BUILDING INNOVATION
Conference

Assessing the GHG Emissions Impacts of Distributed Workplace Policies

Workplace Investment Feasibility & Modeling (WIFM) Tool

A GSA + Noblis Study

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GSA

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Noblis

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Workplace 2030- A CHANGING FUTURE OF WORK

Work can be done anywhere, at any time.

Real estate will help us maintain and enhance human connections, but technology will be the primary force that brings work together.

The office is necessary, but its purpose is shifting.

Offices will remain critical to collaborate, maintain connections, and access secure resources. They will also continue serving as primary workspaces for those who can't (or don't want to) work from home.

Distributed work is trusted work.

During the pandemic, agencies discovered the positive impacts of telework. Employees will want to continue working wherever it best suits the task at hand.

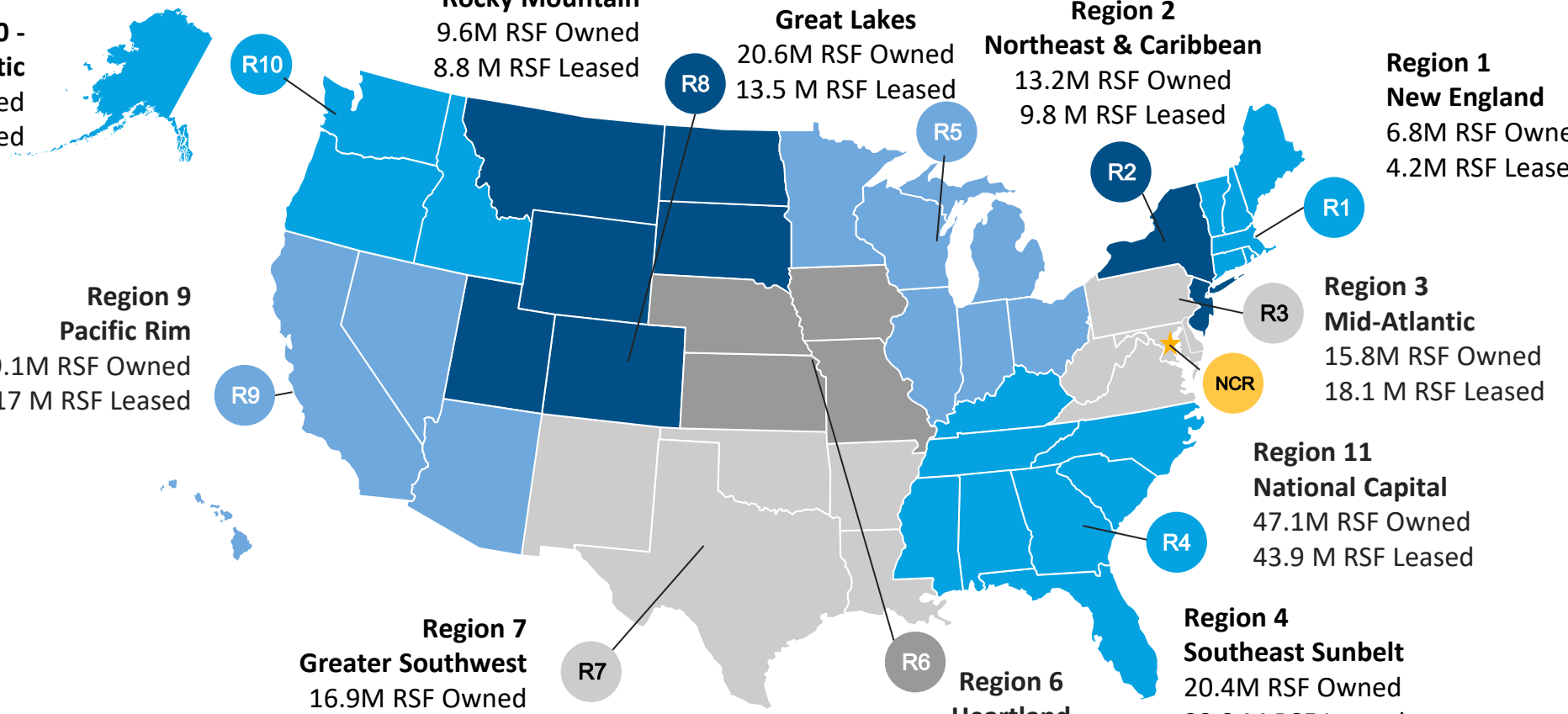
Hybrid work arrangements benefit both the employee and the organization.

Working from home affords employees scheduling flexibility, opportunities to improve a work-life balance, and cost and time savings from commuting.

GSA Portfolio : Snapshot

- 2,000 communities across the country
- 360 Million Rentable Square Feet (RSF)
  - 190 Million RSF in 1,685 federally-owned assets
  - 170 Million RSF in 6,590 leased assets;
    56% expiring within 5 years
- 5.8% Vacant Space end of FY23
  - 9.9% federally-owned; 2.3% leased

GSA Portfolio : National Distribution



Region 10 - Northwest/Arctic
7.8M RSF Owned
7 M RSF Leased

Region 8 Rocky Mountain
9.6M RSF Owned
8.8 M RSF Leased

Region 5 Great Lakes
20.6M RSF Owned
13.5 M RSF Leased

Region 2 Northeast & Caribbean
13.2M RSF Owned
9.8 M RSF Leased

Region 1 New England
6.8M RSF Owned
4.2M RSF Leased

Region 9 Pacific Rim
19.1M RSF Owned
17 M RSF Leased

Region 3 Mid-Atlantic
15.8M RSF Owned
18.1 M RSF Leased

Region 11 National Capital
47.1M RSF Owned
43.9 M RSF Leased

Region 4 Southeast Sunbelt
20.4M RSF Owned
23.3 M RSF Leased

Region 7 Greater Southwest
16.9M RSF Owned
17.9 M RSF Leased

Region 6 Heartland
9.2M RSF Owned
12.9 M RSF Leased

GSA Portfolio : Asset Types

Facility Type	*Total RSF (Millions)*	*Vacant RSF (Millions)*	*Average Age*
Office	**103.6**	6.8	65
Courthouse	**64.3**	3.4	65
Warehouse	**7.1**	0.4	64
Land Port of Entry	**4.8**	0.9	31
Laboratory	**1.7**	0.2	30
Public Facing Facility	**0.9**	0.2	52
Child Care Center*	**0.2**	-	26
Parking	**0.2**	0.2	42
Other	**3.9**	1.3	43

Size Range (RSF)	Owned Assets
Under 10K	700
10K to 25K	210
25K to 50K	137
50K to 100K	153
Over 100K	452
Total	**1,652**

WIFM Tool Overview

WHAT IS IT?

A configurable tool that allows GSA project teams and client agencies to quickly see potential space-saving benefits from increased telework levels.

BACKGROUND & DEVELOPMENT

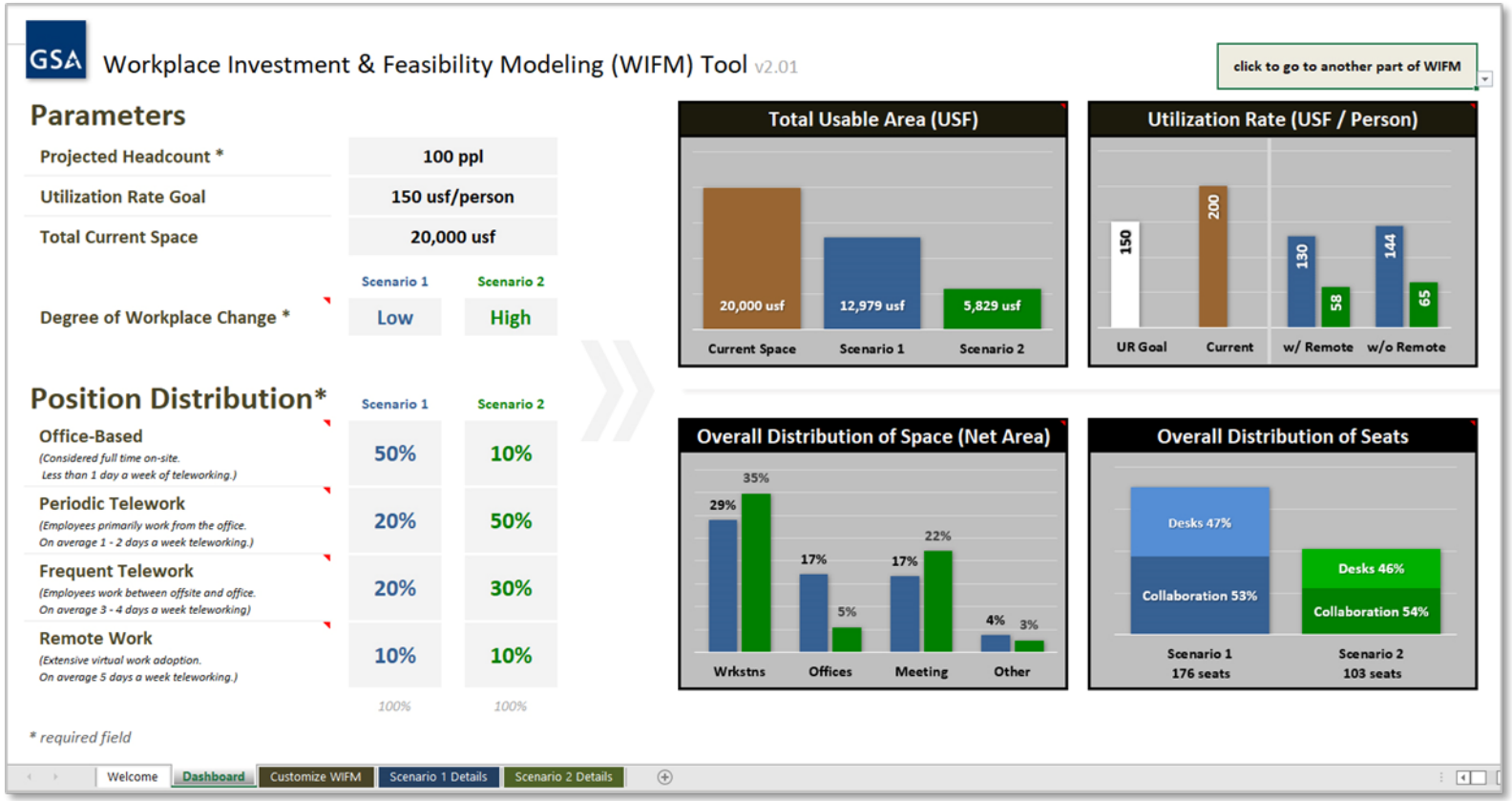
The first version of WIFM was developed in-house and released to client agencies in 2018. By adjusting individual workspace sizes and desk sharing ratios, client agencies could see the overall impacts on space needs. GSA recently enhanced the tool, giving it a cleaner user interface, do-it-yourself customization features, and greater accuracy in space calculations. Latest update in Spring 2023 added CO_2e estimates.

