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# Renewable Energy Zone (REZ) Transmission Planning Process

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**National Renewable Energy Laboratory**

**Transmission Planning for a High Renewable Energy Future**

**Greening the Grid Webinar**

**September 6, 2017**

# Outline

1. What is the Renewable Energy Zone (REZ) Transmission Planning Process?
2. Overview of the REZ Process
3. The REZ Toolkit



# What is a Renewable Energy Zone (REZ)?



**A REZ** is a geographical area that enables the development of profitable, cost-effective, grid-connected renewable energy (RE).

A REZ has:

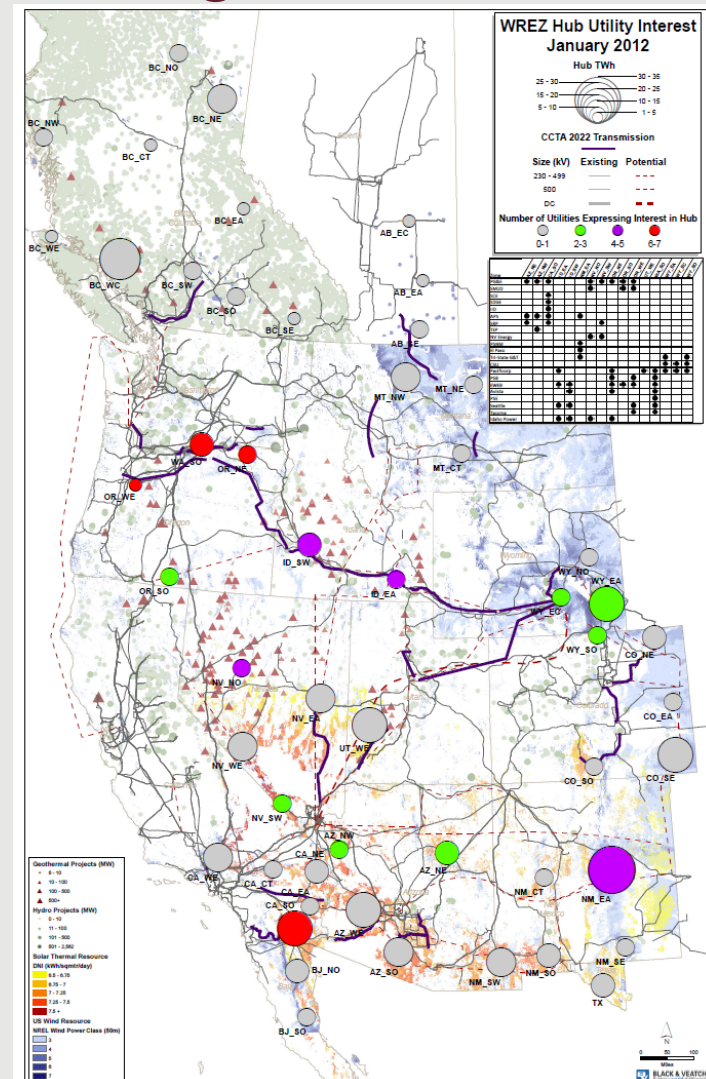
- High-quality RE resources,
- Suitable topography and land-use designations
- Demonstrated interest from developers

All of these support cost-effective RE development.

# What is the REZ Transmission Planning Process?

The **REZ Transmission Planning Process** is a proactive approach to plan, approve, and build transmission infrastructure connecting REZs to the power system.

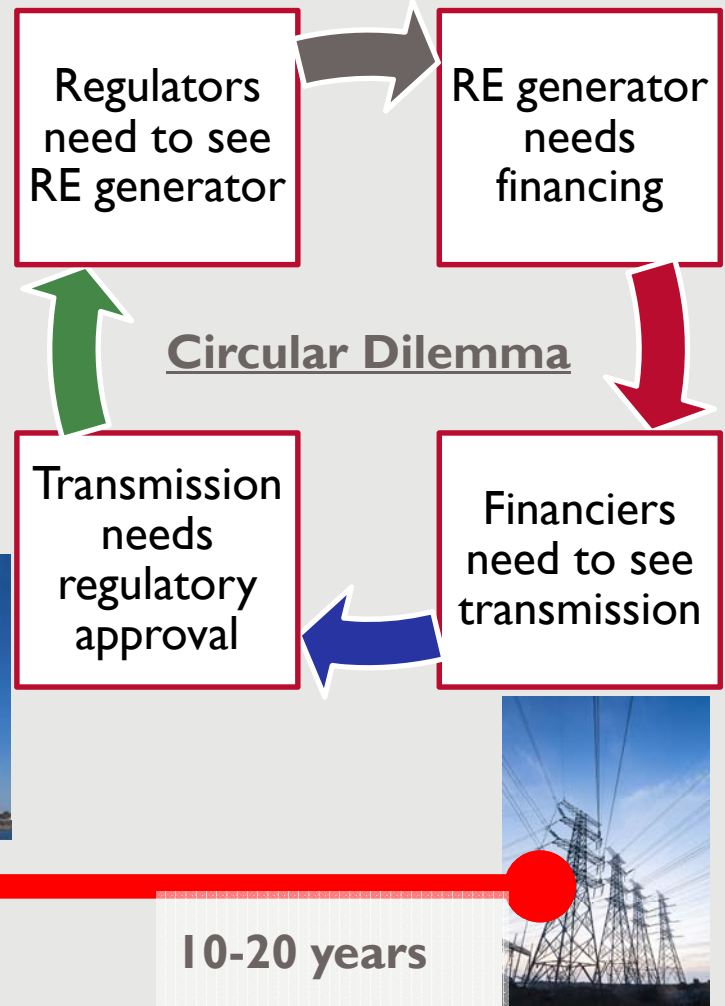
- Helps to increase the share of solar, wind and other RE resources in the power system while maintaining reliability and economics.
- Focuses on large-scale wind and solar resources that can be developed in sufficient quantities to warrant transmission system expansion and upgrades.



