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GREEN ENERGY PITFALLS AND PAYOUTS ON THE FARM

FEBRUARY 23, 2022

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VISION:

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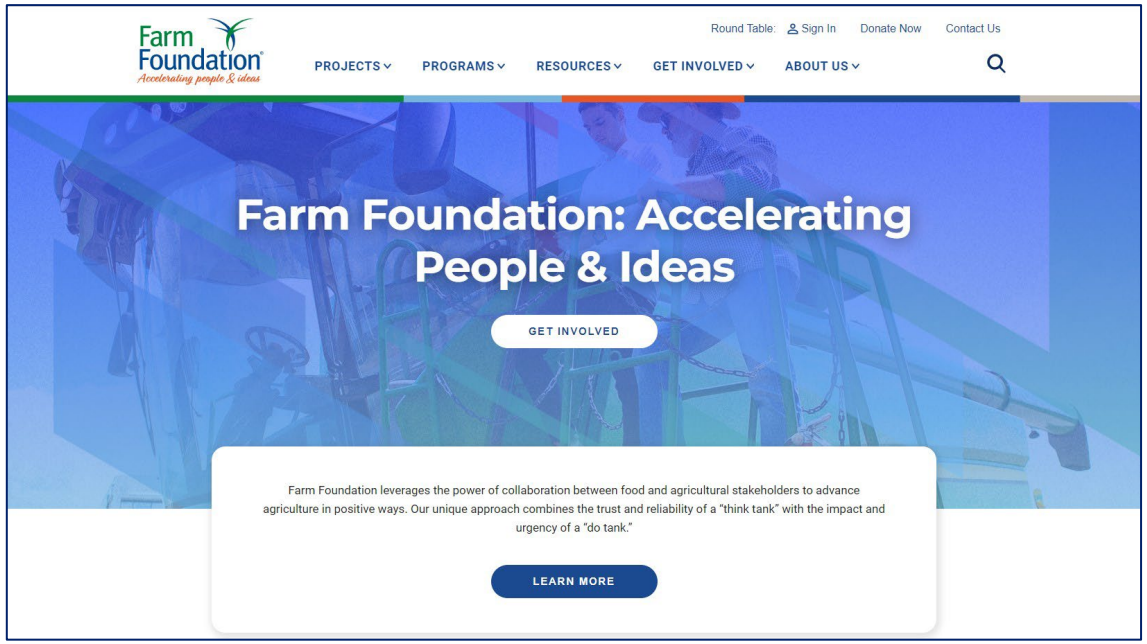

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IMPORTANT NOTES

- Submit questions by clicking on the **Q&A Button** at the bottom of your screen.
- Please **include your name and company** so questions may be contextually understood.
- Due to **time limits**, we may not be able to ask all questions submitted.
- This Forum is being recorded and will be posted on our website at **farmfoundation.org** as well as the Farm Foundation **YouTube** channel.
- Please take the **short survey** at the conclusion of the Forum.

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TYNE MORGAN

Moderator
Host and Executive Producer
U.S. Farm Report

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SHANNON FERRELL

Associate Professor, Agricultural Economics

Oklahoma State University

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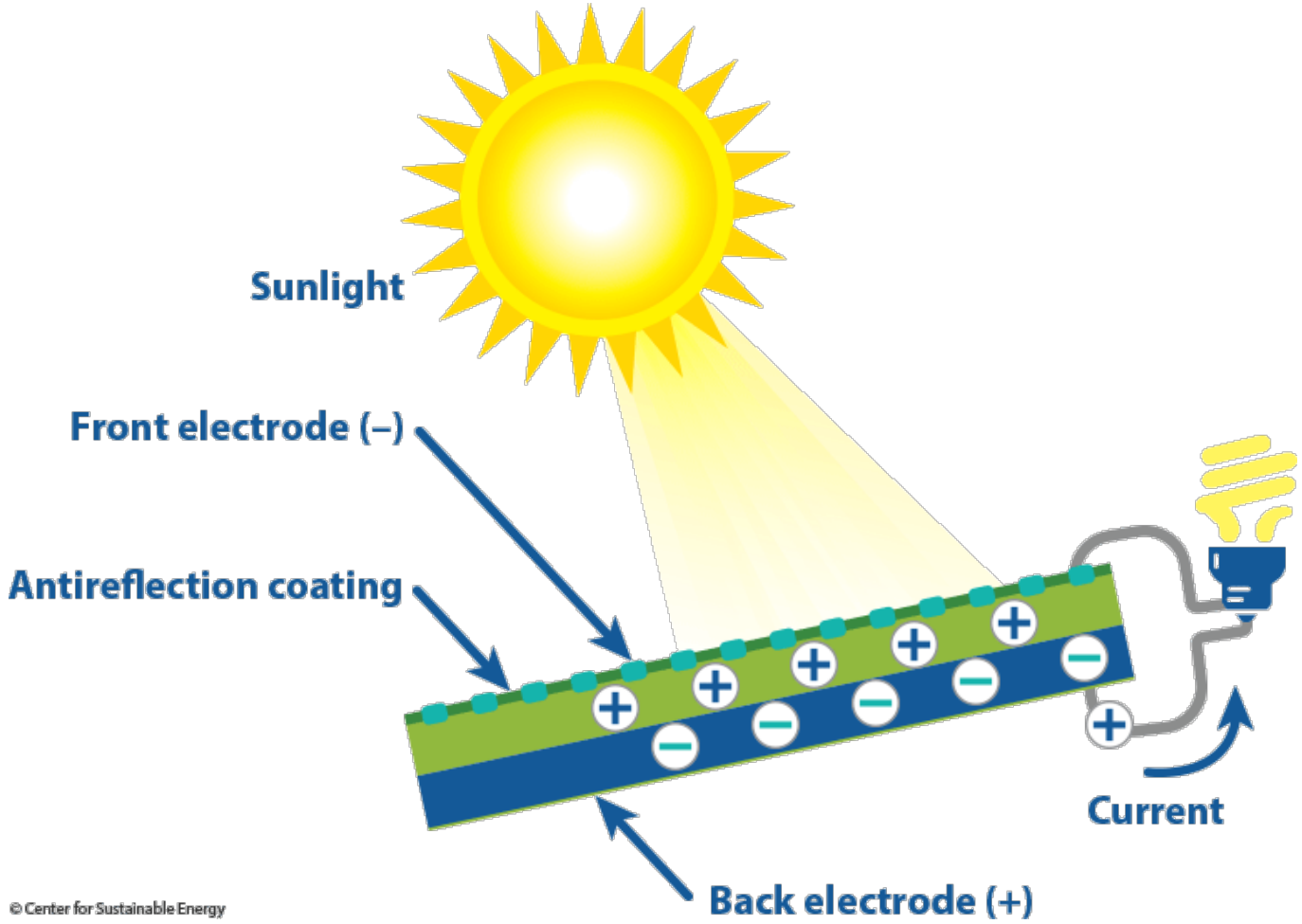
Green Energy:
Pitfalls and Payouts on the Farm

Shannon L. Ferrell, Oklahoma State University

Farm Foundation Forum - February 23, 2022

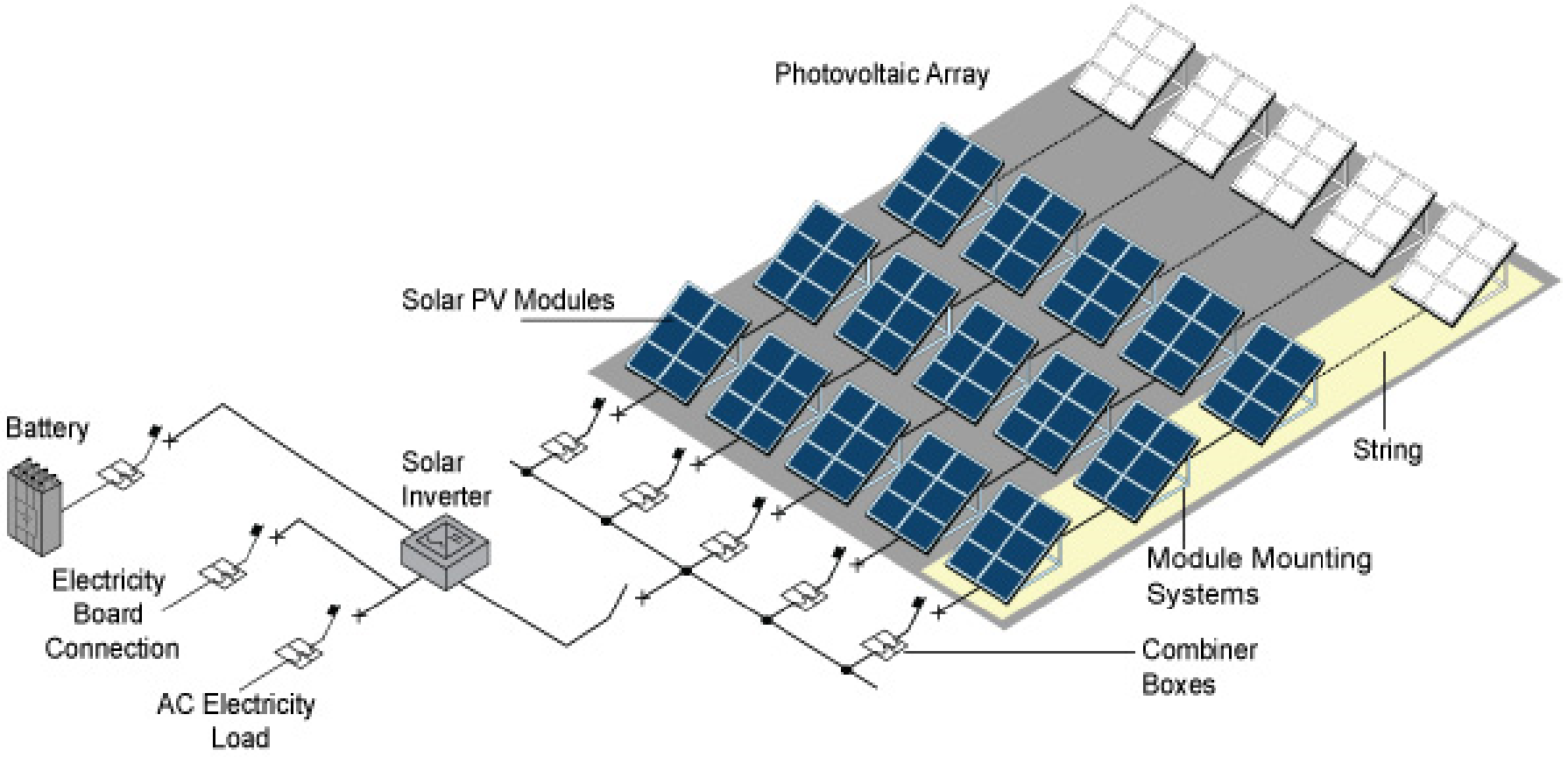
Photo source, upper: Agrovoltaics Conference
Photo source, lower: Stephanie Buway

