAP) Net metering (1 MW) Feed-in tariff: 1–3 MW CA Solar Initiative	RPS: 25% by 2025 No transmission needed *(Net metering <40 kW)*	Gap meeting 15% RPS *Net metering (no limit; only if selling behind the meter [BTM])*
Technology	Solar resource rich; solar dominates Southern CA	Wind resource rich; not nearly as much solar	Solar (photovoltaic [PV] or concentrating PV) strong, commercial
Consensus	Given facts, should Tribe pursue?	Given facts, should Tribe pursue?	Given facts, should Tribe pursue?

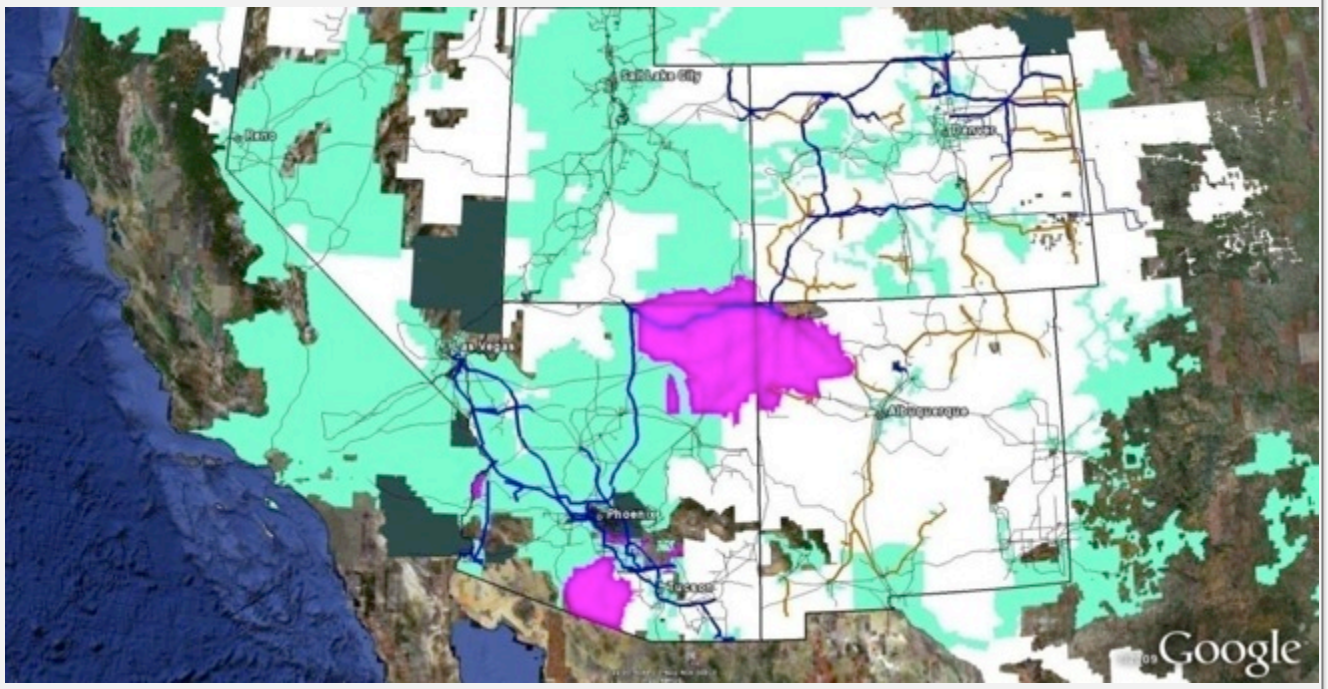
Framework: NREL BEPTC™
Information sourced from Thomas, Pilar; "Briefing the Senate Natural Resources Committee and Senate Indian Affairs Committee," May 18, 2012. And 2011 retail and wholesale rates: Energy Information Administration

Step 1: Site and Project Potential Buyer



Identify and begin discussions with potential power purchasers in Arizona:

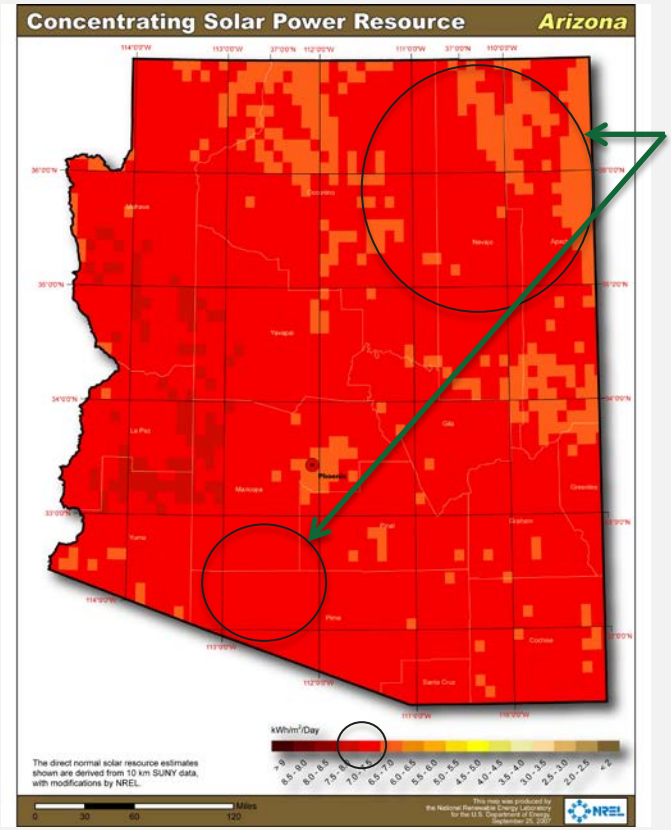
- Navopache Electric Cooperative (NEC)
- Salt River Project (SRP)
- Arizona Public Service (APS)
- Tucson Electric Power
- Navajo Tribal Utility Authority (NTUA)



MAP KEY					
WAPA TRANSMISSION, IN-SEVICE		TSGT TRANSMISSION, PROPOSED		IOU UTILIITY SERVICE AREA	
WAPA TRANSMISSION, PROPOSED		TRIBAL UTILITY SERVICE AREA		STATE/MUNICIPAL UTILITIY SERVICE AREA	
TSGT TRANSMISSION, IN-SERVICE		COOPERATIVE UTILITY SERVICE AREA			

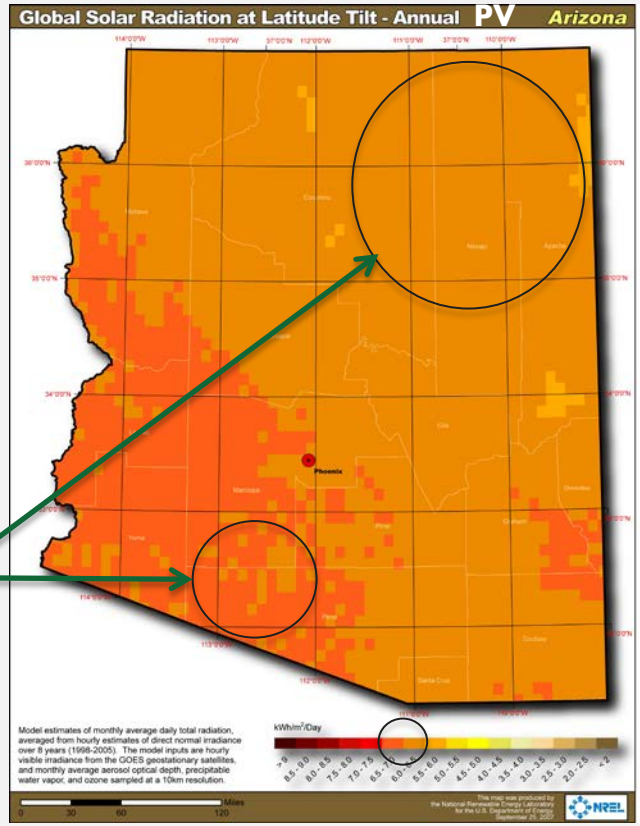
Step 1: Resource

Potential | Options | Refinement | Implementation | Operations & Maintenance



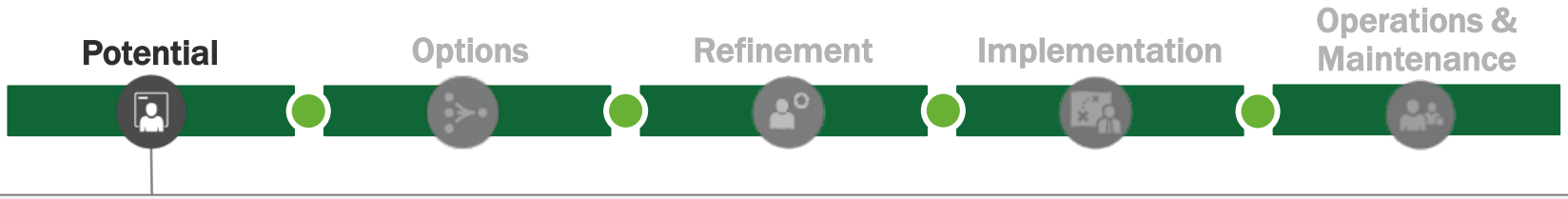
7–8 kWh/m^2/day is excellent!

6–7 kWh/m^2/day is good!



http://www.nrel.gov/gis/mapstore/

Step 1: Off-take, Production, Savings



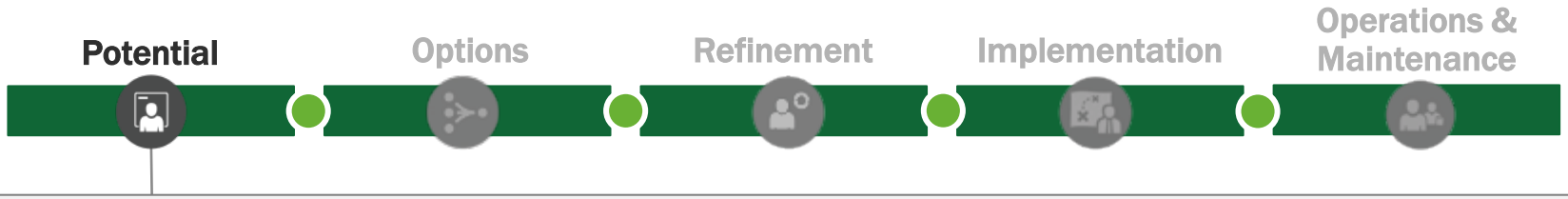
Project – 21.5 MW PV plant in southern Arizona or 20 MW CSP in southwest Arizona

Off-taker – A utility, most likely (competing with 3.54¢/kWh wholesale rate)

Production and Cost:

- Use NREL's System Advisor Model (SAM) for production and cost estimates depending on whether third-party owned or Tribe-owned:
  - PV: 37.7 million kWh/yr; third party: 2 ¢/kWh Tribe: ~5 ¢/kWh
  - CSP: 59.2 million kWh/yr; third party: 14.2 ¢/kWh Tribe: 20.7 ¢/kWh
- Based on lower cost and better access to capital/lower risk, choose PV over CSP

Step 1: Hypothetical Commercial Example – Outputs



- ✓ **Technology** – solar PV, at this scale and location
- ✓ **Project scale** – commercial/utility-scale (21.5 MW)
- ✓ **Resource and market context** – gap meeting RPS in Arizona
- ✓ **Production potential** – 37.7 million kWh/yr
- ✓ **Preliminary sites options** – Tribe's land, federal land, or I act as developer on another's land
- ✓ **Team** – assume tribal leaders are in favor, support, and champion the project and are preparing to do more projects in the future
- ✓ **Tribal role options** – own or partner with tax-equity investor

Commercial-Scale Project Risks – Post Step 1

	Risks	Risk Assessment Post Step 1
Development	• Poor or no renewable energy resource assessment • Not identifying all possible costs • Unrealistic estimation of all costs • Community push-back and competing land use	Screened good sites Reduced Reduced Reduced
Site	• Site access and right of way • Not in my backyard (NIMBY)/build absolutely nothing anywhere (BANANA) • Transmission constraints/siting new transmission	Unchanged; Critical to have site control and community support
Permitting	• Tribe-adopted codes and permitting requirements • Utility interconnection requirements • Interconnection may require new transmission, possible NEPA	Reduced Reduced High risk, reduced
Finance	• Capital availability • Incentive availability risk • Credit-worthy purchaser of generated energy	High risk, unchanged Reduced Unchanged
Construction/ Completion	• Engineering, procurement, and construction (EPC) difficulties • Cost overruns • Schedule	Assumed low, mitigable, or allocatable
Operating	• Output shortfall from expected • Technology O&M • Maintaining transmission access and possible curtailment	Assumed low, mitigable, or allocatable