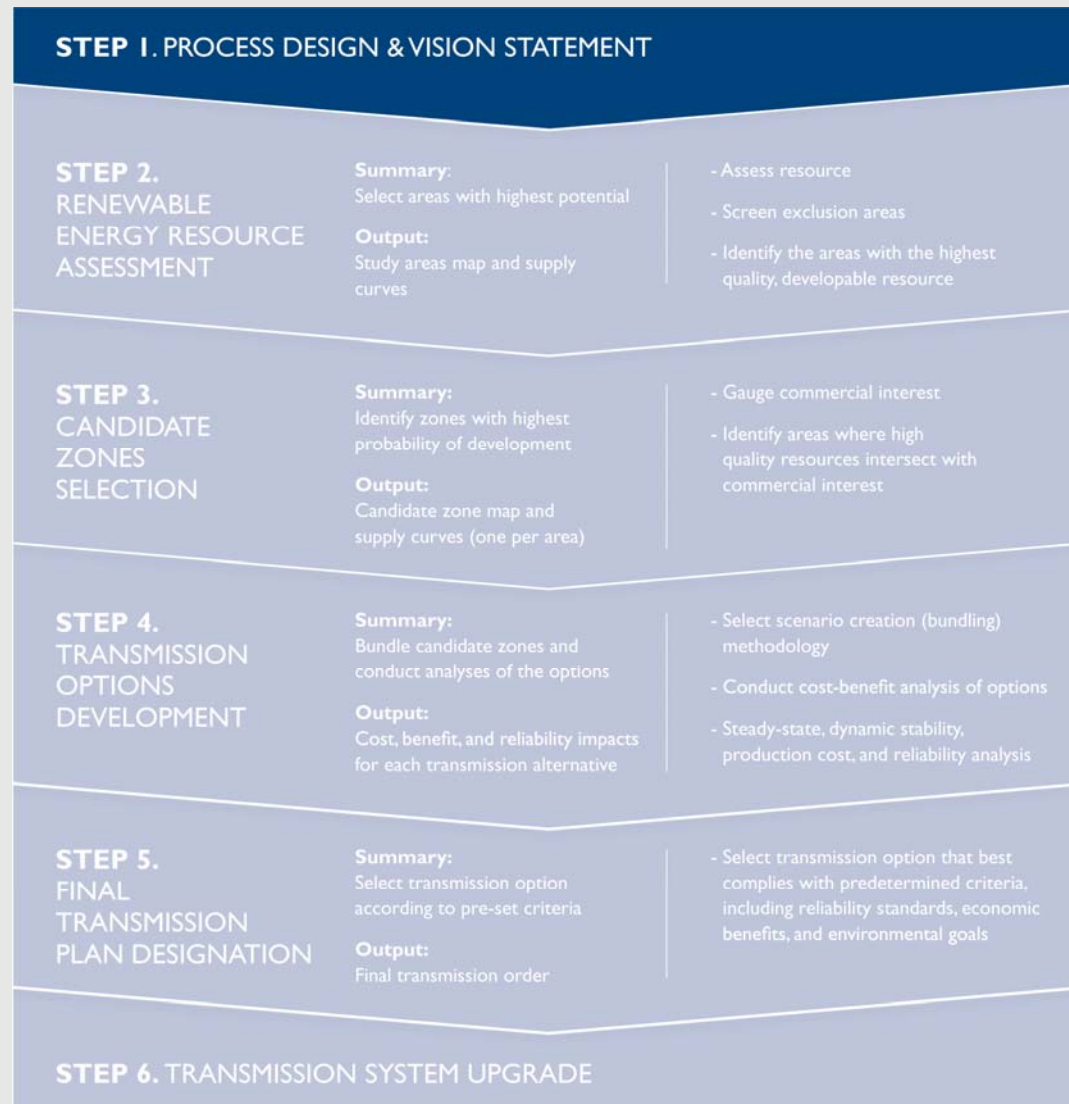
REZs and transmission infrastructure to access zones – Western Renewable Energy Zones Initiative (Schwartz 2012)

# Why is the REZ Process Advantageous?

Traditional transmission planning may not align with RE development as decisions need to be made well in advance of RE generation development decisions.



