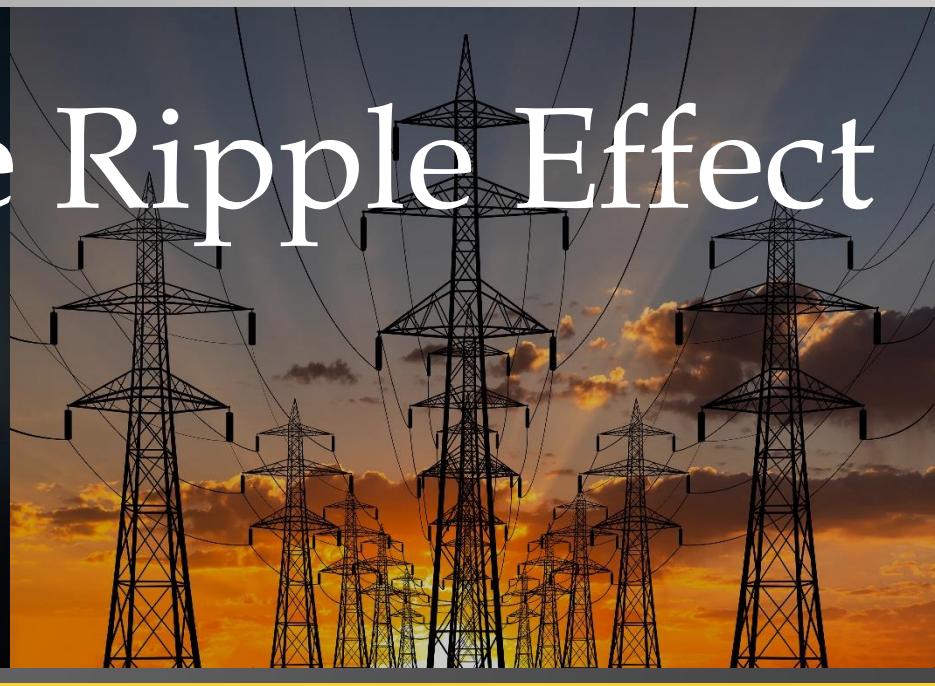
WICHITA PROPERTY TAX CONFERENCE
VALUATION & ASSESSMENT TOPICS FOR COMPLEX INDUSTRIES

51st Annual Wichita Property Tax Conference

July 23 – July 27, 2023



Electric Renewables: The Ripple Effect

Presented by:

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Agenda

- **Fawad Jamal and Joe Skutt - Avangrid Networks**
  - Future of the Electrical Grid
  - Distribution Planning
  - EV Adoption Challenges
- **Joseph Kettell - The Inflation Reduction Act (IRA)**
  - IRA Overview and Timing
  - Bonus Credits (ITC/PTC adders) and Transferability
  - Eligibility and Benefits by Project Type
  - Battery Storage and Nuclear Power Plants
- **Jay Belinfante – Impacts of the Rise of Alternative Energy**
  - Clean Energy Overview and Trends in the U.S.
  - Coal Power Plants and Mining
  - Property Tax Assessment Implications

Fawad Jamal & Joe Skutt

Overview of AVANGRID

Formed by merger between Iberdrola USA & UIL in December 2015

81.5% Owned by Iberdrola, S.A.

AVANGRID
NYSE: AGR
www.AVANGRID.com

8 Regulated Utilities in NY, CT, ME, MA(1)

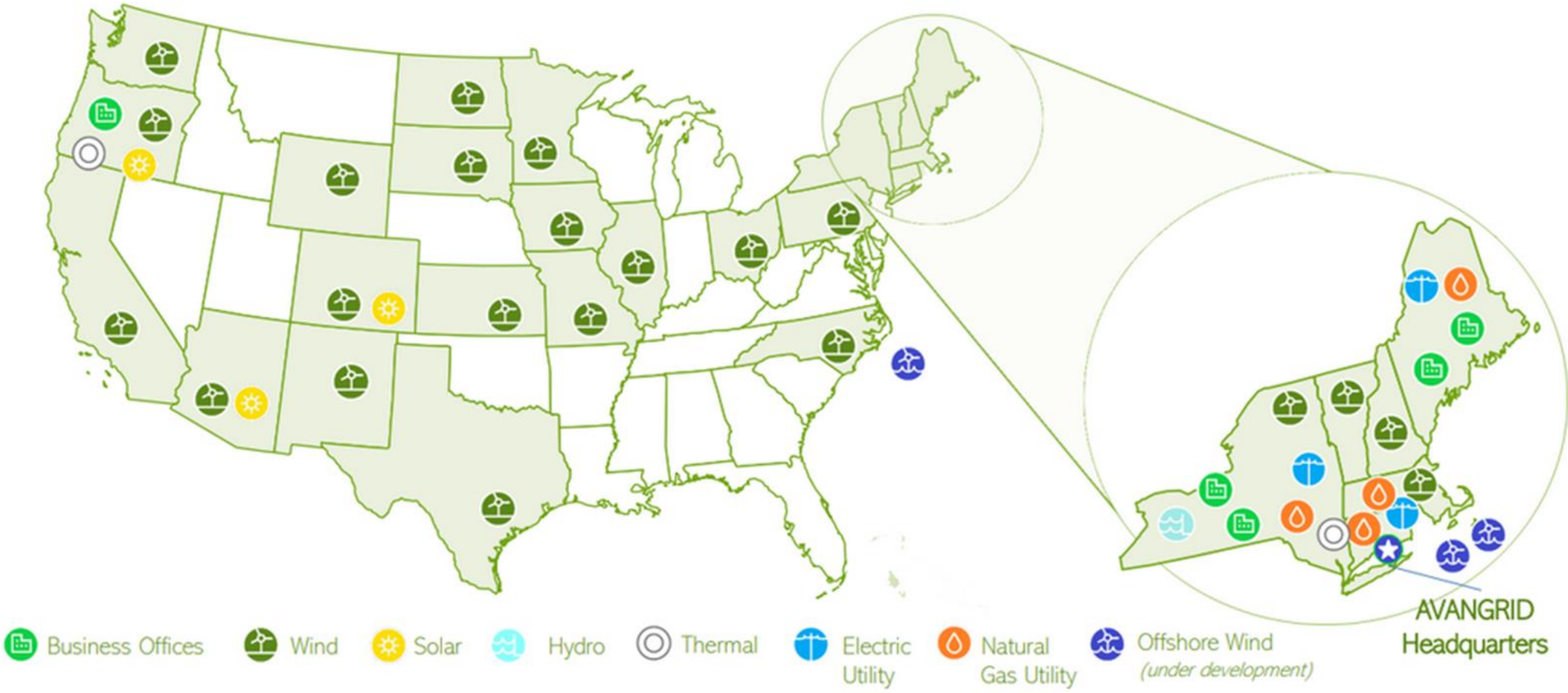
Average Rate Base	~$11.7B
Customers Served	~3.3M
Miles of Transmission Lines	~9k
Miles of Electric Distribution Lines	~71k
Miles of Gas Distribution Pipeline	~23k

3rd largest Wind & Solar Operator in U.S.

Wind & Solar GW Installed	~8.2 GW(2)

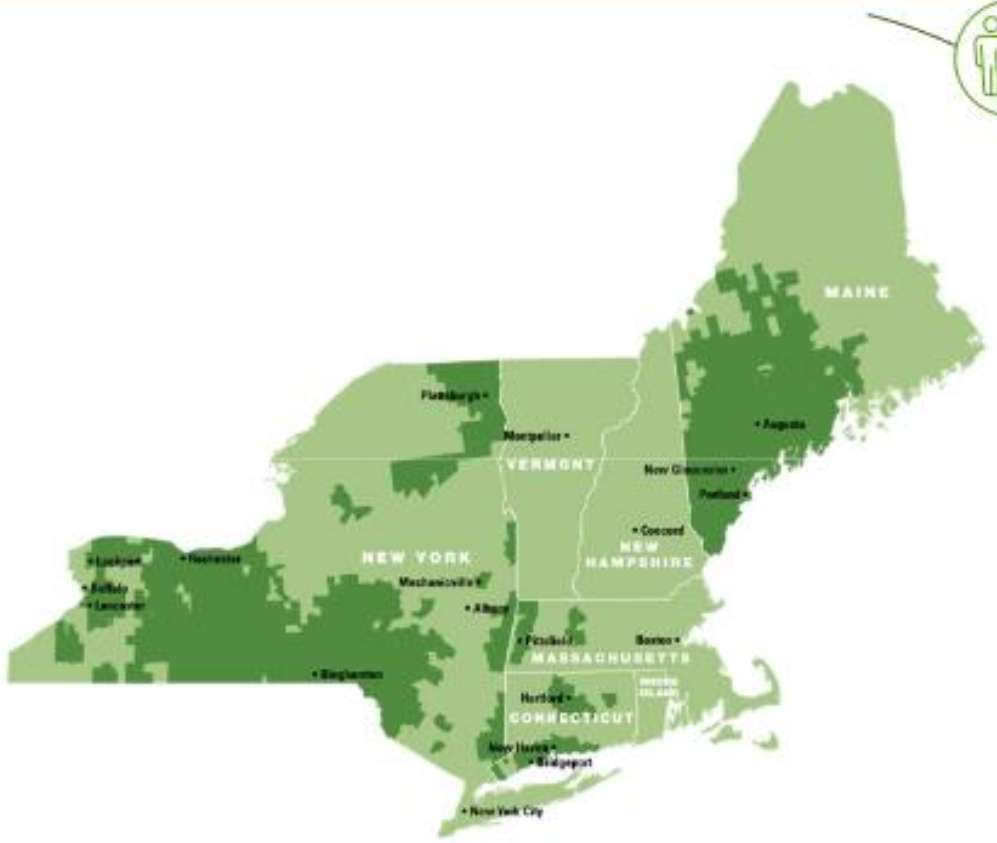
(1) As of 12/31/21; rate base excludes MEPCO.
(2) As of 3/31/22 including JVs, 1Q '22 Average Operating Capacity; 7.9 GW

Overview of AVANGRID



Overview of AVANGRID

8 regulated utilities in NY, CT, ME & MA serving ~3.3M electric & natural gas customers



CUSTOMERS

2.3M electric customers and **1.0M** natural gas customers

RATE BASE

Average Rate base of **$11.7B**

ELECTRIC SERVICE

Delivered **36,630 GWh** of electricity in 2021. 71K miles of distribution lines and 9K miles of transmission lines, 819 substations

GAS SERVICE

Delivered **193M DTh** of natural gas in 2021. 23K miles of distribution pipeline and 126 miles of transmission lines

REGION

36K mi² service area in the Northeast Region of the U.S.

