



Inflation Reduction Act of 2022

Notable Commercial Tax Incentives

Updated November 2022

Inflation Reduction Act of 2022 (IRA)



Department of Energy

DOE Projects Monumental Emissions Reduction From Inflation Reduction Act

AUGUST 18, 2022

Energy.gov » DOE Projects Monumental Emissions Reduction From Inflation Reduction Act

Historic Legislation Supports Massive Clean Energy Buildouts, Rebates and Tax Credits to Slash Domestic Emissions up to 40%, Save Americans Hundreds of Dollars in Energy Costs a Year

WASHINGTON, D.C.—The U.S. Department of Energy (DOE) today released a fact sheet highlighting the Inflation Reduction Act's monumental support for clean energy technologies that will lower energy costs for families and businesses while helping drive 2030 economy-wide greenhouse gas (GHG) emissions to 40% below 2005 levels. The legislation will also bolster domestic manufacturing and provide direct investments for overburdened and underserved communities across America. This is the first report by the United States government analyzing how the Inflation Reduction Act can reduce GHG pollution.

Even more, the Act will lower energy costs for working families with rebates and tax incentives for home energy improvements, solar energy, and electric vehicles. The Inflation Reduction Act enhances President Biden's strong executive actions on climate change, state and local government actions, as well as the game-changing innovation currently being developed by American workers and businesses. Together with the President's Bipartisan Infrastructure Law, these transformative accomplishments will help position the U.S. to reach President Biden's goal of reducing greenhouse gas emissions 50-52% in 2030.

Source: [US Dept of Energy](https://www.energy.gov)

The White House @WhiteHouse

The Inflation Reduction Act will reduce greenhouse gas emissions by about a gigaton. That puts America on track to cut climate pollution by 40% and positions us to meet @POTUS' goal to cut that pollution in half by 2030.

WE'RE
REDUCING
GREENHOUSE
EMISSIONS
BY ABOUT A
GIGATON
BY 2030

1 gigaton = 1 billion metric tons

4:30 PM · Aug 21, 2022 · The White House

Source: [The White House](https://www.whitehouse.gov)

Decarbonization Levers



IRA Incentives & Investments

IMPACTS ON THE COMMERCIAL MARKET



~\$216B*

In est. corporate **tax incentives** designed to catalyze private investment in **clean energy**, transport, and manufacturing

\$30.5B+

To **boost U.S. production to support building electrification**
(incl. energy storage & heat pumps)

\$30B

To transition states & electric utilities to **clean electricity**

\$3.42B

To **decarbonize federal buildings** through construction or retrofit

\$1B+

In grants for **local gov'ts to modernize commercial & residential buildings** to meet energy codes

\$50M+

To reduce air pollutants in **schools**

Updates to Investment Tax Credit

48 ITC: Energy Investment Tax Credit

- Long-standing **tax credit** for private and non-taxable entities
- **Historically for qualified “energy property,”**
incl: solar, fuel cells, microturbines, geothermal heat pumps and combined heat and power
- **Expanded to incl. thermal energy storage property** – defined as:
Property comprising a **system** which:
 - (I) is directly connected to a **heating, ventilation, or air conditioning system**,
 - (II) removes heat from, or adds heat to, a **storage medium for subsequent use**, and
 - (III) provides energy for the heating/cooling of the interior of a **residential or commercial building**
- Increased credit value of **up to 50% of the cost** for energy property projects
- Timeframe base credit rates apply:
 - **Thermal energy storage: 12/31/2022-12/31/2024**
 - Geothermal heat pumps: phase out from 6%-4.4% from 12/31/2021-1/1/2035



Updated Investment Tax Credit

Base Rate	6%
Increased Credit Amount*	Up to 30%
Meets Domestic Content Requirements**	2%-10%
Meets Energy Communities Requirements***	2%-10%
Total Potential Credit Value	Up to 6% Base + Up to 50% Bonus

*Increase Credit Amount: must meet prevailing wage and apprenticeship requirements **Domestic Content: i.e., materials are made in the USA ***Energy Communities: a brownfield site (as defined by the EPA); a community with above-average unemployment rate and 1) \$0.17 direct employment or 2) 25%+ local tax revenue from coal, oil or nat gas processes; census tracts containing mines and/or coal-fired generating units that have retired after 12/31/1999 or 12/31/2009 respectively | Source: full text of the legislation ([Link](#)) | Disclaimer: Trane does not provide tax, legal, or accounting advice. This material is for informational purposes only and it should not be relied on for tax, legal, or accounting advice. Tax law is subject to continual change. All decisions are your responsibility, and you should consult your own tax, legal, and accounting advisors. Trane disclaims any responsibility for actions taken on the material presented.