Solar Photovoltaic (PV): The basic idea



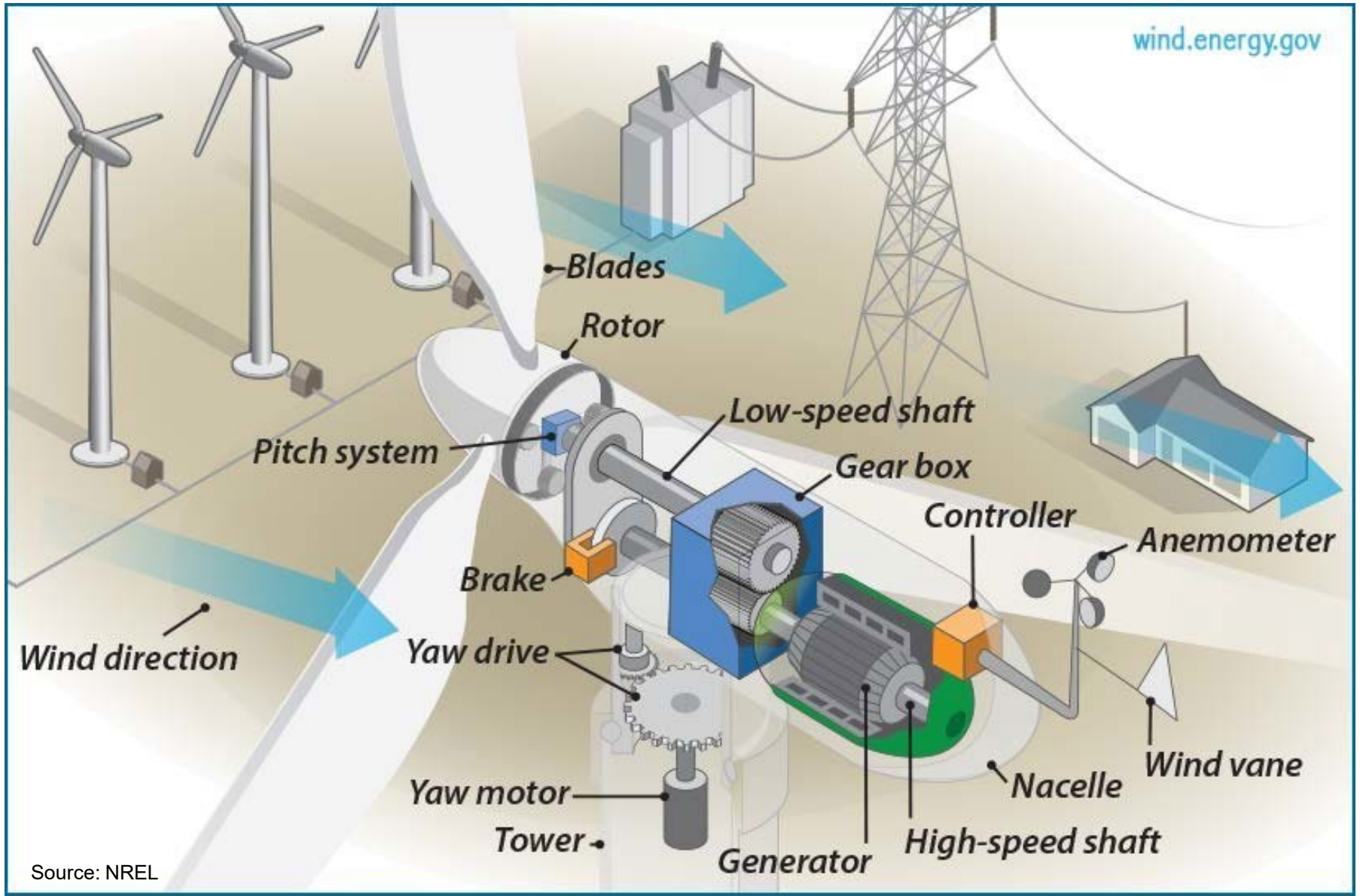
Source: Center for Sustainable Energy

Solar Photovoltaic (PV): The basic idea



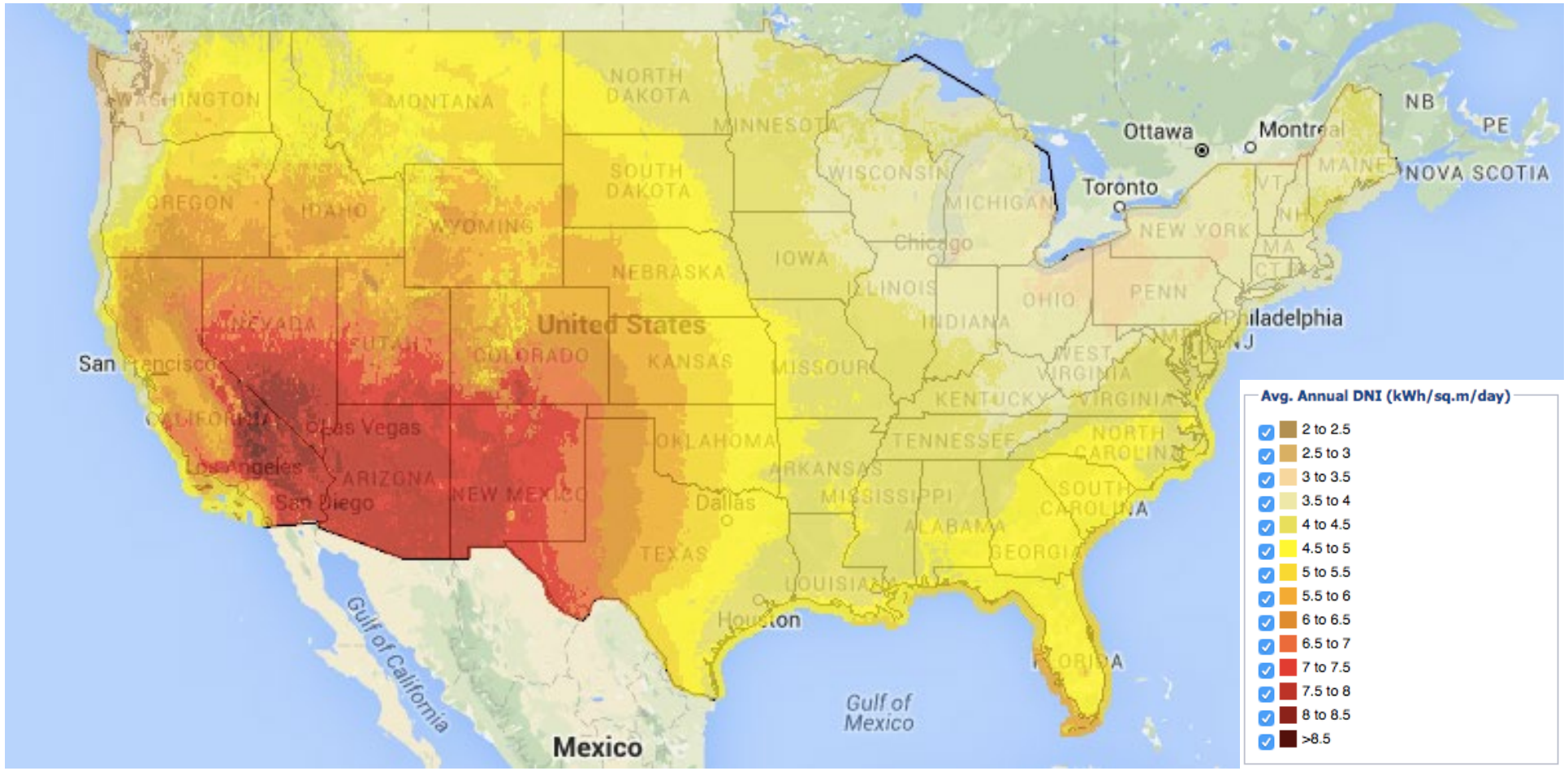