Future of the Electrical Grid

Distributed Generation

- Renewable Energy
  - Old Grid – Power Flows in One Direction
  - New Grid – Power Flows in Several Directions
- Fluctuating Output

Increased Electric Demand

- Electrification
  - Electric Vehicles
  - Electric Heating

Resiliency/System Hardening

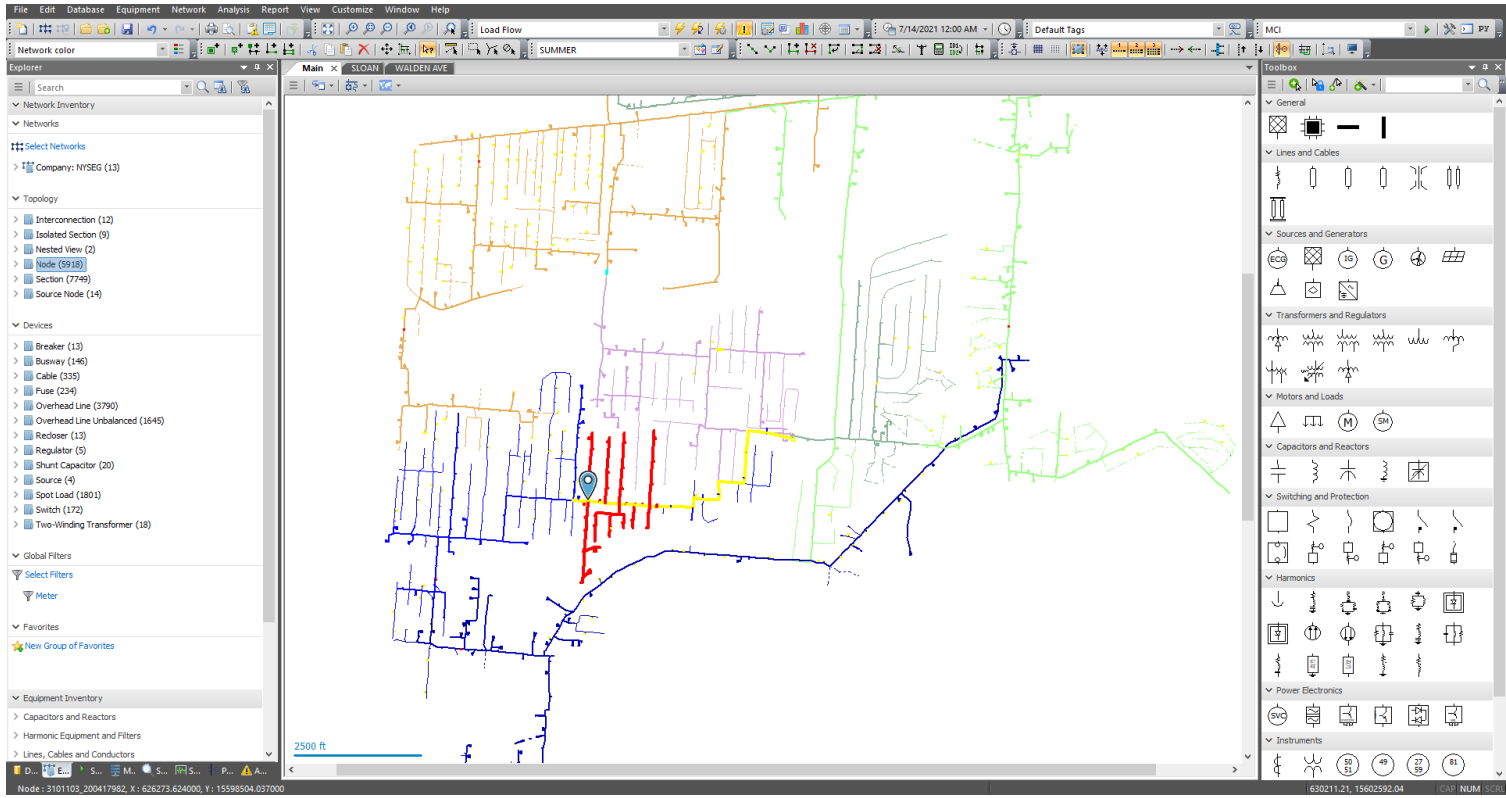
- N-1 Contingency
- Automatic Restoration

Distribution Planning

Analysis and solution planning cycle for maintenance and development of the utility grid, to maintain safe, reliable, and affordable service while also efficiently operating the existing electrical facilities that make up the grid.

What we study:

- Interconnections
  - Load Studies
  - Distributed Generation (DG)
- Comprehensive Area Studies
  - Immediate, 5-Year, and 10-Year impact studies
  - Culmination of all studies and analysis
- Resiliency/System Hardening
- Automation
  - Sequential Reclosing
  - Automatic Grid Recovery (AGR)
- Protection and Coordination
  - Fusing (Sizing and Locations)
- Motor Flicker
- Low/High Voltage Concerns
- Short-Circuit/Fault Current Analysis



EV Programs & Pilots

EV make-ready programs at all AVANGRID electric utilities

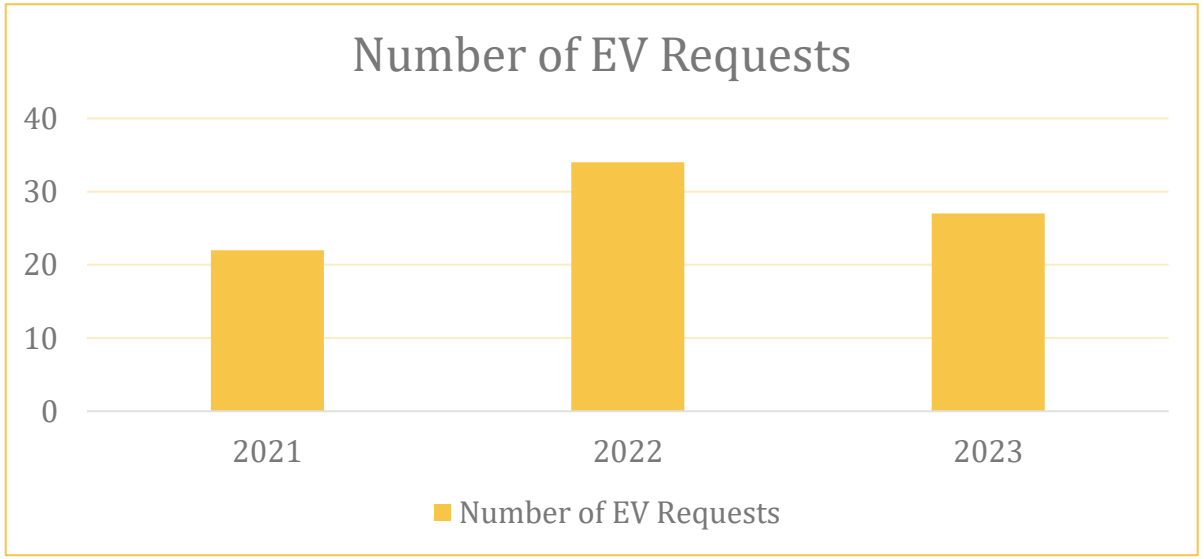
	Total Potential Investment	L2 (7.2 kW) installed	L3 (DCFC, ≤ 50 kW) installed
New York	**$146.5M**[1]	**13,457** (9,279 NYSEG & 4,178 RG&E)	**399** (250 NYSEG & 149 RG&E)
NY PSC Order approved a **statewide EV make-ready program through 2025** for L2 & DCFC, enabling more investments			
Connecticut	**$20.3M**[2]	**2,533**	**99**
Comprehensive EV Program proposed for UI; part of ongoing CT Grid modernization framework to **support EV Charging infrastructure**			
Maine	**$240K**	**60**	
Pilot program approved to install charging infrastructure launched Summer 2020 **NECEC Stipulation Funding**: $15M EV fund for DCFC network			

New partnership with EV Connect, an integrated EV charging solutions platform. EV Connect actively manages over 1 million transactions per year across thousands of site owners, dozens of networks, and supports nearly 100,000 EV drivers via the EV Connect app. With utility coordination and partnership, EV Connect provides data analytics to understand usage patterns and impacts to the grid.

