DOE OFFICE OF INDIAN ENERGY

Renewable Energy Project Development: Advanced Process Topics

Understanding Energy Markets, Project Scale Decision Factors, Procurement Options, and the Role of the Project Team

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

Course Outline

What we will cover…

- About the DOE Office of Indian Energy Education Initiative

- Processes for Developing Renewable Energy Projects on Tribal Lands
  - Understanding the **Energy Market** and **Project Scale**
  - Project Scale and **Ownership Options**
  - **Procurement** Process
  - Project **Team**

- 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 (RE) 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.*

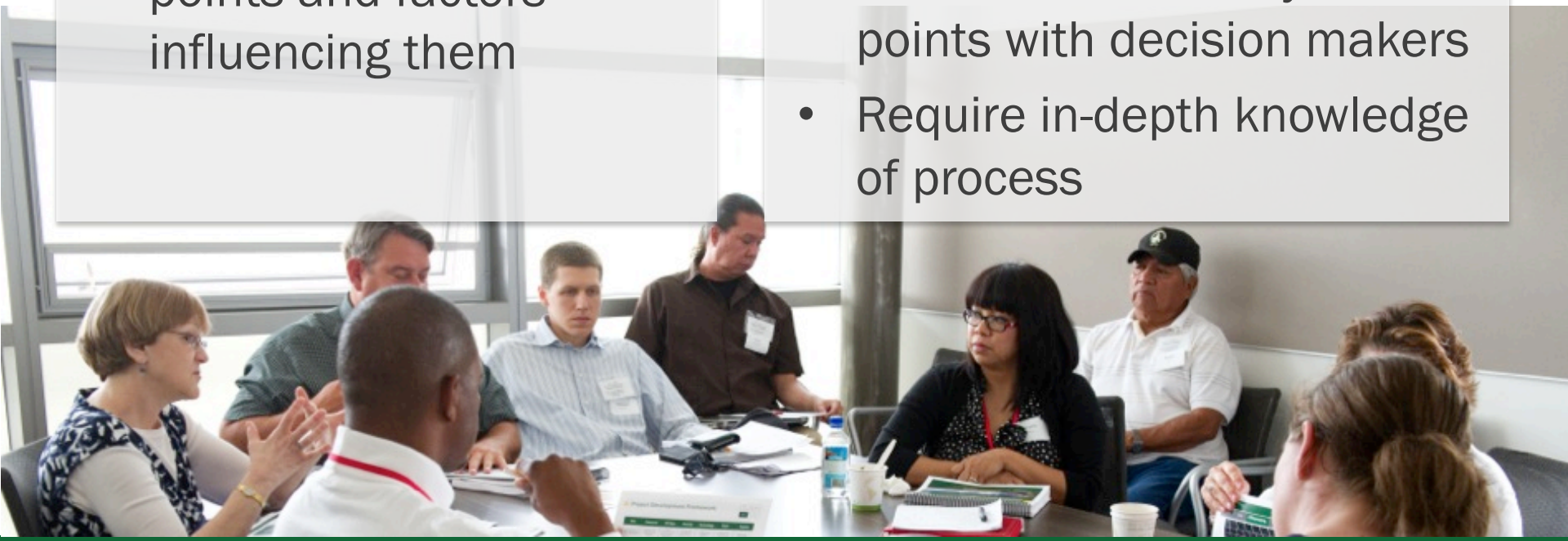
Course Audiences

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

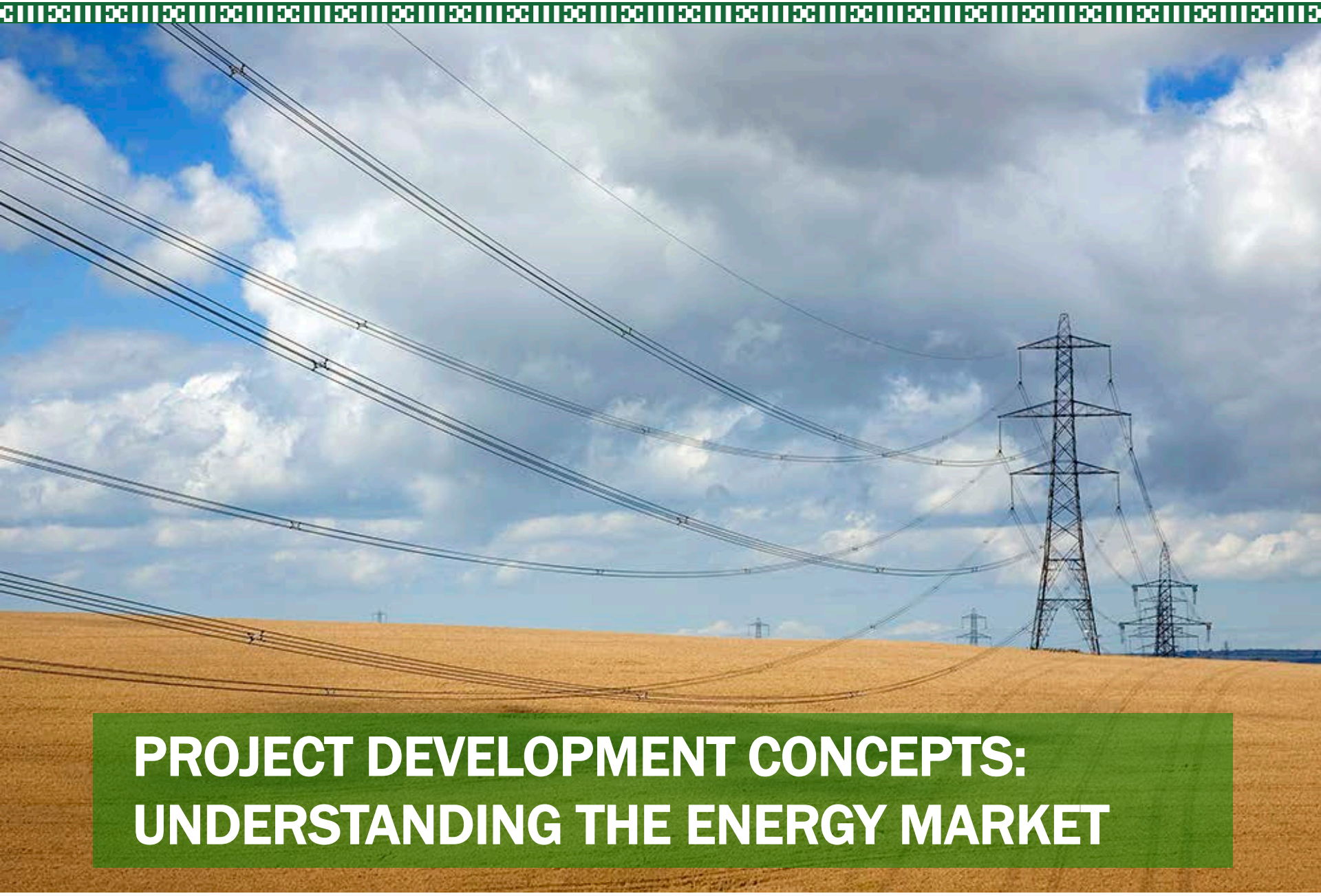
- **The Project Team**
- Risk and Uncertainty
- Roles of the Tribe
- Levelized Cost of Energy (LCOE)
- Tax-Equity Partnership

