

*Board of County Commissioners*

**Sustainability & Resiliency  
Emerging Trends**

**September 12, 2023**



# Overview

- Follow up from May 23, 2023 Sustainability annual update presentation to the Board on the SORAP.
- Sustainability Strategy: Phased approach to become a top-ranked community for sustainability. 1<sup>st</sup> Step- Lead by example.
  - SORAP Goal 2: 100% clean, renewable energy for County operations electricity load by 2035.
  - SORAP Goal 3: Implement community-wide energy saving programs for all.
  - SORAP Goal 11: Deploy EV-ready infrastructure and convert 100% of light-duty County fleet to electric or alternative by 2030.
- Guest experts addressing questions about solar and electric vehicles.



# Sustainability & Resiliency Emerging Trends

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- **Overview**
- **Common questions about solar**
- **Utilities and the solar transition**
- **Electric Vehicles (EVs) and solar- materials and recycling**
- **National Context**
- **Conclusion**



# Guest Presenters

- Heaven Campbell, Solar United Neighbors (SUN)
- Kevin Noonan, OUC
- Lisa Curran & Derick Farfan, Duke Energy
- Dr. Zhihua Qu & Dr. Kris Davis, UCF
- Chris Castro, U.S. Department of Energy



# The Why



OCCC 2 MW Solar Array



Orange County Electric Fleet Vehicle



Check Presentation of \$400,000 Federal Funding for Solar Array at County Facility

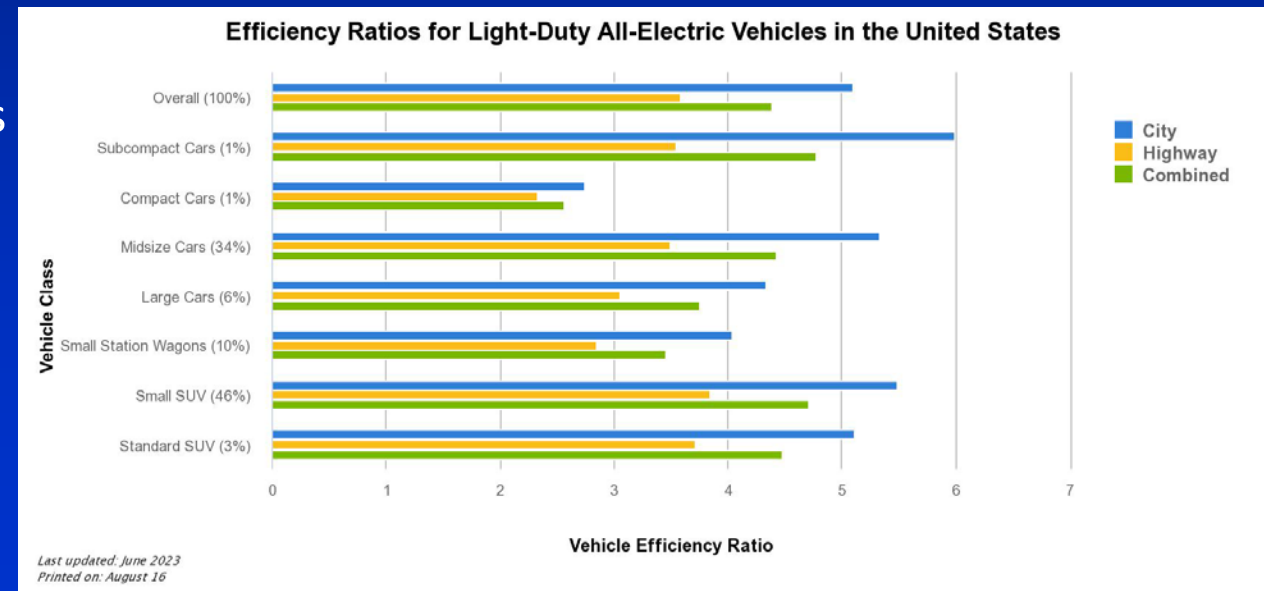


# The Why

- **Cleaner and Improve Air Quality**
- **Financial Incentives: Tax credits and rebates available**
- **EVs are more efficient**
  - Overall 4.4 times more efficient than gas vehicles
- **Automotive industry direction**



Source: Quora



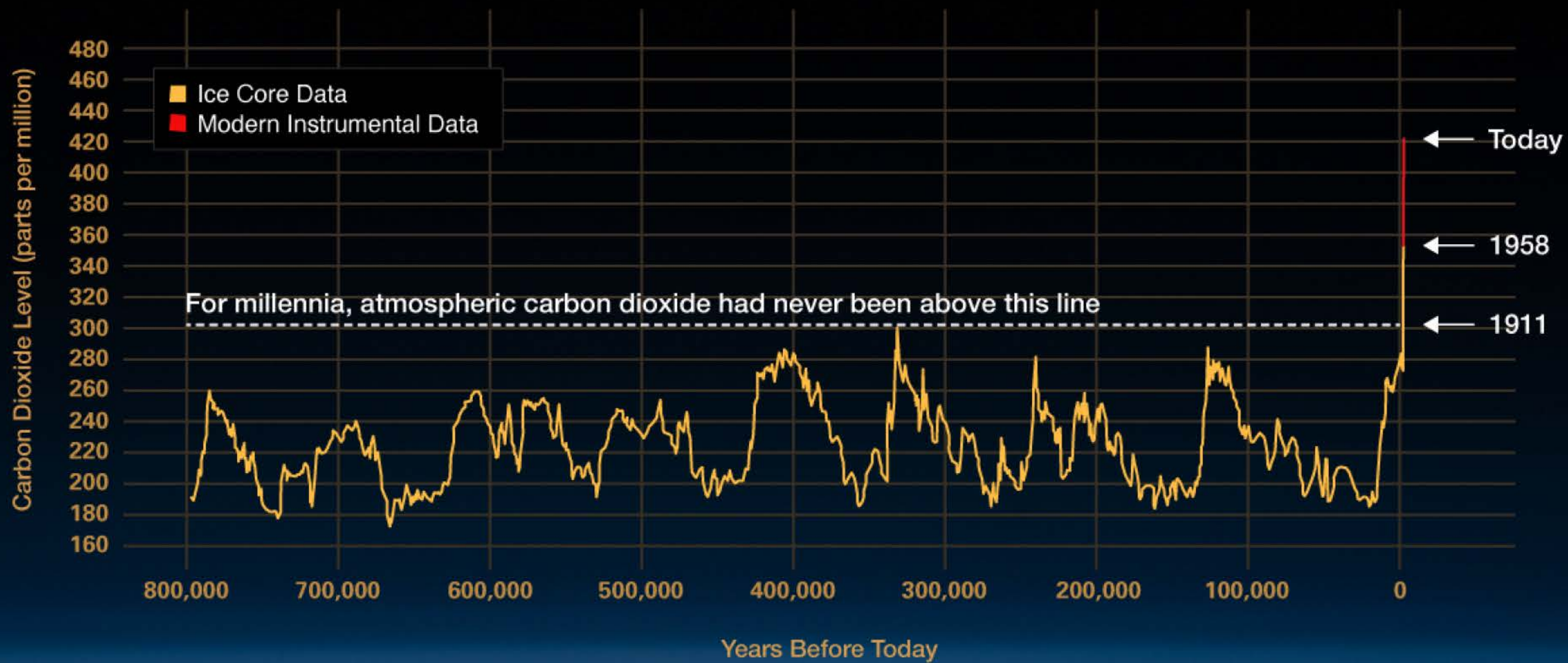
Source: [afdc.energy.gov/data](https://afdc.energy.gov/data)



# Car Manufacturers Transitioning to Electric

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- **Stellantis (Chrysler, Dodge, Jeep, and Ram):** 50% passenger car and light duty truck sales will be zero-emissions by 2030.
- **Ford:** Anticipates half of global sales by volume to be zero-emission by 2030.
  - **Lincoln:** All zero-emission vehicles by 2030.
- **General Motors (Buick, Cadillac, Chevrolet, GMC):** All zero-emission vehicles by 2035
- **Honda and Acura:** All zero-emission vehicles by 2040
- **Hyundai:** All zero-emission vehicles by 2040

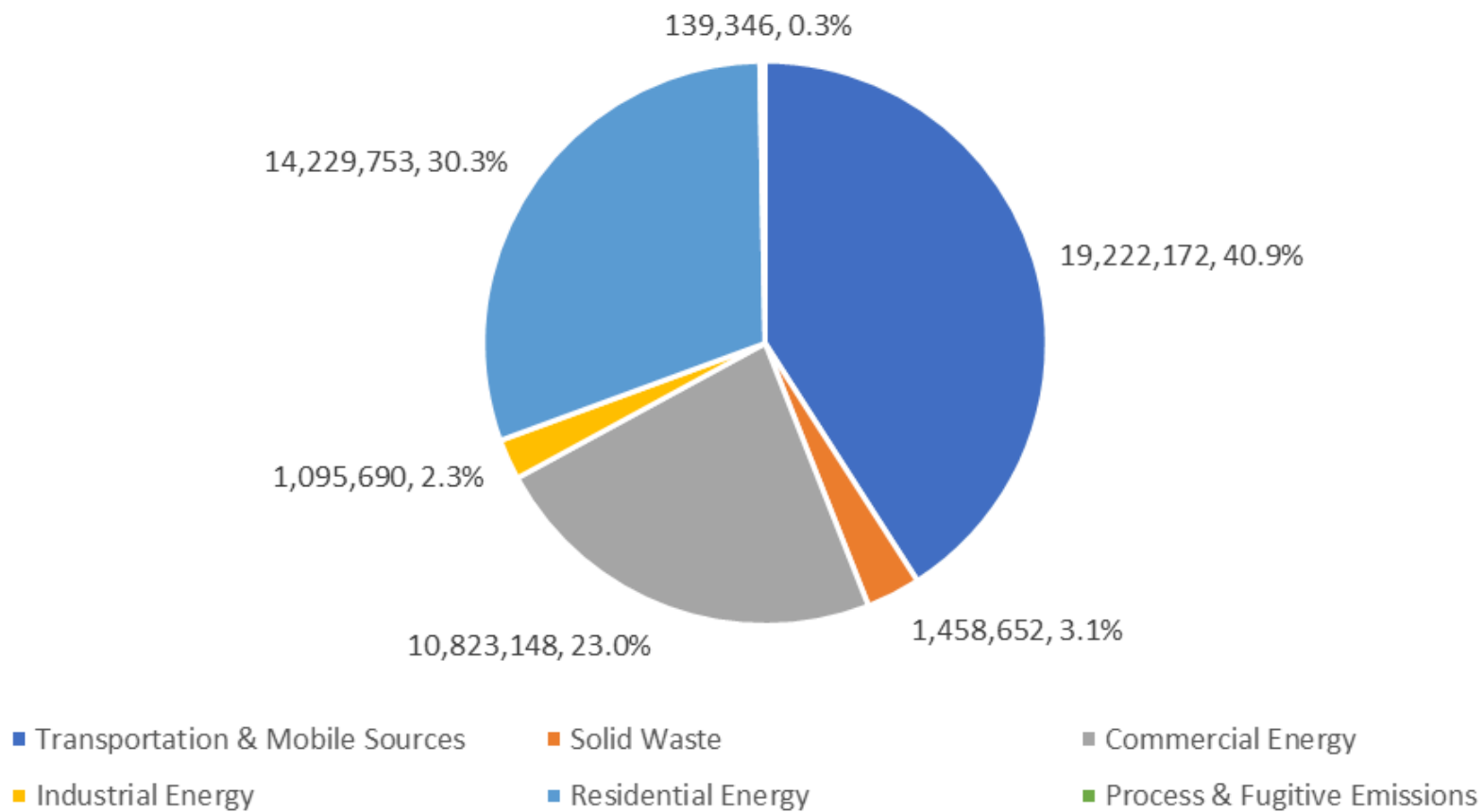






# Greenhouse Gas Sources in our region

ECFRPC R2C 2019 Regional GHG Inventory  
46,968,761 MT CO<sub>2</sub>e





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# Let's Go Solar!

Heaven Campbell  
Solar United Neighbors of Florida  
[heaven@solarunitedneighbors.org](mailto:heaven@solarunitedneighbors.org)



WHAT IS SOLAR UNITED NEIGHBORS?

We're a vendor neutral,  
national 501(c)(3)  
nonprofit.