Number of EV Requests

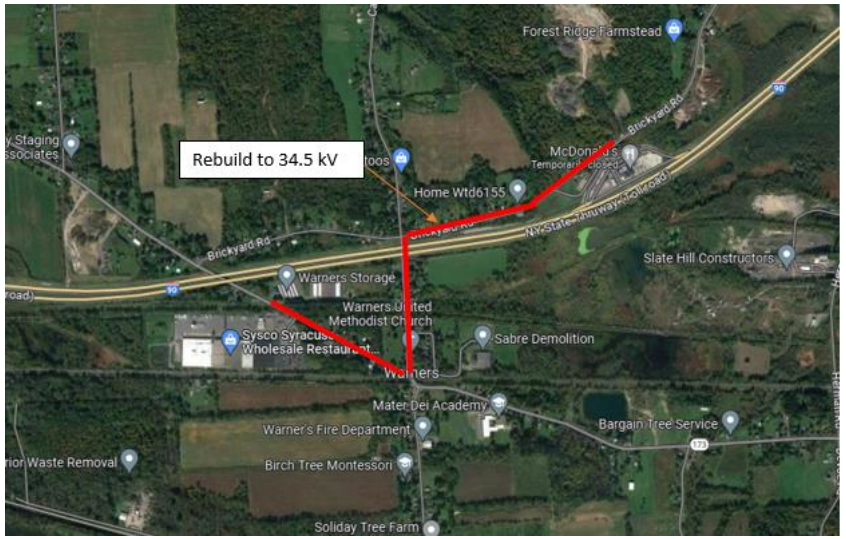
Steep rise in number of applications for EV load

Year	Number of EV Requests
2021	22
2022	34
2023	27



Case Study #1- DC Fast Charger on NYSEG Circuit

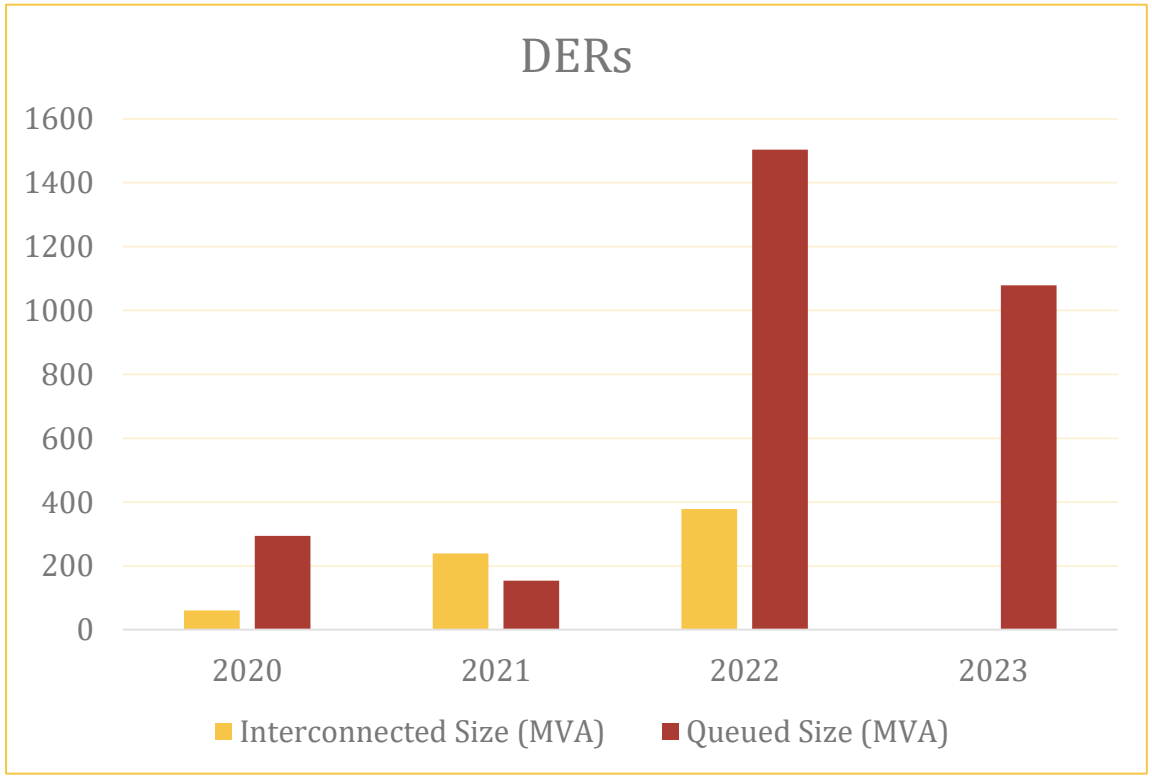
- A 1.5 MW car charger wanted to go on a NYSEG 4.8 kV distribution circuit
- Multiple upgrades were needed to accommodate load
  - Converting 1.23 miles of distribution line to 34.5 kV
  - New transformers, conductor, poles had to be installed
  - A new transmission capacitor had to be installed
- ~$1.9 million in transmission upgrades
- $100Ks in distribution upgrades



Number of DER studies

Total size of applications received is increasing at an exponential pace

Year	Interconnected Size (MVA)	Queued Size (MVA)
2020	60	294
2021	239	154
2022	378	1504
2023	2	1079



Challenges faced with EV and DER adoptions

- Large DC Fast Chargers will use over 1 MW
  - As much as a strip-mall!
- Requires Major substation upgrades
- DER are most suitable in rural areas where there is enough land
- NYSEG has substations in rural areas as low as 1 MW in capacity
- There are still 4.8 kV (relatively low-voltage) distribution circuits remaining with limited capacity
- Distribution line/Substation upgrades can be in the millions of dollars

Joseph Kettell

INFLATION REDUCTION ACT (IRA)

Benefits For The Renewable Energy Industry

TODAY'S FOCUS:
IRA's RENEWABLE ENERGY INCENTIVES

- On August 16, 2022, President Biden signed the IRA into law just as ITC and PTC were being phased out for wind and solar projects.
- Start date for newly constructed Wind and Solar extends 10 years
- ITC and PTC are now offered to other "technology neutral" projects
  - standalone energy storage (batteries, etc.)
  - hydrogen fuels
  - nuclear power
  - biofuels

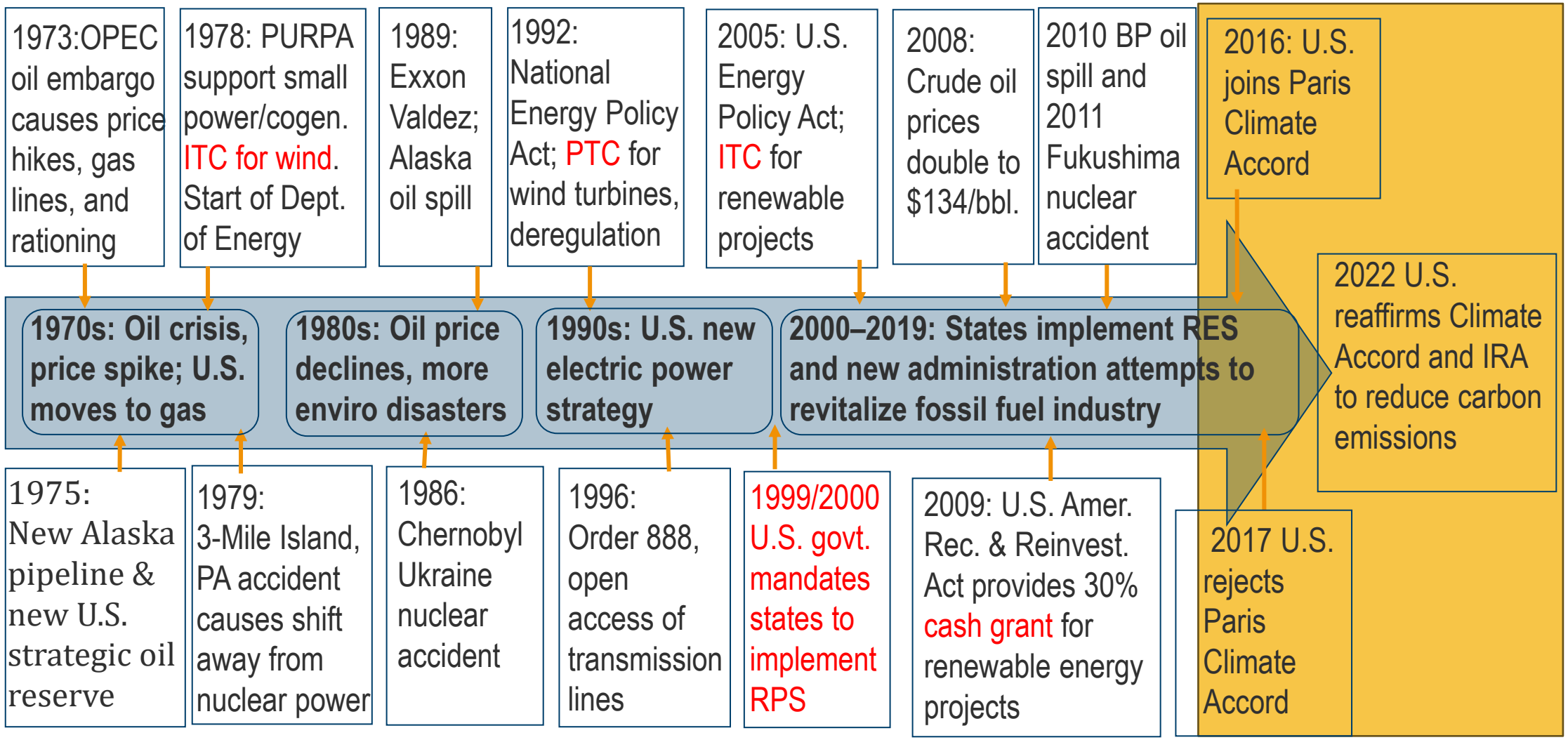
WHAT ELSE IS IN THE IRA?
MILE-HIGH VIEW

TOPLINE ESTIMATES:

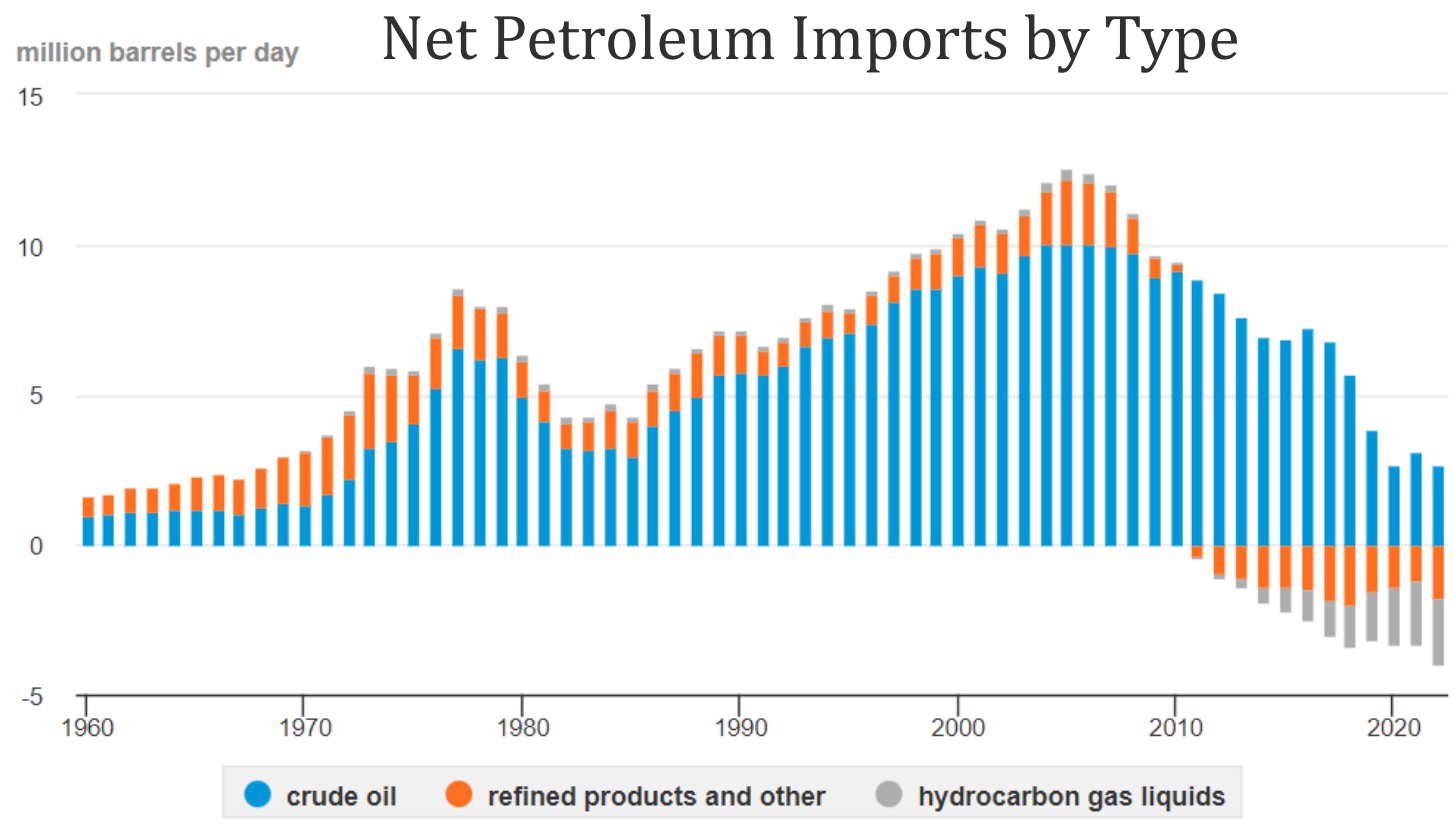
TOTAL REVENUE RAISED	**$739 billion**
15% Corporate Minimum Tax	*313 billion**
Prescription Drug Pricing Reform	*288 billion***
IRS Tax Enforcement	*124 billion***
~~*Carried Interest Loophole*~~	~~*14 billion**~~
TOTAL INVESTMENTS	**$433 billion**
Energy Security and Climate Change	*369 billion****
Affordable Care Act Extension	*64 billion***
TOTAL DEFICIT REDUCTION	**$300+ billion**

* = Joint Committee on Taxation estimate
** = Congressional Budget Office estimate

A 50-YEAR JOURNEY FOR RENEWABLE ENERGY



EFFECTS OF U.S. GOVERNMENT ENERGY POLICY



IRA TIMING

- ITC and PTC are available for projects starting construction between Jan. 1, 2022, and Jan. 1, 2025
- After January 1, 2025, ITC/PTC will be replaced by the "clean energy ITC/PTC ("technology-neutral" zero emissions) under IRA Section 48E, and will then expire on January 1, 2033
- For ITC, the 30% credit is provided until January 1, 2033, and then reduced to 22.5% in 2034, 15% in 2035, 0% in 2036 and thereafter
- This ITC/PTC 10-year extension is a major benefit. Historically, ITC/PTC received short-period extensions, exposing projects to planning and construction risks
- ITC can phase out earlier if greenhouse gas emissions are 75% lower than 2022 emissions from electricity generation

IRA SECTION 48E TECHNOLOGY-NEUTRAL PROJECTS

- To qualify for the 30% ITC, owners must follow the *prevailing wage* for construction and operation of their project, set by the Department of Labor (DOL)
  - Wages must match the DOL wages by geographic area and labor classification
- If *prevailing wage is not* met, the project will only be eligible for the *base rate* of 6.0% ITC
- Renewable energy projects under 1 MW are excluded from prevailing wage requirements and will receive 30% ITC.

BONUS CREDIT OVER 30 PERCENT

Category	Adders
More than 40% Domestic Material Content	ITC: +10%
	PTC: +0.3¢/kWh
Energy Community Site (Brownfield, Mining Sites, Fossil Fuels Areas)	ITC: +10%
	PTC: +0.3¢/kWh
Low-Income Community and Tribal Land (<5 MW_{AC})	ITC: +10%
	PTC: N/A
Qualified Low-Income Residential Buildings and Economic Benefit Projects	ITC: +20%
	PTC: N/A

TAX CREDIT TRANSFERABILITY

- Project owners can transfer ITC/PTC tax benefits to third parties without taking on a tax equity partner
  - Owners must elect to transfer tax credit in year that credits are eligible
  - Purchased credits can be carried forward, but not subsequently transferred to another taxpayer
  - The buyer must pay cash for the tax credit and the purchase price is not taxable income for the seller and not tax deductible for the buyer
  - Depreciation tax benefits are not transferable so a developer may still want a traditional tax equity financing partner
- Will ITC/PTC transferability affect project value for tax assessment purposes?
  - Benefit now severable from tangible property
- What happens to ITC claw-back when credit is sold and project is subsequently shuttered?

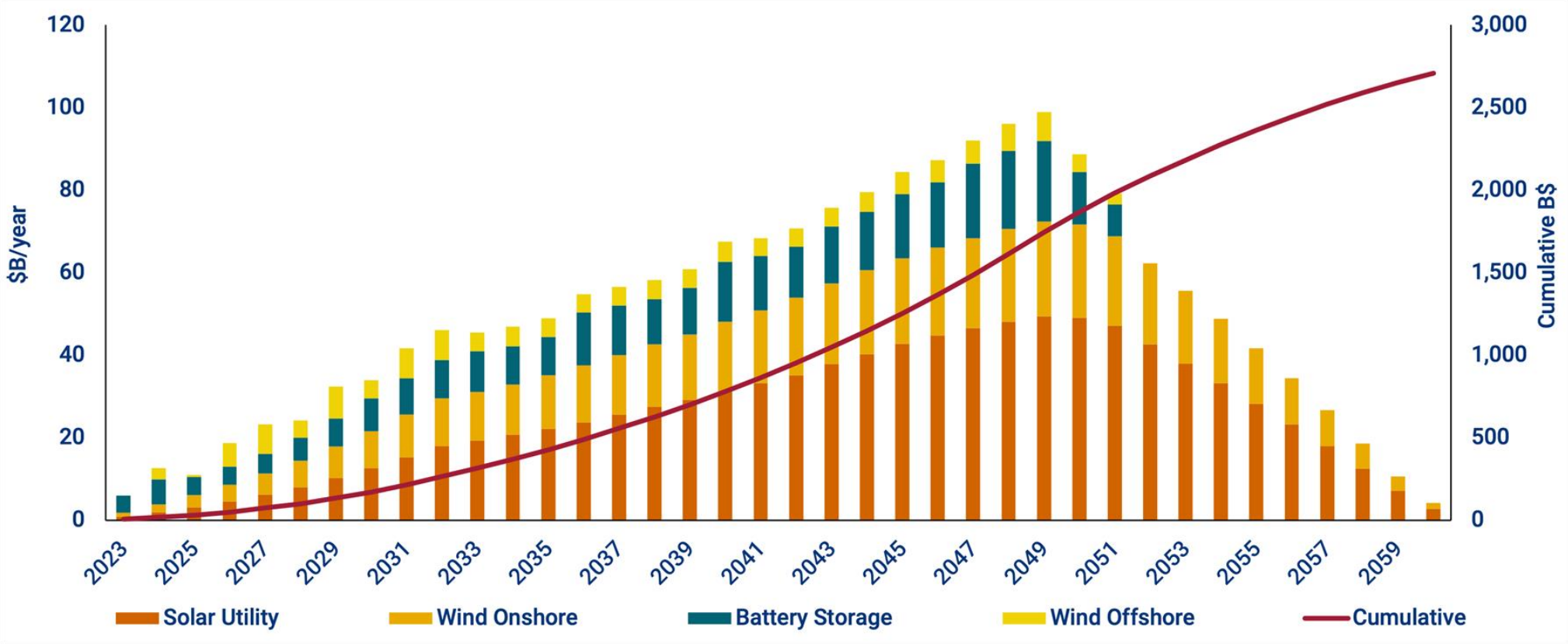
TAX-EXEMPT ENTITIES

- Prior to the IRA, tax-exempt entities such as cities, counties, school districts, municipal utilities, churches, and other 501(c) organizations, could not take advantage of renewable energy tax benefits
- Now, tax-exempt entities can receive benefits through a refund from the IRS, in lieu of tax credits

IRA ELIGIBILITY BY PROJECT TYPE

ITC or PTC	ITC (but not PTC)	PTC (but not ITC)
solar and wind, municipal solid waste, geothermal (electric), and tidal	energy storage, microgrid controllers, fuel cells, geothermal, combined heat & power, microturbines, and electrical interconnection	biomass, landfill gas, hydroelectric, marine and hydrokinetic