PURPOSE

To help users make better and earlier decisions about their workplace needs, as they consider the impact of hybrid work and alternative workplace strategies.

WIFM Tool Benefits

- Configure and compare multiple workplace scenarios
- Jump start development of future space requirements
- Develop feasibility scenarios for subsequent workplace programming & sustainability criteria
- Identify potential future need for change management services



WIFM Tool-Use Cases

Change in Capacity

Evaluate quickly how an increase or decrease in personnel will impact future space needs.

Requirements Development

Generate and compare many different options at the beginning of the Requirements Development process.

Telework Policy Change

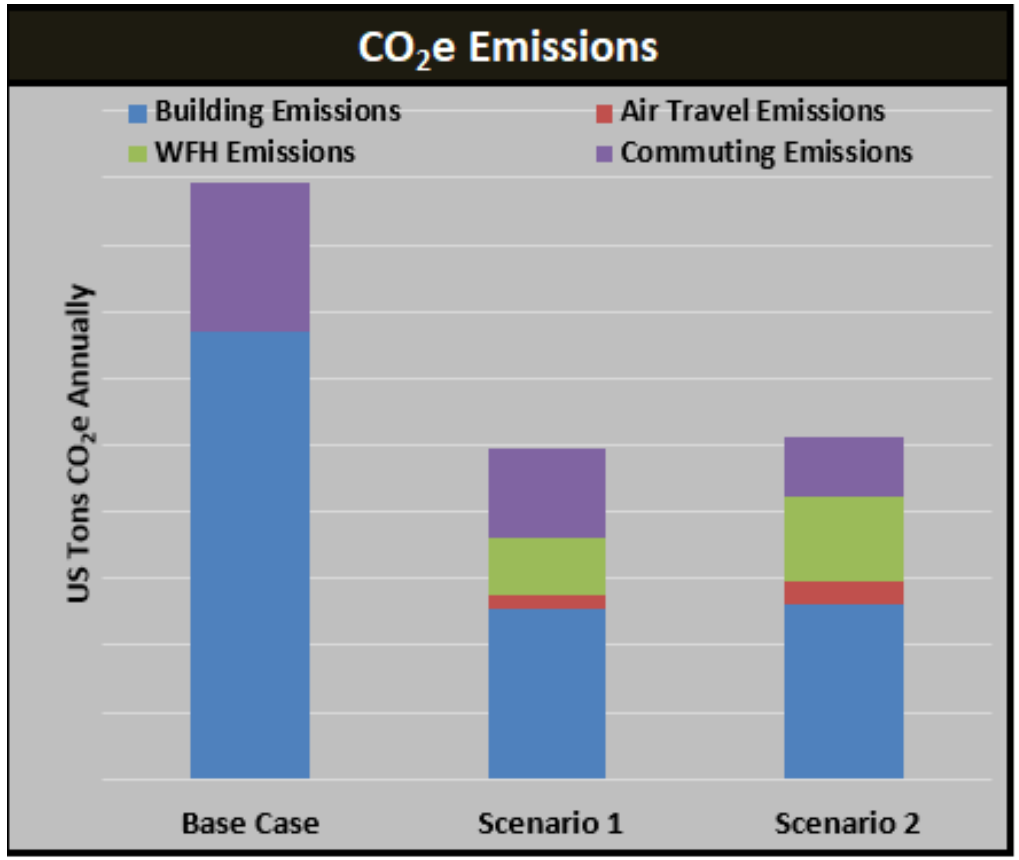
Rapidly compare options for changing telework or mobility policy to see the impacts on future space needs.

CO_2e Estimates (new feature)

Understand the rough magnitude of impact that changes in workplace policy/space requirements may have on emissions.

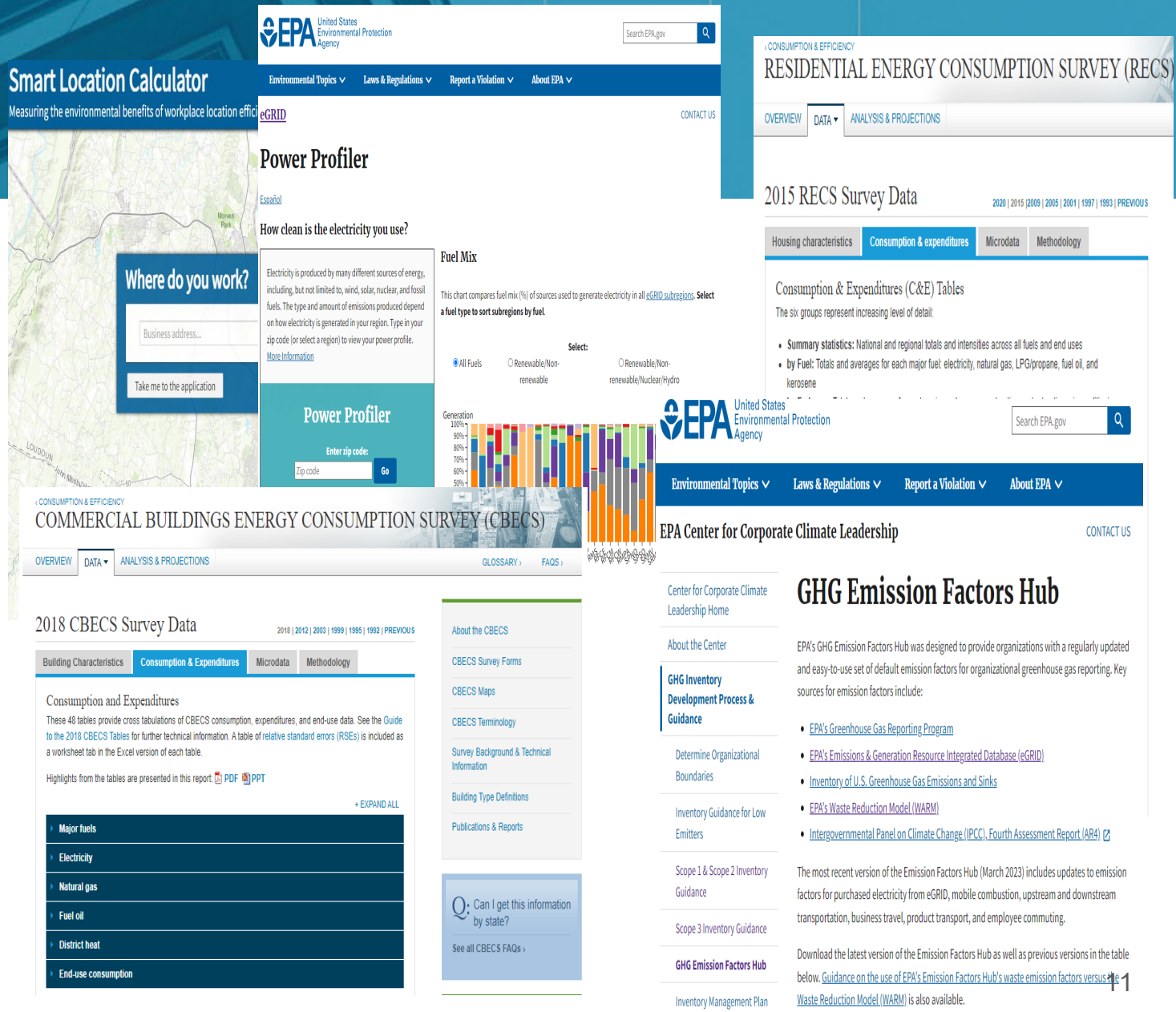
WIFM Tool-CO_2e Module

- Added to WIFM in Spring 2023
- Methodology, data, and calculations validated by a cross sector SME Advisory Panel
- It's a planning and decision making tool **NOT** a calculator
- Provides ROM estimates of annual workplace CO_2e
- Shows changes in CO_2e based on changes in workplace policies,space requirements, and planning decisions (base case VS 2 Scenarios)
- Captures CO2e from **4 emissions streams**:
  - Office building emissions
  - Commuting emissions
  - WFH emissions
  - Air travel emissions



