May 13, 2021

Pandemic Problem Solving:

Facing Energy Challenges Across Sectors

Virginia Energy Efficiency Council

Sponsored by veic

Session Speakers

Cathy Lin

Director of Facilities & Operations
Arlington Public Schools

Benjamin Knopp

Building Science Consultant
Think Little Home Energy

Aaron Schneider

Director of Sales
Metrus Energy

Leigh Anne Ratliff (moderator)

Account Manager, PJM
CPower Energy Management

Presentation Outline

- Opportunities: implementing sustainability & energy efficiency projects, financing & tools available
- Reopening Businesses & Schools: indoor air quality technologies, using systems for maximum efficiency, meeting ASHRAE guidelines and ventilation requirements while keeping energy costs down, lessons learned in how to operate, how to operate post-pandemic

Pandemic Problem Solving – Energy Impacts

Catherine Lin

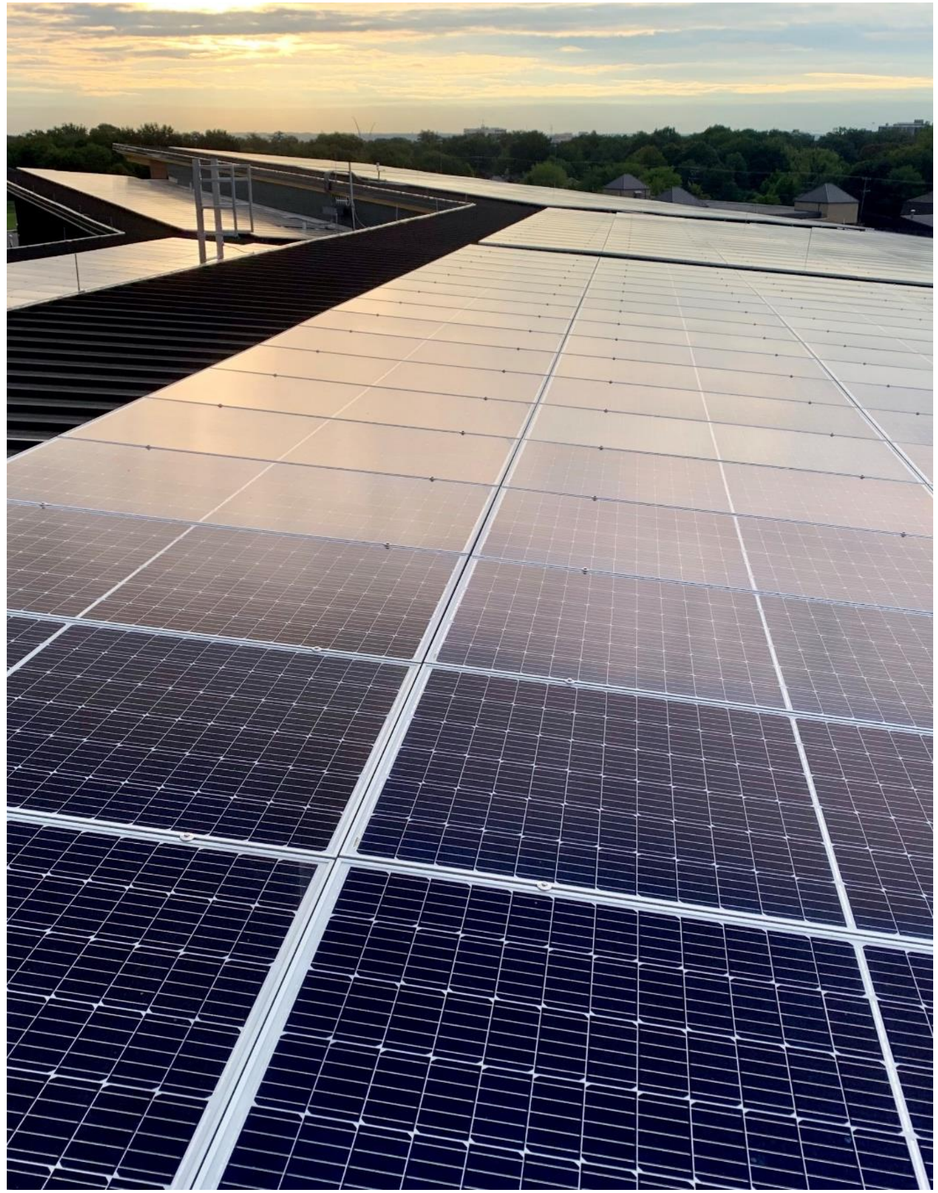
Director, Facilities & Operations

Arlington Public Schools

May 13, 2021

Agenda

- Facilities
- Transportation
- Energy Impacts and Opportunities



Facilities – Ventilation

APS follows CDC, ASHRAE and The Harvard School of Public Health guidelines during the pandemic

ASHRAE Epidemic Task Force Building Readiness Guide

- Pre and Post occupancy building flushing strategy
- Maximizing outside air ventilation
- Upgrading filtration to MERV-13 where possible

Harvard T.H. Chan School of Public Health Reopening Strategies for Schools during COVID-19

- Recommended 4 – 6 ACHe equivalent air changes for classrooms
- Opening windows and doors
- Upgrading to MERV-13 filtration
- Supplement with portable air cleaners

Facilities – Transportation

Before March 19, 2021: CDC's guidance of 6-foot social distancing between students