IRA BENEFITS BY PROJECT TYPE



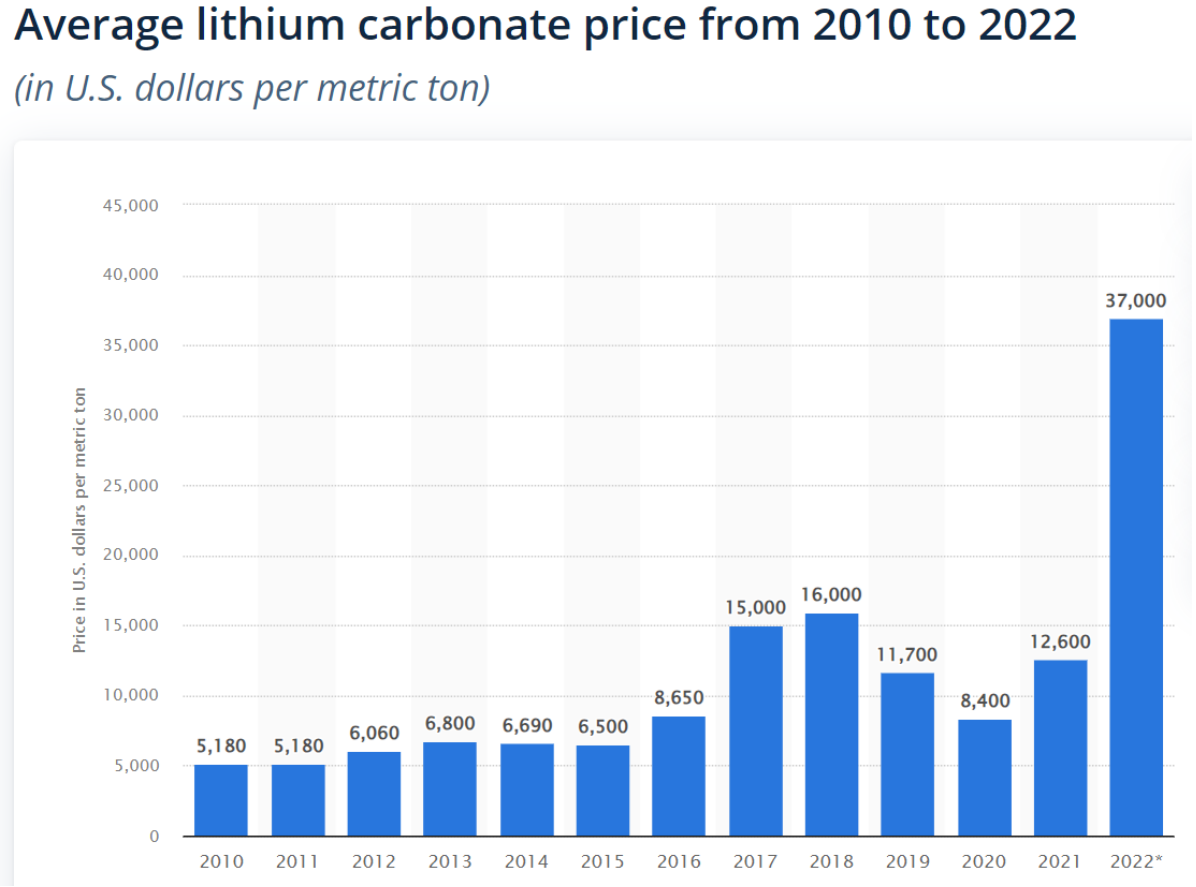
Source: Wood Mackenzie North America Power Service 2022 Base Case Update. Note that this only includes the value of tax credits for utility-scale wind, solar and storage. This assumes utility-scale solar elects the PTC.

BATTERY STORAGE PROJECTS

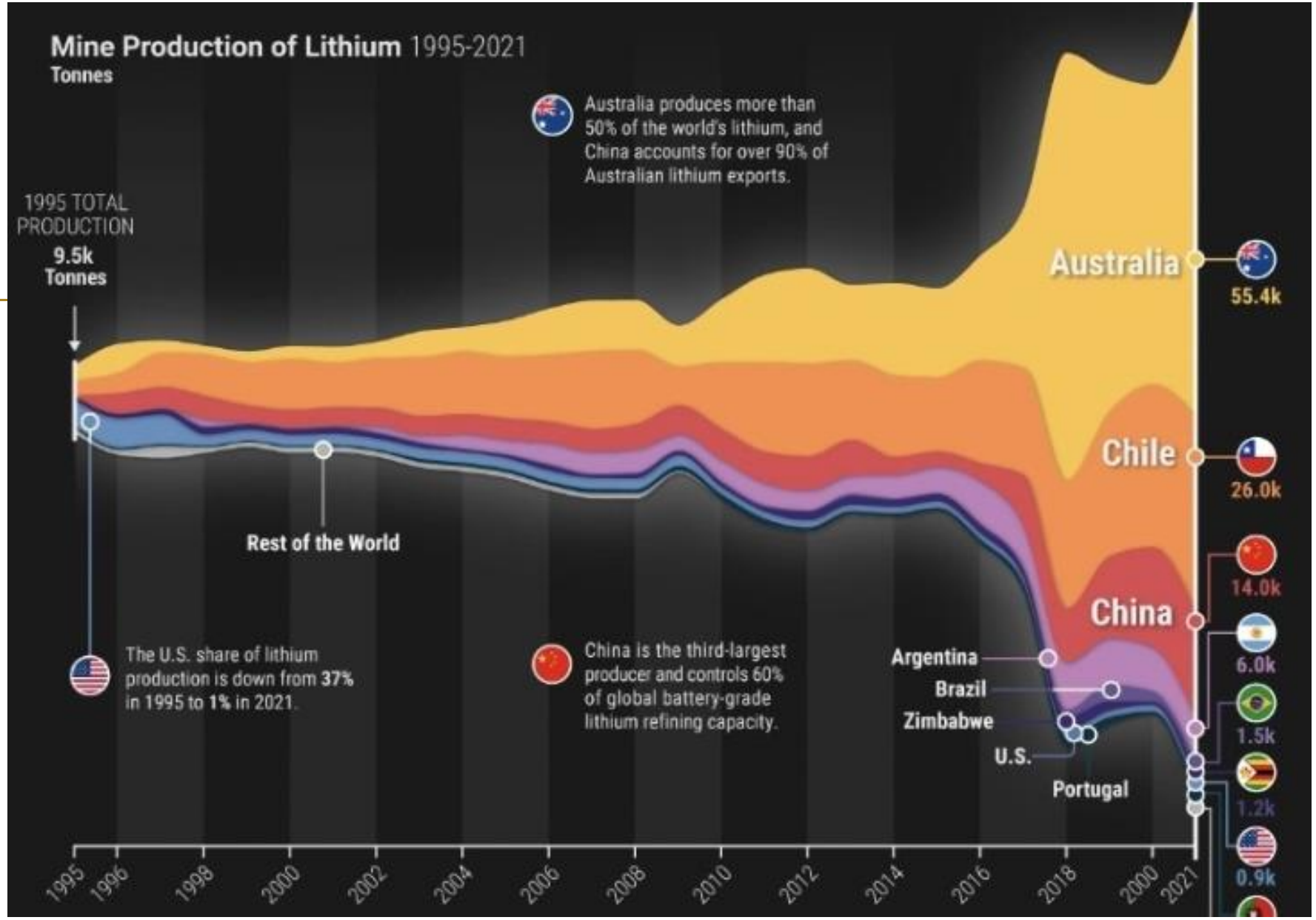
- Before IRA, only batteries integrated with new solar construction could claim ITC
- IRA adds standalone energy storage technology (>5 kWh) to eligible projects
- Installing batteries at existing solar and wind plants are now ITC-eligible
- Increases financing options and improves overall economics of storage installations
- U.S. is now the fastest growing regional market for planned battery cell manufacturing plants

SUPPLY ISSUES FOR BATTERY PROJECTS

- High demand for batteries has caused shortages of lithium along with other metals including copper, aluminum, nickel and cobalt



LITHIUM PRODUCTION BY COUNTRY



IRA AND NUCLEAR POWER PLANTS

- Aimed at preventing the decommission of *existing* nuclear plants
- Generally, a PTC of $0.03/kWH, increasing to $.015/kWH, if certain "prevailing wage requirements" are satisfied
- Tax equity project financing has been nonexistent in the nuclear sector. Now, the IRA will facilitate the monetization of tax credits as they will be transferable to third-party
- Small modular nuclear reactors may be "drop-in" replacements for retiring coal plants as footprint and MW output are similar

