

Act on Climate Sharing Session

Please complete this pre-session survey while we wait for folks to join us:
www.pollev.com/eresources411

Technical questions about zoom: email
Matthew.Moretta.CTR@energy.ri.gov

We will get started shortly!



Act on Climate

Sharing Session #3

March 16, 2022

RIEC⁴

Act on Climate Mandates

2022 Update: By 12-31-2022, the EC4 shall submit an update to the 2016 Greenhouse Gas Emissions Reduction Plan to Governor & General Assembly

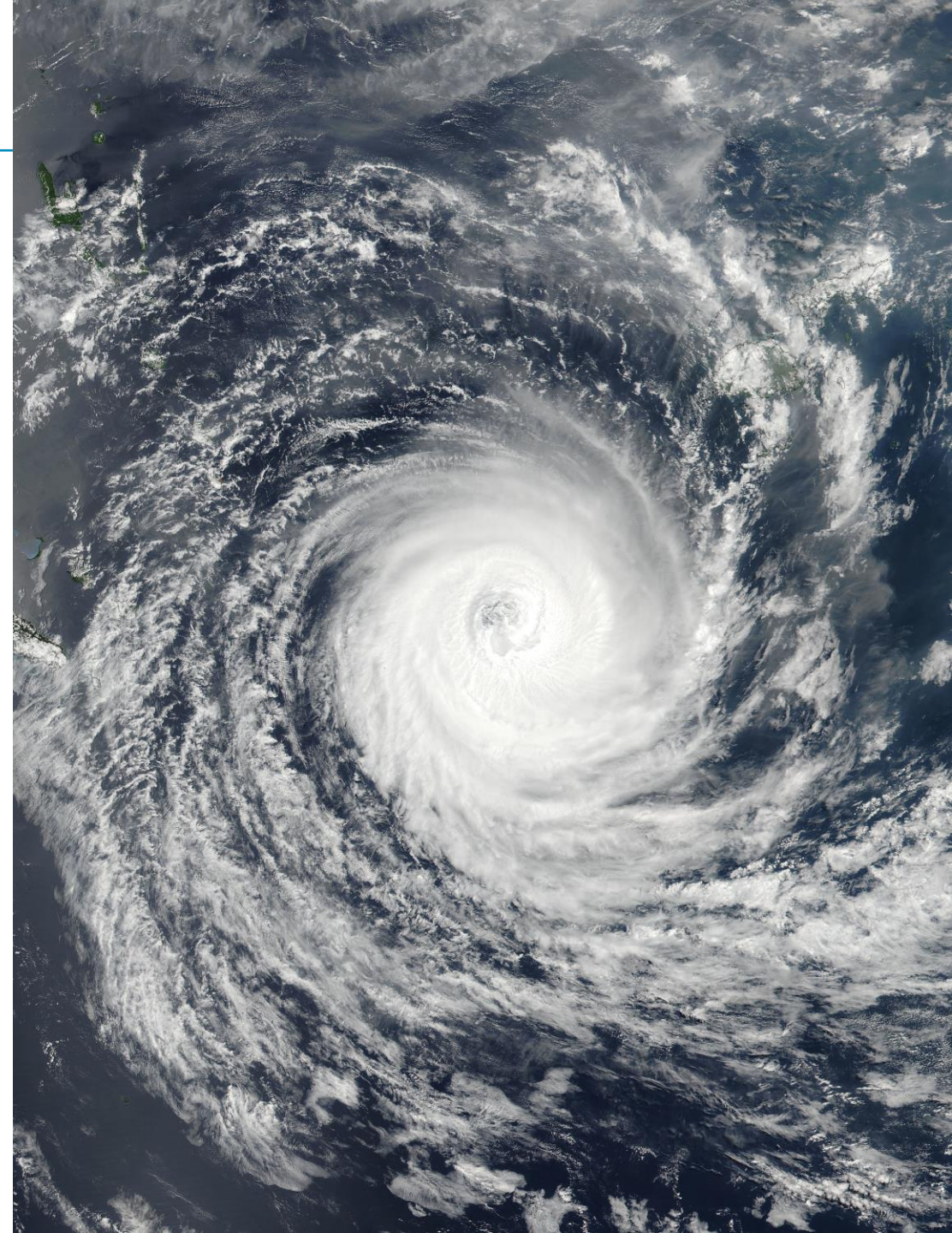
- For more information on the scope of the 2022 Update, visit www.climatechange.ri.gov/aoc/
- Today's discussion informs technical review and updating emissions reduction goals since 2016

The Act on Climate establishes economy-wide emissions reduction targets of:

- 10% below 1990 levels by 2020;
- 45% below 1990 levels by 2030;
- 80% below 1990 levels by 2040; and
- **Net-zero emissions by 2050**

Facilitated Discussion

1. Considerations for re-estimating land use impacts
2. Considerations for updating the 1990 baseline
3. Other considerations?