March 19, 2021: CDC's revised guidance of 3-foot social distancing between students

Bus Capacity:

- 11 students per standard bus based on 6-foot social distancing guidelines
- 21 students per standard bus based on 3-foot social distancing guidelines

Routing challenges and bus fleet capacity:

- Tuesday/Wednesday routes and Thursday/Friday routes for in-person hybrid learning
- Routing for virtual students for in-person required testing
- Fuel costs regarding routing with only 11 or 21 students per bus

Facilities – Energy Impacts and Opportunities

Buildings

Increased outside air ventilation

Open windows and impact on HVAC operations

HVAC operational strategy

Zero Energy Schools and Healthy Buildings

Transportation

Fuel costs with reduced student capacity for routes

Electrification of Transportation

Facilities – Energy Impacts and Opportunities

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Indoor Air Cleaning Efficiency and Effectiveness

VAEEC 2021 Spring Forum

Benjamin Knopp - May 2021

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Proven Technology

“Subtractive Air Cleaning”

- Ventilation
  - Mechanical
  - Natural
- Filtration
- Germicidal UV*

*properly engineered

Emerging Technology

“Additive Air Cleaning”

- Electronic Air Cleaners
  - Ionizers
    - bipolar (BPI), needlepoint (NPBI), negative/positive, plasma, etc.
  - Oxidizers
    - photocatalytic oxidation (PCO), reactive oxygen species (ROS), hydroxyl radicals, dry/gaseous hydrogen peroxide, ozone, superoxide anions, etc.

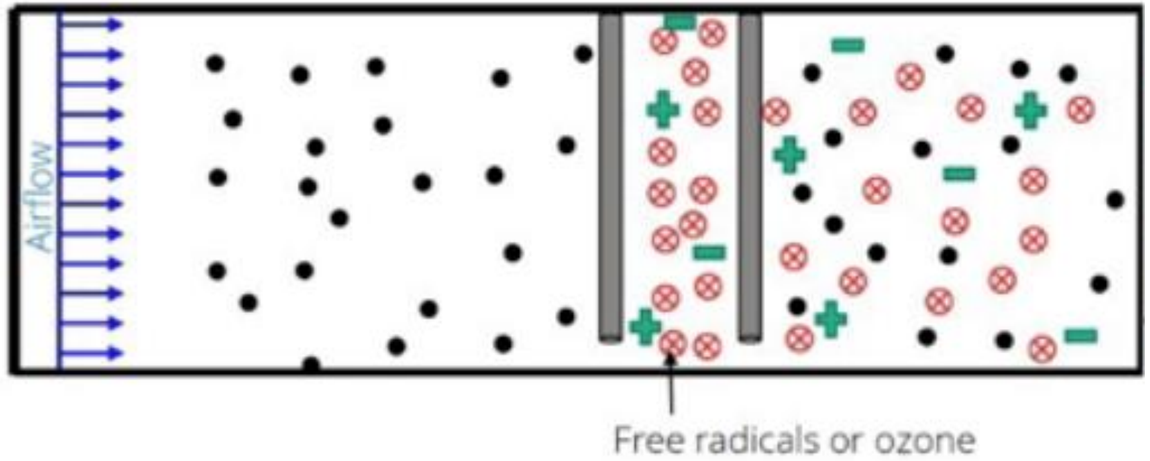

Image Source: “Open Letter to address the use of Electronic Air Cleaning Equipment in Buildings” By Dr. Marwa Zaatari & Dr. Marcel Harmon

“I have already purchased/installed an electronic air cleaner. What do I do now?”