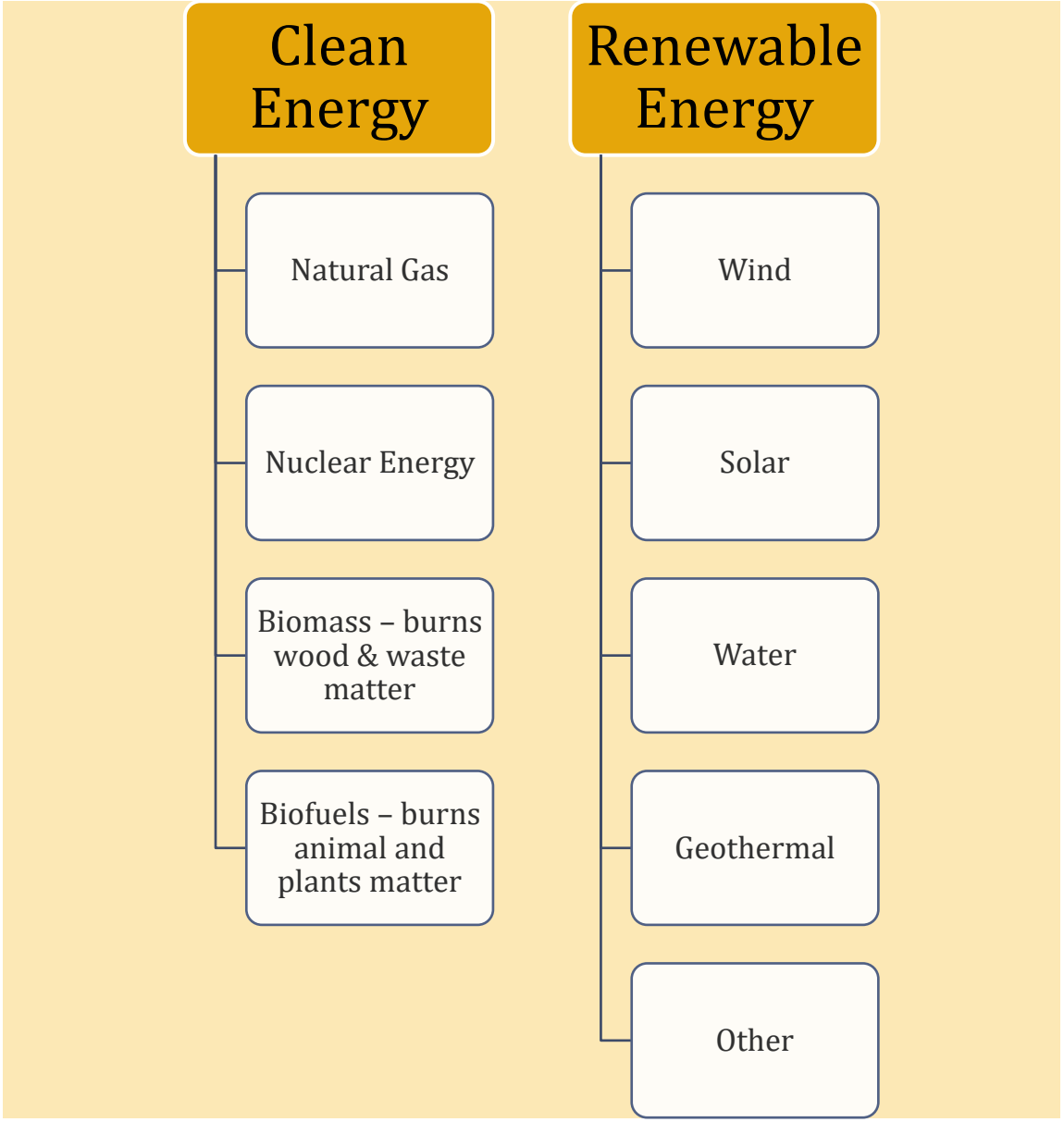
Key Takeaways

- The IRA extends ITC/PTC to existing projects, adds new technologies to the list, and increases energy credits to 60% in certain circumstances:
  - *prevailing wage and registered apprenticeship requirements*
  - *domestic content requirements*
  - *energy community*
- Two new groups can benefit for ITC/PTC:
  - *tax exempt owners can receive payments directly from IRS in lieu of credits*
  - *owners without sufficient taxable income can now sell tax credits to third parties*
- The Treasury Department will provide more details in 2023 concerning the IRA and renewable energy projects

Jay Belinfante

Alternative Energy

"Alternative energy" refers to energy from clean (depletable) sources and renewable (not depletable) sources. It is presented as an alternative to conventional energy sources, which involve burning non-renewable fossil fuels like oil or coal.



How Clean and Renewable Energy Serve the Power Industry

Currently renewables primarily serve as peaker plants, but advances in battery storage technology and research to modify the grid, will also allow renewables to serve as base and load following plants.

Clean Energy

- Base Load Power Plants – Nuclear, Geothermal, Natural Gas
- Load Following Power Plants
- Peaker Power Plants – Nuclear, Natural Gas

Renewable Energy

- Peaker Power Plants – most renewable energy sources
- Base Load – Large Hydro Projects

A Developing Demand for Alternative Energy

In 2022 renewables passed coal in market share for the first time.

- Renewables - 21.5% share.
- Clean energy's natural gas has the highest share at 39%.
- Coal fire generating turbine's share has contracted to 17%.

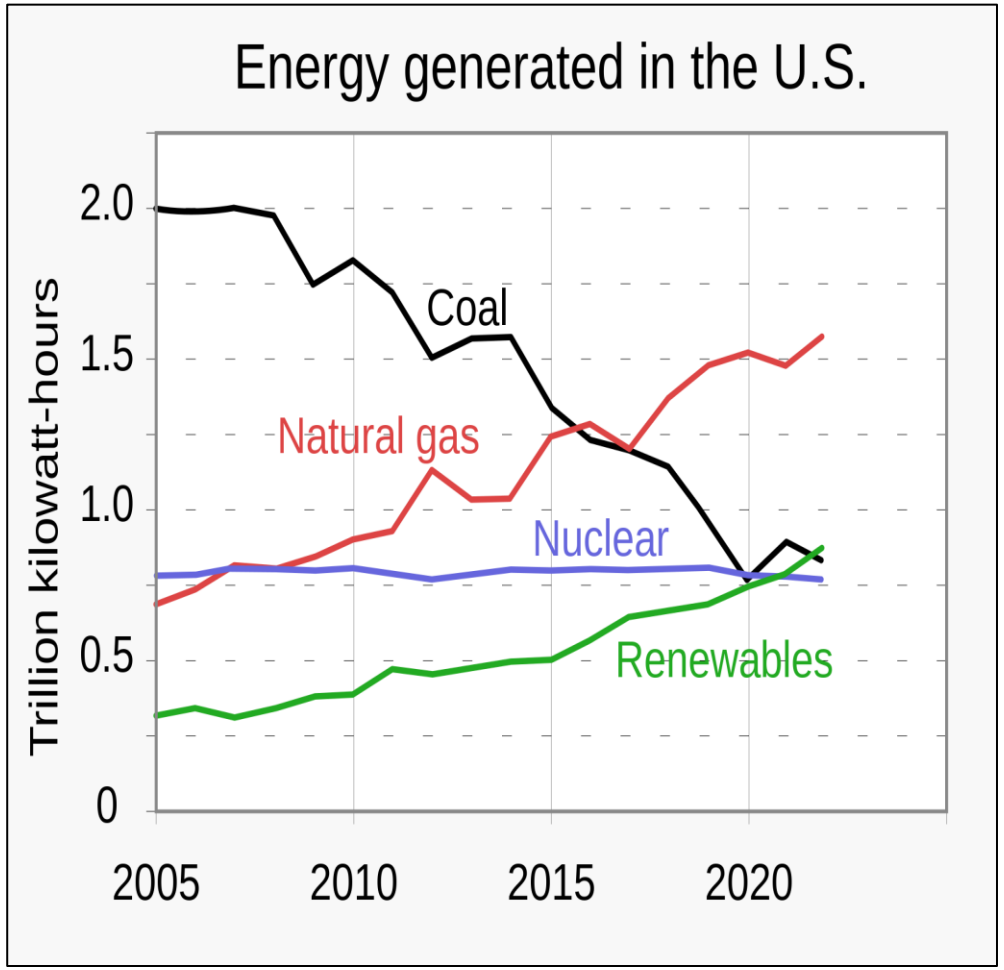
The Federal government and more than thirty states have set goals accelerating the phase-in of a carbon pollution-free power sector and net zero emissions economy.

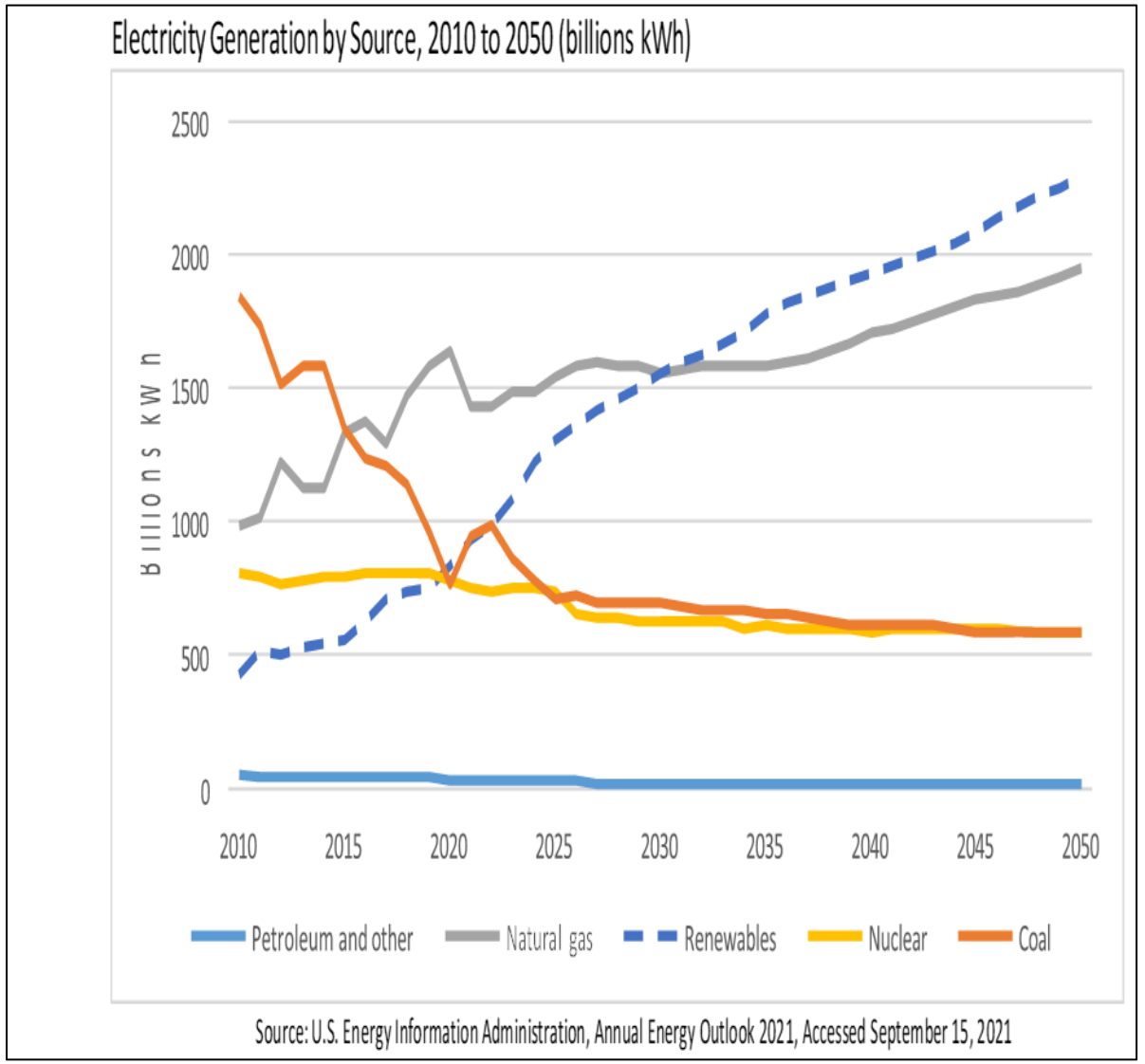
- The Inflation Reduction Act of 2022 improves tax incentives allowing for increasing investment in renewables, creating significant revenue for state and local property tax bases.
- Many state and local governments offer incentives and other forms of support for renewable projects ranging from tax credits to "green banks" that provide financing for renewable projects.

Additional support for long term growth in the alternative energy sectors.