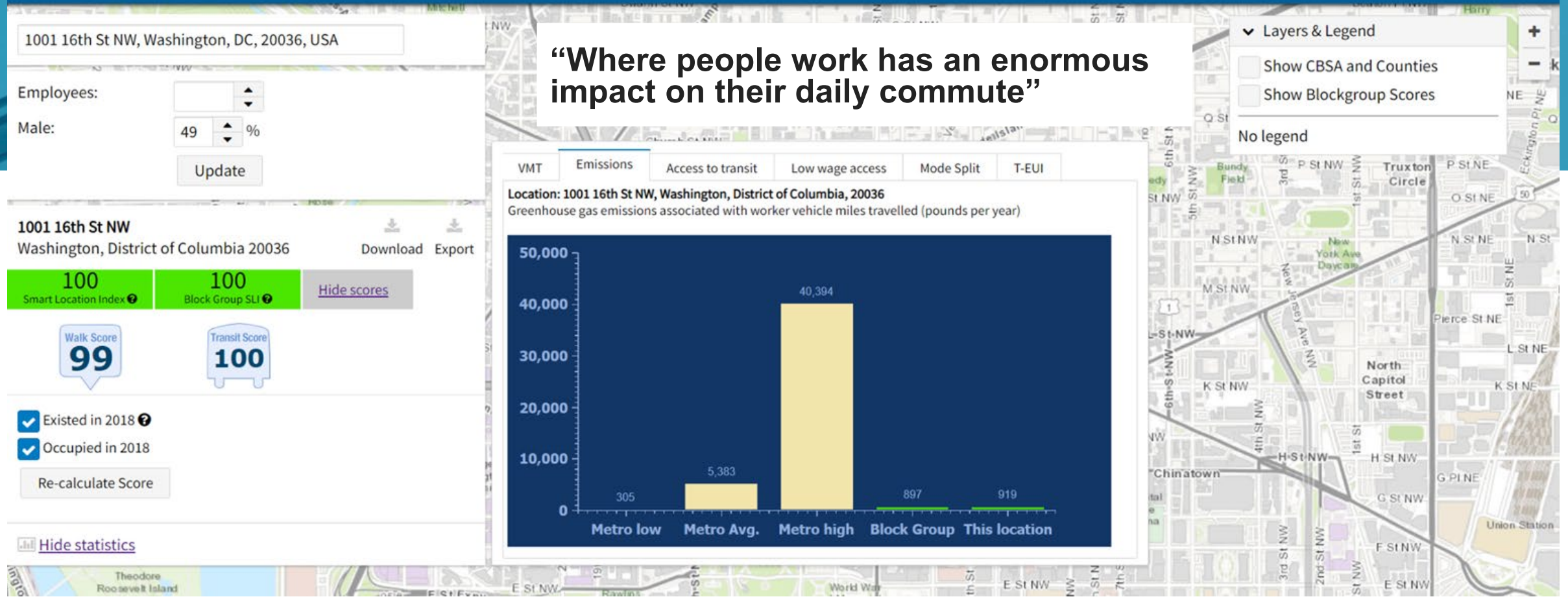
WIFM Tool-CO_2e Module - Data Sources

- CBECS 2018 - Building Energy Use Intensity
- RECS 2015 - Work From Home (WFH) Heating and Cooling Energy
- EIA Energy Use by Type of Building - Office building emissions
- EPA's Emissions Factors - Converting energy, Vehicle Miles Traveled, air miles to CO_2e emissions
- eGRID - Converting electricity to emissions
- Smart Location Calculator - Average Vehicle Miles Traveled for GSA buildings by Zip Code (internal source)



Smart Location Calculator

Measuring the environmental benefits of workplace location efficiency

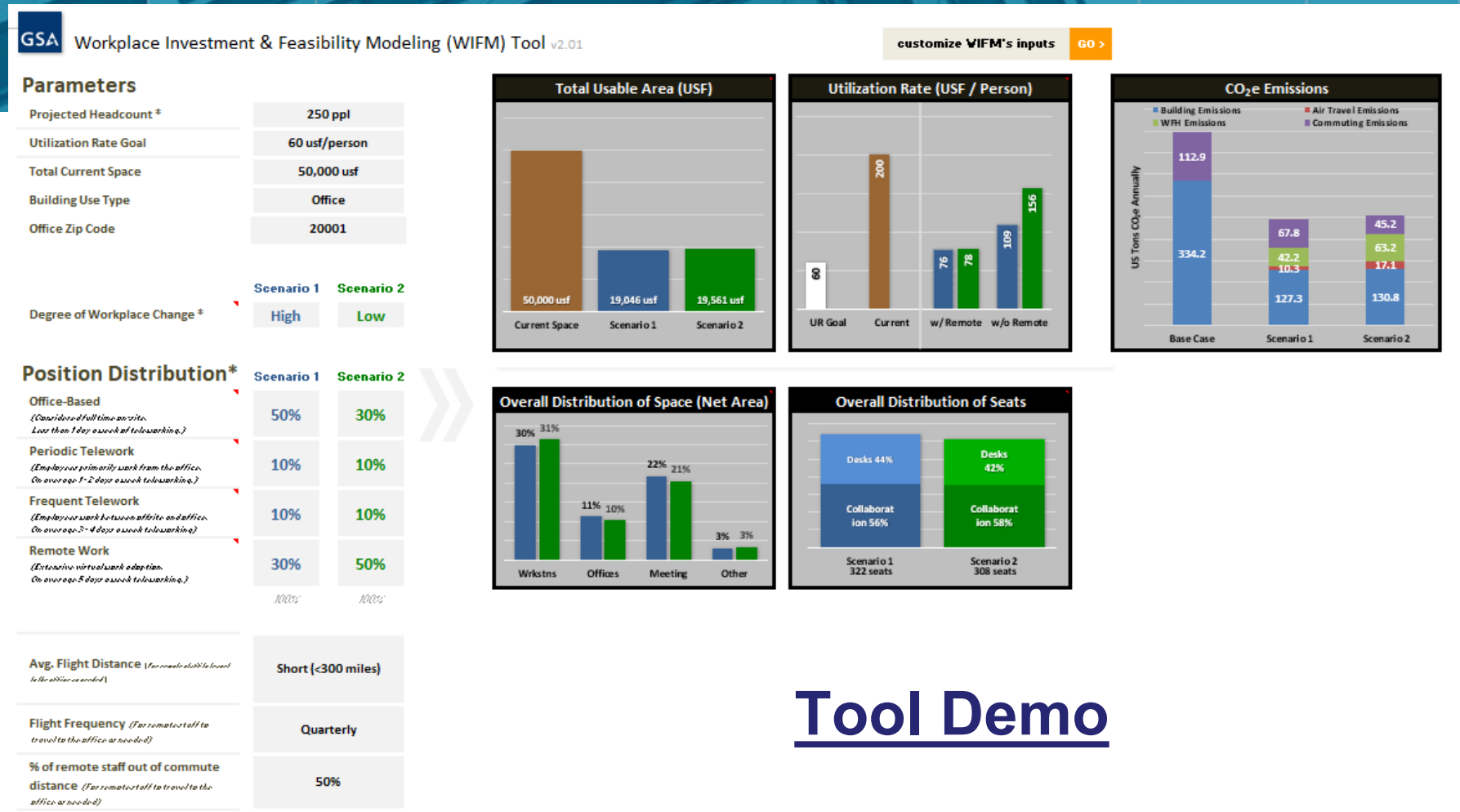


- The Smart Location Calculator is a simple tool for exploring how workplace location affects worker commute travel.
- Joint GSA/EPA tool, publicly available at slc.gsa.gov
- Measures the environmental benefits/impacts of workplaces
- Location specific (down to CBSA level)
- Smart location index (0-100)- With 0 being the least efficient.
- VMT/GHG
- Walk/transit scores