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

About the Speaker

Jason Coughlin

- Project Leader at NREL with a primary focus on financing solar projects across all market segments
- Extensive experience with the request for proposal (RFP) and solar developer selection processes
- Has partnered with many local governments on public sector solar project development
- Finance and banking background



PROJECT DEVELOPMENT CONCEPTS: UNDERSTANDING THE ENERGY MARKET

Project Scale and Energy Markets

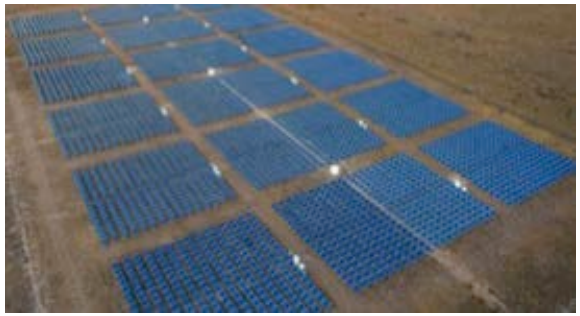
FACILITY	COMMUNITY	COMMERCIAL
		
Definition: Single building system	**Definition:** Multiple buildings, campuses, parking lots	**Definition:** Stand-alone utility-scale project
Primary purpose: Offset building energy use	**Primary purpose:** Offset community energy costs	**Primary purpose:** Revenue derived from wholesale electricity sales or land lease
Energy market: The Tribe	**Energy market:** The Tribe	**Energy market:** External

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

Understanding Energy Markets

A renewable energy project is built with a particular market context

- **Facility- or community-scale projects** (distributed generation [DG]) are focused on interconnection, net metering, retail electricity rates and rate structures, and other local policies and regulations
- **Commercial-scale projects** require an understanding potential off-takers, regional wholesale electricity rates, access to transmission, conducting interconnection studies, determining need for grid upgrades, proximity to renewable portfolio standard (RPS) markets, and the potential for material environmental and land-use permitting processes, among others
- **Contracts** will vary depending on the market context

Key Question: What is the market for your electricity and how do you get it there?

Refer to Electricity Grid Basics course for additional information

What Are the Potential Markets?

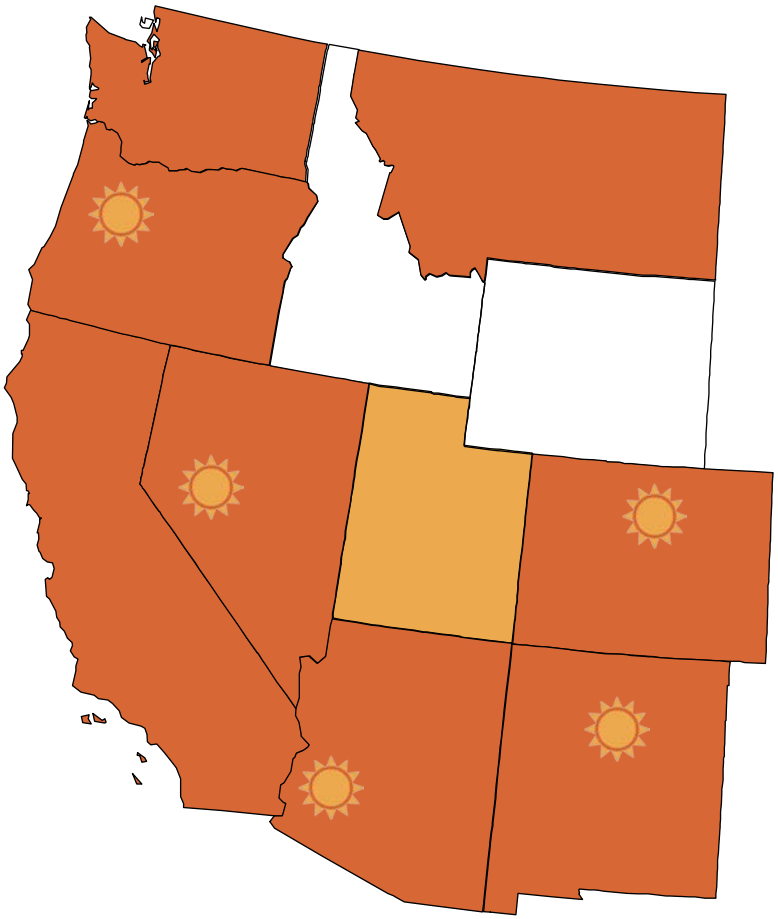
On-site Facility- or Community-Scale

- The Tribe is "the market" but need to know what is allowed within a given utility territory

Commercial-Scale

- Need an off-taker to buy your electricity
  - A utility
  - A large commercial, industrial, or government agency (e.g., military base)
- Utility motivated by RPS compliance
- Nonutilities motivated for a number of reasons, including: cost savings, sustainability goals, and energy hedging

Identifying a Market: Western States' RPS Policies



State	RPS
AZ	15% by 2025
CA	33% by 2020
CO	30% by 2020 (IOUs) 10% by 2020 (co-ops/munis)*
MT	15% by 2015
NM	20% by 2020 (IOUs) 10% by 2020 (co-ops)
NV	25% by 2025*
OR	25% by 2025 (large utilities)* 5%–10% by 2025 (small utilities)
WA	15% by 2020*
UT	*GOAL: 20% by 2025*

