DOE Office of Indian Energy Renewable Energy Project Development Training: Curriculum Overview

National Congress of American Indians

Annual Meeting: November 1, 2011

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National Renewable Energy Laboratory
Matt Ferguson and Joe Cruz, The Reznick Group

DOE Office of Indian Energy

Mission: Direct, foster, coordinate, and implement energy planning, education, management, and programs that assist tribes with energy development, capacity building, energy infrastructure, energy costs, and electrification of Indian lands and homes.

Why Are We Here?

Indian Country contains a significant portion of United States energy resources

- **Tribes:**
  - **Energy development can provide foundation for increased economic development and support Tribal sovereignty**
  - Attracts trade and investment
  - Indian Country capital markets interested in clean energy investment
- Traditional project finance/tax equity models can be challenging in Indian Country

The Situation

- Fewer than five renewable energy (RE) power plants in operation, with a combined capacity of less than 60 megawatts (MW)
- Lands in Indian Country have the resources to produce:
    - 1.3 million megawatt-hours (MWh) of wind (**about 148,000 homes**)
    - 9.2 million of solar photovoltaics (PV)
    - 4 million MWh of biomass
- Federal incentives reduce net capital cost for biomass, geothermal, wind, and solar projects **by about 30%**
- Interest expressed gaining access to DOE's unique expertise on how traditional renewable energy projects are financed - requested during Office of Indian Energy's National Tribal 2011 Tribal Roundtables and Energy Summit

Purpose of the Training Series

- Provide technical assistance directly to Tribes regarding the development of renewable energy projects on tribal lands
- Train tribal leaders and executives on the options for renewable energy development on tribal lands by:
  - Outlining a framework for project development
  - Describing commercial renewable energy technologies and where they may best be developed
  - Describing and giving examples of ***proven*** financing structures

Office of Indian Energy Project Development Training Curriculum

- **100 Series:** Project Development Framework
- **200 Series:** Market and Situation Analysis
- **300 Series:** Tribal Role and Associated Financing Options

Purpose of Today's Workshop

- Provide an overview of the training series
- Give an overview of the opportunity, framework, and ownership structures for project development
- Solicit feedback on training series usefulness and identify further tribal needs for assistance in project development

Timeline for Training Series

November 1, 2011:

NCAI Workshop Overview

January/February 2012:

Full In-Person Multi-Day Training

April 2012:

E-Learning Trainings

100 Level Training Series
Project Development Framework: BEPTC™ and SROPTTC™

Jeff Bedard

National Renewable Energy Laboratory

What You Know

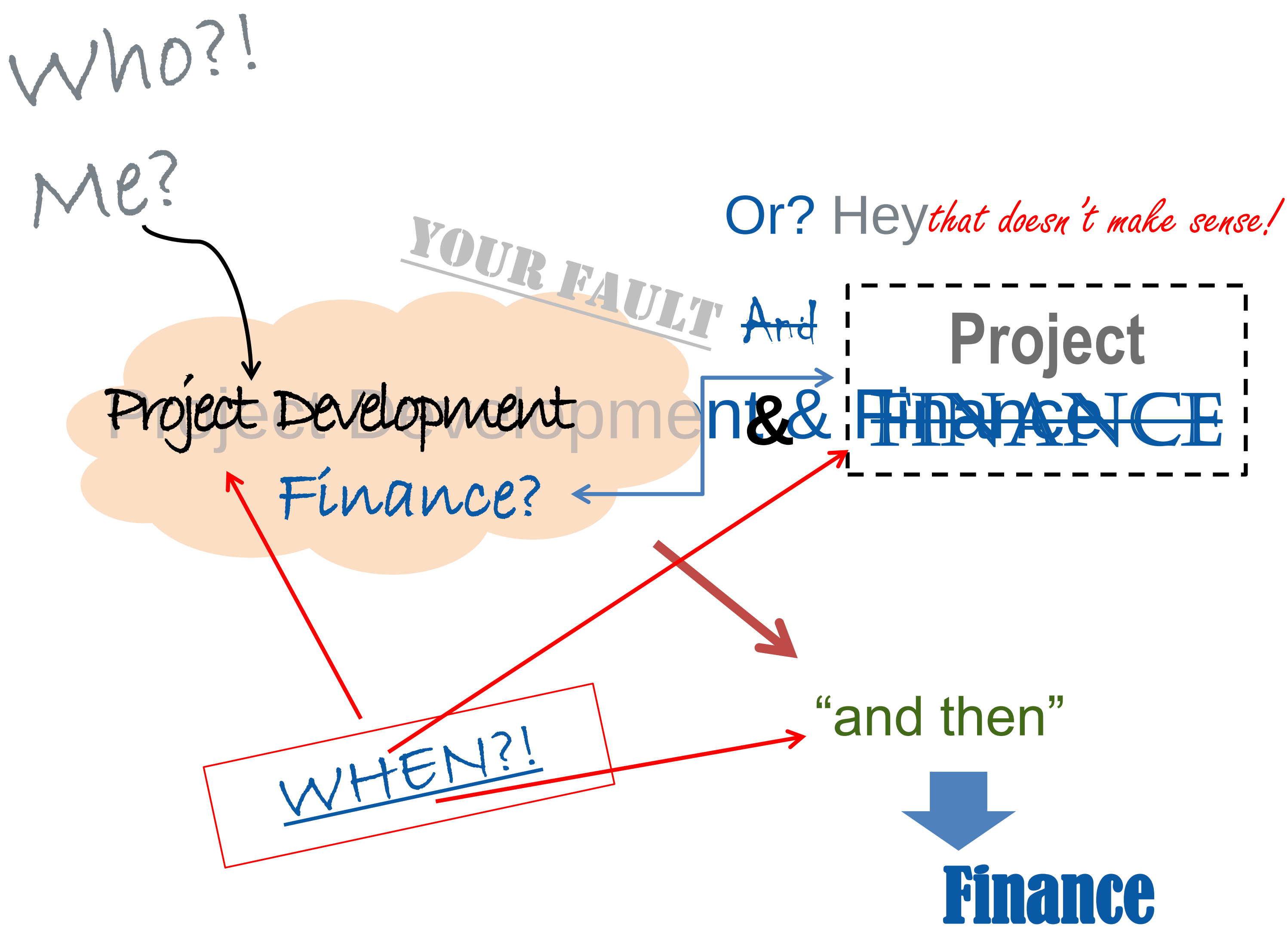
- Opportunity exists for renewable energy development on tribal lands
- You have an existing electrical demand
- You would like to make money

What You Will Learn

- Project development process and common pitfalls
- What you need for success
- How to say NO!

Intent

This methodology serves the intent of **<u>actually</u>** building "the project" at the end of the day, and driving to that conclusion while managing risk.



Who?!
Me?
YOUR FAULT
Or? Hey that doesn't make sense!
~~And~~
Project Development
Project Development & Finance
&
Project
FINANCE
Finance?
WHEN?!
"and then"
Finance

Key Concept ♦ Project Development

THERE ARE TWO CONCEPTS TO DEVELOP

- Market Context **(BEPTC)**
- Project Development Framework **(SROPTTC)**

Key Concept ♦ Project Motivation

Project Motivation

- Developing project concepts into reality requires a strong foundation of drivers to overcome challenges, uncertainty, and maintain forward momentum.

- In a commercial application, this is first established in a market analysis; if a public entity is involved, it is not the same thing (or even appropriate), but the effect has to be achieved.

Project Motivation

If the opportunity is big and resilient enough, it will motivate the effort and investment needed to overcome the challenges, continue the investment, and mitigate the risk.

Project Motivation: Market Context

I'm motivated already! **How do I do it?**

- **B**aseline: existing energy "reality"
- **E**conomics: fundamental driver(s)
- **P**olicy: create conditions for success
- **T**echnology: what, when, where, how many?
- **C**onsensus: establish, advance, defend

Establish and maintain motivation within this framework

BEPTC

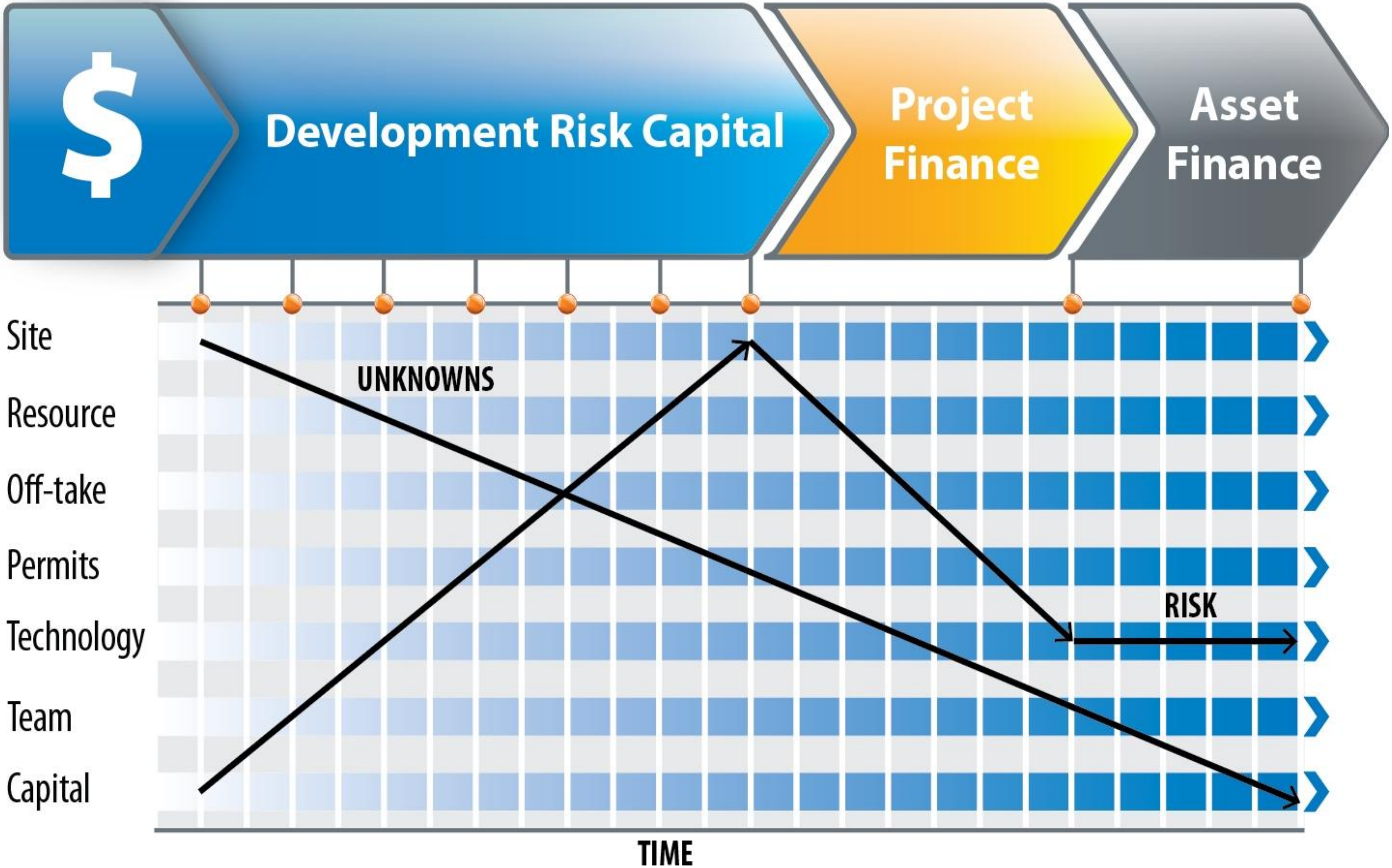
BEPTC – Project Motivation Framework

Baseline	Economics	Policy	Technology	Consensus
Your Energy Reality	**Fundamental Drivers**	**Conditions for Success**	**What, when, how many…**	**Defend, defend, defend…**
• Define energy • Unit and point of measure • Source of fuel • Vulnerabilities • Impact to economy • Industry structure • Regulatory structure	• Understanding costs AND benefits • Dominant input to energy economics • Relationship between inputs and results • Ratepayer perspective • Social cost/benefit	• Market Policies • Regulatory Policy • Economic Development • Jobs • Energy Security • Environmental Policy	• What is real? • What is experimental? • Which one is right for my system/location? • How much is here? • How much can be used? • Integration/ reliability?	• Communicate • Create a forum • Defend fundamentals • Build consensus • Raise the level of conversation • Lather, rinse, repeat

Key Concept ♦ Process Discipline

SROPTTC

Site
Resource
Off-take
Permits
Technology
Team
Capital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Development Risk Capital
Project Finance
Asset Finance
Site
Resource
Off-take
Permits
Technology
Team
Capital
UNKNOWNS
RISK
TIME

Process Discipline: SROPTTC

Using this framework to visualize the development process:

- Best practice: process is iterative; each iteration aims to find a fatal flaw and end project – manage development risk.
- Best practice: not making the GO/NO GO decision until the end; incremental decisions followed by incremental investments, managed investment risk.
- Best practice: focus on (invest in) pro forma inputs incrementally, maximizing yield on every dollar invested.

Pitfalls:

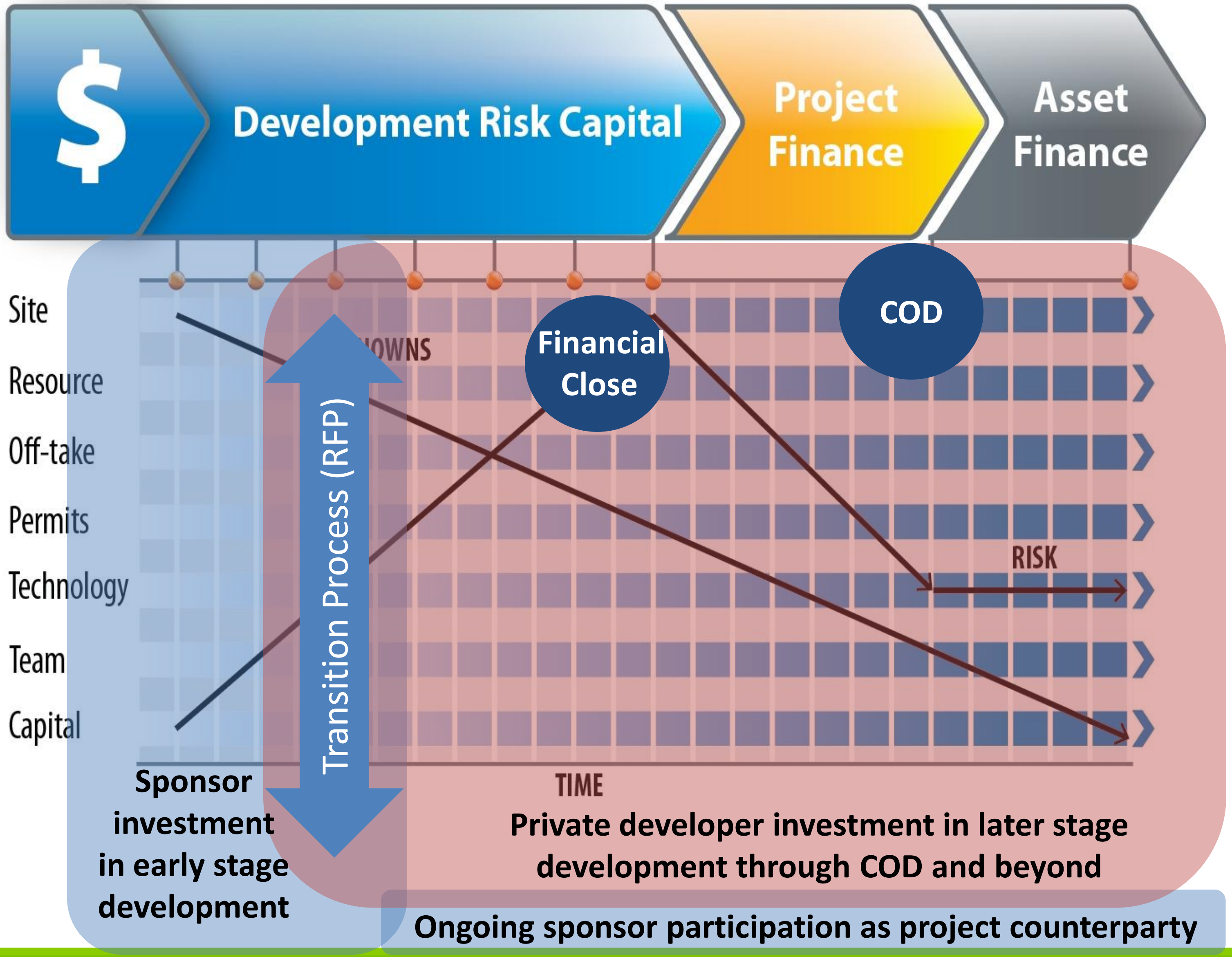
(1) Mistaking each iteration for final "go/no go", vs. "go forward/stop"

(2) Not getting out early enough on bad projects (even if investment would be lost)

(3) Not investing for fear "it won't work"; BEPTC probably not fully developed, which may indicate that doing nothing is riskier than investing under uncertainty.

