

DOE OFFICE OF INDIAN ENERGY

# Strategic Energy Planning



U.S. DEPARTMENT OF  
**ENERGY**

Office of  
Indian Energy

# DOE Office of Indian Energy

## Free On-request Technical Assistance

- Strategic Energy Planning (SEP)
- Housing and Building Energy Efficiency
- Village Power
- Project Development
- Resilience
- Policy and Regulations



# What is Community Strategic Energy Planning?

And what does it do for you?



- Brings desired energy future into focus and builds consensus
- Considers current reality and local resources
- Considers hurdles/challenges before you reach them
- Maps out efficient path to achieve your desired energy future
- Clarifies key performance indicators
- Documents the game plan for short- and long-term success

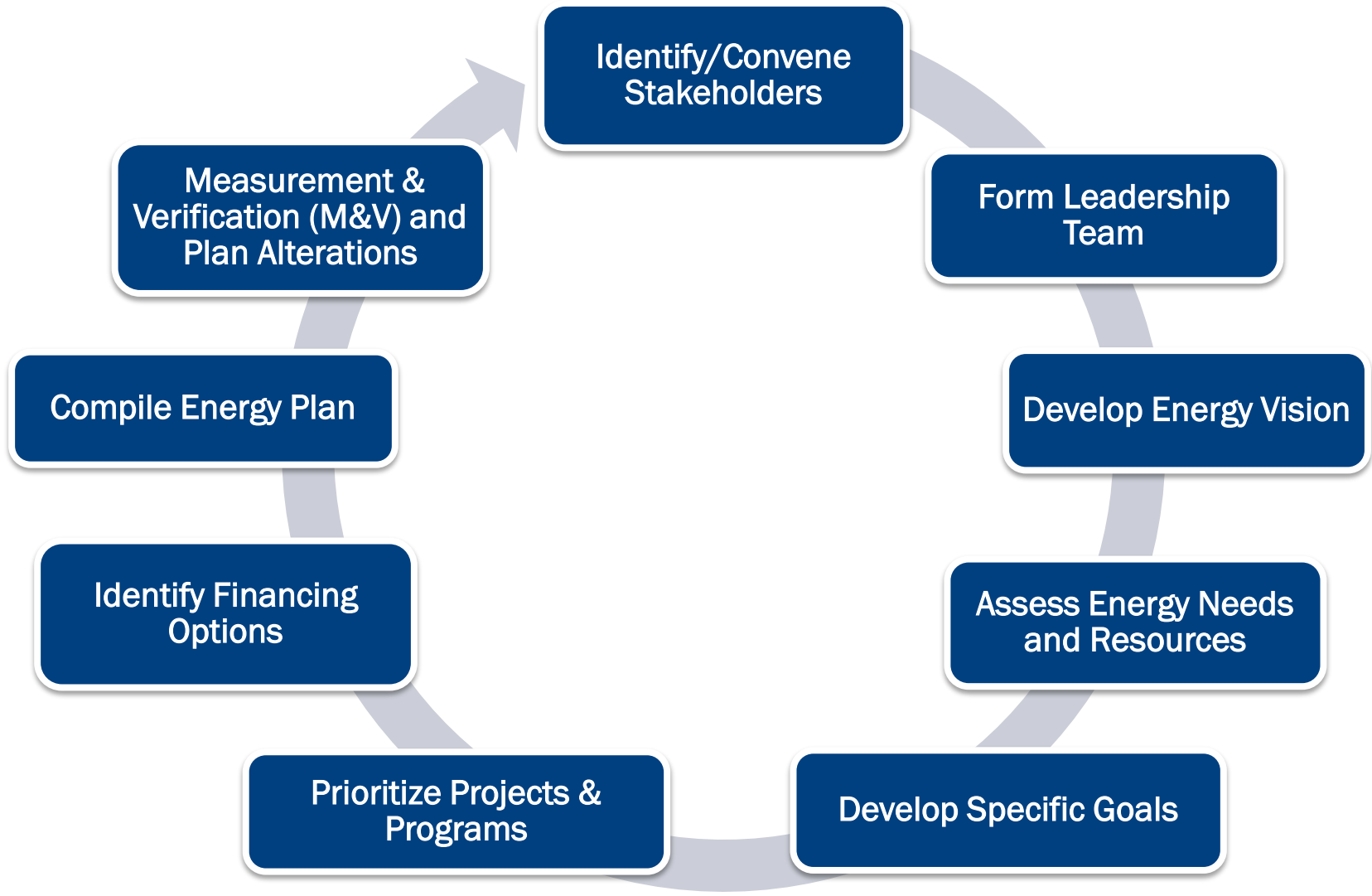
# Why Does Strategic Energy Planning Fail?



- Short-sighted predictions of the situation, timeline
- Unrealistic predictions of resources
- Uncoordinated implementation
- Narrow ownership
- Failure to follow the plan
- Poor, or casual, communication

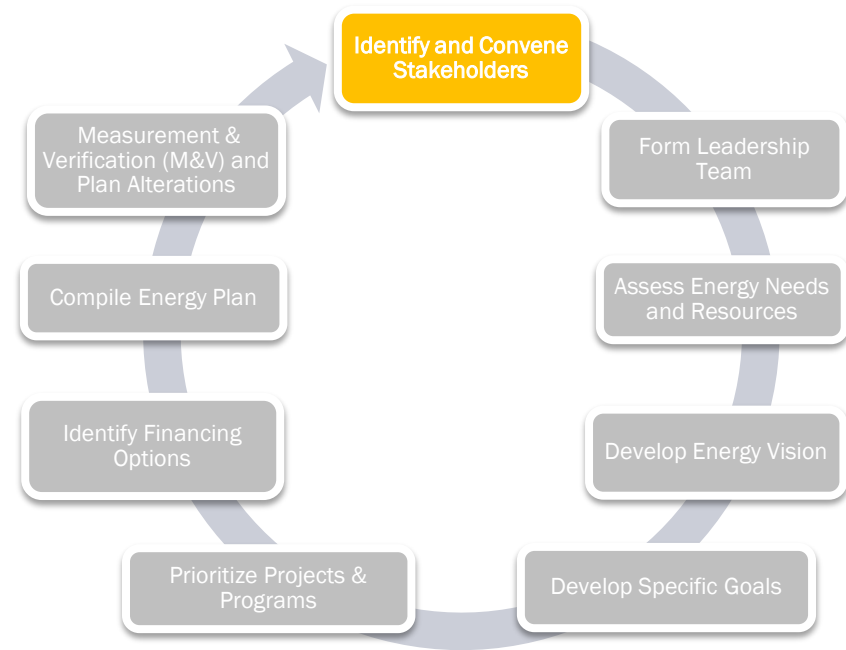
Graphic concepts reprinted with permission from Lesley Kabotie, Kabotie Consulting.

# Steps in Strategic Energy Planning



# Step 1: Identify and Convene Stakeholders

- Utility representatives
- Community leaders (tribal/city)
- Local facilities managers
- Community businesses/industry
- Regional intertribal organizations
- Community members
- School district
- Housing authority
- State or regional-level energy-focused administrators

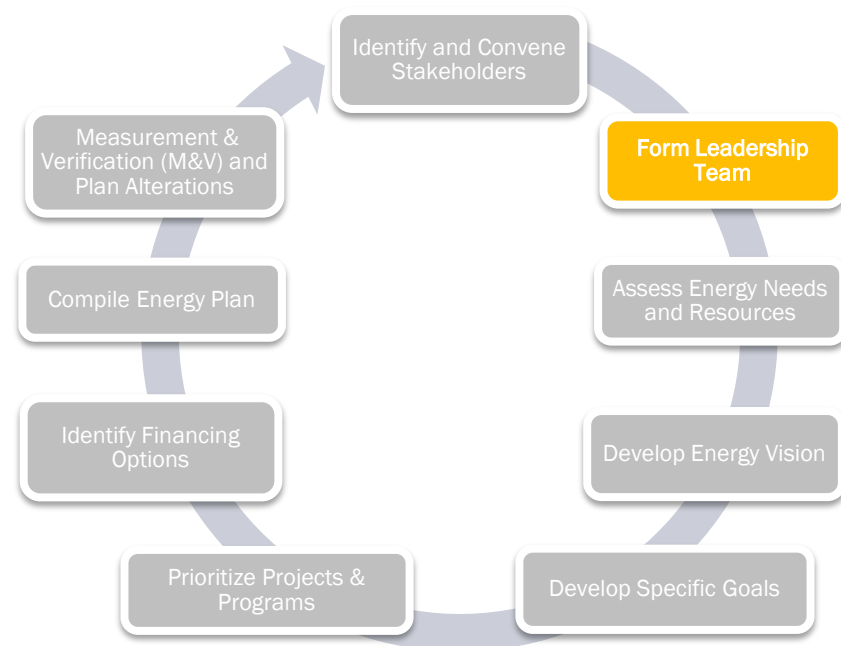


# Step 2: Form Leadership Team

Who are your energy leaders?

## Draw from the stakeholders:

- Tribal and Business Council Member(s)
- Municipal Representative(s)
- Utilities and energy providers
- Alaska Native Corporation & Enterprise Leader(s)

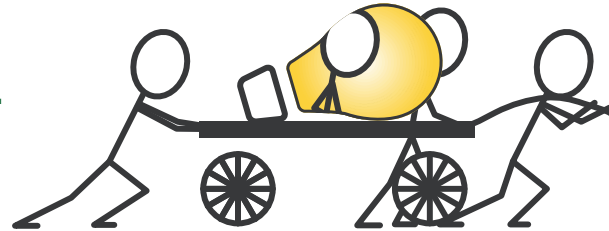


*Key success component:  
Identify and select an energy  
“champion” to endorse the  
process and a “plan advocate”  
to shepherd the steps in the  
process*

# Tips for Forming a Leadership Team



vs.