OFF

Optimal Setting for Electronic Air Cleaners

Using Proven Technologies

Balancing Safety, Effectiveness, and Efficiency

- Utilize available resources
- Establish ventilation and filtration targets
- Assess existing equipment
- Establish a plan to better utilize or upgrade equipment
- Monitor and adjust to ensure continued effectiveness

Resources

- CDC Ventilation FAQ
  - https://www.cdc.gov/coronavirus/2019-ncov/community/ventilation.html#Ventilation-FAQs
- ASHRAE COVID-19 Technical Resources
  - https://www.ashrae.org/technical-resources/resources
- “Open Letter to address the use of Electronic Air Cleaning Equipment in Buildings” by Dr. Marwa Zaatar, Dr. Marcel Harmon (medium.com)
  - https://medium.com/open-letter-to-address-the-use-of-electronic-air/no-to-ionizers-plasma-uvpco-bc1570b2fb9b
- “5-step guide to checking ventilation rates in classrooms” by Joseph Allen, Jack Spengler, Emily Jones, Jose Cedeno-Laurent (Harvard Healthy Buildings program)
  - https://schools.forhealth.org/wp-content/uploads/sites/19/2020/08/Harvard-Healthy-Buildings-program-How-to-assess-classroom-ventilation-08-28-2020.pdf

Questions?

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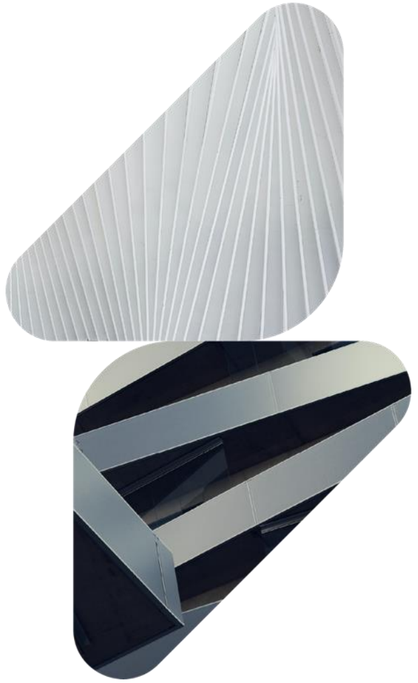
A Year into COVID