Updates to Tax Deduction

179D: Energy Efficient Commercial Buildings Tax Deduction



- Long-standing **tax deduction** for building owners
- **Expanded** for both **private & tax-exempt** entities
 - *Added inclusion allows specified “**tax-exempt entities**” that own buildings to “**allocate**” 179D deduction amounts to “the person primarily responsible for **designing the property** in lieu of the owner of such property.”
- Incentivizes commercial owners who **retrofit** or **newly construct** facilities to be energy efficient
- Increased deduction **up to \$5/sq.ft.**
- **Reduced** improved efficiency threshold to **25%**
- **Alternative deduction** for energy efficient **retrofit** property allows comparison **to baseline energy use intensity**
- **3-year cap** (vs previous lifetime), allowing for **multiple projects over time**

Notable Criteria to Reach Maximum

- ✓ Qualifying property must:
 - Be within scope of ASHRAE 90.1
 - Be in service after 12/31/2022
- ✓ Qualifying improvements incl: **HVAC & hot water systems**, building envelope, **interior lighting**, and more
- ✓ Bonus deduction - must meet prevailing wages and apprenticeship requirements*
- ✓ Retrofit buildings must be in service 5+ years to qualify for alt. deduction path

Efficiency Gain Over Baseline	Base Deduction Rate	Bonus Deduction Rate*
25% (min)	\$0.50 / sq.ft.	\$2.50 / sq.ft.
30%	\$0.60 / sq.ft.	\$3.00 / sq.ft.
35%	\$0.70 / sq.ft.	\$3.50 / sq.ft.
40%	\$0.80 / sq.ft.	\$4.00 / sq.ft.
50% (max)	\$1.00 / sq.ft.	\$5.00 / sq.ft.

Thermal Energy Storage



Provides demand flexibility and can help to reduce reliance on grid (thus reducing costs)



Enables renewable energy and decarbonization



Offers reliable power redundancy and assurance



Incentivized by utility programs, federal tax incentives, and local funding programs



Trane Thermal Energy Storage (TES) Solutions



- **Financial Savings:**

- TES qualifies as “energy property” and can help to reduce tax liability significantly under 48 investment tax credit
- TES reduces reliance on grids by enabling off-grid power during peak demand hours – thus reducing energy costs

- **Carbon Reducing:** Renewable energy is variable – TES can store renewable energy when its available and dispatch renewable energy when it is needed the most.

- **Applications:**

- **Retrofits – Cooling with Thermal Battery™ Cooling Systems:**

- Partial storage systems are already a cost-effective strategy using TES to meet peak thermal loads.
- Incentives allow you to maximize carbon reduction with full storage systems where the entire cooling is stored for later use

- **New Construction - Decarbonize Even More With Heating:**

- Cooling with TES is expanded to heating (Storage Source Heat Pump) for even more carbon reduction through electrification of heat

Heat Pumps Combined with Thermal Storage...



