

DOE OFFICE OF INDIAN ENERGY

Renewable Energy Project Development: Advanced Financing Concepts

Why It Makes Sense to Bring on a Third-Party Partner



U.S. DEPARTMENT OF
ENERGY

Office of
Indian Energy

Course Outline

What we will cover...

- About the DOE Office of Indian Energy Education Initiative

- Concepts for Financing Renewable Energy Projects on Tribal Lands

- Levelized Cost of Energy (LCOE)

- Business Structures

- Tax-Equity Partnerships – Introduction

- 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 Office of Indian Energy Course Terminology Guide



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

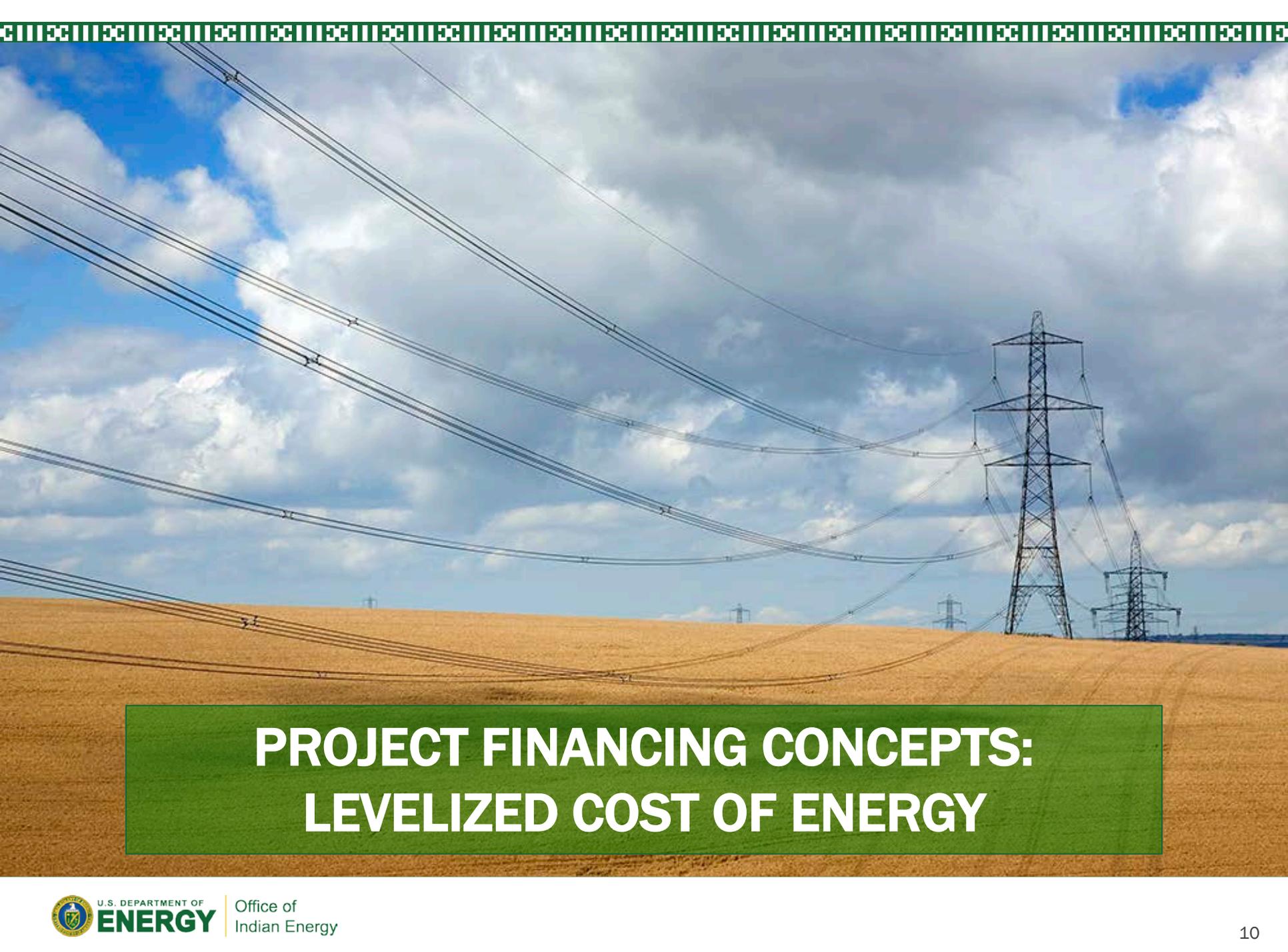
In-depth information on each key concept available in Advanced Courses

About the Speaker

Paul Schwabe

- Renewable energy finance and policy analyst at the National Renewable Energy Laboratory (NREL)
- Over 11 years of experience within various sectors of the energy and finance industries
- Financial and technical advisor to the U.S. Department of Energy, the U.S. Army, Consolidated Edison Co., and the California Public Utilities Commission