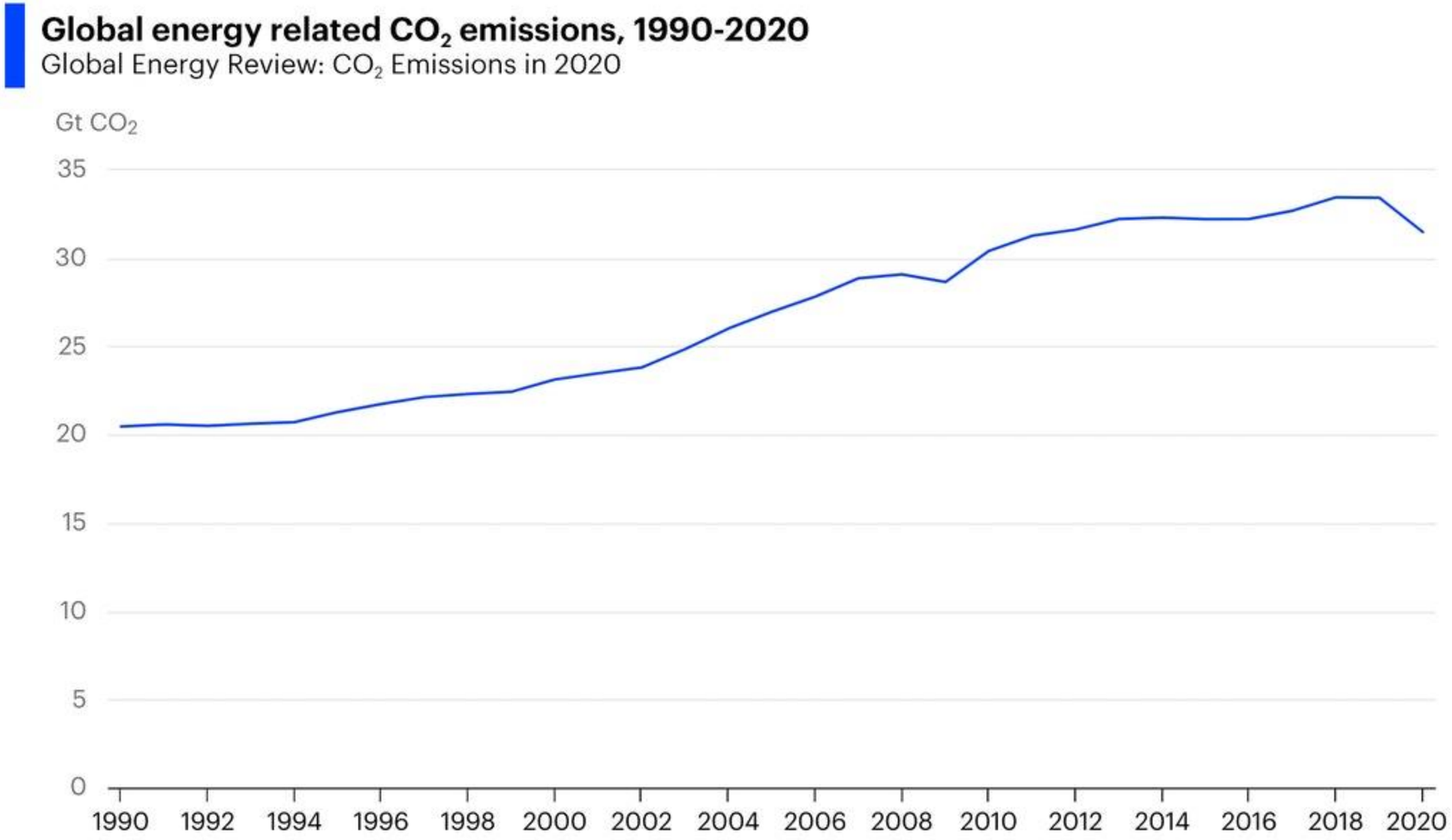
Prepared for the Virginia Energy Efficiency Council