Cost

Reduce Heat Pumps by up to 50%

Outdoor space

Reduce Space for Heat Pumps by up to 50%

Thermal Balancing loads are NOT equal and synchronized

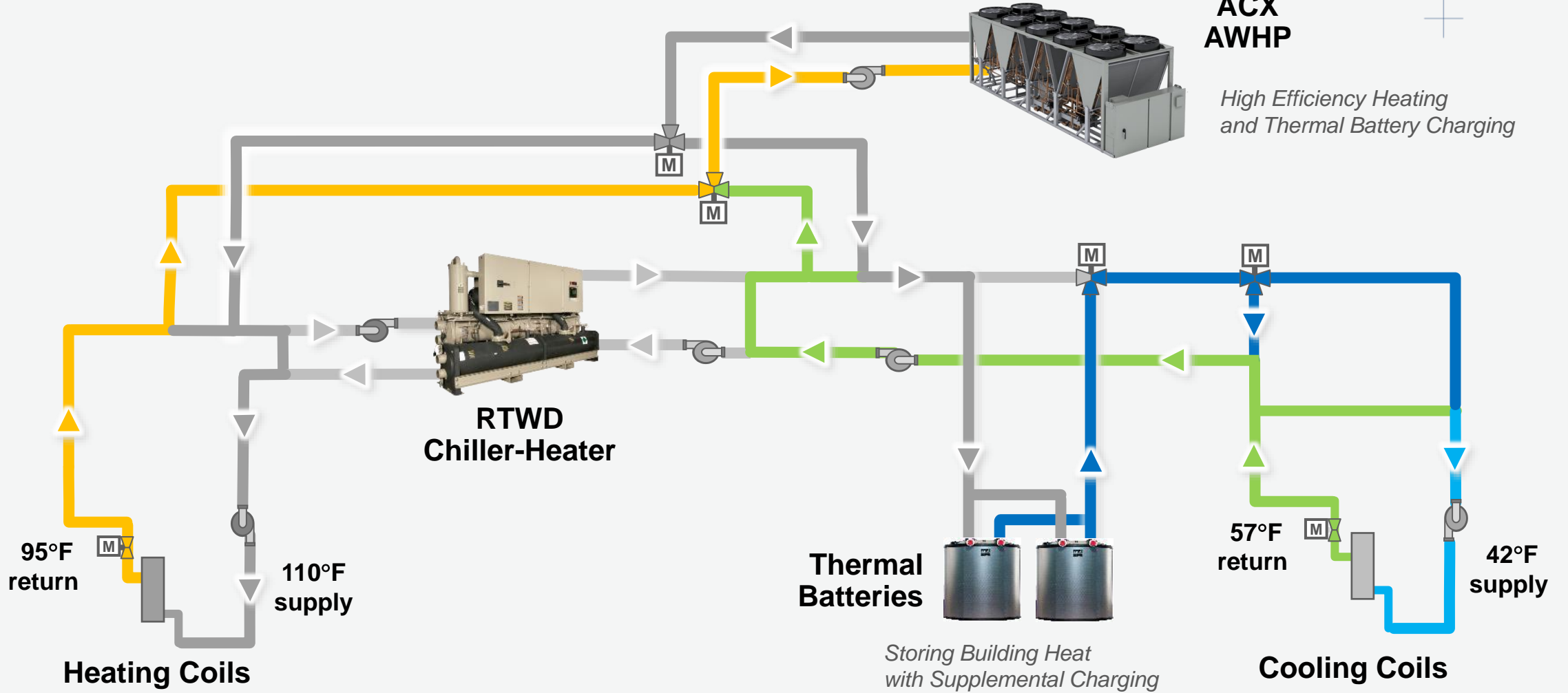
Balances the Thermal Loads

Potential tax credits, rebates, carbon footprint reduction

Significant change to the Business Case



Storage Source Heat Pump System



Key Ideas Regarding System Operation

- **Outdoor air** is the primary source of building cooling and heating using the **ACX AWHP**.
- Calmac **Thermal Storage Batteries** are an **alternative source** of cooling and heating when conditions favor or require it.
- ACX is able to “**cool charge**” (freeze water) or “**heat charge**” (melt ice) the Calmac Thermal Batteries when conditions are favorable.
- Calmac thermal batteries will directly cool the building (melt ice) to **shift the electrical load** and limit electrical demand in cooling season or to store building heat during heating season.
- **RTWD** units will be used for thermal battery source **building heating** (freezing water) during cold outdoor conditions (**below 0F**).
- Key benefits are:
 - **Cold ambient electrified heating**
 - Hot water supply (**130F**) when **cold**
 - **Time independent heat recovery**
 - **AWHP downsizing**
 - Enables demand management



FirstPass™ Heating Outputs



Financials
 Financials with new ITC
 Emissions
 TES footprint

SSHP Summary

FirstPass™ Analysis Of: **Chicago Project**
 Ice Bank® Energy Storage Analyzer - A FirstPass Life Cycle Analysis

Building Profile	
City / Location	Chicago (SA), Illinois (IL)
Building Type	Office
Chiller Type and Peak Cooling Load	Water Cooled @ 570 Tons
Peak Heating Load	5,160,000 BTU/hr

SSHP - Energy Savings Summary (Peak Heating and Cooling)			
SSHP System	vs. Chiller+Gas Heat	vs. Chiller+Elec. Heat	vs. Chiller+Heat Pump
Energy Demand Cost Savings	-\$12,877	\$55,903	\$21,513
Energy Utility Rate Savings	\$2,174	\$86,213	\$12,442
Annual Operating Cost Reductions	-\$10,703	\$142,716	\$33,955

SSHP - Business Case			
SSHP System	vs. Chiller+Gas Heat	vs. Chiller+Elec. Heat	vs. Chiller+Heat Pump
First Cost Premium	\$424,434	\$517,048	-\$95,866
Net Present Value	-\$474,169	\$1,918,325	\$795,165
Internal Rate of Return	-1.9%	71.5%	Infinite
Payback Period	No Payback	3 years 7 months	Immediate

SSHP - Heating Carbon Estimates			
SSHP System Total Output Emission Rate	1,159,492 lbs CO2e		
Conventional Systems (bs CO2e)	Gas Heat	Electric Heat	Heat Pump
	2,168,399	3,745,120	1,461,513
Additional Carbon vs. SSHP	87.0%	223.0%	26.0%

SSHP System Architecture	
Storage Farm of 1190C Units	14
Approximate Square Footage	980
Pump Flow (GPM)	909
Pump Power (HP)	20
Pipe Size (in)	8

Design Cooling Day Profile

Design Heating Day Profile

SSHP System Architecture

Storage Farm of 1190C Units	14
Approximate Square Footage	980
Pump Flow (GPM)	909
Pump Power (HP)	20
Pipe Size (in)	8