How to Participate



- **Unmute** yourself using the icon at the bottom right of the screen and speak your question or comment.



- Open the **chat box** by clicking on the icon at the bottom of your screen.
- Type your question or comment into chat.
- Type that you would like to speak in the chat.
- We will either read your comment or call on you to speak.



- Click the participants icon at the bottom of your screen then click the **raise hand** icon at the bottom left of the pop-up window to raise your hand.
- We will call on you to speak.



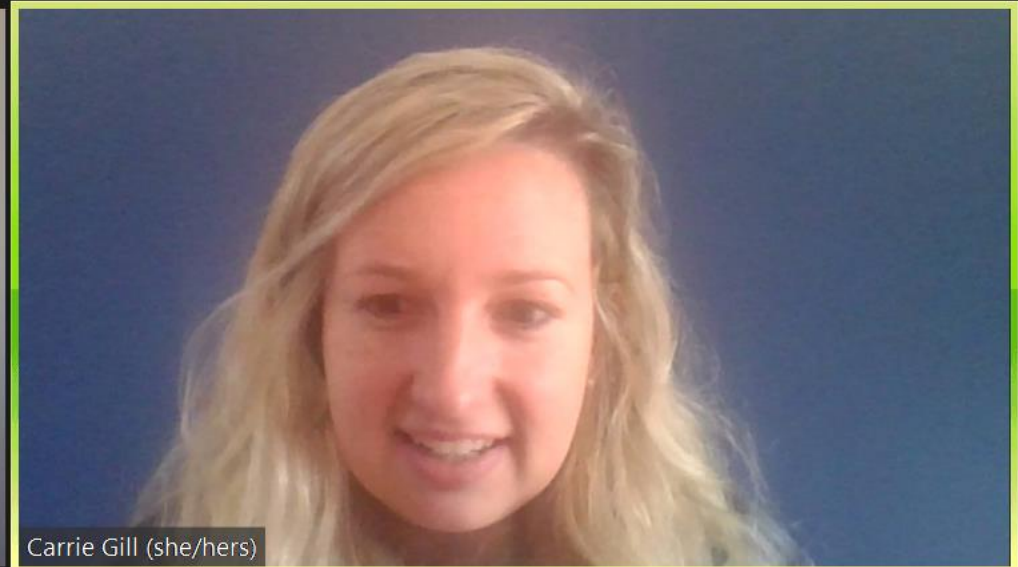
- **Phone:** unmute yourself from your phone options and speak your question or comment.
- Phone: hit *6 to unmute yourself and speak your question or comment.
- Phone: hit *9 to raise hand and we will call on you to speak.



- Please direct technical zoom **questions** to Matthew.Moretta. CTR@ energy.ri.gov



Yasmin Yacoby (she/hers)



Carrie Gill (she/hers)

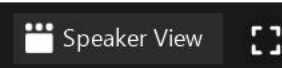


Becca Trietch

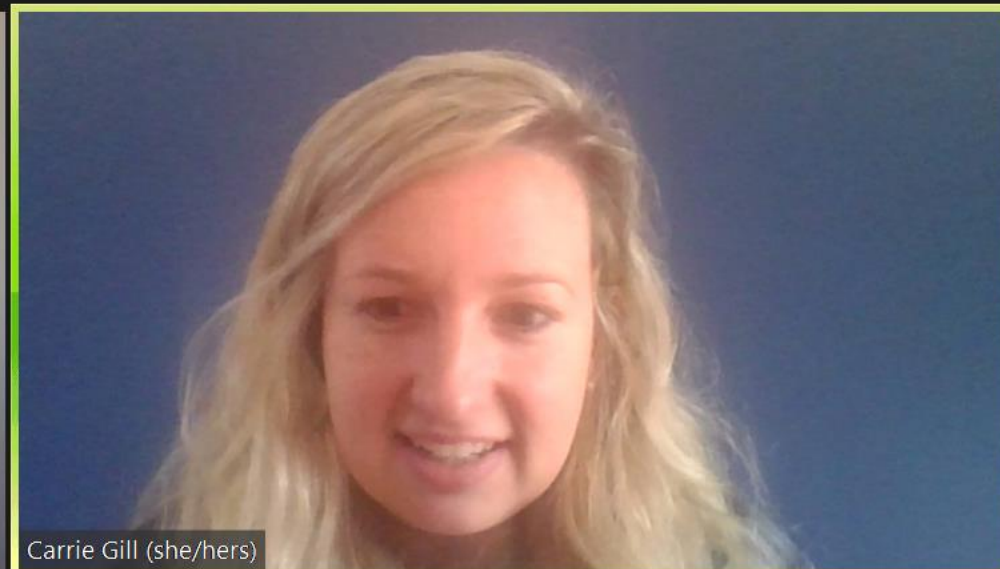


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Yasmin Yacoby (she/hers)



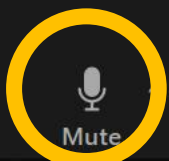
Carrie Gill (she/hers)