PROJECT FINANCING CONCEPTS: LEVELIZED COST OF ENERGY



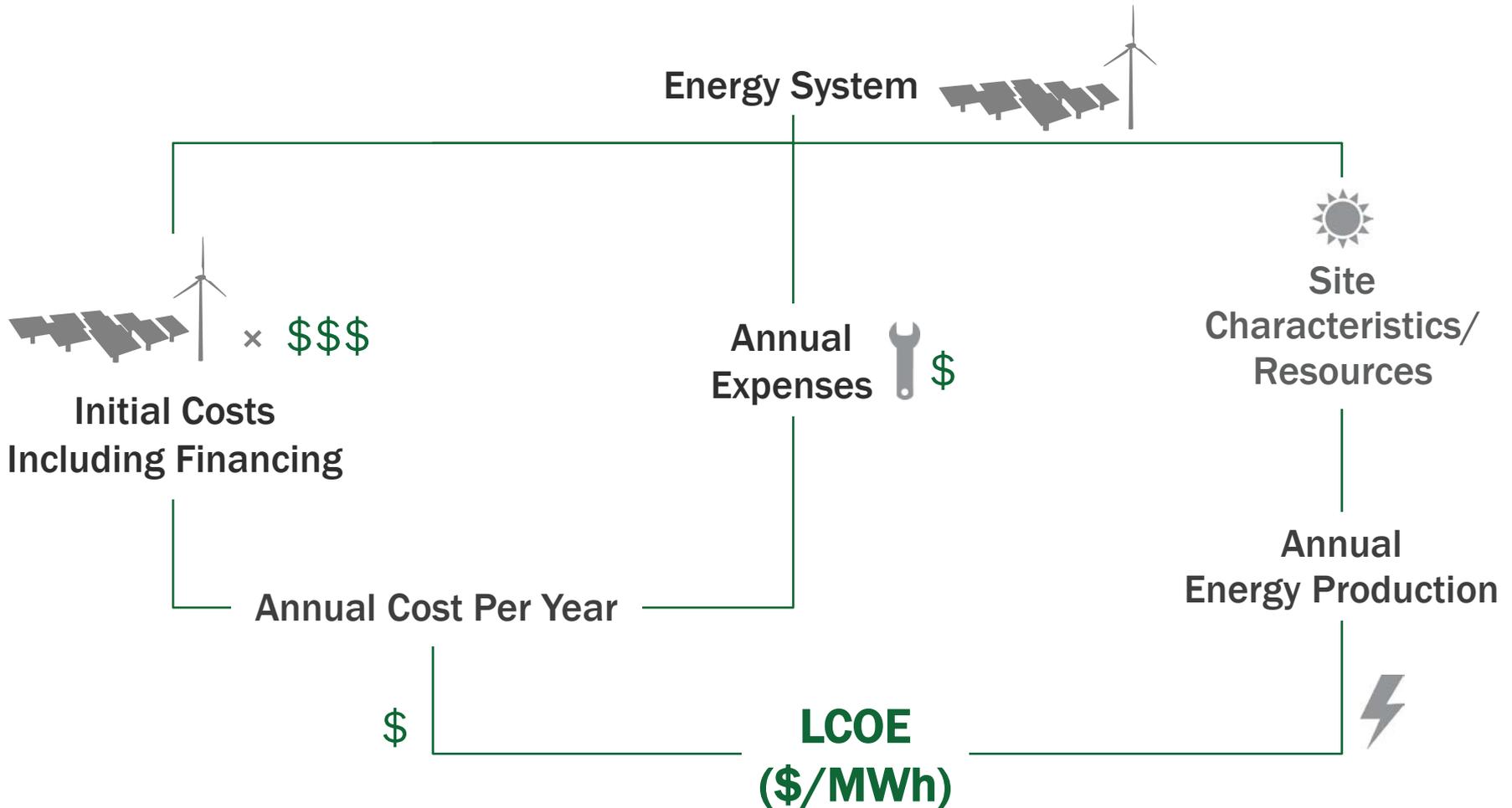
Key Concept: Levelized Cost of Energy (LCOE)



- Measures lifetime costs divided by energy production
- Calculates present value of the total cost of building and operating a power plant over an assumed lifetime. Expressed in real or nominal dollars on a megawatt-hour (MWh) or kilowatt-hour (kWh) basis
- Allows the comparison of different technologies (e.g., wind, solar, natural gas) of unequal life spans, project size, different capital cost, risk, return, and capacities

Critical to making an informed decision to proceed with development of a facility-, community-, or commercial-scale project