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

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


Comprehensive Energy Plan
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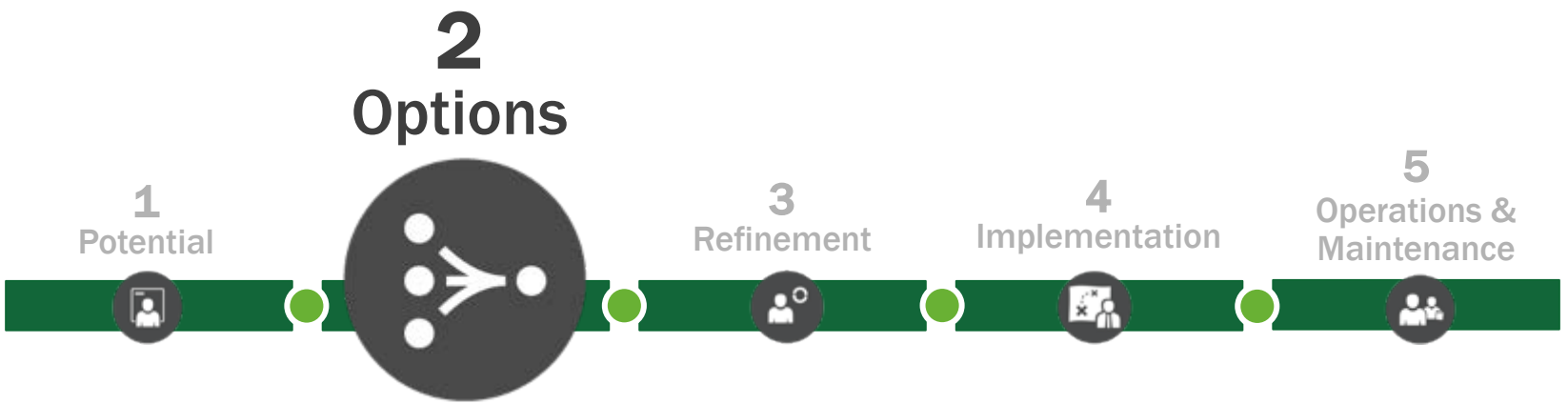
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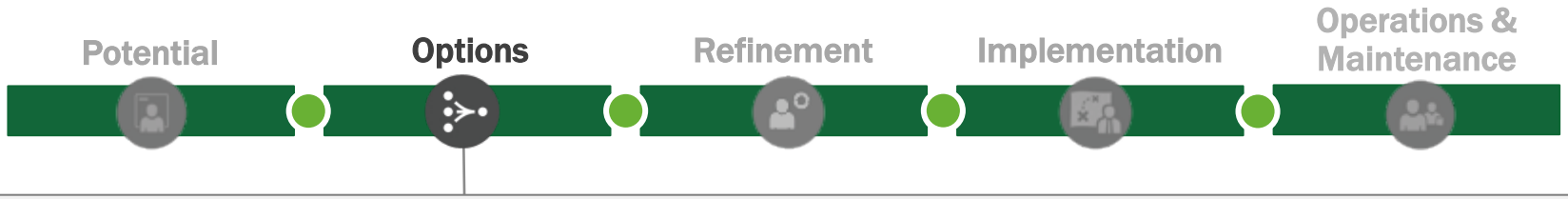
Step 2: Project Ownership and Regulatory Options



Purpose: Determine ownership structure and determine permitting considerations

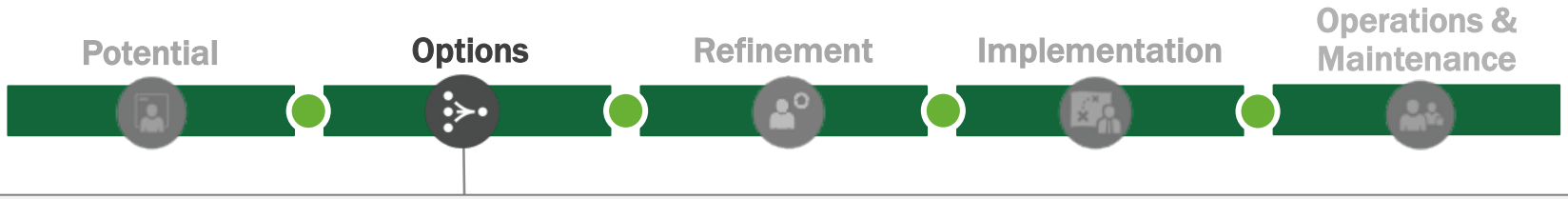
Tasks:

- Identify final resource and project location
- Understand ownership structure/tribal role and risk allocations
- Narrow financing options
  - Clarify tax-equity structure
- Initiate EPC procurement process
- Understand and plan for permitting, interconnection (and transmission)

Resources:

DOE Office of Indian Energy renewable energy technology-specific webinars: http://www.energy.gov/indianenergy/resources/education-and-training.

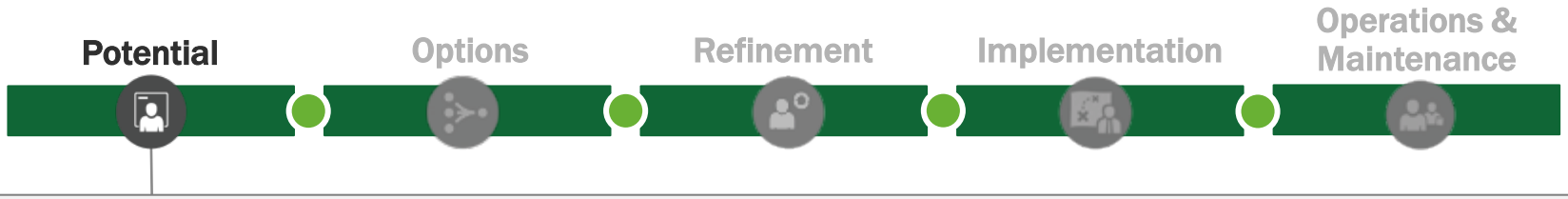
Step 2: Ownership Structure Options



- Direct ownership
- Third-party power purchase agreement (PPA)
  - Containing a traditional land lease/royalty structure
- Equity investment partnering
  - Partnership flip
  - Sale leaseback
  - Inverted lease/lease pass-through

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

Step 2: Paying for Project



Three Major Costs to Develop a Project:

1. **Feasibility** – this is the potential analysis
2. **Preconstruction** – permitting, environmental, site control (lease agreement)
3. **Construction** – engineering, procurement of equipment, and actual construction of plant

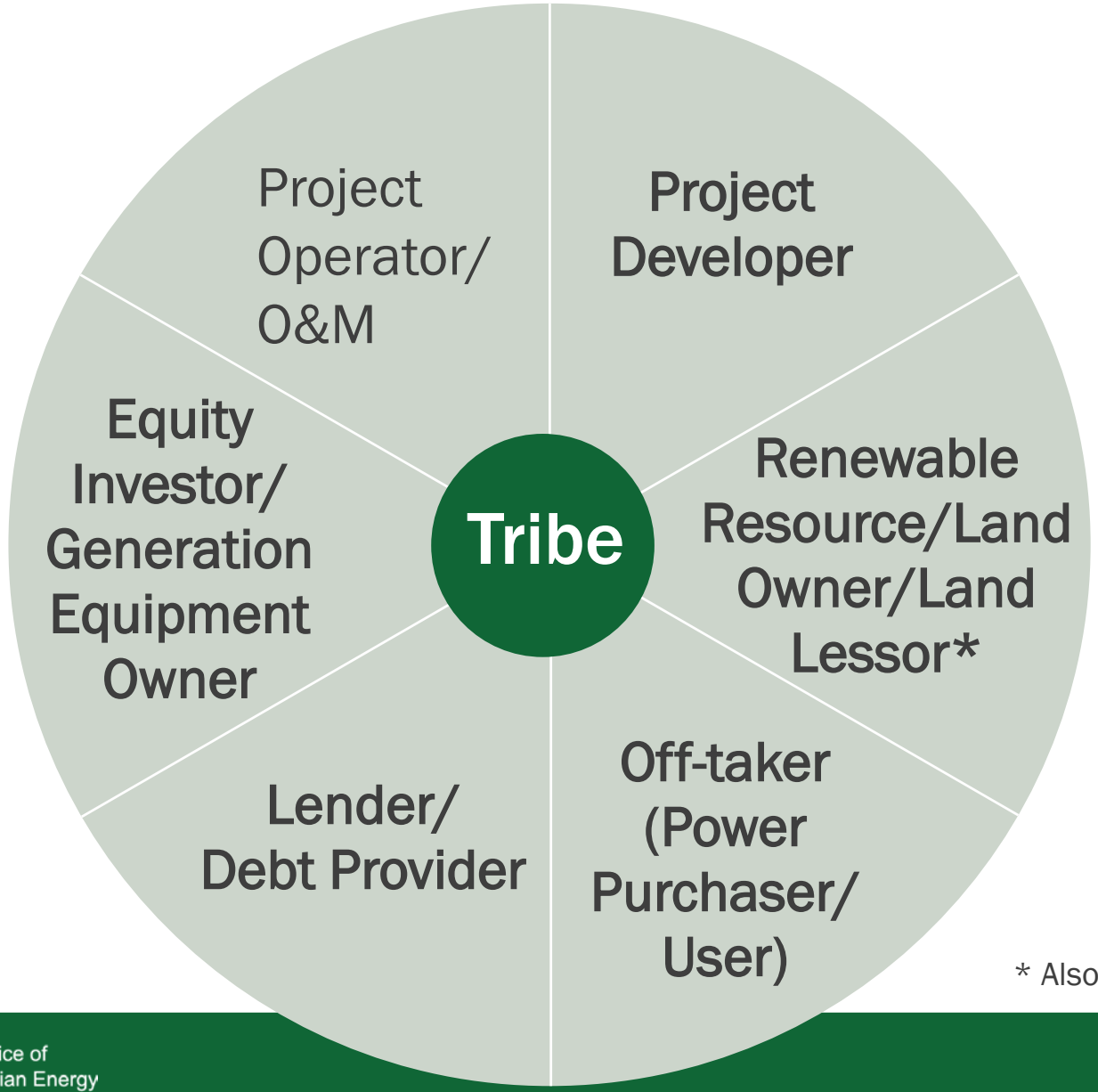
Project Capital Contributions for Each Project Development Step

1. Potential	2. Options	3. Refinement	4. Implementation	5. O&M
Equity	Equity	Equity	Equity	Equity
			Tax equity	Tax equity
		Debt	Debt	Debt
		Vendor financing		

Key Concept: Project Role Definitions

Title	Role
Project Company	Legal entity that owns the project, also called special purpose entity
Resource/Landowner	Legal and/or beneficial owner of land and natural resources
Sponsor/Developer	Organizes all of the other parties and typically controls project development and makes an equity investment in the company or other entity that owns the project
EPC Contractor	Construction contractor provides design, engineering, and construction of the project
Operator	Provides the day-to-day O&M of the project
Feedstock Supplier	Provides 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 Off-taker	Generally enters into a long-term agreement with the project company for the purchase of all the energy
Lender	A single financial institution or a group of financial institutions that provides a loan to the project company to develop and construct the project and that takes a security interest in all of the project assets
Tribal Host	Primary sovereign of project site

Key Concept: Tribal Role Options



* Also called Tribal Host

Key Concept: Tribal Role Options

Role	Opportunity	Constraints	Comments
Resource/ Land Owner	Land rent/royalty, taxes. Low risk, known reward, consistent (small) income.	Limited project control. Must provide site access.	Limited upside potential, limited risk
Off-taker/ Energy User	Only pay if project becomes operational; security.	Only available to Tribes that own utility providers.	Still requires utility interconnection agreement. Med risk.
Project Operator/ O&M	Control and self-determination of project; potential for profits (and losses) is minimal	• Investors require experience • Only consider as a new business (act as operator for multiple projects in a portfolio)	• High risk, complex • Tribes may be best served by outsourcing
Lender/ Debt Provider	Help finance a project (e.g., cash or New Market Tax Credit (NMTC), or Qualified Energy Conservation Bonds (QECBs)) with lower risk	• Requires ready capital • May be cost-prohibitive to document-and manage a single debt transaction (multiple more cost-effective)	• Med-risk, more complex • Requires lending knowledge • Option for Tribes with limited lands, lots of $
Equity Investor/ Gen. Owner	Provide cash, NMTC or QECB for project development.	Higher risk than debt lending. Requires ready capital, or unique source of capital that provides market advantage (like NMTC).	• High risk, more complex • Competes with other investments • Option for Tribes with limited lands, lots of $
Project Developer	Self-determination of project; potential for profits (and losses) is highest. Tribes with cash on hand don't need investors, but could still consider engaging tax equity partners.	• Investors require experience • Only consider as a new business (act as developer for multiple projects in a diverse portfolio) • Tribes investing money may not want this high risk/return investment	• High risk, complex • Tribes may be best served by outsourcing • A project pipeline/portfolio mitigates some risks

Key Concept: Tax-Equity Partnership – Federal Tax Incentives

Internal Revenue Code

- Production Tax Credit (PTC); payment based on kWh produced
  - 10-year, 2.3¢/kWh for wind, geothermal, and closed-loop biomass technologies
  - "Start construction" before 1/1/2014
- Investment Tax Credit (ITC); payment based on % of up-front cost
  - One-time 30% or 10% tax credit (depending on technology) of eligible tax basis
  - "Placed in service" before 1/1/2017

→ Geothermal eligible for PTC and ITC; can only take one of them

- Cost recovery of plant through depreciation deductions
  - Often called "accelerated depreciation"
  - Officially called Modified Accelerated Cost Recovery System (MACRS)

→ Need to pay taxes and have enough of the right kind of tax liability to use federal tax incentives