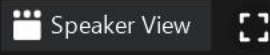


Becca Trietch

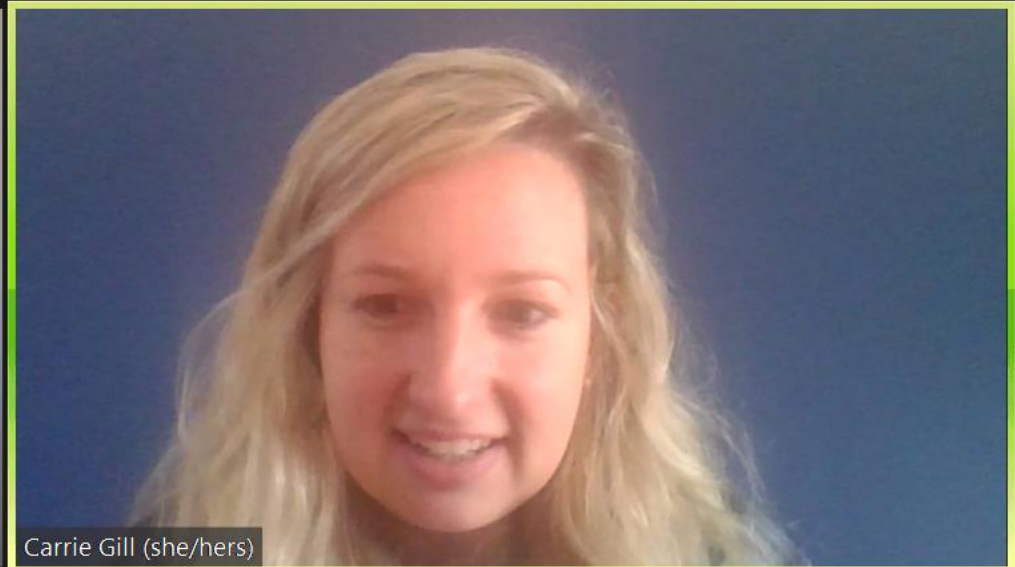


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Yasmin Yacoby (she/hers)



Carrie Gill (she/hers)



Becca Trietch



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Mute



Stop Video



Participants



Chat



Share Screen

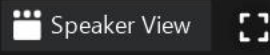


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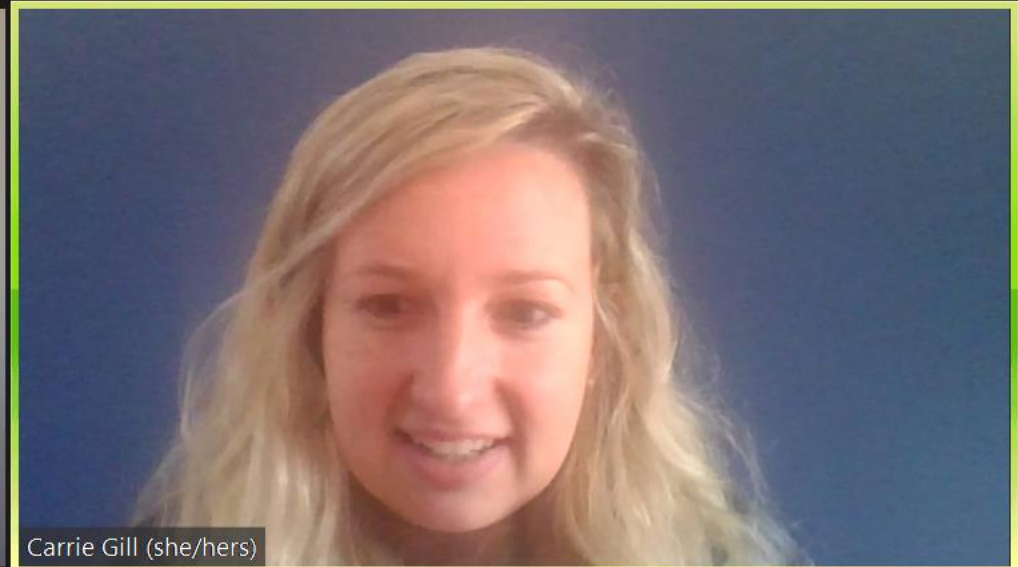


Reactions

Leave



Yasmin Yacoby (she/hers)