Not just people with the “right” idea, but those committed to the long-term task with personal and political influence

## Include ✓

- Individuals with authority to direct resources (utility management, fuel purchasing, school district, facility management, land and waste management, housing construction, etc.)
- Individuals with a passion for the “destination”
- Individuals with influence in the community and administrative abilities to keep the project alive
- Individuals with the technical ability
- Individuals who can “tell the story”

## Avoid ✗

- Exclusively elected officials (turnover potential)
- Exclusively technical staff
- Exclusively implementers



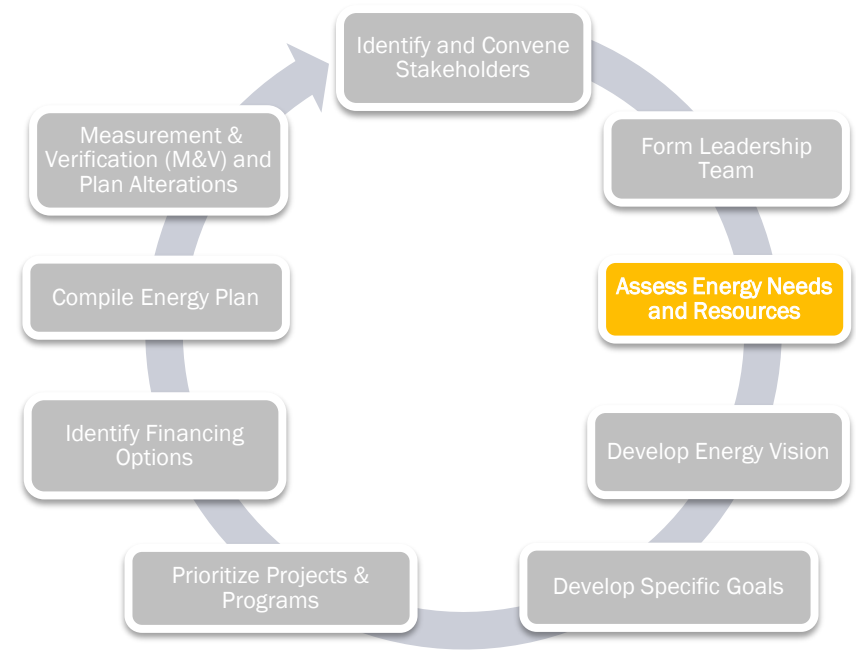
# Step 3: Assess Energy Needs & Resources

Community energy assessment will have two key parts:

- A baseline of a community's energy use and generation (**Present**)
- A forecast that documents future energy demands (**Future**)

And should include:

- Heat
- Power
- Transportation



## DATA, WHERE IS IT!?!?

# Assess Energy Needs

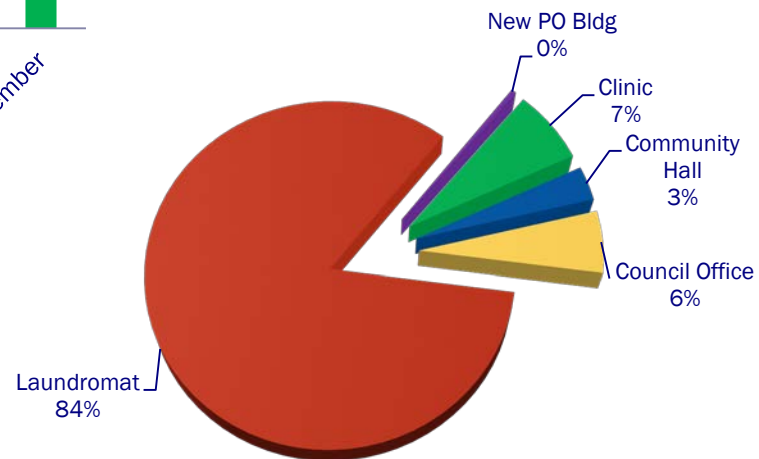
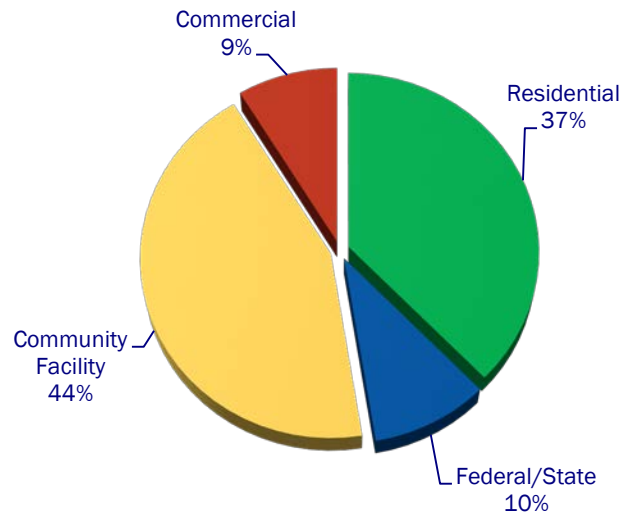
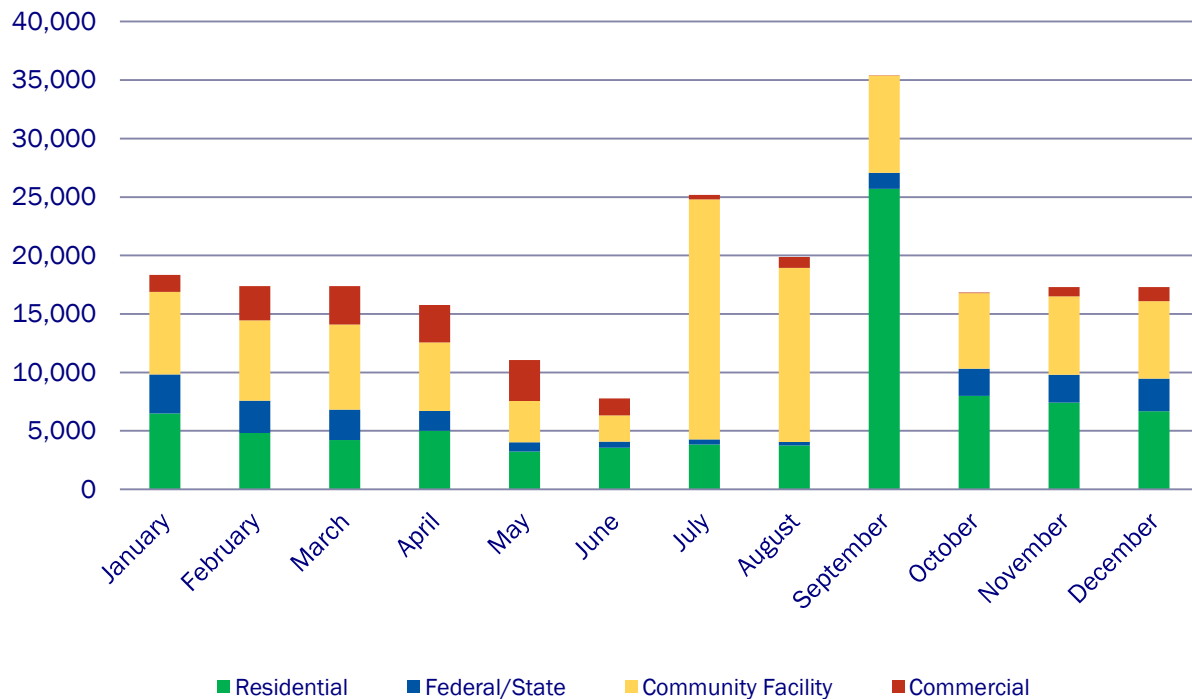
## Document the community baseline:

- Determine energy use including government, residential, school, commercial
- Use available tools:
  - Energy audits
  - PCE reporting documents
- Forecast future load
  - New housing
  - New government facilities
  - New/expanded enterprises
- Verify current service providers and rates for electricity, gas, propane, wood, and others