# Florida's Program's impact since 2016

**2,410+** people gone solar w SUN

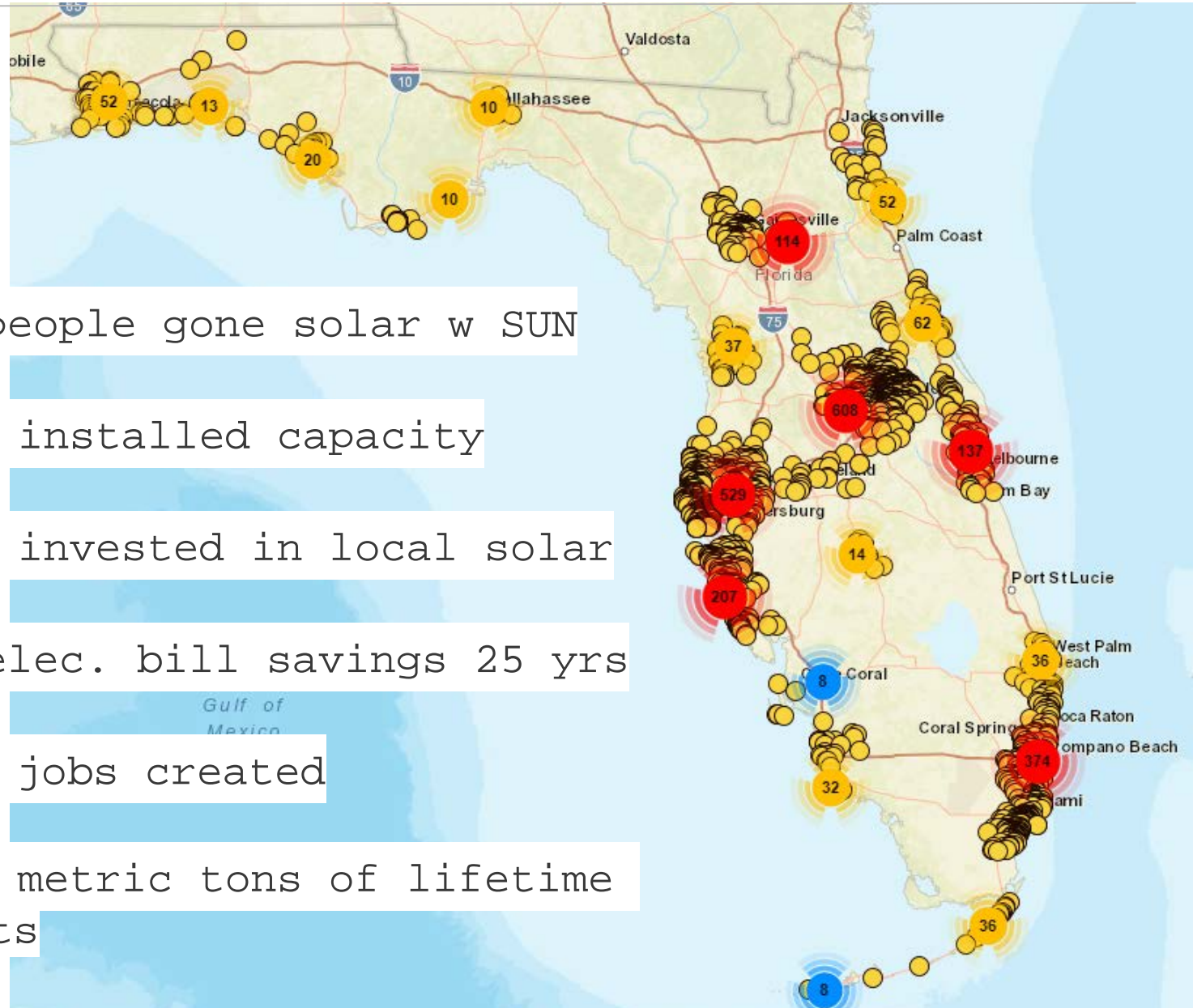
**23.8 MW** installed capacity

**\$57.4 M** invested in local solar

**\$111 M** elec. bill savings 25 yrs

**381** solar jobs created

**327,048** metric tons of lifetime CO<sub>2</sub>e offsets



# Common Questions about Solar

# Insuring Solar Panels

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Florida's  
homeowner's  
insurance  
market has  
been in a  
tailspin...

# Insuring Solar Panels

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## Why it Happened – Florida specific

- **Lawsuits** - From 2019 -2021 Florida filed more property insurance claims than the other 49 states COMBINED
- **Attorney Fees** - \$15B in claims costs over the last 7 years – 71% to attorneys, 21% to carriers and only 8% to consumers
- **Roofing Fraud** – 70% of all property claims in FL were roof related
- **Supply Chain Disruption** – Rising replacement costs
- **Flood Rates** – New rules and regulations April 2022





# Solar scams?!

We live in scary times! The internet is a friend and foe...

We offer consumer protection and warn consumers to watch out for:

- quick turnarounds
- high pressure
- door knockers
- out of area installers
- look for reviews and licenses



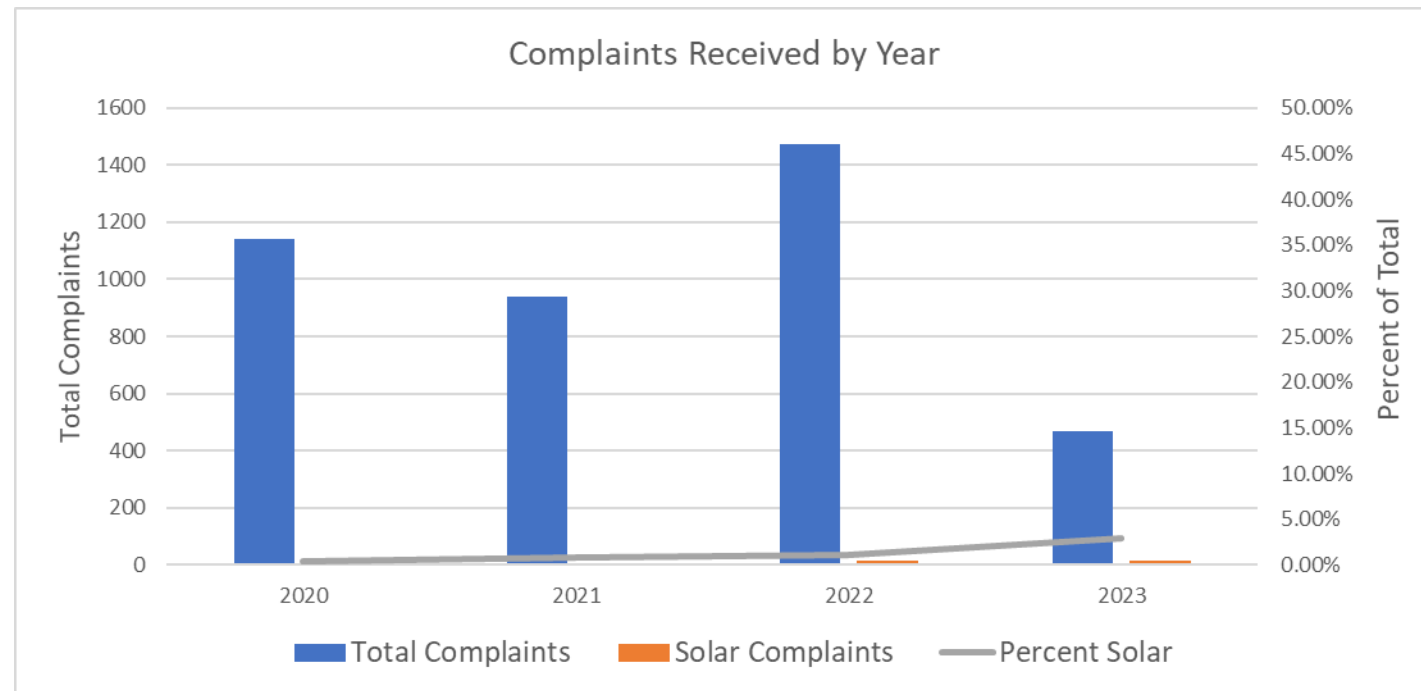
**Resource:**

**Solar Help Desk-** [www.solarunitedneighbors.org/helpdesk](http://www.solarunitedneighbors.org/helpdesk)

# Orange County Consumer Protection Office

- Most common complaint received by office: Timeshares
- Solar complaints received by office at or below 3% of total complaints annually.
- Majority of solar complaints received involve a licensed contractor and go to the Florida Department of Business and Professional Regulation (DBPR).
- Most common solar complaint:
- Solution: consumer education

Year	Total Complaints	Solar Complaints	Percent Solar
2020	1140	5	0.44%
2021	938	8	0.85%
2022	1472	17	1.15%
2023	469	14	2.99%



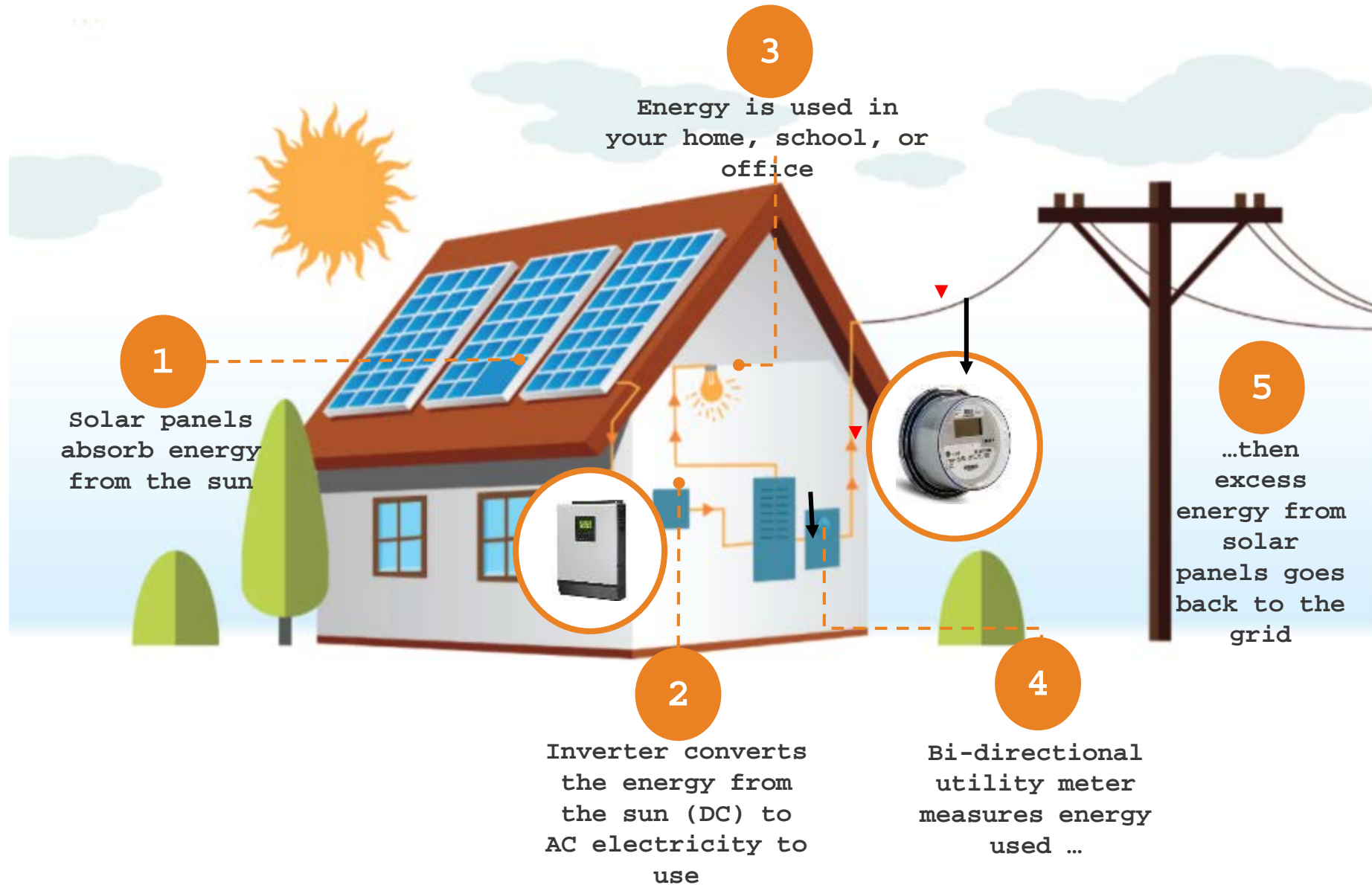
# Paying for your Panels

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**`SolarUnitedNeighbors.org/financing`**

- Plenty of local credit unions
- SELF
- HELOC

# What is Net Metering?



# Example Pricing

	4kW	8kW	12kW
Average FL solar co-op pricing (\$2.25/watt)	\$9,000	\$18,000	\$27,000
30% Federal tax credit	-\$2,700	-\$5,400	-\$8,100
<b>Net Cost</b>	<b>\$6,300</b>	<b>\$12,600</b>	<b>\$18,900</b>
Estimated year 1 electricity savings*	\$675	\$1,351	\$2,026
Estimated year 10 savings (cumulative)*	\$7,225	\$14,449	\$21,674
Estimated lifetime savings (25 yrs)*	\$20,277	\$40,554	\$60,831
<b>Net Profit</b>	<b>\$13,977</b>	<b>\$27,954</b>	<b>\$41,931</b>

EXAMPLE PRICING ONLY.  
ACTUAL SYSTEM SIZES WILL VARY.