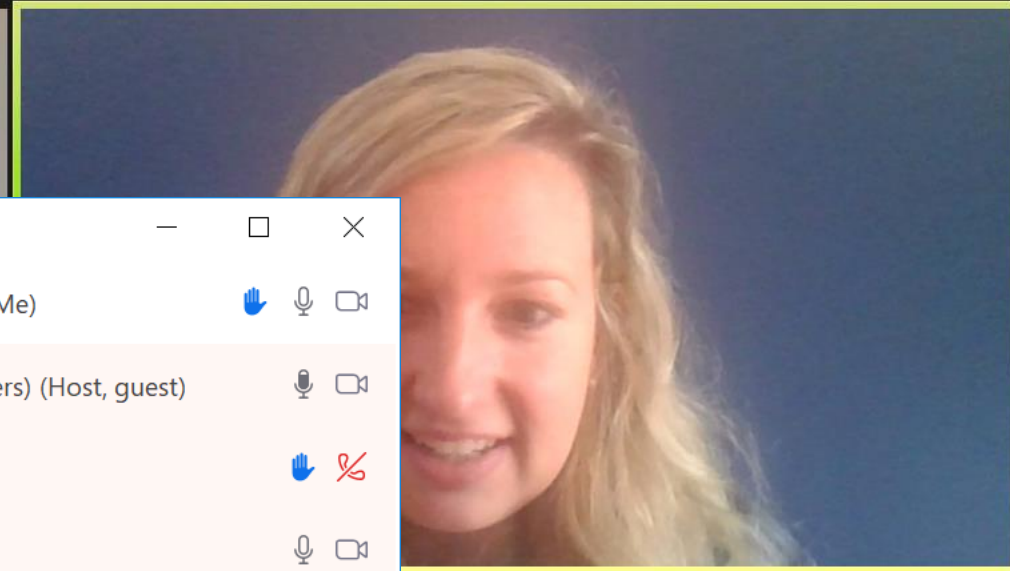
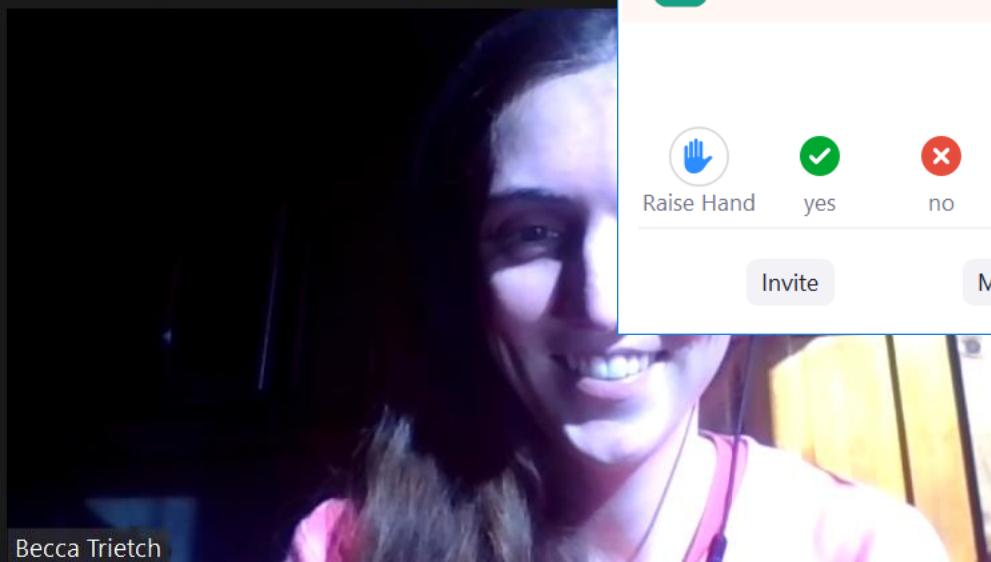
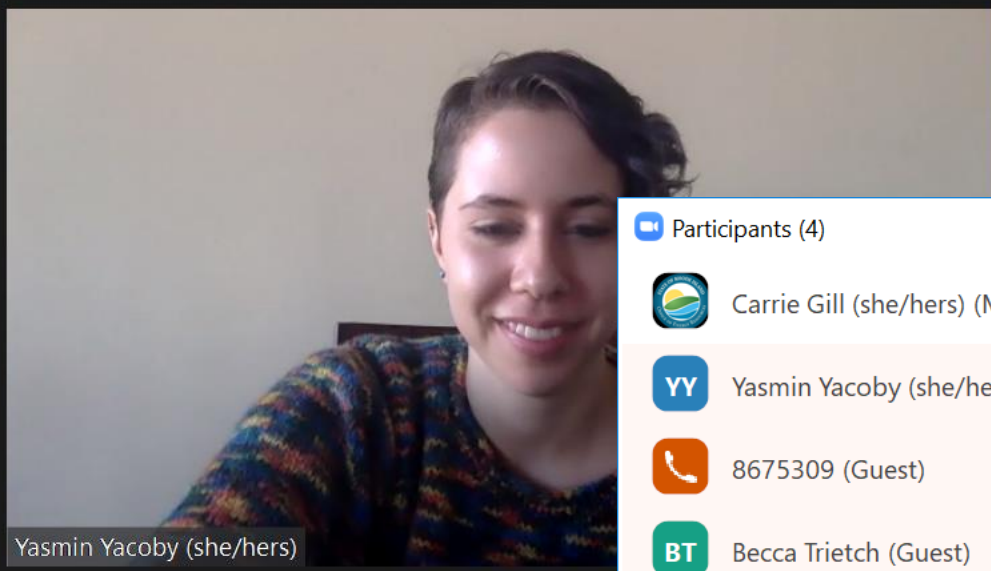
Carrie Gill (she/hers)