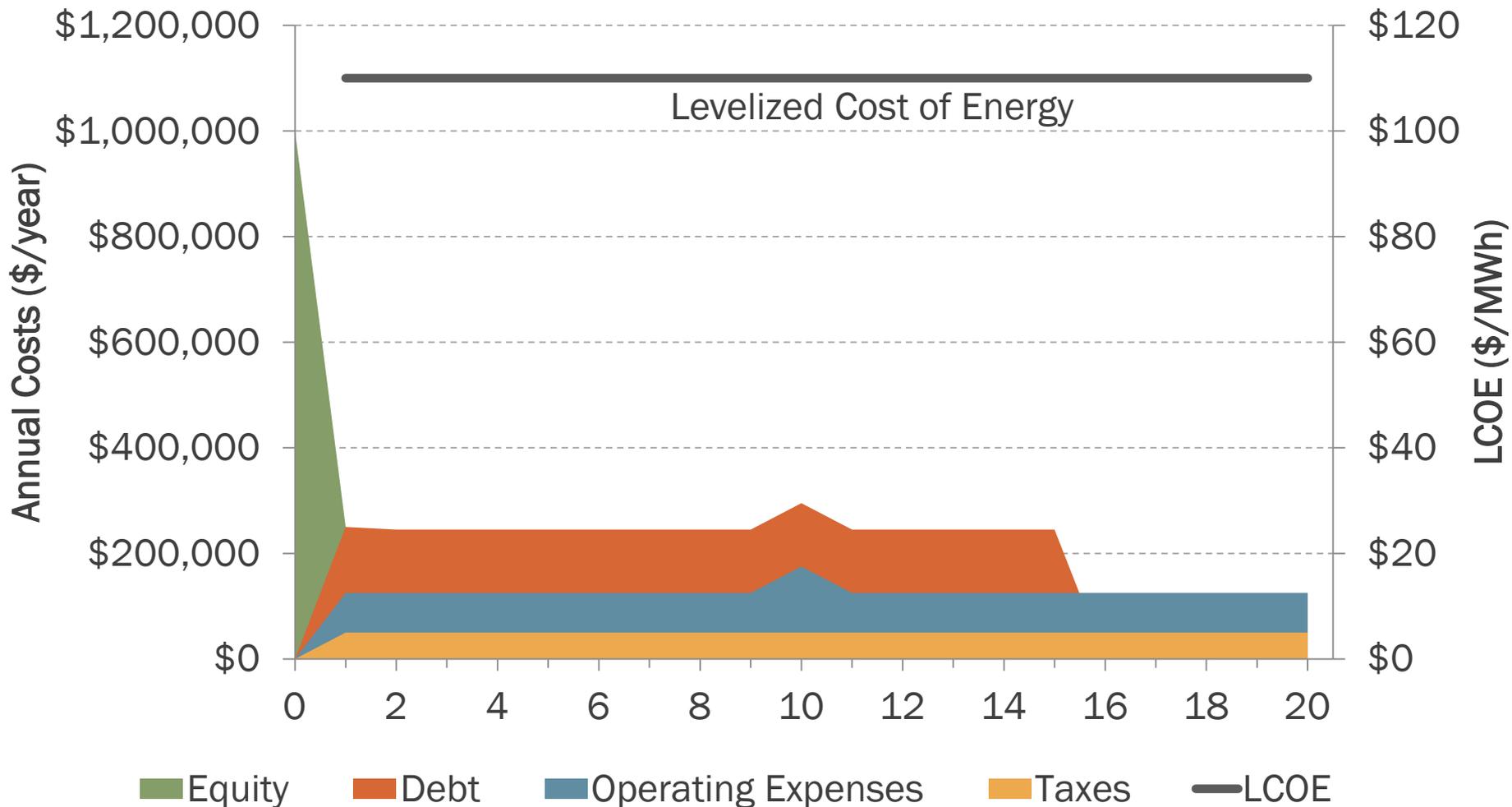
Simple LCOE Concept



Adapted from European Wind Energy Association, "Economics of Wind Energy,"

http://www.ewea.org/fileadmin/ewea_documents/documents/00_POLICY_document/Economics_of_Wind_Energy_March_2009_.pdf

LCOE and Cash Flows



Adapted from Black and Veatch "Levelized Cost of Energy Calculation":

http://www.efchina.org/csepupfiles/report/20112844913435.70772110666485.pdf/Levelized%20Cost%20of%20Energy%20Calculation_BV_EN.pdf

Simplified LCOE Calculation

$$\frac{\sum_{t=1}^n \frac{I_t + M_t + F_t}{(1+r)^t}}{\sum_{t=1}^n \frac{E_t}{(1+r)^t}}$$

I_t = Investment expenditures in year t (including financing)