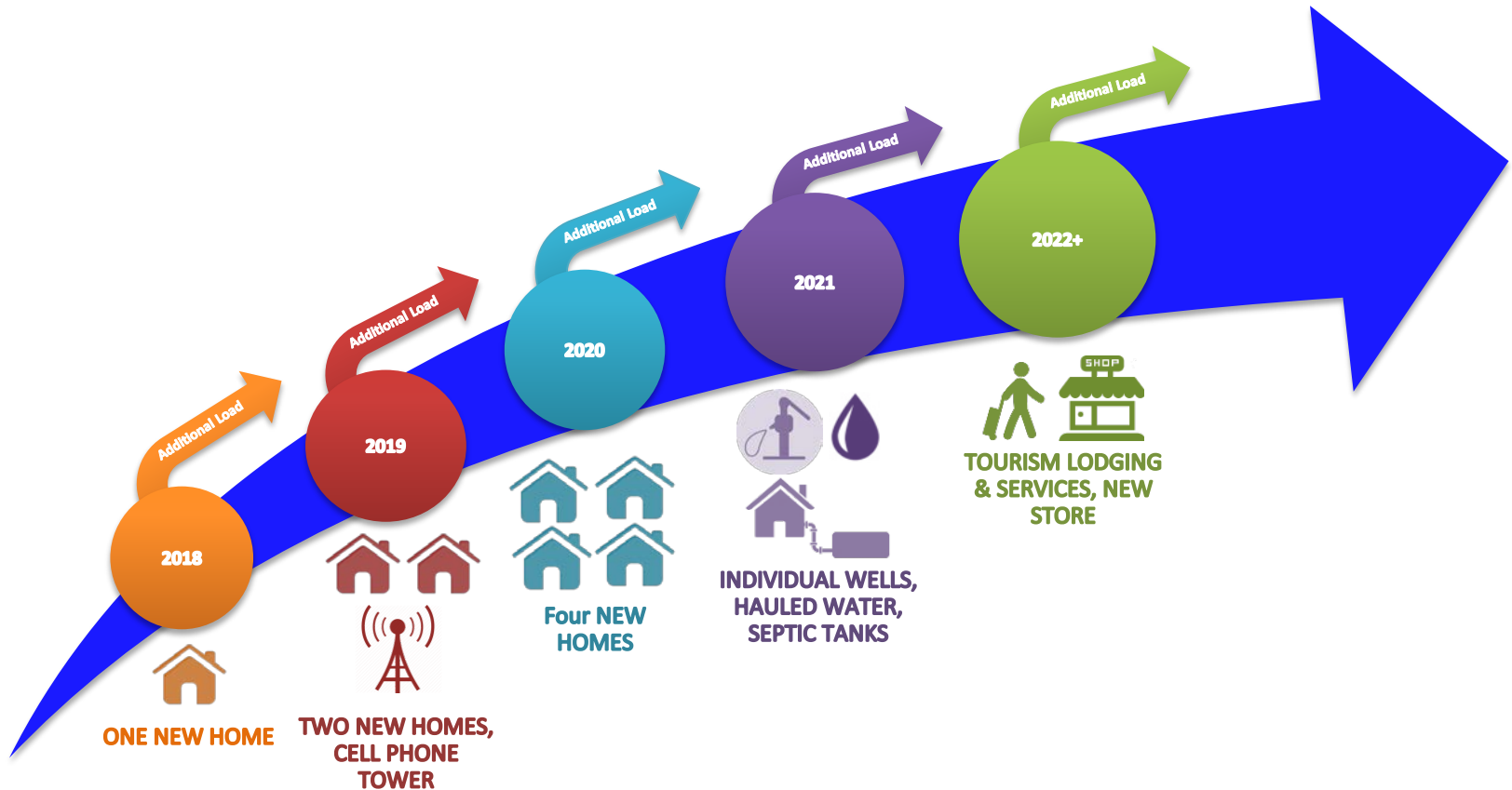
Photo by Alex Dane, NREL 22724

# Rampart Energy Baseline

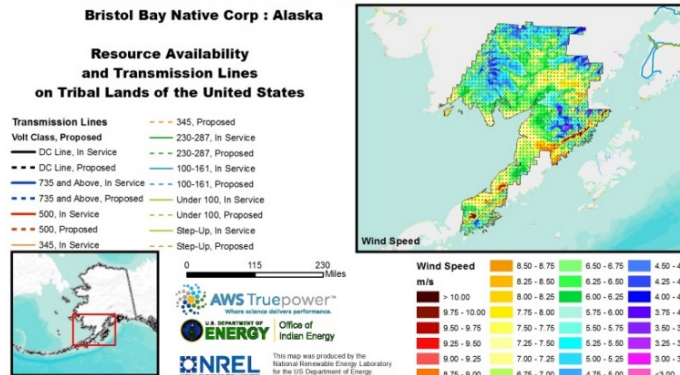
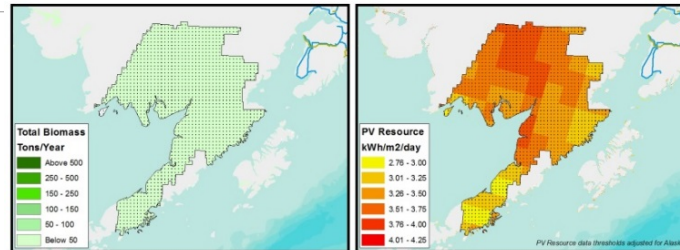
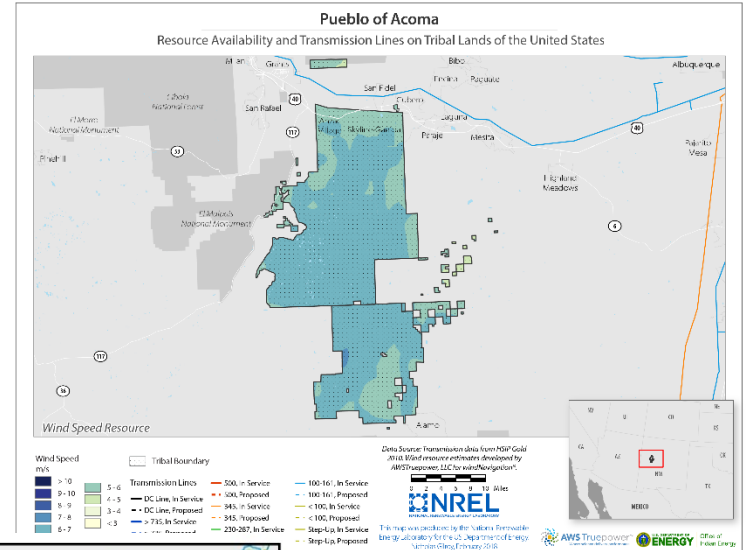
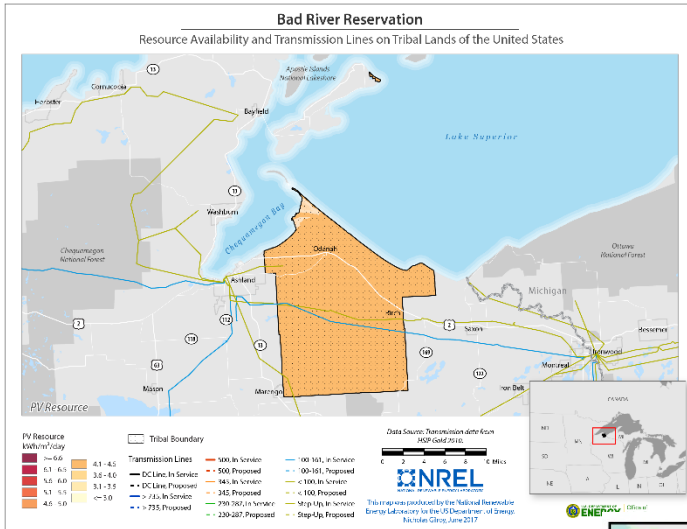


# Forecasting Future Energy Demand

Forecasting energy demand is an exercise in broader community planning



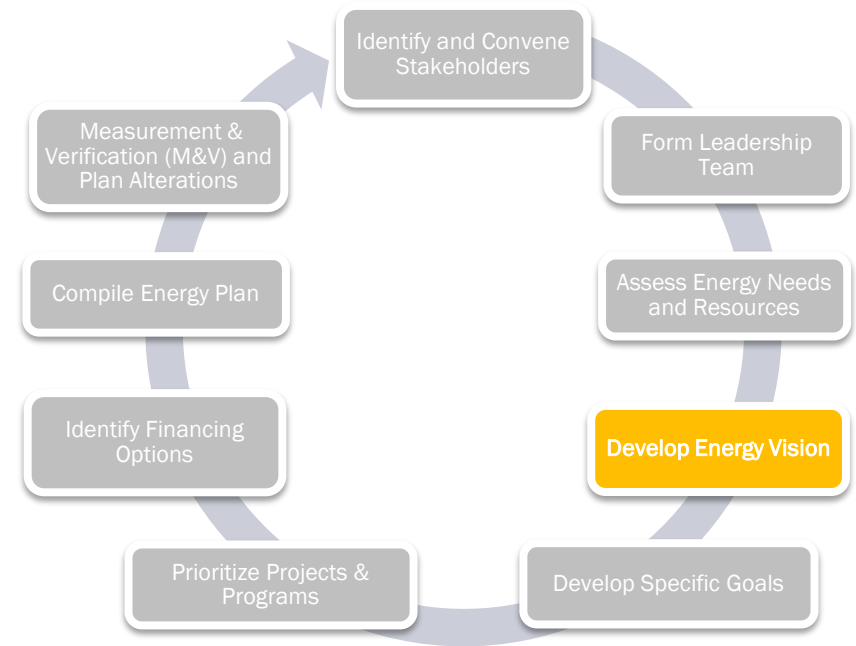
# Resource Assessment



# Step 4: Develop Energy Vision

## A vision statement:

- Describes an optimal, desired future
- Provides inspiration/guidance
- Is succinct, easy to remember
- Specific and relevant to the situation “on-the-ground”



# Values and Objectives Inform an Energy Vision

## Common objectives include:

- Increase and ensure energy reliability
- Minimize environmental impacts
- Diversify energy supply
- Use local, renewable resources
- Strengthen, support economic development
- Build workforce/jobs
- Ensure energy affordability
- Generate revenue for Tribe
- Energy security/self-sufficiency
- Save money (offset energy costs)
- Keep money in the Tribe/Village
- Stabilize energy costs



**BRING YOUR STICKY NOTES!**

# Energy Vision Examples

## Forest County Potawatomi, WI

Reduce the Tribe's carbon footprint to zero while leading energy strategy initiatives, which support and promote the efforts of others working to reduce their own carbon footprints.

## Blue Lake Rancheria, CA

Achieve 100% self-sufficiency through renewable energy Rancheria-wide.

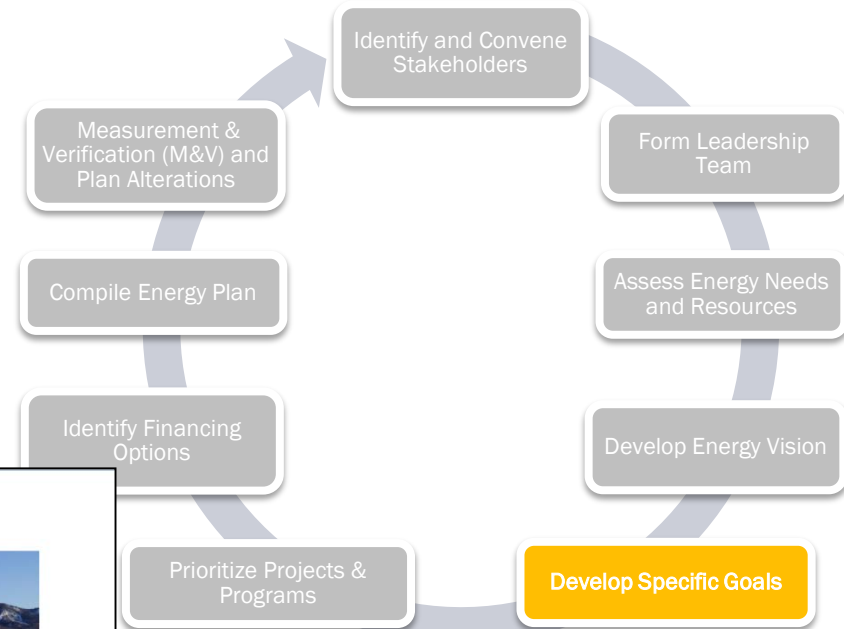
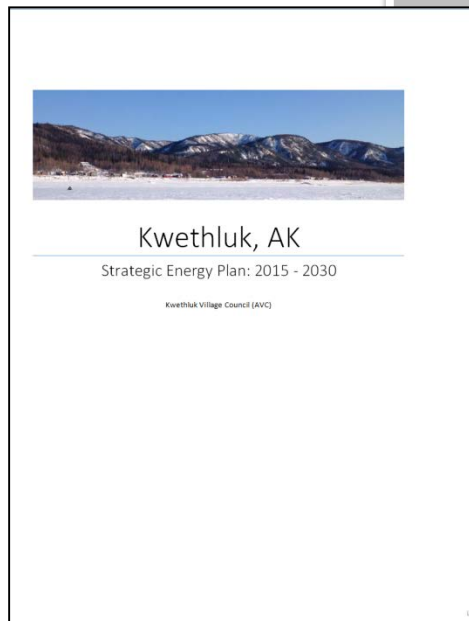
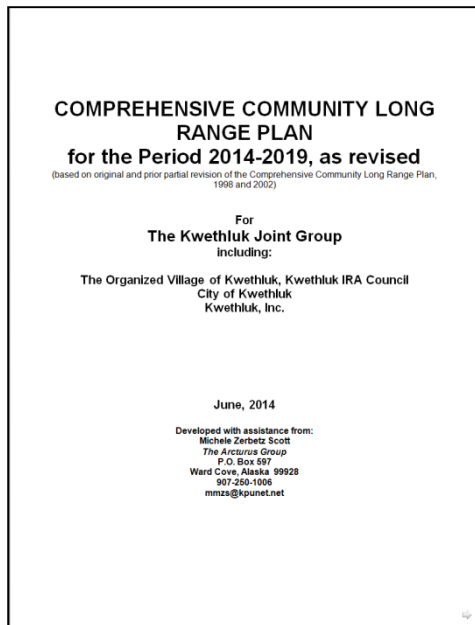
## Rampart, AK

Build capacity to design and maintain new and existing energy systems while focusing on increasing the grid's efficiency, reliability, and stability and to provide employment and training opportunities for tribal members