- The U.S. has estimated that renewable energy sources available is 100 times that of the nation's current annual electricity need.
- In January 2023, Hanwha Q Cells committed investment of $2.5B into US solar infrastructure.

The Rise of Renewable & Clean Energy & the Decline of Coal Energy

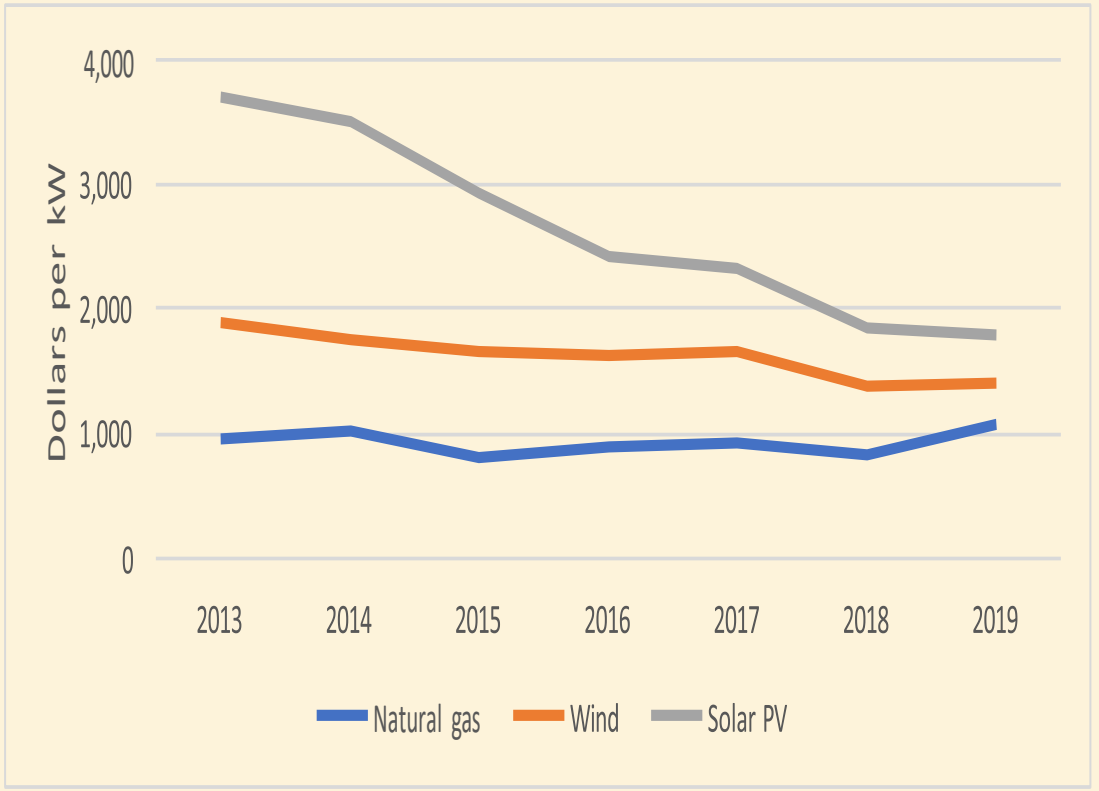




Key Renewable Energy Considerations

- The levelized cost (lifetime costs / by energy production) of wind energy declined by 70% over the past decade solar's decline is 90%.
- Wind and solar are poised to be the backbone of the growth in renewables, but continued advancements in technology are needed if they are going to provide 100% of U.S. electricity.
- Challenges remain for engineers and policy-makers as existing energy grids were built to deliver power from a consistent source. Solar and wind generate power intermittently. So, further improvements in battery storage, long-distance transmission and other steps are needed.
- Although improving, many projects are not yet financially feasible without incentives.
- The EIA expects overnight construction costs to lower than those of natural gas by 2050.

Figure 5. Average Construction Costs for Electric Generators by Source, 2013 – 2019, (Dollars per kW)



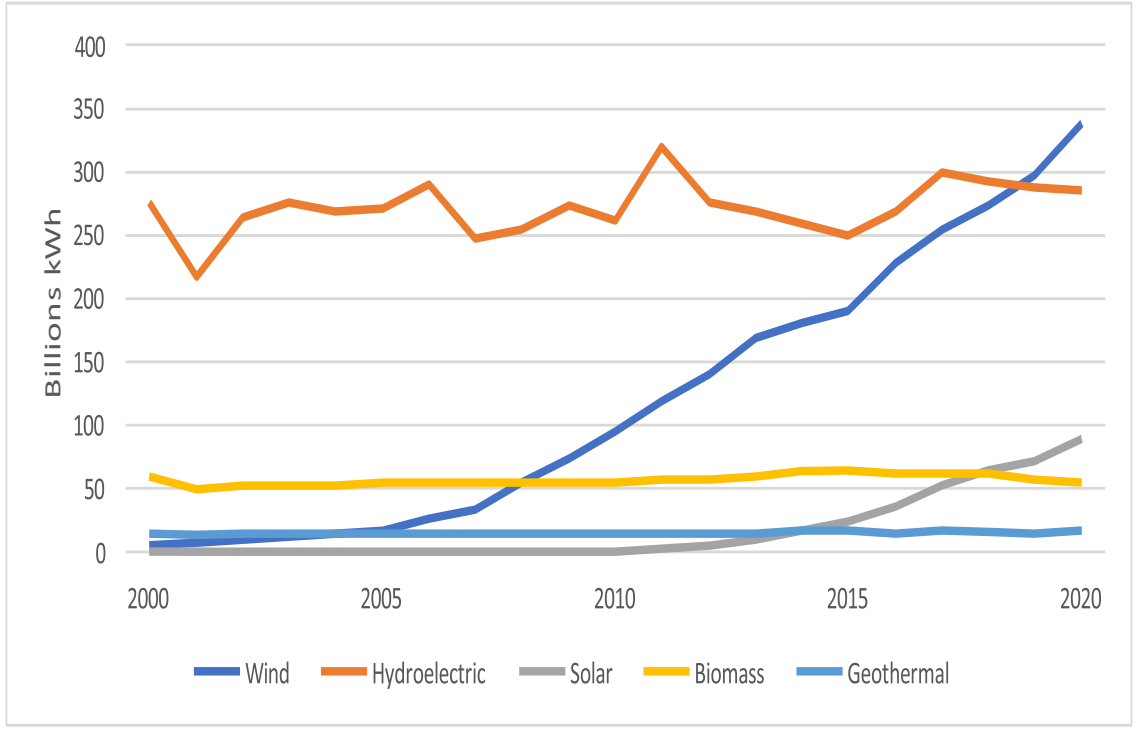
Source: U.S. Energy Information Administration, Construction Cost Data for Electric Generators Installed, Accessed February 7, 2022

Renewable Energy - Property Tax Valuation Considerations

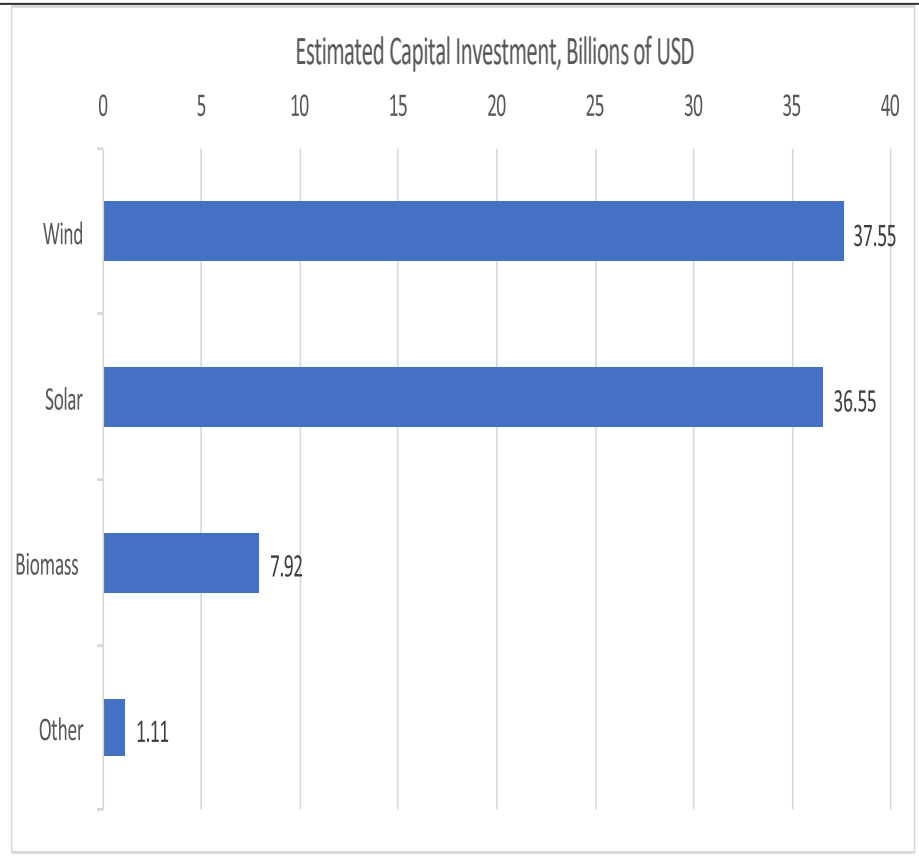
State or Local	State	Unit
		Cost
	Local	Real
		Personal
	Incentives	Qualifications
		Apply or Automatic

A Snapshot of Growth in Alternative Energy

Utility-Scale Electricity Generation from Renewable Energy Sources by Source Type, 2000-2020 (billions kWh)



Source: U.S. Energy Information Administration, "January 2022 Monthly Energy Review: Electricity Net Generation," Accessed February 2022.