M_t = Operations and maintenance expenditures in year t

F_t = Fuel expenditures in year t

E_t = Electricity generation in year t

r = Discount rate

n = Life of the system

Using LCOE

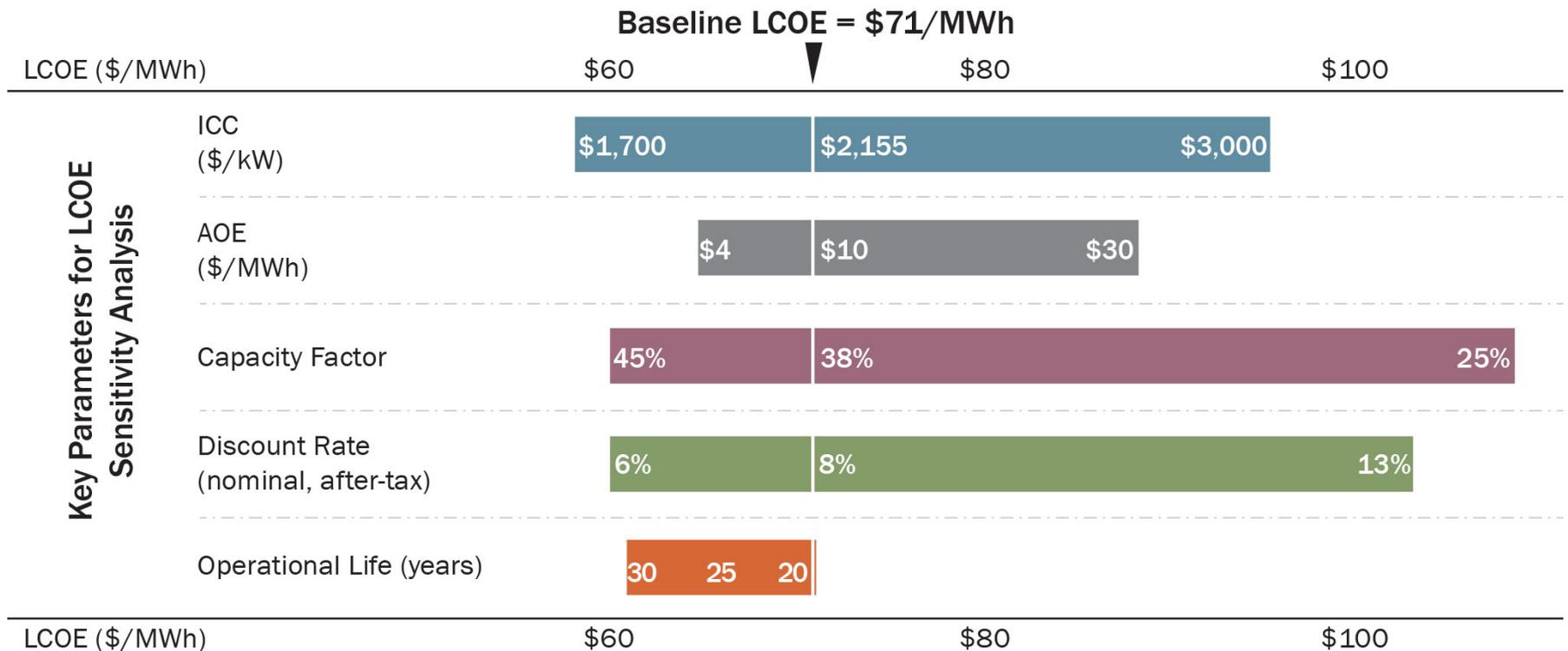
Calculating and comparing LCOE can:

- Measure value across the longer term, showing probable life-cycle costs
- Highlight opportunities for Tribes to develop different scales of projects (facility, community, or commercial)
- Inform decisions to pursue projects on an economic basis, compared to utility rates

Most renewable energy projects have zero fuel costs (with biomass being the possible exception)

Wind LCOE Sensitivity: What Are the Big Drivers?

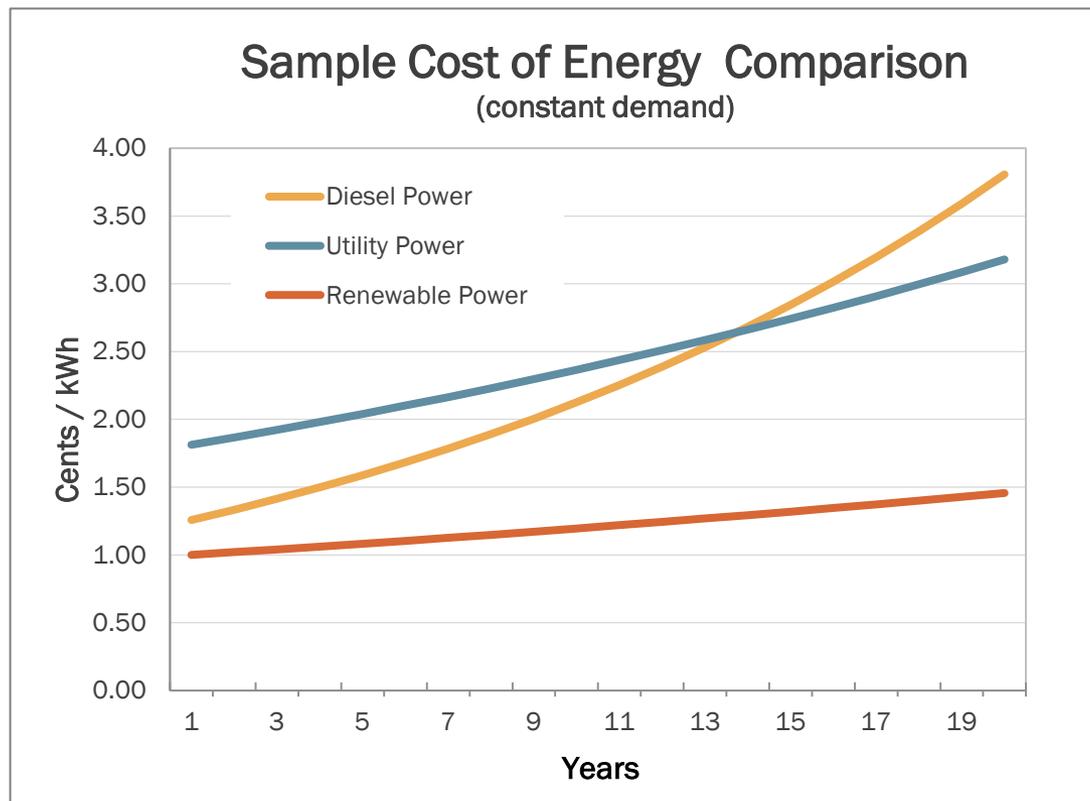
Initial capital cost (ICC) and capacity factor are two critical drivers, but discount rate (financing costs) and annual operating expenses (AOE) are non-trivial. Wind LCOE example shown below:



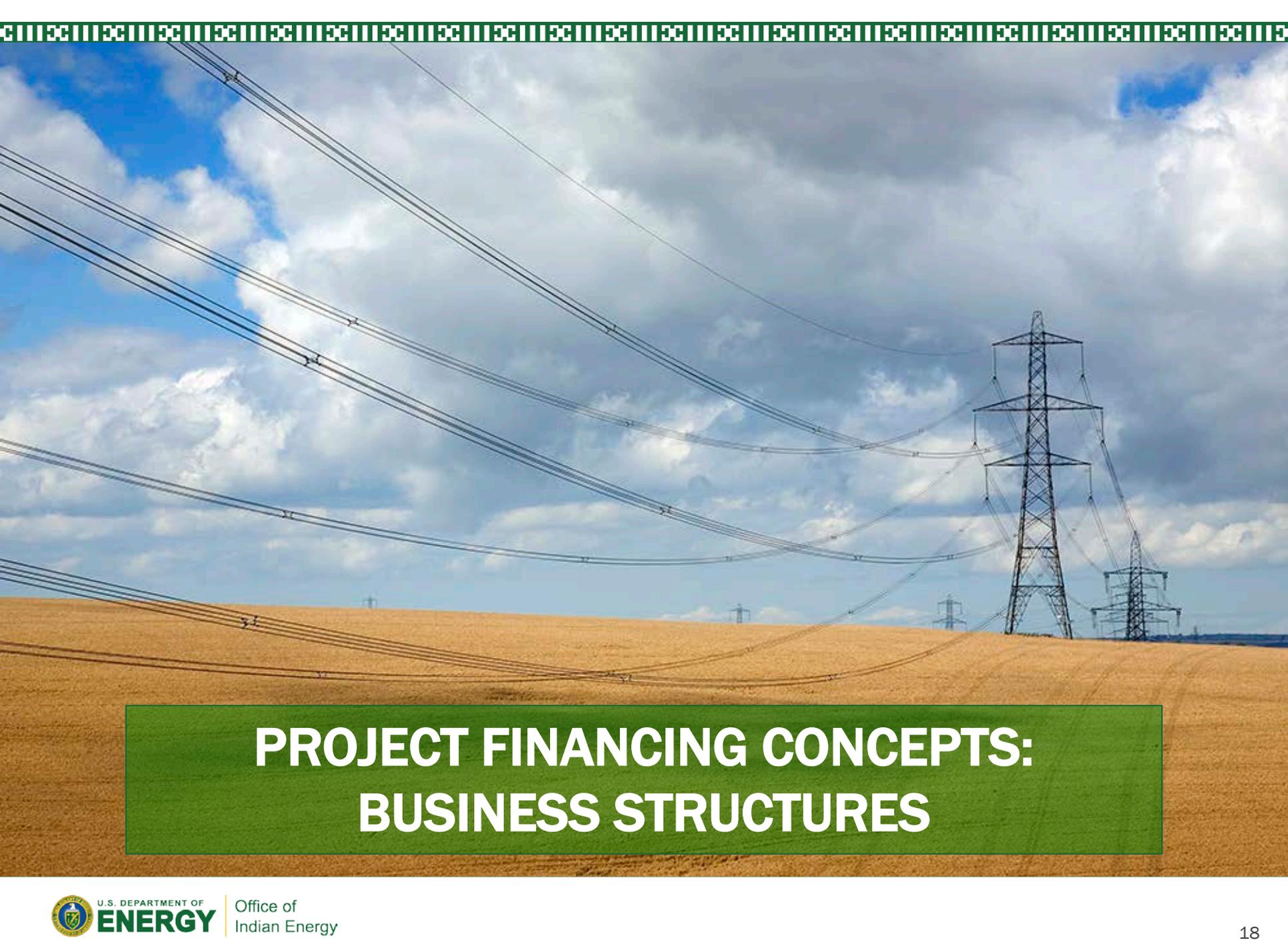
Source: Tegen et al. 2012

Tribal Community Scale Example

A Tribe in Arizona has a remote facility not served by the grid. Diesel fuel is used to power generators to run 24/7.