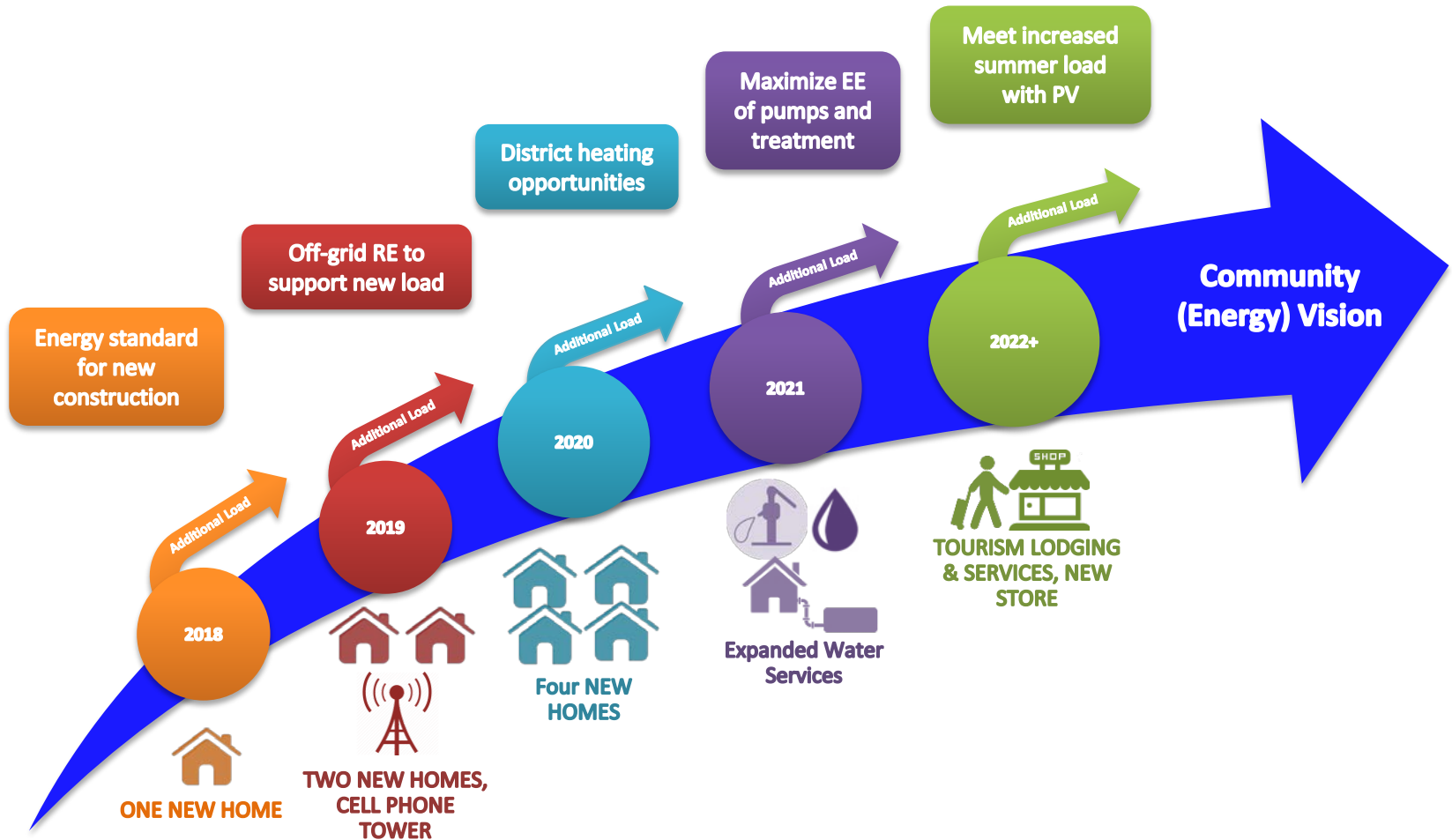


# Step 5: Develop Specific Goals/Projects

Energy Goals Should be Integrated with Community Development Goals!



# Energy Projects Reflect Community Development Projects



# Priorities & Decisions: Develop Specific Goals

## Examples:

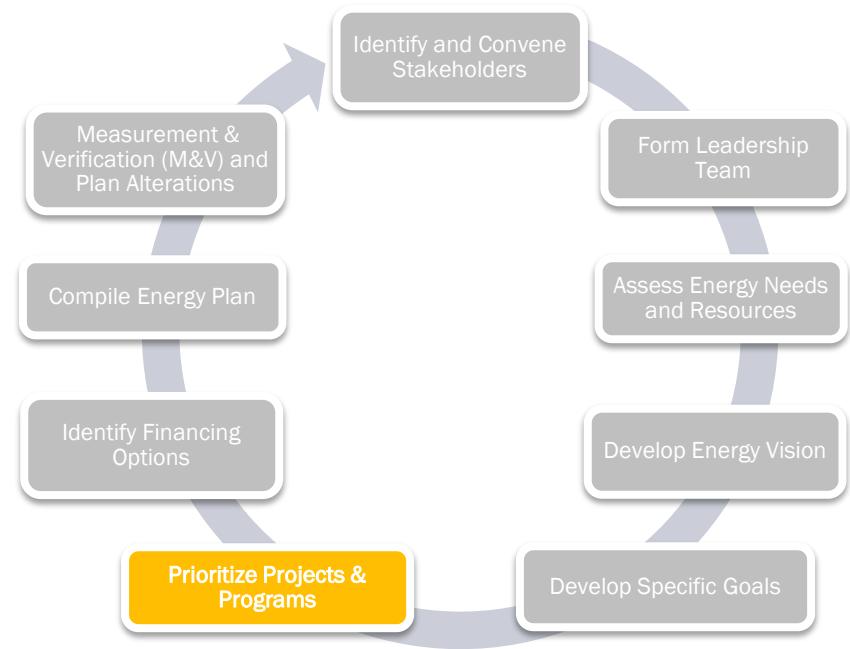
- Reduce electricity use by \_\_\_% by 2022
- Obtain \_\_\_% of electricity from renewable sources within 10 years (similar to a renewable portfolio standard or RPS)
- Reduce energy costs by \_\_\_% within 5 years



Photo by Karen Petersen, NREL

# Step 6: Prioritize Projects & Programs

- Develop a ranking system to understand cost-effectiveness of different projects
- Best practice models:
  - Total Resource Cost
    - Model considers life-cycle benefits for projects
  - Levelized Cost of Energy (LCOE)
    - Allows comparison across different technologies
  - Net Present Value (NPV)
    - Considers the profitability of an investment versus the opportunity costs



# Program/Project Selection Based on Economics

- Produces 53% of the annual electricity of the buildings as estimated by the energy models
- 15.2 year simple payback assuming no incentives
- 10.7 year simple payback assuming the 30% ITC is captured

## RESULTS



**100,312 kWh/Year\***

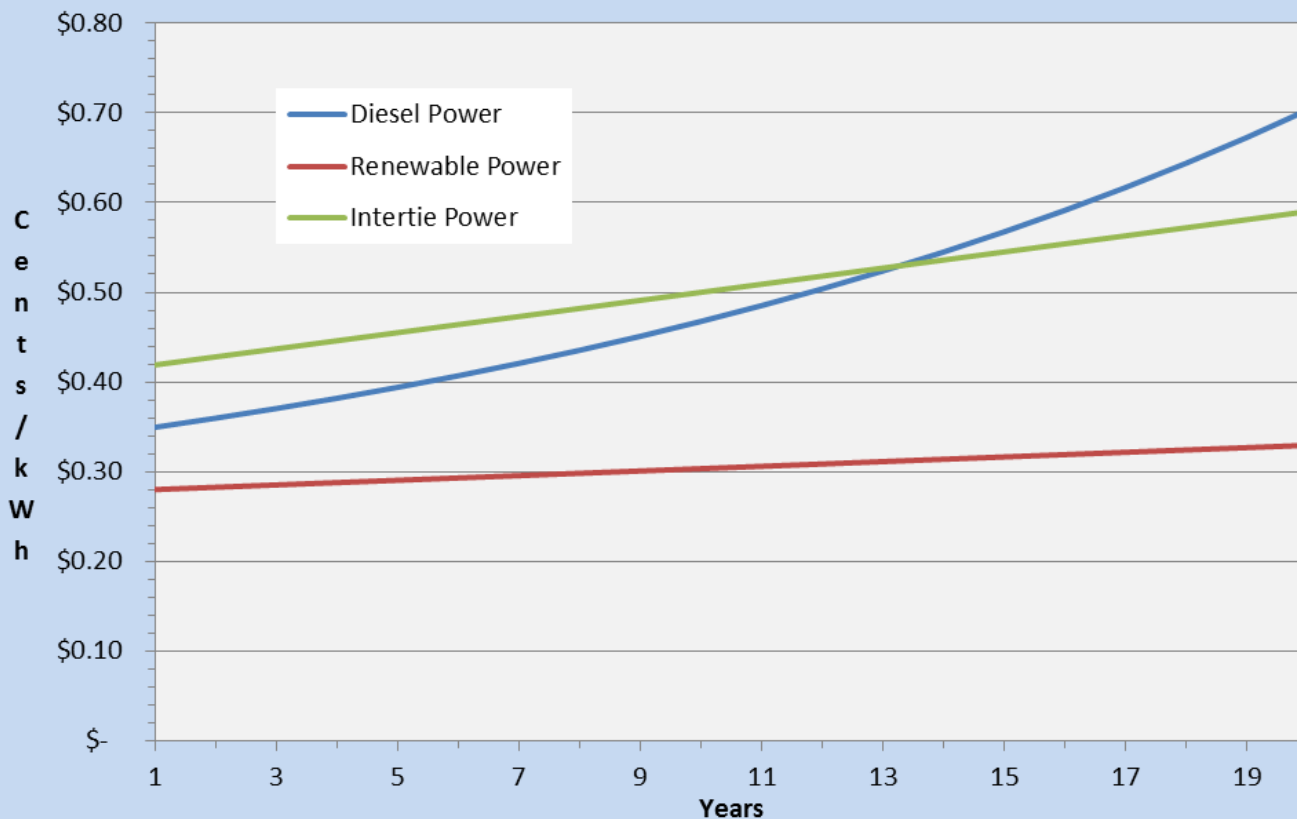
System output may range from 96,560 to 103,131 kWh per year near this location.  
Click [HERE](#) for more information.

Month	Solar Radiation ( kWh / m <sup>2</sup> / day )	AC Energy ( kWh )	Energy Value ( \$ )
January	3.78	5,588	503
February	4.77	6,267	564
March	5.88	8,565	771
April	7.29	10,026	902
May	8.05	11,120	1,001
June	8.33	10,784	971
July	8.15	10,723	965
August	7.49	9,873	889
September	6.74	8,683	781
October	5.39	7,553	680
November	4.25	5,957	536
December	3.55	5,174	466
<b>Annual</b>	<b>6.14</b>	<b>100,313</b>	<b>\$ 9,029</b>

# Program/Project Selection Based on Economics

A remote village in Alaska is currently using diesel fuel to power their generators 24/7 at 35 cents/kWh. They have two options: (1) intertie with a neighboring village, or (2) install wind turbines. Which option is the most economically viable?

**Energy Comparison Cost Sample**  
(constant demand)



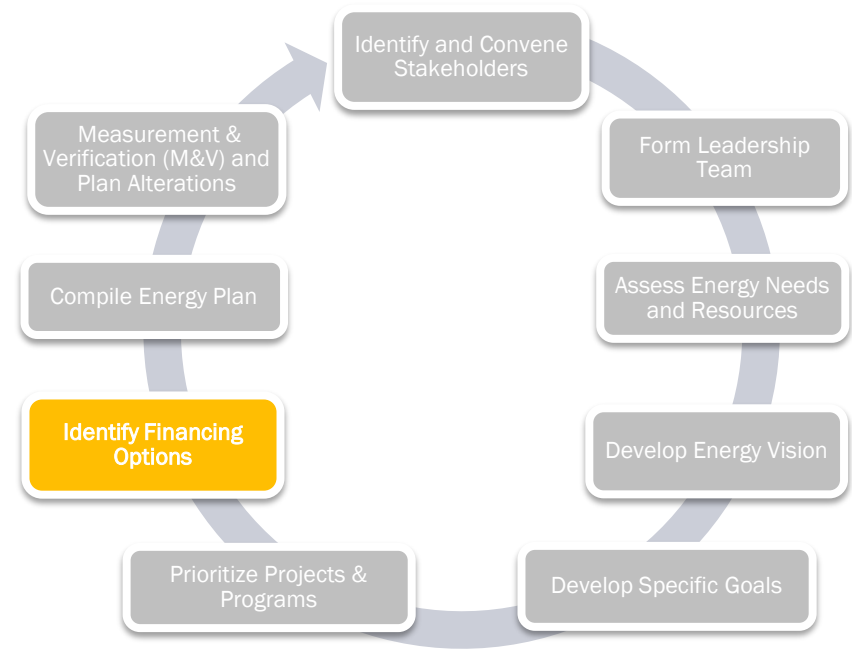
1. Currently, inter-tie appears more expensive than diesel generators.
2. Consider the fact your village would need to build the lines to the neighboring village.
3. Immediate savings are realized from new wind generation, including infrastructure.
4. If diesel power continues to rise, eventually, intertie power should be an important consideration.