Renewable portfolio standard

Renewable portfolio goal

Minimum solar or customer-sited requirement

* Extra credit for solar or customer-sited renewables

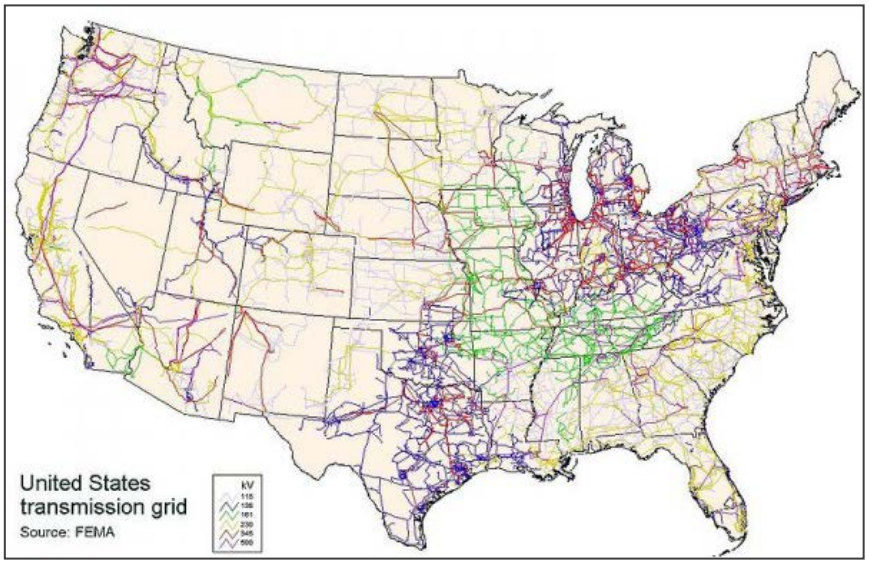
Source: www.dsireusa.org

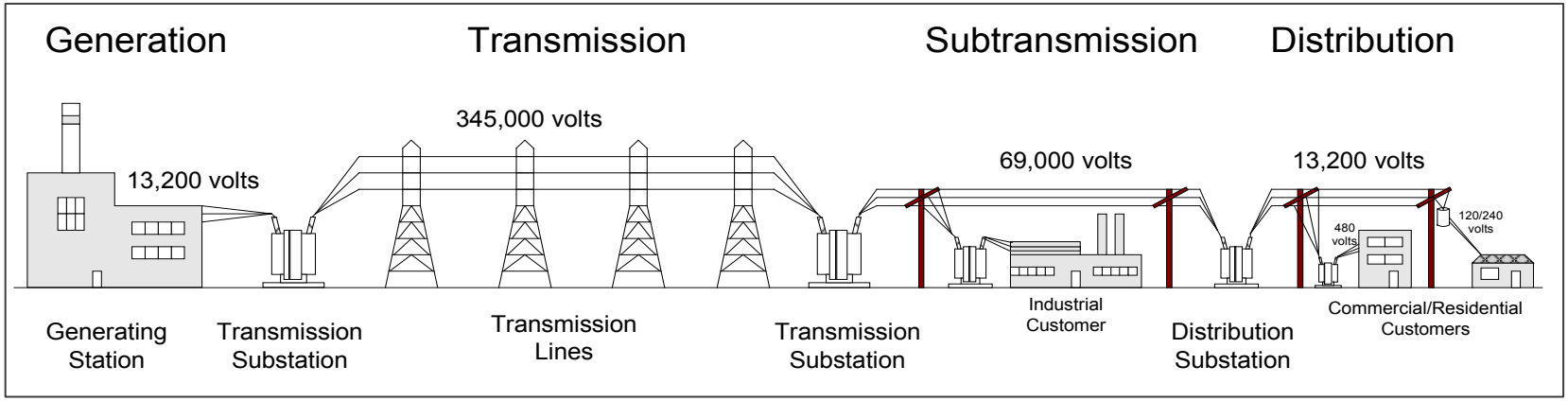
The Electricity Grid

It is not enough to identify a market for the electricity

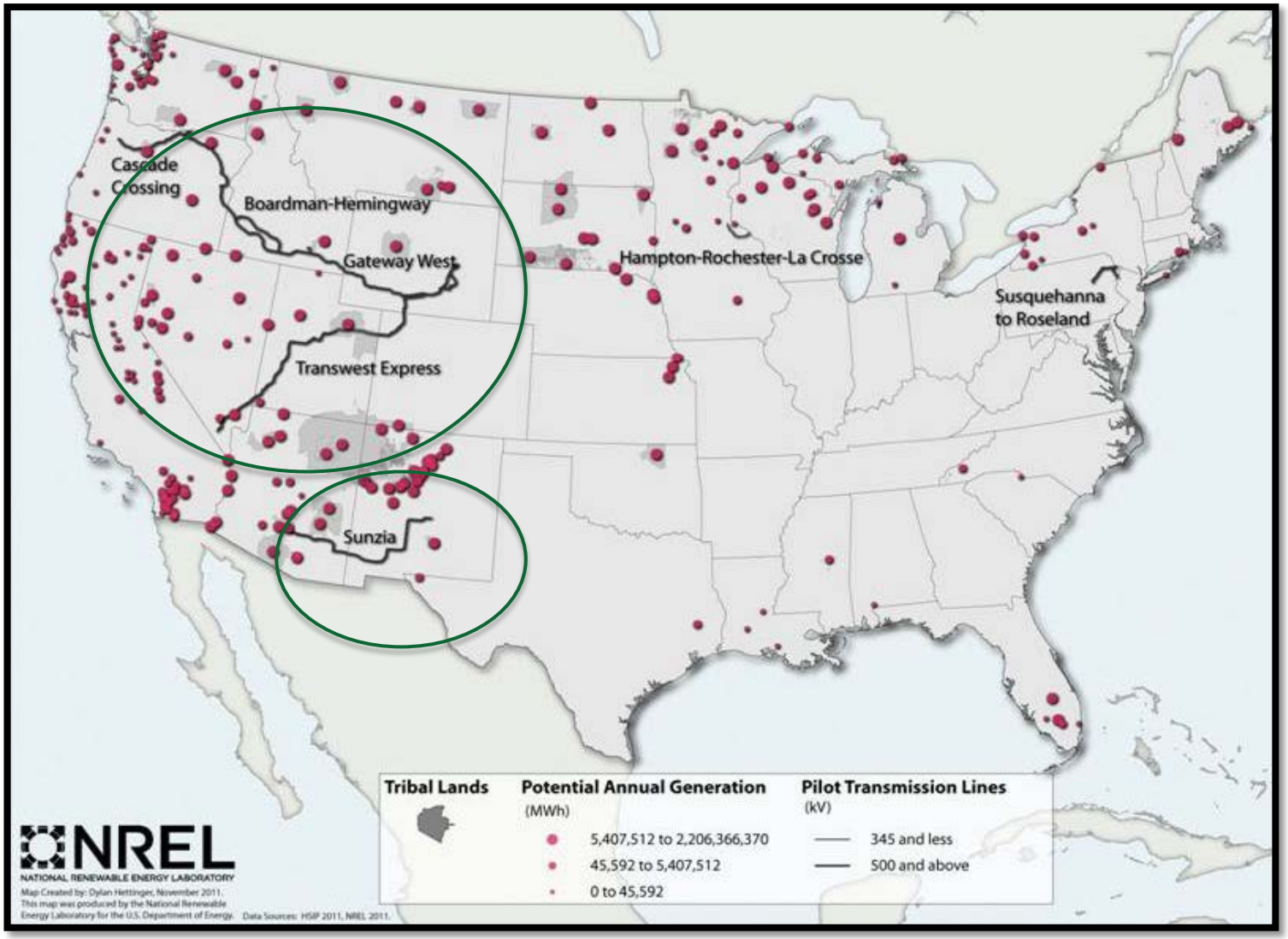
Can you get the electricity to market?

- Existing transmission lines?
- Capacity on those lines?