- Currently, grid tie appears more expensive than diesel generators
- Immediate savings from new solar generation, including infrastructure
- Savings could total ~\$20M over 20 years
- Calculations assumed tax equity used by third-party solar provider



PROJECT FINANCING CONCEPTS: BUSINESS STRUCTURES



Importance of Choosing the Right Business Structure

- Protect tribal assets
- Preserve tribal sovereignty
- Minimize potential liability



Photo by Brian Hirsch, NREL 20893

Business Structure Options for Tribes

- Tribal government entities
 - Unincorporated instrumentalities
 - Political subdivisions
- Section 17 corporations
- Tribally chartered corporations
- State law entities
 - State law corporations
 - Limited liability companies (LLCs)
- Joint venture

Business Structure: Tribal Government Entities

Option 1: Unincorporated Instrumentalities

Advantages

- Easy to form
- Management is centralized
- Not subject to federal income tax
- Same privileges and immunities as tribal government

Disadvantages

- Politics and business are not separated
- Assets and liabilities of the enterprise not separated from governmental assets
- May preclude equity ownership by outside investors

Option 2: Political Subdivisions

Advantages

- Exempt from federal income tax
- Retain sovereign immunity
- May issue tax-exempt bonds
- Ability to form a corporate board

Disadvantages

- Timely and costly to form the entity
- Not as much flexibility as corporations and LLCs
- May deter certain business partners

Source: Office of Indian Energy & Economic Development 2008

Business Structure: Section 17 Corporations

Tribes can form corporations under Section 17 of the Indian Reorganization Act of 1934

Advantages

- Same privileges and immunity as the tribal government, including tribal sovereign immunity
- Separates the assets and liability of the corporation from tribal asset
- Not subject to federal income tax

Disadvantages

- Lengthy timeline to obtain a corporate charter
- Corporation must be wholly owned by a Tribe
- Example of Section 17 Corp: S&K Technologies, Inc.
 - Environmental restoration
 - Stream channel reconstruction
 - Native plant re-vegetation
 - Civil construction



Tour of the Ponnequin Wind Farm. Photo by NREL 09827

Business Structure: Tribally Chartered Corporations

- Formed by tribal ordinance or tribal corporation code
- Must select a name and draft articles of incorporation
- Best utilized to operate on reservation as an arm of the tribal government
- Example: Ho-Chunk, Inc.
 - Information technology
 - Construction
 - Government contracting



Rooftop PV installation on the Forest County Potawatomi Tribe administration building.
Photo from Forest County Potawatomi Tribe, NREL 20107

Business Structure: State Law Entities

State Law Corporations and LLCs

Advantages

- Quick and easy to organize
- Familiar to lenders and potential business partners
- Can be used to acquire or merge with an existing state-law entity

Disadvantages

- Subject to federal income tax
- May not issue tax-exempt debt



Weather Dancer 1 wind project in Alberta, Canada. Photo from Piikuni Utilities Corporation, NREL 13792

Business Structure: Joint Venture – LLCs or Limited Partnerships

Advantages

- Acquire energy project development expertise
- Secure project financing
- Enjoy benefits of federal incentives (e.g., tax credits)

Disadvantages

- Likely loss of sovereign immunity for the joint venture entity
- Inability to qualify for certain kinds of financing



Photo from Bob Springer, NREL 21044

Evaluating the Options

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





PROJECT FINANCING CONCEPTS: TAX-EQUITY PARTNERSHIPS



Key Concept: Tax-Equity Partnerships



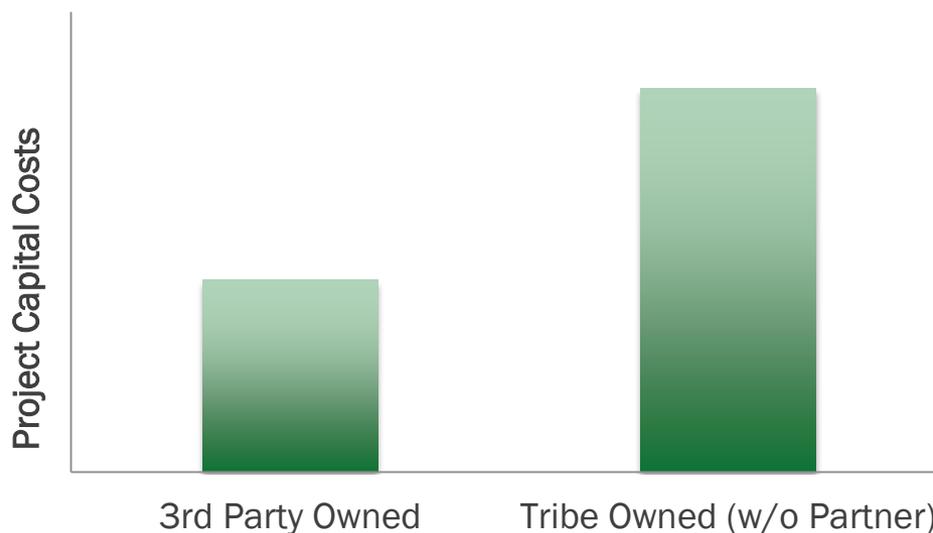
- Tribe can benefit from tax-equity incentives without being taxable
- Tribes can partner with third-party tax investors and/or developers to gain this incentive/advantage
 - Recent IRS private letter ruling supports tribal partnerships with third-party tax equity
 - Even with IRS ruling, the Tribe needs capital to build a large renewable project; less is needed for smaller projects
- Tax incentives such as a Modified Accelerated Cost Recovery System (MACRS) and either production tax credit (PTC) or income tax credit (ITC) can represent up to half the project value, or reduce project's capital costs by ~50%
- Tribe benefits from the renewable project by either reducing electricity costs or offering a more competitive price for energy and renewable energy credits (RECs) from the project to a utility