March 8, 2013 IRS Private Letter Ruling – 111532-11

- An Indian tribal government is not considered a "governmental unit" or "tax-exempt organization" for purposes of renewable energy tax subsidies
- This presumably could permit tribal governments to enter into any one of the three tax-equity financing structures ***without*** jeopardizing access and use of federal tax incentives (***potentially BIG change***)
- Yet to be executed in the market; perhaps only applicable to the Tribe that applied; it would be wise to seek legal counsel

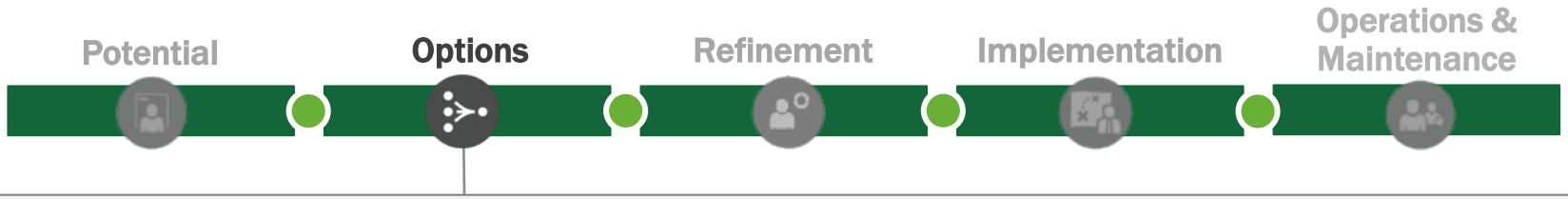
IRS Private Letter Ruling (PLR): http://www.irs.gov/pub/irs-wd/1310001.pdf

Potential tribal implications: http://www.lexology.com/library/detail.aspx?g=2e3eaf47-4fa7-4318-8dff-6ddda49baa56

Key Concept: Tax-Equity Partnerships

- Tribe can benefit from tax-equity incentives without being taxable
- Tribes can partner with third-party tax investors and/or developers to gain this incentive/advantage
  - Recent IRS PLR supports tribal partnerships with third-party tax equity
  - Even with IRS ruling, the Tribe needs capital to build a large renewable project
- Tax incentives (MACRS and either PTC or ITC) can represent up to half the project value, or reduce project's capital costs by ~50%
- Tribe benefits by offering a more competitive price for energy and RECs from the project to a utility

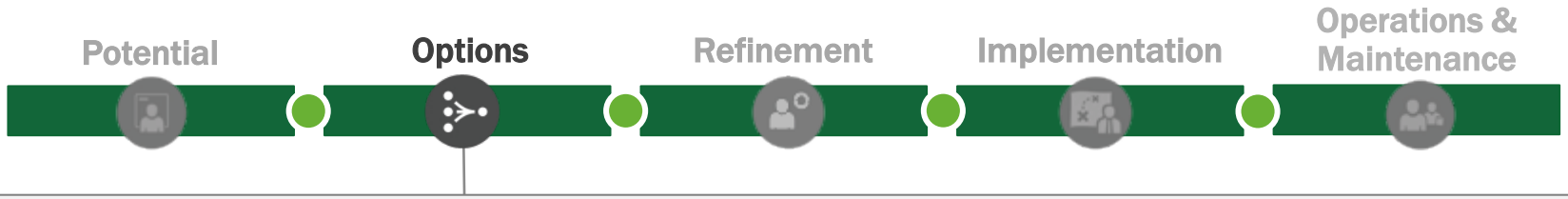
Step 2: Project Options and Strategies



Financial Capital Sources

- Financing structure is highly dependent on capital used for a given project:
  - **Tribal capital:** Tribal investment ($$$) to purchase project equipment
  - **Tribe-private sector capital sharing:** Tribe contributes some resources ($) and partners with third-party capital to leverage tax equity ($$)
  - **Non-Tribe capital:** Developer equity, tax equity, bank debt. Tribe participates in other ways.
- Responsibility to generate capital, collect revenues, and monitor returns will vary according to project structure
- If all framework elements are fully developed and meet market conditions, the project is ready to attract capital

Step 2: Hypothetical Commercial Example – Outputs



- ✓ **Finalize resource type**–AZ 21.5 MW AZ solar; collect bankable data
- ✓ **Determine tribal role** – owns land; some capital; will hire developer
- ✓ **Off-take** - Utility is willing to buy the power and RECs
- ✓ **Initial financing options identified**, want to consider role for tax-equity investment partner
- ✓ **Procurement process initiated –** RFP written for the EPC
- ✓ **Permit needs and process –** understand for all jurisdictions (city, county, AZ permits understood)
- ✓ **Utility interconnection, transmission –** process initiated

Commercial-Scale Project Risks – Post Step 2

	Risks	Risk Assessment Post Step 2
Development	• Poor or no renewable energy resource assessment • Not identifying all possible costs • Unrealistic estimation of all costs • Community push-back and competing land use	Finalized resource Reduced Reduced Reduced
Site	• Site access and right of way • Not in my backyard (NIMBY)/build absolutely nothing anywhere (BANANA) • Transmission constraints/siting new transmission	Reduced Reduced Reduced
Permitting	• Tribe-adopted codes and permitting requirements • Utility interconnection requirements • Interconnection may require new transmission, possible NEPA	Reduced Reduced High risk, reduced
Finance	• Capital availability • Incentive availability risk • Credit-worthy purchaser of generated energy	High risk, reduced Reduced Reduced
Construction/ Completion	• EPC difficulties • Cost overruns • Schedule	Low; allocate to EPC or developer
Operating	• Output shortfall from expected • Technology O&M • Maintaining transmission access and possible curtailment	Assumed low, mitigable, or allocatable

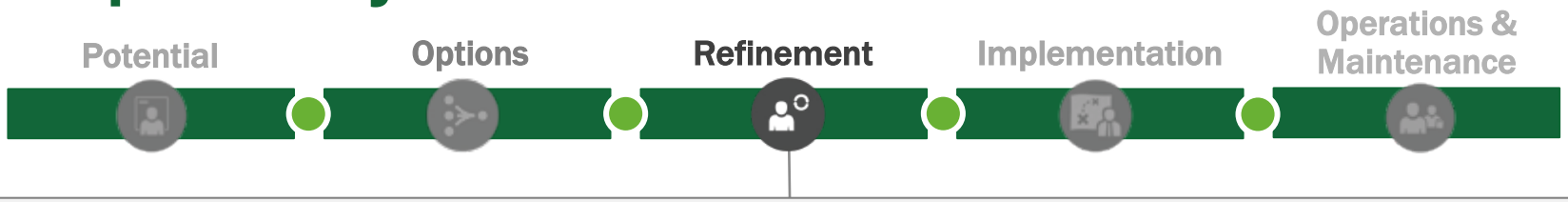
Sources: Adapted from Holland & Hart, RE Project Development & Finance & Infocast, Advanced RE Project Finance & Analysis

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


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


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

Step 3: Project Refinement



Purpose: Validate decisions and finalize project structure

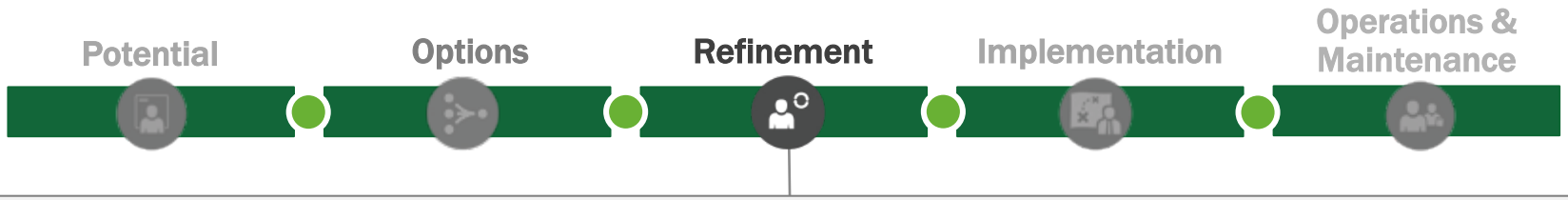
Tasks:

- Finalize ownership structure and project team identification
- Finalize permitting (including environmental reviews), interconnection
- Finalize technology, financing, and development costs

Outputs:

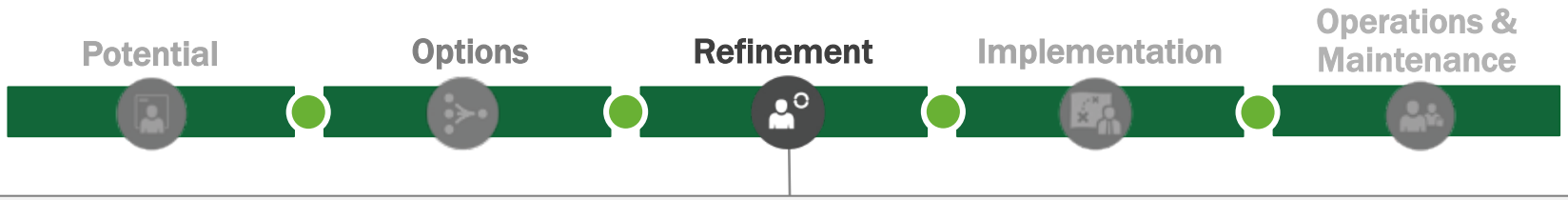
- Proposed financing/commitments and organization structure
- Detailed economic models
- Vendors selected
- Completed environmental reviews and finalized permits
- Off-take and interconnection agreement
- Transmission finalized, if necessary

Step 3: Project Refinement: Outstanding Risks



Site	Resource	Off-Take	Permits	Technology	Team	Capital
Securing site: No site, no project	Engineering assessment (input)	Power purchases: off-take contract – (revenue)	Anything that can stop a project if not in place…	Engineered system (output)	Professional, experienced, diverse	**Financing structure**
• Site control • Size and shape • Location to load and T&D • Long-term control • Financial control • Clear title • Lease terms • Collateral concerns • Environmental • Access • O&M access • Upgradable	• Volume/ Frequency • Variability • Charac-teristics (power/speed) • 24-hour profile • Monthly, seasonal, and annual variability • Weather dependence • Data history • Std. deviation • Technology suitability	• Credit of counterparty • Length of contract • Terms and conditions • Reps and warranties • Assignment • Curtailment • Interconnection • Performance • Enforcement • Take or pay • Pricing and terms	• Permitting/ entitlements • Land disturbance • Environmental and cultural impacts • Resource assessments • Wildlife impacts • Habitat • NEPA, EIS • Utility inter-connection • Other utility or PUC approvals • Lease and/or ROW approvals	• Engineering design plans • Construction plans • Not generic solar panel and inverter • Engineered resource/ conversion technology/ balance of system designs • Specifications • Bid set	• Business management • Technical expertise • Legal expertise • Financial expertise (including tax) • Transmission interconnection expertise • Construction/ contract management • Operations • Power marketing/sales	• Development equity • Project equity • Nonrecourse project debt • Mezzanine or bridge facility • Tax equity • Grants, rebates, other incentives • Environ-mental attribute sales contracts (RECs) • Bond finance

Step 3: Project Refinement: Risks Addressed



Site	Resource	Off-Take	Permits	Technology	Team	Capital
Securing site: No site, no project	Engineering assessment (input)	Power purchases: off-take contract – (revenue)	Anything that can stop a project if not in place…	Engineered system (output)	Professional, experienced, diverse	**Financing structure**
Site secured (likely tribal) for commercial-scale solar PV project: 200 acres with/near transmission access	Solar resource data: favorably evaluated	Electric utility off-taker: identified and contracted	Necessary permits and interconnect. agreement: secured	System design: prepared to bid to secure EPC contractor	Team: identified and engaged	*Determine finance structure:* based on Tribe/ third-party capital and ability to mitigate risks

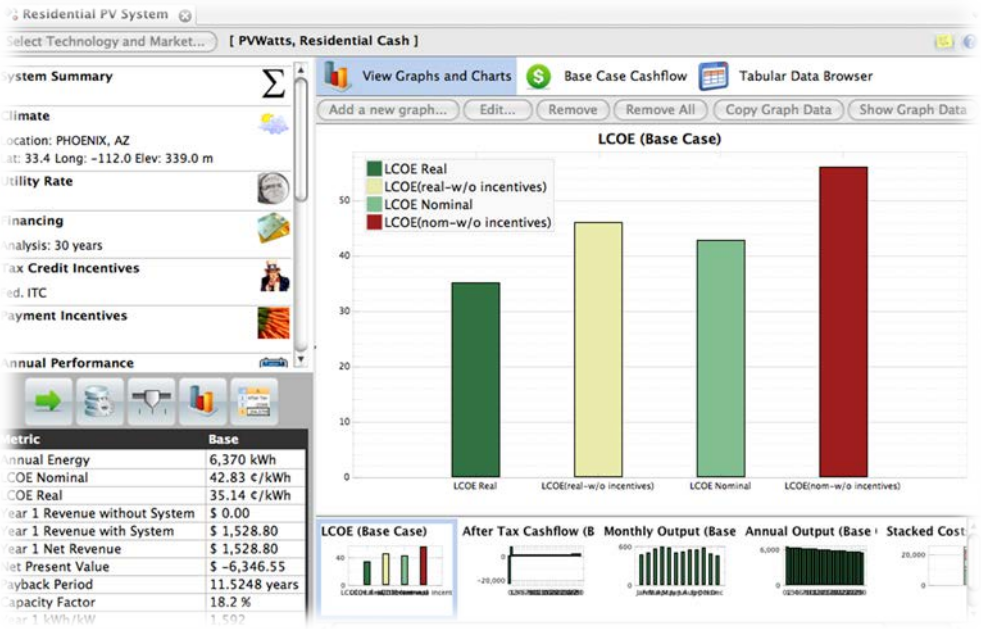
More info: http://www.nrel.gov/docs/fy13osti/57963.pdf

Advanced Tool: NREL's System Advisor Model

Available at: https://www.nrel.gov/analysis/sam/

NREL's System Advisor Model (SAM) is a free computer program that **calculates a renewable energy system's hourly energy output** over a single year and **calculates the cost of energy** for a renewable energy project over the life of the project.