WIFM Tool-CO_2e Module - Assumptions

- All CO_2e estimates are annualized
- Base case - all employees are office based and commute five days a week
- Base case - no emissions from Work From Home (WFH) or Air Travel
- Air Travel - for remote employees traveling to/from the office for internal connection
- Commuting emissions - based on the average vehicle miles traveled (VMT) by zip code
- Commuting emissions - fully remote employees do not commute
- WFH - home-office energy calculations based on 240, 8-hour workdays per year
- WFH - office-based employees have no home-energy emissions

WIFM Tool-CO_2e Module



Tool Demo

Case Study - Chicago Office Building

Base-case parameters:

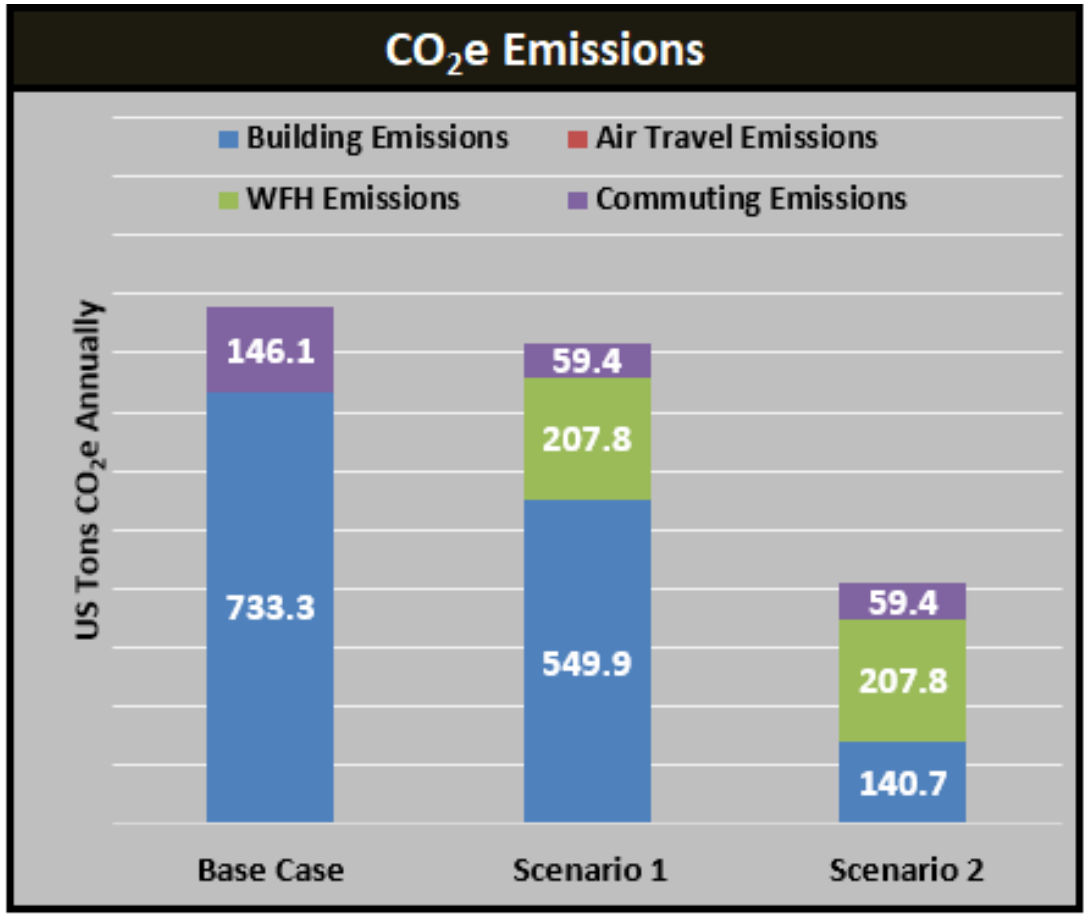
- Original Floorspace: ~80,000 USF
- Headcount: ~500
- Zip Code: 60604
- Base Case: Pre-pandemic, assuming everyone was Office Based
- Air Travel: None assumed for remote employees

WIFM Scenarios:

- Scenario 1 & 2: 57% hybrid, 2% office-based, 41% remote (actual)
- Scenario 1: ~60,000 USF office footprint (actual)
- Scenario 2: ~15,348 USF office footprint (WIFM-calculated)

Supplemental Analysis:

- Change in annual commuting estimated from available HR data:
  - 75% drop pre/post pandemic across GSA (emissions intensity)
  - 72% drop for this location
- Compares favorably ~60% commuting reduction calculated by WIFM
- Actual estimated building emissions for all of GSA-occupied space dropped by 13% from pre-pandemic baseline (2019).
- Scenario 1 projects a 25% reduction in building emissions BUT if GSA followed the WIFM (Scenario 2), emissions would drop by 80%



Case Study - Fort Worth Office Building

Base-case parameters:

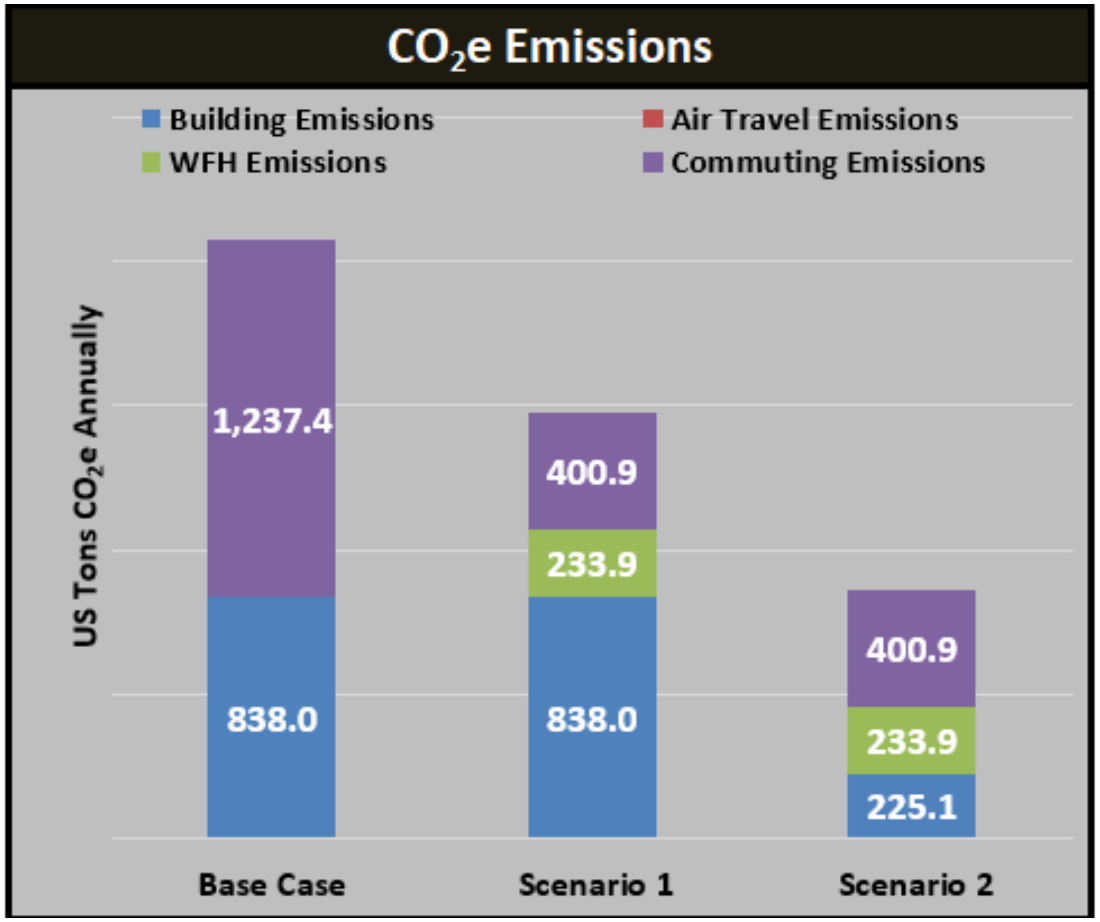
- Original Floorspace: ~126,000 USF
- Headcount: ~660
- Zip Code: 76102
- Base Case: Pre-pandemic, assuming everyone was Office Based
- Air Travel: None assumed for remote employees

WIFM Scenarios:

- Scenario 1 & 2: 46% hybrid, 1% office-based, 53% remote (actual)
- Scenario 1: ~126,000 USF office footprint (actual)
- Scenario 2: ~19,844 USF office footprint (WIFM-calculated)

Supplemental Analysis:

- Change in annual commuting estimated from available HR data:
  - 75% drop pre/post pandemic across GSA (emissions intensity)
  - 81% drop for this location
- Compares favorably ~67% reduction calculated by the WIFM
- Actual building emissions for all of GSA-occupied space dropped by 13% from pre-pandemic baseline (2019).
- Scenario 1 shows no reduction in building emissions BUT if GSA followed the WIFM (Scenario 2), emissions would drop by 73%



Sensitivity Analysis

Approach:
Use CoolClimate's Household Carbon Footprint (HHCFP) dataset to estimate the impacts to non-work household emissions of remote employees that move away from the office location.