SROPTTC – Project Development Framework

Site	Resource	Off-Take	Permits	Technology	Team	Capital
No Site, No Project	**Engineering Assessment**	**Off-take Contract – (Revenue)**	**Anything that can stop a project if not in place…**	**Engineered System**	**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 • Characteristics (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 • Intercon • Performance • Enforcement • Take or pay • Pricing and terms	• Permitting/ entitlements • Land disturbance • Environmental • Cultural impacts • Resource assessments • Wildlife impacts • Habitat • NEPA, EIS • Utility inter-connection • Other utility or PUC 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 • Utility interconnection expertise • Construction/ contract management • Operations • Power marketing/ sales	• Development equity • Project equity • Project debt • Mezzanine or bridge facility • Tax equity • Grants, rebates, other incentives • Environmental attribute sales contracts (RECs) • Bond finance • Non-recourse project finance



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

	Project Debt			Tax Equity		Lease Equity	DOE
	Bank	Private Bond	Term Loan	Levered	Unlevered		
Investor Universe	Commercial Banks	Private or 144A Offering	Institutional investors w/energy focus	Financial investors and some corps. with tax appetite.		Lease equity market, institutional	DOE supports 100% or 80%
Target Rating	"Investment Grade" no rating needed	BBB-/NAIC 2	B is doable; BB is preferred	NA (Investment Grade Offtaker)		NA (Invest. Grade Offtake)	NA
Market Capacity	Up to $1 Billion; up to 1.0XDSCR in Low Case	+$1.0 Billion	$750 Million	Sized to target IRR		Sized to 20-49% of Capital Stack	No Limit
Indicative Pricing	L+250-350 2007: 100-150 +fees 1.5-2.0%	7% Area; T + 5%-6% Fixed	L+250-500; 425 - 450 Libor floor;	11-13.5; IRR by Flip	9-10.5% IRR by Flip	9.0-12.5% after tax yield	T+75-100 bps
Tenor	5-7 years typical, up to 15	Term of PPA (20-25); Prepayment Penalty	Up to 7 years	Target IRR reached by year 10 with PTC; 6-7 with ITC		80% of Useful Life	Up to 30 years
Sizing Profile	DSCR Requirements 1.30-1.40X; lockbox; PPA 'Tail'; EPC with credit support; LIBOR Swaps; Reserves		1% amortization with cash sweep	Downside flip dates: +3 years in downside; +6 years in severe downside		1.30-1.40 "RSCR" Like Project Debt	Driven by required Ratings

100 Series Summary

- Project development is iterative—it's about identifying and moving forward on the most likely successful projects
- Use BEPTC to verify feasibility, identify, and define motivation for a project
- Use SROPTTC to work through project development process

200 Level Training Series
Situation and Option Analysis

Liz Doris

National Renewable Energy Laboratory

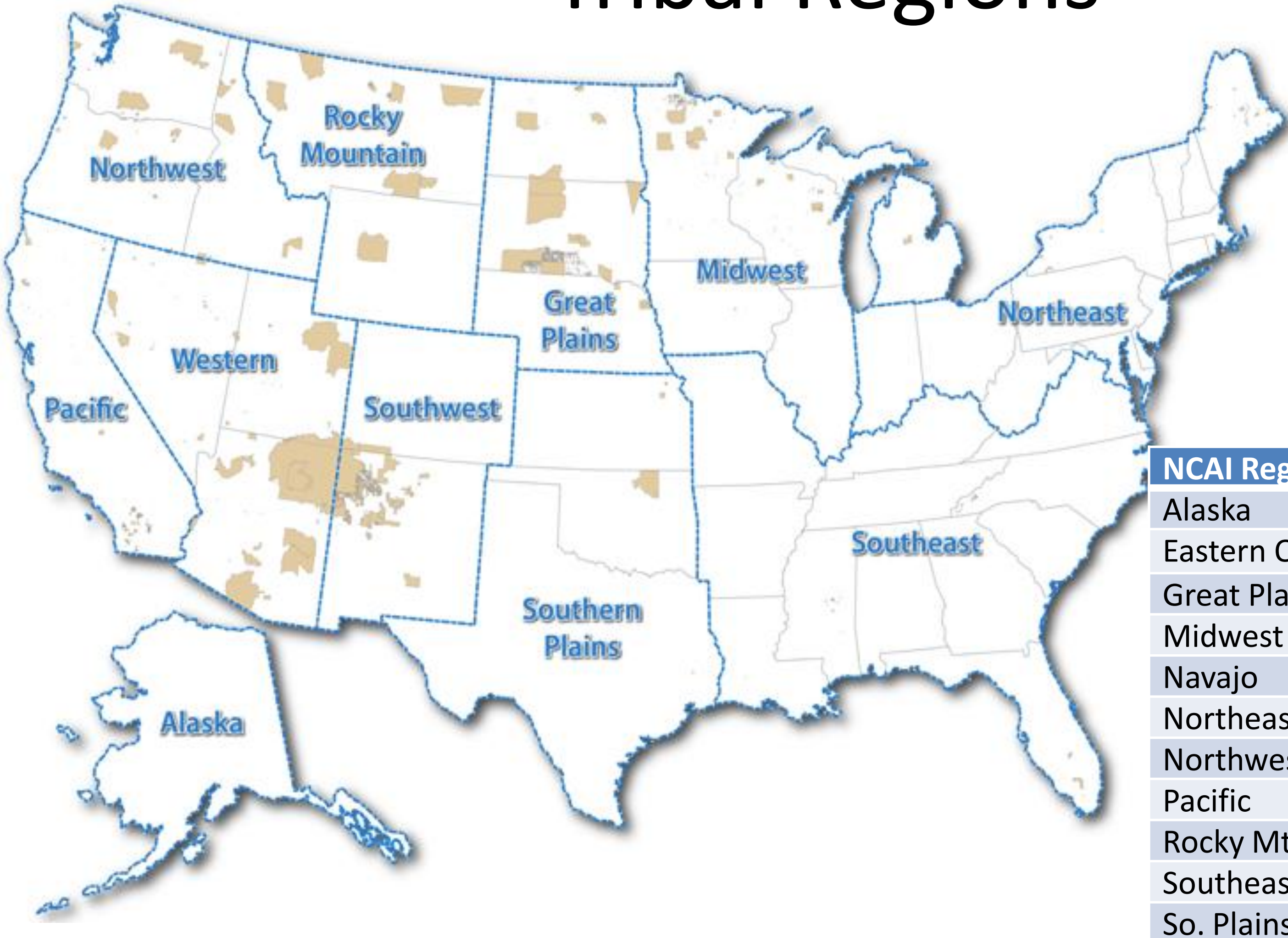
What You Know

- Opportunity exists for renewable energy development on tribal lands
- Project selection and development framework

What You Will Learn

- Overview energy baseline by region
- Overview of policy and regulatory environment by region
- Resources for energy information
- Renewable energy technology basics
- Tools for baseline development

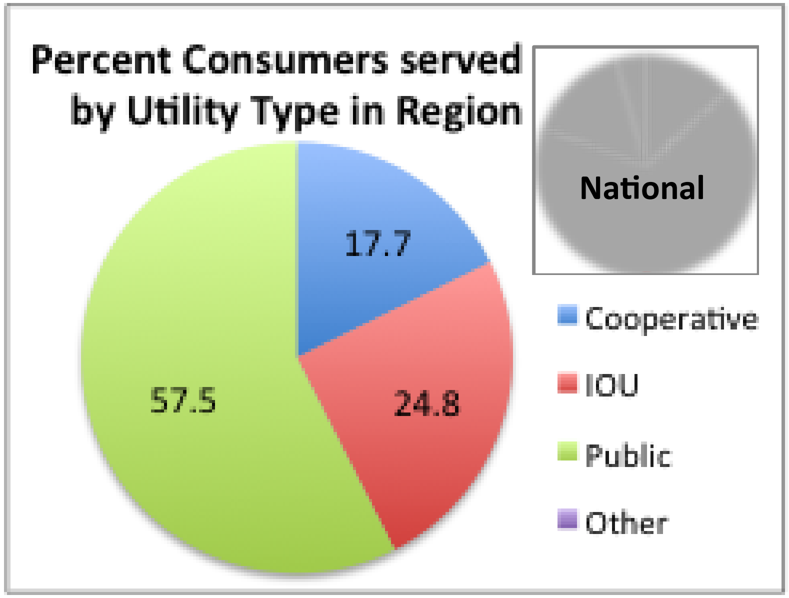
Tribal Regions



NCAI Region	State(s)
Alaska	AK
Eastern OK	OK
Great Plains	ND, NE, SD
Midwest	IA, IL, MI, MN, WI
Navajo	AZ, NM, UT
Northeast	CT, MA, ME, NY, RI
Northwest	ID, MT, OR, WA
Pacific	CA
Rocky Mtn.	MT, WY
Southeast	AL, FL, LA, MS, NC, SC
So. Plains	KS, OK, TX
Southwest	CO, NM
Western	AZ, NV, UT

Great Plains Region

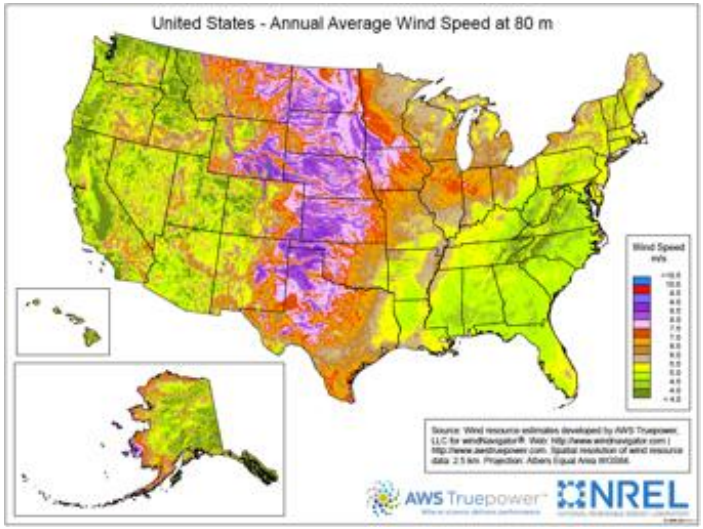
St.	RPS	Interconnect	Net Meter
ND	10% by 2015	No	100 kW
SD	10% by 2015	10 MW	No
NE	10% by 2015	25 kW	25 kW

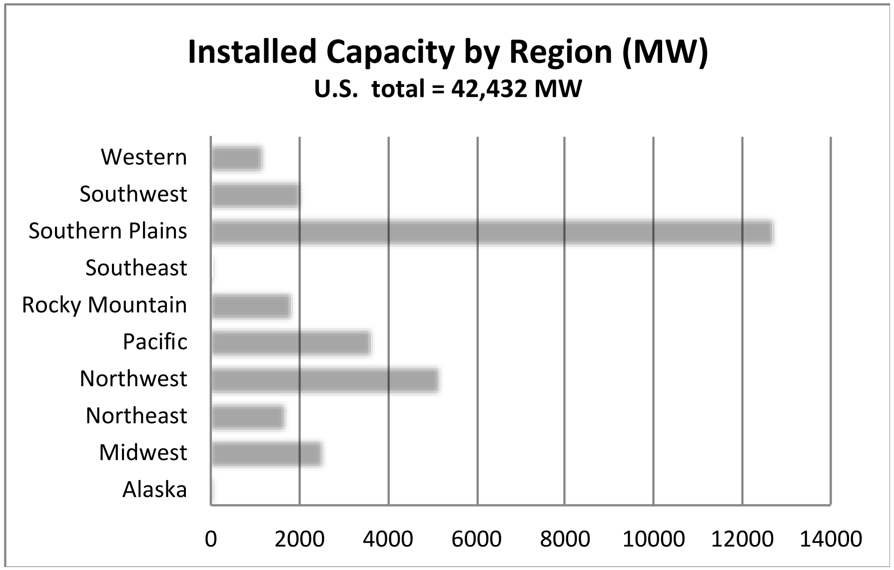


Energy Prices	Region	U.S.
Electric (¢/kWh)	2.6-14.2 (Avg. 7.1)	0.01-123.2 (Avg. 9.8)
Kerosene ($/gal)	NA	2.68
Heating Oil ($/gal)	2.11	2.39
Propane ($/gal)	1.69	1.78
Natural Gas ($/mcf)	8.98	12.14

Wind Energy

- Capture kinetic energy using propeller-like blades on a shaft
- When the wind makes the blades turn, the shaft spins a generator to produce electricity
- Towers above 30 meters capture faster and less turbulent wind





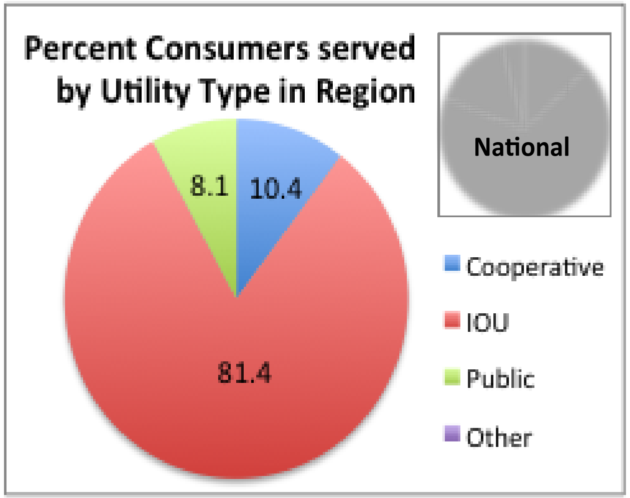
Energy Technology Costs	
Installed	$1.20-2.34/Watt
Levelized (LCOE)	6-12¢/kWh

Top States
Texas
Iowa
California
Washington
Minnesota

Midwest Region

St.	RPS	Interconnect	Net Meter
IA	105 MW	10 MW	500kW
IL	25% by 2025	No limit	40kW
MI	10% by 2015	No limit	150 kW
MN	30% by 2020	10 MW	40 kW
WI	10% by 2015	15 MW	20 kW/100kW

Energy Prices	Region	U.S.
Electric (¢/kWh)	2.6-20.0 (Avg. 8.7)	0.01-123.2 (Avg. 9.8)
Kerosene ($/gal)	NA	2.68
Heating Oil ($/gal)	2.12	2.39
Propane ($/gal)	1.69	1.78
Natural Gas ($/mcf)	9.77	12.14



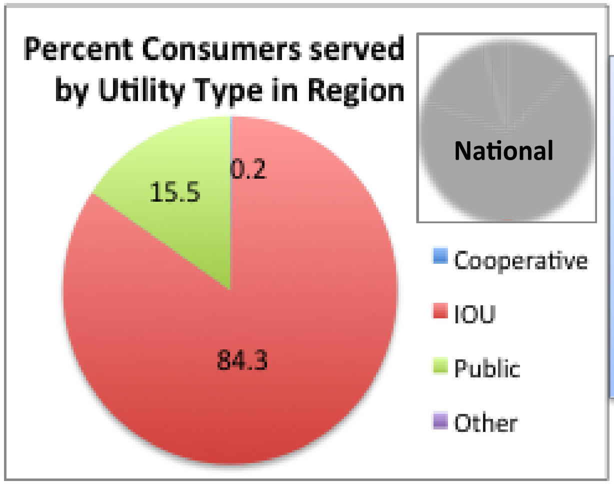
Major Utilities

- Commonwealth Edison Co
- Detroit Edison Co
- Consumers Energy Co
- Northern States Power Co – MN
- Wisconsin Electric Power Co

Northeast Region

St.	RPS	Interconnect	Net Meter
CT	27% by 2020	20 MW	2 MW
MA	15% by 2020	No Limit	10 MW
ME	40% by 2017	No Limit	660 kW/100 kW
NY	29% by 2015	2 MW	2 MW/1MW
RI	16% by 2019	No Limit	5 MW

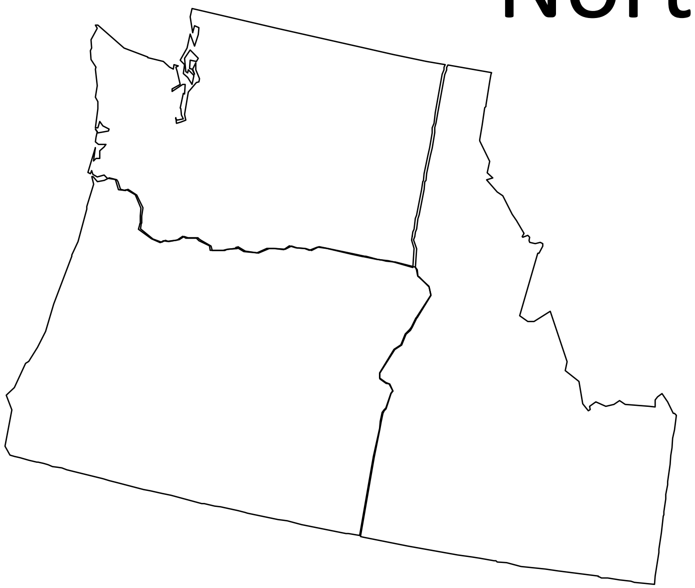
Energy Prices	Region	U.S.
Electric (¢/kWh)	3.4-66.9 (Avg. 15.3)	0.01-123.2 (Avg. 9.8)
Kerosene ($/gal)	2.81	2.68
Heating Oil ($/gal)	2.42	2.39
Propane ($/gal)	2.75	1.78
Natural Gas ($/mcf)	15.64	12.14