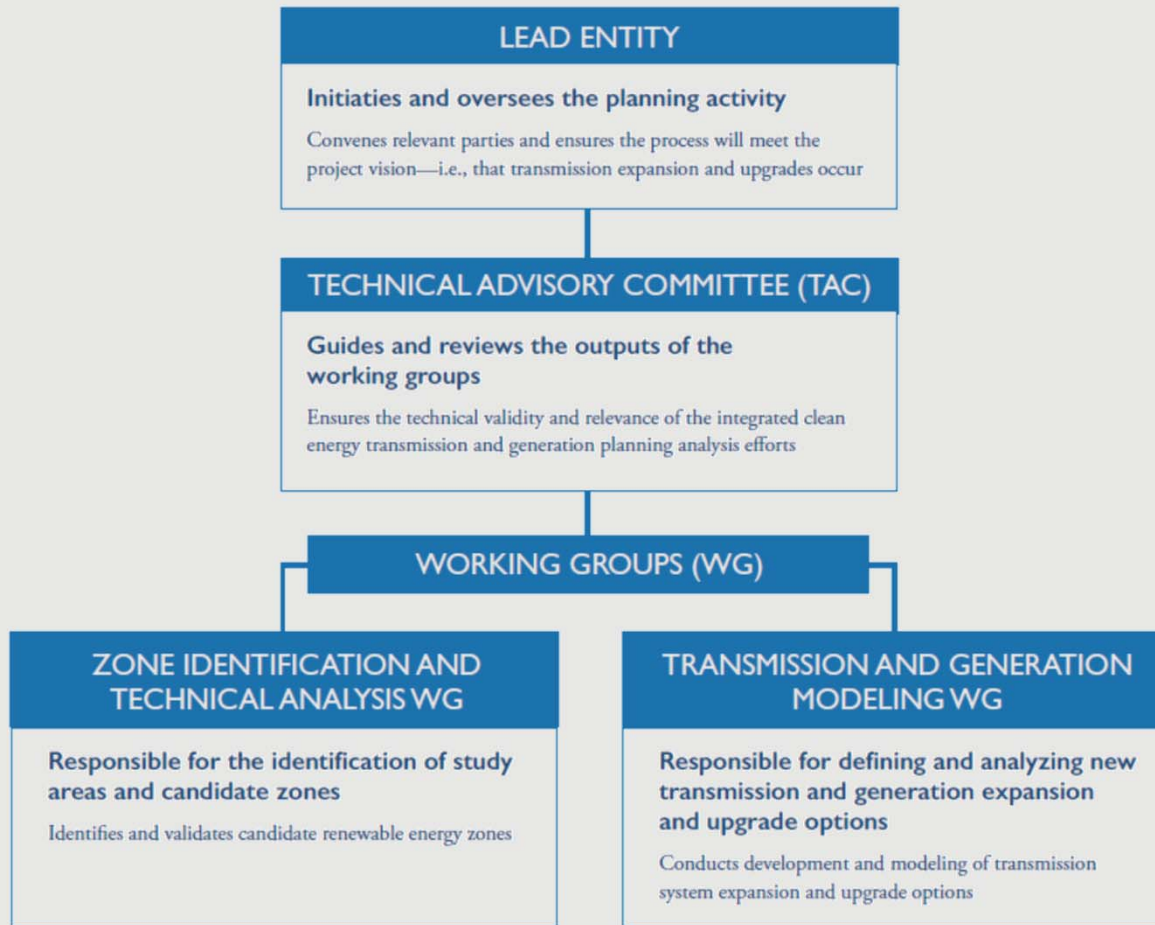
# Overview of the REZ Process



(Lee, Flores-Espino, and Hurlbut 2017)

**Renewable Energy Zone (REZ) Transmission Planning Process: A Guidebook for Practitioners – [www.nrel.gov/docs/fy17osti/69043.pdf](http://www.nrel.gov/docs/fy17osti/69043.pdf)**