metrus

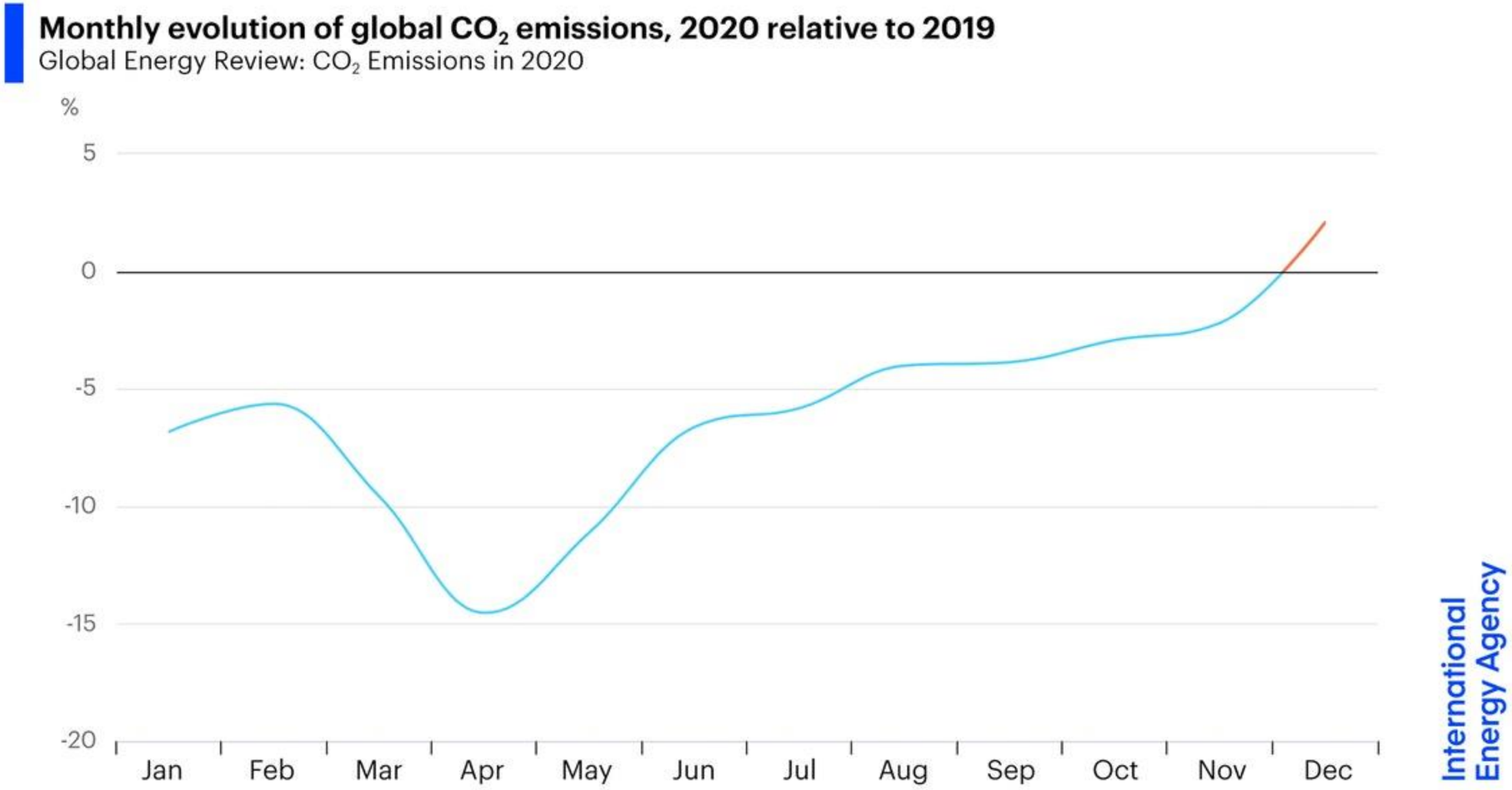
“Never let a good crisis go to waste”