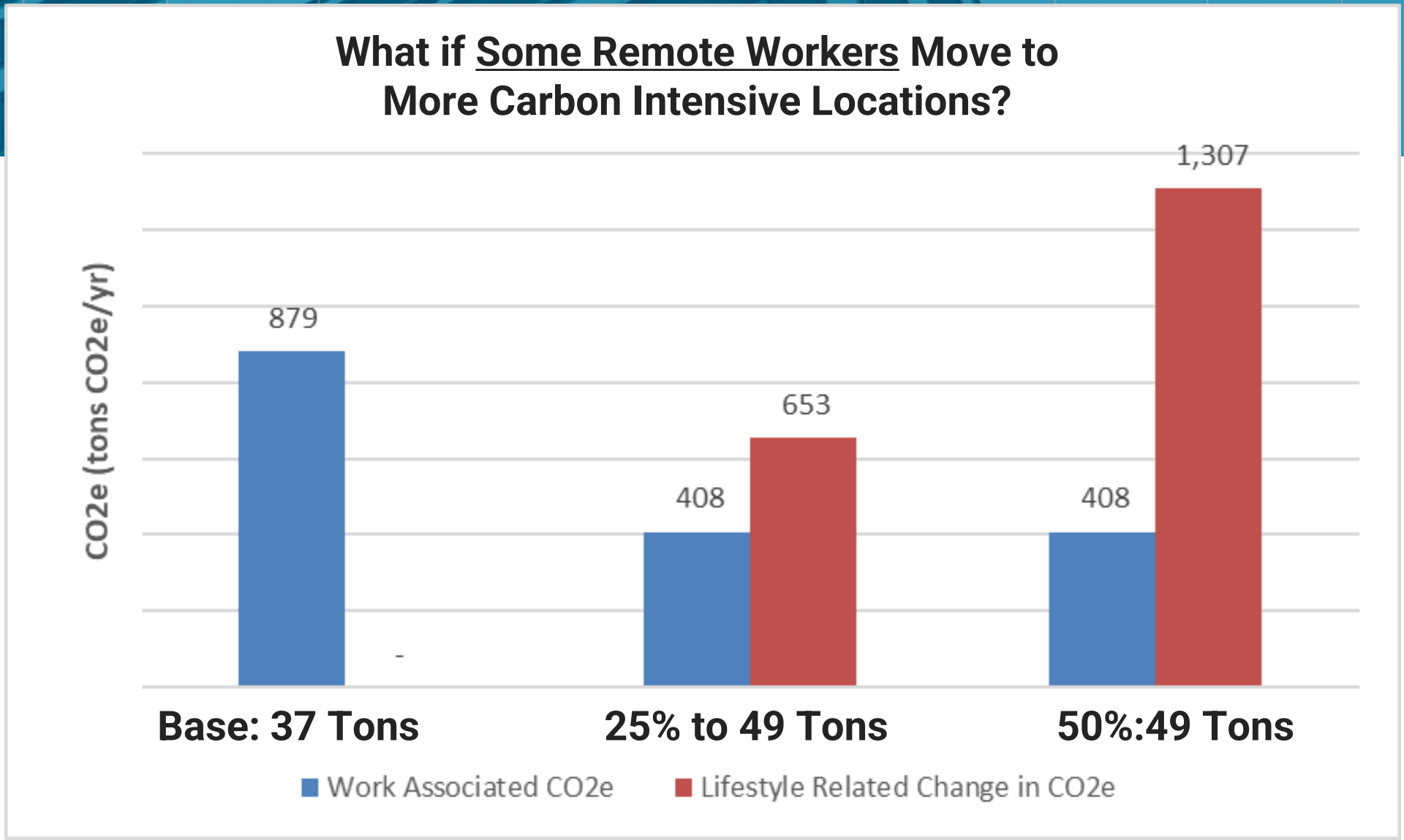
As it is still unclear how prevalent these relocations are, these results don't impact the WIFM's outcome; they are provided to help the decision maker consider this potential unintended consequence.

Scope:
Select the share of remote workers you guess might relocate and an average carbon footprint (higher or lower) for the new location. From this WIFM projects the change in non-work emissions.

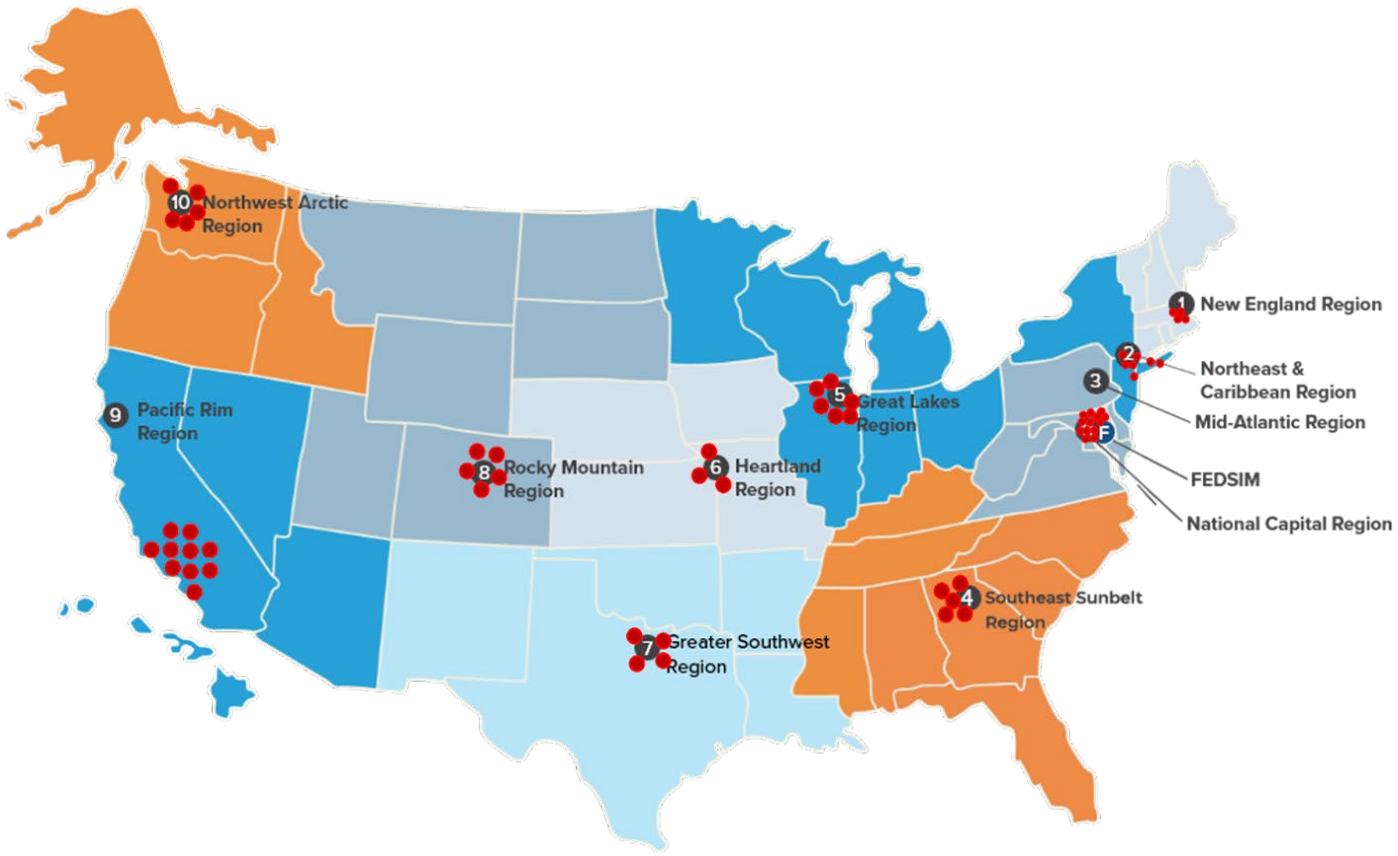
Emission Boundaries/Categories:

- Housing energy: (Electricity, Natural gas, Fuel oil)
- Non-work-related transportation emissions
- Food
- Goods
- Services