Projected Transmission



California

- Projected to need an additional 400–13,000 MW installed by 2020 to meet RPS obligations
- No major projected transmission expansion in California

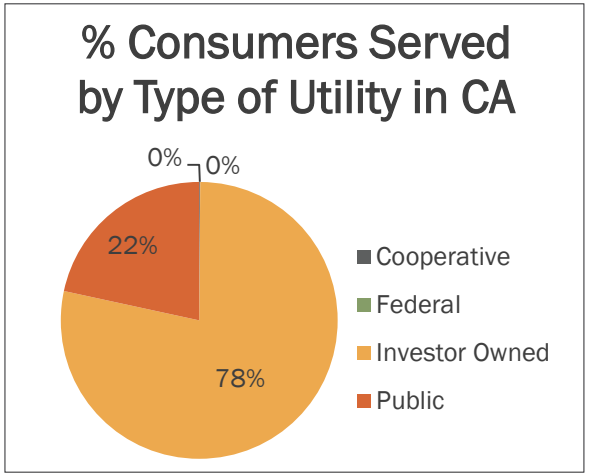
Avg Elec. Prices (c/kWh)	
Retail (2012)	Wholesale (2011)
12.96	3.00

Policy	Limit
RPS	33% by 2020
Interconnection	No Limit
Net Metering	1 MW

Electricity Sales				
Total	% US Res	% US Comm	% US Ind	% Total US
19,000 GWh	6.2%	8.8%	4.3%	6.6%

State TECHNICAL Potential (GW)					
Roof Solar	Utility Solar	CSP	Wind	Bio.	Geo.
61	4,111	2,726	1,052	4	16.7

Tribal RESOURCE Potential (GW)					
Roof Solar	Utility Solar	CSP	Wind	Bio.	Geo.
ND	13.8	10.6	0.68	.127	9



Major Utilities

Los Angeles Department of Water & Power
Pacific Gas & Electric Co.
San Diego Gas & Electric Co.
Southern California Edison Co.

Oregon

- RPS obligations began in 2011
- Projected to have 340–1,700 MW in excess of RPS obligations in 2020
- Large projected transmission expansion across the state

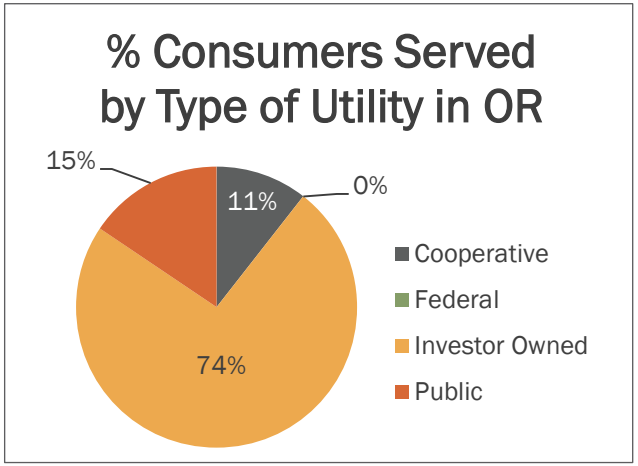
Avg Elec. Prices (c/kWh)	
Retail (2012)	Wholesale (2011)
8.32	3.00

Policy	Limit
RPS	25% (large utilities), 10% (small), 5% (smallest) by 2025
Interconnection	No limit
Net Metering	2 MW

Electricity Sales				
Total	% US Res	% US Comm	% US Ind	% Total US
4,000 GWh	1.7%	1.3%	1.2%	1.4%

State TECHNICAL Potential (GW)					
Roof Solar	Utility Solar	CSP	Wind	Bio.	Geo.
5	1,898	1,017	252	2	2.4

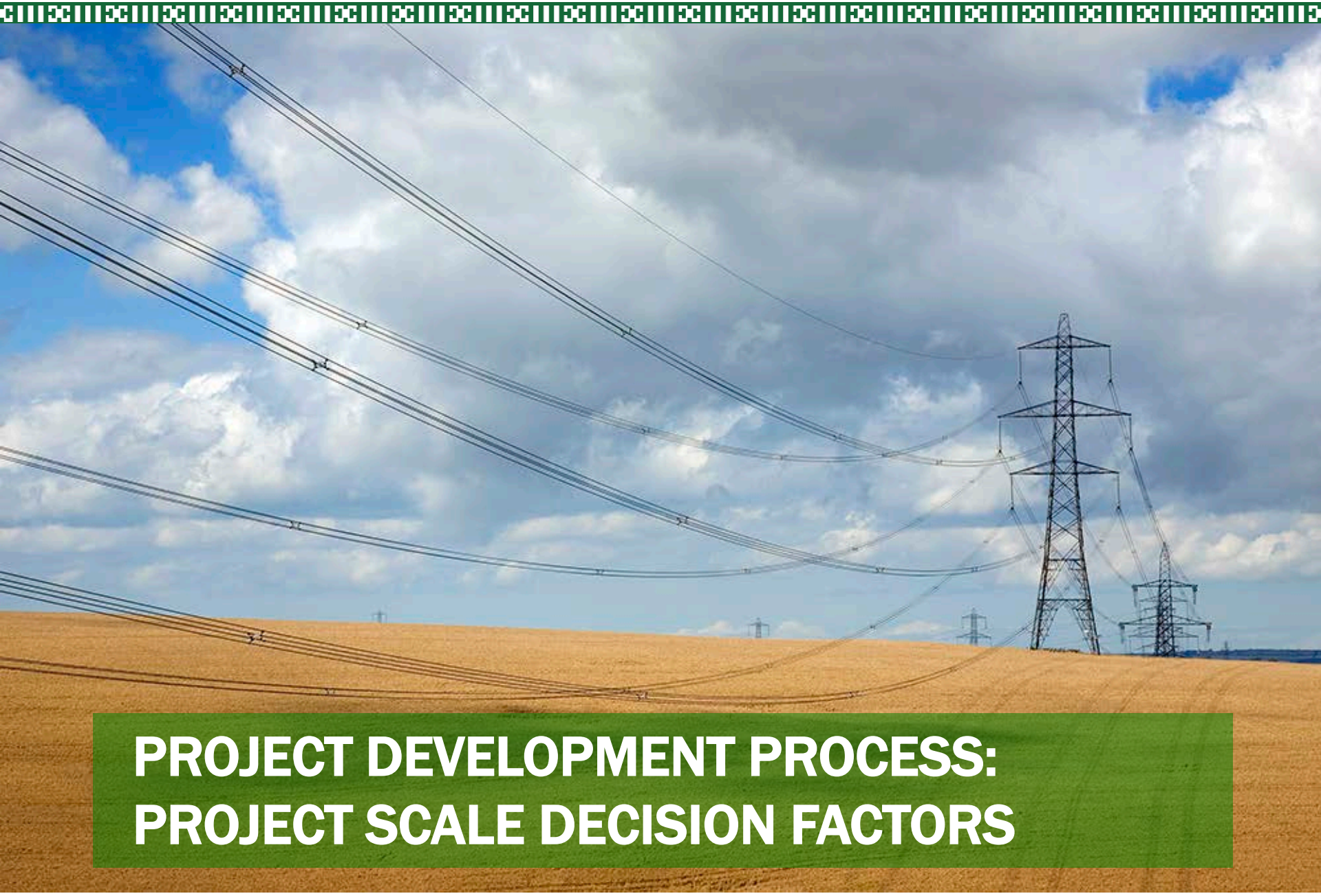
Tribal RESOURCE Potential (GW)					
Roof Solar	Utility Solar	CSP	Wind	Bio.	Geo.
ND	26.4	7.8	1.12	.0001	6