Challenges of Tax Credits and Tax-Equity Finance

1. Tax credits cannot be used efficiently by entities without significant tax liability
2. Value of the credit is diminished through transaction costs and cost of tax-equity finance
3. Limited pool of investors and complexity of structures makes tax equity a particularly expensive source of capital
4. Investors generally want large projects, or portfolio/series of deals so it is worth it

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, since they are sizable
- Many projects also require state-level incentives in order to be economic

Federal Tax Incentives

- Production Tax Credit (PTC)
- Investment Tax Credit (ITC)
- Modified Accelerated Cost Recovery System (MACRS) and bonus depreciation

Production Tax Credit (PTC)

- Generally, 10-year tax credit for power produced
- 2.3¢/kWh for wind, geothermal, and closed-loop biomass technologies
 - PTC value is adjusted for inflation annually
 - 1.1 ¢/kWh for other technologies
- Requirements on ownership and third-party sales (e.g., prohibits leasing)
- Project must “*start construction*” before 1/1/2014 to qualify (see IRS for starting construction qualifications)

For more information on the production tax credit, see:

http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=US13F&re=1&ee=0

Investment Tax Credit (ITC)

- One-time tax credit worth either 30% or 10% of project's eligible tax basis (by technology)
- No owner/operator requirements (i.e., enables leasing financing structures)
- Recapture and normalization limit range of project owners, investors, and ability to sell project within first six years of operation
- Property must be “*placed in service*” before 1/1/2017 to qualify

For more information on the investment tax credit, see:

http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=US02F&re=1&ee=0

Depreciation

- **Modified Accelerated Cost Recovery System (MACRS)**
 - Allows for depreciation of assets over five full years (instead of lifetime)
 - If used in conjunction with ITC, depreciable basis is reduced by half the value of ITC (meaning 85% of eligible costs are depreciable)
- **Bonus Depreciation**
 - Currently, allows for 50% depreciation in first year
 - Expires 12/31/2013
 - Bonus depreciation can be difficult to utilize fully as it requires large tax liabilities in the first year of a project (particularly large ones)

MACRS Depreciation Schedule

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
MACRS	20.00%	32.00%	19.20%	11.52%	11.52%	5.76%
MACRS + Bonus	60.00%	16.00%	9.60%	5.76%	5.76%	2.88%

For more information see http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=US06F&re=1&ee=0