# Example Financing

<b>SAMPLE LOAN PURCHASE</b> Home equity line of credit, interest rate 4%, 26% down (then take the tax credit)	4kW (\$11,000)		8kW (\$22,000)	
	10 year	15 year	10 year	15 year
Monthly Loan payment	\$67	\$49	\$135	\$99
Monthly electric savings**	-\$56	-\$56	-\$113	-\$113
Net monthly payment	\$11	+\$7	\$22	+\$14
Net Profit (25 years)	\$12,200	\$11,400	\$24,400	\$22,800

Lower monthly payment vs. lower total interest and fees paid overall.





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# OUC Net Zero Commitment, Customer Programs & Pricing Update

**OUC100**

*A Century of Reliability*

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**Kevin Noonan,  
Director, Legislative Affairs**

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**09/12/23**



# OUC Announced Net-Zero Goal in 2020

**Significantly reduces coal-fired generation no later than 2025 and eliminates it no later than 2027**



**Accelerates solar and energy storage as primary strategies to ensure energy during non-solar energy production periods**

**Leverages future clean technologies to ensure diversity for reliability**

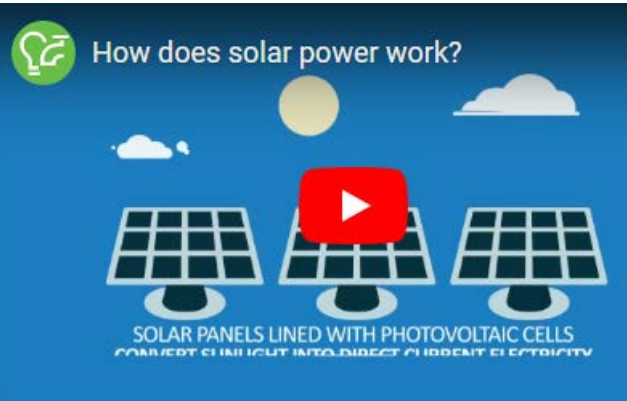


**Strives to maintain competitive rates for customers while achieving strategic goals**



*Interim goals of reducing CO<sub>2</sub> Emissions by 50% by 2030 and 75% by 2040*

- In Florida, **solar is the only viable renewable** option at this time.
- Solar is an **intermittent resource** (not available at night or when cloudy) and will not achieve CO2 emissions reduction goals alone.
- Solar plus **energy storage is key** to reaching net-zero goals and mitigating peak demand while offering resiliency.
- The cost, maturity and availability of **technology advancement** and supporting infrastructure must be balanced to ensure affordability is maintained.
- OUC is committed to a combination of **clean energy, energy storage, vehicle electrification and energy efficiency** to reach goals.



## Solar Education & Support

OUC has long been a proponent of solar energy generation and is committed to helping our customers understand the capabilities of solar systems.



## Utility Scale Solar

In completed and under construction projects, OUC has more than 272 MW of solar power at utility scale, enough to power 50,370 homes



## Community Solar

The OUCommunity Solar gives OUC's customers access to solar energy without installing panels on their homes or businesses. *Currently closed to new subscribers.*



## Floating Solar

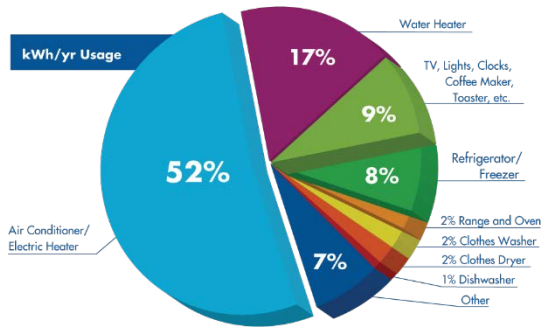
OUC was a leader in the state by integrating floating solar into the utility's portfolio. Currently, OUC is developing a 2MW array on a stormwater pond owned by FDOT in Orlando. This will be the largest floating solar array in the SE.

[www.ouc.com/solar](http://www.ouc.com/solar)

# Exploring Diverse Energy Storage Options



# Ways to Save Energy & Water



## Conservation Education & Rebates

The best way to save energy is to know what uses the most around your home or business. Small behavioral changes can make a big difference on customer's utility bill. Also, OUC offers dozens of energy and water conservation rebates to help customers save.

## Usage Dashboard

The Usage Dashboard is a presentation of consumption trends to customers better understand the days and times they use the most energy and water.

## Energy Audits

OUC experts help customers understand their consumption, as well as how to reduce their utility bill. A trained conservation specialist performs a walk-through audit in order to identify any opportunities to reduce consumption.

## Efficiency Delivered

Efficiency Delivered® provides up to \$2,500 of energy and water efficiency upgrades. An OUC conservation specialist determines which home improvements could save customers the most money and will arrange for a licensed contractor to perform the work.

[www.ouc.com/waystosave](http://www.ouc.com/waystosave)

- The second fuel-rate decrease in four months was approved by OUC's Board of Commissioners.
- It will take effect on October 1, 2023.
- Combined, OUC's two most recent rate adjustments total a net average savings of \$15/month for 1,000 kWh residential customers.

[www.ouc.com/connected](http://www.ouc.com/connected)

Average Residential Bill Effective October 1



\*Strategic Target is +/-5% for 1,000 kWh; Electric Peers includes JEA, FPL, TECO, Duke, KUA, Lakeland, GRU, and Winter Park (July 2023)



## Budget Billing

Allows customers to pay a set amount per month, so there are no surprise bills, and settle any remaining balance on the enrollment anniversary date.



## Power Pass

A prepaid program that allows our residential and small business customers to pay-as-you-go for utility services.



## Payment Options

Payment options are available by logging into myOUC or calling Customer Service.



## Project CARE

Project CARE, OUC's utility payment assistance program, provides emergency relief for those experiencing temporary financial hardships.

[www.ouc.com/assistance](http://www.ouc.com/assistance)



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# Clean Energy Connection & Energy Saving Programs

Orange County Board of County Commissioners Meeting

SEPTEMBER 12, 2023

**Lisa Curran**

Government & Community Relations Manager for Orange and Osceola Counties

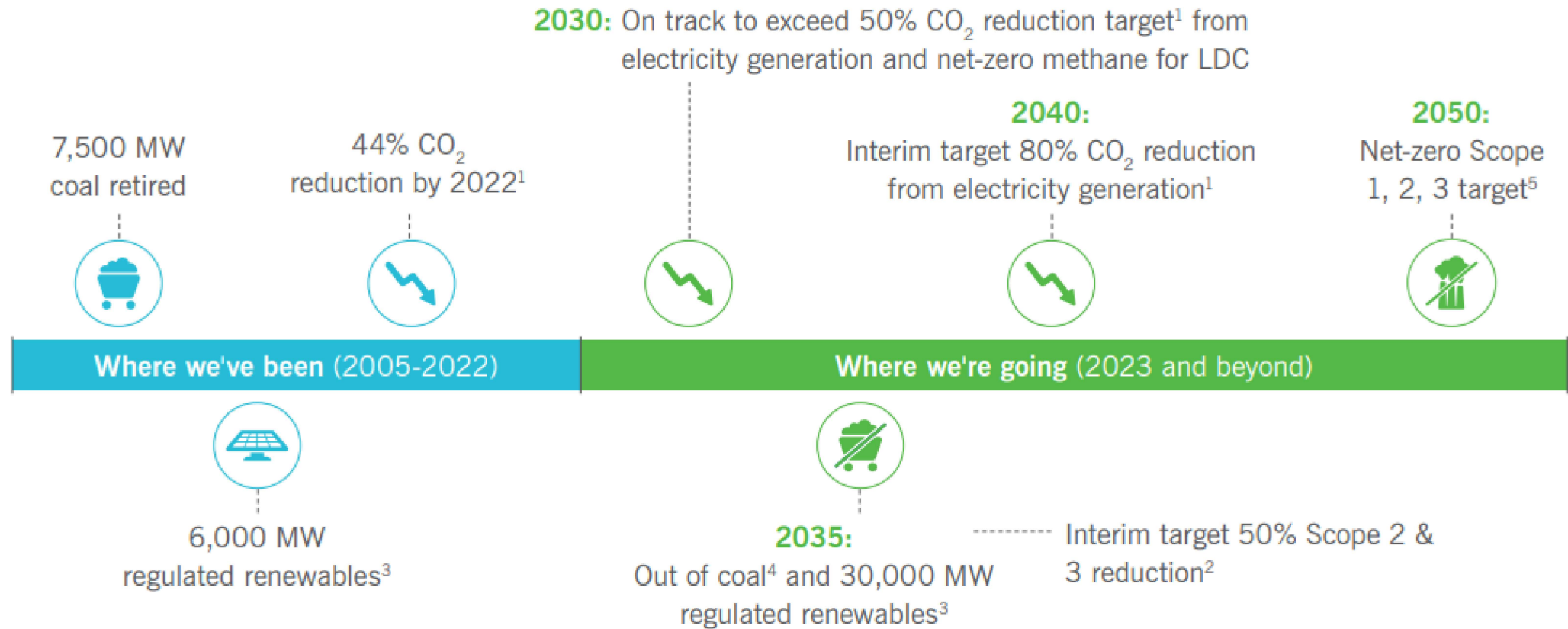
**Derick Farfan**

Lead Strategy & Planning Manager



*BUILDING A SMARTER ENERGY FUTURE*®

# Path to Net Zero



1 From 2005 levels.

2 From 2021 levels. Certain Scope 3 emissions include: upstream fossil fuel procurement, production of power purchased for resale, and downstream use of sold products in our natural gas LDCs.

3 Includes utility-owned and purchase power agreements.

4 Subject to regulatory approvals. Contemplates retiring Edwardsport coal gasifiers by 2035 or adding carbon capture utilization and storage to reduce carbon emissions.

5 Certain Scope 3.

# Clean Energy Connection Program

## Clean Energy Connection (CEC) Overview

- Subscription based community solar program
- Available to Duke Energy Florida Residential and Small/Medium Business
- Governmental and Large/Industrial customers (fully subscribed)
- Enroll quickly and easily with Duke Energy online account

## CEC Includes Income Qualified Customers

- No application fees
- No customer financials needed
- Arrearage status not an excluding factor for enrolling
- Savings the first month of participation

*Income Qualified customers are required to show proof of participation in local, state, or federal assistance programs.*

## What are the benefits?



*The solar energy produced by your subscription earns monthly credits that are projected to lower your bill over time for market rate customers and provide immediate savings for income-qualified customers.*



*No equipment to install or maintain.*



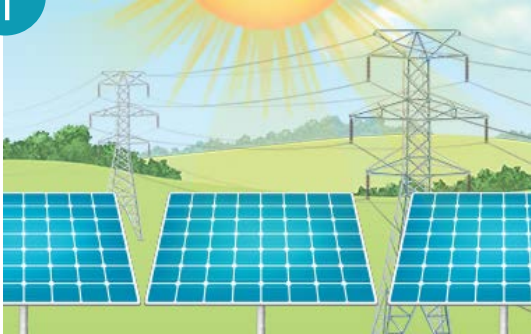
*Pay no upfront costs or cancellation fees. Plus, no long-term obligation.*



*Available whether you rent, own, or lease your home or business.*

# How Does Clean Energy Connection (CEC) Work?

1



## Solar Energy Generated & Added to the Duke Energy Grid

750 MW Clean solar electricity is generated by solar plants located throughout Florida. In total, Clean Energy Connection will have 10 solar centers, each approximately 400-500 acres in size.

2



## Customers Subscribe to CEC up to 100% of previous 12 months of usage

Participants pay a fixed monthly-kW subscription fee for the life of the program, or until they decide they would no longer like to participate. This fee supports the operation of these solar facilities and is added to the customer's regular monthly energy bill.

3



## Earn Bill Credits Based on Solar Center Generation

The subscription earns bill credits that are applied directly to the monthly bill. These grow over time and supersede fixed monthly-kw subscription fee.

4



## Share in Sustainability

Renewable Energy Certificates (RECs) will be retired based on customer participation (dependent on available blocks and annual energy consumption).

[Duke-Energy.com/CEC](https://www.duke-energy.com/CEC)

# FREE Home Energy Check & Rebates in 3 Steps

## 1. GET ASSESSMENT

Learn how to help your home save energy and money.  
(Available online or in-person)

## 2. MAKE UPGRADES

Invest in the comfort, value and energy efficiency of your home.

## 3. START SAVING

Fill out and submit rebate form. Begin saving on your monthly bill.