Source: Sunipod

Wind power: the basic idea

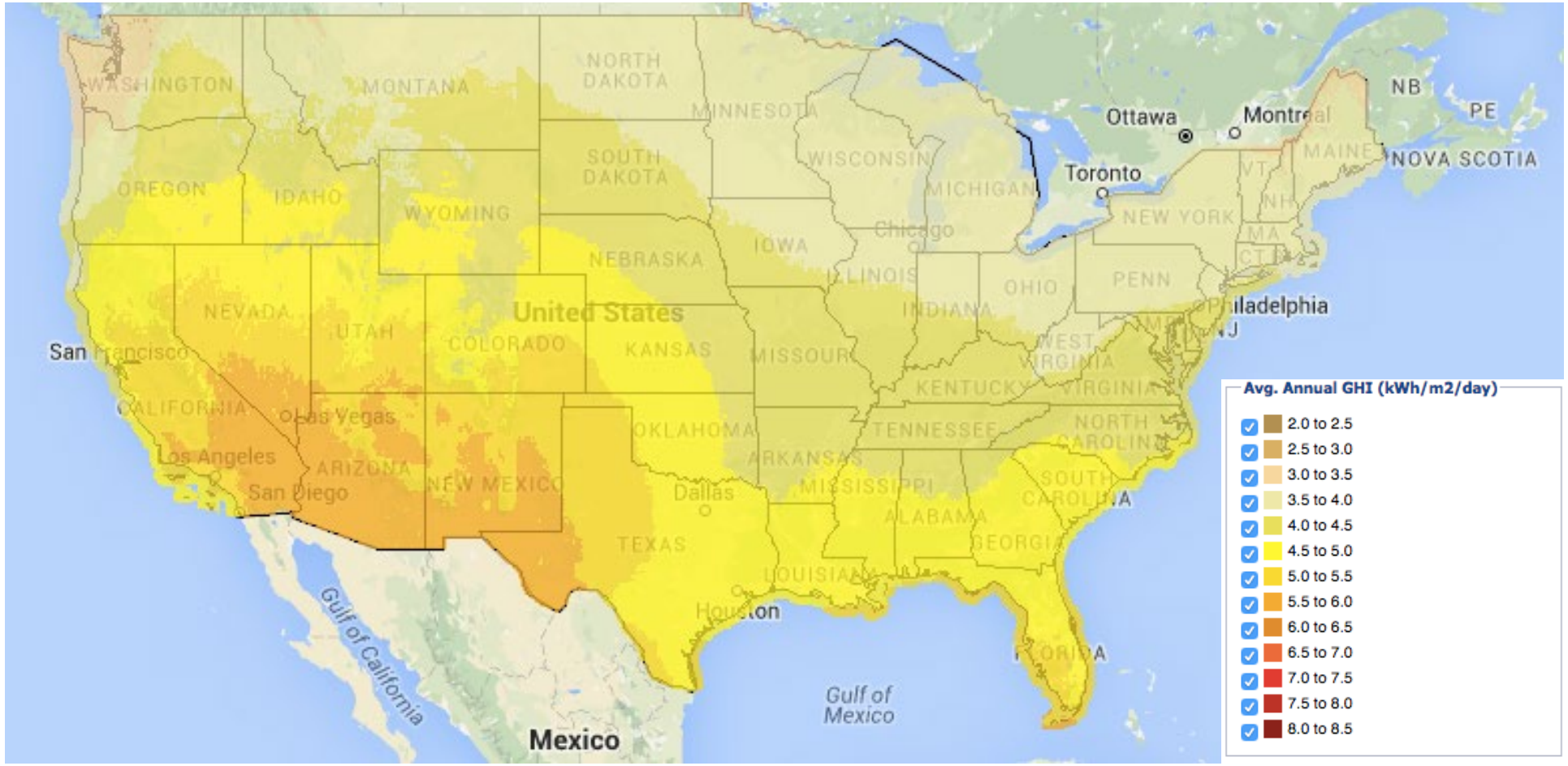


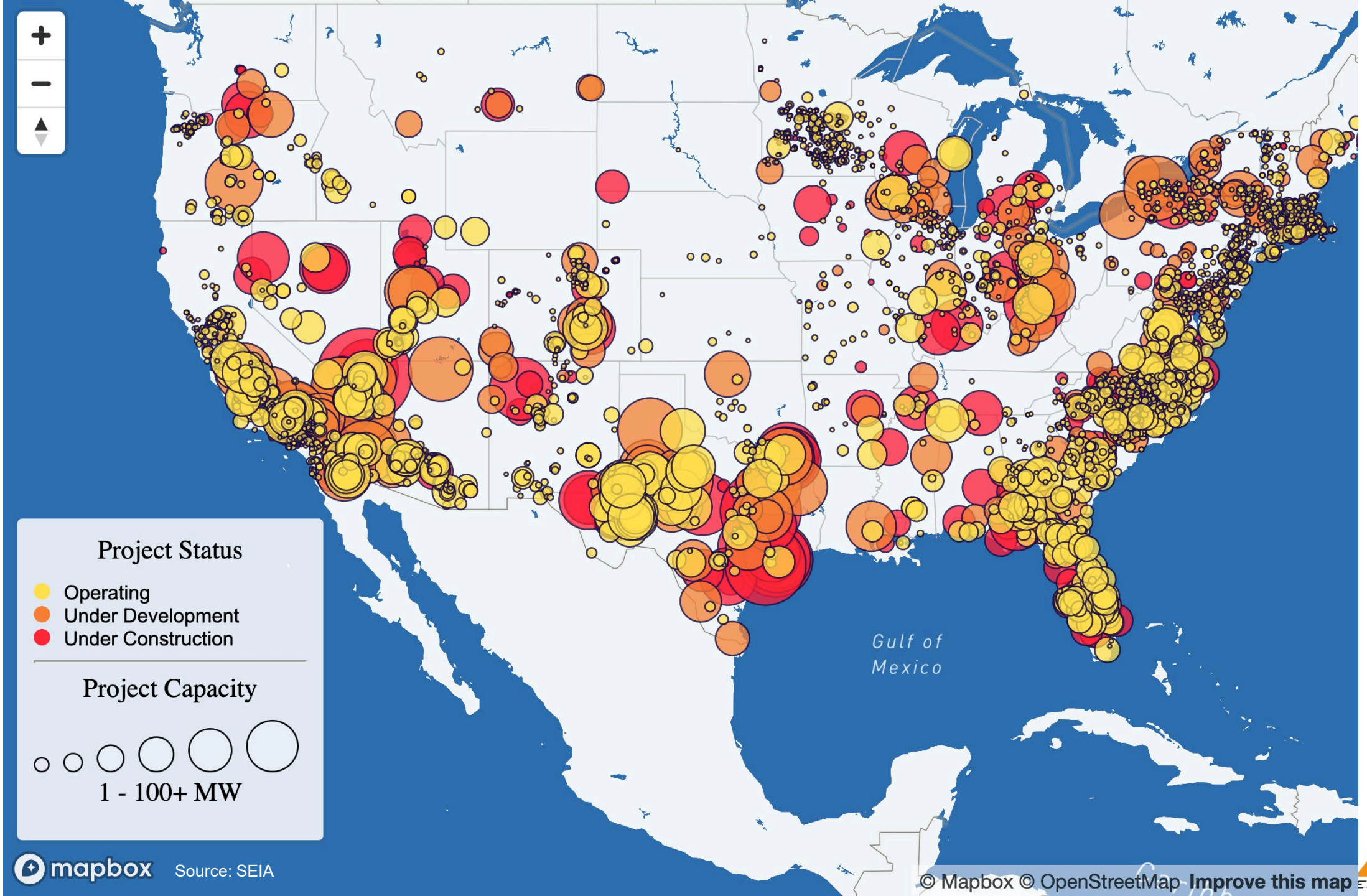
Source: NREL

The U.S. solar resource
Direct Normal Irradiance (DNI)