- Solar, wind, geothermal, and other renewable and fossil technologies available
- These calculations are done using detailed performance models, a detailed cash flow finance model, and a library of reasonable default values for each technology and target market

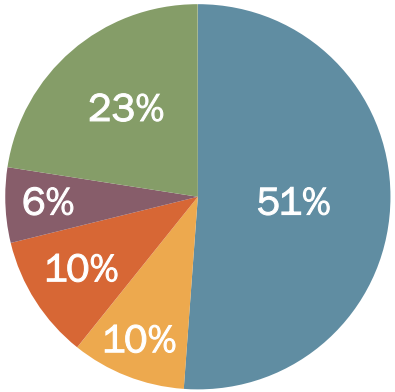


Step 3: AZ Solar PV System Cost Example

Q3/Q4 2012
Total Cost/Watt: $2.46/Wdc
System Capacity: **21.5** MW

AZ Solar LCOE:
~10¢/kWh – 12¢/kWh

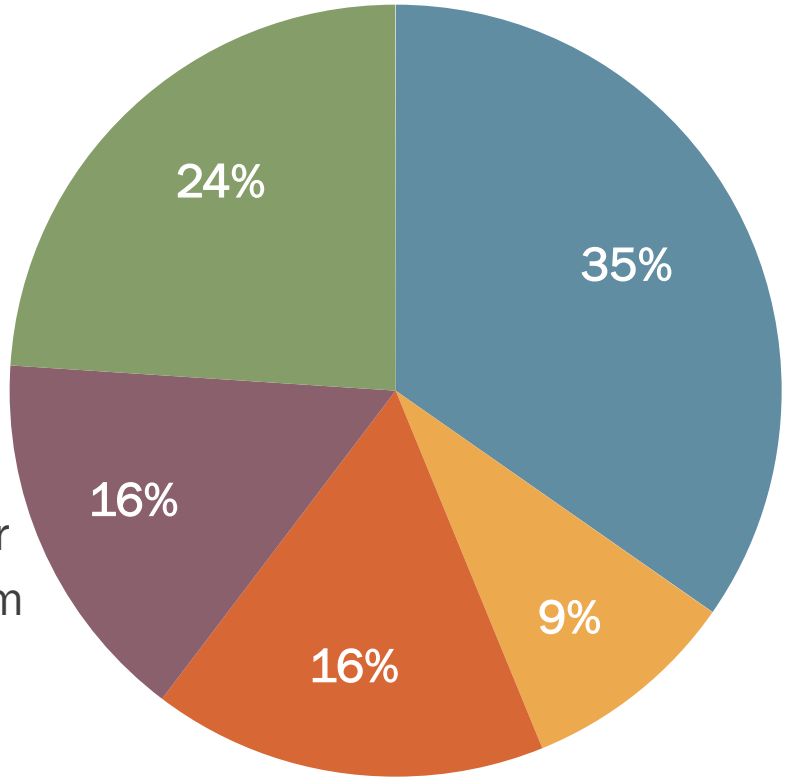
2011 Total Cost/Watt: $4.38
System Capacity: 21.5 MW



Total System Cost: $94 Million

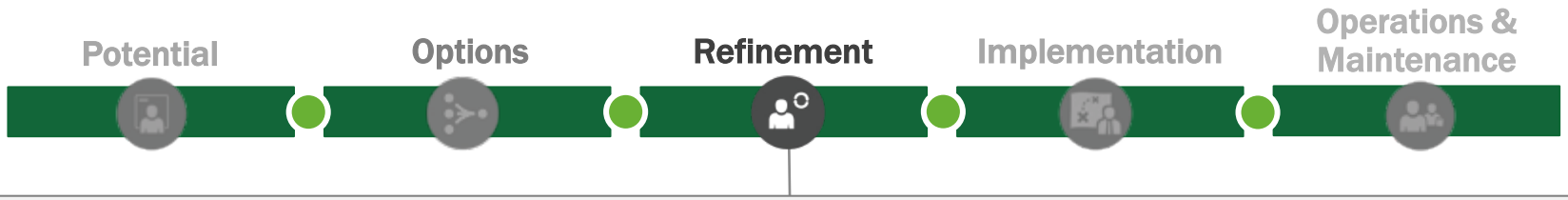
- PV Modules
- Inverter
- Installation/Labor
- Balance of System
- Soft Costs

Solar PV System Cost (%)
Q3/Q4 2012



Total System Cost: $49.2 Million

Step 3: Capital to Pay for the Project

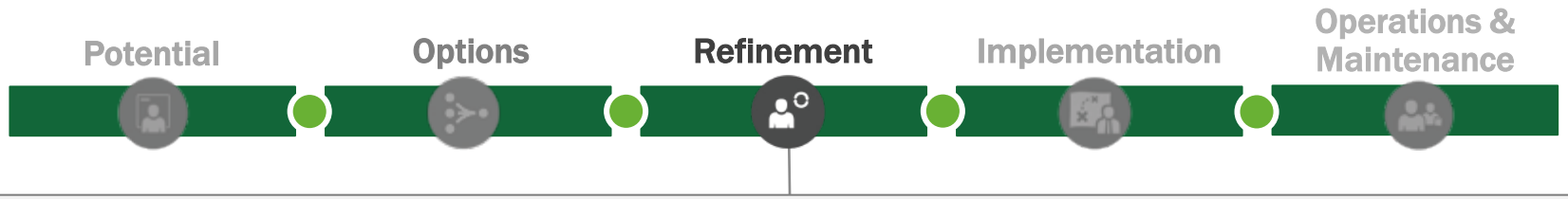


Process Stage	Activity	Primary Capital	Secondary Capital
1. Potential	Feasibility studies	Developer equity	None
2. Design	Permitting, environmental, site control	Developer equity	None
3. Refinement	Engineering, buy equipment	Developer equity	Debt Vendor financing
4. Implementation	Construction	Construction debt (OR tax equity)	Developer equity (OR construction debt)
5. Operations & Maintenance (O&M)	Completed	Developer equity	Reserve fund term debt (tax equity)

Financing Structures and Tribal Implications

	Direct Ownership	Partnership Flip	Sale Leaseback	Inverted Lease/Lease Pass-Through
Financing	User self-finances system and consumes power on-site	Investor can provide up to 99% financing. Debt can also be part of capital stack.	Investor provides 100% financing. Debt can also be part of capital stack, commonly at developer level.	Investor provides partial financing. Debt is a common part of capital stack.
Up-front Tribal Capital Req.	$$$$	$	$, potentially $0	$$–$$$
Ownership	User-owned	Co-ownership by developer and investor	Developer has option to purchase assets at lease term	Assets revert to developer at the lease term
Tax Credit	NA	PTC or ITC, and MACRS	ITC and MACRS	ITC and MACRS
Investor Preference	Certain firms have preferences for/familiarity with particular structures and/or technologies. Project specifics may also dictate financial structure selected.			

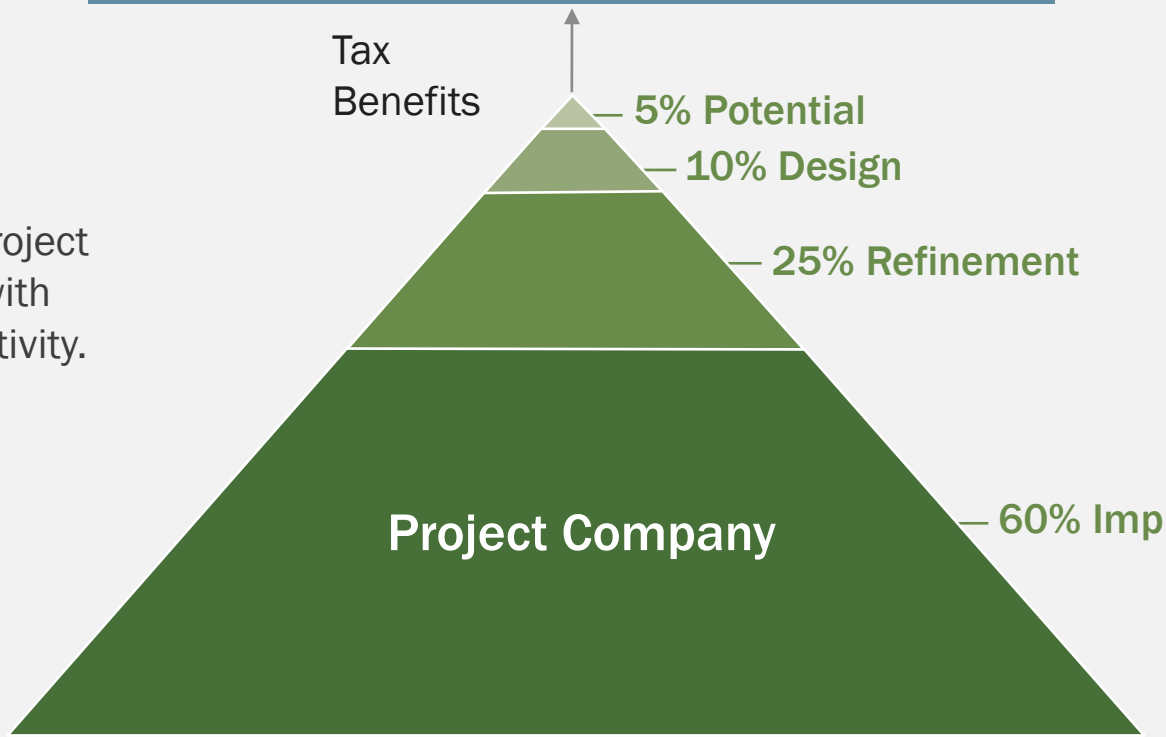
Single Finance



Parent Company: Taxable Corporation

Tax Benefits

A completed project is a business with commercial activity.