Earn up to \$1,700 in home improvement rebates



Attic Insulation Upgrade >

Get up to \$800 back



Duct Test & Repair >

Get up to \$200 back



Energy Efficient Windows >

Get up to \$400 back



HVAC Replacement >

Get up to \$300 back

[Duke-Energy.com/Comfort](https://www.duke-energy.com/Comfort)

# FREE Business Energy Check & Rebates

## Three Energy Check Types available:

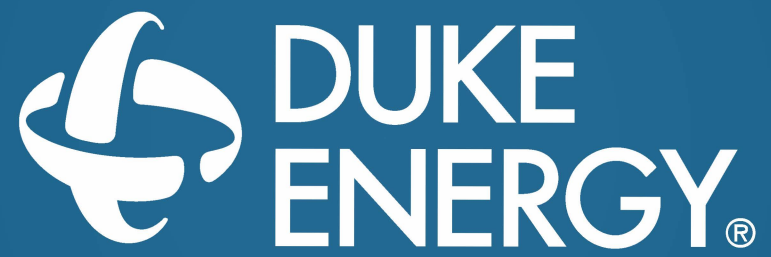
1. **Online Analysis** – Answer a few short questions about energy use in your business and find ways to help you save.
2. **Phone Assisted Audit** – Speak to a certified Business Energy Advisor to understand facility and provide recommendations.
3. **On-site Audit** – Work with a certified Business Energy Advisor to conduct a helpful on-site analysis of your energy use.

Call 866.380.9580 or email us at [prescriptiveincentives@duke-energy.com](mailto:prescriptiveincentives@duke-energy.com).

[Duke-Energy.com/business](http://Duke-Energy.com/business)

## Business Rebates available:

Building Envelope	HVAC Equipment	HVAC System Services
Ceiling Insulation (.17 cents per sq ft)	Chillers (\$20 per ton)	<b>Duct Test and Repair</b> 50% of test cost up to \$50 for 1 <sup>st</sup> unit 50% of test cost up to \$20 for 2 <sup>nd</sup> unit <i>Also, Duke Energy pays half up to \$200 per system for any identified repair costs to ducted systems</i>
Wall Insulation (.10 cents per sq ft)	Large Unitary A/C & Heat Pumps (\$50 per ton)	
	Small Heat Pumps (\$50 per ton up to \$250)	
	PTHP/PTAC (\$67 per ton)	
	Energy Recovery Ventilation (\$0.75 / CFM (Minimum 450 CFM per unit)	
	Demand Control Ventilation (\$50 per ton up to 50% of project cost)	





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# Q&A @ Board of County Commissioners

Zihua Qu

Pegasus Professor, T. J. Riordan and H. C. Towle Chair, and Director

Kris Davis

Associate Professor

RISES Center

University of Central Florida

# How EV Works

## How do electric vehicles work?

### Inverter

This is an important part of an EV, as it converts electricity from AC to DC to store in the battery, and then back to AC to be used in the electric motor. The inverter an EV has will impact the amount of time it takes to charge up the battery.



### Transmission

As electric motors are extremely efficient, the vast majority of EVs only have a single gear that works across all speeds and loads.



### EV battery

The battery is like the 'fuel tank' of an EV and will generally be located in the chassis.

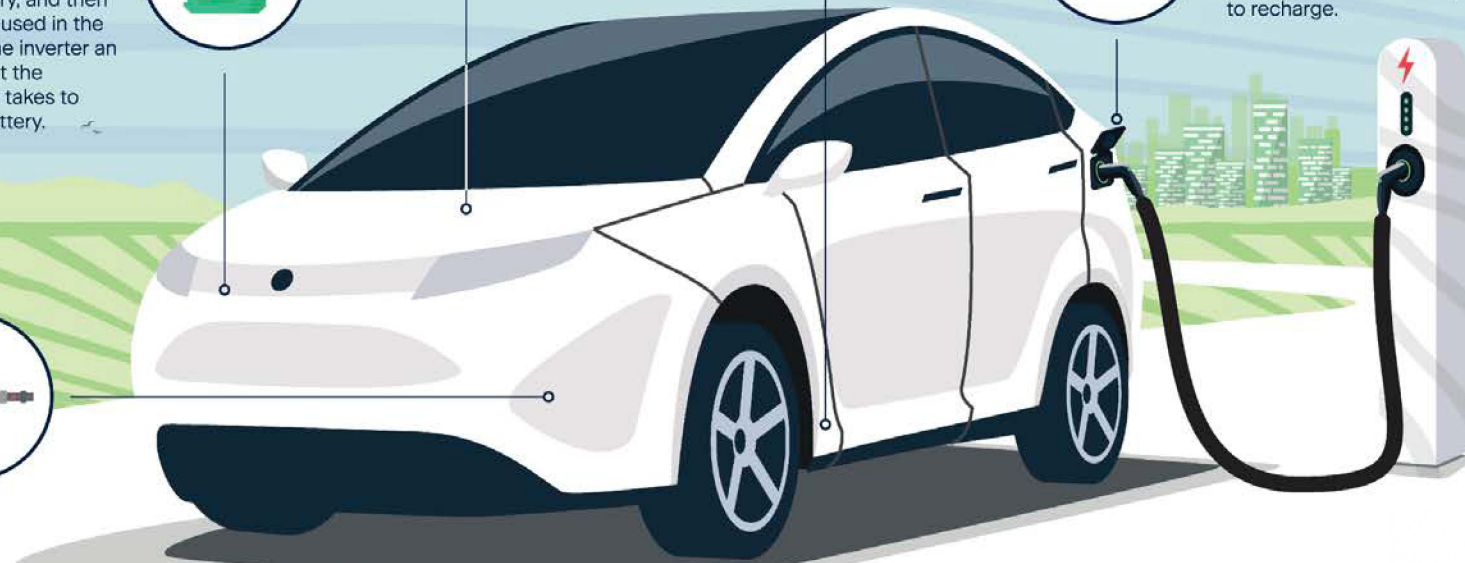
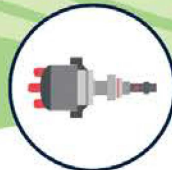


### Battery charger

EVs have a battery and charger built into them. This is where you'll plug in to recharge.

### Electric motor

The motor is what turns the wheels of an EV. Depending on the EV model, there may be a single motor, or multiple motors.



# Is There An Alternator: Drive, Braking, and Other Systems for EVs

**PDM**  
The Power Delivery Module is an onboard charger for the battery pack, and converts AC (alternating current) power from the EVSE to DC (direct current) to charge the battery pack.

**Inverter & Controller**  
The inverter modifies power coming from the batteries to be compatible with the motor.  
The controller uses a PWM (Pulse Width Modulation) systems that pulses on and off very quickly; the more the current is "on," the more power is delivered to the motor and the faster it will spin.

**Electric motor**  
BEVs generally use a variation of an AC motor. Due to possible heat issues, the electric motors are artificially limited to max out from  $\approx 10\text{-}20\text{k}$  RPMs (revolutions per minute).

**PERFORMANCE: AC induction**  
**ECONOMY: AC synchronous**

**Copper coils on rotor**  
**Permanent magnets on rotor**

**Slip: rotor in the motor is slightly behind the magnetic field created by the stator**  
AC synchronous motors use permanent magnets on the rotor, which keeps the motor in sync and reduces slip. They can be more efficient at lower RPMs, and produce max torque at 0 RPMs, which can make them well suited for "commuter" vehicles.

**AC induction motors use coils on the rotor, which produces "slip," (the rotor in the motor is slightly behind the magnetic field created by the stator). Because of this, they can produce max torque (twisting force) through high RPMs (revolutions per minute).**

**Gearbox**  
Because of the electric motor's torque and high RPM abilities, most BEVs use a single speed, 9.7:1 ratio gearbox (the motor spins 9.7x for every 1 tire revolution), so the vehicles never "shift gears" but can still have top speeds between 70-160 mph.

**10k-20k RPM LIMIT**

**SINGLE SPEED GEARBOX**

**Regenerative Braking**

Some BEVs are designed to collect energy when coasting. When the "gas pedal" is released, the wheel/axel assembly pushes the gearbox; this turns the motor which generates electricity for the battery.

Aside from charging the battery, resistance in the motor can also significantly slow the vehicle.

**Acceleration: power generated by battery flows to motor**

**Coasting / braking: power generated by motor flows back into battery**

**Heating**  
Most BEVs use a positive temperature coefficient heater. This style of electric heater increases resistance as the temperature rises, preventing it from getting too hot.

**Cooling**  
An electric compressor, similar to what's used in a refrigerator, is used to cool air for the A/C unit.

**Steering**  
Generally, BEVs use rack and pinion steering assisted by an attached electrical motor.

**Braking**  
An electric vacuum pump is used to create a vacuum on the back side of the brake pedal. This is used with hydraulic braking systems to make the pedal easier to push.

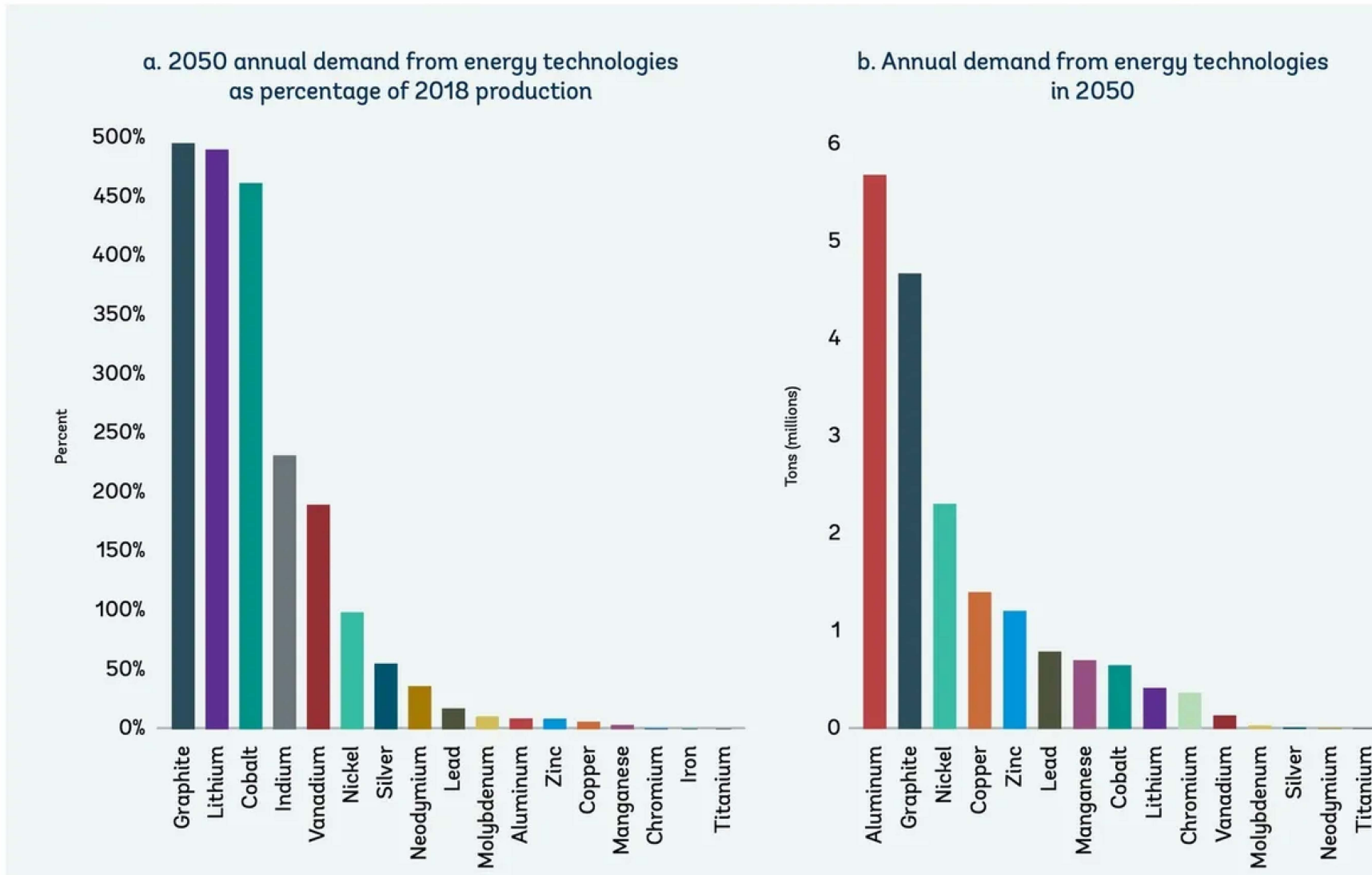
**Additional battery**  
To preserve the charge life of the battery pack, EVs will often have an additional 12v, lead-acid battery to run these systems.  
Lead acid is used because it can hold a charge within a wider temperature range than lithium ion and isn't usually damaged when charging below freezing temperatures.