# Step I - The Importance of Stakeholder Engagement

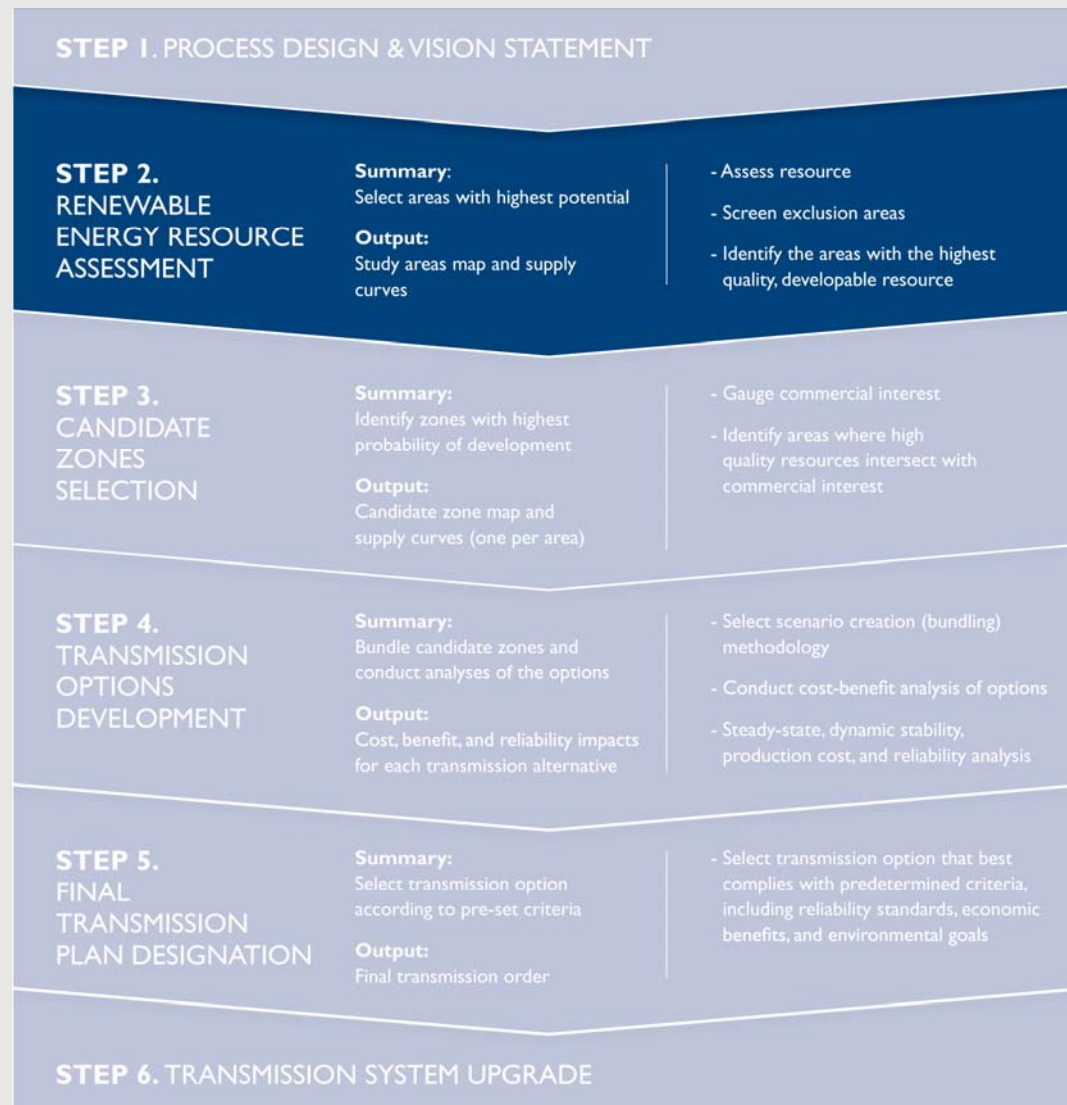


**General REZ Process Organizational Structure  
(Lee, Flores-Espino, and Hurlbut 2017)**

## Example REZ Process Decision Makers and Stakeholders

Decision Makers	Stakeholders
Energy ministry or agency officials	RE developers
Environment ministry and other relevant ministry officials	Electric Utilities