Becca Trietch



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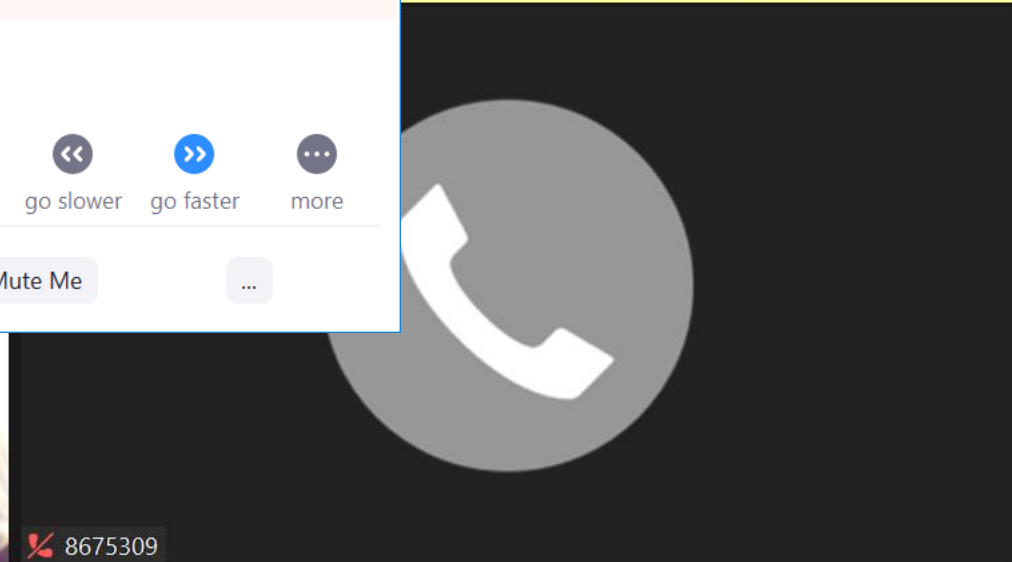
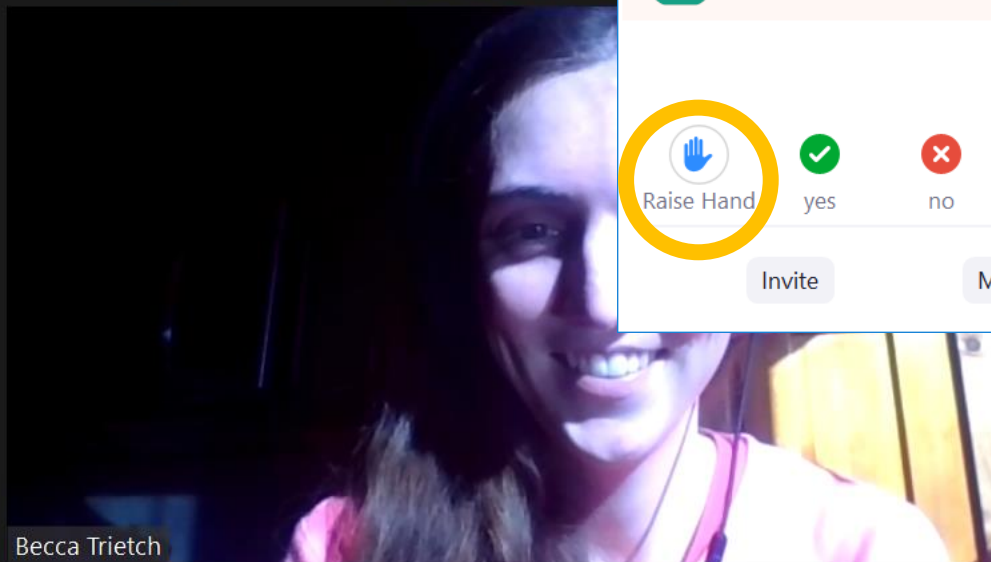
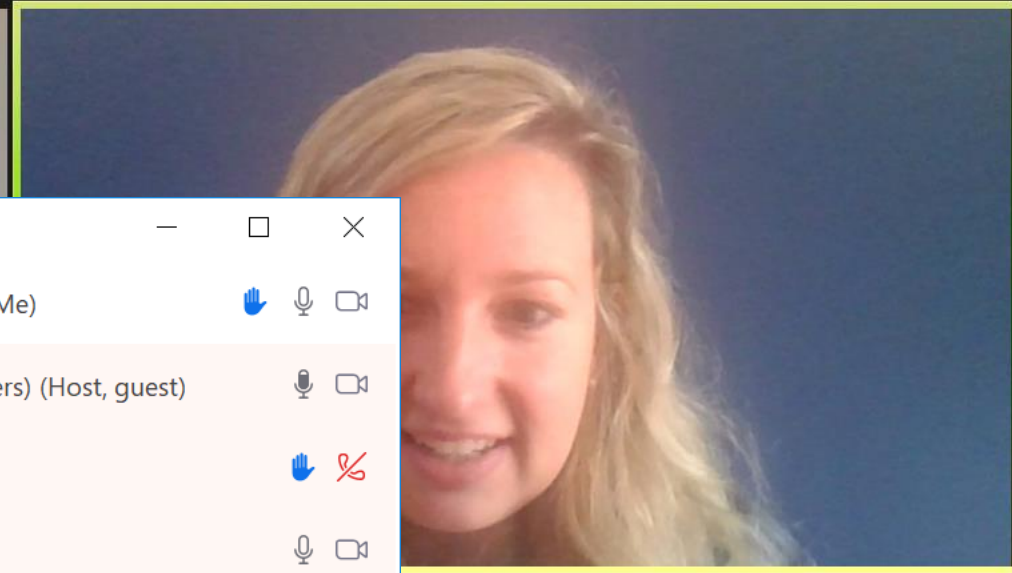
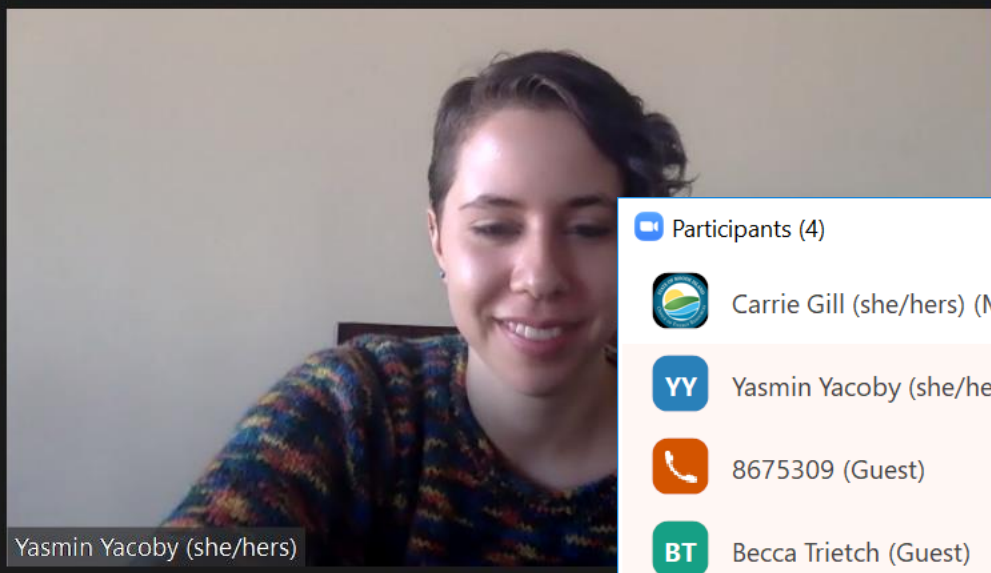
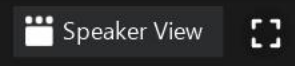