Alternator: generate AC power (and DC with a rectifier)



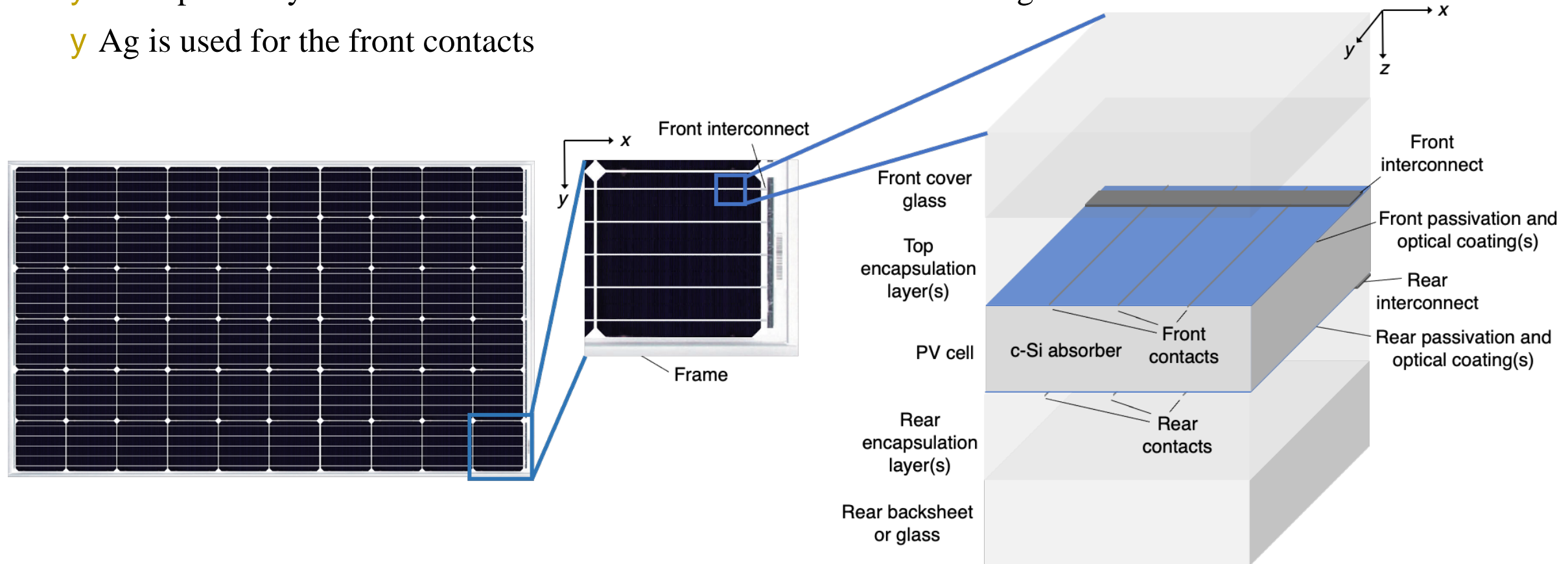
# Precious Metals Needed for Energy Transition (PV, Batteries, Etc.)

Figure 4.3 Projected Annual Mineral Demand Under 2DS Only from Energy Technologies in 2050, Compared to 2018 Production Levels



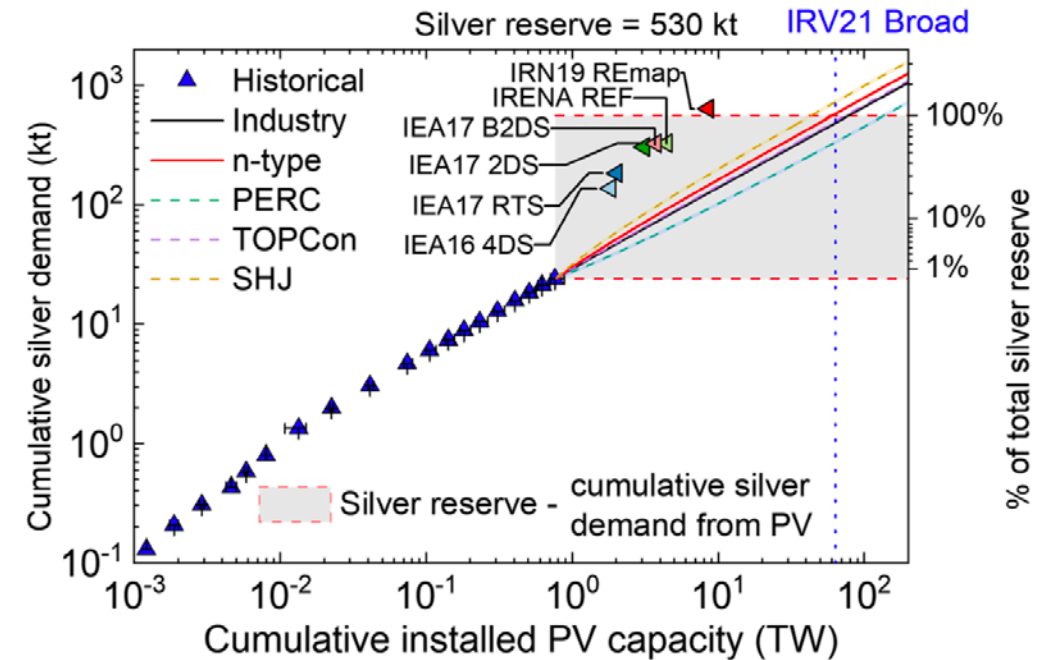
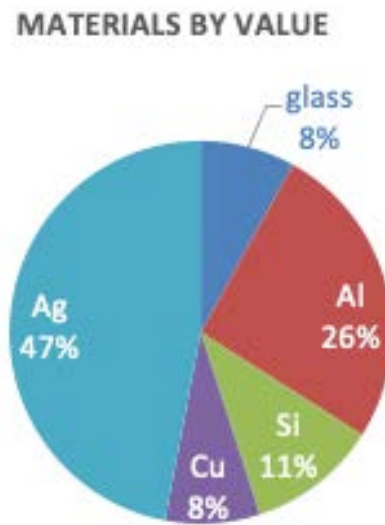
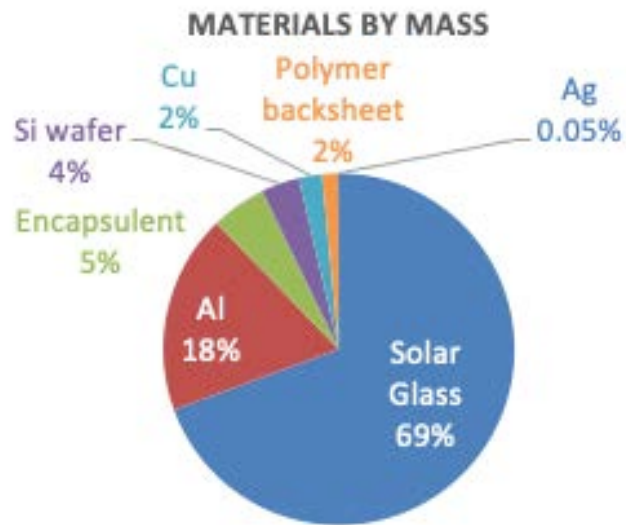
# Precious Metals Needed for Energy Transition – PV Specifically

- z In the photovoltaics (PV) sector, aluminum (Al), copper (Cu), and silver (Ag) are the primary metals used
  - y Al is primarily used for the frame of the PV module, but also for the rear contacts
  - y Cu is primarily used for the interconnect ribbons and external wiring
  - y Ag is used for the front contacts



# Precious Metals Needed for Energy Transition – PV Specifically

- By mass, Al is the primarily metal used in the module (left figure)
- By value though, Ag add significantly to the manufacturing cost, more than Al, Cu, or even the silicon (Si) itself that makes up the PV device (middle figure)
- Ag consumption is expected to grow over time as the industry scales (figure on the right)



Source: U.S. Dept. of Energy Funding Opportunity Announcement (FOA) Number DE-FOA-0002582

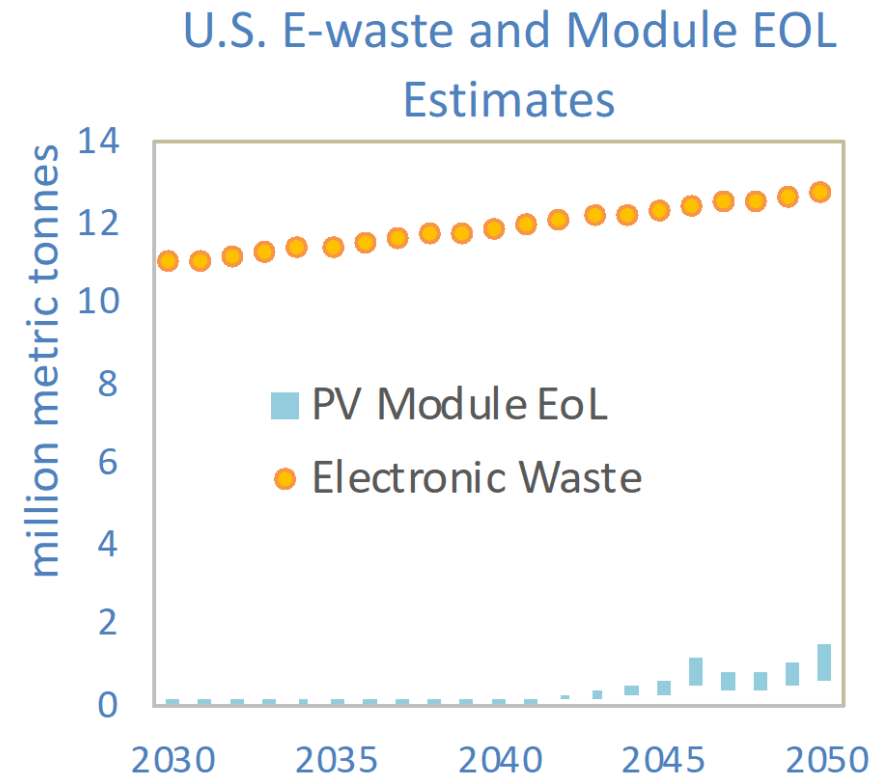
Source: B. Hallam *et al.*, *Prog. in Photovoltaics*, 2022.

# Potential Solutions to the Precious Metal Challenge

- z Right now, the PV R&D community, PV industry, and funding agencies are all exploring technologies to enable the use of alternative contact metallization materials
- z Perhaps the best candidate is Cu, due to similarly high conductivity, but much lower cost
- z Cu has a lot of challenges in terms of the ability to process the materials and easily integrate it into devices because it oxidizes more readily and Cu atoms/ions can act as critical point defects if/when they enter the crystalline silicon absorber of the PV device
- z Several groups, including UCF, are exploring how to address this issue
- z UCF and the Univ. of Delaware were just selected by the U.S. Dept. of energy for a three year, \$1.87M project to develop a new manufacturing process to print Cu metal contacts

# Recycling PV Panels

- z The actual waste associated with the PV industry is dwarfed by other sectors, like electronics waste (figure on the right)
- z However, the industry is growing, so many are considering how this will be addressed
- z About 85% of a PV module is comprised of glass and Al, but the Ag and Si are also potentially valuable
- z A key challenge is the polymer encapsulation layers essentially act like a glue that holds the entire package together making isolation of the constituent parts very difficult



Source: U.S. Dept. of Energy Funding Opportunity Announcement (FOA) Number DE-FOA-0002582



# Lithium-ion Battery (LIB) Growth and Impact of Recycling

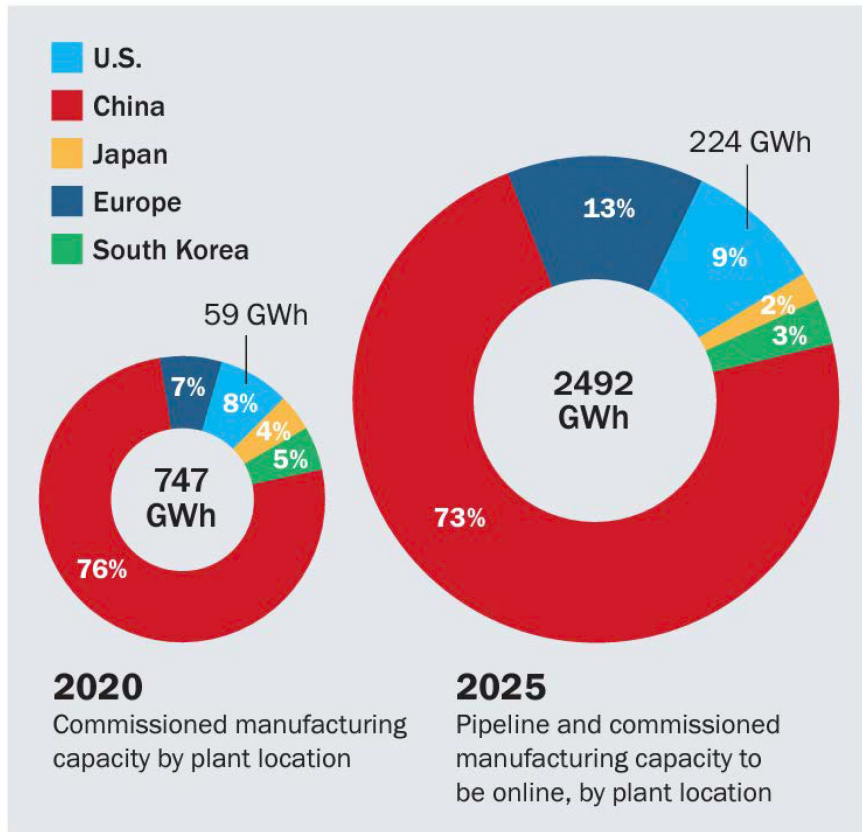


FIGURE 3. Cell manufacturing capacities.  
Source: "Lithium-Ion Battery Megafactory Assessment", Benchmark Mineral Intelligence, March 2021.