Regulators	Environment, resource, land use authorities
Power system planners	Environment and other interest groups
Transmission system operators	Non-governmental organizations

# Overview of the REZ Process

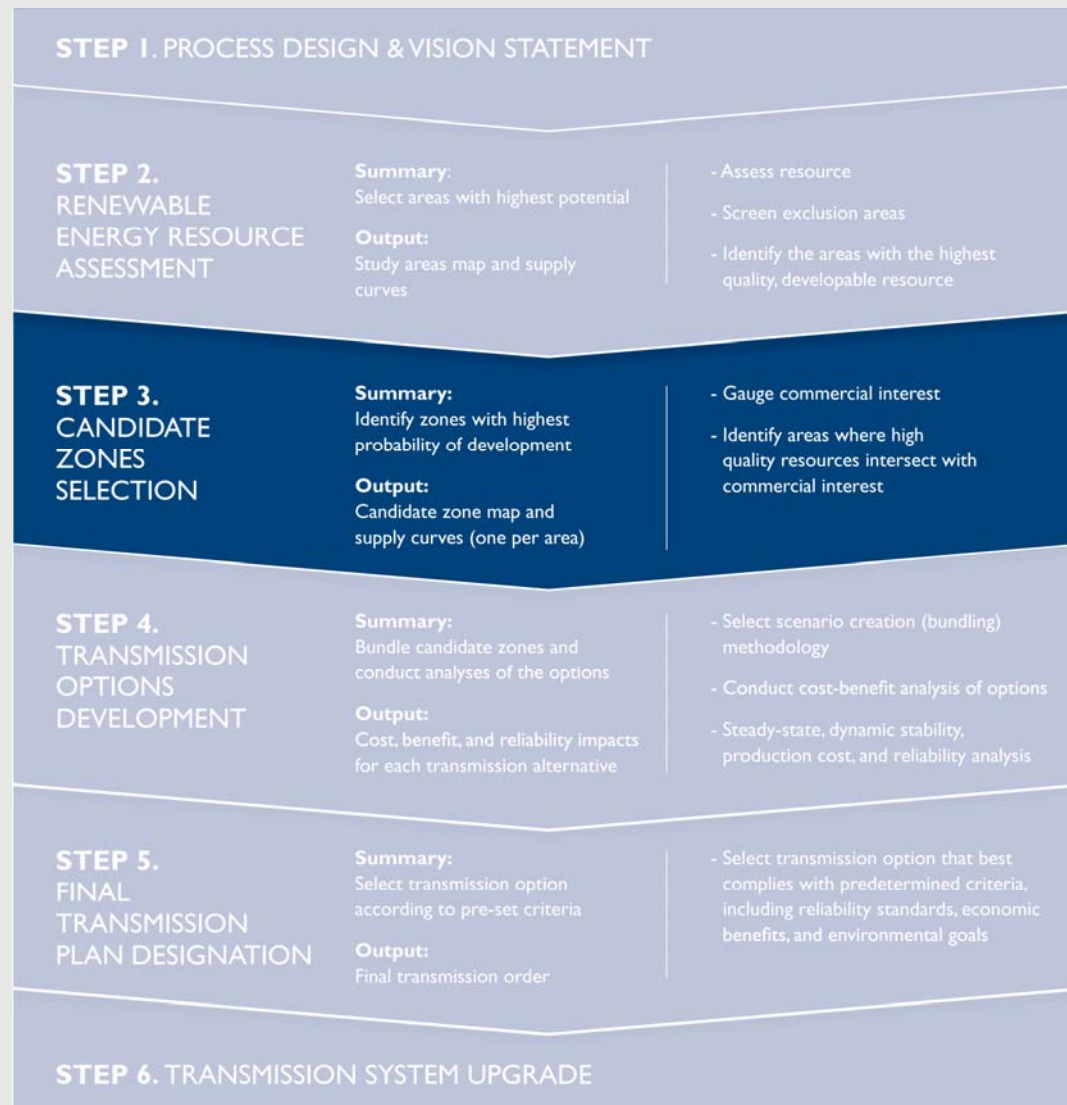


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## Step 3 - Screening Zones Based on Developer Interest

Areas with excellent RE resources may not be attractive to private developers.