# Step 7: Identify Financing Options

## Techniques:

Consider various financial approaches

1. Cost avoidance (have to do no matter what: aggravate fuel purchases, GSA purchases)
2. Efficiency (weatherization and optimization), power plant tune-up
3. Public Money: Grants, loans
4. Private Funding (RurAL CAP, Aid Foundations, Native Corps)



### State Funding

- AEA
- AFHC

### Non Profit

- Rasmussen Foundation
- Rockefeller
- Etc.

### Federal Funding

- Denali Commission
- DOE
- EPA
- IHS
- USDA
- HUD
- NGOs / Non-Profits

# Priorities and Decisions: Identify Financing Options

Secure planning and project funding sources:

- Tribal funding  
(<https://energy.gov/indianenergy/energy-development-assistance-tool>)
- DOE Technical Assistance (TA) Program
- Other federal agency TA and grant programs
- State programs
- Non-governmental organizations (NGOs)



Photo by Alex Dane, NREL



# DOE Funding Tool

<https://energy.gov/indianenergy/energy-development-assistance-tool>

Provides information for Tribes about federal grant, loan, and technical assistance programs available from multiple federal agencies to support energy development and deployment in Indian Country and Alaska Native villages

Sort information by type of assistance, eligibility, agency or office, program name, or project phase

## When Pursuing Grants:

- Integrate grant writing capability and project team technical knowledge during project identification to support this step
- Research intent of grant programs and attributes of successful awards
- Align grant award timetable and project development process

Search: \_\_\_\_\_ SEARCH RESULTS

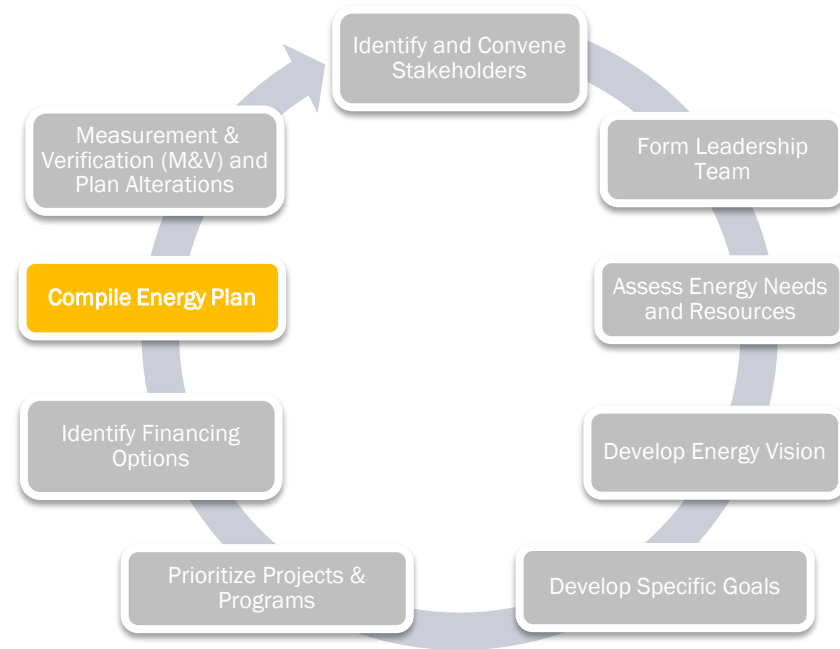
Showing 1 to 10 of 63 entries

TYPE OF ASSISTANCE	PROGRAM	AGENCY	DESCRIPTION	TYPE OF ASSISTANCE	ELIGIBILITY	PHASE
<input type="checkbox"/> Education and capacity building	<a href="#">504 Loan Program</a>	Small Business Administration	Provides growing businesses with long-term, fixed-rate financing for major fixed assets, such as land and buildings.	Loan and loan guarantee programs	Federally recognized Tribes and tribal governments; Alaska Native and tribal corporations; Alaska Native villages; Tribal universities, utilities, and other organized tribal groups; State-recognized-only Tribes; Tribal universities, utilities, and other organized tribal groups; Tribal nonprofit organizations (503-(C)) (3); Tribal energy resource development organizations	Phase 1; Phase 4
<input type="checkbox"/> Grants						
<input type="checkbox"/> Information resources						
<input type="checkbox"/> Loan and loan guarantee programs						
<input type="checkbox"/> Tax credits						
<input type="checkbox"/> Technical assistance						
<b>ELIGIBILITY</b>						
<input type="checkbox"/> Alaska Native and tribal corporations	<a href="#">Advanced Biofuel Payment Program</a>	Department of Agriculture: Rural Development	Provides payments to eligible producers to support and expand production of advanced biofuels refined from sources other than corn kernel starch.	Loan and loan guarantee programs	Tribal universities, utilities, and other organized tribal groups; State-recognized-only Tribes	Phase 4
<input type="checkbox"/> Alaska Native villages						
<input type="checkbox"/> Federally recognized Tribes and tribal governments						
<input type="checkbox"/> State-recognized-only Tribes						
<input type="checkbox"/> Tribal energy resource development organizations	<a href="#">Advanced Research Projects Agency-Energy (ARPA-E)</a>	Department of Energy: ARPA-E	Empowers America's energy researchers with funding, technical assistance, and market readiness to accelerate the pace of energy innovation.	Grants	Federally recognized Tribes and tribal governments; Alaska Native and tribal corporations; Alaska Native villages; Tribal universities, utilities, and other organized tribal groups; State-recognized-only Tribes; Tribal universities, utilities, and other organized tribal groups	Phase 4
<input type="checkbox"/> Tribal nonprofit organizations (503-(C)(3))						
<input type="checkbox"/> Tribal universities, utilities, and other organized tribal groups						
<b>PROJECT DEVELOPMENT PHASE</b>						



# Step 8: Compile Energy Plan

- Draft the plan
- Reach a consensus
- Execute the plan
- Communicate the plan to the community
- Keep the plan moving and revisit!



# Energy Plan: Components

## Include:

- Vision
- Objectives
- Goals
- Baseline
- Barriers
- Program/project options
  - Demand side
  - Generation
- Recommendations
- Communication plans
- Adoption by Tribal Council



Photo by Paul Dearhouse, NREL 24503

# Executing the Plan

- Form a working group
- Identify champions – Who will lead the effort?
- Meet regularly
- Map out strategies/tactics
- Establish a timeline; assign tasks
- Track metrics
- Communicate successes

# Community Outreach and Engagement

- Communications outreach is a common goal tribes identify through the strategic energy planning process
- Communicating your project's goals, benefits, and successes is key to your project's success
  - Facebook and other social media
  - Community radio
  - Newsletter
  - Postcards with energy efficiency tips
  - Strategy and messaging slide decks
  - Community events
  - Exhibit and posters
  - Strategic Energy Plan brochure
  - Technical reports
  - Case studies. Fact sheets
  - Website, blog

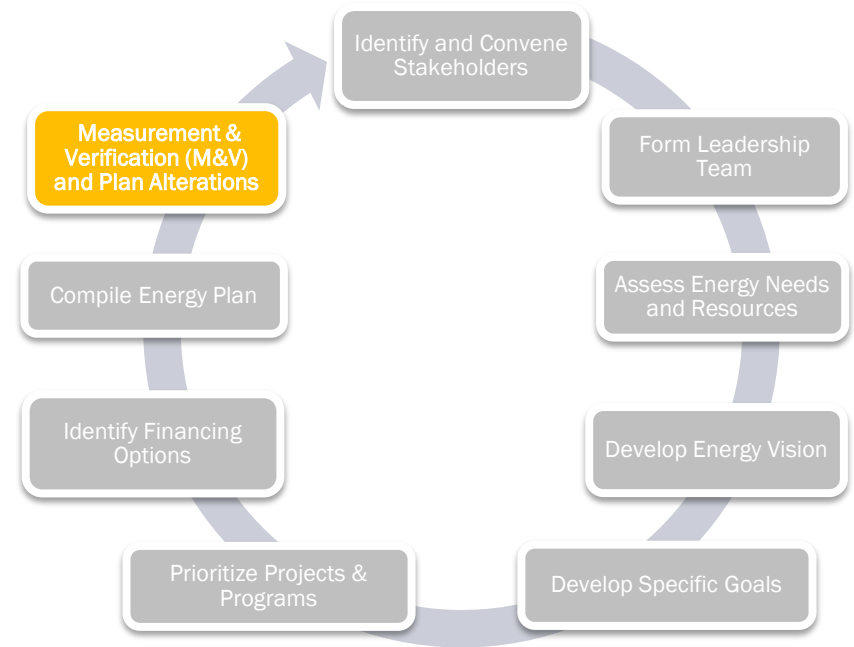
# Step 9: Measurement & Verification



M&V

Evaluate

Fine Tune



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# The Five-Step Process Framework for Project Development