Participants (4)

	Carrie Gill (she/hers) (Me)			
	Yasmin Yacoby (she/hers) (Host, guest)			
	8675309 (Guest)			
	Becca Trietch (Guest)			

Raise Hand yes no go slower go faster more

Invite Mute Me ...



Participants (4)

	Carrie Gill (she/hers) (Me)			
	Yasmin Yacoby (she/hers) (Host, guest)			
	8675309 (Guest)			
	Becca Trietch (Guest)			

yes

no

go slower

go faster

more

Invite

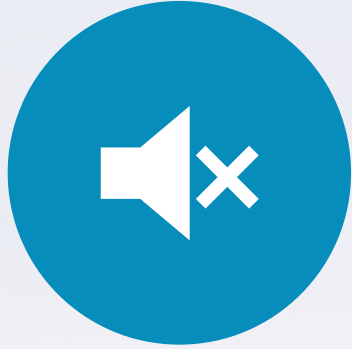
Mute Me

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Housekeeping and Logistics



- This meeting is being **recorded** so we can be sure to capture your comments.
- We do not intend to post this recording publicly.



- Please **mute** your mic when not speaking.
- OER will monitor noise levels and mute folks who may have accidentally unmuted themselves.



- **Make space and take space**
- Each person will be allotted a maximum of 3 minutes to speak initially to ensure we are allowing everyone an opportunity to be heard



- We recognize there may be inherent **power dynamics** in this conversation.
- We **encourage** everyone to voice both support and concerns, and invite you to challenge our assumptions and our thinking.



- Thank you in advance for your good intentioned comments and questions and for your **respect** toward everyone present.
- Please refrain from interrupting or speaking over others – this will ensure we hear and understand all speakers.