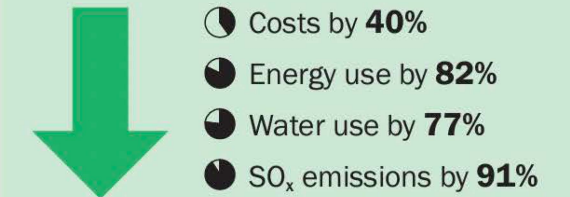
1 ton of battery-grade **lithium** can come from:



1 ton of battery-grade **cobalt** can come from:



Using **recycled materials\*** from spent batteries has potential to **decrease**:

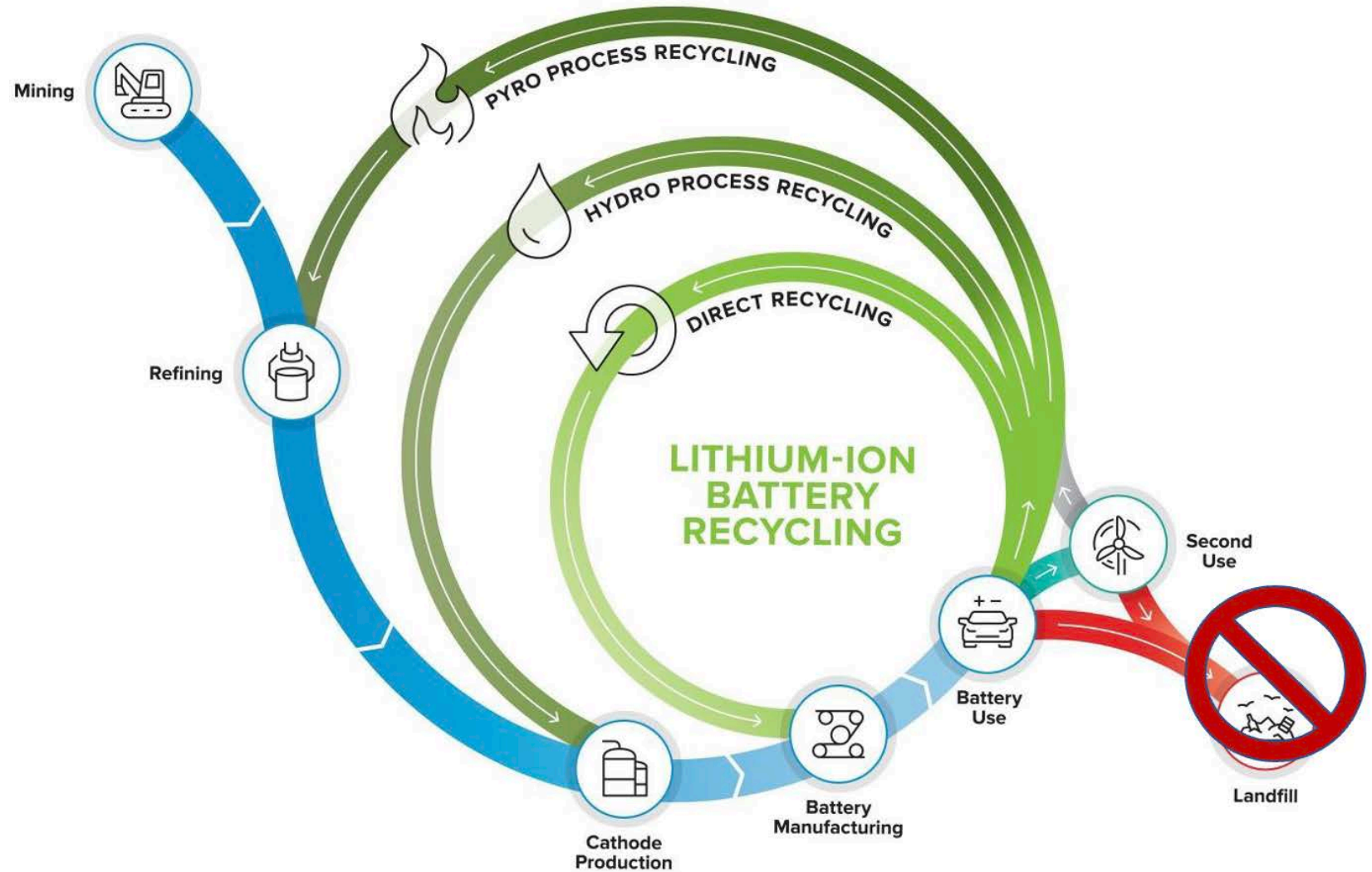


\*Assumes a direct recycling method

FIGURE 7. Benefits of recycling for lithium-ion batteries. Data from Argonne National Laboratory's ReCell Center, 2019.<sup>33</sup>

# Pathways of Recycling Batteries

- There are currently a small number of commercial LIB recyclers.
- Pyrometallurgical processes are most common.
- Hydrometallurgical processes could yield higher recovery rates but may be less economical.
- Direct process aims to avoid resynthesis of cathode compound
- **A mixed chemistry waste stream is a barrier for battery recycling.**



Original Image: <https://recellcenter.org/publications/>



# Sustainability & Resiliency Emerging Trends

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- Overview
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- Conclusion



# SCEP

STATE & COMMUNITY ENERGY PROGRAMS

## Accelerating Clean Energy in Orange County, Florida

**Chris Castro**  
Chief of Staff, SCEP  
U.S. Department of Energy

Orange County Board of County  
Commissioners

September 12th, 2023

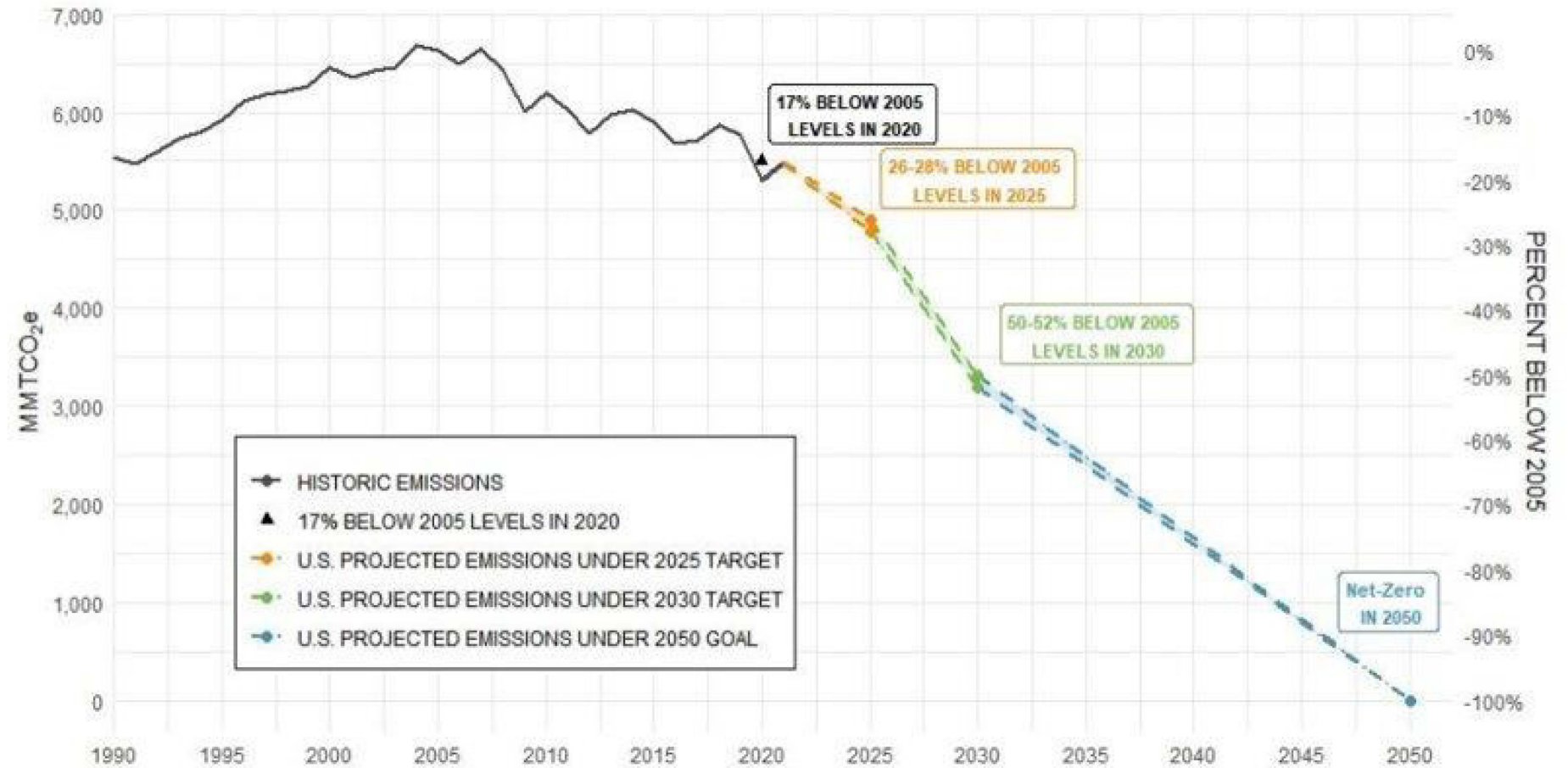


# DOE investments align with the Administration's near- and long-term climate and clean energy goals

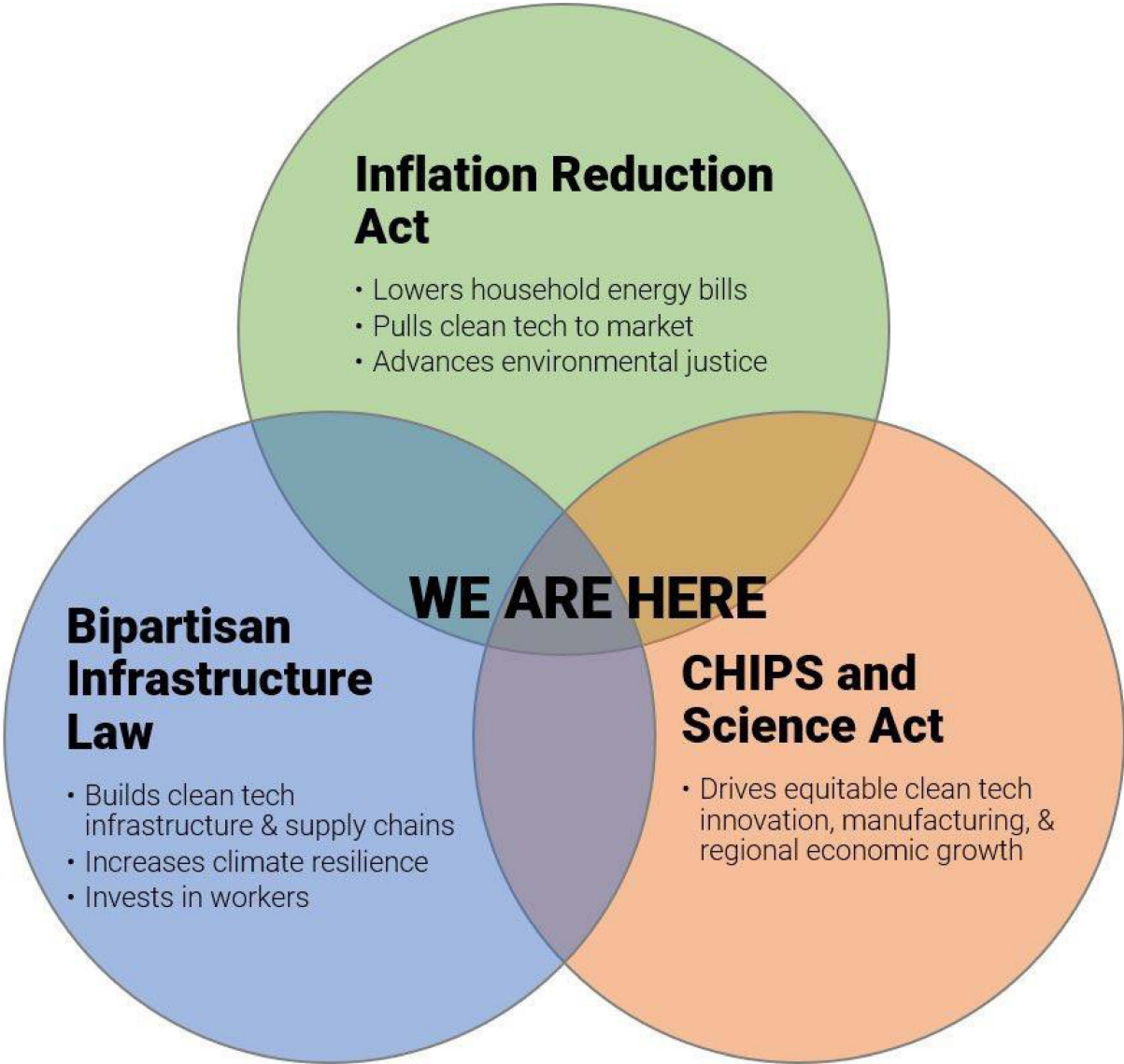
**50-52%**  
GHG reductions by  
2030

**100%**  
clean electricity by  
2035

**Net-Zero**  
emissions by  
2050



# Over \$500 BILLION invested in the clean energy transition



# Congress has given DOE new mandates and unprecedented funding

Hydrogen

Buildings: efficiency & electrification

Carbon Management

Energy Storage

Electric Grid

Cybersecurity

**~\$100B in Grants and Rebates**  
**\$250B+ In Loans and Loan Guarantees**

Critical Minerals/Materials

Domestic Supply Chains

EVs and Chargers

State, Local, Tribal Partnership

Workforce

Clean Energy Projects



# SCEP

STATE & COMMUNITY ENERGY PROGRAMS

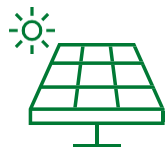
## Whole Greater than Sum of its Parts

SCEP's Mission is to partner with State, Local, and Tribal governments and community organizations to catalyze local economic development and job creation through equitable, clean energy solutions.