Corporations

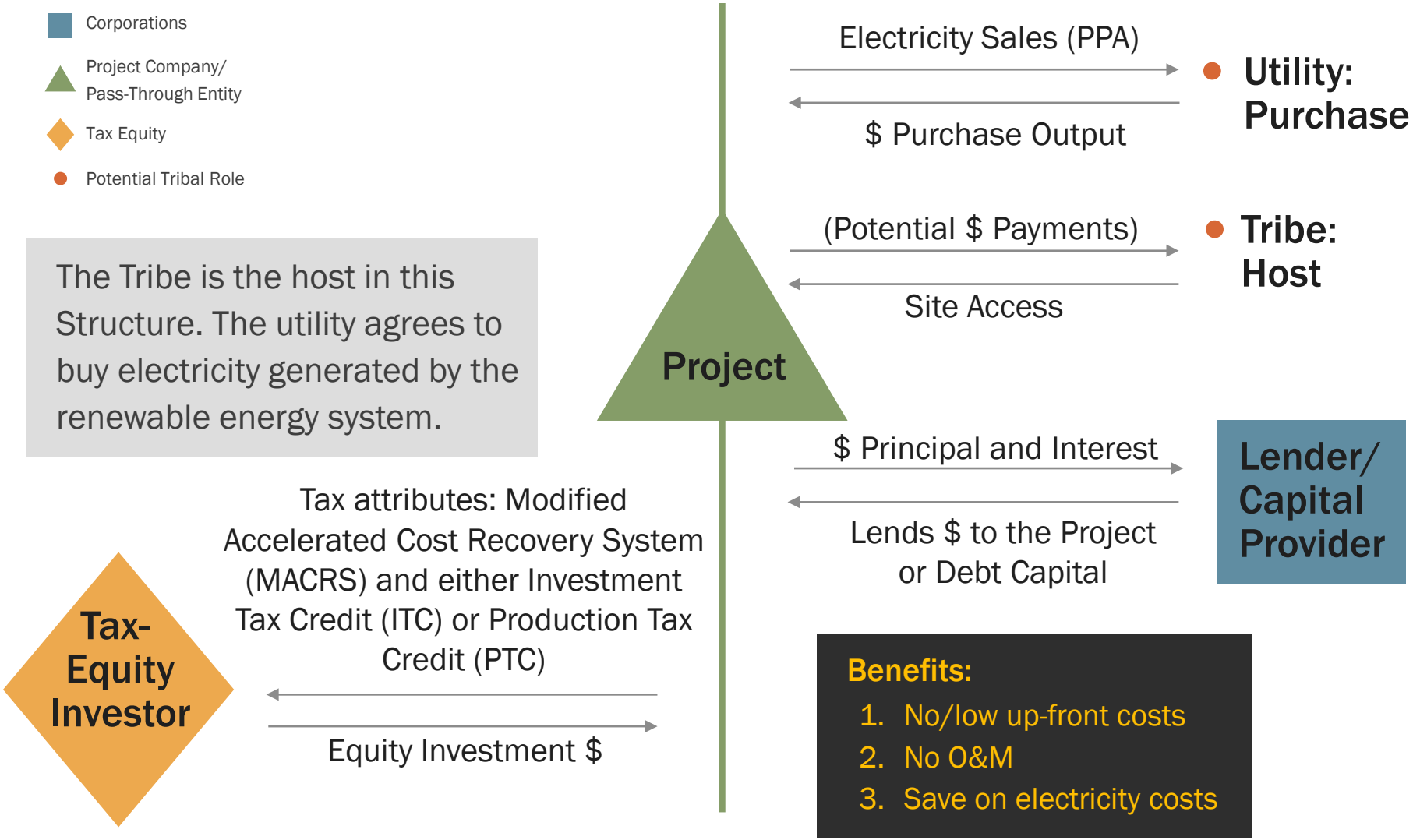
Project Company/ Pass-Through Entity

Tax Equity

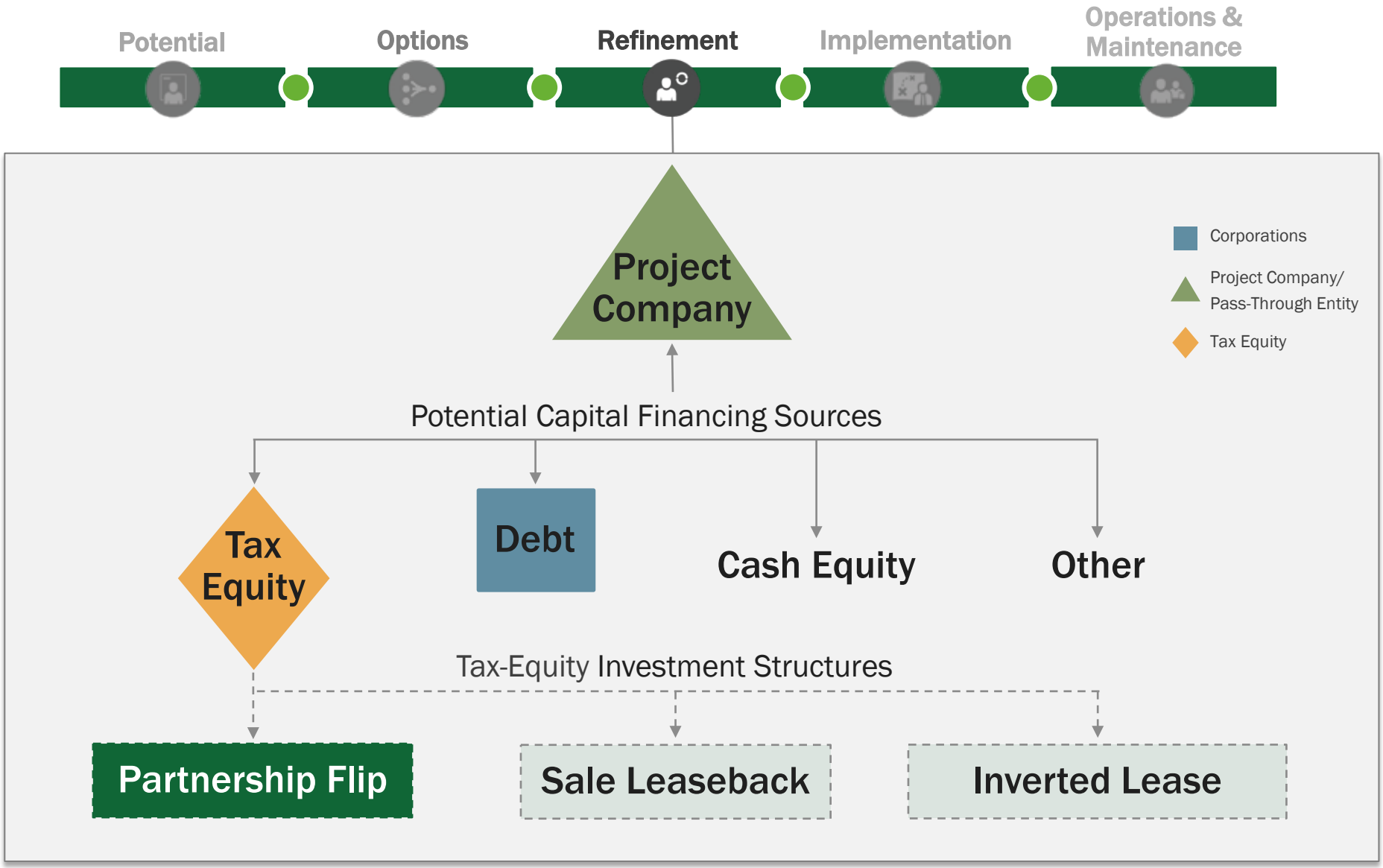
Project Development Stages – % Resource Inputs, Time/$

Third-Party Financed Power Purchase Agreement:

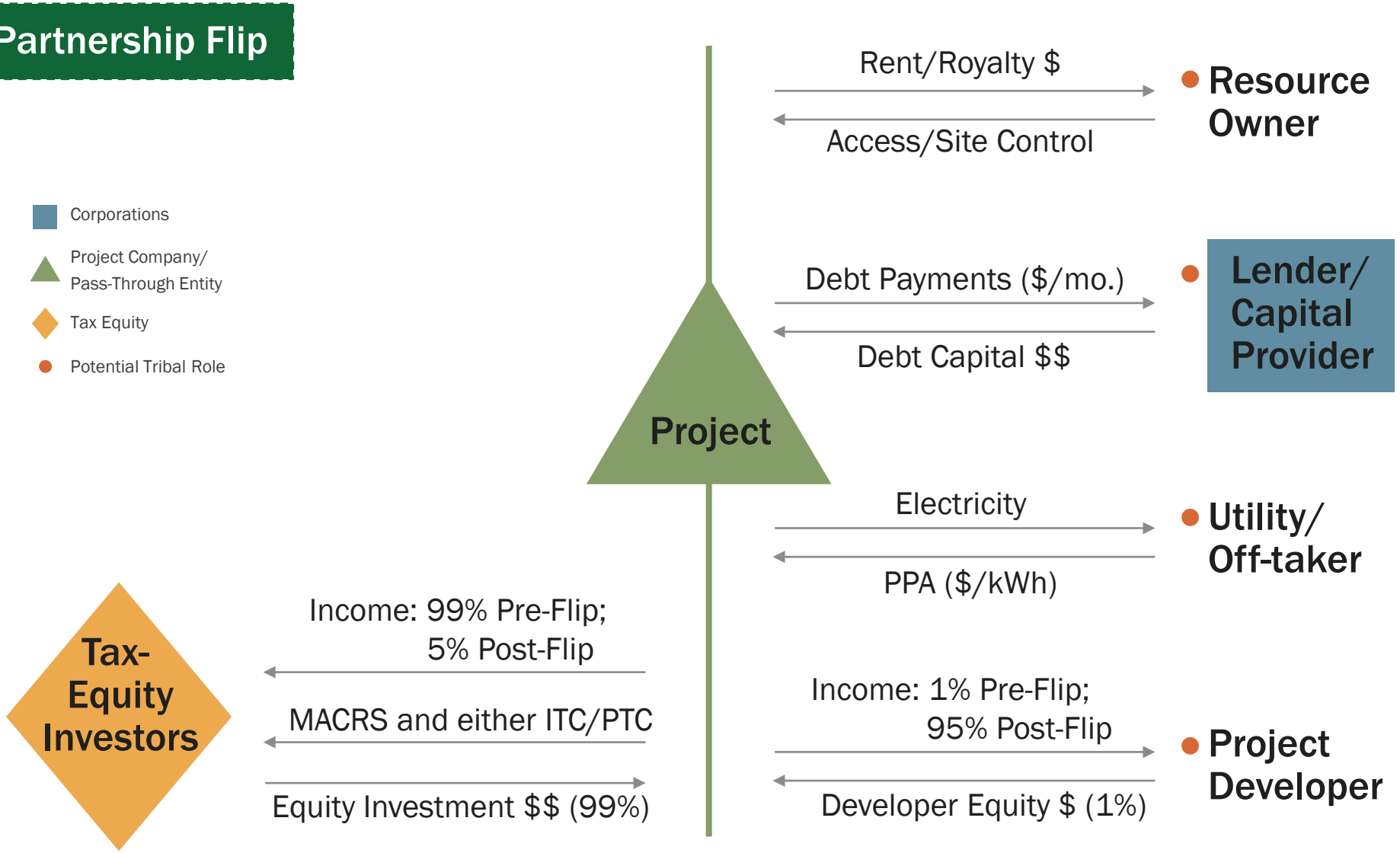
Where Electricity is Sold to a Utility



Capital Structure with Tax Equity

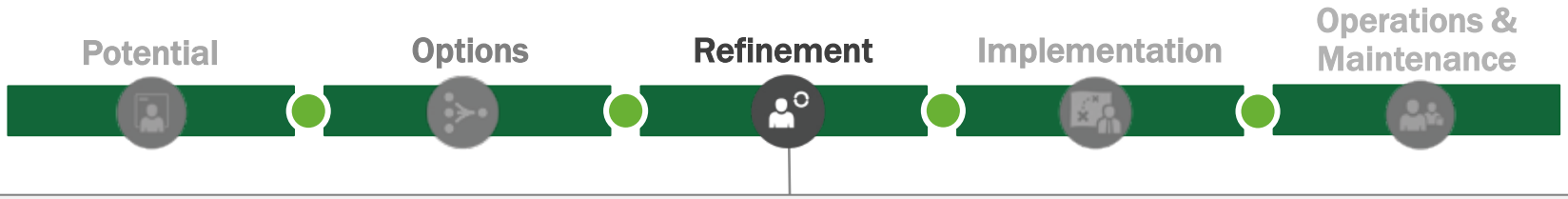


Partnership Flip



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

Project Finance: Partnership Flip Tax-Equity Structure



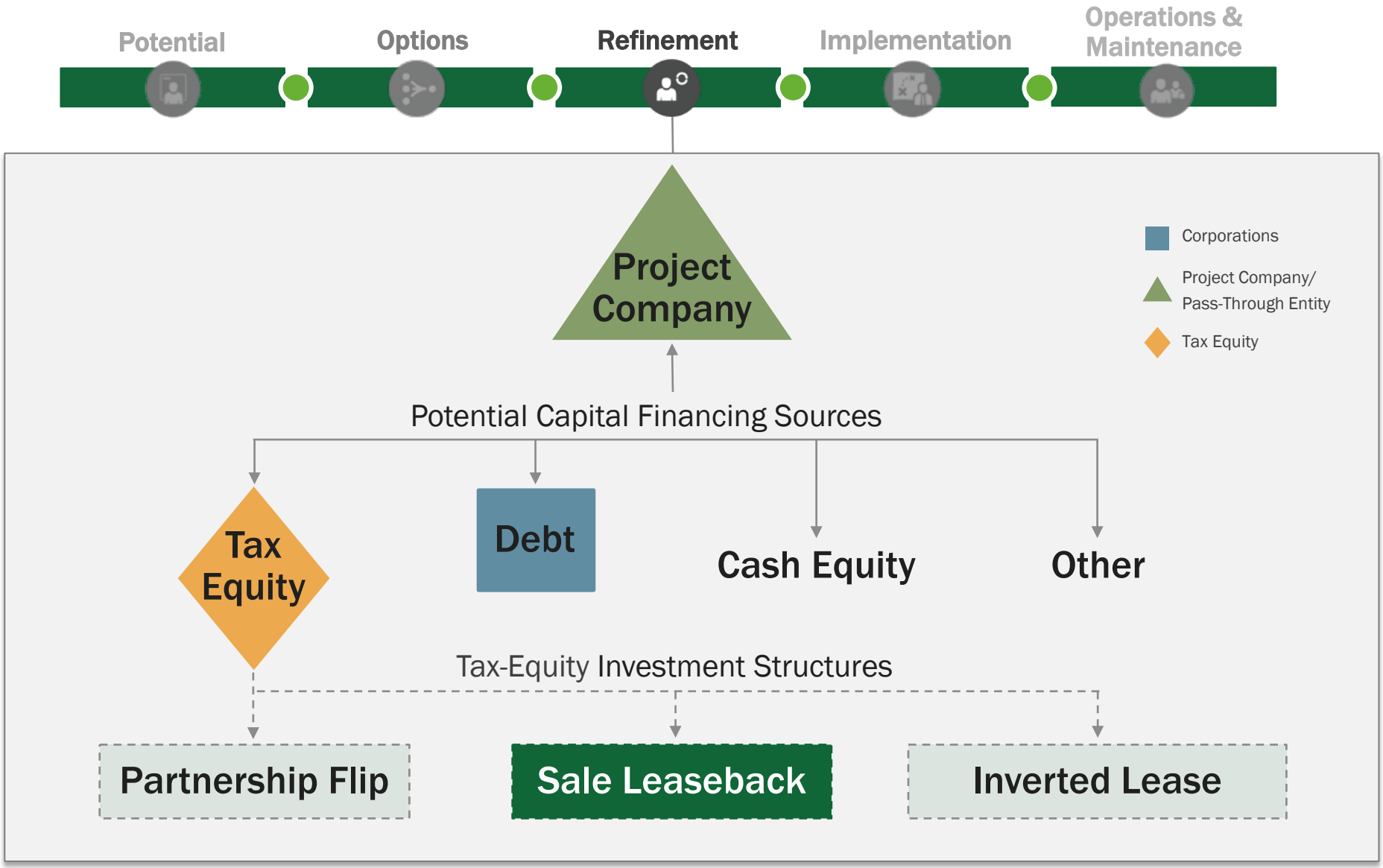
Advantages:

- Tax equity provides most of the capital up front
- Easier way for Tribe/developer to own the project in the long run (than other advanced financing structures)
- Generally familiar structure for wind and solar industry, so many tax-equity investors have experience

Challenges:

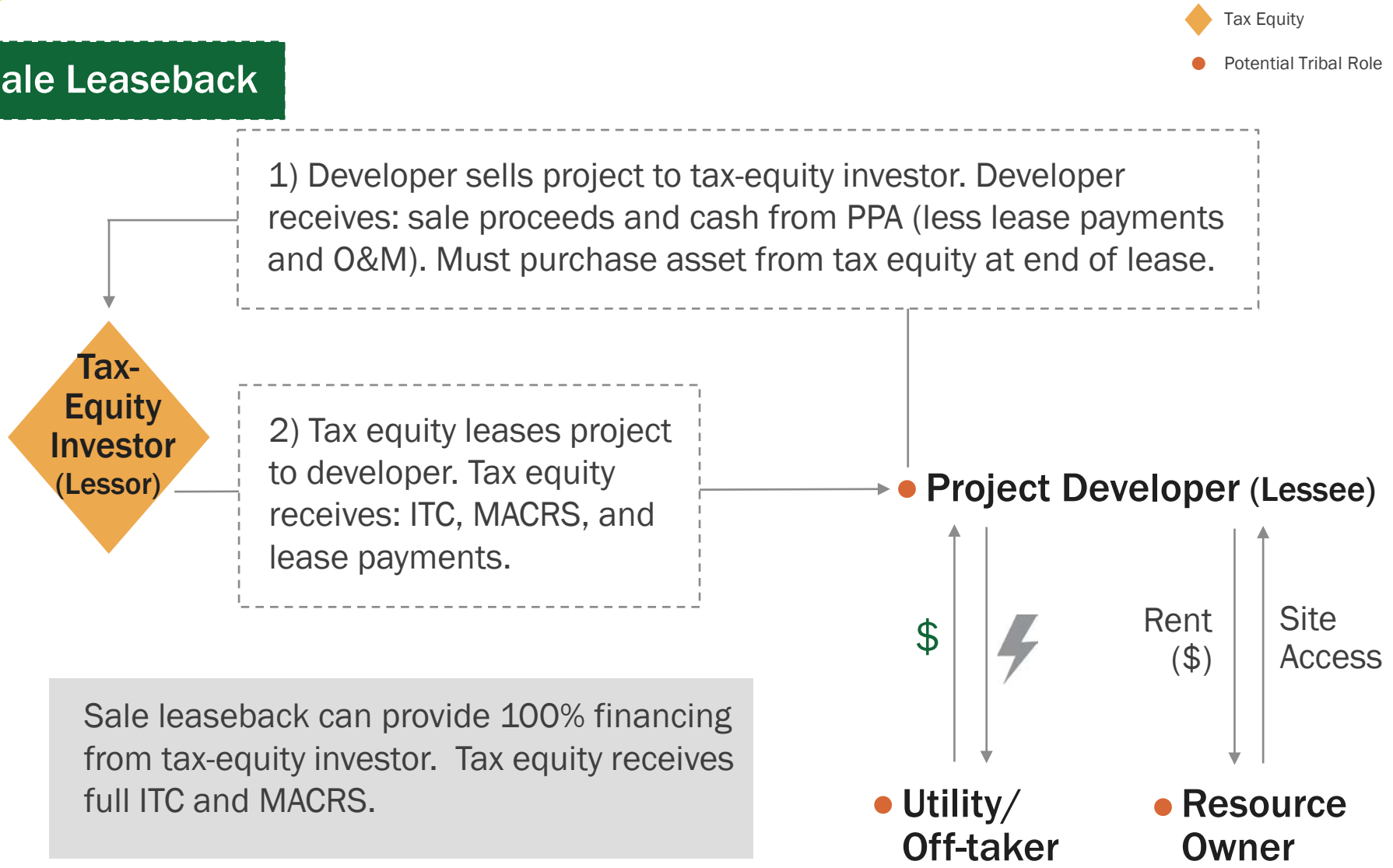
- Limited distribution payments to Tribe/developer until later in project (e.g., year 6-7 for solar; year 10-11 for wind)
- Still requires up-front capital contribution from Tribe
- Developer must consult tax equity on major decisions

Capital Structure with Tax Equity



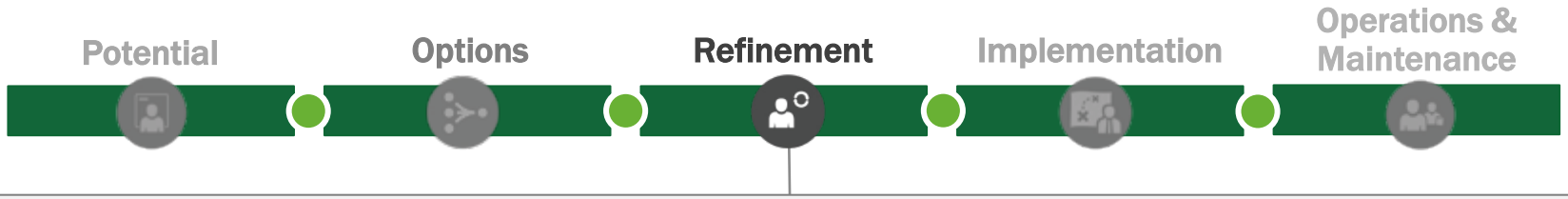
Sale Leaseback Structure

Sale Leaseback



Sale leaseback can provide 100% financing from tax-equity investor. Tax equity receives full ITC and MACRS.

Project Finance: Sale Leaseback Tax-Equity Structure



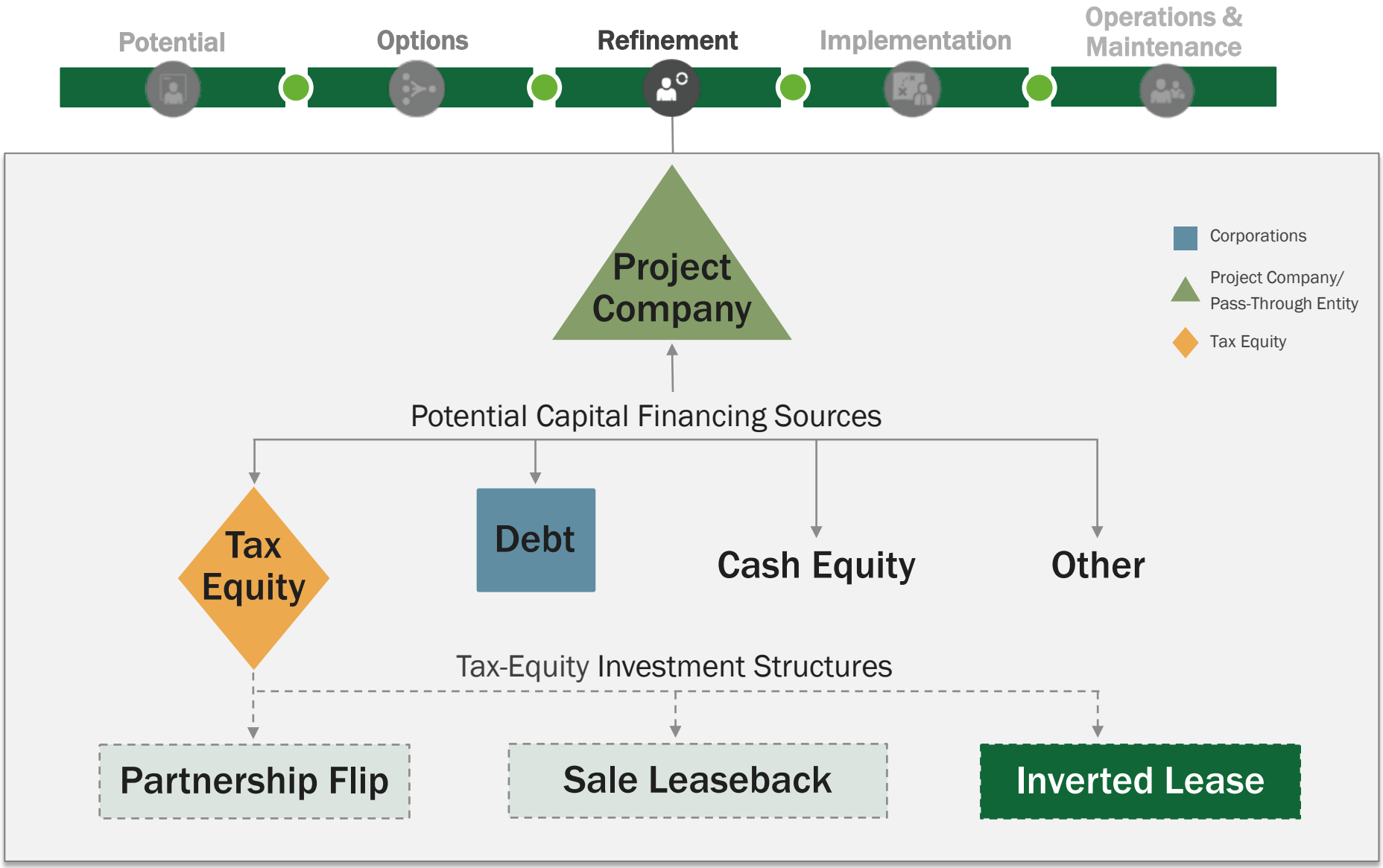
Advantages:

- Tax equity can provide 100% of the capital up front
- Developer gets large cash distribution upon sale of project
- Familiar and utilized structure among solar community

Challenges:

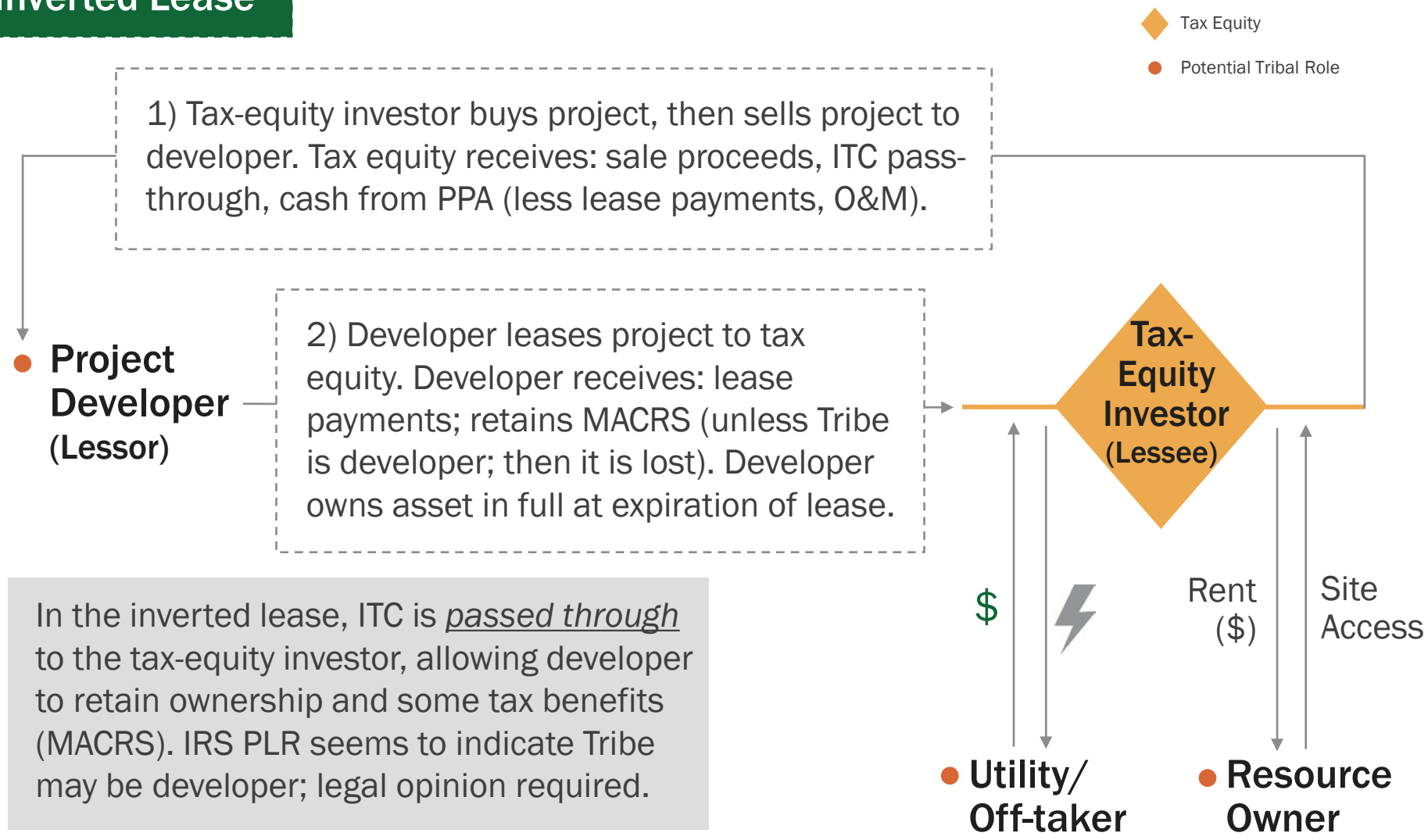
- Most costly for Tribe/developer to acquire long-term ownership of project (large cash infusion ~ year 7)
- Tribe/developer operates the project
- Requires largest equity contribution from tax-equity investor (could limit investment)
- Limited participation to developer/Tribe until buyout of project (~ year 7)
- Not possible for PTC-based project (e.g., wind)