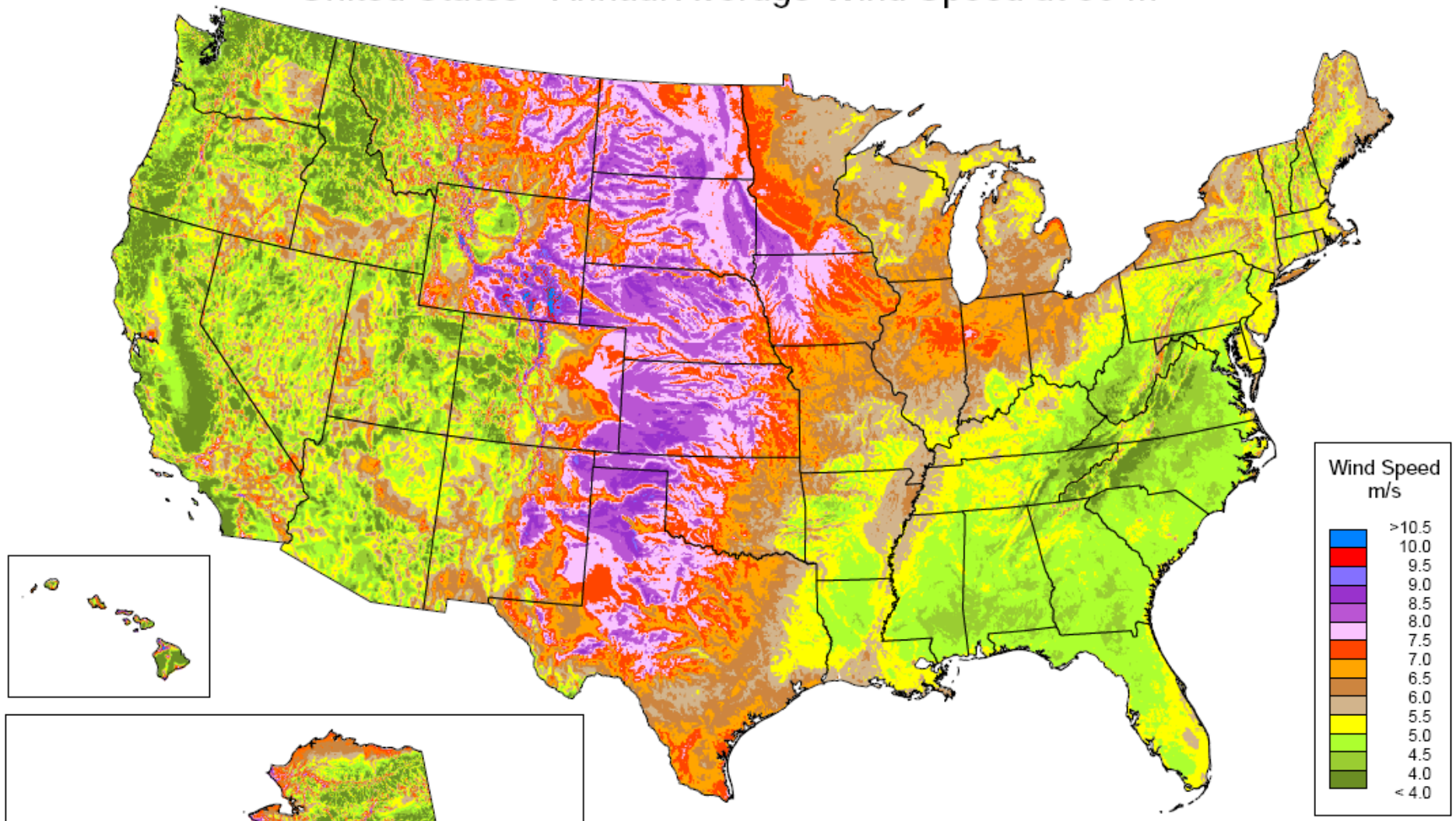


The U.S. solar resource
Global Horizontal Irradiance (GHI)




Project Status
Operating
Under Development
Under Construction
Project Capacity
1 - 100+ MW
Gulf of Mexico
mapbox
Source: SEIA
© Mapbox © OpenStreetMap Improve this map

United States - Annual Average Wind Speed at 80 m



Source: Wind resource estimates developed by AWS Truepower, LLC for windNavigator®. Web: http://www.windnavigator.com | http://www.awstruepower.com. Spatial resolution of wind resource data: 2.5 km. Projection: Albers Equal Area WGS84.