Heat Pump
 \$1,513
 6.0%



Compare the exact same load on 2 different grids to show the impact in CO2e

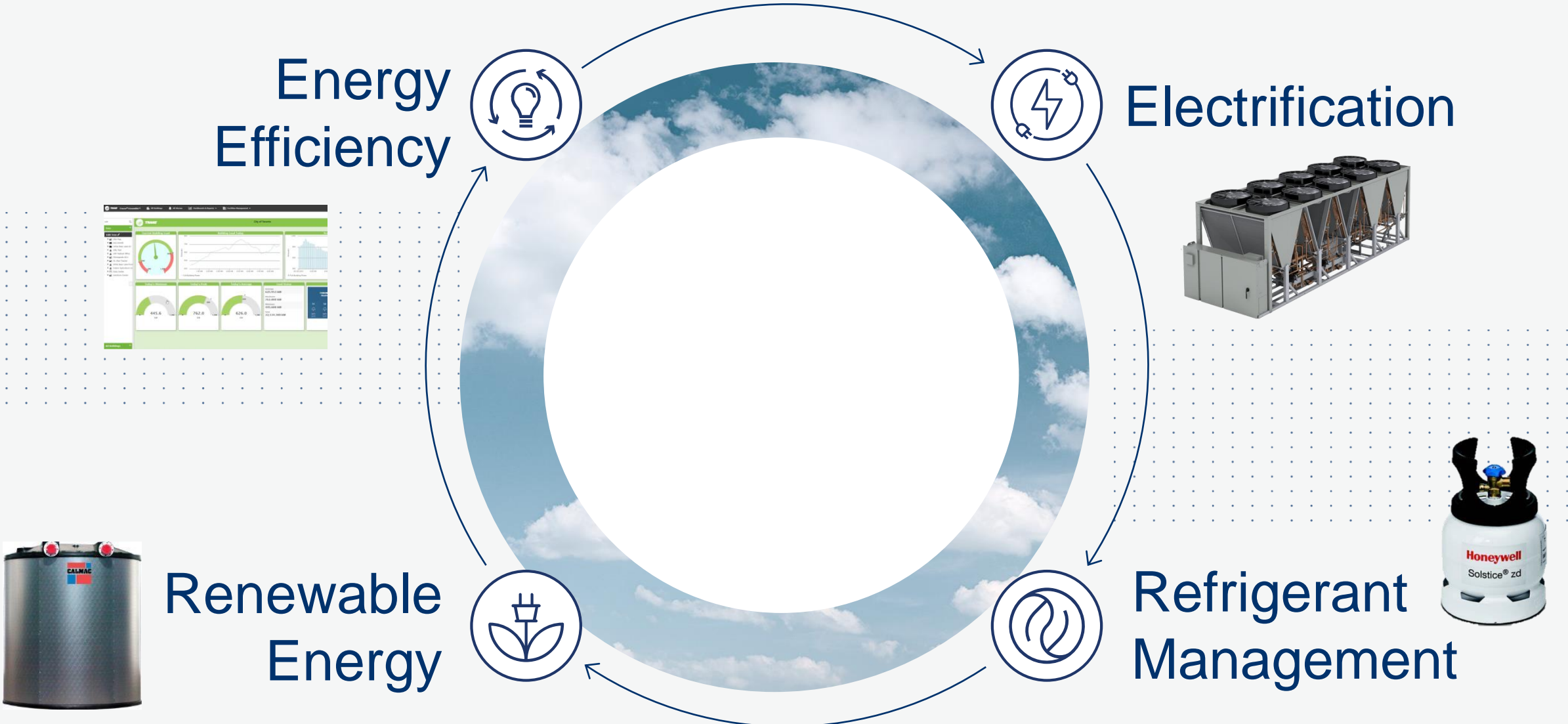


Same profile – dirty grid

SSHP - Heating Carbon Estimates			Chicago
SSHP System Total Output Emission Rate		1,159,482 lbs CO2e	
	Gas Heat	Electric Heat	Heat Pump
Conventional Systems (lbs CO2e)	2,168,399	3,745,128	1,461,513
Additional Carbon vs. SSHP	87.0%	223.0%	26.0%

SSHP - Heating Carbon Estimates			Buffalo
SSHP System Total Output Emission Rate		604,183 lbs CO2e	
	Gas Heat	Electric Heat	Heat Pump
Conventional Systems (lbs CO2e)	2,168,399	1,951,512	761,566
Additional Carbon vs. SSHP	258.9%	223.0%	26.0%

Decarbonization Levers



Summary

Decarbonization Initiatives Growing Exponentially

Reduced carbon emissions will increasingly influence our thinking and decision making

Trane has a growing **heating** products and system offering

Inflation Reduction Act offers unique opportunities for Trane and our customers