In this step developers demonstrate their interest in the screened areas to ensure that the candidate REZs are commercially attractive for development.



Author's photo

**Examples of commercial interest and financial commitment  
(Lee, Flores-Espino, and Hurlbut 2017)**

Pending or signed interconnection agreements

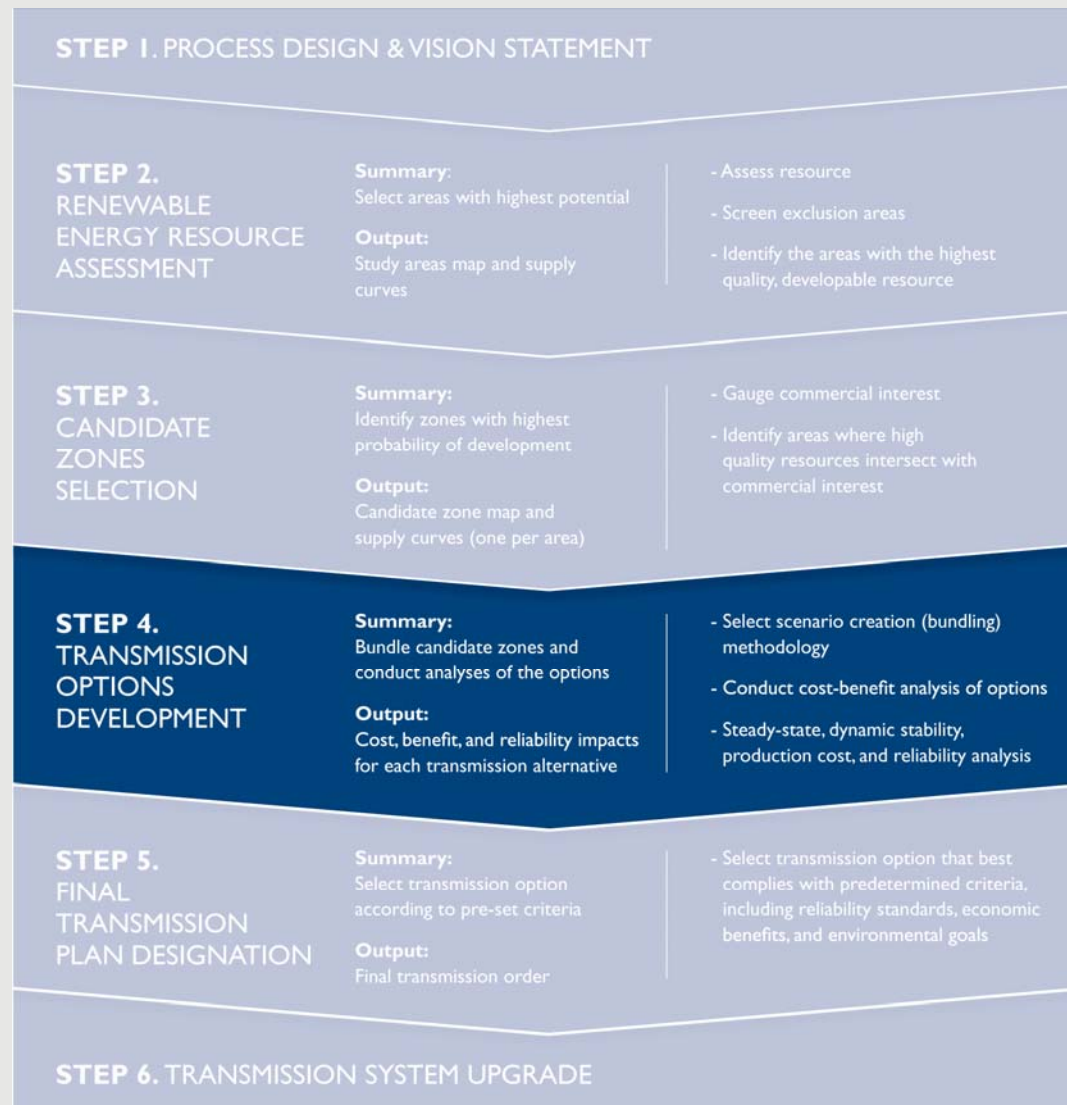
Leasing agreements

Letters of credit

Interconnection studies by a transmission owner or grid operator

Other indications deemed appropriate by the regulatory authority

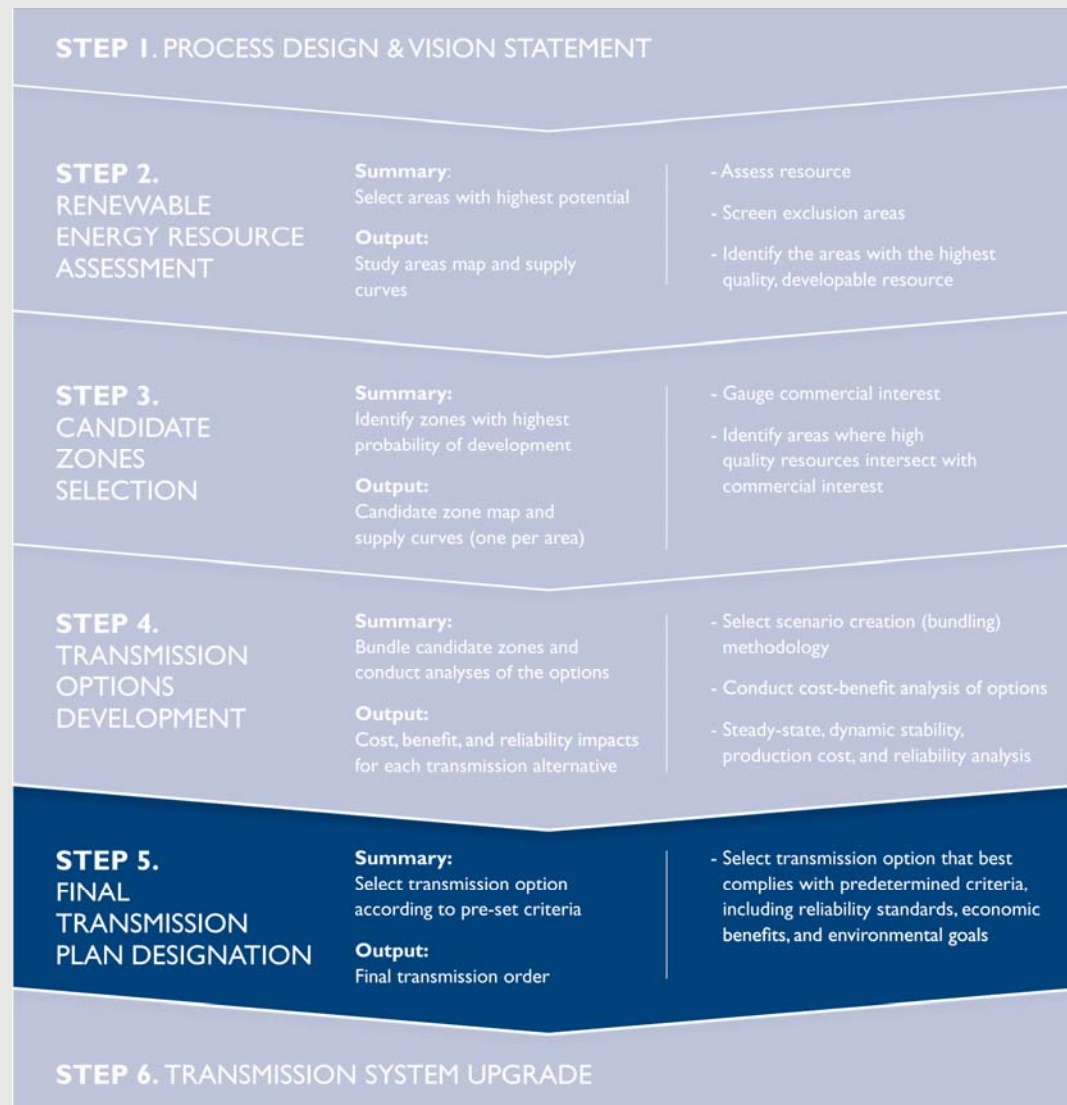
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## Step 5 – Designation of a Transmission Plan

The appropriate authority designates the final transmission plan to be implemented.