Source: Financial Times, Renewable Energy Investments in Destination Markets, Accessed February 7, 2022

Coal Power Plants and Mining - Downfall by Regulation

Impact of Federal and State Regulations

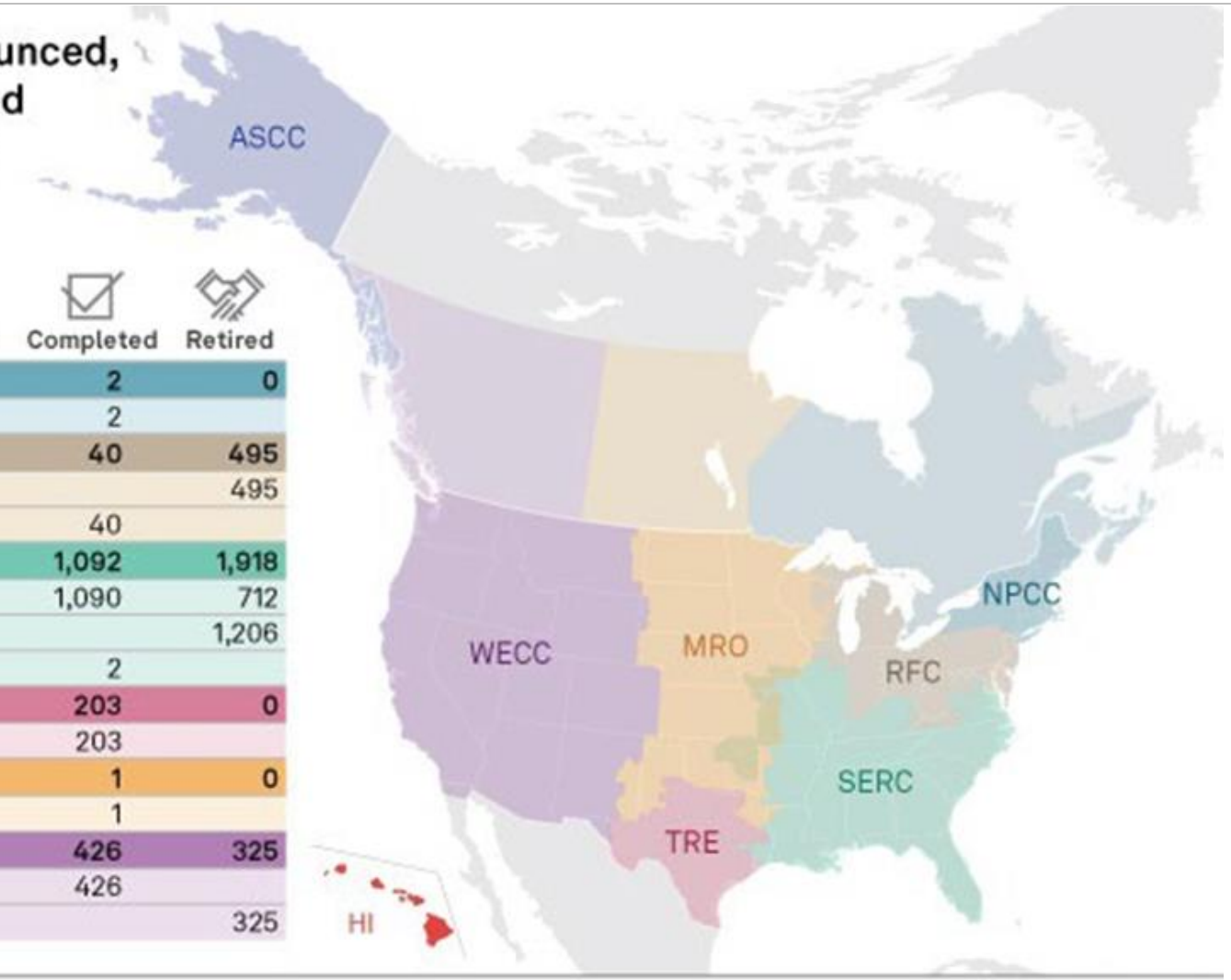
2014 EPA regulations on carbon dioxide emissions shut down 94 coal-fired power plants through 2021.	The 94 plants included 194 coal fired generators with another 23 that are scheduled for shutdown in 2023.
	The EPA is issuing six rules during 2023 for mercury and air toxics, pollution crossing state lines, coal plant waste in groundwater and legacy combustion residuals. The rules are expected to trigger new coal turbine retirements rather than install expensive pollution control equipment.
Additional EPA standards include utility power plants must meet four remedies.	Increase Energy Efficiency.
	Shifting from coal to natural gas.
	Investing in renewable energy.
	Making power plant emission upgrades.
The U.S. has rejoined the Paris Agreement.	Curb greenhouse gas emissions.
	Claims that coal poses significant environmental and health risks.
	Suggests that environmental consequences of coal use, such as water contamination and habitat destruction, are common.
By the end of 2020, the number of producing coal mines in the United States fell to 551 mines, the lowest number since U.S. coal production peaked in 2008. In 2020, 40 coal mines were opened or reactivated, and 151 mines were idled or closed.	The market value of the U.S. coal mining industry steadily decreased from 2010 to 2021. As of July 2021, the U.S. coal mining industry's market value amounted to 18.26 billion U.S. dollars. In 2010 the market value was 46.1 billion U.S. dollars.
	The overall decrease resulted in an 18% annual decline in the total number of producing coal mines from 2019 and a 62% decline since 2008.
Some coal mining companies & electric utilities stated plans to diversify their holdings to include renewables.	Coal reserves are not as economically feasible to obtain.
	Expanding access to reserves requires significant expenditures.
	1–2-year contracts are becoming the norm.
	Fuel costs have increased significantly, and the industry utilizes specialty equipment.

Coal Fired Power Plants Retired

US and Canada announced, completed and retired power projects (MW)

December 2022

	Announced	Completed	Retired
NPCC	**0**	**2**	**0**
Solar		2	
RFC	**0**	**40**	**495**
Coal			495
Solar		40	
SERC	**0**	**1,092**	**1,918**
Gas		1,090	712
Coal			1,206
Solar		2	
TRE	**0**	**203**	**0**
Solar		203	
MRO	**0**	**1**	**0**
Solar		1	
WECC	**0**	**426**	**325**
Solar		426	
Coal			325



Data compiled Jan. 24, 2023.
Capacity aggregates are based on development capacity announced, completed or retired in December 2022 for U.S. and Canadian plants.
Figures are rounded to the nearest whole number.
Map credit: Joe Felizadio.
Source: S&P Global Market Intelligence.

A Look at the Future of Coal

Retirements

A combination of renewable energy incentives and growing regulation of U.S. industries using coal as their primary revenue source has reduced demand for coal.

The last large coal fired power plant is the Sandy Creek Station Energy Station, Texas was built in 2013.

This translates into 173 coal-fired generating units scheduled to close between now and 2030 located in 33 states.

Another 55 units are projected to close between 2031 and 2040 which and are spread across 17 states.

Coal mining has been declining since the late 2000s due to factors such as retirement of coal-fired power plants, low natural gas prices and increasing competition from renewables.

US coal mine output will be affected by the closure of several mines in recent years located in the Powder Basin which produced a combined 20.5Mt of coal in 2021.

According to the EIA, scheduled retirements during 2022, reduced demand for mined coal.

Takeaways

Property Tax Considerations

Renewables

- Advancement in technology is still needed before most renewables can move from peaker plants to the always on base load plants, which provide most of the daily electricity for the U.S.
- Recent improvements in battery storage technology has greatly improved the ability of renewables to provide power to the grid during peak hours.
- Although cost to construct is declining a renewable solar or wind farm, as we heard in the second presentation, incentives are needed to make many projects profitable.
- As we heard in the first presentation, the grid still requires modifications to take full advantage of renewable energy. This will be a significant financial undertaking.

Coal fired generating units/power plants

- The increase of federal regulation and state mandates in recent years which is expected to continue into the immediate future will make it too costly for most of the remaining 224 coal fired power plants to add and manage new pollution control equipment to stay compliant.
- The power industry has been, and still is replacing coal fired power turbines and plants with clean energy natural gas ones.
- The power industry is also leveraging their portfolio by investing in renewable energy sources.

Coal Mining

- Increasing federal regulation and state mandates has made it too costly for many coal mines to continue operations.
- 62% of coal mines were closed since coal mining peaked in 2008.
- The industry utilizes unique equipment that's use is limited to the mining industry.
- Reclamation costs are significant.

Property Taxes - Renewables

Assessment

Changing Assessment Practices	State or local assessment
	Trending
	Investment Tax Credits
	Legislative changes
Incentives	Federal Incentives – Investment Tax Credits
	State incentives – Abatements, Exemptions, PILOTs, Alternatives Assessment Methods
Valuation Methods	What is including in incentives?
	How is the incentive calculated?
	Is it state or locally assessed?
	Valuing property coming of incentive
	Cost, income, market or unit approach?

Property Tax – Coal Fired Power Plants

Assessment

Obsolescence

Shorter Economic Life – government regulation and diminishing supply from coal mines.

Overnight cost to construct vs. natural gas and renewables.

In 2019 a utility concluded it could save $320M and save $700M in PC costs over 20 years by retiring coal. It would replace 730 MW of coal generators with 1,050 MW of solar capacity, 300 MW of wind power, and two natural gas combustion turbines (480 MW).

Equipment

Specialty equipment - resale.

Repurposed and used by a variety of industries.

Sold for scrap, or to other plants for parts if costs to dismantle and transport are worthwhile.

Income

Additional regulation requirements have had an impact on income of utilities with coal fired power plants.

The income approach should also be considered to quantify obsolescence.

Property Tax – Coal Mining

Assessment		
	Obsolescence	Functional/Technological
		Economic – states are open to a variety of approaches & calculations
		Mine Retirements
	Equipment Adjustments	Idle equipment
		Pollution control exemptions
		Unrecorded disposals
	Asset Cost Indexing	Generic Indexes
		Specialty mining equipment
		Scrap Value

Summary

- Regarding property taxes, the alternative energy and coal industries are interconnected.
- The U.S. government's phase out of coal-based energy production by increasing regulation and simultaneous augmentation of Federal ITCs and State property tax incentives have accelerated growth in the renewables sector.
- Clean energy is well established in the U.S. and property tax assessment methods are established.
- Clean energy plants can serve as base load, load following and peaker plant.
- Advancements in renewable energy technology and battery storage, increasing use of Federal ITCs and property tax law unable to keep pace with these changes creates challenges for valuing renewable projects for both assessors and project owners for property tax purposes.
- Currently renewable energy technology restricts projects to work as peaker plants.
- Valuation discussions should include the impact coal mining and coal power plants have on each other.

Questions?