SCEP does this through the **management and oversight of \$16 billion** in formula grants, competitive grant awards, consumer rebate grants, and technical assistance.



Prioritize  
Justice40  
Initiative



Deploy clean  
energy  
technologies



Catalyze local  
economic  
development



Create  
jobs and  
increase hiring



Avoid pollution  
through place-based  
strategies



Reduce  
energy costs



# 28+ Programs Coming Out of SCEP

\$3.5B for  
Weatherization Assistance Program

\$260M for  
Building  
Efficiency  
Workforce  
Training

\$750M for  
State Energy  
Program &  
Revolving Loan  
Fund

\$500M for  
Energy Efficiency  
& Renewable  
Energy in Public  
Schools

\$100M for  
Energy  
Future  
Grants

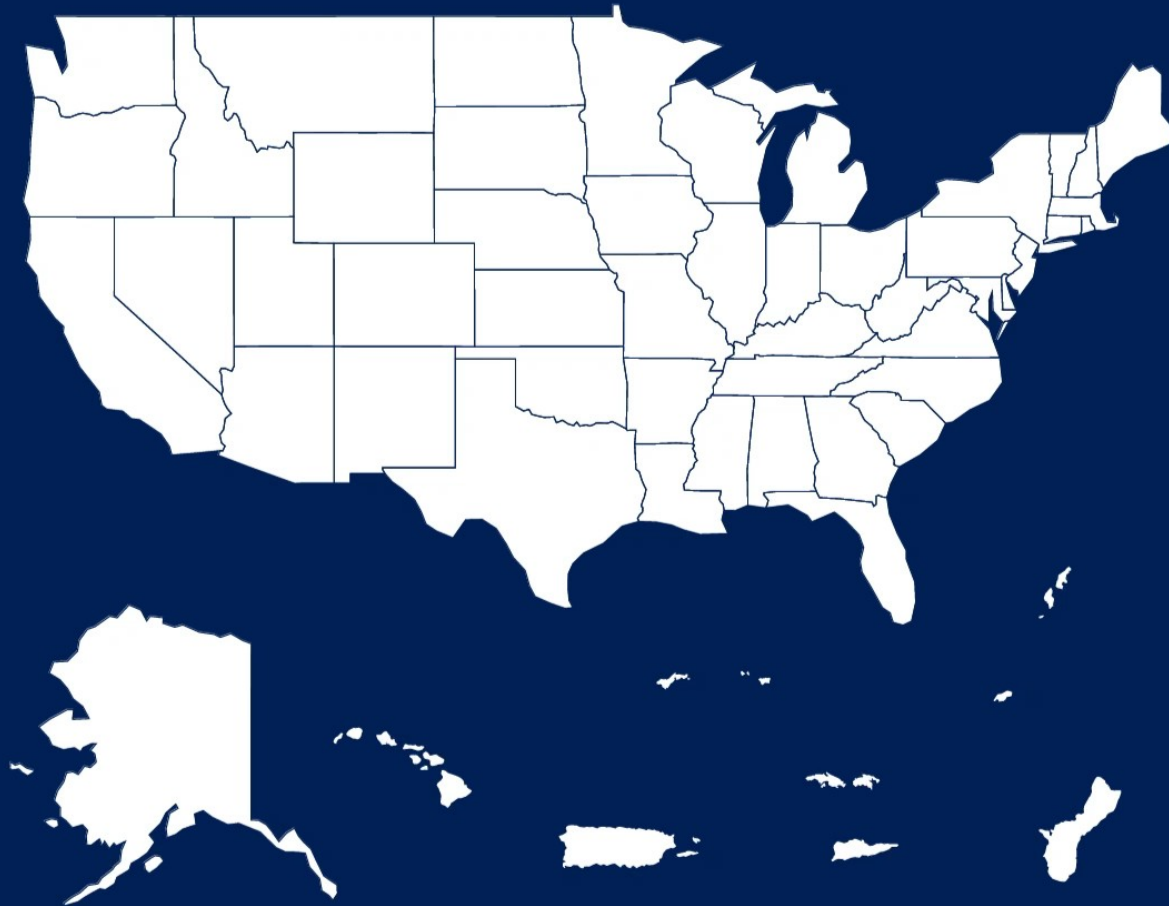
\$50M for  
Energy  
Efficiency for  
Non-Profits

\$550M for  
Energy Efficiency  
& Conservation  
Block Grants  
Program

\$1B for  
Energy Codes  
Technical Assistance

\$8.8B for Home Energy Rebates

# EECBG Program Directly Investing in Over 2,700 Communities Across U.S.



**OCFL =  
\$807,430**

**Orlando =  
\$353,540**

**Ocoee =  
\$76,560**

**Winter Garden =  
\$76,560**

**Apopka =  
\$114,500**

**Total =  
\$1,428,590**



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# Clean Energy Tax Credits and Elective Pay

# Tax credits Available for Consumers



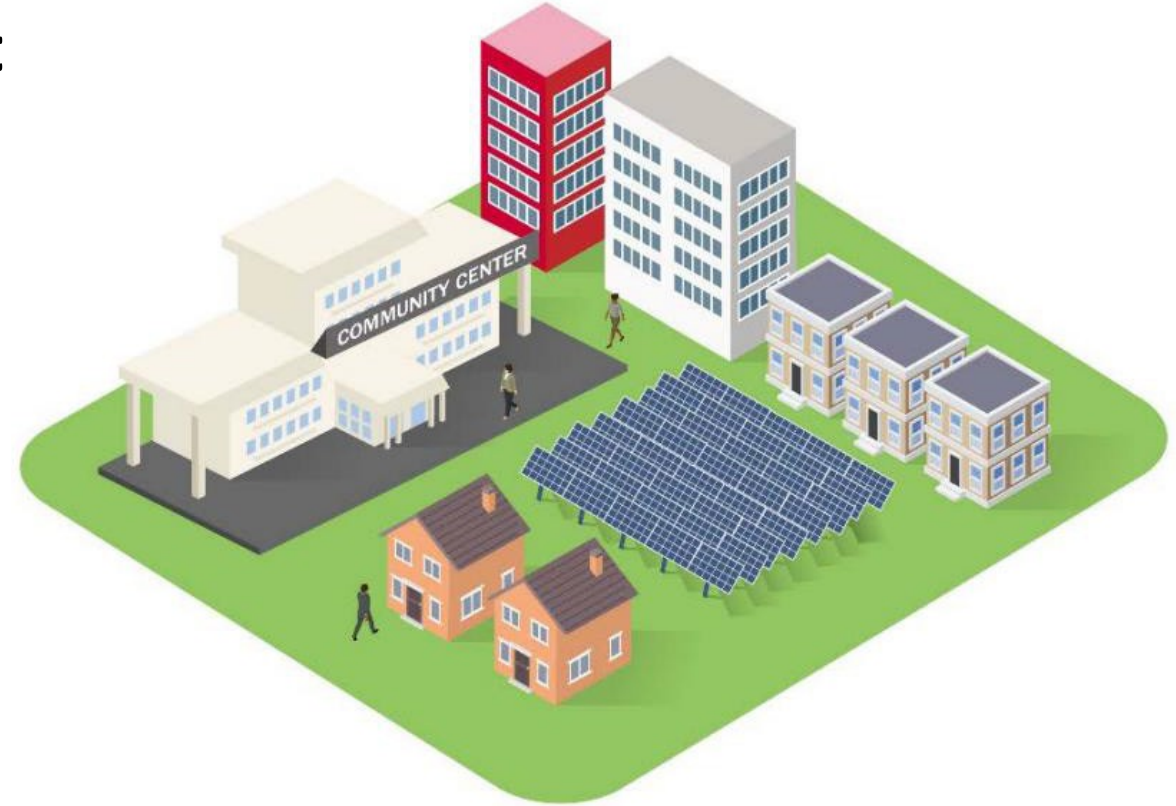
Category	Examples
<b>Efficient Appliances</b>	<ul style="list-style-type: none"> <li>Heat pumps, air conditioners, and water heaters – 30% of cost (with limits)</li> </ul>
<b>Home Improvements</b>	<ul style="list-style-type: none"> <li>Home energy audits - up to \$150</li> <li>Efficiency upgrades like electric panels, insulation</li> </ul>
<b>Clean Energy</b>	<ul style="list-style-type: none"> <li>Solar panels and battery storage - 30% of cost</li> </ul>
<b>Clean Vehicles</b>	<ul style="list-style-type: none"> <li>New vehicles - up to \$7,500 depending on manufacturing requirements</li> <li>Used vehicles - up to \$4,000</li> <li>Charging equipment – 30% of cost up to \$1,000</li> </ul>



# Elective Pay – Cash for Clean Energy

Elective pay allows **local governments and tax-exempt entities to receive a cash payment** from the IRS for eligible clean energy investments.

- Example: local government invests \$600,000 in tax-credit eligible solar, battery storage, and EV chargers at a community center.
- Cash-back: Through elective pay, local government receives a **\$180,000 cash payment from the IRS** as they qualify for a 30% investment tax credit for each of the eligible investments.



# Elective Pay



Tax-exempt and governmental entities can now receive a **payment equal to the full value of clean energy tax credits** even though they do not owe taxes.



Tax credits earned through Elective Pay **can be combined with DOE grants and loans** with some limitations.



Eligible entities must complete a **pre-filing registration** and then claim the credit by filing a tax return with the IRS after the project or property is placed in service.

# Elective Pay

- **12 of the Inflation Reduction Act clean energy tax credits are eligible for elective pay including:**

Investment tax credit (ITC)

Clean electricity, storage, microgrids, other energy projects

Production tax credit (PTC)

Clean electricity

Bonus credits

For ITC and PTC projects located in “Energy Communities”, using domestic content, or benefiting low-income communities

Clean commercial vehicles

Credit eligible for passenger EVs and other clean vehicles

EV chargers

Credit for chargers installed in low-income or non-urban areas

- **See the full list of credits and details at: [IRS.gov/ElectivePay](https://www.irs.gov/ElectivePay)**




## Air Conditioners (energy efficient)


[MORE INFO ON AIR CONDITIONERS](#)

**Incentive Type:** Tax Credit ✕

**Incentive Amount:** 30% of the cost paid by the consumer, up to \$600.

**How to Access:** Submit [IRS Form 5695](#) if you meet the [requirements detailed on IRS.gov](#).

 Subject to a cumulative, annual cap of \$1,200.

 Believe it or not, another option for energy-efficient home cooling is a heat pump, which provides both air conditioning and heating! Credits exist for both air-source and geothermal heat pumps, which could save you additional money on your monthly costs in the long-run.

[www.energy.gov/save](http://www.energy.gov/save)

The Energy Savings Hub is a comprehensive tool that shows consumers how they can save money on energy efficient appliances and equipment through tax credits and other incentives.



# Stay Connected

Visit [energy.gov/bil](https://energy.gov/bil) for announcements and sign up for Bipartisan Infrastructure Law email updates.

### Email Updates

To receive the latest news and updates about the BIL programs at DOE, submit your e-mail address.

Visit [energy.gov/scep/slsc/all-state-local-solution-center-resources](https://energy.gov/scep/slsc/all-state-local-solution-center-resources) for state and local TA resources from SCEP, as well as the Spotlight newsletter.

WHAT ARE YOU TRYING TO ACCOMPLISH? -

- Develop Plans and Programs
- Empower Organizations
- Establish Financing
- Implement Data Management

Showing 1 to 10 of 485 entries

Search:

**RESOURCE**

[Standard Energy Efficiency Data Platform \(SEED\) Platform](#)  
The Standard Energy Efficiency Data Platform (SEED) Platform is an open-source software application designed to manage building performance data (such as required by a benchmarking ordinance) which can be costly and time consuming for states, local governments, and other organizations. SEED helps users combine data from multiple sources, clean and validate it, and generate queries and reports.