Today's Agenda



- **Primer on Rhode Island's Greenhouse Gas (GHG) Emissions Inventory Methodology and Tools**
 - Time for clarifying questions
- **Facilitated Discussion**
 - Considerations for re-estimating land use impacts
 - Considerations for updating the 1990 baseline
 - Other considerations?

Rhode Island's Greenhouse Gas Emissions Inventory Methodology & 1990 Baseline



Rhode Island
Department of
Environmental
Management

OFFICE OF AIR RESOURCES

*Act on Climate
Sharing Session
March 16, 2022*

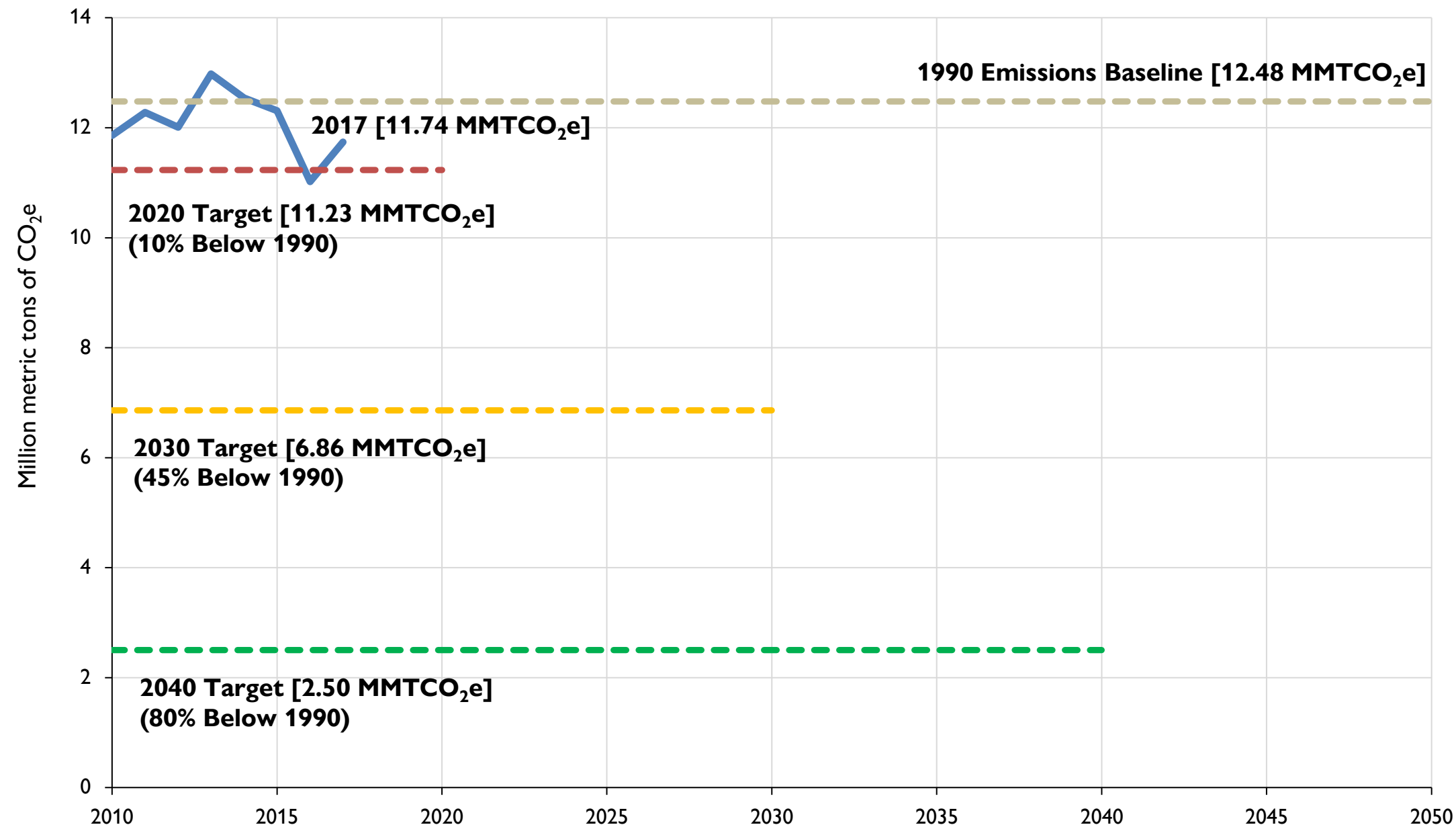
GHG Emissions Inventory History



- RI's 1st GHG emissions inventory completed by NESCAUM (2013)
 - Estimated 1990 baseline
 - Completed 2010 inventory
 - Projected 2020 emissions
 - Primary tool: EPA's State Inventory Tool (SIT)
 - *SIT is an interactive excel spreadsheet that calculates sector by sector GHG emissions*
 - *Users can pre-load default data or insert state-specific data*
- RIDEM's Office of Air Resources continues to estimate GHG emissions primarily using the SIT on an annual basis.
- Dec. 2019 release of RI's 2016 GHG EI Summary
- GHG Emissions Inventory: <http://www.dem.ri.gov/programs/air/ghg-emissions-inventory.php>