Sensitivity Analysis - Chicago Office Building



Optimizing Our Footprint Helps Achieve Other Goals



Ventilation Verification Program

140 Buildings

~50% of federally-owned space

Test and Balance

Minor Repairs

Verify Outdoor Air Rates

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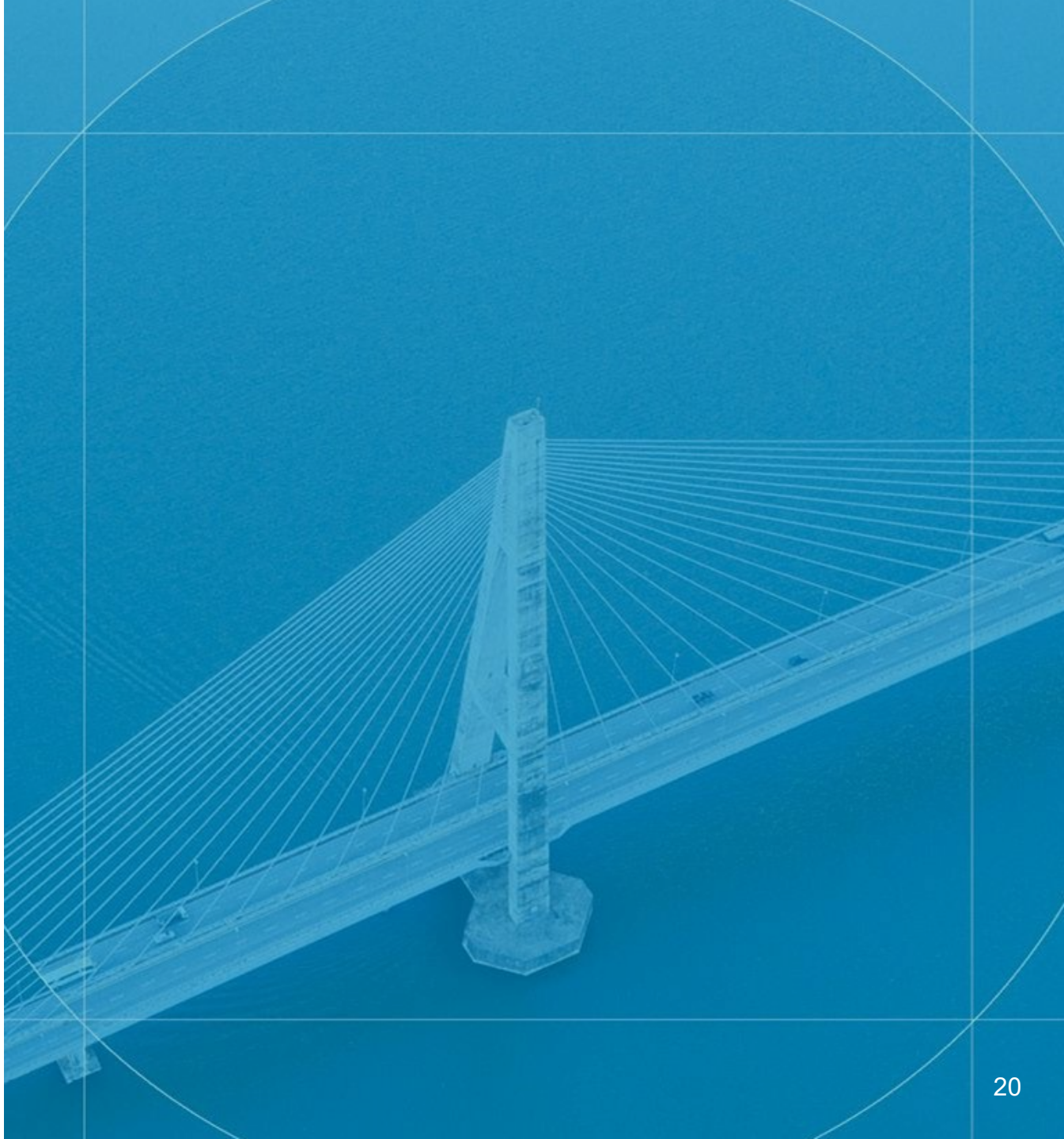
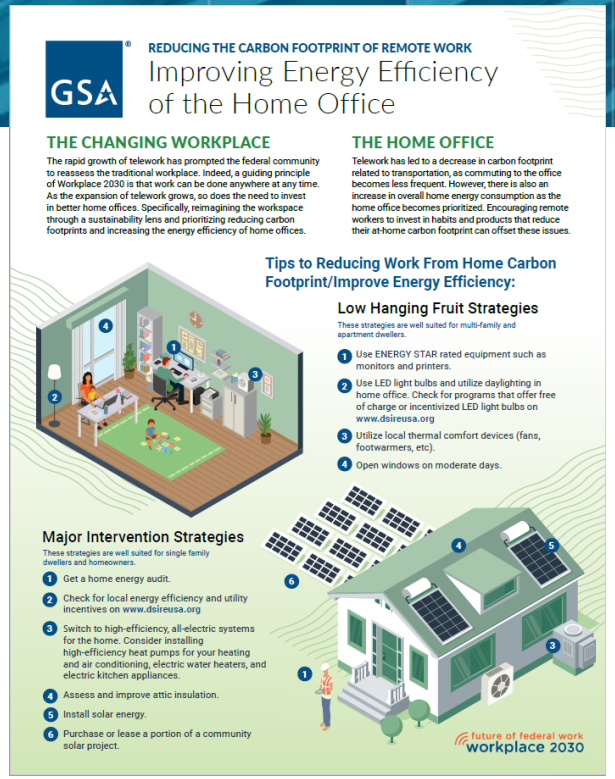
Resources



Change Management

Resources to Improve The Home Office



REDUCING THE CARBON FOOTPRINT OF REMOTE WORK

Improving Energy Efficiency of the Home Office

THE CHANGING WORKPLACE

The rapid growth of telework has prompted the federal community to reassess the traditional workplace. Indeed, a guiding principle of Workplace 2030 is that work can be done anywhere at any time. As the expansion of telework grows, so does the need to invest in better home offices. Specifically, reimagining the workspace through a sustainability lens and prioritizing reducing carbon footprints and increasing the energy efficiency of home offices.

THE HOME OFFICE

Telework has led to a decrease in carbon footprint related to transportation, as commuting to the office becomes less frequent. However, there is also an increase in overall home energy consumption as the home office becomes prioritized. Encouraging remote workers to invest in habits and products that reduce their at-home carbon footprint can offset these issues.

Tips to Reducing Work From Home Carbon Footprint/Improve Energy Efficiency:

Low Hanging Fruit Strategies

These strategies are well suited for multi-family and apartment dwellers.

1. Use ENERGY STAR rated equipment such as monitors and printers.
2. Use LED light bulbs and utilize daylighting in home office. Check for programs that offer free of charge or incentivized LED light bulbs on www.dsireusa.org
3. Utilize local thermal comfort devices (fans, footwarmers, etc).
4. Open windows on moderate days.

Major Intervention Strategies

These strategies are well suited for single family dwellers and homeowners.

1. Get a home energy audit.
2. Check for local energy efficiency and utility incentives on www.dsireusa.org
3. Switch to high-efficiency, all-electric systems for the home. Consider installing high-efficiency heat pumps for your heating and air conditioning, electric water heaters, and electric kitchen appliances.
4. Assess and improve attic insulation.
5. Install solar energy.
6. Purchase or lease a portion of a community solar project.

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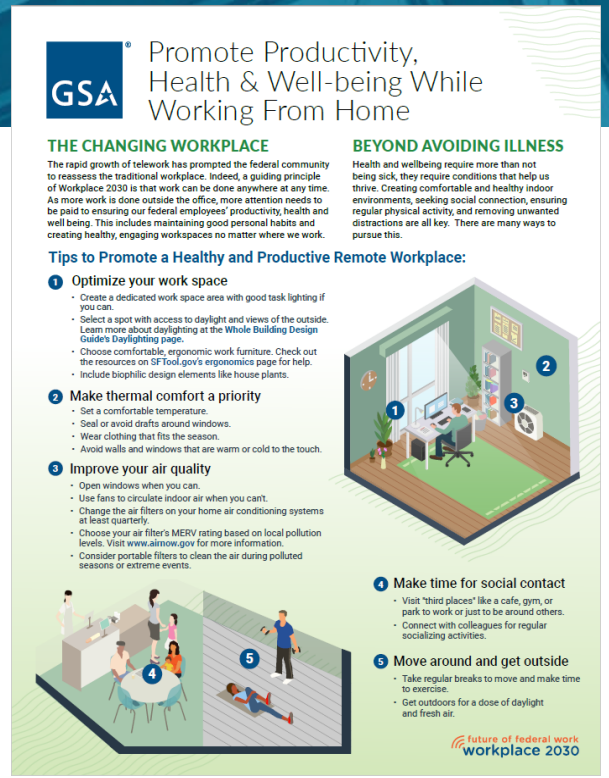
Reduce home-office energy use



Promote Productivity, Health & Well-being While Working From Home

THE CHANGING WORKPLACE

The rapid growth of telework has prompted the federal community to reassess the traditional workplace. Indeed, a guiding principle of Workplace 2030 is that work can be done anywhere at any time. As more work is done outside the office, more attention needs to be paid to ensuring our federal employees' productivity, health and well being. This includes maintaining good personal habits and creating healthy, engaging workspaces no matter where we work.