Major Utilities

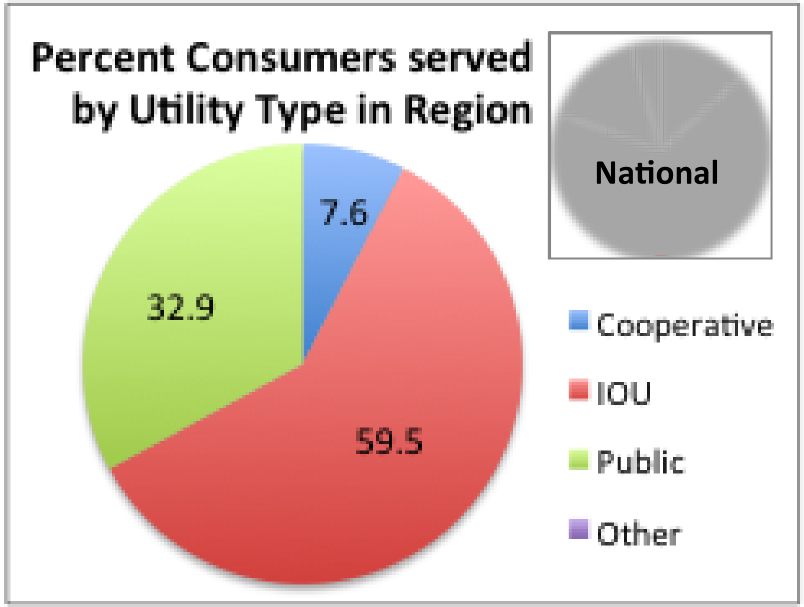
- Consolidated Edison Co-NY Inc
- Niagara Mohawk Power Corp.
- Massachusetts Electric Co
- Connecticut Light & Power Co

Northwest Region



St.	RPS	Interconnect	Net Meter
ID	No	No	100 kW
OR	25% by 2025	20 MW+	2 MW (non-r)
WA	15% by 2020	20 MW	100 kW

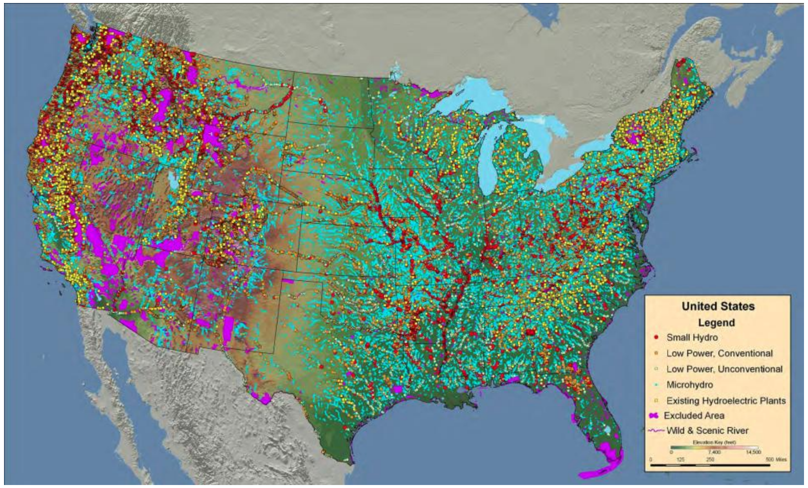
Energy Prices	Region	U.S.
Electric (¢/kWh)	0.01-12.2 (Avg. 6.9)	0.01-123.2 (Avg. 9.8)
Kerosene ($/gal)	NA	2.68
Heating Oil ($/gal)	2.22	2.39
Propane ($/gal)	1.91	1.78
Natural Gas ($/mcf)	13.00	12.14



Low Head Hydroelectricity

- The use of flowing water to produce electrical energy
- Water flow spins a turbine, activating a generator
- Low head characterized as being less than 30 feet; low power is anything less than 1 MW

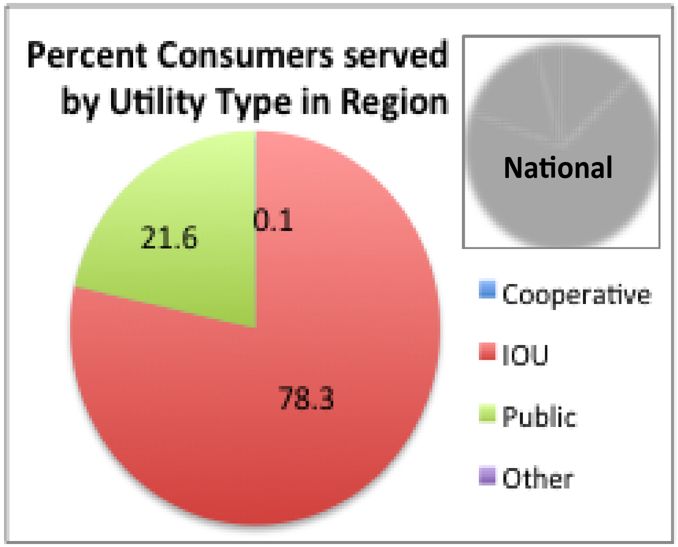
Energy Technology Costs	
Installed	$1.24-3.23/Watt
Levelized (LCOE)	4-13¢/kWh



Pacific Region

Energy Prices	Region	U.S.
Electric (¢/kWh)	3.2-21.1 (Avg. 13.2)	0.01-123.2 (Avg. 9.8)
Kerosene ($/gal)	NA	2.68
Heating Oil ($/gal)	2.33	2.39
Propane ($/gal)	1.97	1.78
Natural Gas ($/mcf)	9.43	12.14

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

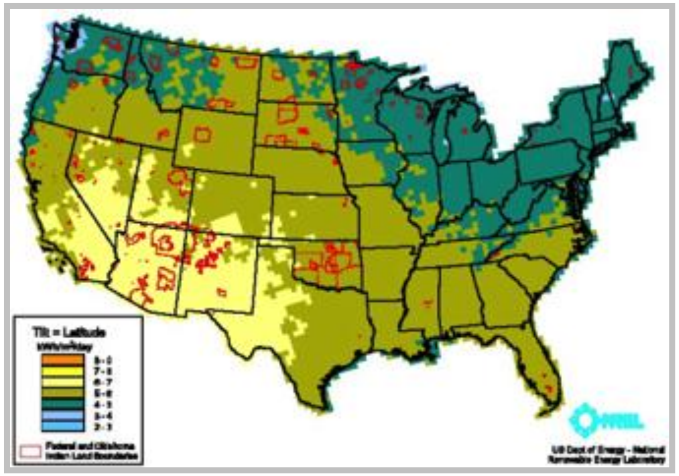


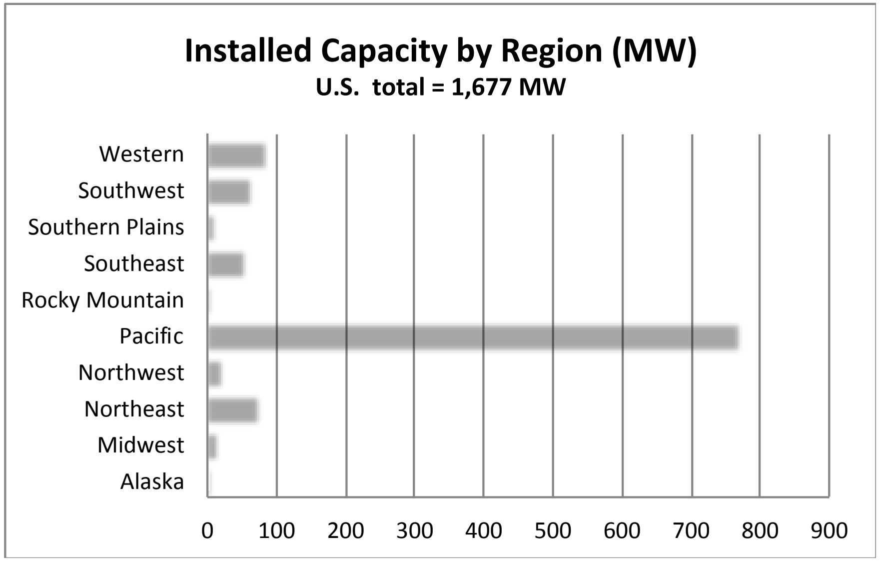
Major Utilities

- Pacific Gas & Electric Co
- Southern California Edison Co
- City of Los Angeles
- San Diego Gas & Electric Co

Solar Photovoltaic (PV) Energy

- Solar cells convert sunlight into electricity
- Technology Options:
  1. Traditional: efficient, flat-plate
  2. Thin-film: flexible, micro-thin layers
  3. Solar inks, dyes, and conductive plastics: expensive, but efficient



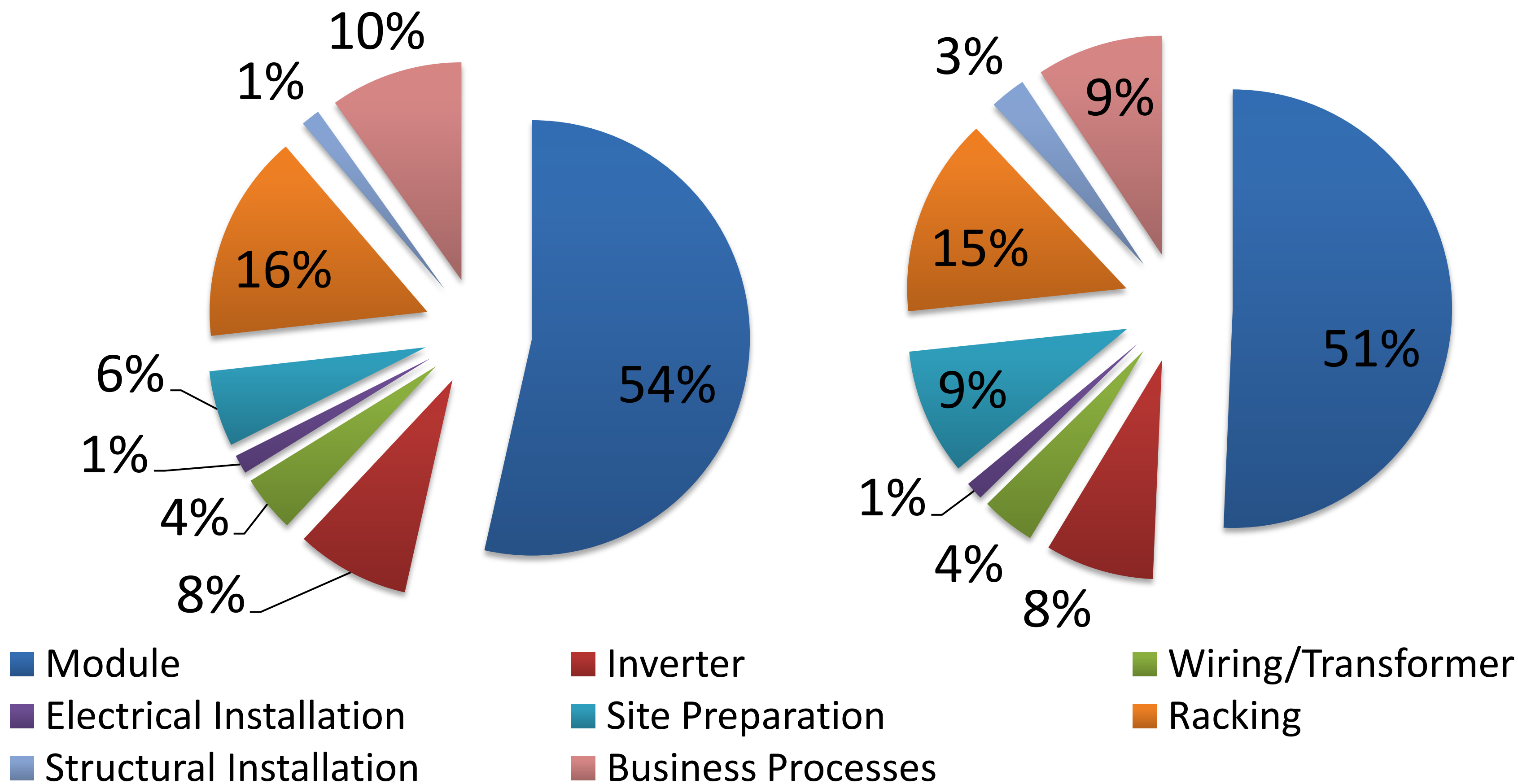


Energy Technology Costs	
Levelized (LCOE)	18-43¢/kWh

Top States
California
New Jersey
Colorado
Arizona
Florida

Solar PV Installed Cost Breakdown

Ground Mount – $3.50/Wdc | **Roof Mount - $3.75/Wdc**

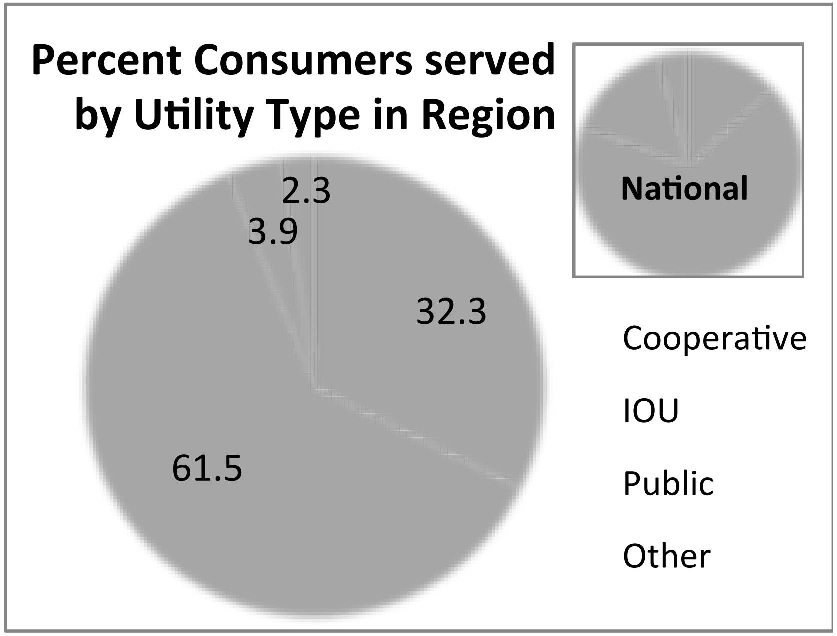


Data Source: RMI 2010: http://www.rmi.org/Content/Files/BOSReport.pdf

Rocky Mountain Region

St.	RPS	Interconnect	Net Meter
MT	15% by 2015	50 kW	50 kW/10 kW
WY	No	25 kW	25 kW

Energy Prices	Region	U.S.
Electric (¢/kWh)	2.1-15 (Avg. 6.8)	0.01-123.2 (Avg. 9.8)
Kerosene ($/gal)	NA	2.68
Heating Oil ($/gal)	2.05	2.39
Propane ($/gal)	1.85	1.78
Natural Gas ($/mcf)	9.45	12.14

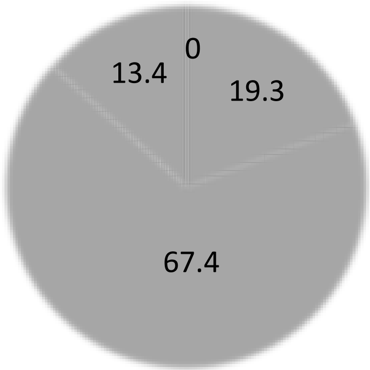


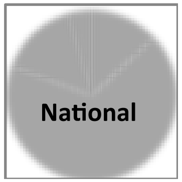
Southeast Region

St.	RPS	Interconnect	Net Meter
AL	No	No	No
FL	7.5% by 2015*	2 MW	2 MW
LA	No	300 kW	300 kW
MS	No	No	No
NC	12.5 by 2021*	No Limit	1 MW
SC	No	100 kW	100 kW

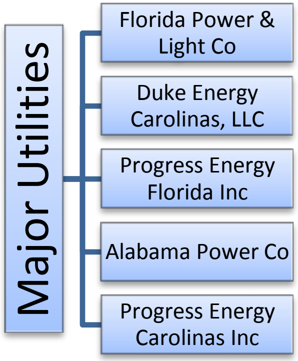
Energy Prices	Region	U.S.
Electric (¢/kWh)	2.5-18.3 (Avg. 8.9)	0.01-123.2 (Avg. 9.8)
Kerosene ($/gal)	NA	2.68
Heating Oil ($/gal)	2.07	2.39
Propane ($/gal)	1.65	1.78
Natural Gas ($/mcf)	15.31	12.14

Percent Consumers served by Utility Type in Region



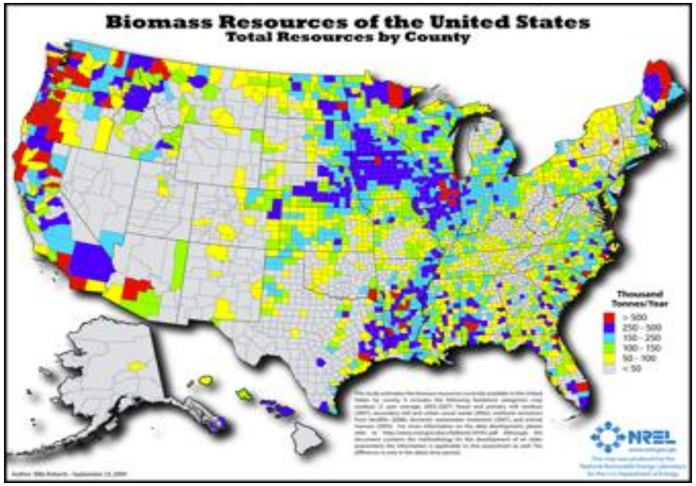


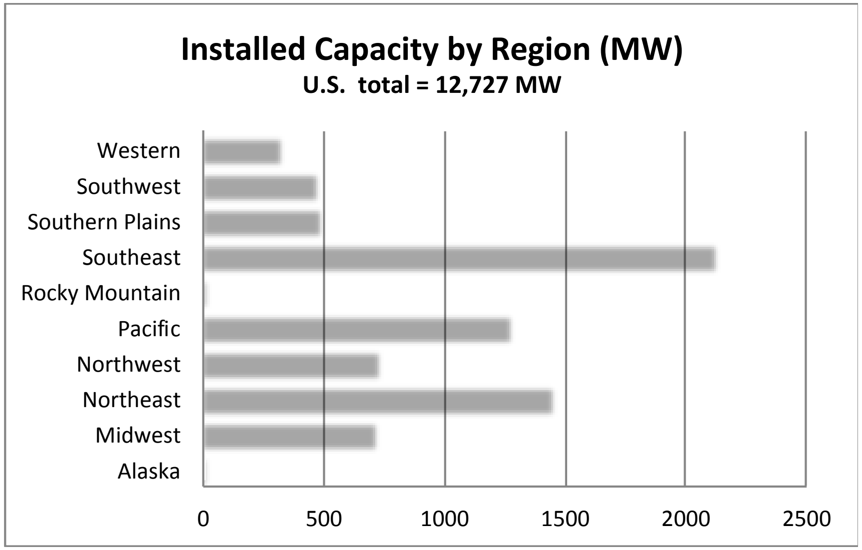
Cooperative
IOU
Public
Other



Biomass: Residues & Energy Crops

- Organic material derived from plants or animals
- Stored chemical energy is released as heat when burned
- Includes agricultural and forestry residues, municipal solid wastes, industrial wastes, and terrestrial and aquatic "energy crops"