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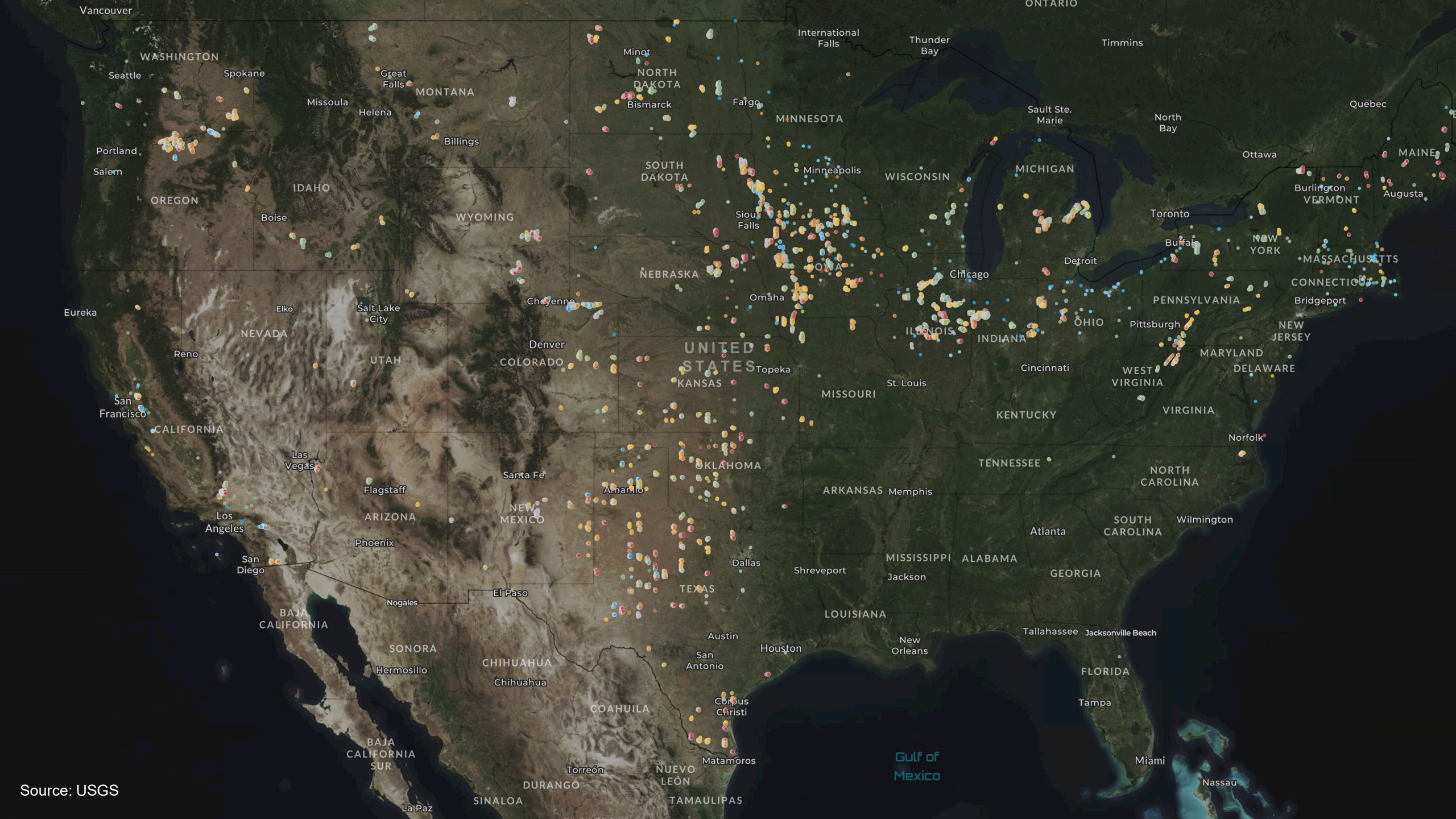
OKLAHOMA STATE UNIVERSITY EXTENSION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Jacksonville Beach
SONORA
Hermosillo
CHIHUAHUA
Chihuahua
COAHUILA
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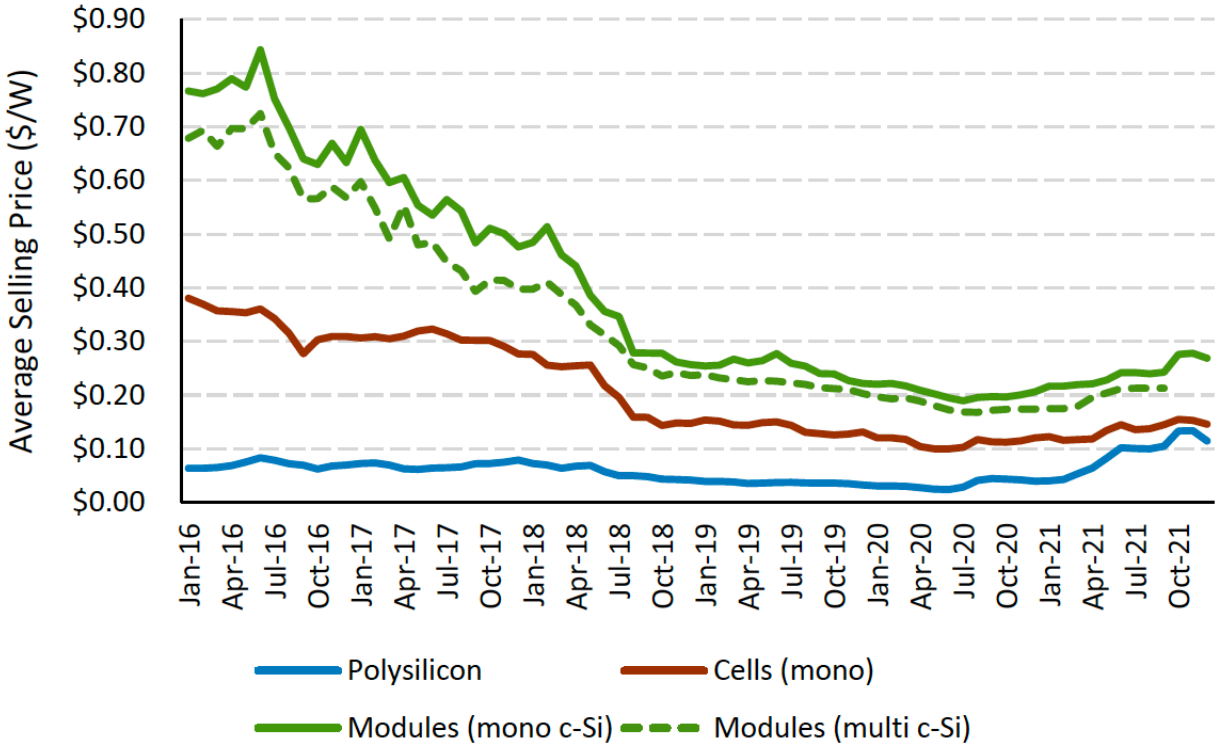
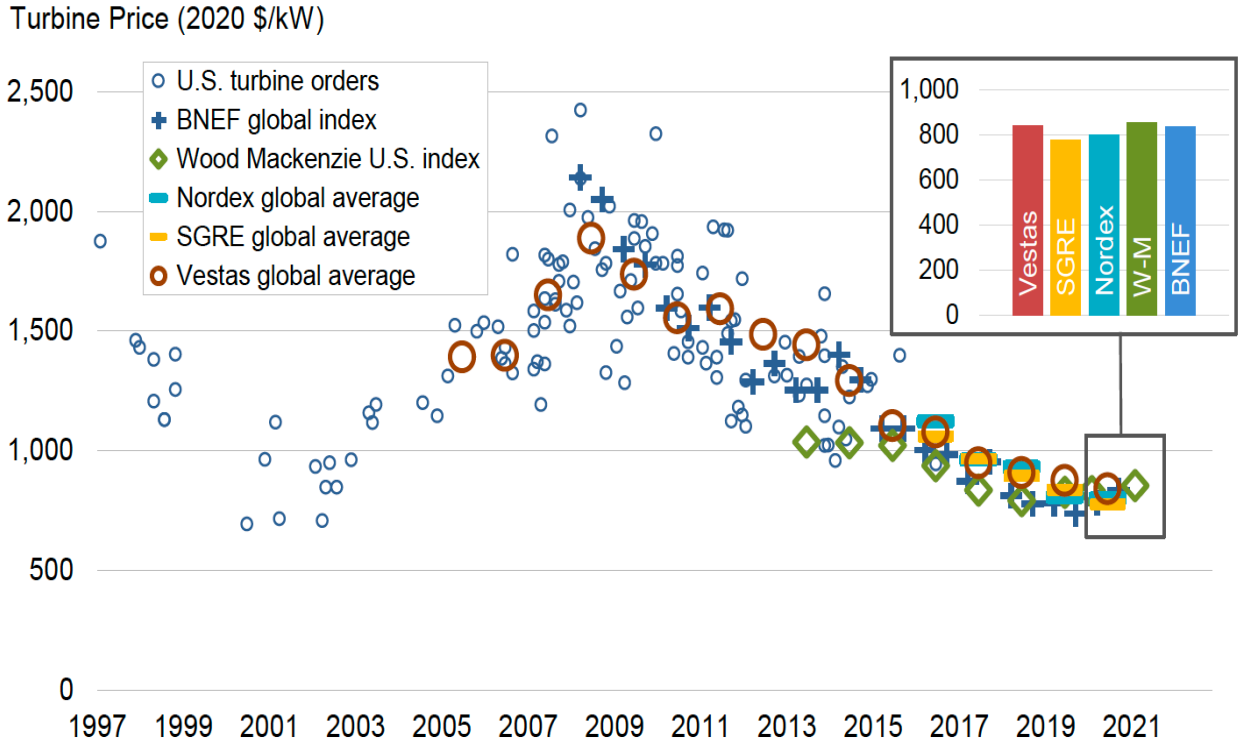
NUEVO LEÓN
Matamoros
SINALOA
TAMAULIPAS