BEYOND AVOIDING ILLNESS

Health and wellbeing require more than not being sick, they require conditions that help us thrive. Creating comfortable and healthy indoor environments, seeking social connection, ensuring regular physical activity, and removing unwanted distractions are all key. There are many ways to pursue this.

Tips to Promote a Healthy and Productive Remote Workplace:

1. **Optimize your work space**
   - Create a dedicated work space area with good task lighting if you can.
   - Select a spot with access to daylight and views of the outside. Learn more about daylighting at the Whole Building Design Guide's Daylighting page.
   - Choose comfortable, ergonomic work furniture. Check out the resources on SFTool.gov's ergonomics page for help.
   - Include biophilic design elements like house plants.
2. **Make thermal comfort a priority**
   - Set a comfortable temperature.
   - Seal or avoid drafts around windows.
   - Wear clothing that fits the season.
   - Avoid walls and windows that are warm or cold to the touch.
3. **Improve your air quality**
   - Open windows when you can.
   - Use fans to circulate indoor air when you can't.
   - Change the air filters on your home air conditioning systems at least quarterly.
   - Choose your air filter's MERV rating based on local pollution levels. Visit www.airnow.gov for more information.
   - Consider portable filters to clean the air during polluted seasons or extreme events.
4. **Make time for social contact**
   - Visit "third places" like a cafe, gym, or park to work or just to be around others.
   - Connect with colleagues for regular socializing activities.
5. **Move around and get outside**
   - Take regular breaks to move and make time to exercise.
   - Get outdoors for a dose of daylight and fresh air.

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Improve health & wellness

Solid Waste Management in the Home Office

THE CHANGING WORKPLACE

The rapid growth of telework has prompted the federal community to reassess the traditional workplace. Indeed, a guiding principle of Workplace 2030 is that work can be done anywhere at any time. As more work is done within the home office, and more solid waste is therefore cycled through the home, we need to ensure our federal employees' can properly manage their work-related solid waste to reduce the environmental impacts of telework.

SOLID WASTE MANAGEMENT

Solid waste is accumulated more now within the home as federal employees spend more time working from their home offices. Electronics used for work in addition to other waste is cycled through the home much quicker now. Employees can manage waste by using the reduce, reuse and recycle method and best practices.

Tips to Reduce Waste Through the Reduce, Reuse and Recycle method:

1. **Reduce**
   - Avoid using printers, ink, and paper as much as possible; switch to electronic documents and files.
   - Turn off and/or unplug lights during the day. This will save energy and keep your lights lasting longer.
   - Reduce hazardous waste by buying batteries with low mercury content or using rechargeable batteries.
   - Don't leave your phones, tablets, laptops, and headsets plugged in all day, cycle charging to off-peak hours and extend the life of the batteries.
   - Learn more about waste reduction here: www.waste360.com/waste-reduction/ten-ways-reduce-waste-office
2. **Reuse**
   - Extend the life of office electronics including computers, printers, phones, etc.
   - Regular maintenance and turning off your office electronics when not working can greatly improve their life span.
   - When possible, buy refurbished electronics.
   - Have a yard sale to find homes for clothes, toys, appliances, and books that you no longer need.
   - For indoor house cleaning, buy reusable mops, rags and sponges.
3. **Recycle**
   - Recycle certain office items such as paper and ink cartridges (defer to your local recycling program).
   - Learn to compost at home. Snacks, coffee, and lunches at home could be composted.
   - Recycle unwanted old office electronics by taking them to stores like Best Buy.
   - Find recycling locations and programs information on: https://recyclenation.com/ https://www.wm.com/ https://search.earth911.com/

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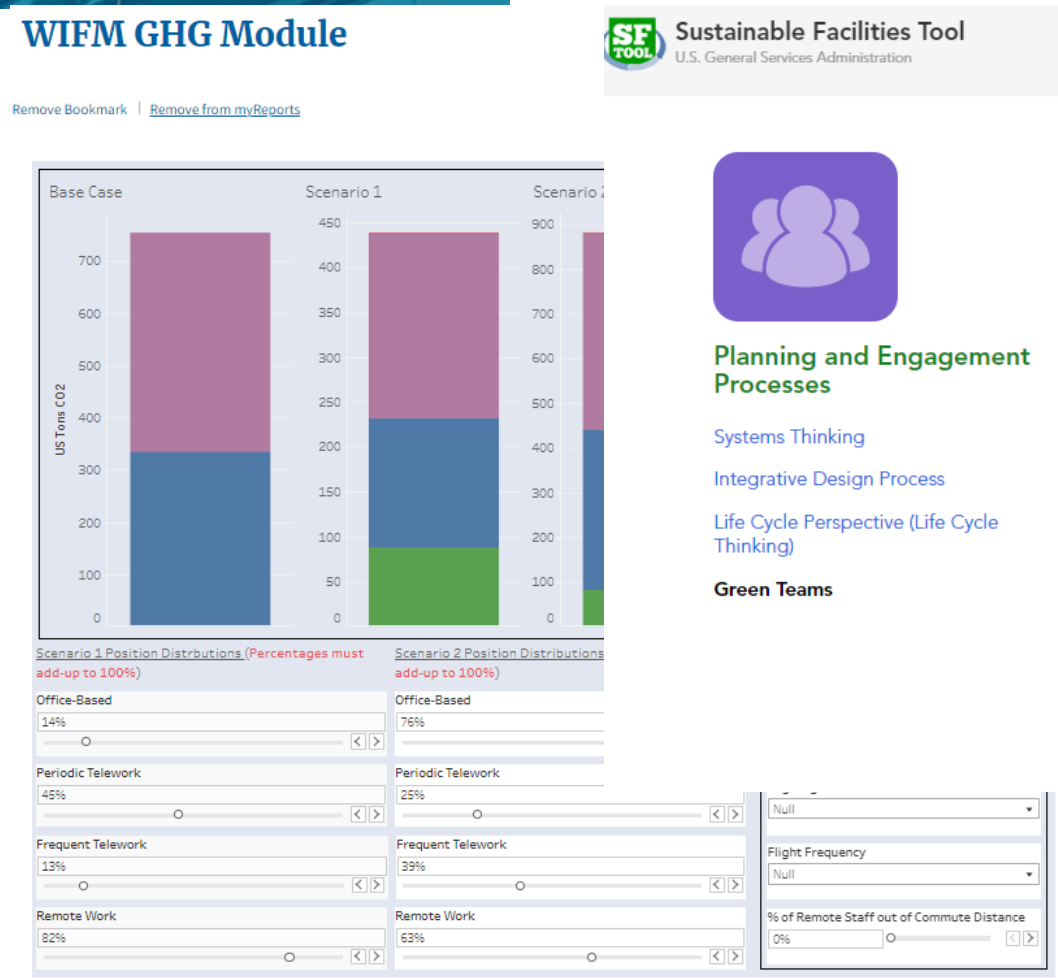
Reduce home-office waste