Energy Technology Costs	
Installed	$2.58-3.66/Watt
Levelized (LCOE)	8-12¢/kWh

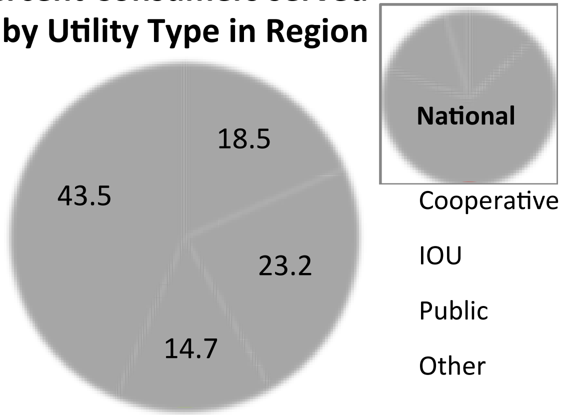
Top States
California
Florida
Maine
Virginia
Georgia

Southern Plains Region

Energy Prices	Region	U.S.
Electric (¢/kWh)	2.9-20.5 (Avg. 8.3)	0.01-123.2 (Avg. 9.8)
Kerosene ($/gal)	NA	2.68
Heating Oil ($/gal)	2.00	2.39
Propane ($/gal)	1.51	1.78
Natural Gas ($/mcf)	11.23	12.14

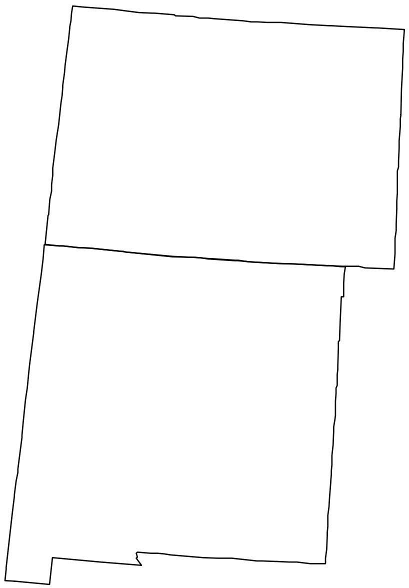
St.	RPS	Interconnect	Net Meter
KS	20% by 2020	200 kW	200 kW
OK	15% by 2015	No	100kW*
TX	10,000 MW by 2025	10 MW	10-25 kW

Percent Consumers served by Utility Type in Region



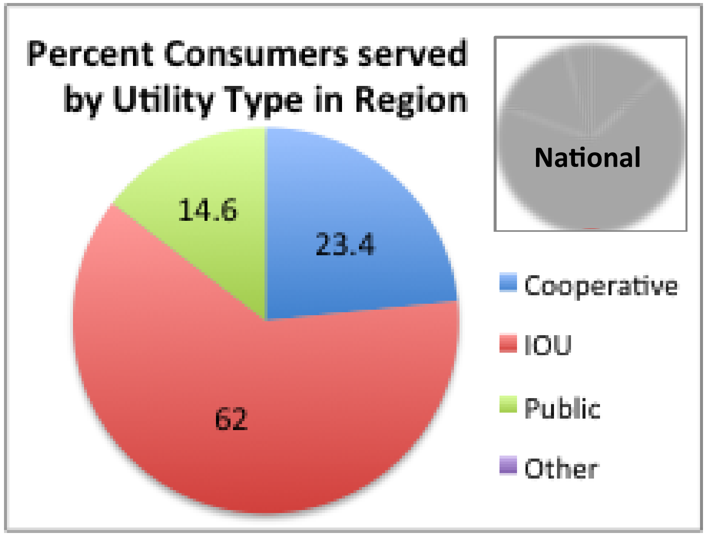
Major Utilities
- TXU Energy Retail Co LP
- Reliant Energy Retail Services LLC

Southwest Region



St.	RPS	Interconnect	Net Meter
CO	30% by 2020*	10 MW	120% average annual consumption
NM	20% by 2020*	80 MW	80 MW

Energy Prices	Region	U.S.
Electric (¢/kWh)	2.6-19.7 (Avg. 8.2)	0.01-123.2 (Avg. 9.8)
Kerosene ($/gal)	NA	2.68
Heating Oil ($/gal)	1.97	2.39
Propane ($/gal)	1.59	1.78
Natural Gas ($/mcf)	9.17	12.14

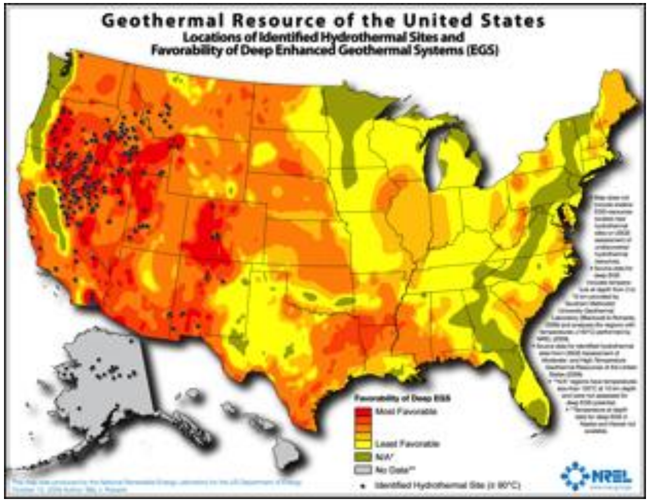


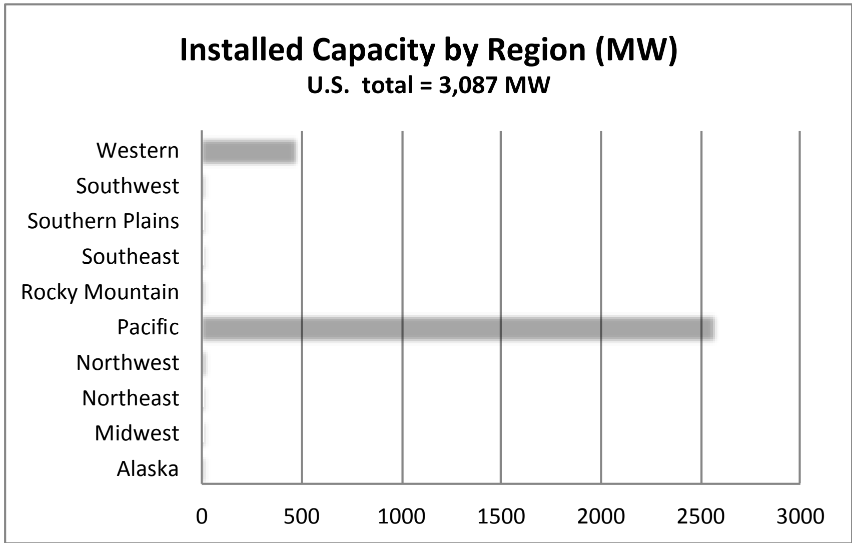
Major Utilities

Public Service Company of CO

Geothermal Energy

- Residual heat from deep in the Earth in the form of hot water or steam
- Deep wells drilled into underground reservoirs tap the heat source for various applications:
  - Direct use
  - Electricity production
  - Heat pumps

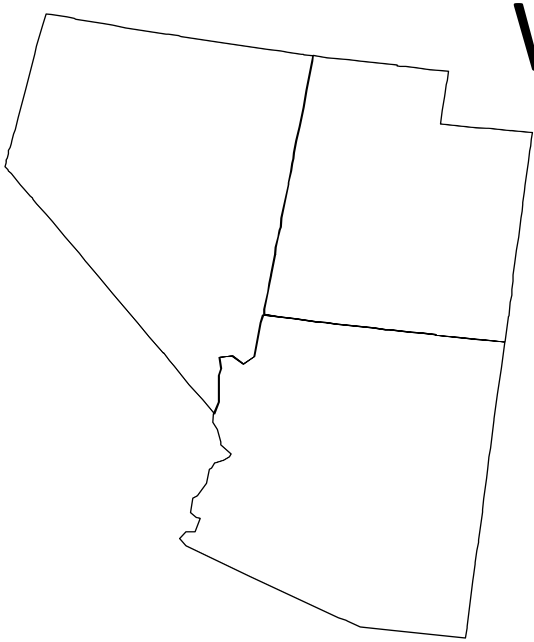




Energy Technology Costs	
Installed	$1.66-3.90/Watt
Levelized (LCOE)	6-13¢/kWh

Top States
California
Nevada
Utah
Hawaii
Idaho

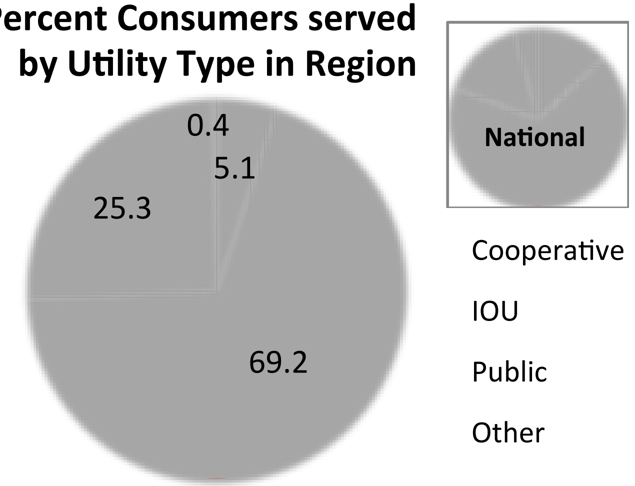
Western Region



St.	RPS	Interconnect	Net Meter
AZ	15% by 2025	No	No Limit
NV	25% by 2025	20 MW	1 MW*
UT	20% by 2025	20 MW	2 MW

Energy Prices	Region	U.S.
Electric (¢/kWh)	0.9-16.6 (Avg. 8.9)	0.01-123.2 (Avg. 9.8)
Kerosene ($/gal)	NA	2.68
Heating Oil ($/gal)	2.19	2.39
Propane ($/gal)	1.91	1.78
Natural Gas ($/mcf)	13.26	12.14

Percent Consumers served by Utility Type in Region

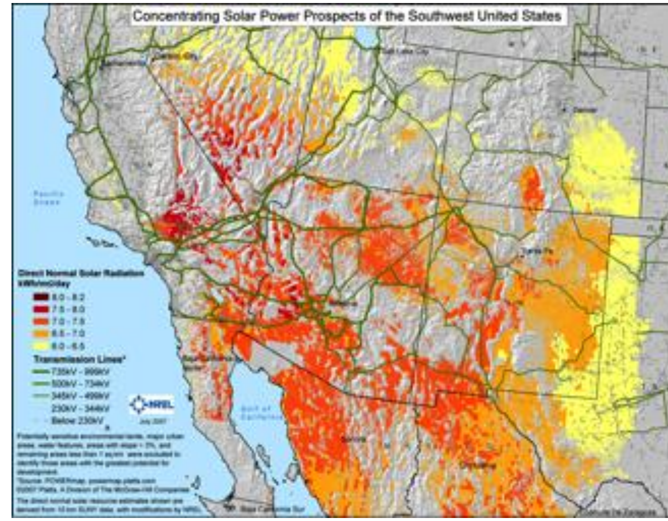


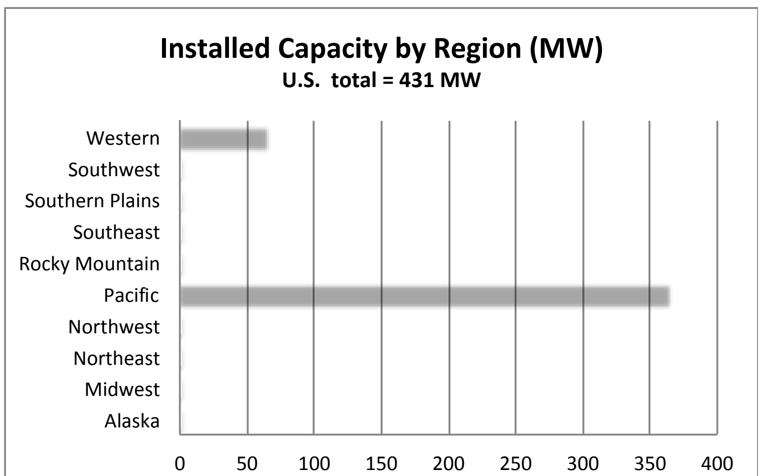
Major Utilities

- Arizona Public Service Co

Concentrating Solar Power

- Reflective surfaces concentrate sunlight 80 to 3,000 times normal, producing high temperatures
- Receiver transfers heat to a device that converts the heat into electricity
- CSP Types:
  1. Linear Concentrator
  2. Dish/Engine
  3. Power Tower



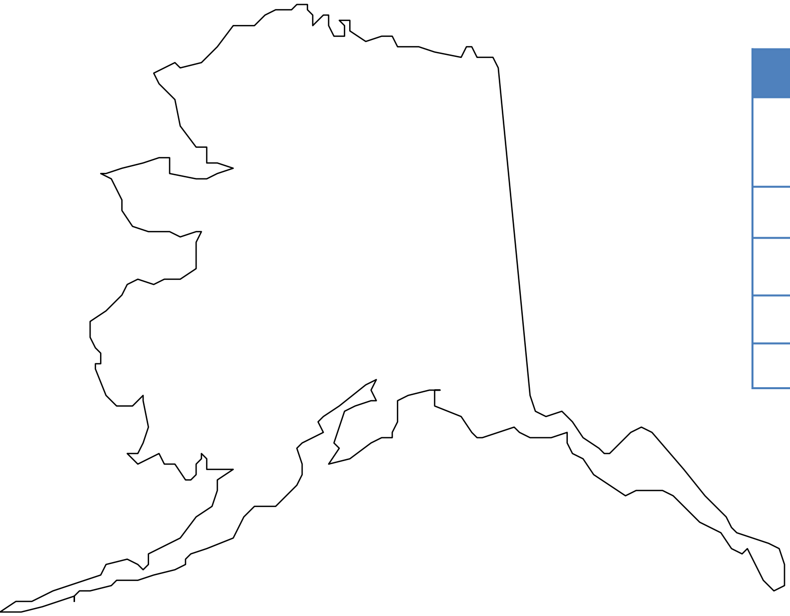


Top States
California Nevada Hawaii Arizona

Energy Technology Costs	
Installed	>$4.00/Watt
Levelized (LCOE)	19-35¢/kWh

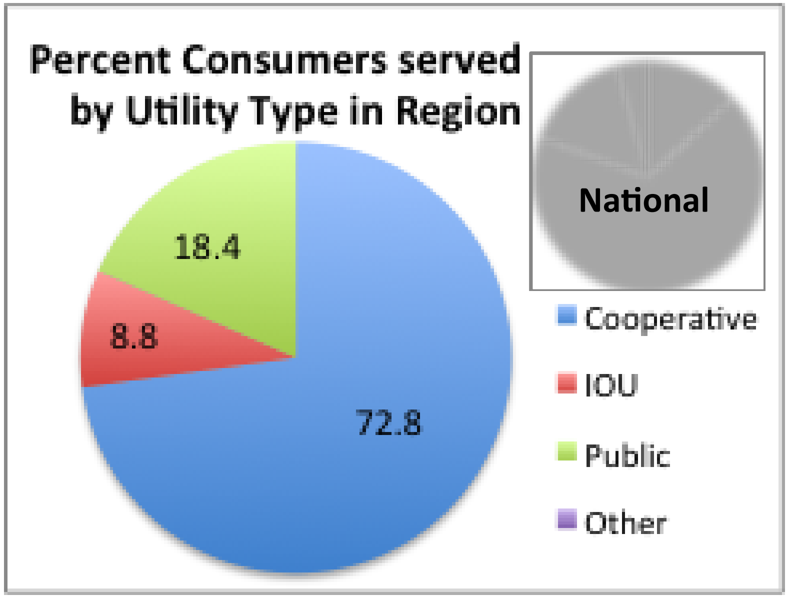
U.S. DEPARTMENT OF ENERGY | Office of Indian Energy