Major Utilities
None

Summary: Understanding Electricity Markets

- **Who Is Your Market?**
  - On-site
  - Utility/utilities
  - Nearby federal agencies (especially Department of Defense)
  - Large commercial or industrial off-taker
- **Getting Power to the Market**
  - Proximity to transmission
  - Current capacity of existing transmission
  - New transmission being planned
  - Required transmission studies take time; start early
- **Contracts Needed to Put It All Together**
  - Signed power purchase agreement (PPA) with creditworthy buyer
  - Signed interconnection agreement
  - Signed transmission agreement



PROJECT DEVELOPMENT PROCESS: PROJECT SCALE DECISION FACTORS

Impacts of Project Scale

- Projects have different attributes depending on their scale
- The scale of project drives financing options
- Transaction complexity increases with scale
- Two common roles for the Tribe would be the owner of the project or the purchaser of the electricity through the use of the PPA

Project Scale Attributes

	Facility-Scale	Community-Scale	Commercial-Scale
Likely Ownership	Tribe	Tribe or third-party developer/investor	Third-party developer/investor
Financial success metric	Savings on utility bills (present and future)	Savings on utility bills (present and future)	Positive cash flow for Tribe
Relative Investment	Low	Medium	High
Level of Complexity	Low	Medium	High
Potential Jobs Impact	Modest amount of construction jobs	More construction jobs	Potentially significant construction jobs Possibly O&M-related jobs
Time Frame	1–6 months	6–18 months	18 months–5 years

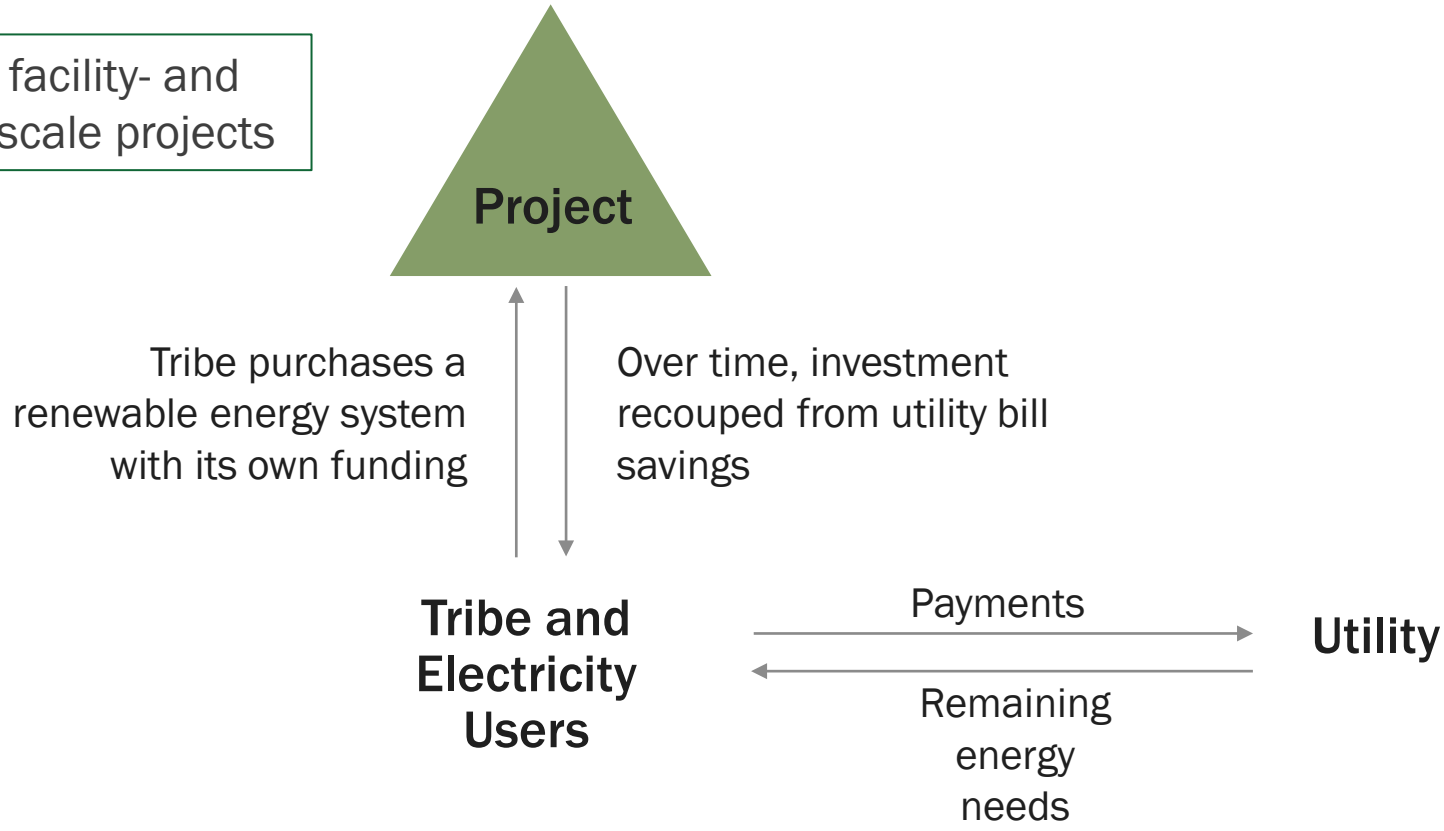
Project Ownership Options

Most common options:

- Direct tribal ownership
- Tax-equity partnerships

Direct Ownership Structure

Primarily for facility- and Community-scale projects



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

Ownership Options – Direct Ownership

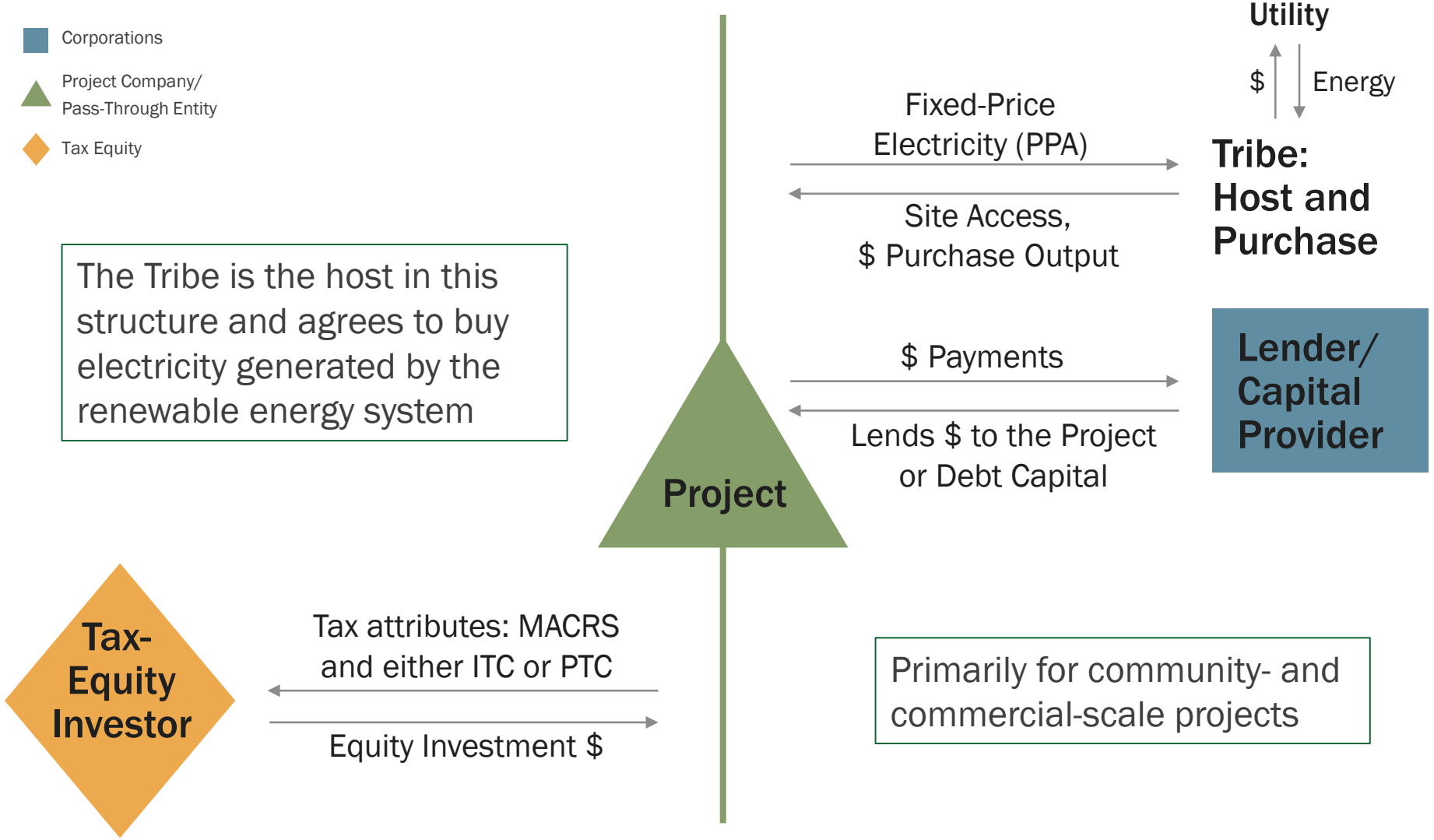
Advantages

- Maximum reduction in electricity bills
- Lower finance costs (or none depending on source)
- Full control over a project: design, operations, and risks
- Own renewable energy credits (RECs) and can choose to retain or monetize
- Might be only option for small projects

Challenges

- Need the resources to pay for the project
- Don’t fully benefit from available tax incentives given tax-exempt status
- Responsibilities of ownership (operations and maintenance [O&M])

Tax-Equity Partnerships and Third-Party PPAs



The Tribe is the host in this structure and agrees to buy electricity generated by the renewable energy system

Primarily for community- and commercial-scale projects

Tax-Equity Partnerships and Third-Party PPAs

Advantages

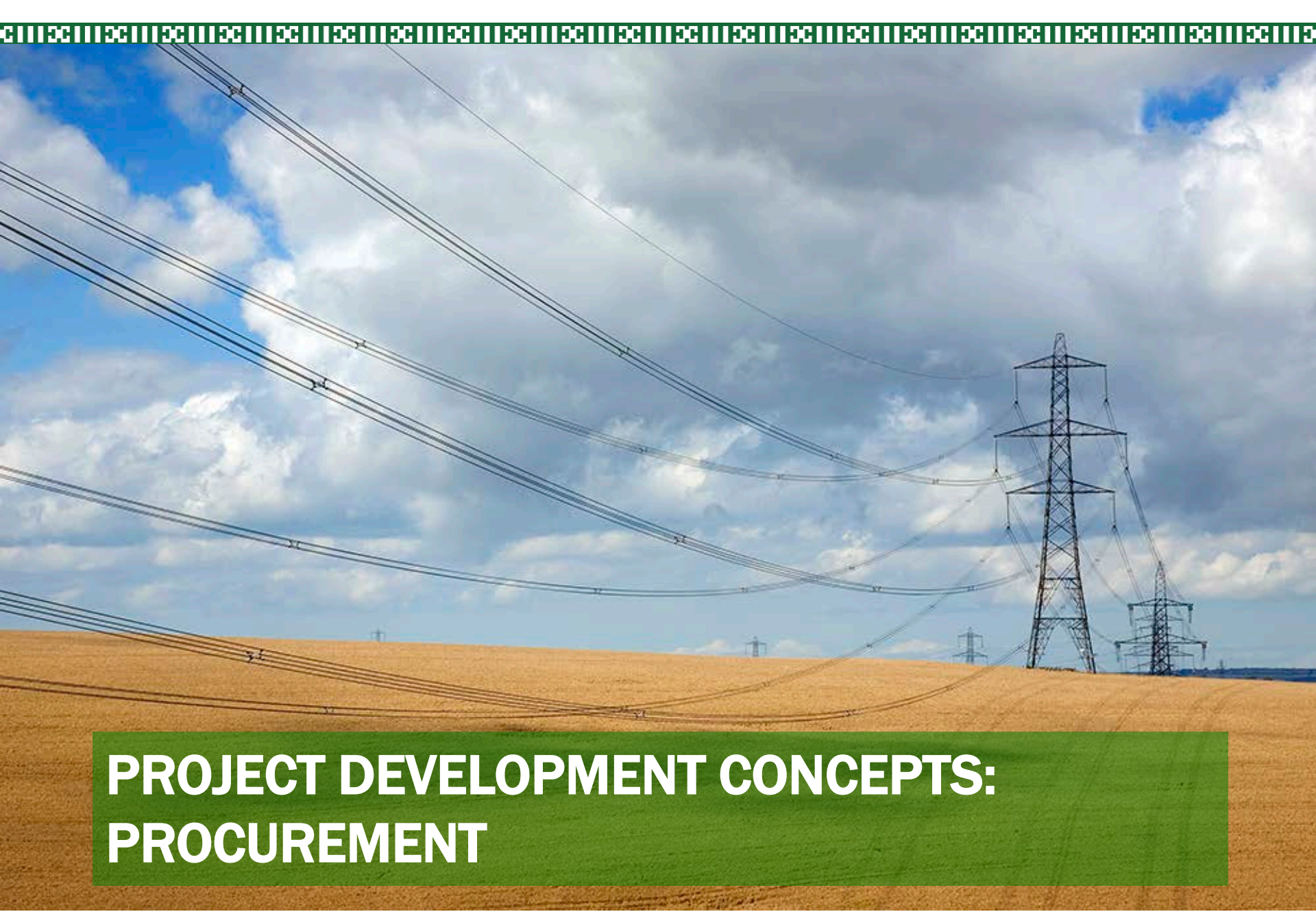
- No/low up-front outlay of capital
- Ability for tax-exempt entity to benefit from savings derived from tax-based incentives
- Fixed electricity price for 15–25 years
- No operating and maintenance responsibilities
- Path to ownership if desired