Sign up to receive SCEP's monthly **State and Local Spotlight** newsletter for detailed information.

Office of STATE AND COMMUNITY ENERGY PROGRAMS

**\$4.5 Million in Awards Available for Energy Efficiency Upgrades in Public Schools**

DOE Office of State and Community Energy Programs sent this bulletin at 02/24/2023 11:17 AM EST

Having trouble viewing this email? [View it as a Web page.](#) | [SHARE](#)

**SCEP**  
STATE & COMMUNITY ENERGY PROGRAMS

**State & Local Spotlight**  
February 23, 2023

**News**

**\$4.5 Million in Awards Available for Energy Efficiency Capacity Building in Public Schools**

Calling all local education agencies to apply for the U.S. Department of Energy's (DOE) Energy CLASS Prize. Through this prize, energy managers will receive training on ways to identify, plan, and implement energy upgrades in school facilities so students can learn in comfortable, healthy classrooms.

Watch a recording of the Energy CLASS Prize Office Hours for answers to common questions including what is required of a full application, eligibility rules, and upcoming deadlines.



# SCEP

STATE & COMMUNITY ENERGY PROGRAMS



# Sustainability & Resiliency Emerging Trends

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# Conclusion

- **Sustainability:** “meeting the needs of the present without compromising the ability of future generations to meet their own needs.” (United Nations Brundtland Commission, 1987)
- **Resilience:** Ability to bounce-forward from threats, shocks, and stressors.
- Moving towards renewable energy and zero-emission vehicles makes our community more sustainable and resilient.

*Board of County Commissioners*

**Sustainability & Resiliency  
Emerging Trends**

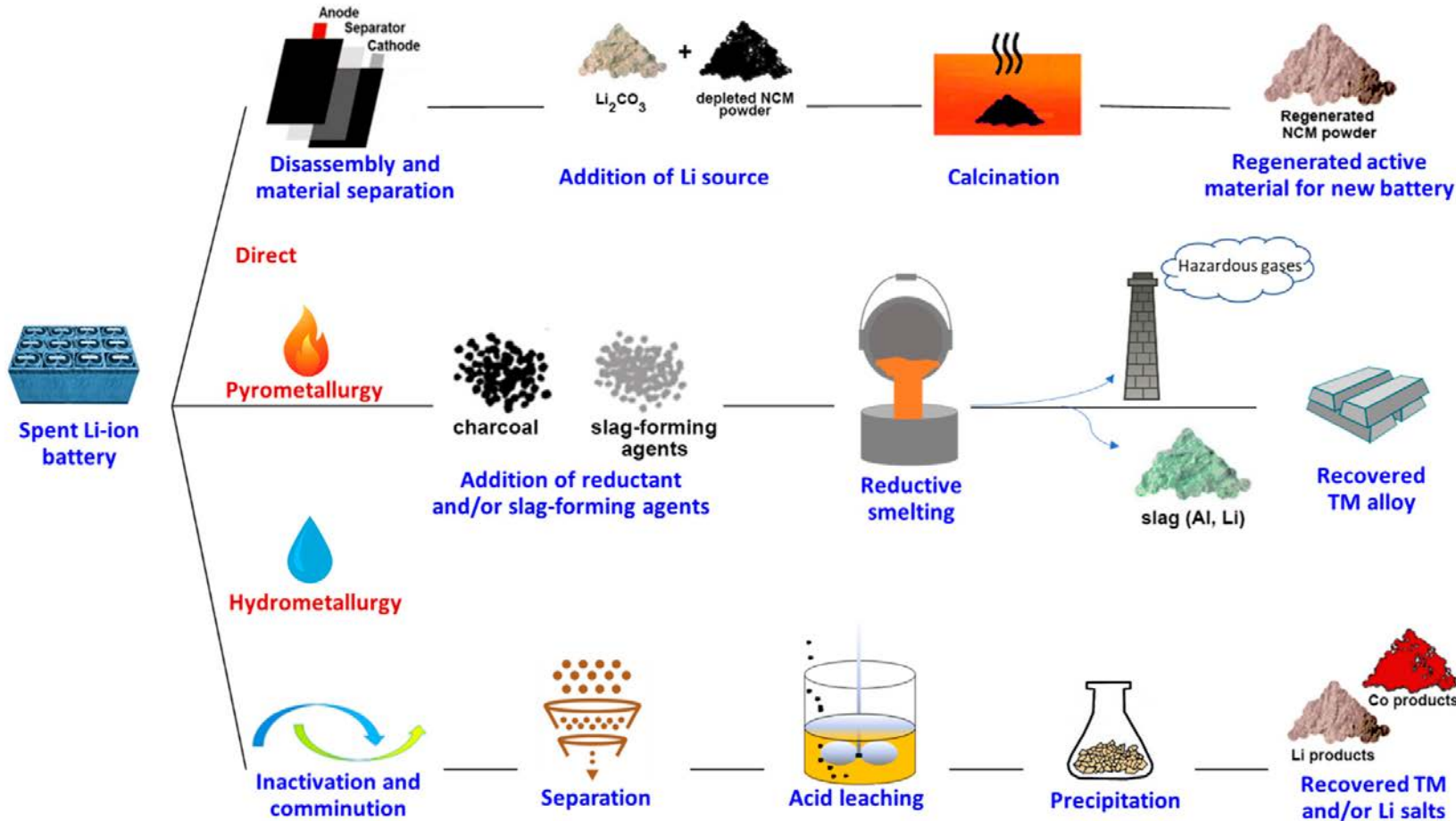
**September 12, 2023**

*Board of County Commissioners*

**Sustainability & Resiliency  
Emerging Trends**

**September 12, 2023**

# Pathways of Recycling Batteries

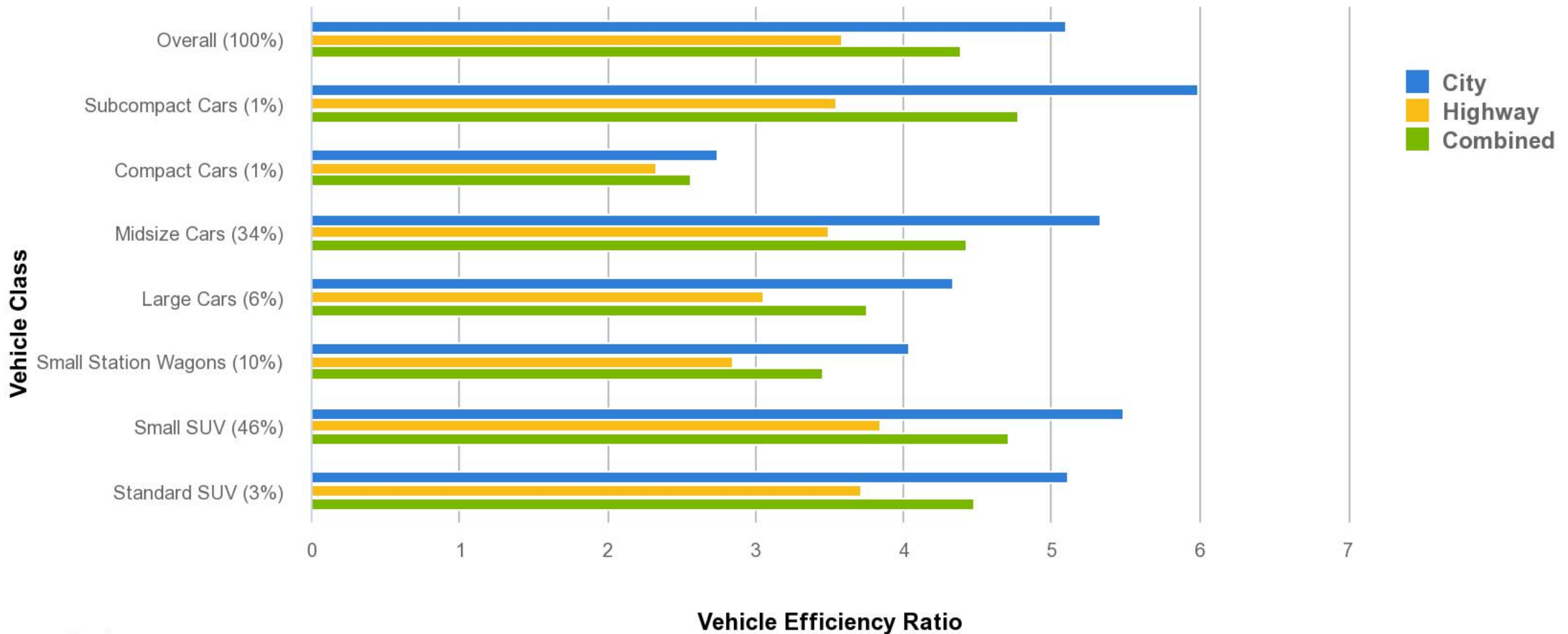


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- **A mixed chemistry waste stream is a barrier for battery recycling.**



# EVs are More Efficient

### Efficiency Ratios for Light-Duty All-Electric Vehicles in the United States

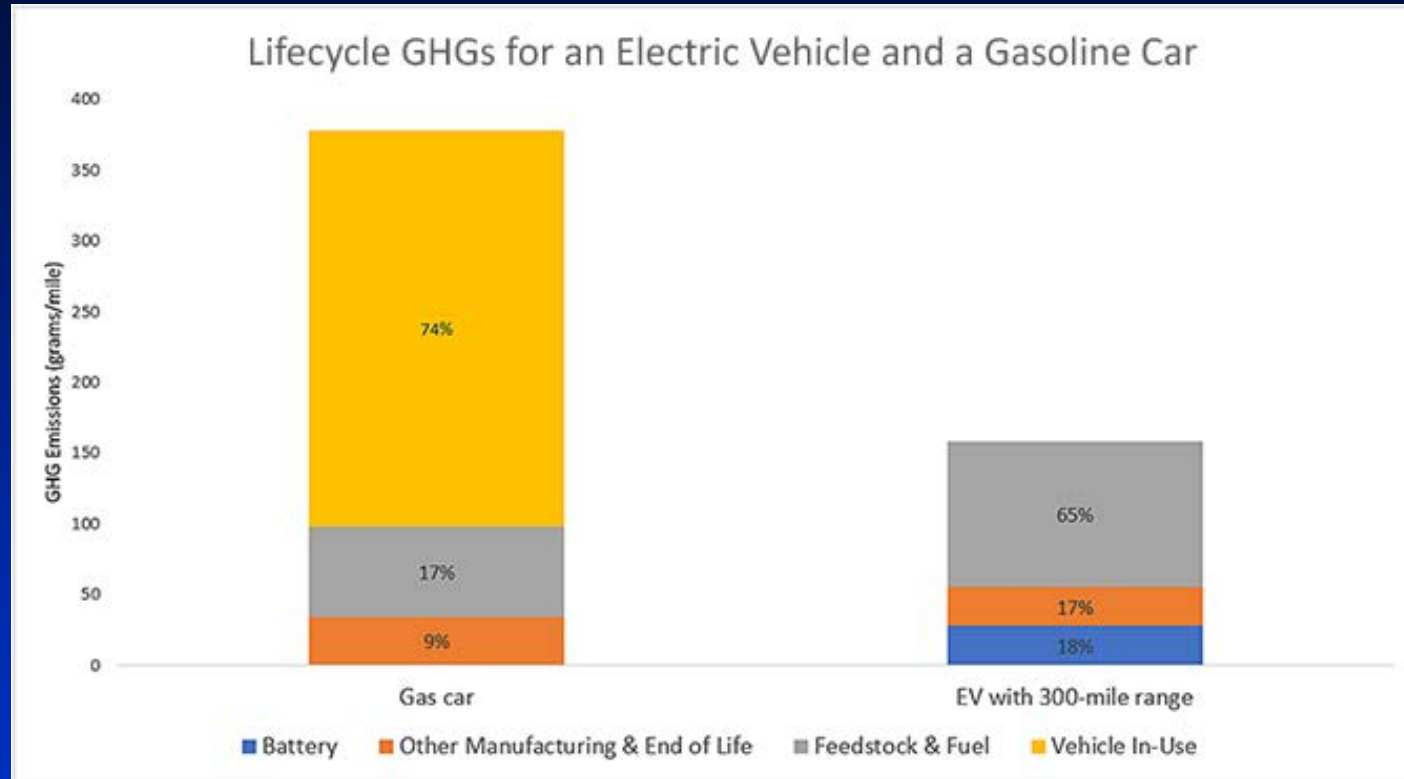


Last updated: June 2023  
Printed on: August 16





# Lifecycle Greenhouse Gas Emissions Comparison



**Blue** - Battery related emissions

**Orange** - Remainder of the vehicle manufacturing (e.g., extracting materials, manufacturing and assembling other parts, and vehicle assembly) and end-of-life (recycling or disposal).

**Gray** - Upstream emissions associated with producing gasoline or electricity (U.S. mix).

**Yellow** - Tailpipe emissions during vehicle operations