Source: USGS

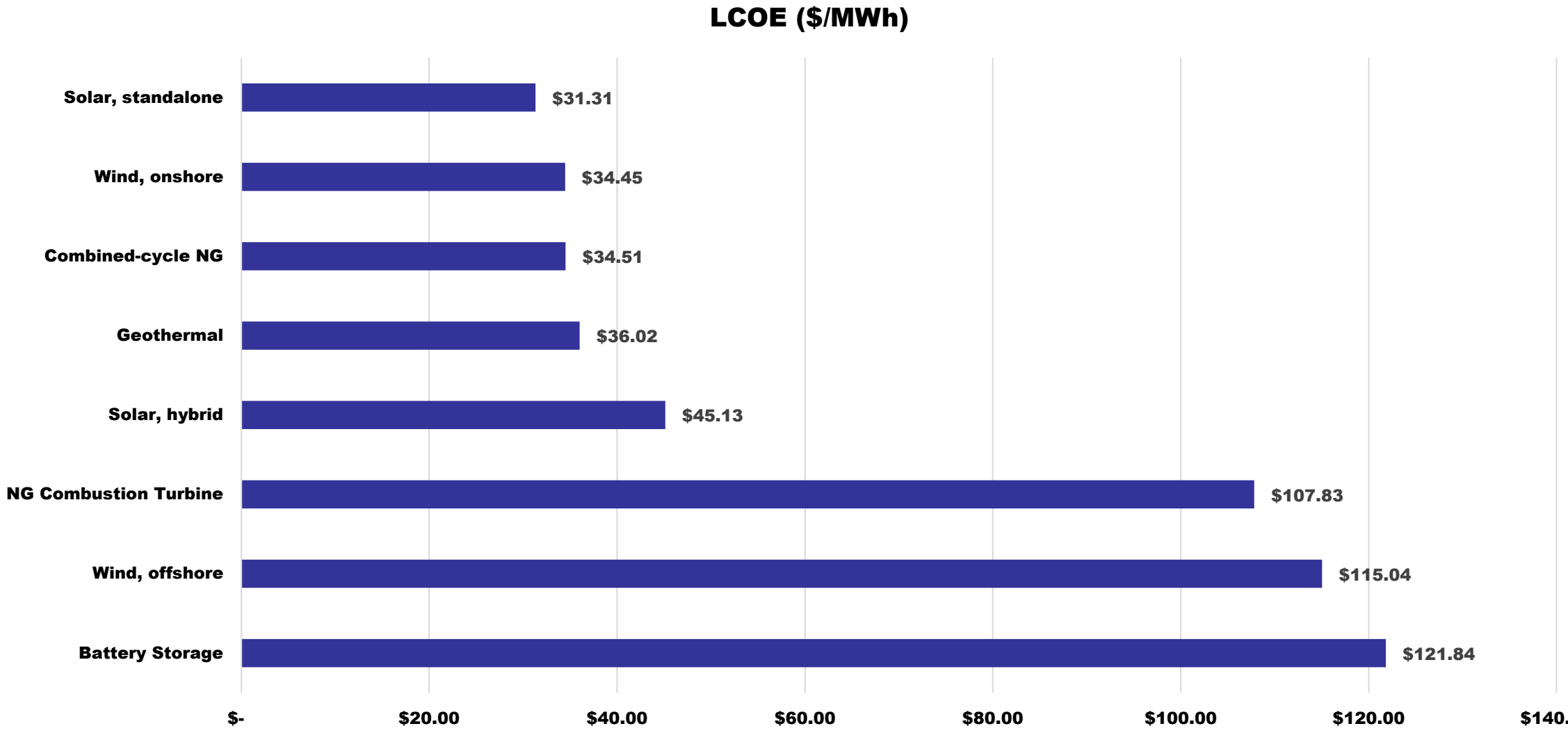
Solar and wind equipment price trends





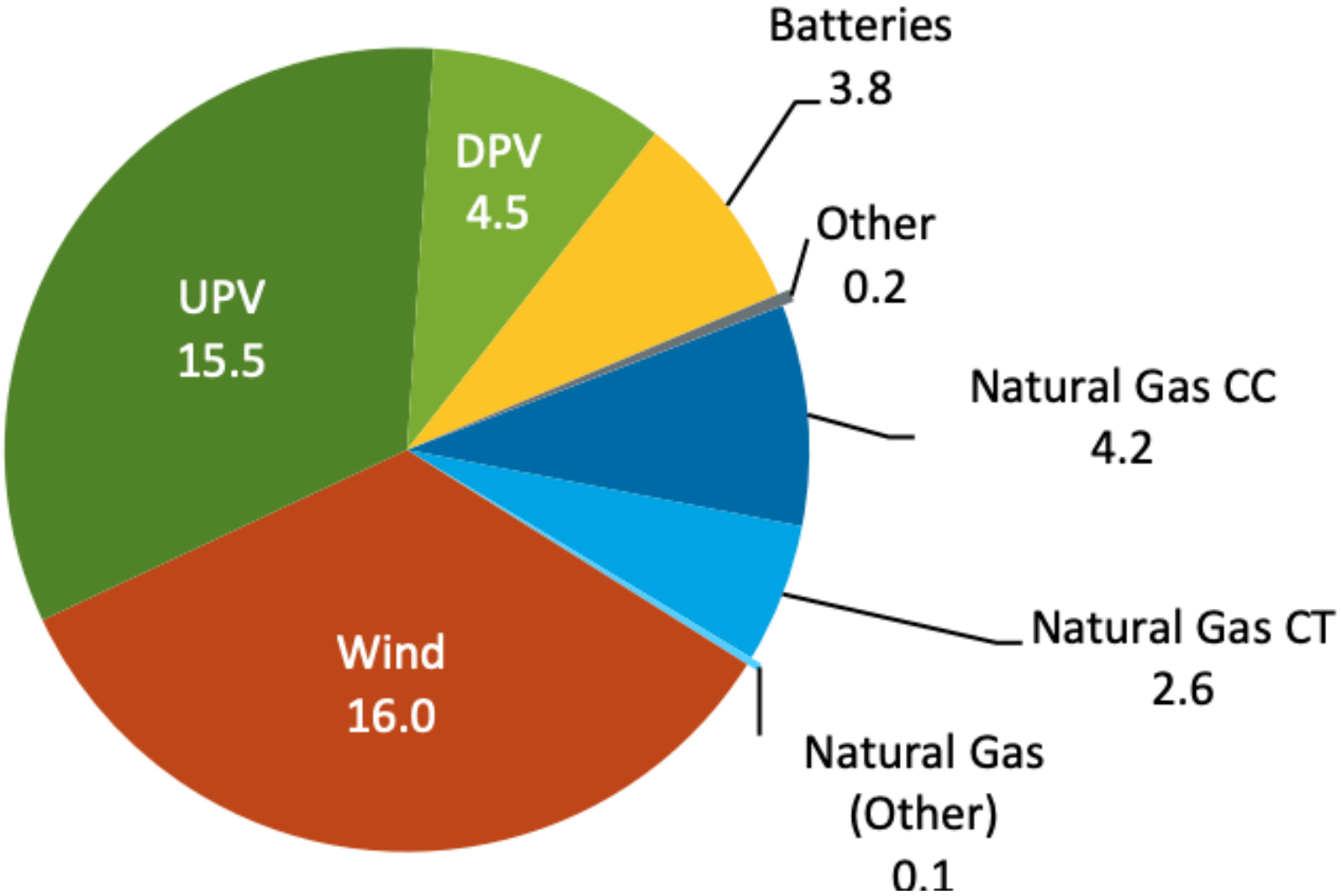
Source: NREL

Levelized Cost of Energy by Technology w/o tax credits



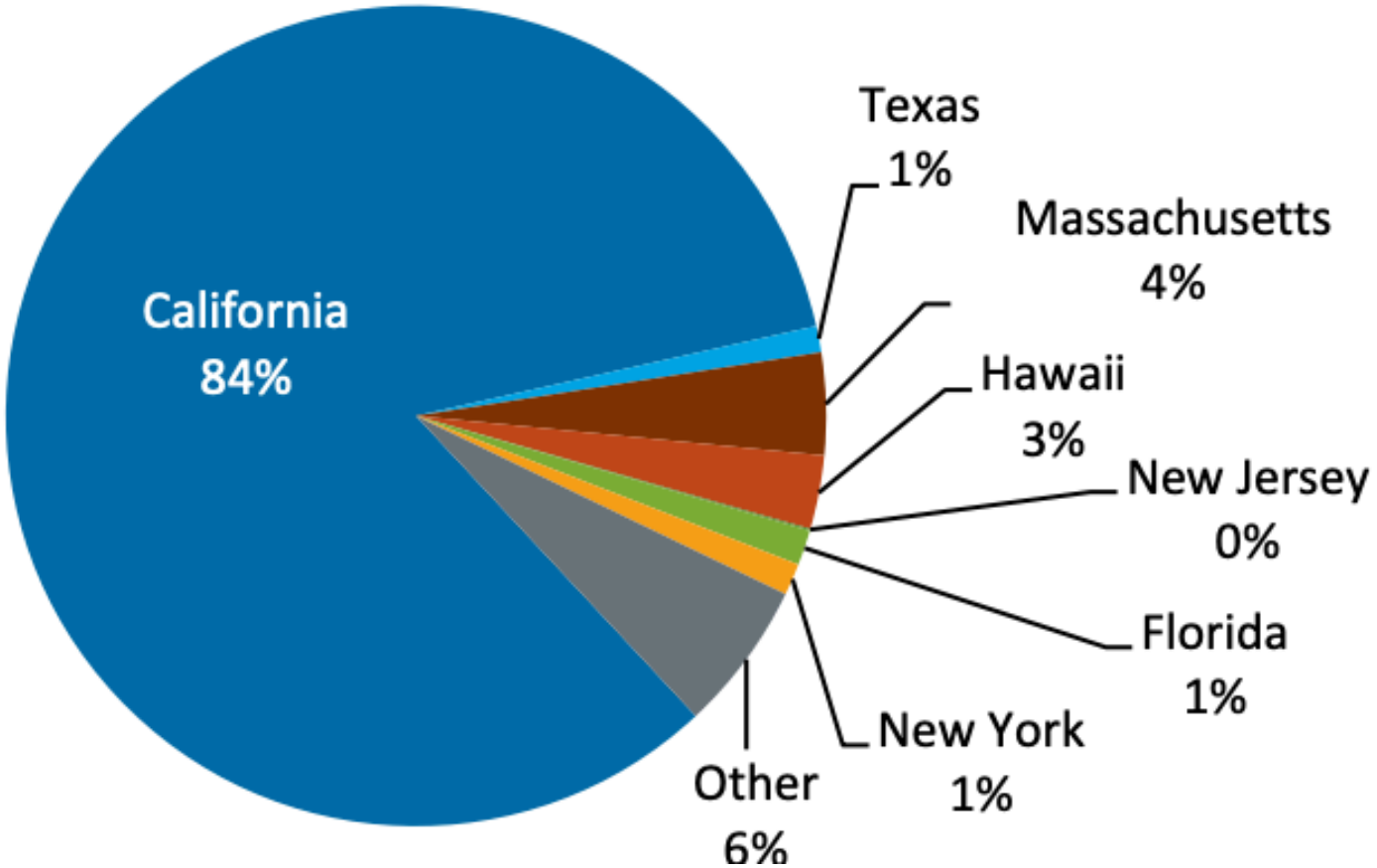
Source: EIA, Levelized Costs of New Generation Resources in *Annual Energy Outlook 2021*

Planned 2021 U.S. Generation Capacity Additions (Total 46.9 GW)



Source: NREL H1 2021 Solar Industry Update

Q1 2021 U.S. Energy Storage Installations by Region (0.8 GWh)



Source: NREL H1 2021 Solar Industry Update

The developer's dilemma:

Transmission Buildout, Equip. Costs → Project Costs

Resource Quality → Project Revenues

Five questions every farm owner should ask

1. What are the impacts to property use?
2. How long will agreement last?
3. What are the landowner's obligations?
4. How will the landowner be compensated?
5. What happens when the project ends?