Comparison of Tax Incentives

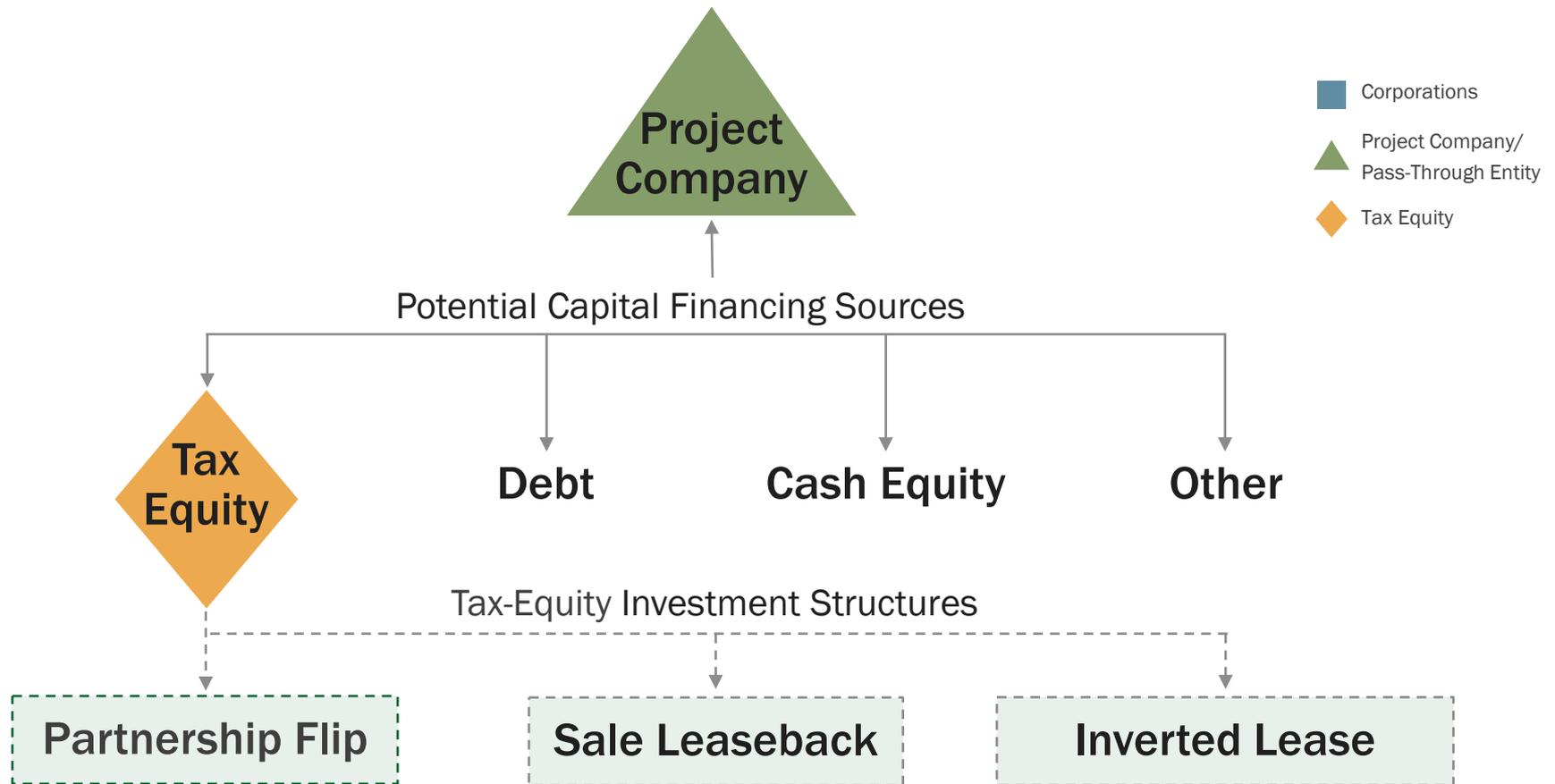
	PTC	ITC	Accelerated Depreciation
Value	Tax credit of 2.3¢/kWh or 1.1 ¢/kWh, depending on tech	Tax credit of 10% or 30% of project costs, depending on tech	Depreciation of eligible costs (not all project costs qualify)
Select Qualifying Technologies	<ul style="list-style-type: none"> • Wind • Geothermal • Biomass • Hydro 	<ul style="list-style-type: none"> • Solar • Fuel cells • Small wind • Geothermal 	Depreciation can be taken with either PTC or ITC
Basis	Energy produced over 10-year period. Can be combined with depreciation, but not ITC	Eligible project cost. Credit taken once the project is placed in service. Can be combined with depreciation, but not PTC	<p>MACRS: 5-year depreciation schedule</p> <p>Bonus: 50% first year accelerated depreciation on equipment</p>
Expiration	Start construction before 1/1/2014	Placed in service before 1/1/2017	<p>MACRS: None</p> <p>Bonus: 1/1/2014</p>

Renewable Project Finance

- **Economics are Dependent on Tax Equity/Other Policy**
 - Governments/nonprofits have no tax appetite
 - Utilities may value RECs to satisfy legal requirements
 - Third-party financing can be one solution
- **Key Contract: Power Purchase Agreement (PPA)**
 - A long term, financeable commitment to buy project output
 - Generally addresses energy and attributes (like RECs)
 - Allows developer to monetize tax or other policies
 - Finding a power purchaser/off-taker is key for securing capital

Several common financing structures and financing sources are used by the industry to finance renewable energy projects

Capital Structure with Tax Equity



Non-Taxable Government Entity Example

PROJECT: Denver International Airport installed a 2-megawatt solar array to provide up to half of the electricity to power the people mover transit system

MARKET BARRIERS: Cost of electricity, price stability, construction risks

GOVERNMENT ROLE: Sponsor, off-taker

TRANSACTION SUMMARY: MMA Renewable Ventures (MMA) financed and owns the project and sells the electricity it produces to the airport under a long-term PPA

OUTCOME: DIA reduced electricity costs; MMA sells the RECs to Xcel Energy to fulfill its state renewable energy obligation (through 2020). MMA receives a rebate from Xcel, a large tax federal break, and generates revenue from the electricity the array produces

Project Name	Denver Airport Solar Project
Size (DC)	2,000 kilowatt (kW);
Type	Ground-mount, single-axis tracking
Developer	World Water & Solar Technologies
Owner	MMA Renewable Ventures
PPA Terms	<ul style="list-style-type: none">• 25 years• Fixed-price 6¢/kWh for first 5 years• Buyout option at year 6, or price increases to 10.5¢/kWh

Source: <http://www.nrel.gov/docs/fy10osti/46668.pdf>; and <http://thegreenwombat.com/2007/10/01/denver-airport-goes-solar/>

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- Levelized Cost of Energy (LCOE)

- Business Structures

- Tax-Equity Partnerships – Introduction

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.nerlearning.org

THANK YOU



INFORMATION ON THE CURRICULUM PROGRAM & 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.nerlearning.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