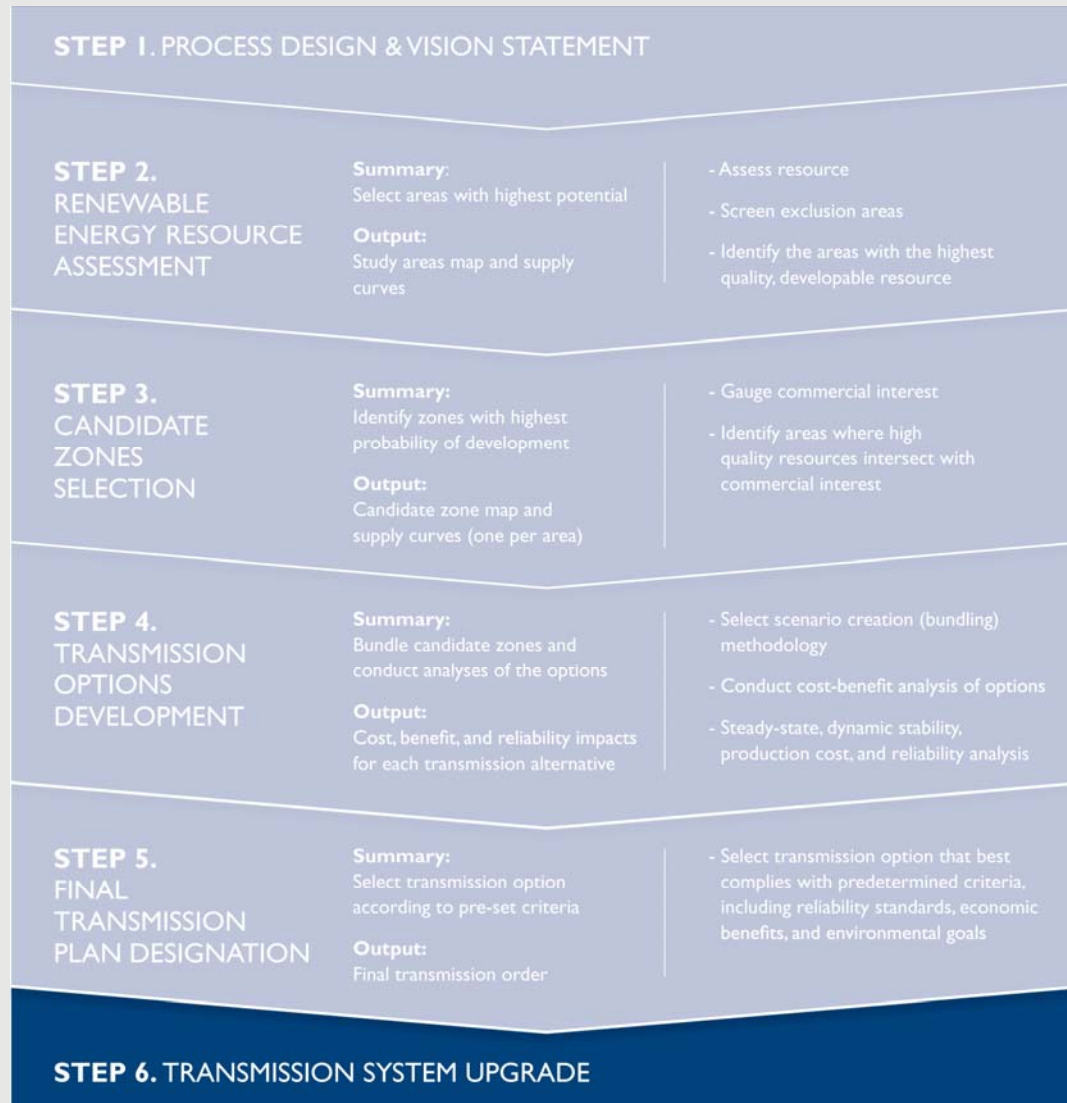
This designation includes:

- A geographic description of the REZs
- Identifies major transmission improvements to cost-effectively deliver electricity
- Identifies who will pay for the improvements
- Updates any estimates on the maximum generation capacity in the REZs



**REZs and new transmission infrastructure to access zones  
- Texas Competitive Renewable Energy Zones (CREZ)  
(Hurlbut, Chernyakhovskiy, and Cochran 2016)**

# Overview of the REZ Process



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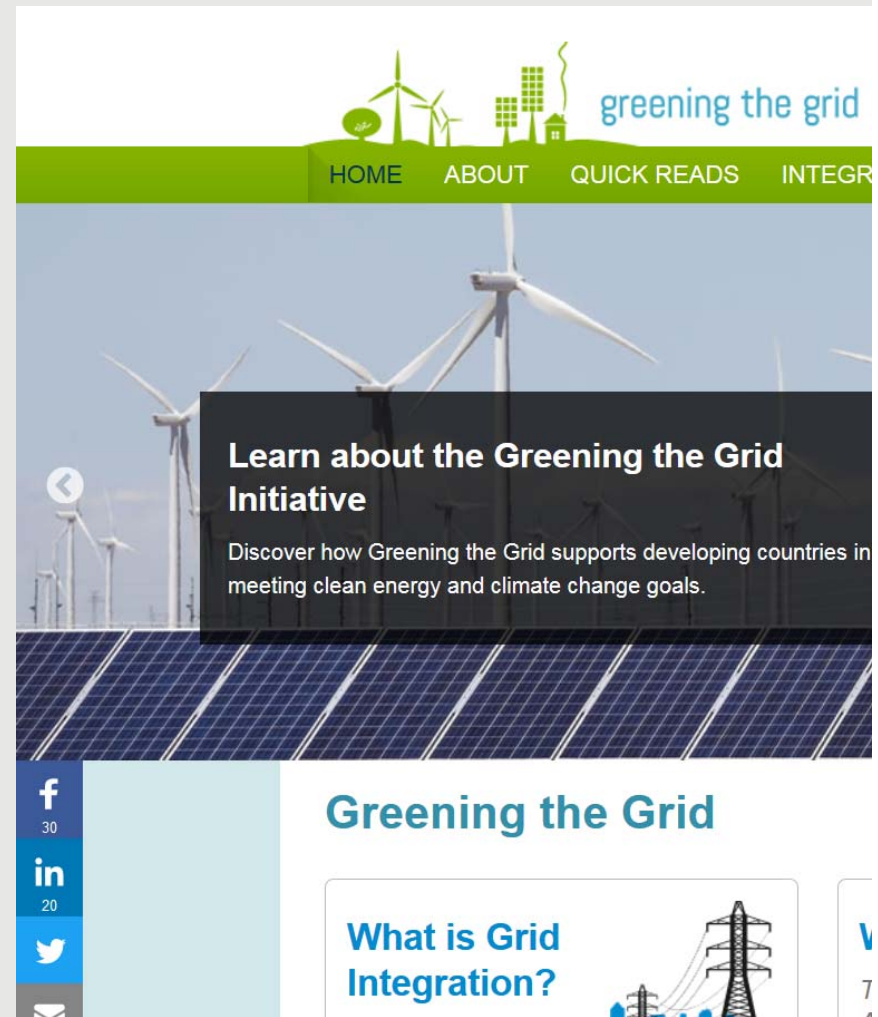
# Renewable Energy Zones (REZ) Toolkit

Online platform with information and tools to aid practitioners in successfully deploying the REZ Process around the world.