Total field area: 156.88 ac

Total field area: 156.88 ac
Total obstructed area: 3.85 ac
Use ratio: 2.46%

Total field area: 15.51 ac

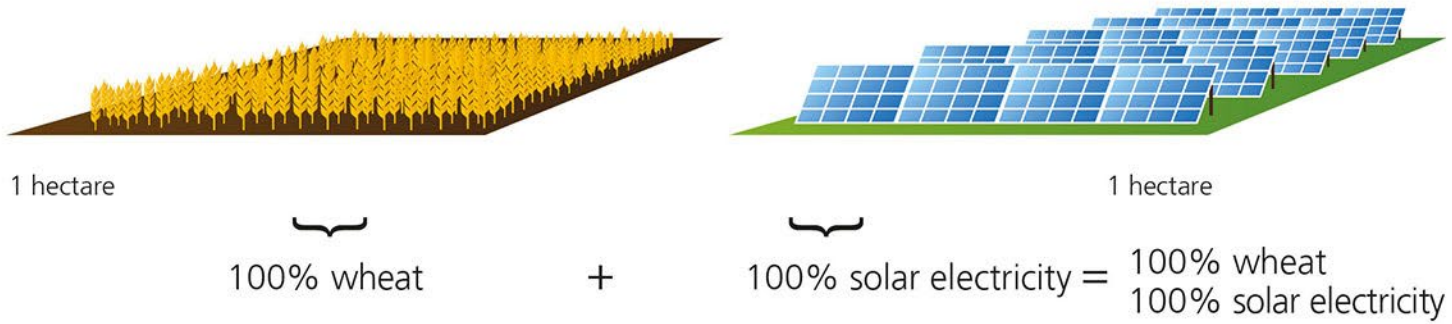
Total field area: 15.51 ac
Total obstructed area: 6.81 ac
Use ratio: 43.92%

Source: Apex Wind Energy

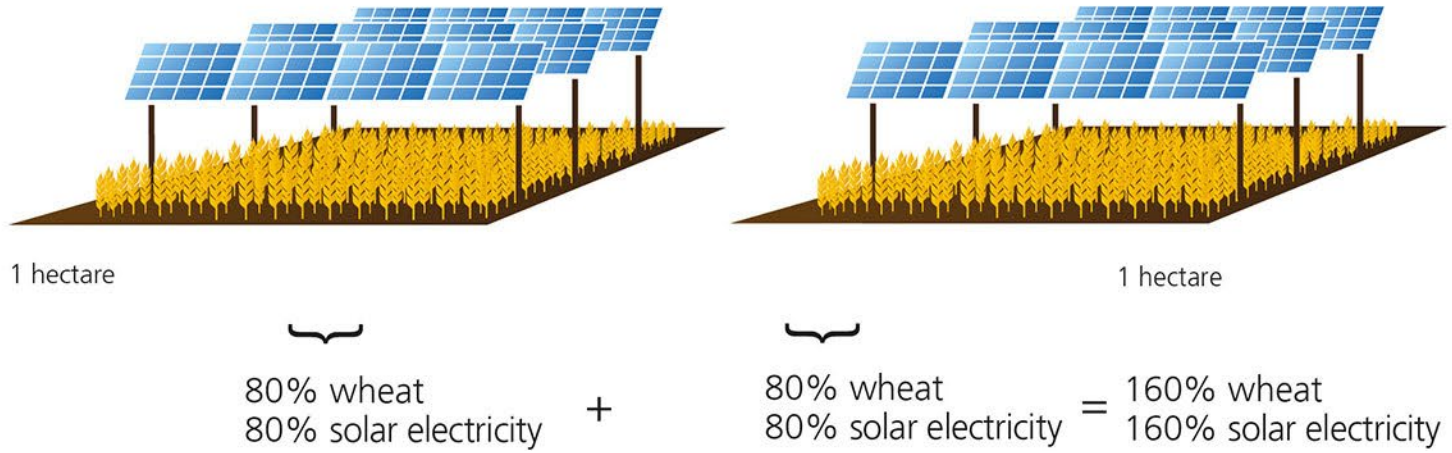
Source: Wikimedia Commons

Field Geometry and Land Use

Separate Land Use on 2 Hectare Cropland

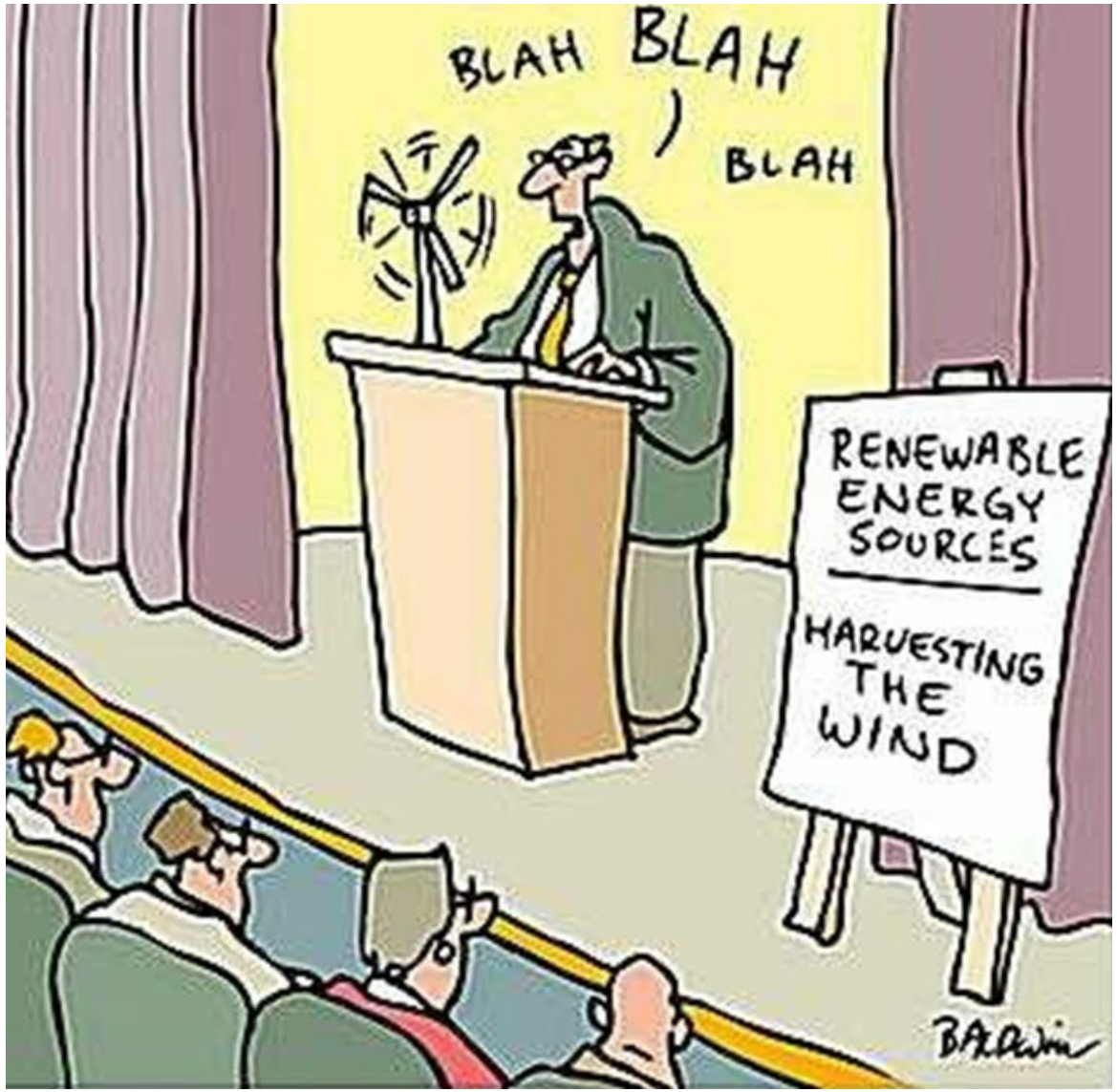


Combined Land Use on 2 Hectare Cropland: Efficiency increases over 60%



Source: Metsolar, “What is Agrivoltaics?”

Thanks!



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GARRETT THALGOTT

Corporate Law Attorney

Illinois Farm Bureau

Farm Foundation
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RENEWABLE ENERGY:

What landowners ought to know

Garrett Thalgott
Illinois Farm Bureau

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Illinois Solar Farms

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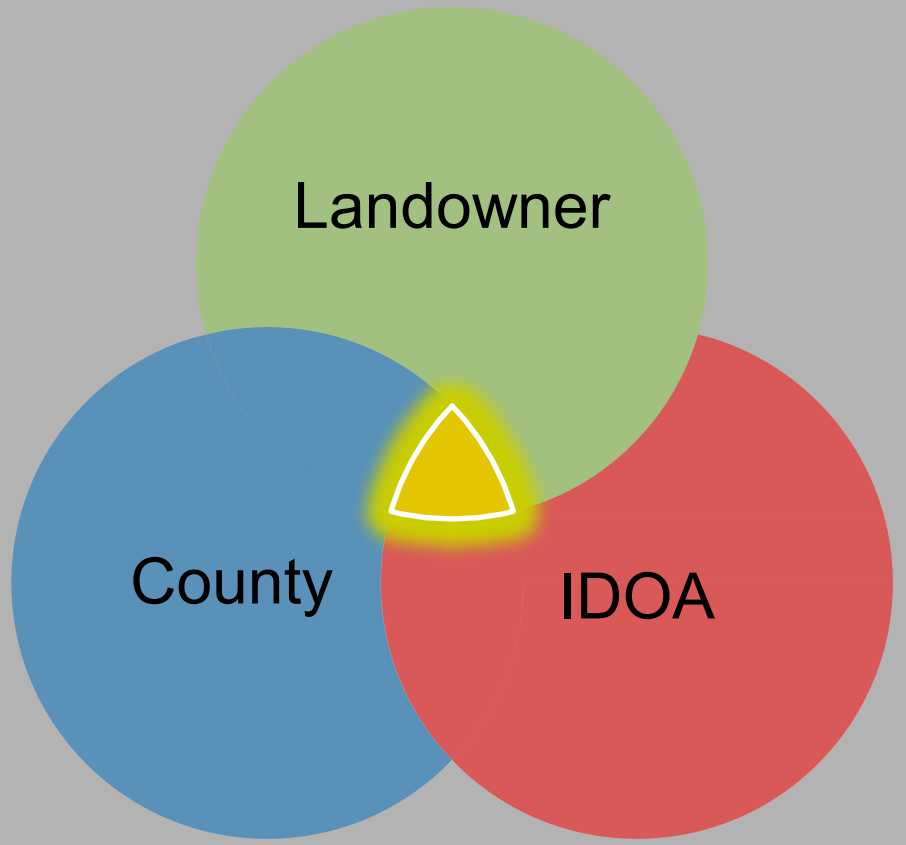
Understand your role…