Largest Annual Drop in CO2 Emissions since WWII



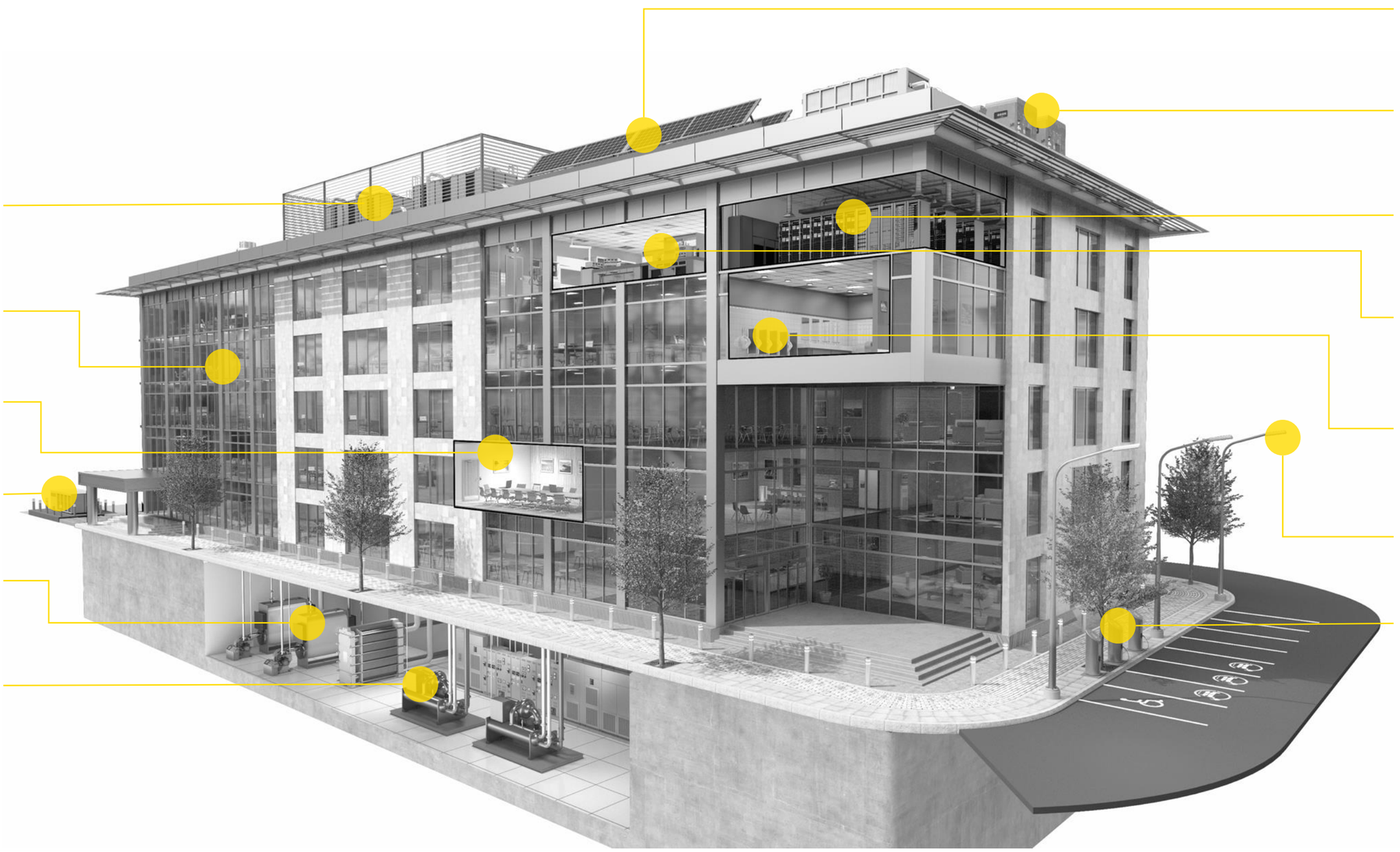
International Energy Agency

But 2021 Emissions Are Rebounding Quickly



Historic Opportunity to Build Back Green

In every building…there is opportunity



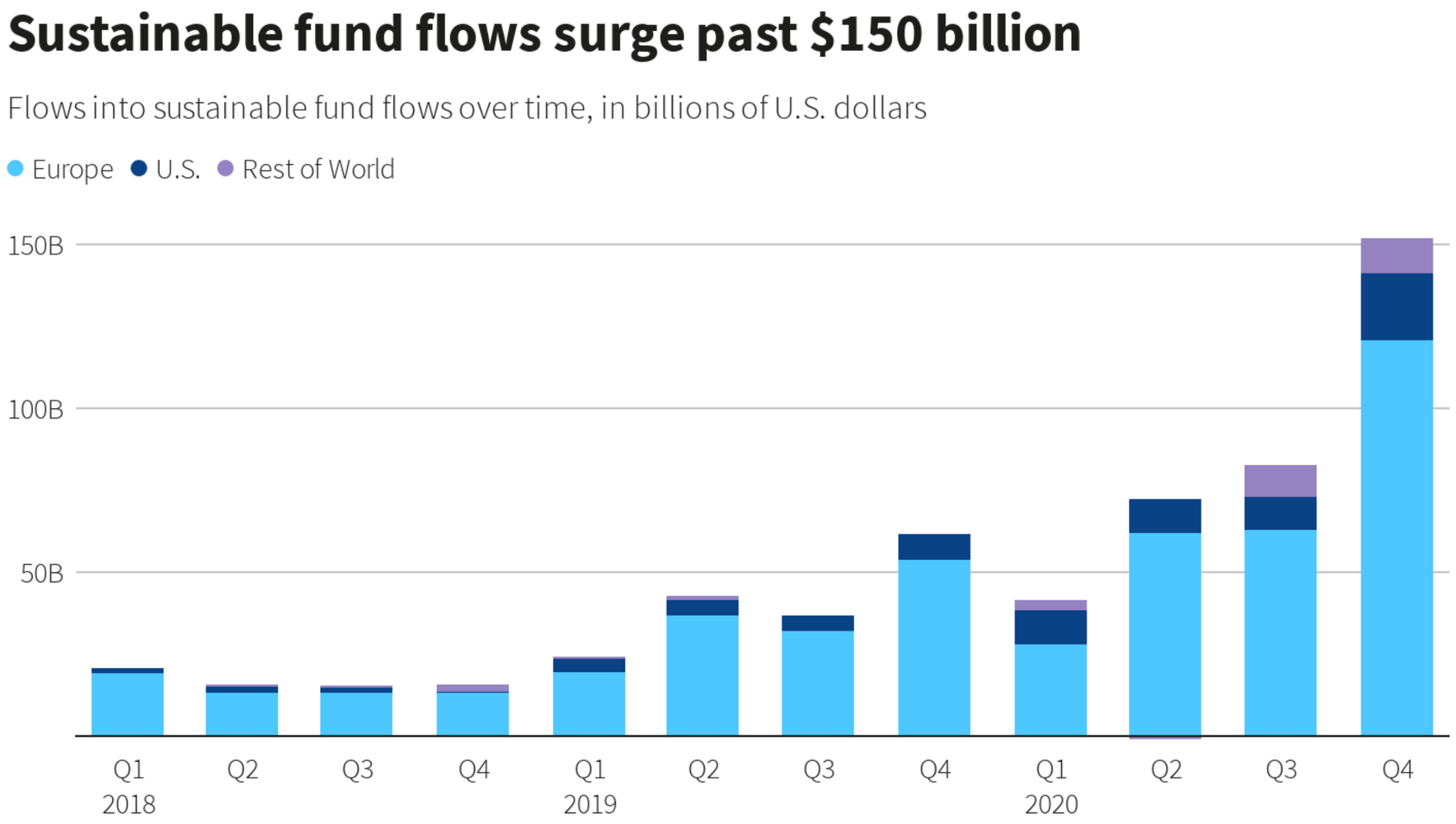
More Money than Ever for Green Projects

U.S. Flows into Sustainable Funds Increased…

2x in 2020 vs 2019

10x in 2020 vs 2018.

U.S. Lagging Europe though…



Lessons Learned

Three Suggestions

1) **<u>Start</u>** with projects that the biggest bang for the buck in terms of CO_2 reductions per dollar of investment

2) Require that tracking and ongoing reporting of carbon emissions reductions is built into the investment.

3) Segment CO_2 reductions into
   - <u>Scope 1 (direct) and</u>
   - <u>Scope 2 (indirect</u>) emissions.

About Metrus: A Mission Driven Investor

- **What we do:** Metrus develops, finances, owns and operates sustainable energy projects.
- **Our ecosystem:** Leading energy services companies and lenders and local subcontractors and suppliers.
- **The Results:**
  - 30 different types of sustainability measures deployed
  - 1.1 million tons of CO2 savings
  - 1.5 billion in kWh savings

Thank you

Aaron Schneider

Director of Sales

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Q+A

Thank you for participating.

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Breakout Session Discussions

1. Using Energy Management Systems for Whole Building Efficiency
2. Making a Difference in Low-Income Housing: How the RGGI Auctions Affect EE Work
3. *Pandemic Problem Solving: Facing Energy Challenges Across Sectors*

If you would like to attend a different discussion group, leave this breakout room to return to the main room. VAEEC staff will be there to assist you.

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Breakout Session Discussions

Pandemic Problem Solving: Facing Energy Challenges Across Sectors

Facilitator: Leigh Anne Ratliff, CPower Energy Management

Event Agenda

Updates, Business Meeting, Member Spotlight	10:00-10:45 am
Networking Session *Sponsored by Virginia Energy Sense*	10:45-11:15 am
Break	11:15-11:30 am
Concurrent Breakout Sessions	11:30 am-12:30 pm
Breakout Session Discussions	12:30-12:50 pm
Closing Remarks	12:50-1:00 pm

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