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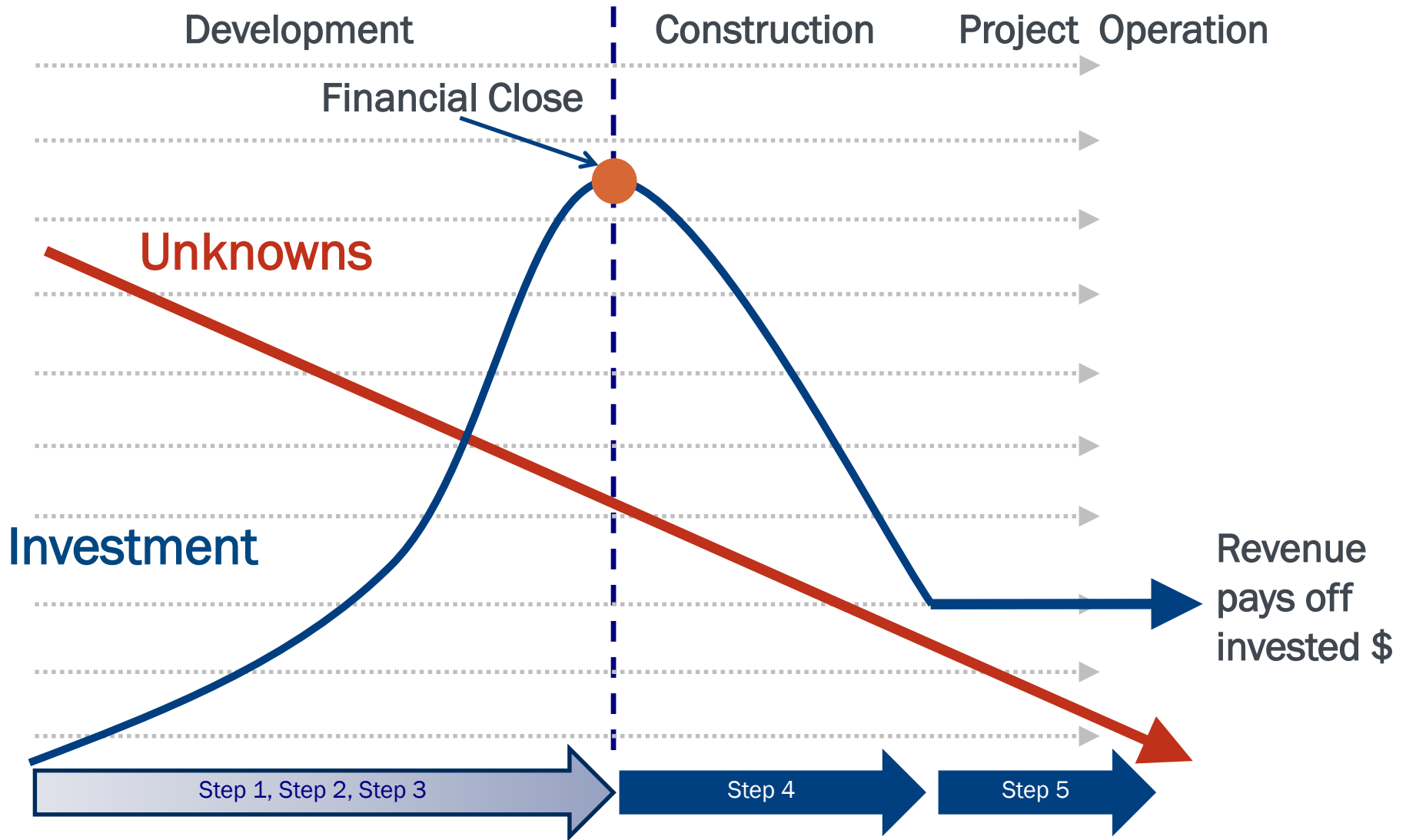
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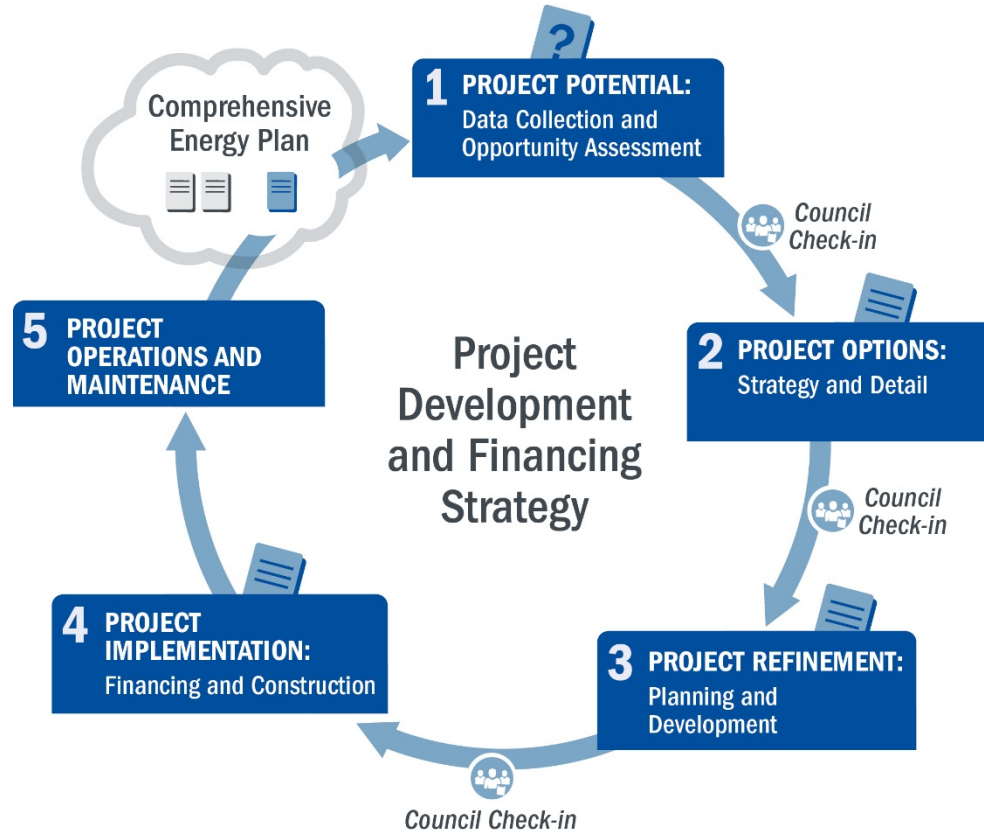
# The Five-Step Process Framework for Project Development: What Is It?

- Framework based on **experience**
- Focuses on key **decision points**
- Shows that project development is **iterative**
- Emphasizes that delaying or deciding against a project that does not meet current **goals** is a viable outcome and option

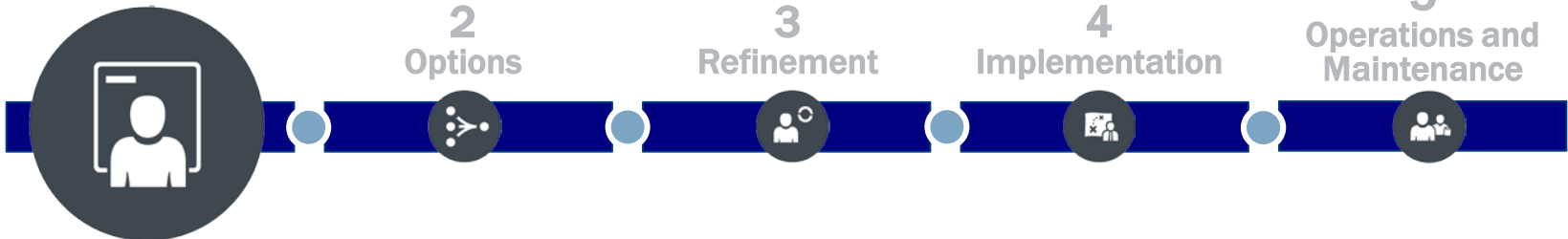


# Project Uncertainty/Capitol at Risk

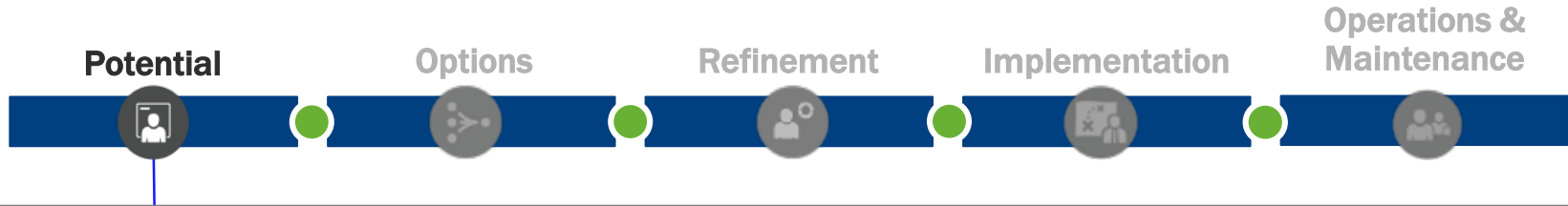




# 1 Potential



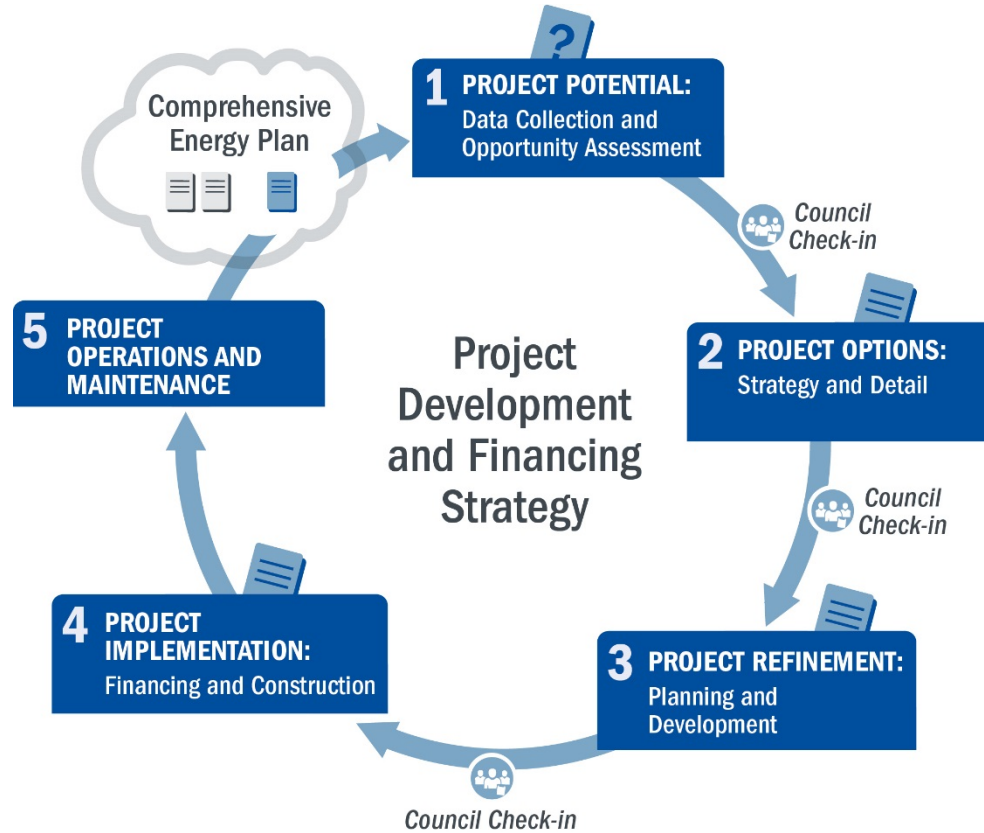
# Step 1: Site, Scale, Resource, and Community Market Potential



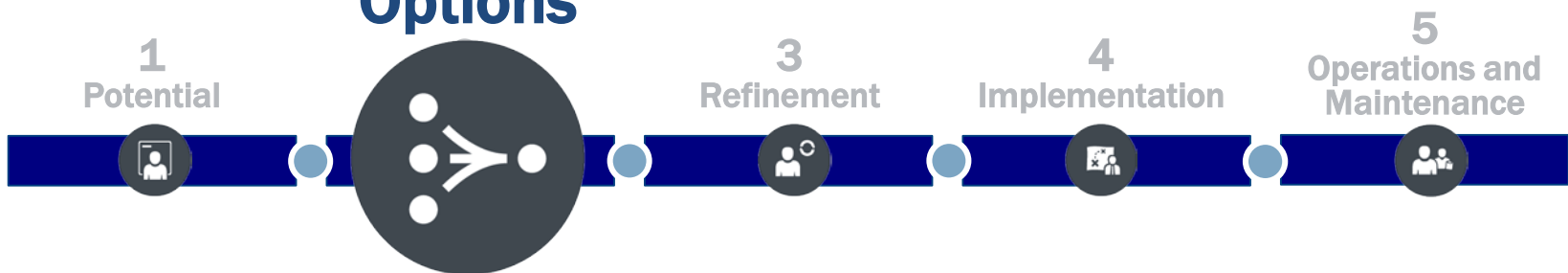
**Purpose:** Determine whether basic elements for a successful project are in place