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ROLES

Landowner: ensuring that appropriate protective provisions are in lease documents

County: ensuring that appropriate land use regulations are in place prior to renewable energy development

State: ensuring that appropriate regulatory schemes are developed and in place prior to renewable energy development

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Lease Provisions

- Sun obstruction-dust from normal farming operations?
- Easement for Interference: agree to allow glare, noise, flicker, electromagnetic, or any other effects from the solar farm

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Term of Agreement

- Diligence Period
  - Allows developer to access land for investigation, testing, and to obtain regulatory approvals
  - 6 months - 8 years
- Operations Term
  - 20-60 years: Should be tied to life of solar farm
  - Termination by developer prior to end of agreement
  - Consideration: tie length of lease to the Power Purchase Agreement or to life of solar equipment?

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Lease Provisions

- Warranty of Property Title
  - What exactly do you own?
  - Make sure the parties are clear as to ownership
  - Have subsurface mineral rights been severed?
- Exclusivity zone?
- Escalator provision: how much rent escalation? Tied to CPI? Caps?

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Lease Provisions

- Insurance
  - Require developer to carry commercial liability insurance in appropriate amount and name landowner as additional insured
  - Inquire with your agent about any landowner indemnity obligations (will your general farm policy provide coverage?)
  - What about waivers of subrogation?

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Restoration of Land

- Decommissioning
- Repair of damaged soil conservation practices
- Repair damaged tile on farm and on adjacent property
- Compaction/Rutting: rip 18 inches

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AIMA Standards

- *Renewable Energy Facilities Agricultural Impact Mitigation Act*-505 ILCS 147
- Intended to establish
  - Minimum restoration standards for agricultural land impacted by construction, operation, deconstruction
  - Intended to establish minimum decommissioning standards and financial protections
- It DOES NOT address all issues associated with renewable energy development

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AIMA Provisions

The draft AIMA covers issues such as:

- Concrete removal to 5 feet
- Underground cabling depth of 5 feet
- Repair of damaged tile lines
- Repair of compaction and rutting
- Repair of damaged soil conservation practices
- Construction during wet weather

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Government Farm Programs

- Land with solar energy panels is nonagricultural land and not eligible to be part of a farm's crop acreage base
- ARC-CO, Price-Loss Coverage, or ARC-IC are not available to nonagricultural land
- Make sure to ask FSA first if land is in CRP, CSP, EQIP, or WHIP
- Renewable energy installation might trigger repayment of program monies previously received

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Fin…

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HOWARD HALDERMAN

President and CEO

Halderman Farm Management Service

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THE SOLAR LEASING:
Landowner's View

23 FEBRUARY 2022

HALDERMAN
REAL ESTATE & FARM MANAGEMENT

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Halderman Companies' Scope of Business

Farm Management

- 242,000 acres in 22 states

Real Estate

- 110 farm, 13,000 acres, $125 million in sales annually (Auction & Private)

Farm Appraisal

- 1,000+ appraisals annually

Starting in the spring of 2020 Halderman uses their expertise in farmland to assist solar companies in sourcing land for solar projects.

Halderman helped multiple solar companies source land in Indiana, Kentucky, Michigan, Texas and Ohio. As of the fall of 2021, the Halderman solar team brought over 75 landowners and 11,000 acres under solar option or sale for solar development. These projects are still ongoing and expected to reach 14,000 acres by the end of 2021.

Opportune Areas for Solar Development

- Green Zones / Open & Environmentally Safe Land for Solar Development
  - Minimal land is still taken up by the solar using low impact strategies, optimally designed solar arrays maxing power per sq/ft, and pollinator habitat is planted if there is soil present, creating improved soil health throughout the use life of the solar project.
  - No tree/vegetation removal needed
    - If some trees have to be removed, new trees or vegetation is planted elsewhere.
  - Not in an endangered/threatened species habitat
  - Not in a natural wetland or environmentally fragile and/or protected area

Opportune Areas for Solar Development (cont'd)

- Brownfields (or Brightfields) / Superfund Sits / Aged & Sealed Landfills Gravel-Pits / Environmentally Destroyed / Distressed Areas
- Opportunity Zones – Economically Distressed Areas
- Parking-Lots, Carports / Canopies
- Big Rooftops / Big Buildings / Facades / Solar Windows / Passive Solar Airports
- (FUTURE??) Roadways, Sidewalks

Why Consider a Solar Lease?

- Farm and Family Income
- Secure farm's generational future
- Diversify income stream with no additional costs
- Enable farm to grow and expand through increased income opportunity
- Low cost of entry for landowner
- Environmental benefits from solar on HEL acres or other land through reduced erosion, pollinator habitat and reduced runoff of water, fertility and pesticides.

Why Consider a Solar Lease? (cont'd)

- Community enhancement thru increased real estate tax revenue and/or reduced real estate taxes due to higher assessed valuation.

- Improved Infrastructure (roads, bridges, schools, community buildings 4-H fairgrounds, other municipal buildings) improves quality of life, attracts people to the community and promotes long term viability and growth. "all boats will rise."

Lease Term

- Long Term Nature of Lease – Get it Right Upfront
- Option/Development Term – 2-5 years
- Site Plan - Land Owner Approval/Plan Commission Approval
- Operation Term – 25-35 years
- Renewal Options – 5-25 years
- Solar/Wind Company Reserves Right to Terminate
- Solar – Need Protection on Partial Termination

Rent

- Signing Bonus??
- Option/Development Term Rent $20-$40/Acre
- Construction Period Rent – Difference Between Wind/Solar
  - Wind – varies ranges from 50-100% of Operational Rent
  - Solar – Ranges from 50% to 100% of Operational Rent
  - Crop Damage
    - Wind – Adequate Compaction Damages
    - Solar – Varies based on when construction started
    - Adequate Tile Damage Provisions - Top Soil Grading Prohibition

Rent (cont'd)

- Operational Rent
  - Wind – Complex with multiple factors ($5,000 - $12,000/turbine)
  - Solar – More Basic - $$/acre range $700-$1,200
    - Solar needs to include Minimum Acreage Protection
  - Inflation Factor
    - 2% Annual Typical – Have seen 2.5% in Solar Leases with No CPI
    - CPI Annual – More Critical with Today's Inflation hitting 7% last qtr.
    - Key is When Appreciation Starts
  - Late Fees and Interest

Easement Language

- Easements Over Other Property – Remove or Provide Payment
- Easement Fees - $4/lineal foot??
- Transmission Lines – Overhead/Underground
- Battery Storage Rights
- Substations
- Sell acres for substation and battery storage. $50,000/acre.
- Fencing/Setbacks/Natural Breaks/Irrigation?

Misc.

- Assignability by Wind/Solar Company
- Insurance Coverage Requirements/Safety of project
- Property Tax
- Environmental Issues – Substations / Battery Storage
- Environmental Benefits (pollinator habitat, cover crops)
- Restoration Requirements/Decommissioning Bond
- Removal Security – Does it start early enough and is it adequate?
- Sale Option

Valuation of Renewable Acres

- Wind = $500 - $1,000/acre over farmland values. Capitalize the income into the value. Assume $8,000 annual income. At 6% discount rate = $133,000 of value. $1,300/acre on 100 acres.

- Solar – few comparable sales, if any. Again using discount rate solar acres might = $1,000/acre lease rate divided by 6% discount rate = $16,666/acre. Farmland rent of $300/acre divided by 2.75% cap rate = $10,900/acre

Valuation of Renewable Acres (cont'd)

- Net Usable acres is key in valuation. Significant percentage of some land is non-usable due to setbacks.

- Net farmable acres likely higher percentage and therefore the valuation comparison needs to be on total income versus per acre.

Lease Option / Lease Timeline

- Landowner enters a lease option with a solar developer
- Landowner may assist in recruiting other landowners in the area to participate
- Once developer achieves critical mass or scale needed for a viable project begin approval process

Lease Option / Lease Timeline (cont'd)

- Plan for 12 to 24 months for approval process. Zoning, plan commission, state regulatory agencies, and possibly a satisfactory sale of electricity. Due diligence occurs via soil testing, site inspections, etc.
- Construction could be 1 -3 years.
- Damage clause is important to review to cover crop and soil damage during due diligence work.


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