Capital Structure with Tax Equity



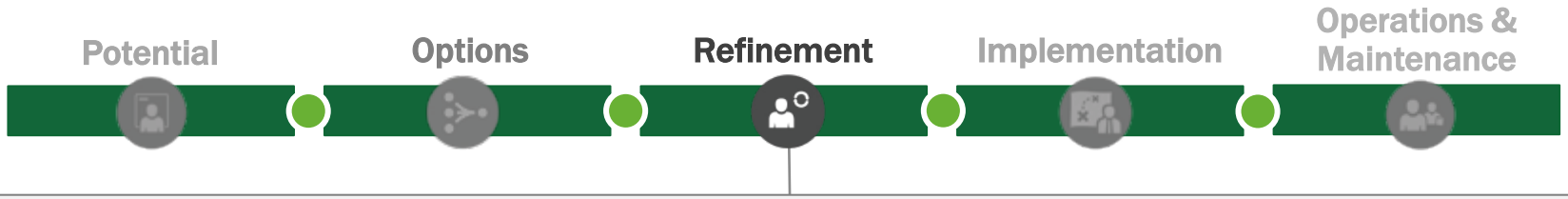
Inverted Lease/Lease Pass-Through Structure

Inverted Lease



In the inverted lease, ITC is *passed through* to the tax-equity investor, allowing developer to retain ownership and some tax benefits (MACRS). IRS PLR seems to indicate Tribe may be developer; legal opinion required.

Project Finance: Inverted Lease Tax-Equity Structure



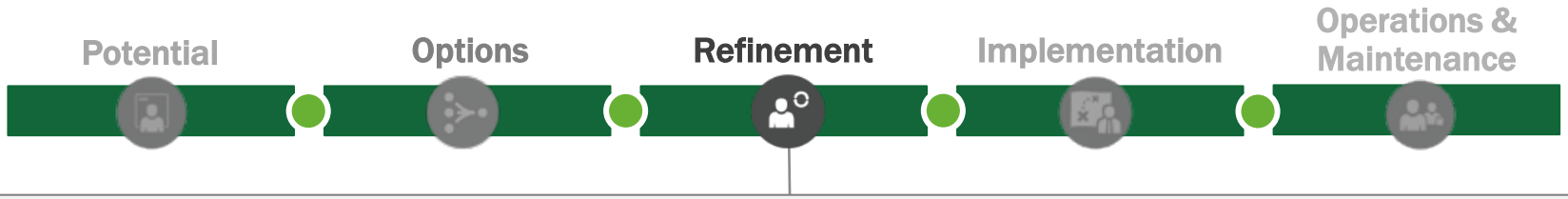
Advantages:

- Tribe/developer maintains controlling interest and ownership in project
- Cash flows to Tribe/developer from beginning
- Limits risk to tax-equity investor, possibly increasing availability of investment
- The developer owns the project after the expiration of the lease term

Challenges:

- Most complicated of all three tax-equity structures
- Developer must contribute significantly to up-front capital investment
- Not possible for PTC-based project (e.g., wind)
- Limited upside for tax-equity investor

Step 3: Hypothetical Commercial Example – Outputs



- ✓ Financing structure and Tribe organization – inverted lease
- ✓ Detailed economic models – modeled in SAM
- ✓ EPC vendors selected – sign contract
- ✓ Completed environmental reviews and finalized permits, as required by third-party investors
- ✓ Off-take agreement – PPA signed
- ✓ Utility interconnection and transmission – working with utility to complete

Commercial-Scale Project Risks – Post Step 3

	Risks	Risk Assessment Post Step 3
Development	• Poor or no renewable energy resource assessment • Not identifying all possible costs • Unrealistic estimation of all costs • Community push-back and competing land use	Low ; site picked Low; detailed model Low; detailed model None; addressed
Site	• Site access and right of way • Not in my backyard (NIMBY)/build absolutely nothing anywhere (BANANA) • Transmission constraints/siting new transmission	Low; site secure None; opposition addressed Low; process started
Permitting	• Tribe-adopted codes and permitting requirements • Utility interconnection requirements • Interconnection may require new transmission, possible NEPA	Low; complete Low; complete Low; identified
Finance	• Capital availability • Incentive availability risk • Credit-worthy purchaser of generated energy	Low; PPA complete Low; risk on developer Low; PPA complete
Construction/ Completion	• EPC difficulties • Cost overruns • Schedule	Low; allocate to EPC or developer
Operating	• Output shortfall from expected • Technology O&M • Maintaining transmission access and possible curtailment	Assumed low, mitigable, or allocatable

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

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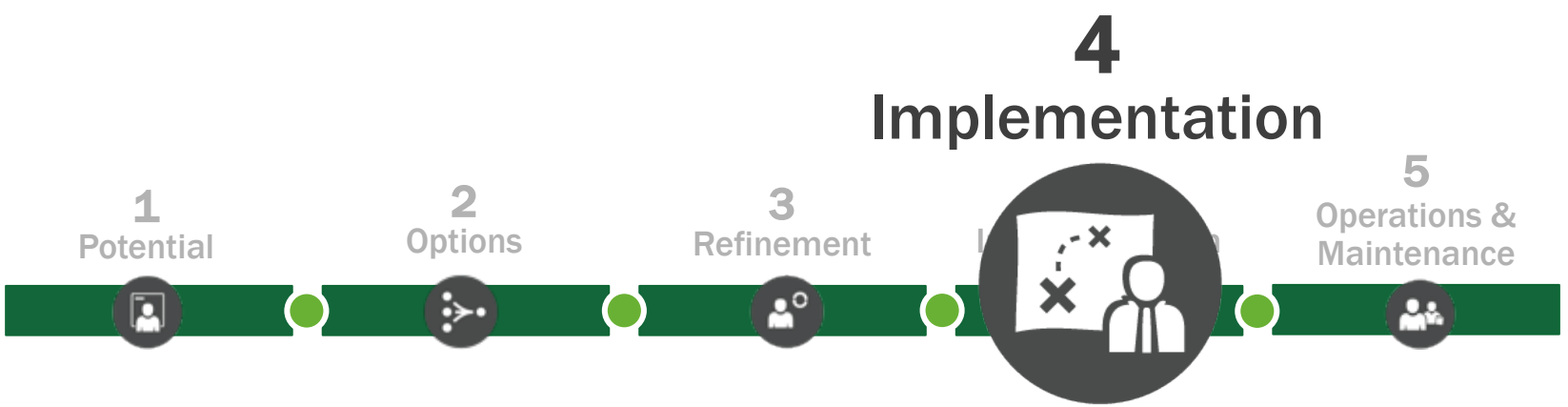
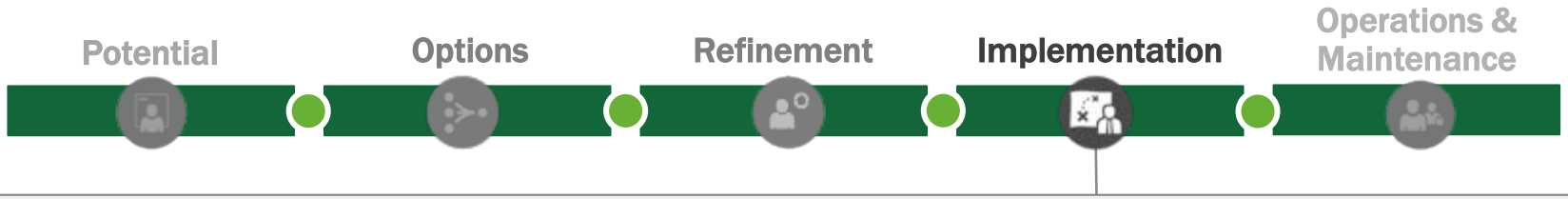

4
Implementation
1
Potential
2
Options
3
Refinement
5
Operations & Maintenance

Step 4: Implementation



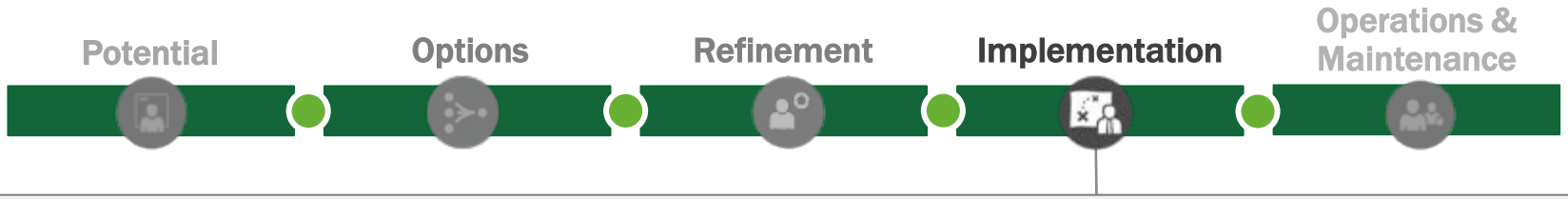
Purpose: Contract for, realize physical construction of project

Tasks:

- Finalize project agreements
- Finalize vendor contracting process
- Finalize preconstruction tasks
- Realize construction and equipment installation
- Realize interconnection
- Realize project commissioning leading to commercial operations

Output: Completed project (commercial operation)

Step 4: Project Implementation Example



Check:

- Ensure permitting is complete
- Ensure on-site activities will not interfere with construction and vice versa
- Communicate and plan with the vendor/contractor

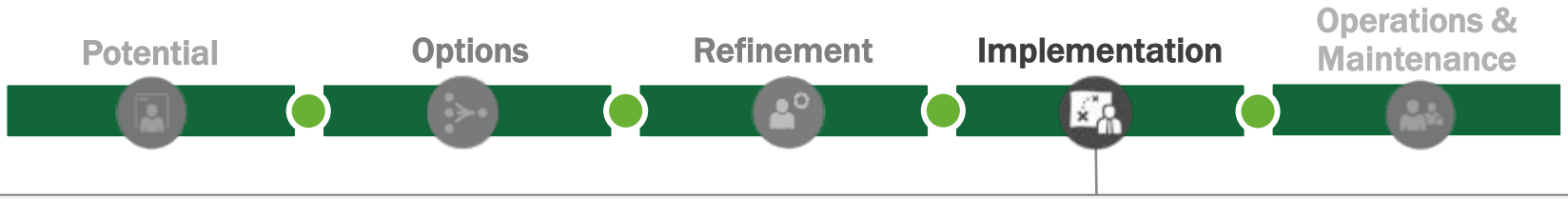
Interconnection:

- Sometimes contracted and completed by system owner in cooperation with utility
- Sometimes involves host
- Often coordinated by contractor/system owner

Construction/commissioning: diligence of each party as appropriate to its assumption of risk as:

- PPA energy seller (or purchaser) – least diligence for tribal entity – economic due diligence needed
- Energy system seller (or purchaser/owner) – technical diligence and capability for tribal entity

Step 4: Hypothetical Commercial Example – Outputs



- ✓ Completed and operating project
- ✓ New ownership organization completed (if needed)