Toolkit Resources for REZ:

- Process guidebook for practitioners [www.nrel.gov/docs/fy17osti/69043.pdf](http://www.nrel.gov/docs/fy17osti/69043.pdf)
- Technical assistance for the REZ Process
- Learning and training sections
- Topical quick-reads and in-depth resources
- Tools, templates and exercises

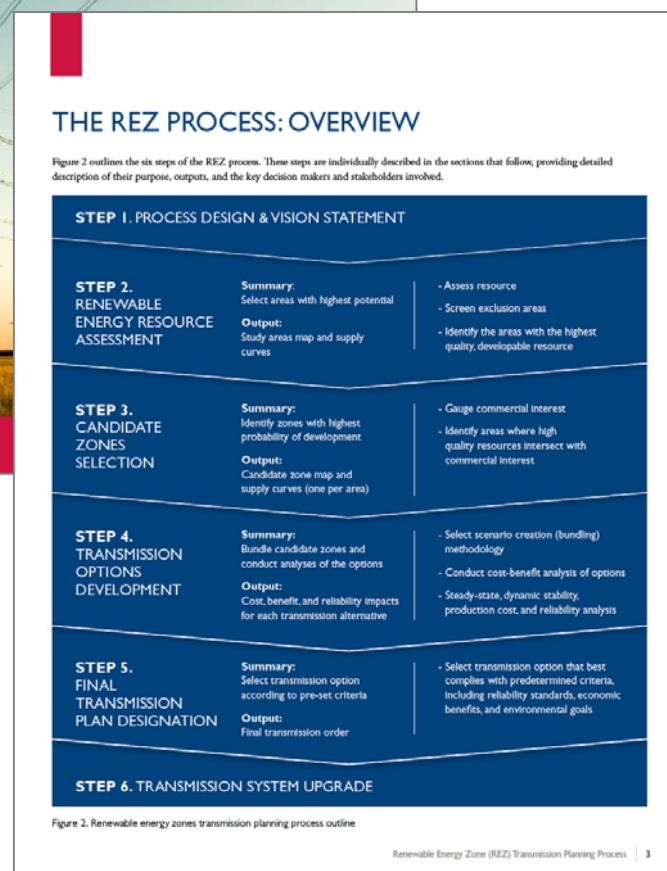
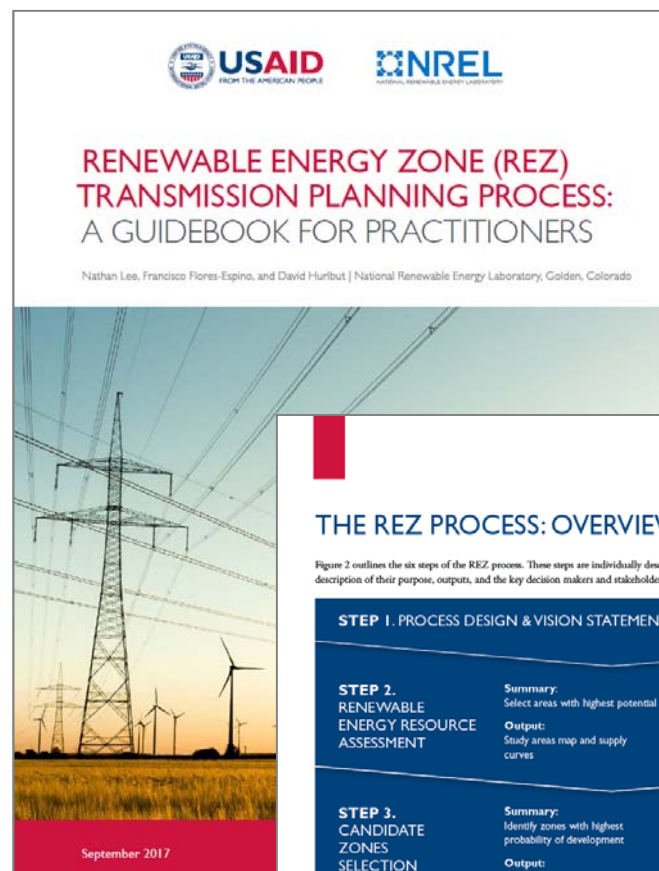
## Coming Soon!



[Greeningthegrid.org](http://Greeningthegrid.org)

# REZ Process: A Guidebook for Practitioners

- Helps power system planners, key decision makers, and stakeholders apply the REZ process to integrate transmission expansion planning and RE generation planning
- Presents an organizational structure an effective, stakeholder inclusive REZ Process
- Details each step of the REZ process from identifying a vision to transmission upgrades
- Based on the Texas Competitive Renewable Energy Zones (CREZ) initiative and may be modified based on each country's or application's unique circumstances.





## Key Takeaways on the REZ Process and REZ Toolkit

1. The REZ Process is a transmission planning process. It is not (just) a mapping exercise to develop an RE resource atlas.
2. Successful implementation of the REZ Process enables integrated transmission and RE generation development to harness the best and most developable RE resources and deliver the lowest possible cost electricity from renewable generation.
3. The REZ Toolkit offers resources and technical assistance to help practitioners understand and implement the REZ Process.

# Thank You!

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