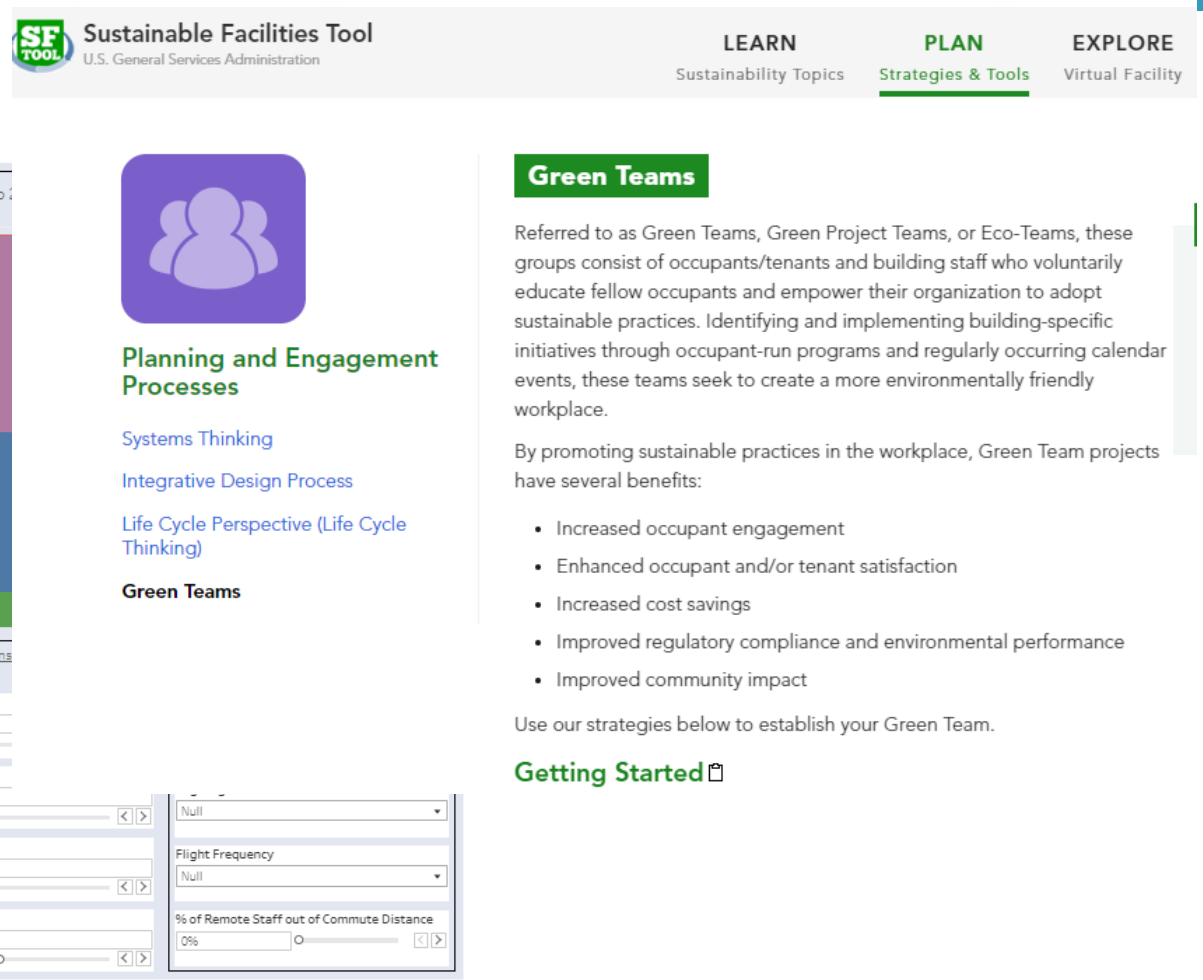
Additional Resources

1. Beta WIFM CO2e module Tableau Dashboard

1. Client Enrichment Series

1. SFTool- Green Teams





The Balancing Act: Distributed Work and Greenhouse Gas Emissions

https://noblis.org/gsa-wifmtool/

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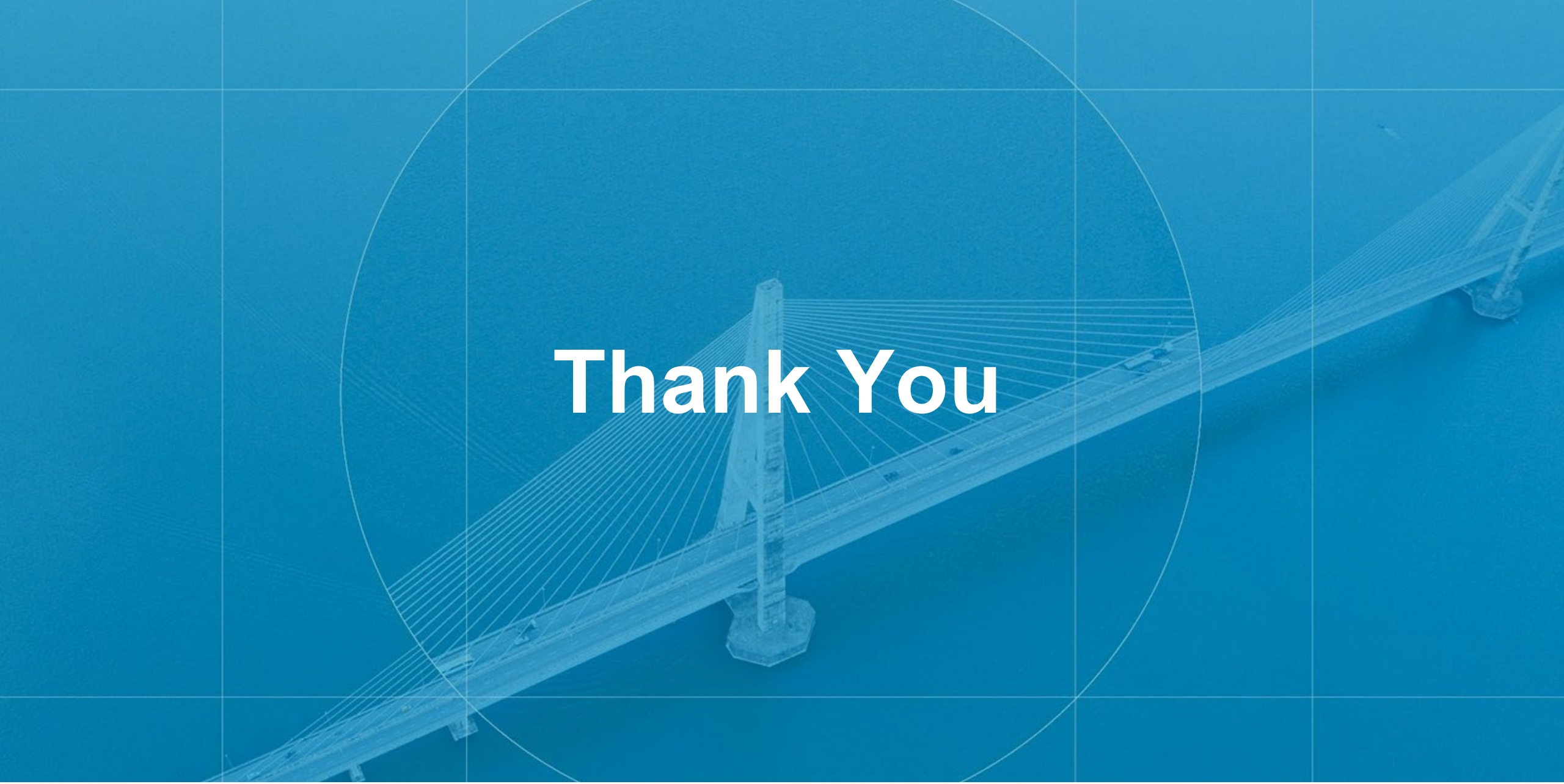

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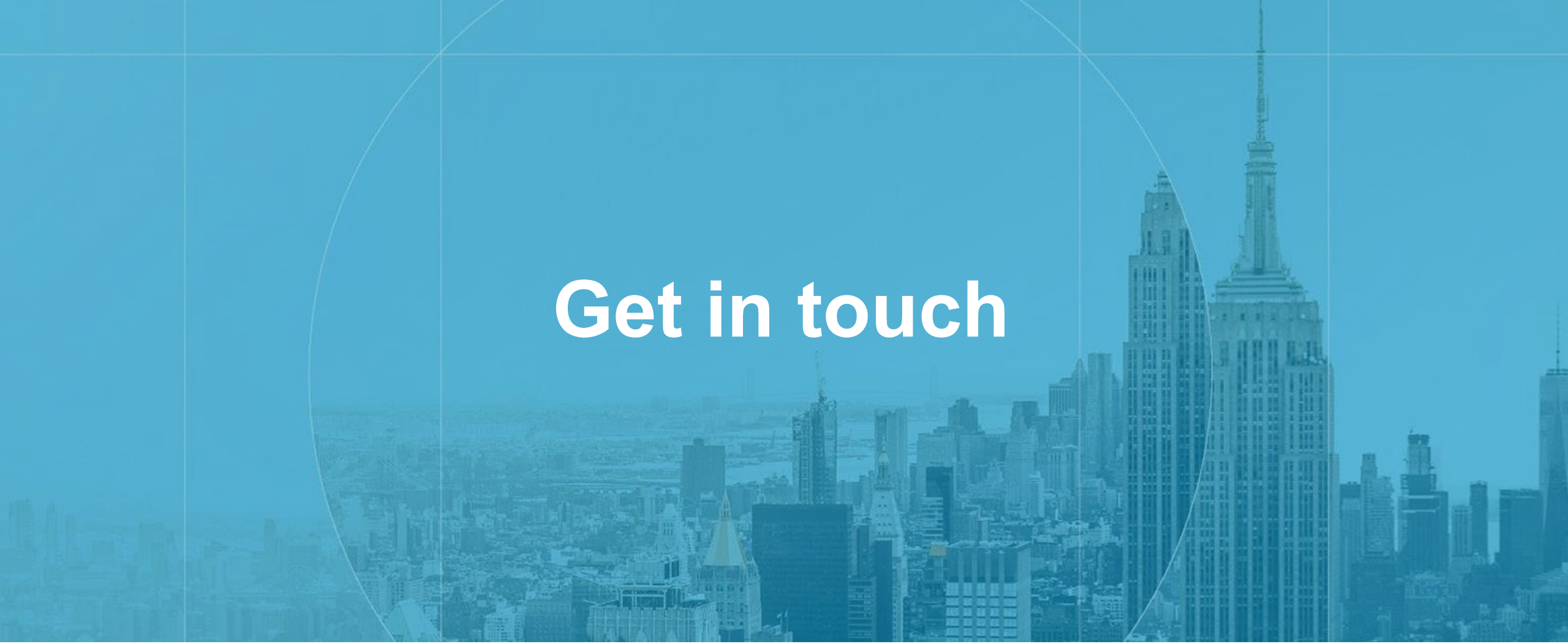

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