## Tasks:

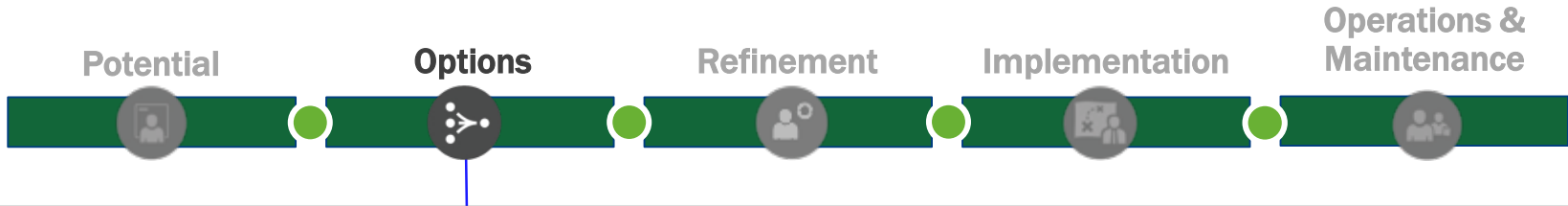
1. Identify possible **sites** for project locations
2. Determine the **energy load/demand** for these sites using past electric bills for these facilities
3. Confirm renewable energy **resource**
4. Review tribal facility electric cost data, regulations, and transmission and interconnection requirements
5. Evaluate community market potential for renewable sales. **Your community is the marketplace/energy –user.**
6. Assemble or communicate with the right team—those in positions or with knowledge to facilitate, approve, and champion the project



## 2 Options



## Step 2: Roles, Business Structures, & Regulatory Considerations



**Purpose:** Determine ownership structure and permitting considerations if any.

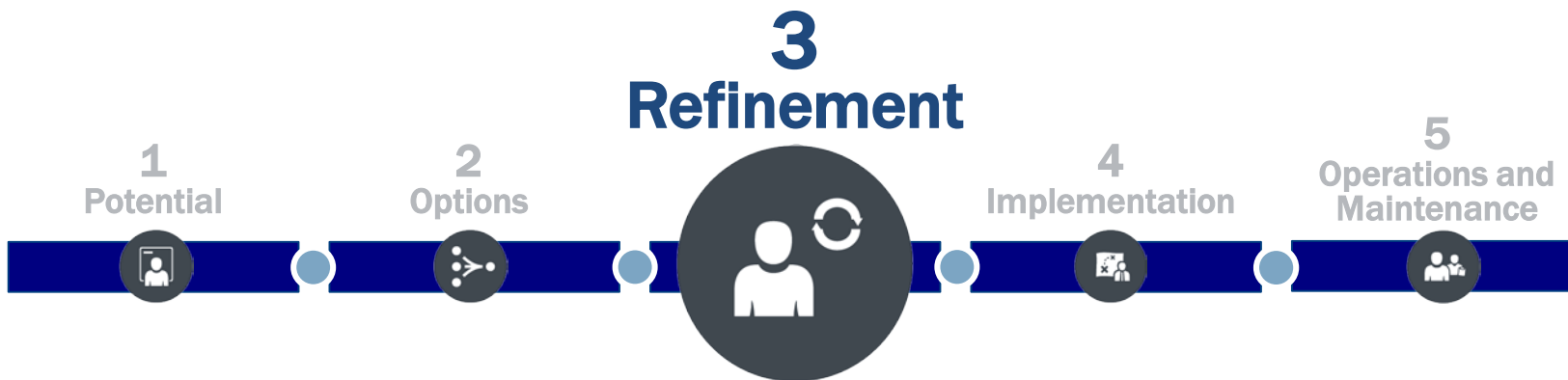
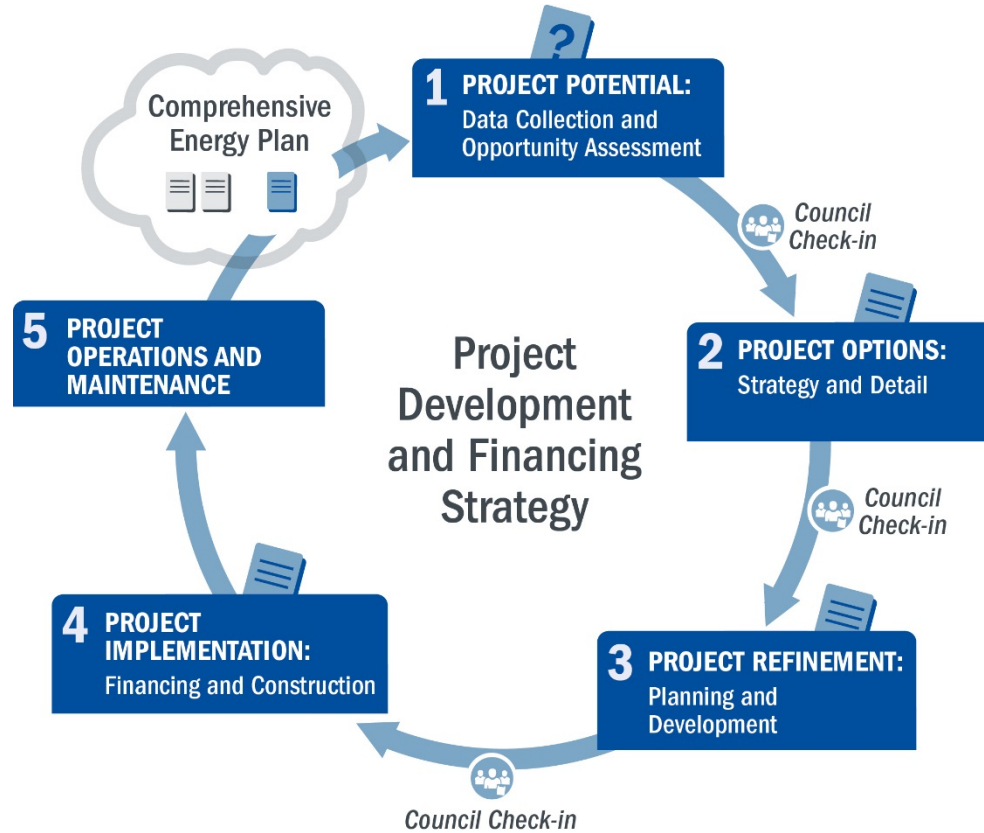
*(Note: It is likely that internal tribal permitting is required if developed on tribal lands, however, state and federal permitting may be required if the Tribe is dealing with fee or trust land outside the tribal land holdings.)*

### Tasks:

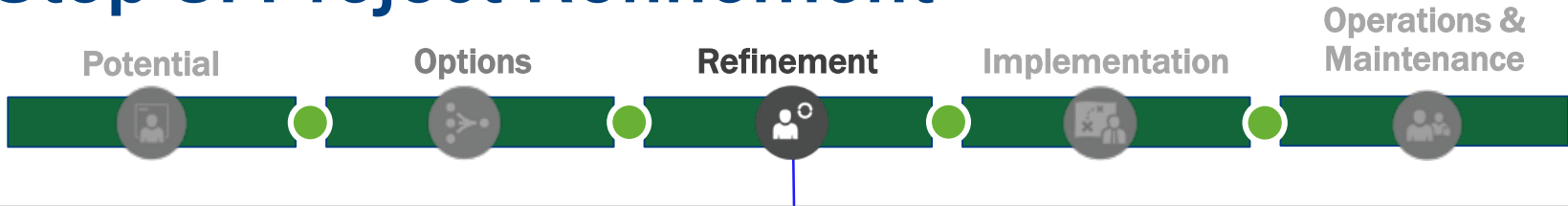
1. Understand tribal role(s) and risk allocations/business structure
2. Identify permitting needs and site use considerations
3. Identify interconnection rules and net metering options with the local utility

### Outputs:

1. Clarify tribal roles
2. Decide on business structure
3. Understand the permit needs and process
4. Understand interconnection and net-metering options



# Step 3: Project Refinement



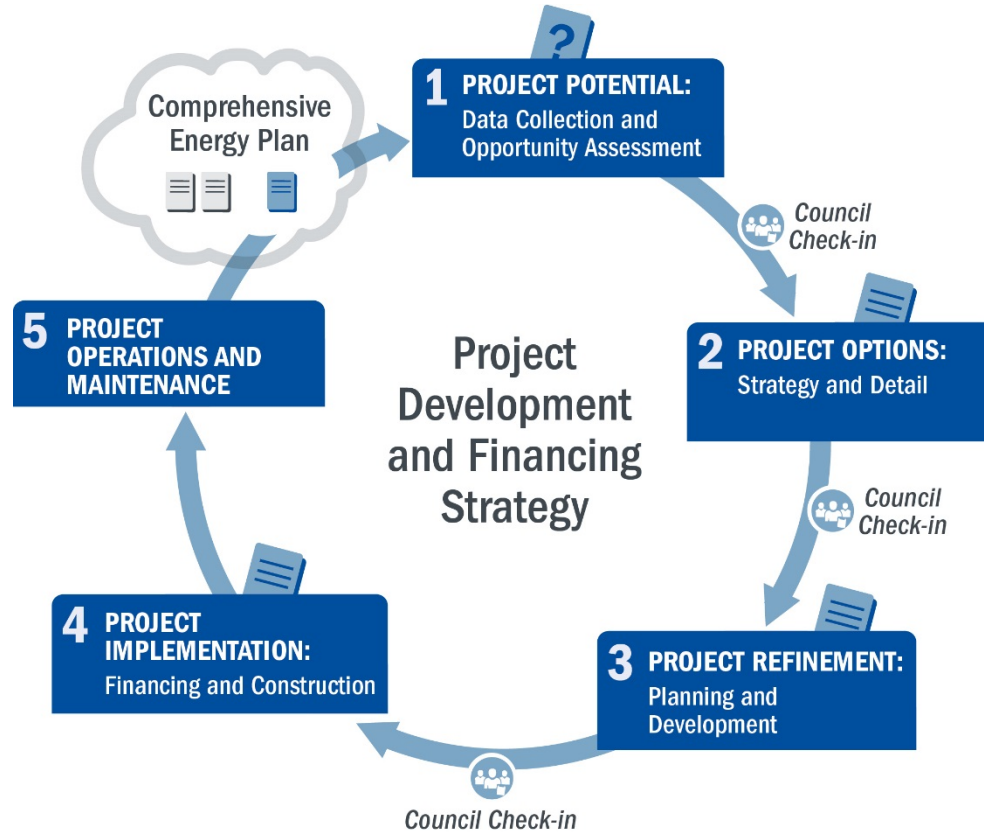
**Purpose:** Validate decisions and finalize project structure