Challenges

- The process of negotiating a PPA can be lengthy and costly
- Need to be able to enter into longer-term contracts (10–25 yrs)
- Still pay for 100% of electricity
- Don’t own the green attributes (RECs) unless they are purchased
- Need to allow and manage site access
- Difficult to use for small projects (facility-scale)

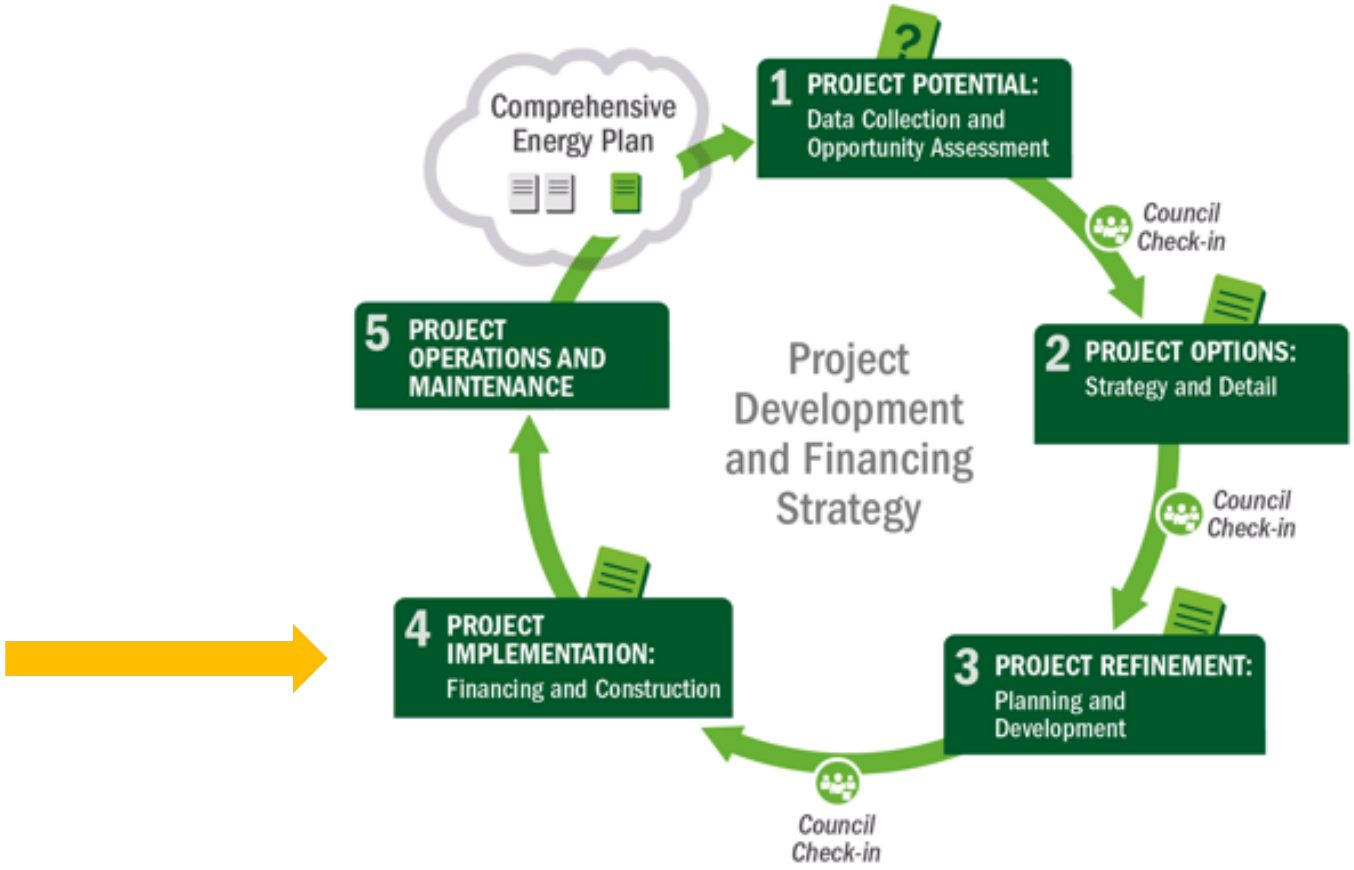
Summary: Project Scale Attributes

- Project attributes vary scale
- Facility-scale projects more likely to be directly financed and owned by the Tribe
- As projects get larger, financing options increase but so does complexity
- Third-party financed projects allow tax-based incentives to be incorporated into projects involving tax-exempt entities
- More complex roles and project structures are discussed in finance course



PROJECT DEVELOPMENT CONCEPTS: PROCUREMENT

Project Procurement and Implementation



Procurement Plan for RE System

Facility-Scale

- Tribe will likely purchase the system directly
  - Obtain funding
  - Select a contractor/installer

Community-Scale

- Direct purchase or third-party financed (PPA)
  - Procuring distinct things
    - Capital equipment or services agreement

Commercial-Scale

- Procuring a "partner" – very distinct pathway!
- Topic covered in the Project Finance course

Procurement Process

Facility- and Commercial-Scale Projects

Outline of the RFP Process

- **Develop RFP**
  - Timeline: 1 month – 1 year (depends on project scale and site complexity)
  - Who creates the RFP: Project leader, contract officer/lawyer, site manager(s), energy manager and technology expert. RFP writers will receive input from utility, tribal leaders, and stakeholders
  - RFP content
- **Issue RFP**
  - Tribal networks, federal networks and industry networks
- **Administer the RFP**
  - Proposal meeting(s)
  - Site tour(s) – can be concurrent with proposal meeting
  - Q&A process – ensure all developers get same information
- **Evaluate Criteria**
  - Should be a clear process with well defined criteria
  - Evaluation panel recommended to consist of an odd number of members (typically 3 to 7)
- **Award Contract**
  - Four approaches

Develop RFP

Key Elements of the RFP

- ☐ Type of procurement:
  - Purchase
  - PPA
  - Other finance structure
- ☐ Technical specification (scope of work)
- ☐ Criteria for evaluating proposals: 3–5 of most important project aspects
  - Proposed project solution that meets specified criteria
  - System performance guarantee
  - Developer experience, track record and customer satisfaction
  - Developer financial health/longevity
  - Maintenance plan
  - Reasonable timelines
  - Other

Develop RFP (continued)

Key Elements of the RFP

- ☐ Description of RFP administration process
  - Typically 2–5 months
  - Key dates: proposal meeting(s), sites visit(s), proposal due date
  - Description of how questions will be handled and answered
- ☐ Defining responsible parties
  - Who is responsible for permits
  - Who is responsible for interconnection agreements
  - Who is responsible for applying for incentives
- ☐ Any preferences on parties allowed to submit proposals
  - Small business
  - Minority-owned
  - Other
- ☐ Land use agreements
  - Address site access and land use issues as relevant to ownership model