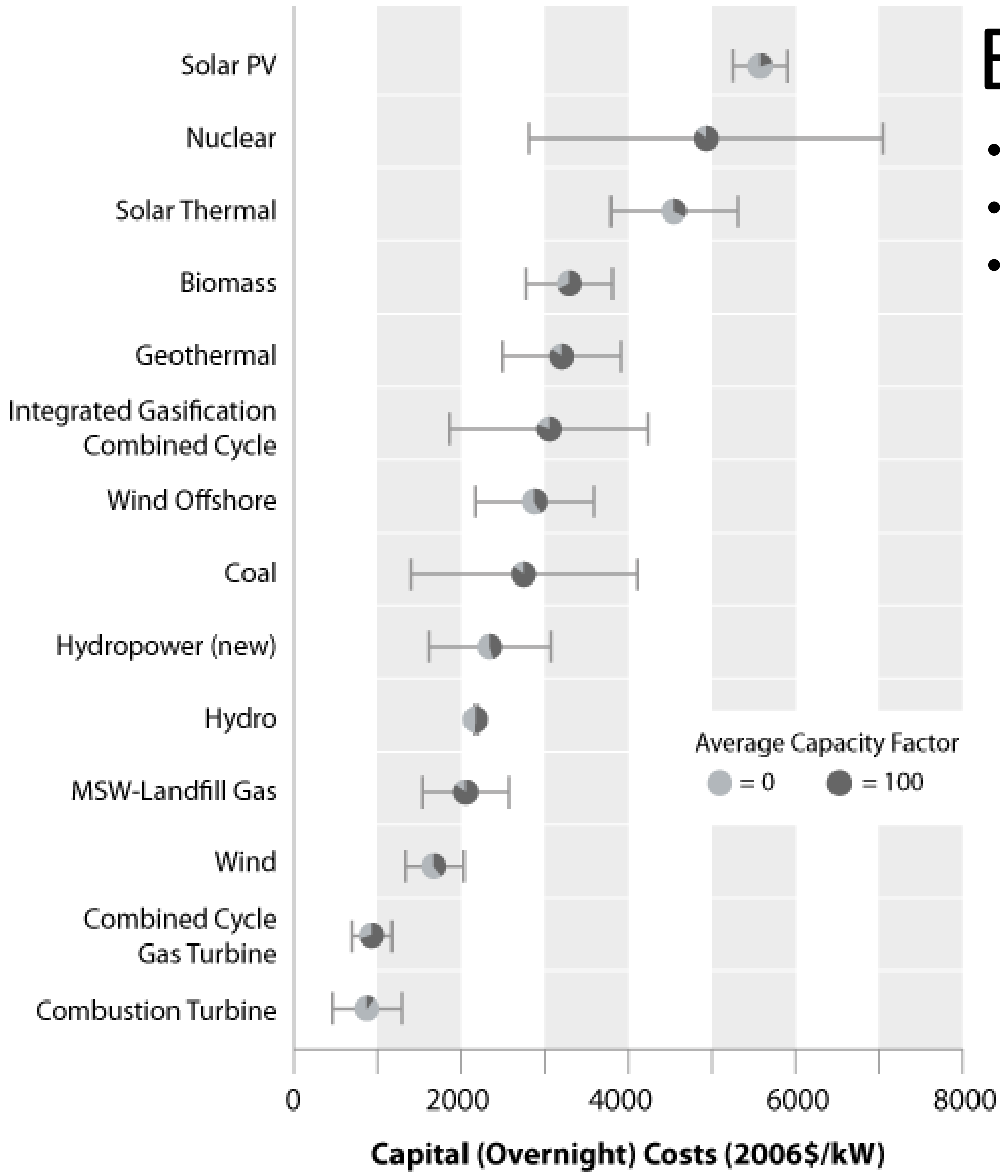
Alaska



Energy Prices	Region	U.S.
Electric (¢/kWh)	9.4-123.2 (Avg. 15.1)	0.01-123.2 (Avg. 9.8)
Kerosene ($/gal)	NA	2.68
Heating Oil ($/gal)	2.50	2.39
Propane ($/gal)	4.21	1.78
Natural Gas ($/mcf)	10.23	12.14

Policy	Limit/Goal
RPS	No
Interconnection	25 kW
Net Metering	25 kW





Estimated Capital Costs

- Summary capital costs as of July 2010
- Based on a wide range of data sources
- More information:
  http://www.nrel.gov/analysis/tech_costs.html

Federal Renewable Incentive Programs

Renewable Electricity Production Tax Credit (PTC)		
Resource Type	**In-Service Deadline**	**Credit Amount**
Wind	December 31, 2012	2.2¢/kWh
Closed-Loop Biomass	December 31, 2013	2.2¢/kWh
Open-Loop Biomass	December 31, 2013	1.1¢/kWh
Geothermal Energy	December 31, 2013	2.2¢/kWh
Hydroelectric	December 31, 2013	1.1¢/kWh

Business Energy Investment Tax Credit (ITC)			
Resource Type	**In-Service Deadline**	**Credit Amt.**	**Max Incentive**
Solar	December 31, 2016	30%	No limit
Biomass	December 31, 2013	30%	No limit
Geothermal	No stated expiration	10%	No limit
Microturbines	December 31, 2016	10%	$200/kWh

Dept. of Treasury - 1603 Program (closes December 2011): Payments for Specified Energy Property in Lieu of Tax Credits			
Resource Type	**In-Service Deadline**	**Credit Amt.**	**Max Incentive**
Solar	January 1, 2017	30%	No limit
Biomass	January 1, 2014	30%	No limit
Geothermal	January 1, 2017	10%	No limit
Microturbines	January 1, 2017	10%	$200/kWh
Hydroelectric	January 1, 2014	30%	No limit

Modified Accelerated Cost-Recovery System (MACRS) + Bonus Depreciation			
Resource Type	**In-Service Deadline (100% Deduction)**	**In-Service Deadline (50% deduction)**	**MACRS Property Class Life (years)**
Solar	December 31, 2011	December 31, 2012	5
Wind	December 31, 2011	December 31, 2012	5
Geothermal	December 31, 2011	December 31, 2012	5
Biomass	December 31, 2011	December 31, 2012	7

200 Level Series Summary

- From 100 Series: Understanding context and energy environment is critical to effective project selection
- There is extensive information already compiled
- There are tools and information available to be tailored to your exact needs

300 Training Series
Renewable Energy Project Finance in Indian Country

Matt Ferguson & Joe Cruz
Reznick Group

A survey of modules 300, 301, 302, 310 & 410

Objective

- For tribal nations with natural resource wealth to:
  - Learn about existing sources of renewable energy project **capital**
  - Learn **proven** renewable energy project finance structures so that decision makers and advisors are informed about the financial and economic implications of transaction structures

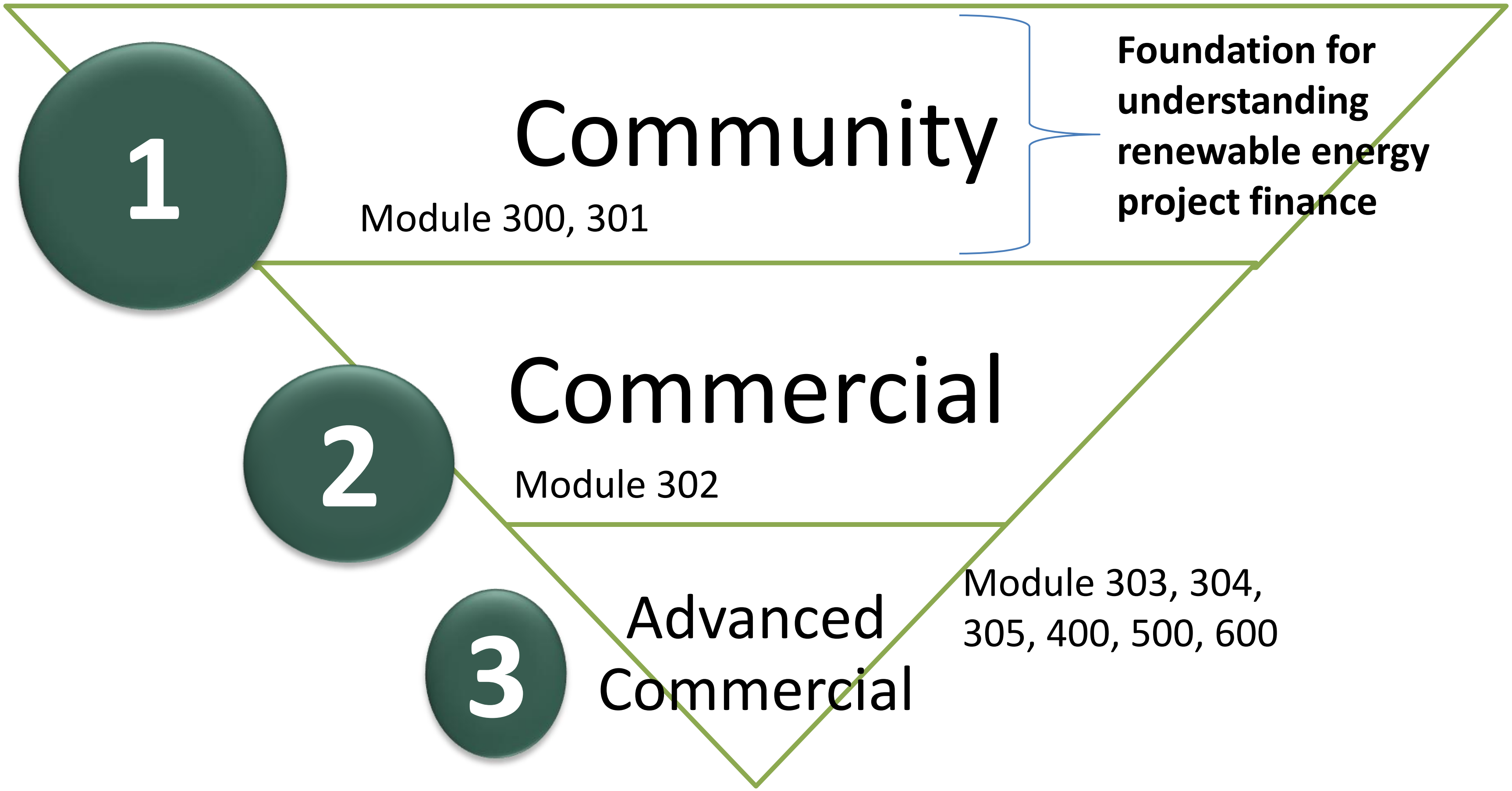
- You Know
  - How to identify economically viable renewable energy projects
  - That renewable energy project development can be an economic development tool
  - That there are a range of roles that tribal nations can play in a renewable energy opportunity

- You Will Learn
  - About common renewable energy project organization models and financing structures
  - How to assess varying tribe roles within organization models, general risks, and returns in renewable energy opportunities
  - About general economic drivers of renewable energy project finance structures

Training Series

Module	Description	Case Study
300	Finance Series – Introduction to public, private partnership of renewable energy project finance	Overview of Community & Commercial finance structures
301	Detail for lawyer, manager, finance responsible party	Community Project
302	Detail for lawyer, manager, finance responsible party	Commercial Project - Partnership Flip
303	Detail for lawyer, manager, finance responsible party	Commercial Project - Inverted Lease
304	Detail for lawyer, manager, finance responsible party	Commercial Project - Sale/Leaseback
305	Detail for lawyer, manager, finance responsible party	Public/Private Structure Analysis & Strategy

Building Blocks of Curriculum



Agenda

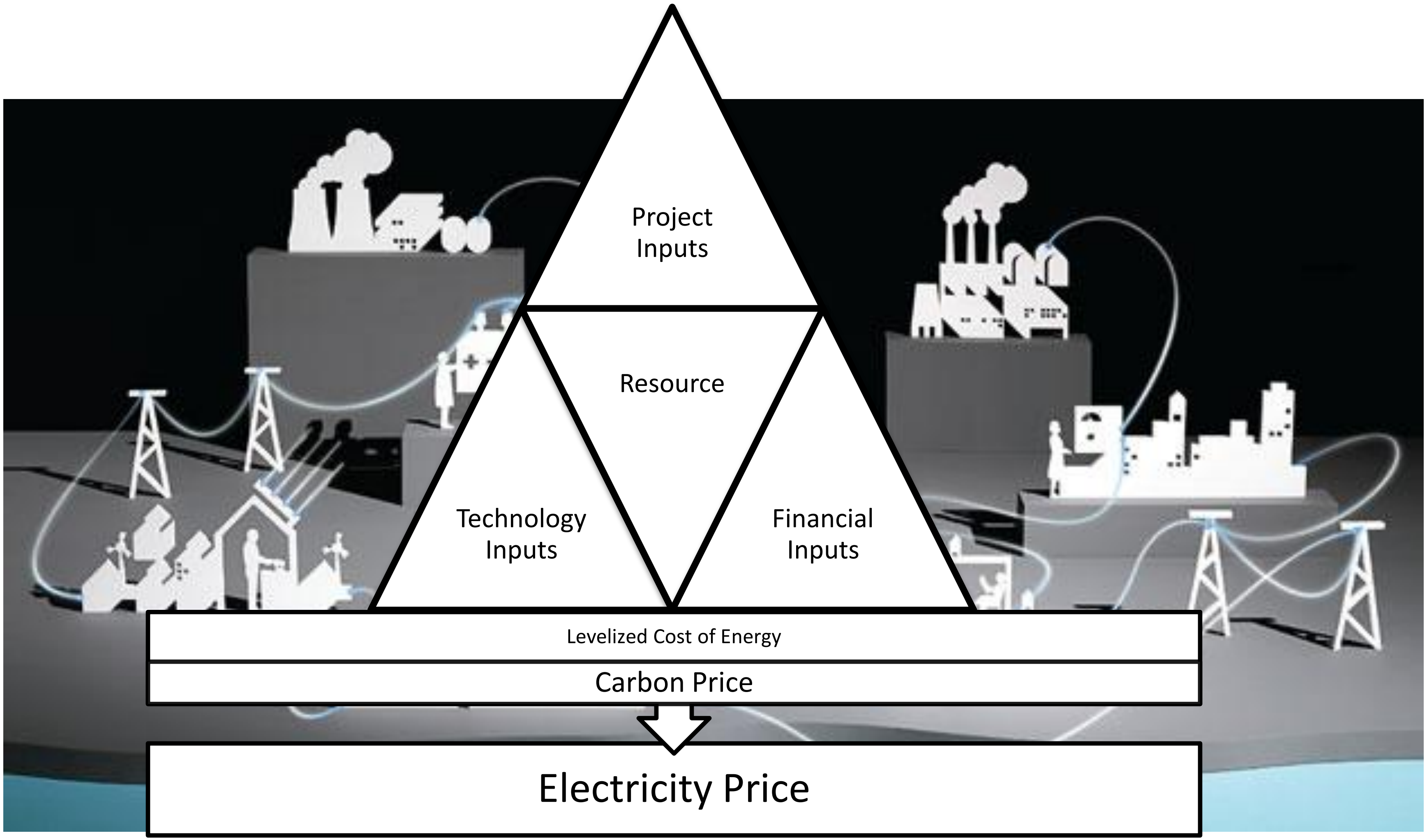
- **Quick Overview**
  - **Recap relevant principles Series 100 & 200**
- Case Studies
  - One: Community (Solar)
  - Two: Fundamental Commercial (Solar)
- Financial Structures & Models
- Case Study Three: Advanced Commercial (Wind)
- Conclusion

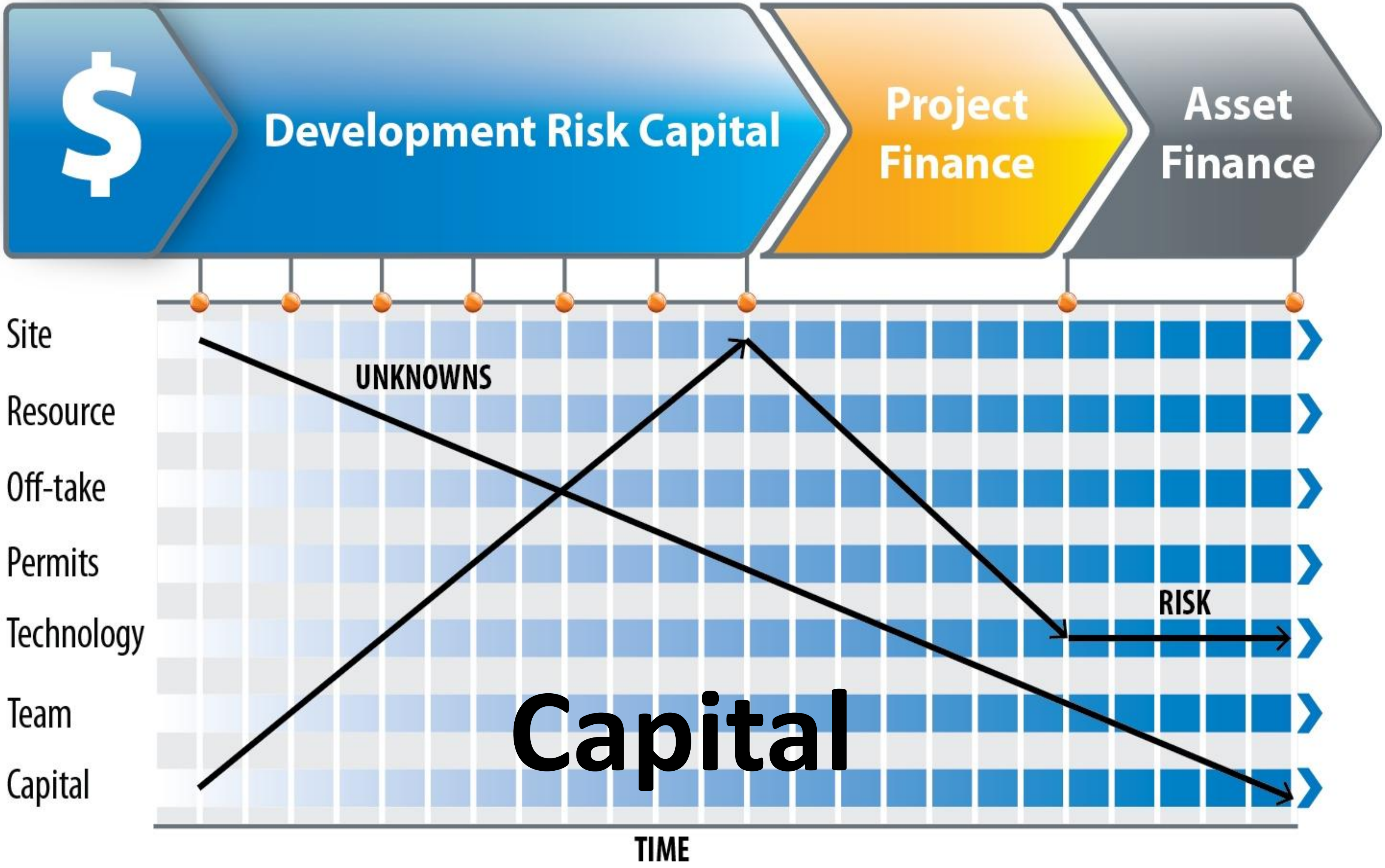
Value of Energy

- What is the demand for energy?
- Selling electricity = revenue
- Electricity basics
  - Power markets
  - Retail price, wholesale vs. cost of production
  - Renewable Energy Credits
  - Independent system operators, etc.
  - Transmission → "gotta get to buyer"
  - Closed vs. open (regulated vs. unregulated)
    - California vs. North Dakota
- Levelized Cost of Energy (LCOE)
- Tax Credits and other subsidies