## Tasks:

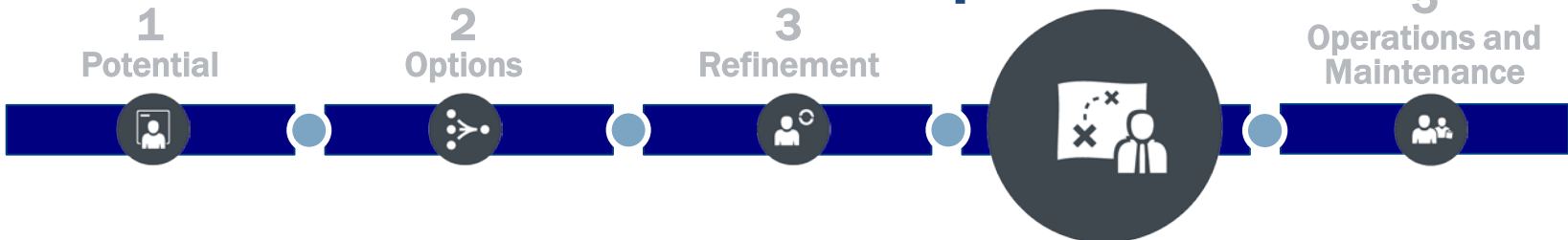
1. Finalize ownership structure and project team identification
2. Finalize permitting, including environmental reviews, net metering, and interconnection
3. Finalize technology, financing, and development costs

## Outputs:

1. Proposed financing/commitments and organization structure
2. Detailed economic models
3. Vendors selected
4. Completed environmental reviews and finalized permits
5. Net-metering and interconnection agreement
6. Transmission finalized, if necessary

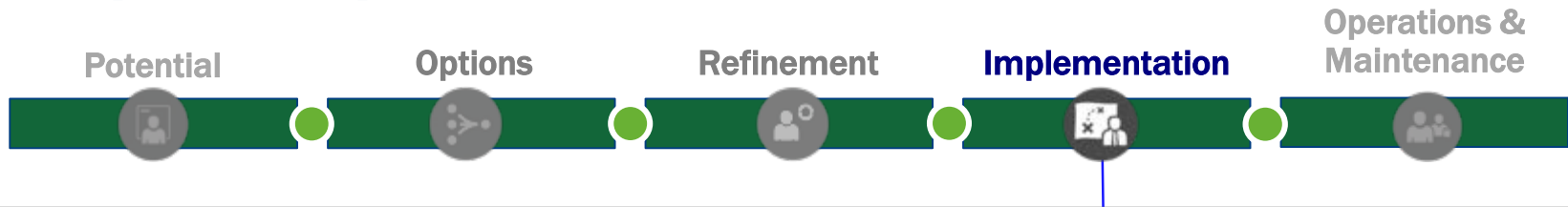


# 4 Implementation





# Step 4: Implementation

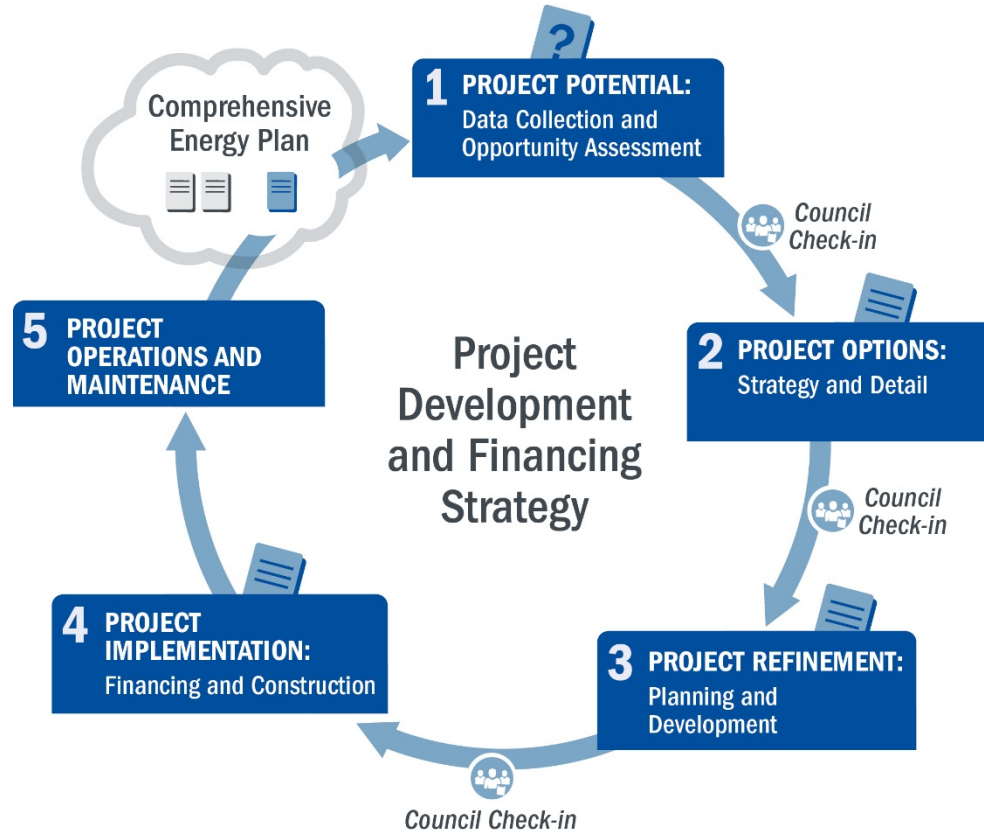


**Purpose:** Contract for and *build* the project

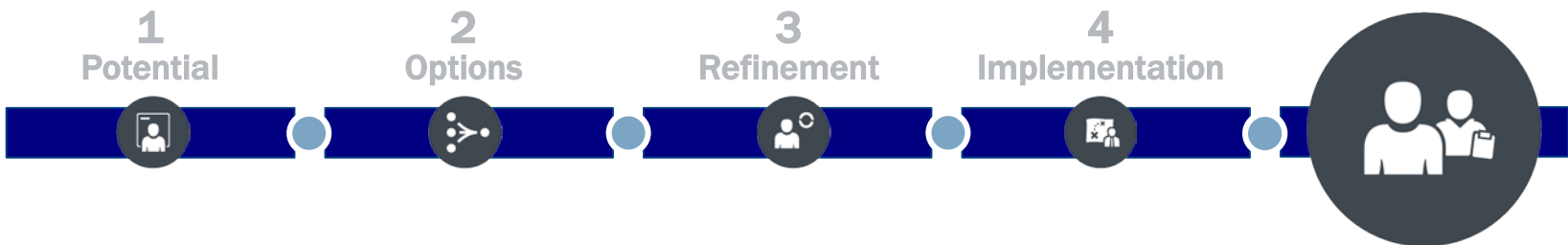
## Tasks:

- Finalize pre-construction activities including project agreements—financial, contractual, and interconnection
- Start construction and equipment installation
- Interconnect project to the grid
- Start project commissioning leading to facility/community project operation

**Output:** Completed project (operation)



# 5 Operations and Maintenance



# Step 5: Operations & Maintenance



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

## Task:

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

## Outputs:

- Ensure responsible party carries out O&M/R&R\*
- Measuring and tracking success
- Correlate with business plan and strategic energy plan
- Contract compliance
- Reporting of generation
- Met or exceeded energy and financial performance

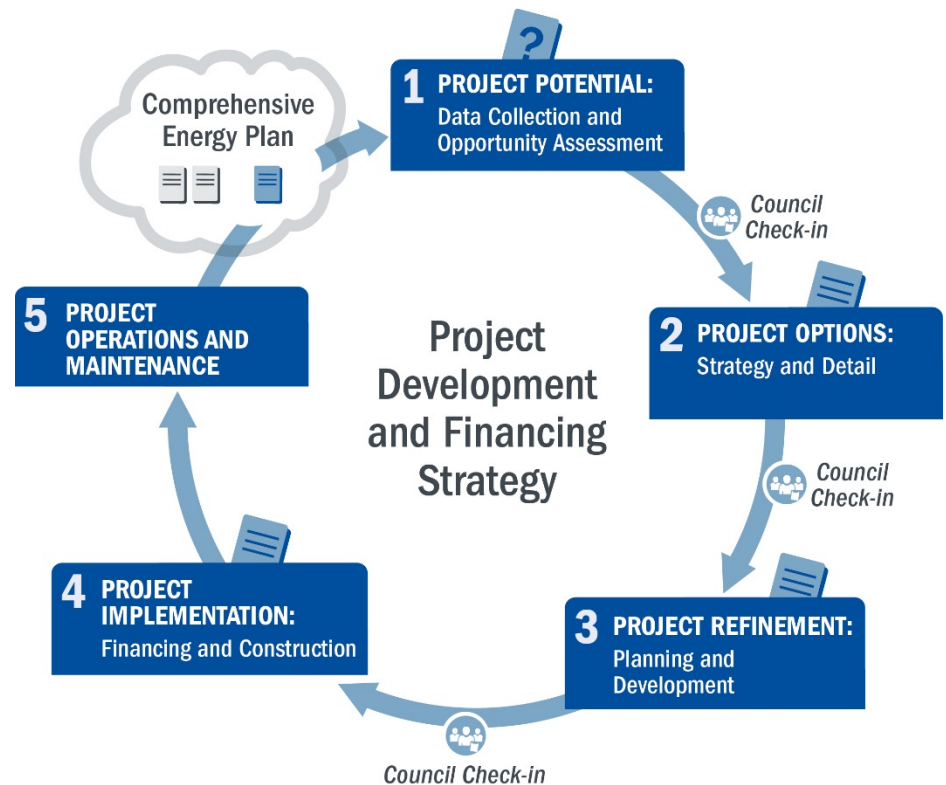
*\*Especially if owner – role of highest O&M risk*



Photo by Warren Getz, NREL 00180

# Revisit Energy Plan

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



# Resources: On-Demand Curriculum

Access free courses anytime

- **Foundational Courses**  
Overview of specific renewable energy technologies, strategic energy planning, and grid basics
- **Leadership & Professional Courses**  
In-depth information on the components of the project development process and existing financing structures

**Renewable Energy Online Learning**

Home > Education & Training > Renewable Energy Online Learning

Tribal leaders and professionals can access online curriculum on developing and financing renewable energy projects on tribal lands below. The courses are available as webinars that can be watched at any time. Foundational courses provide an overview of renewable energy technologies, strategic energy planning, and grid basics. Leadership and professional courses provide in-depth information on the components of the project development process and existing finance structures. Courses are presented by technical experts from DOE's National Renewable Energy Laboratory and partnering organizations.

**Foundational Courses**

- Assessing Energy Needs and Resources
- Geothermal
- Biomass
- Hydroelectric
- Direct Use of Building Heat and Hot Water
- Strategic Energy Planning
- Electricity Grid Basics
- Solar
- Wind

**Leadership & Professional Courses**

- Project Development and Finance Essentials
- Project Financing Process and Structures
- Project Development Concepts
- Commercial-Scale Projects
- Community-Scale Projects
- Facility-Scale Projects
- Project Development Process
- Project Financing Concepts

<https://energy.gov/indianenergy/renewable-energy-online-learning>

# Questions?

- Sean Esterly
  - [Sean.Esterly@nrel.gov](mailto:Sean.Esterly@nrel.gov)