Technical Specifications

Define Scope of Work

- What is the project scale
- Type of RE technology
- Site information:
  - Location
  - Interconnection requirements as known
  - Applicable codes and standards
  - Roof structure, soils, other (as applicable and available)
  - Site prep: fencing, roads, grading limitations, etc.
  - Installation requirements: min/max heights of equipment, vegetation mitigation, design standards for structural/electrical
- Equipment minimum standards and warranties
- Expected minimum performance (recommended) or capacity
- Commissioning plan

Evaluation Criteria

Two Typical Approaches

- Best value:
  - Typically 3–5 criteria with weighting based on importance
  - Score proposal on each criteria
  - Somewhat subjective and can lead to contentious, time-consuming evaluations but good method to capture best value
- Low price, technically acceptable
  - Proposals initially stripped of pricing/cost information
  - First evaluation determines proposals that meet technical hurdle
  - Technically acceptable proposal with lowest cost gets award
  - More transparent process but may not capture best value

Award Contract

Choose One of These Four Typical Approaches

- Award based on proposal
  - Awarded solely on merits of proposal
- Award with discussion
  - Awarded on proposal but contingent on clarifying discussions
- Award with discussion and negotiation
  - Awarded on proposal but contingent on further negotiation
- Award with best proposal
  - Best proposals are short-listed
  - Short-listed proposals asked for best final proposal revision
  - Award based on final proposal revision

Post-Procurement

Project Gets Built

Project Gets Commissioned

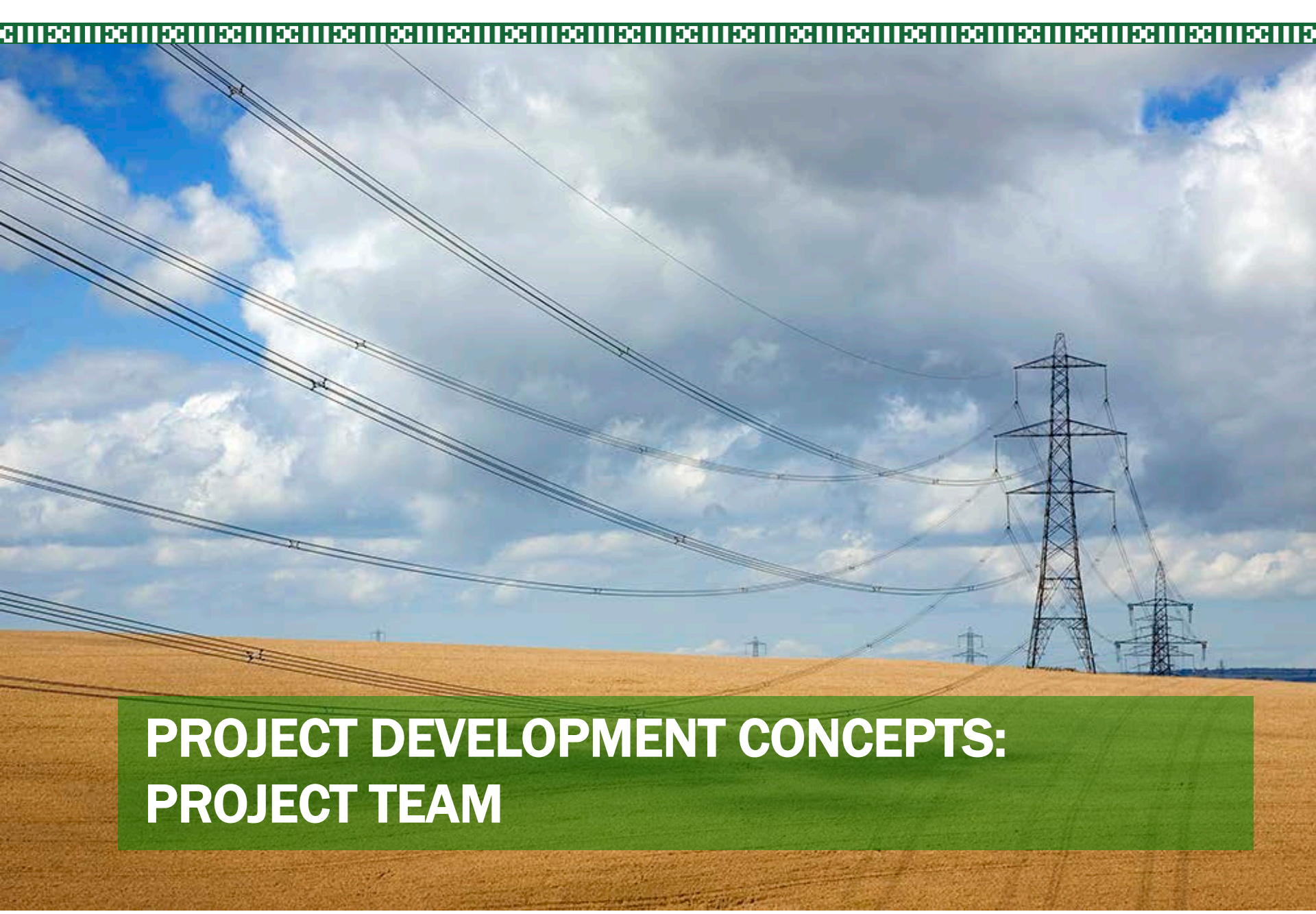
Ongoing Monitoring and Maintenance

Post-Procurement: Project O&M

- O&M agreements
- Warranties
- Monitoring system
- System performance
- Production guarantees
- Buyout options

Summary: Project Procurement and Implementation

- Procurement strategy will vary depending on the project scale and financing solution selected
- Increasingly more complex for larger projects
- Post procurement issues are critical as these are very long term assets and relationships



PROJECT DEVELOPMENT CONCEPTS: PROJECT TEAM

Key Concept: Project Team

- A successful project is usually the result of an effective team made up of individuals with diverse skills and experience
- Clearly defining roles and responsibilities at the outset is critical, including who is the ultimate decision-maker at various stages in the development process

Potential Team Members

- 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.
- Government
  - Tribal government, federal, state, local entities, regulating bodies (public utilities commission), Bureau of Indian Affairs, DOE, Federal Energy Regulatory Commission, etc.

Key Success Component

Identify and select an energy "champion" to shepherd the process

Photo by Dennis Schroder, NREL 21010

Project Champion's Role

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, Stacy Buchanan, Karlynn Cory, Jason Coughlin, Elizabeth Doris, Mike Elchinger, Sara Farrar-Nagy, Bill Gillies, Travis Lowder, Anirudh Paduru, Paul Schwabe, Bob Springer, Blaise Stoltenberg and Rachel Sullivan of the National Renewable Energy Laboratory; Joe Cruz and Matt Ferguson of Cohn Reznick; Paul Dearhouse of Dearhouse Consulting 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