LCOE/Cost of Energy Controls EVERYTHING

Economic Inputs: *Is the Project Feasible?*





Development Risk Capital
Project Finance
Asset Finance
Site
Resource
Off-take
Permits
Technology
Team
Capital
UNKNOWNS
RISK
Capital
TIME

Discussion

EXISTING ACTIVITY IN INDIAN COUNTRY

Agenda

- ✓ Quick Overview -
- **Case Studies**
  - **One: Solar Community**
  - Two: Fundamental Commercial
- Financial Structures & Models
- Case Study Three: Wind Commercial
- Summary

Two Paths

Cost Avoidance	Business Venture
Community project	Commercial project
Case study one	Case studies two and three
<u>Value proposition</u> • Save money, reduce electricity costs • Energy independence <u>Success Measurement</u> • Cost avoidance <u>Market Indicator</u> • Retail electricity price <u>Decision Discipline</u> • Capital budgeting	<u>Value proposition</u> • Selling electricity to make money <u>Success Measurement</u> • Levelized cost of energy (LCOE) <u>Market Indicator</u> • Wholesale electricity prices, Demand <u>Decision Discipline</u> • Investment /Business decision

Two Paths

- Community
  - Install solar equipment for electricity cost management
    - Government center, casino, hotel, school
- Commercial
  - Install utility scale solar or wind for revenue generation
    - Contracted sale with a utility
    - Contracted sale with a large electricity user

1

Solar Community

- Self Use
- Capital Budgeting Decision

2

Fundamental Commercial

- For Sale
- Business Decision

3

Advanced Commercial

- For Sale
- Business Decision

Case Study One: Community Project

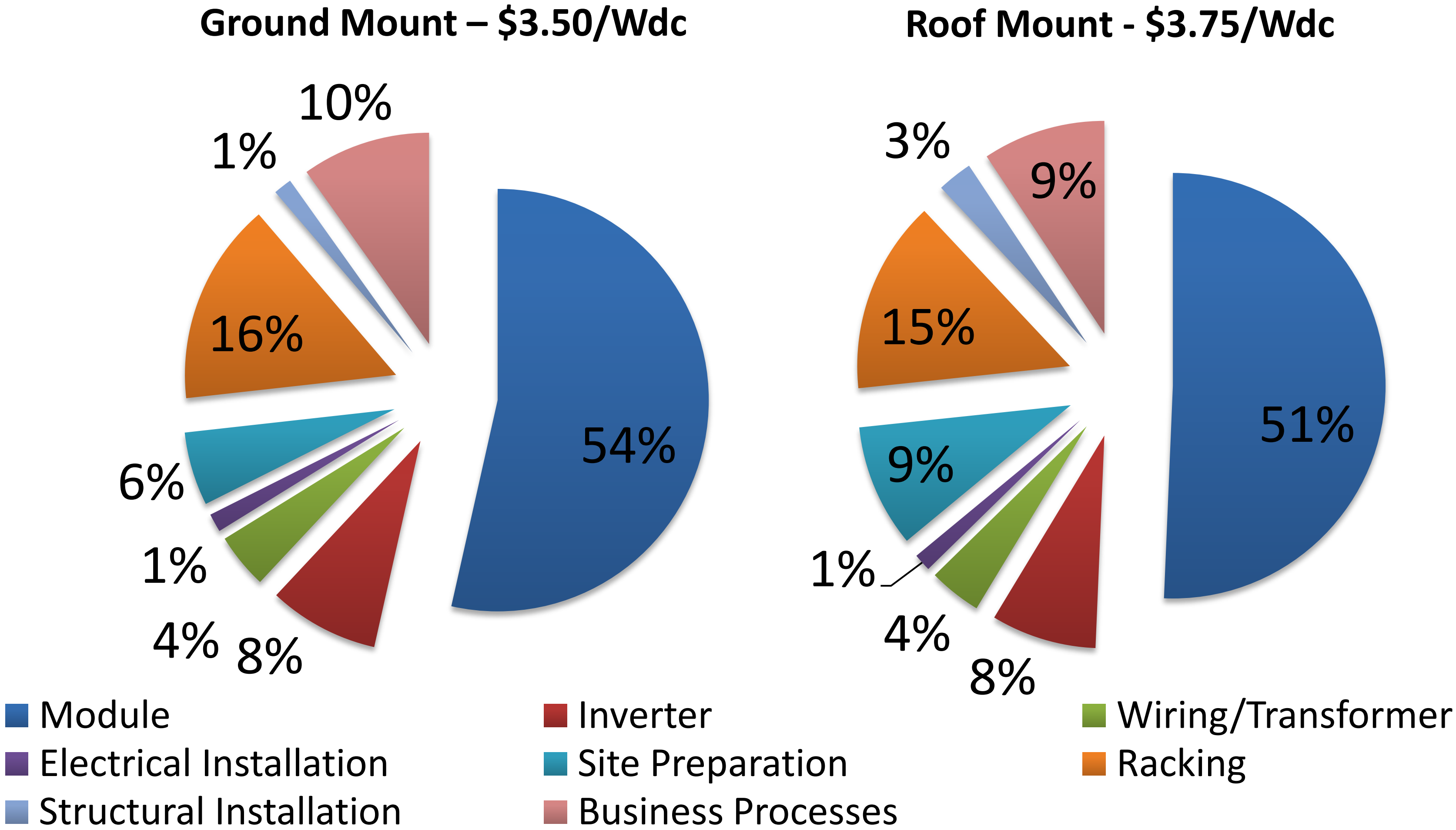
1

Solar Community

- Self Use
- Capital Budgeting Decision

- Solar PV
- 1 MW
- $3,500/kW or $3,500,000/MW installed cost
- Inspiration
  - 1 MW PV system that provides power for HVAC system for tribal casino hotel
  - 1 MW PV system – powers a significant portion of the total energy needs for tribe's business operations
- Quick application
  - Begin feasibility for existing use – government, enterprise or residences
  - Solar tax credit expires 2016

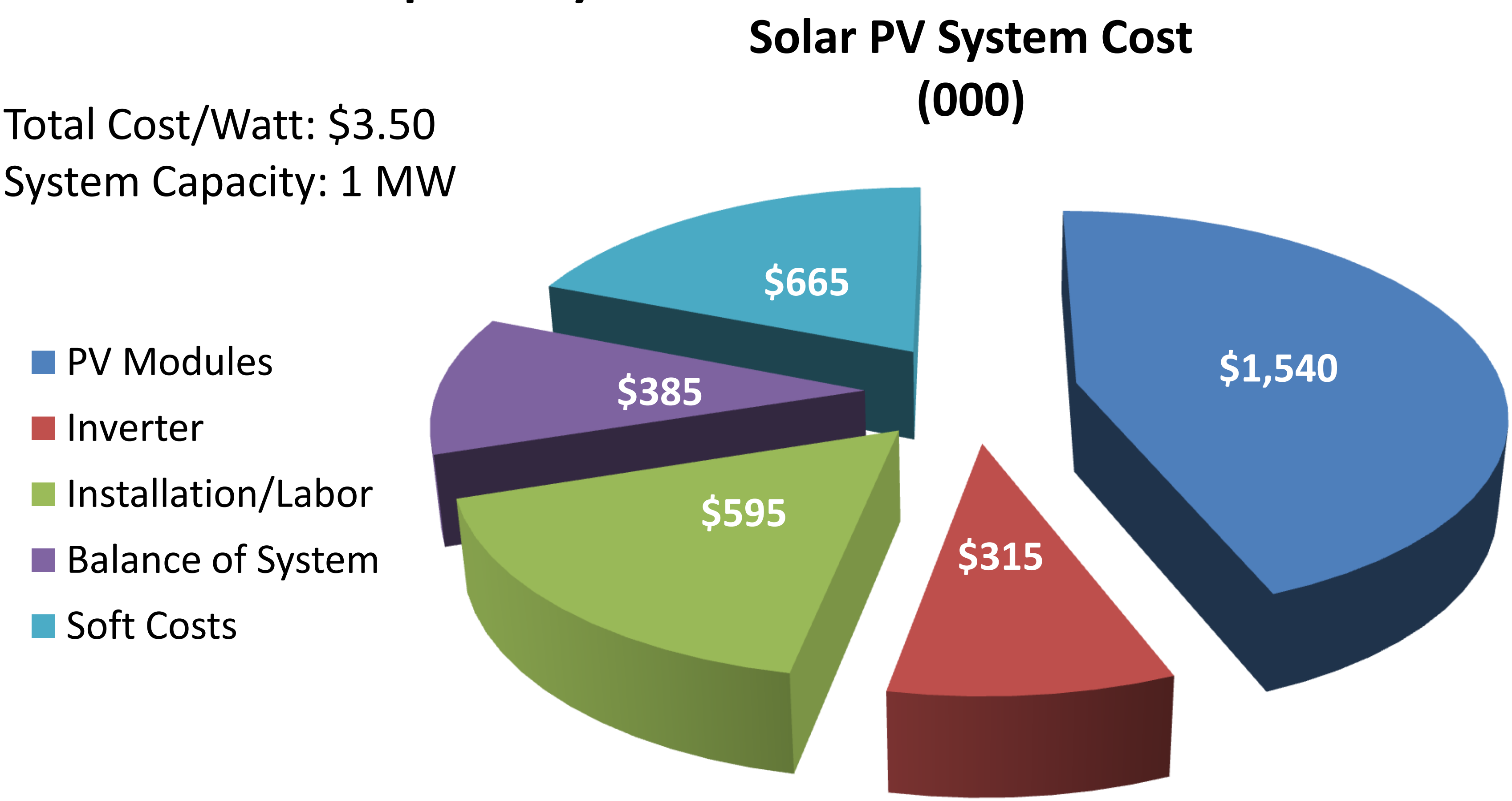
Solar Installed Cost Breakdown



Data Source: RMI 2010: http://www.rmi.org/Content/Files/BOSReport.pdf

Case Study One: Community Project Example System Cost Breakdown

Total Cost/Watt: $3.50
System Capacity: 1 MW



Total system cost $3.5 million

Case Study One: Community Project

1

Solar Community

- Self Use
- Capital Budgeting Decision

- Electricity access and connection
  - Yes - Replacement, substitution, or complement
  - No - Originating necessary resource
- Source of fuel has broad implications
  - Coal
  - Hydroelectric
  - Natural Gas
- Existing electricity price
- Forecasted electricity and energy prices

Capital for tribal community project

- **Direct Purchase**
  - Traditional Debt
  - Tribal Economic Development Bond
  - Bond
  - Enhanced Equity/Debt – New Markets Tax Credit
- **3rd Party Financed**
  - Performance Contract
  - Power Purchase Agreement
  - Tax Equity
  - Enhanced Equity/Debt – New Markets Tax Credit

Case Study One: Community Project

1

Solar Community

- Self Use
- Capital Budgeting Decision

- Sources & Use of Project Capital
  - Sources of payment
    - Grants, Tribal Nation's money, debt
  - Use of capital for project equipment/development
    - Engineering, Procurement & Construction (EPC) Agreement
- Project economics & financial model
- Operating costs
  - Operations & Maintenance Agreement
- Financial details
  - Payback
  - Retail rates

Case Study One: Community Project

Range of Cost for Solar PV System

1

Solar Community

- Self Use
- Capital Budgeting Decision

- 40 – 55% Solar panels
- 6 – 10% Inverter
- 12 – 25% Installation/labor
  - includes racking hardware
- 5 – 10% Balance-of-system
  - wiring, electrical hardware, interconnection, kiosks, etc.
- 15 – 25% Soft costs
  - permitting, accounting, legal, developer fee, etc.

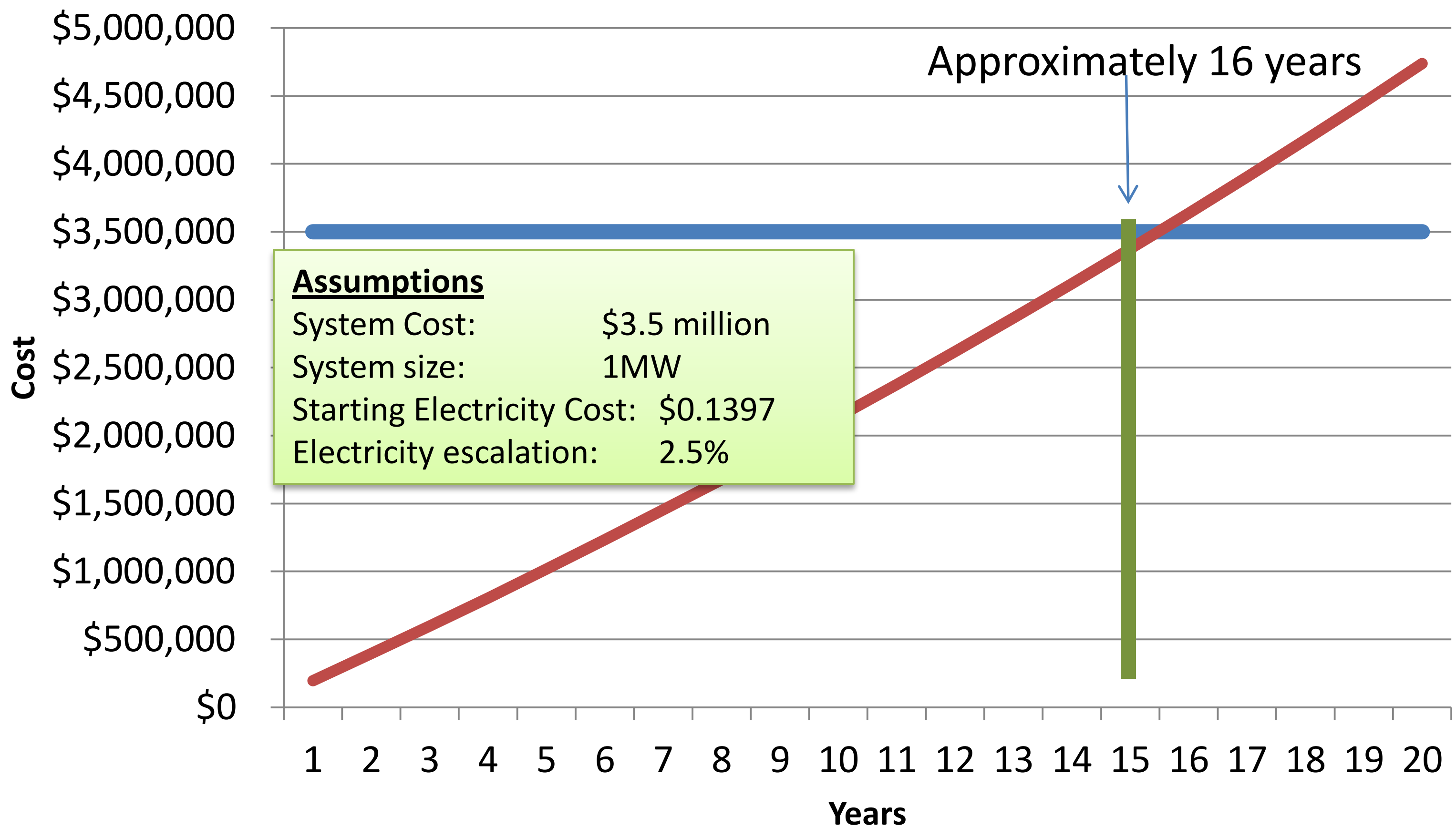
Case Study One: Community Project

Solar Project Payback

1

Solar Community

- Self Use
- Capital Budgeting Decision



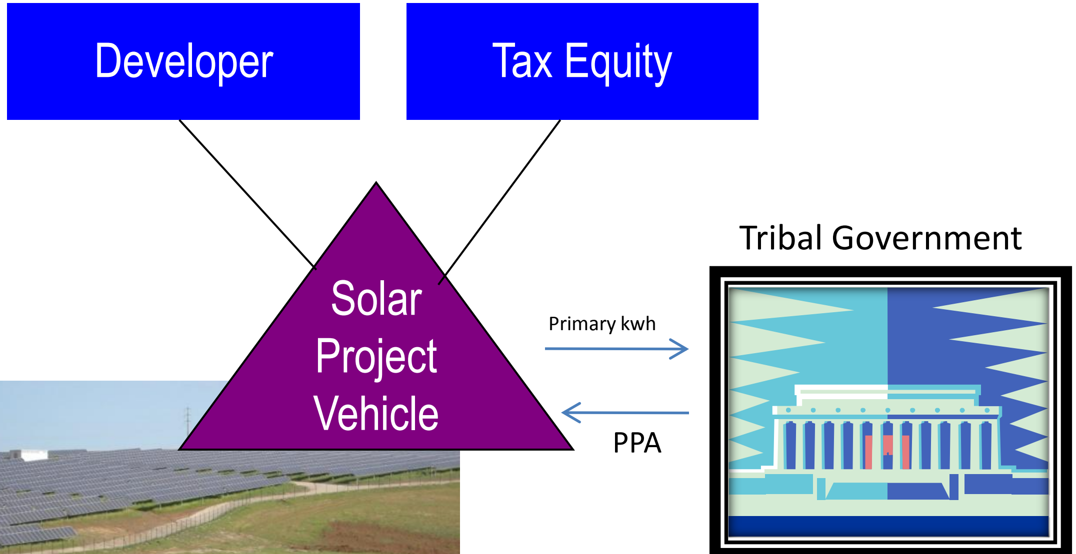
Excludes Federal Incentives

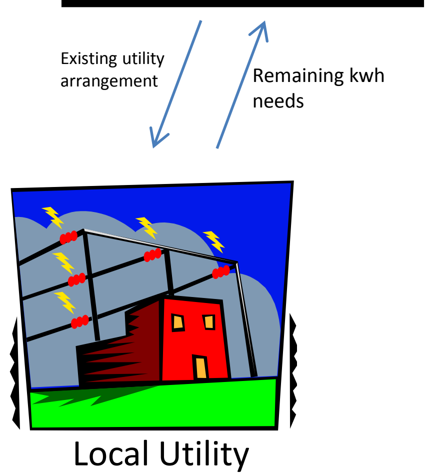
System Cost   Avoided Electricity Cost

Tribe Sponsored & Preferred Commercial Structure

Tribal PPA Solution

Accelerate Payback Strategy





Benefits:

1. no/low upfront costs
2. no O&M
3. Save on electricity costs

Step 1 – Instead of purchasing system, tribe hosts system and buys electricity from SPV via a power purchase agreement (PPA)

Step 2 – Upon flip or expiration of risk period tribe exercises option and purchases pre-owned system

Discussion

OWNERSHIP

Building Blocks of Case Studies

1. Community
2. Commercial
3. Advanced Commercial

Agenda

- ✓ Background
- ✓ **Case Studies**
  - ✓ One: Solar Community
  - – **Two: Fundamental Commercial**
- Financial Models
- Case Study Three: Wind Commercial
- Summary

Two Paths

Cost Avoidance	Business Venture
Community project	Commercial project
Case study one	Case studies two and three
<u>Value proposition</u> • Save money • Reduce electricity costs • Energy independence <u>Success Measurement</u> • Cost avoidance <u>Market Indicator</u> • Retail electricity price <u>Decision Discipline</u> • Capital budgeting	<u>Value proposition</u> • Sell electricity for money <u>Success Measurement</u> • Levelized cost of energy <u>Market Indicator</u> • Wholesale electricity prices, Demand <u>Decision Discipline</u> • Investment /Business decision

1

Solar Community

- Self Use
- Capital Budgeting Decision

2

Fundamental Commercial

- For Sale
- Business Decision

3

Wind Commercial

- For Sale
- Business Decision

Case Study Two: Solar Commercial Project

2

Fundamental Industrial

- For Sale
- Business Decision

- Federal Tax Credits reduce the capital cost of renewable energy projects for taxable entities only
- Tribes are tax exempt; therefore, financing the is renewable energy project with a non-tribal entity (i.e., tax equity investor) is compelling
- Tax Equity Investors = passive investors, limited partners that own the renewable energy project and primarily get their investment return through federal and state income tax benefits (tax deductions and tax credits).

Case Study Two: Solar Commercial Project

2

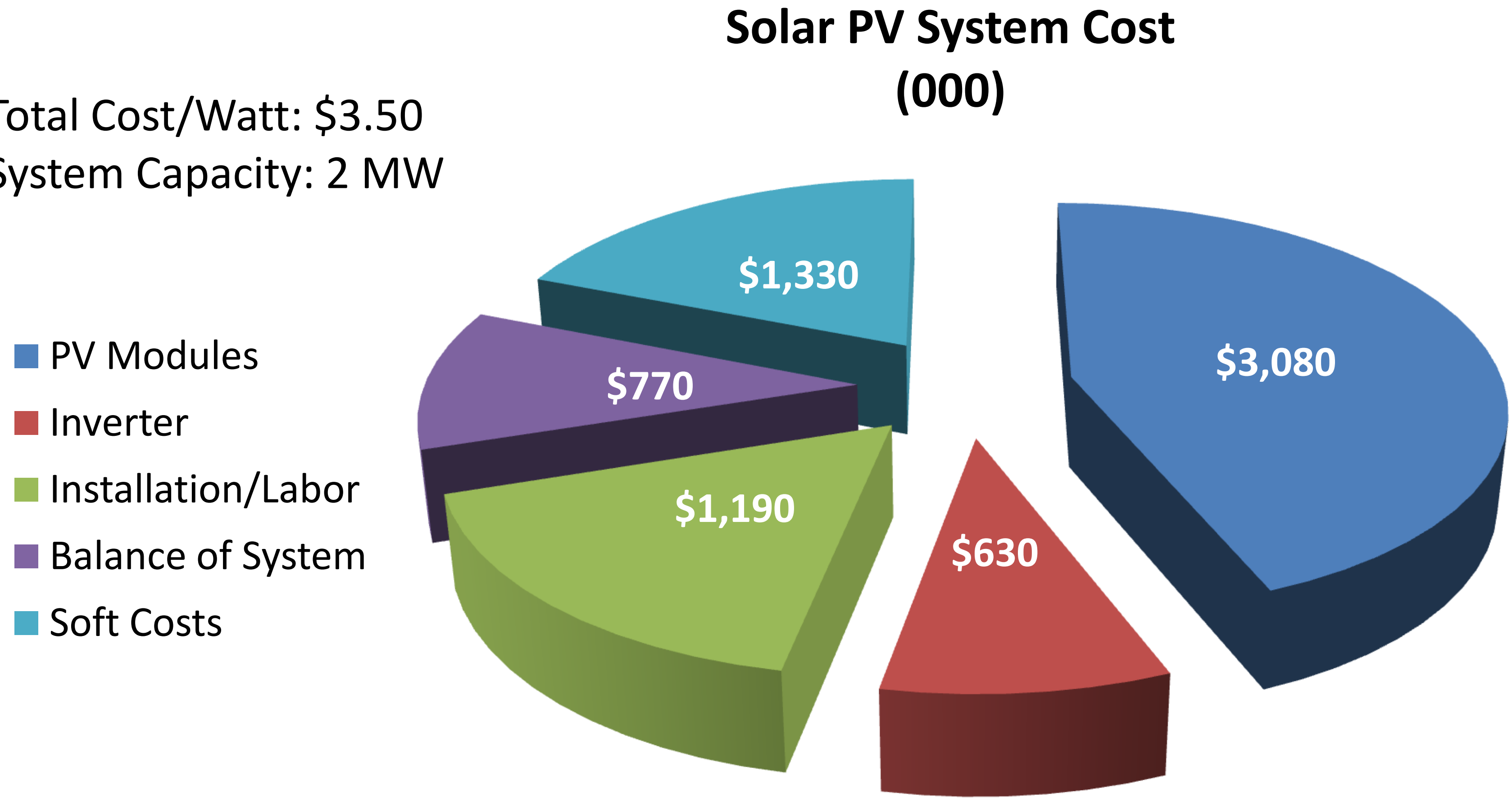
Fundamental Industrial

- For Sale
- Business Decision

- Ground mounted Solar PV power plant
- 2 MW
- $3,500/kW or $3,500,000/MW
- 20 Year Project IRR: 10%
- Wholesale, commercial or retail rates
- Inspiration:
  – 4 MW Solar PV project with power sales to a utility

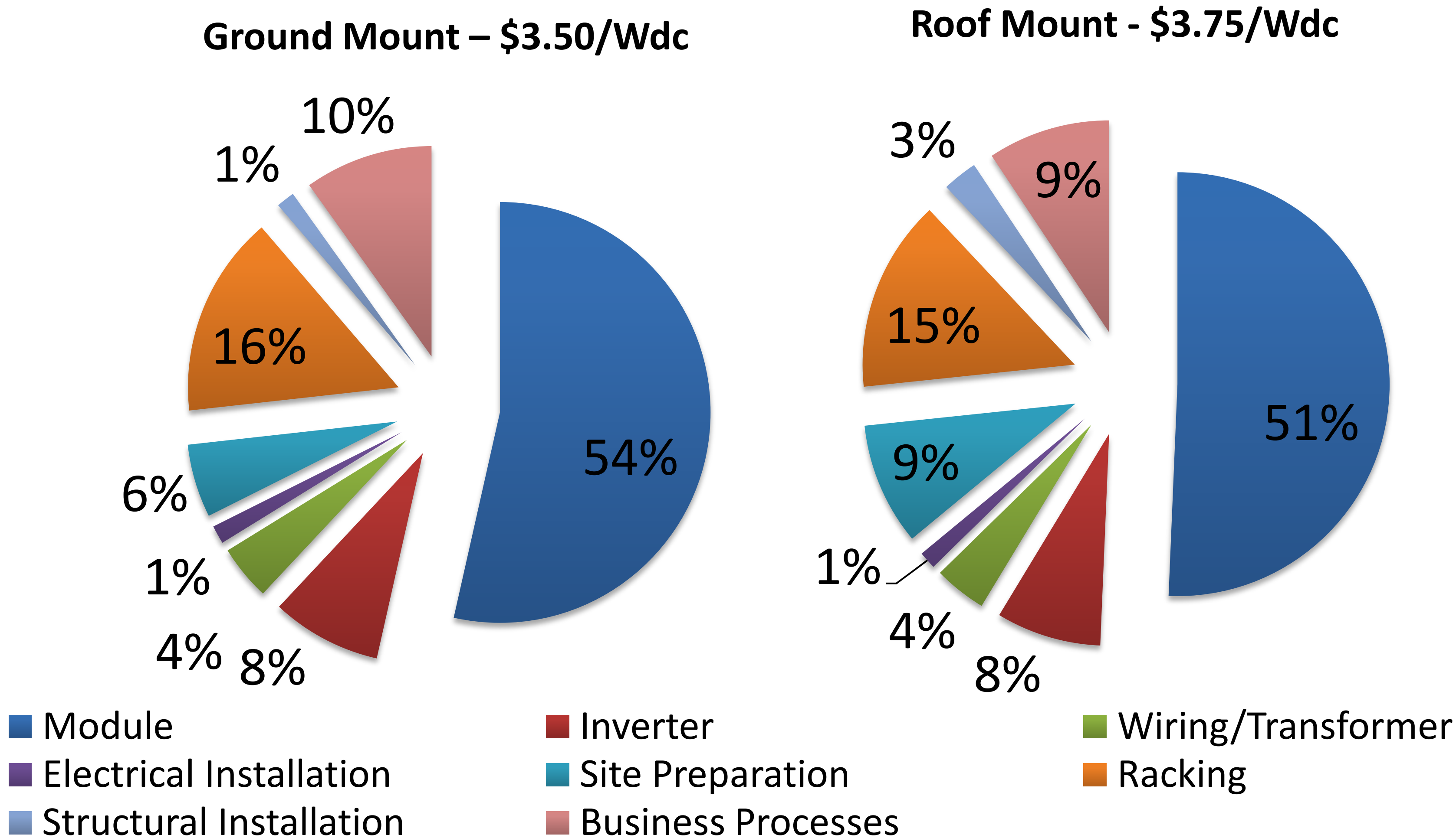
Example System Cost Breakdown

Total Cost/Watt: $3.50
System Capacity: 2 MW



Total system cost $7 million

Solar Installed Cost Breakdown



Data Source: RMI 2010: http://www.rmi.org/Content/Files/BOSReport.pdf

Case Study Two: Solar Commercial Project

2

Fundamental Industrial

- For Sale
- Business Decision

- Cost of electricity varies across the country
  - California/Connecticut vs. North Dakota/Arizona
- Interconnection & transmission access
- Fair price for electricity (PPA)

Primary focus: how much you can sell electricity for?

Who can you sell it to?

Power market review

Case Study Two: Solar Commercial Project -Roles

Sovereign

- Lessor: Collect rent and/or royalty
- Tax Administrator: Collect taxes
- Regulator: Permitting

Participant

- Funding, Development, Construction
- Operations & Maintenance
- Tribal ownership

Joint entre-preneur

- Part owner with tax equity

Select one, two …

Case Study Two: Solar Commercial Project—Capital Expenses

2

Fundamental Industrial

- For Sale
- Business Decision

- Capital cost/expense for equipment
  - EPC agreement
- Operating costs
- Project economics
- Sources of funding
  - Grants, Tribal Nation's money, investors, or debt
- Financial details
  - Project, investor, Tribal IRR

Range of Cost for Solar PV System

2

Fundamental Industrial

- For Sale
- Business Decision

- 40 – 55% Solar panels
- 6 – 10% Inverter
- 12 – 25% Installation/labor
  - » includes racking hardware
- 5 – 10% Balance-of-system
  - » wiring, electrical hardware, interconnection, kiosks, etc.
- 15 – 25% Soft costs
  - » permitting, accounting, legal, developer fee, etc.

Operations

2

Fundamental Industrial

- For Sale
- Business Decision

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

Project Economics

2

Fundamental Industrial

- For Sale
- Business Decision

- Analysis of capital budgeting decision (community) vs. new business venture or investment (Commercial)

Agenda

- ✓ Overview
- ✓ Case Studies
  - ✓ One: Solar Community
  - ✓ Two: Fundamental Commercial
- **Financial Structures & Models**
- Case Study Three: Wind Commercial
- Summary

Considerations

- Partners
  - —Tribes are tax exempt: need a partner that can use tax credits
  - — Use of Federal subsidies creates a “marketable/bankable” project
- •Motivational Factors
  - — Develop a low cost project with a competitive LCOE
    - A competitive LCOE translates into the ability to sell power and make a profit
  - -- Be MORE than a landlord
  - -- Extract more value/money out of the project than when pursuing it independently, or alone isn’t lucrative

Legal Entity Refresher

- Renewable energy assets/projects generally held in special purpose vehicle (SPV)
- Pass-through entity
  - Partnership
  - Limited Liability Company
  - IRS considers all "partnerships"
    - Excluding single member LLC with election
- Partnership tax law applies

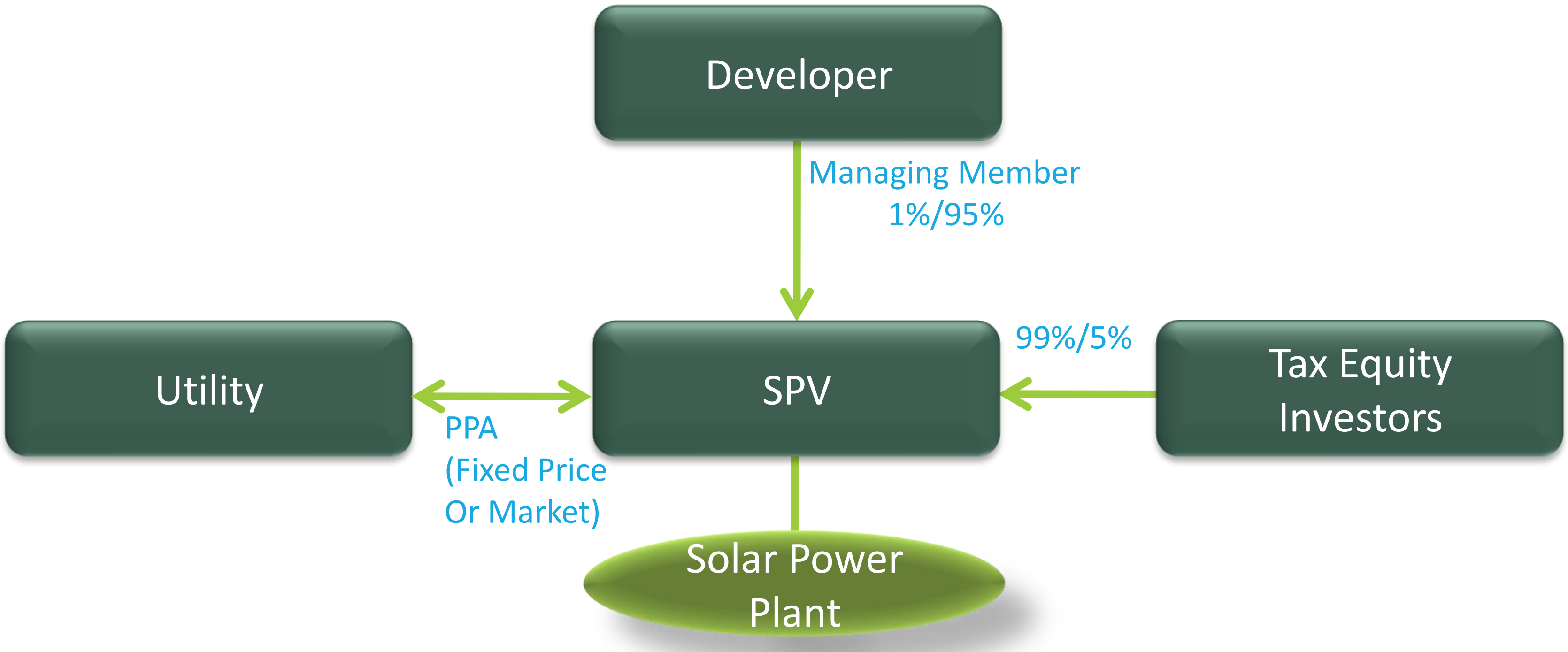
Capital Structure: Sources and Use

	Sources	Roles of Parties
Flip	General Partner (GP) Limited Partner (LP)	GP – Project Developer LP – Tax Equity Investor (Tax credit, Depreciation)
Inverted Lease	Developer Equity Investor	Developer – Lessor (Depreciation) Equity Investor – Purchaser, Lessee (Tax Credit
Sale Leaseback	Developer Equity Investor	Developer – Seller, Lessee Equity Investor – Purchaser, Lessor (Tax credit, depreciation)