Commercial Operating Date (COD) Success

- Project generating electricity
- Project developed within budget

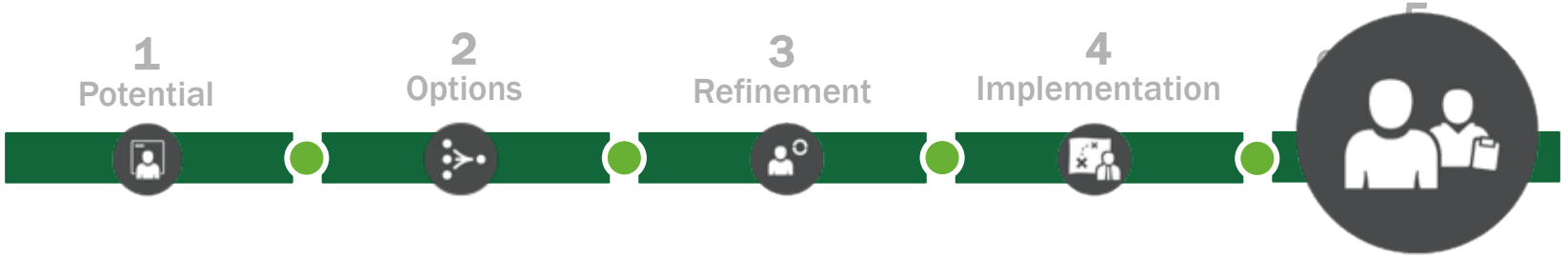
Photo by Dennis Schroeder, NREL 21512

Commercial-Scale Project Risks – Post Step 4

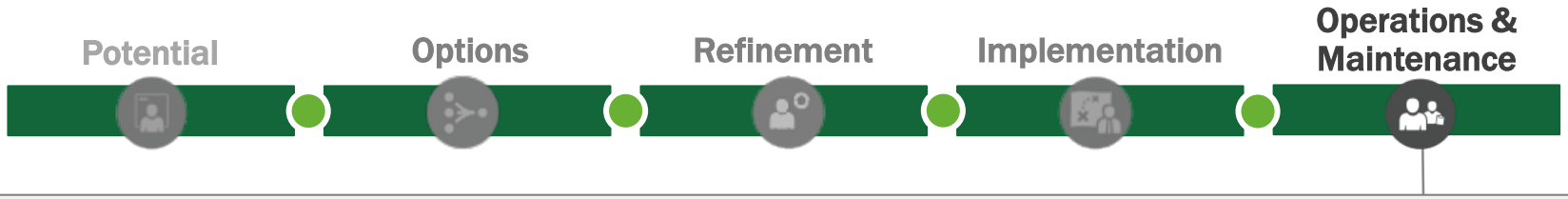
	Risks	Risk Assessment Post Step 4
Development	• Poor or no renewable energy resource assessment • Not identifying all possible costs • Unrealistic estimation of all costs • Community push-back and competing land use	Low; site picked Low; detailed model Low; detailed model None; addressed
Site	• Site access and right of way • Not in my backyard (NIMBY)/build absolutely nothing anywhere (BANANA) • Transmission constraints/siting new transmission	None; site secure None; opposition addressed None; addressed
Permitting	• Tribe-adopted codes and permitting requirements • Utility interconnection requirements • Interconnection may require new transmission, possible NEPA	Low; complete Low; complete None; complete
Finance	• Capital availability • Incentive availability risk • Credit-worthy purchaser of generated energy	None; finalized None; finalized None; finalized
Construction/ Completion	• EPC difficulties • Cost overruns • Schedule	None; contracted None; construction complete
Operating	• Output shortfall from expected • Technology O&M • Maintaining transmission access and possible curtailment	Assumed low, mitigable, or allocatable

Sources: Adapted from Holland & Hart, RE Project Development & Finance & Infocast, Advanced RE Project Finance & Analysis
NOTE: Underlining signifies that the risk assessment outcome changes during the step at hand.

Project Development Process



Step 5: Operations & Maintenance



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

O&M Costs:

- Equipment maintenance and upkeep
- Gearbox/inverter replacement
- Insurance
- Labor and staffing
- Extended warranty agreements

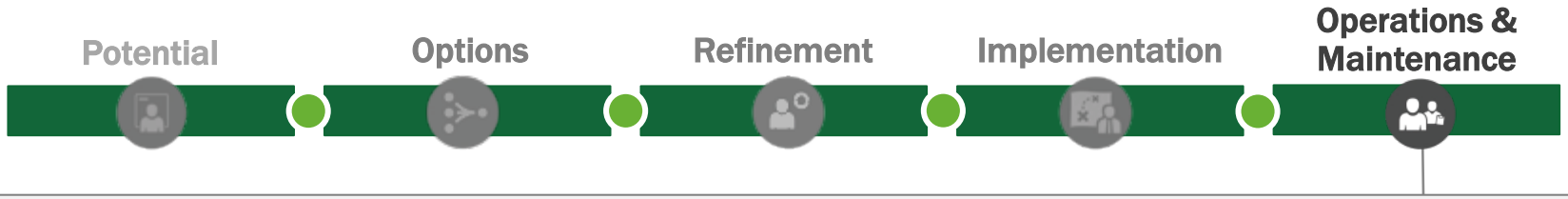
If leasing, lessor often manages maintenance

If PPA, vendor typically manages maintenance

* Esp. if owner – role of highest O&M risk

Photo from Florida Solar Energy Center, NREL 14728

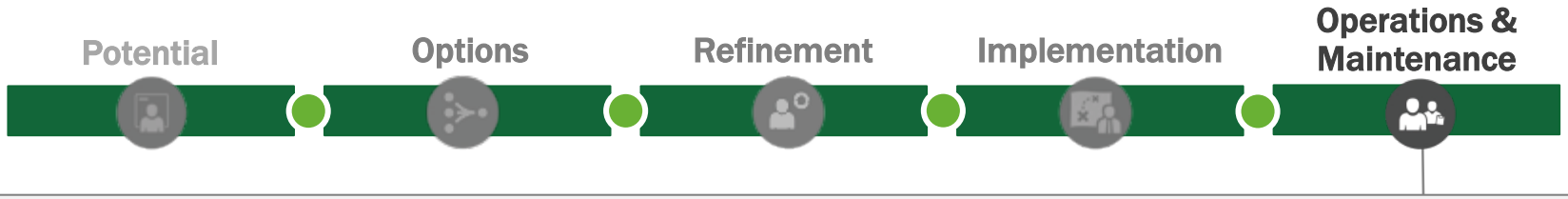
Step 5: O&M Example



In our hypothetical case, the tribal community elected the inverted lease with a tax-equity investor.

- Tribe may elect to have responsibility for O&M (or can subcontract to the equipment manufacturer or other vendor)
- Tribe revenues will be at risk if O&M is not conducted; impacts project cash flows
- Investment partners will be concerned as well – revenues for all parties in the partnership are impacted by system performance

Step 5: Hypothetical Commercial Example – Outputs



- ✓ Ensure responsible party carries out O&M/R&R*
- ✓ Measuring and tracking success
- ✓ Correlation with business plan and strategic energy plan
- ✓ Revenue management
- ✓ Contract compliance
- ✓ Reporting of generation

* Esp. if owner

Photo from Henry Price, NREL 14952

Commercial-Scale Project Risks – Post Step 5

	Risks	Risk Assessment Post Step 5
Development	• Poor or no renewable energy resource assessment • Not identifying all possible costs • Unrealistic estimation of all costs • Community push-back and competing land use	Low; site picked Low; detailed model Low; detailed model None; addressed
Site	• Site access and right of way • Not in my backyard (NIMBY)/build absolutely nothing anywhere (BANANA) • Transmission constraints/siting new transmission	None; site secure None; opposition addressed None; addressed
Permitting	• Tribe-adopted codes and permitting requirements • Utility interconnection requirements • Interconnection may require new transmission, possible NEPA	Low; complete Low; complete None; complete
Finance	• Capital availability • Incentive availability risk • Credit-worthy purchaser of generated energy	None; finalized None; finalized None; finalized
Construction/ Completion	• Engineering, procurement, and construction (EPC) difficulties • Cost overruns • Schedule	None; contracted None; construction complete
Operating	• Output shortfall from expected • Technology O&M • Maintaining transmission access and possible curtailment	Being managed by appropriate party

Sources: Adapted from Holland & Hart, RE Project Development & Finance & Infocast, Advanced RE Project Finance & Analysis
NOTE: Underlining signifies that the risk assessment outcome changes during the step at hand.

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

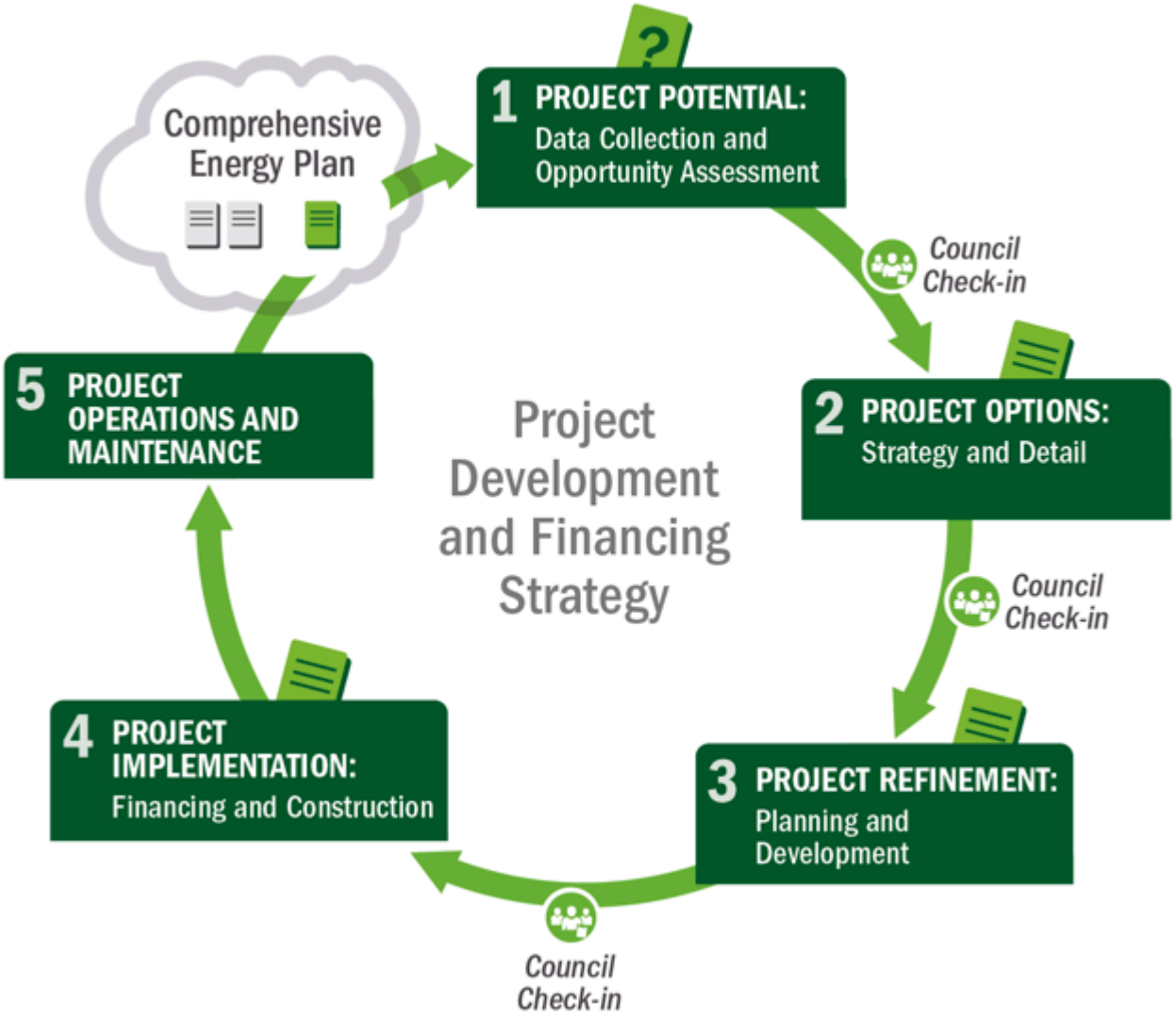
Celebrate!

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

Not Quite Done!

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

Wrap-Up: Project Development Process



Key Concepts Review

- Risk and Uncertainty
- LCOE
- Tax-Equity Partnership
- Roles of the Tribe
- The Project Team

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

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, Karlynn Cory, Elizabeth Doris, Travis Lowder, Paul Schwabe, and Bob Springer of the National Renewable Energy Laboratory; Joe Cruz and Matt Ferguson of Cohn Reznick; Paul Dearhouse of the Dearhouse Group; and Carolyn Stewart of Red Mountain Energy Partners.

Questions, comments: indianenergy@hq.doe.gov
For more information: www.energy.gov/indianenergy
Additional courses: www.nterlearning.org

THANK YOU

INFORMATION ON THE CURRICULUM PROGRAM AND OFFERINGS

Curriculum Structure and Offerings

Foundational Courses

Provide an overview of foundational information on renewable energy technologies, strategic energy planning, and grid basics

Leadership and Professional Courses

Cover the components of the project development process and existing project financing structures

Foundational Courses

Energy Basics

- Assessing Energy Needs and Resources
- Electricity Grid Basics
- Strategic Energy Planning

Renewable Energy Technology Options

- Biomass
- Building Heat & Hot Water
- Geothermal
- Hydroelectric
- Solar
- Wind

All courses are presented as 40-minute webinars online at: www.nterlearning.org

Leadership and Professional Courses

Essentials

Project Development and Financing Essentials

- Key concepts
- Process overview
- Decision points

Advanced/In-Depth

Project Development

- Concepts
  - Risk and uncertainty
  - Tribal project roles
  - Policies and renewable energy (federal & state)
- Process
  - Project scale decision factors
  - Understanding the energy market
  - Project team
  - Procurement

Project Finance

- Concepts
  - LCOE
  - Business structures
  - Tax-equity partnerships
- Process and Structures
  - Direct ownership
  - Flip
  - Leaseback
  - Inverted lease

Project Scale

- Facility
- Community
- Commercial