Use: Construction and Equipment Costs

Partnership Flip Structure

Module 302



Partnership Flip Structure Demonstration

Native American Solar PV Company
Solar PV Project B
2 MW Solar PV Power Plant Economics
Annual Project Pro Forma ($000)

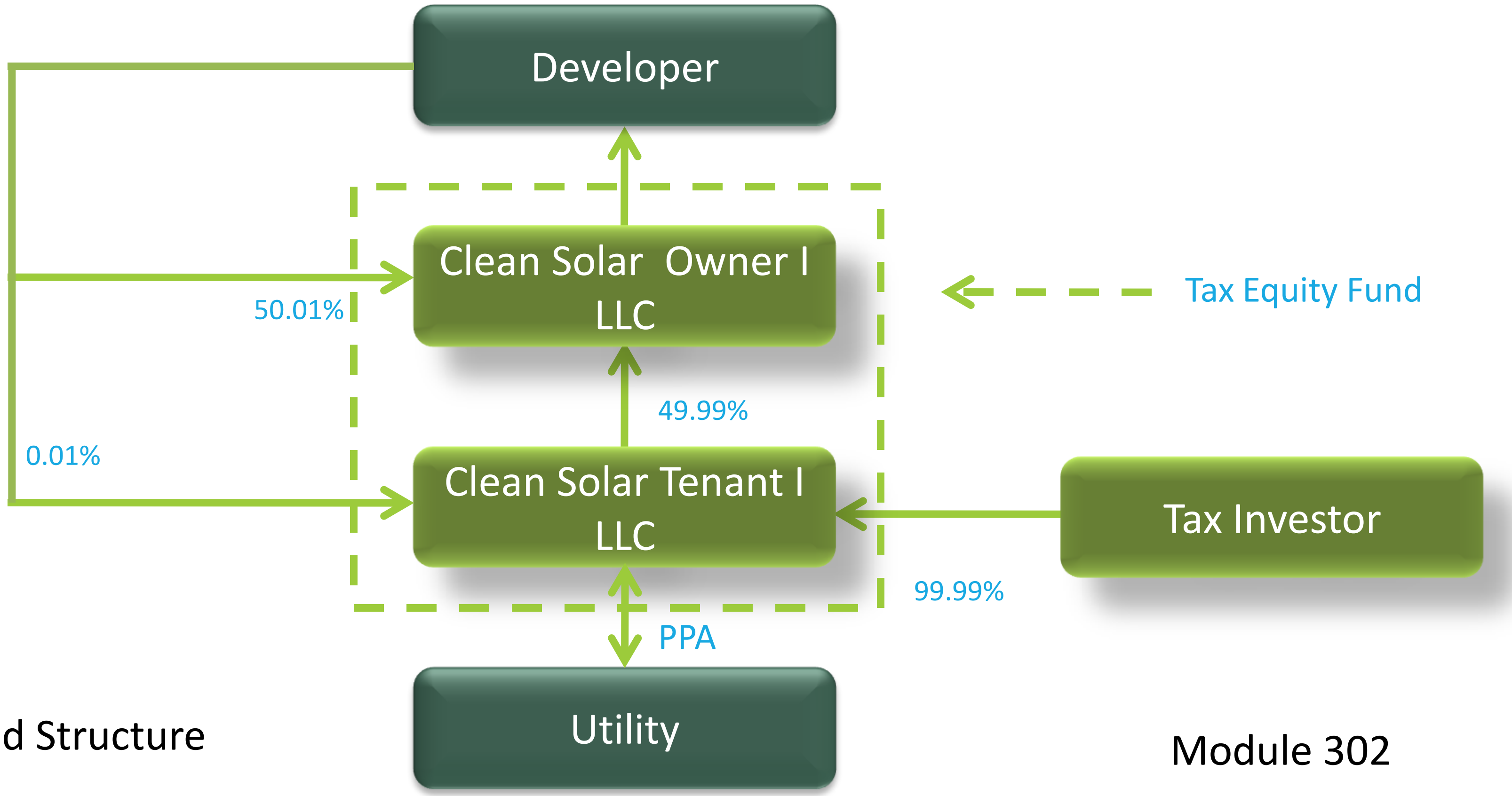
	1	6	7	20
Year:	**2013**	**2018**	**2019**	**2032**
REVENUE	$589	$574	$572	$536
INVESTMENT TAX CREDIT	$2,100			
O&M EXPENDITURES	($55)	($55)	($55)	($57)
OPERATING CASH FLOWS (EBITDA)	$534	$520	$517	$479
NET INCOME	($656)	$177	$517	$479
Taxes Benefit/(Payable) @ 35%	$229	($62)	($181)	($168)
PROJECT BENEFITS				
Energy tax Credit	$2,100			
Cash Flow	$534	$520	$517	$479
Tax Benefit/(Payable) @ 35%	$229	($62)	($181)	($168)
Total Benefits	$2,864	$458	$336	$311
Capital Cost	($7,000)			
Total Project Benefits (Cash & Tax)	($4,136)	$458	$336	$311
INVESTOR BENEFITS	($1,403)	$198	$17	$16
DEVELOPER BENEFITS	($2,733)	$260	$491	$455

Project IRR @ 20 Years = 10%

Tribal Ownership

- Total tribal ownership is feasible post flip
- Investor owns a small interest post flip (e.g., 5%)
  - Efficient for tribe to buy out investor
- Legal and beneficial ownership cash flow
  - Tribe is paying self:
    - Rent/royalty
    - Tribal taxes
    - If project was subject to non-tribal taxes – full tribal ownership reduces likelihood of taxability.

Inverted Lease Structure



Advanced Structure

Module 302

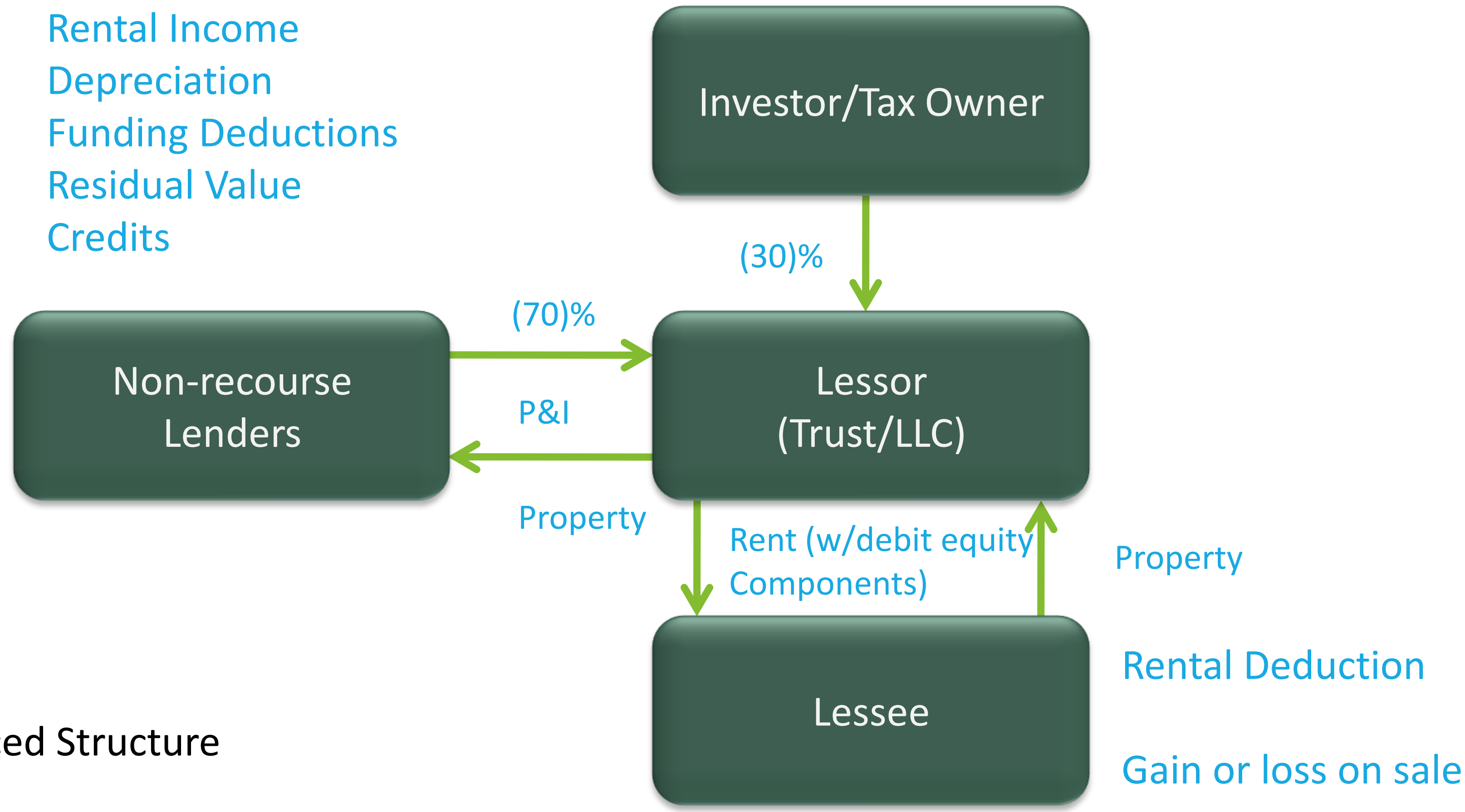
Inverted Lease Structure

Advanced Structure

- Developer owns project, contributes it to a lessor entity, and leases to tax equity Investor
  - Investor/lessee sells power
  - Pays rent to developer/lessor
  - Lessor elects to pass through tax credit to lessee
- Lessor claims depreciation as owner to shield its income
  - Lessee shares in depreciation through interest in lessor entity
  - Developer deducts rent that may mirror depreciation it would have received as owner
- Tax credit based on market value of project vs. cost
  - Lessor does not have to reduce depreciable basis by half the credit
    - Note: investor must report half the credit as income over five years

Sale Leaseback Structure

Module 303



Advanced Structure

Sale Leaseback Structure

- Developer sells project to tax equity investor and then leases it back
  - Sale is the market value of the project
  - Investor receives tax credit and depreciation
- Lease cannot be longer than 80% of expected life and value
- Tax credits only claimed on new equipment
  - Equipment status preserved as new if it’s sold and leased back within three months
- Allows developer to indirectly share in tax subsidies through reduced rent for use of equipment

Advanced Structure

	Project Debt			Tax Equity		Lease Equity	DOE
	Bank	Private Bond	Term Loan	Levered	Unlevered		
Investor Universe	Commercial Banks	Private or 144A Offering	Institutional investors w/energy focus	Financial investors and some corps. with tax appetite.		Lease equity market, institutional	DOE supports 100% or 80%
Target Rating	"Investment Grade" no rating needed	BBB-/NAIC 2	B is doable; BB is preferred	NA (Investment Grade Offtaker)		NA (Invest. Grade Offtake)	NA
Market Capacity	Up to \$1 Billion; up to 1.0XDSCR in Low Case	+\$1.0 Billion	\$750 Million	Sized to target IRR		Sized to 20-49% of Capital Stack	No Limit
Indicative Pricing	L+250-350 2007: 100-150 +fees 1.5-2.0%	7% Area; T + 5%-6% Fixed	L+250-500; 425 - 450 Libor floor;	11-13.5; IRR by Flip	9-10.5% IRR by Flip	9.0-12.5% after tax yield	T+75-100 bps
Tenor	5-7 years typical, up to 15	Term of PPA (20-25); Prepayment Penalty	Up to 7 years	Target IRR reached by year 10 with PTC; 6-7 with ITC		80% of Useful Life	Up to 30 years
Sizing Profile	DSCR Requirements 1.30-1.40X; lockbox; PPA 'Tail'; EPC with credit support; LIBOR Swaps; Reserves		1% amortization with cash sweep	Downside flip dates: +3 years in downside; +6 years in severe downside		1.30-1.40 "RSCR" Like Project Debt	Driven by required Ratings

Discussion

FOUNDATION CONCLUSION

Agenda

- ✓ Overview
- ✓ Case Studies
  - ✓ One: Solar Community
  - ✓ Two: Fundamental Commercial
- ✓ Financial Models
- ✓ **Case Study Three: Advanced Commercial**
- ✓ Summary

1

Solar Community

- Self Use
- Capital Budgeting Decision

2

Fundamental Commercial

- For Sale
- Business Decision

3

Advanced Commercial

- For Sale
- Business Decision

Commercial Wind Project

3

Wind Industrial

- For Sale
- Business Decision

Module 310

- 100 MW
- $2,000/kW or $2,000,000/MW
- $100/MW PPA
- 30% capacity factor
- 20 Year project IRR: 10%
- Inspiration: 20 to 200 Mw projects that are in varying degrees of development

Revenue

3

Wind Industrial

- For Sale
- Business Decision

- Cost of electricity varies across the country
  - California/Connecticut vs. North Dakota/Arizona
- Interconnection & transmission access
- Fair price for electricity (PPA)

Primary focus: how much you can sell electricity for?

Who can you sell it to?

Power market review

Capital Expenses

3

Wind Industrial

- For Sale
- Business Decision

- Project Expenses
  - Pre-development
    - Permitting
    - Biological Studies
    - Met towers
  - Foundations
  - Towers
  - Turbines and blades
  - Electric grid
- Total installed cost $2,000/kw

Operations

3

Wind Industrial

- For Sale
- Business Decision

Operations and maintenance includes

- Equipment maintenance and upkeep
- Spare parts (including blades)
- Monitoring and curtailment
- Insurance
- Labor and staffing
- Extended warranty agreements

Project Economics

3

Wind Industrial

- For Sale
- Business Decision

Native American Wind Company
Wind Project A
100 MW Wind Farm Economics
Annual Project Pro Forma ($000)

Year:	1 **2013**	10 **2022**	11 **2023**	20 **2032**
REVENUE	$24,528	$24,528	$24,528	$24,528
PRODUCTION TAX CREDIT (PTC)	$5,396	$6,739	$0	$0
OPERATING EXPENDITURES	($6,416)	($8,365)	($8,628)	($9,429)
OPERATING CASH FLOWS (EBITDA	$18,112	$16,163	$15,900	$15,099
NET INCOME	($21,423)	$15,931	$15,667	$15,099
Tax Benefit/(Payable) @ 35%	$7,498	($5,576)	($5,484)	($5,285)
PROJECT BENEFITS				
PTC	$5,396	$6,739	$0	$0
Cash Flow	$18,112	$16,163	$15,900	$15,099
Tax Benefit/(Payable)	$7,498	($5,576)	($5,484)	($5,285)
Total Benefits	$31,006	$17,327	$10,416	$9,814
Capital Cost	$200,000			
Total Project Benefits (Cash & Tax)	($168,994)	$17,327	$10,416	$9,814
INVESTOR BENEFITS	($62,106)	$17,327	$521	$491
DEVELOPER BENEFITS	($106,888)	$0	$15,105	$14,344

Project IRR @ 20 Years = 10%

Agenda

- ✓ Background
- ✓ Case Studies
  - ✓ One: Solar Community
  - ✓ Two: Fundamental Commercial
- ✓ Financial Models
- ✓ Case Study Three: Wind Commercial
- ✓ **Summary**

Renewable Energy Project Development Takeaways

- **Who:** Tribal Nations with Natural Resources
- **What:** Develop Renewable Energy projects or go into Renewable Energy business
  - Community: Use the energy/power for tribe
  - Commercial: Sell to power company or others
- **Where:** Indian Country or controlled lands
- **Why:** Value proposition
  - Economic development
  - Risk mitigation
  - Portfolio diversification
  - Jobs
  - Assert sovereignty
- **How:** Informed financial structuring
  - Flip
  - Sale leaseback
  - Inverted lease

Series 300 Summary

- Renewable Energy projects can be an economic development tool for Tribal Nations
- Tribal Nations can participate in Renewable Energy projects for commercial or community benefit
- Renewable Energy projects are financed and structured to transfer risk and allocate capital effectively
  - Flip
    - Simple structure
    - Investor utilizes tax credits in exchange for capital
  - Inverted lease
    - Tax credit based on Fair Market Value
    - Tax credits pass through to Lessee
  - Sale leaseback
    - Lessor purchases project at Fair Market Value
    - Lessor utilizes tax credits and depreciation