Rhode Island Greenhouse Gas Emissions

2021 Act on Climate Reduction Mandates

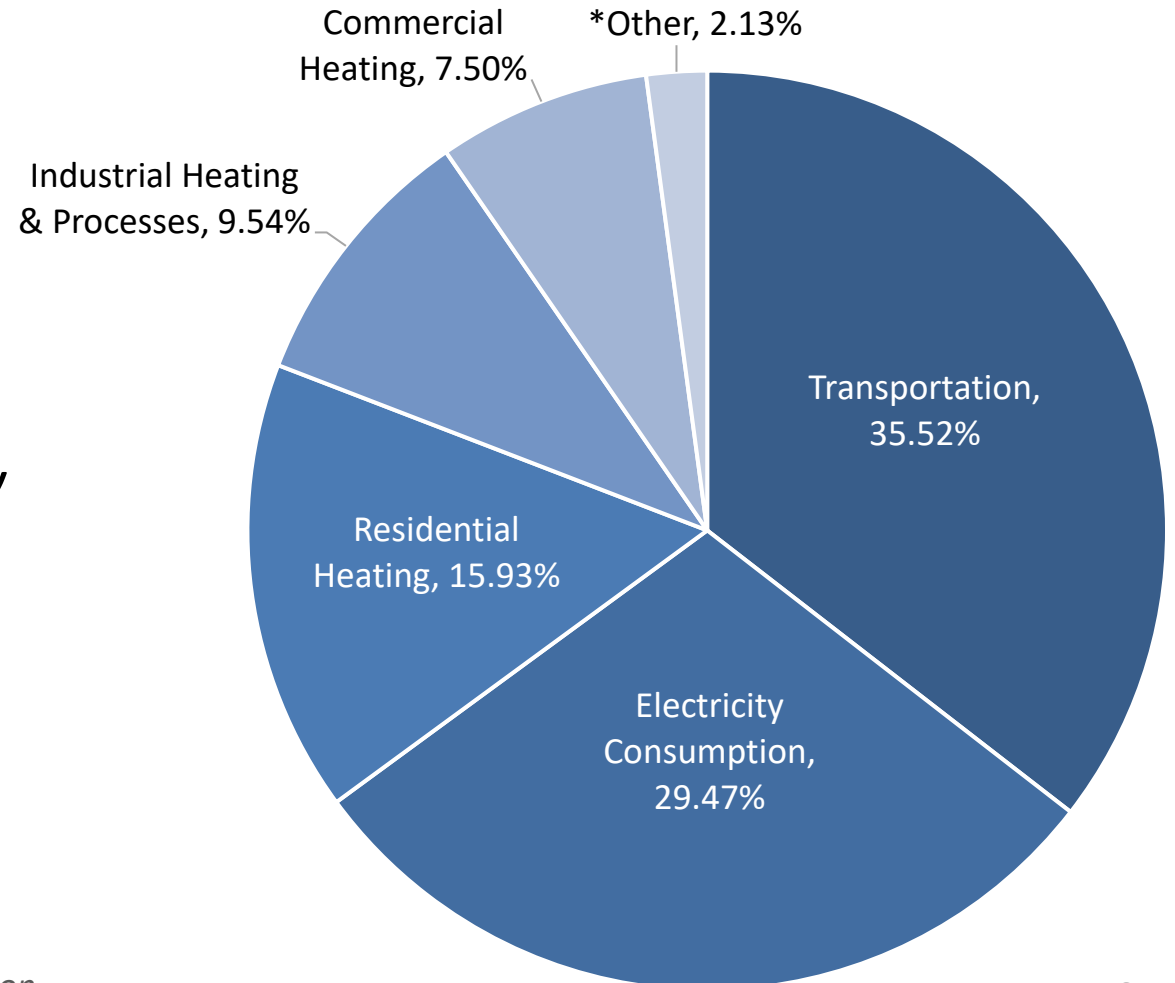


Sectors of RI GHG Emissions



1. **Transportation**
2. **Electricity Consumption**
3. **Residential Heating**
4. **Industrial Heating & Processes**
5. **Commercial Heating**
6. ***Other**
7. *Land Use, Land Use Change, and Forestry (LULUCF)*

Inventoried GHG Emission Sectors, 2017



**Other includes emissions from agriculture, waste, and natural gas distribution.*

Greenhouse Gas Inventory Data Sources



- RIDEM uses a variety of resources to compile the annual greenhouse gas inventory.
- The State Inventory Tool (SIT) is most heavily relied upon for most emissions sectors.
- The MOVES (Motor Vehicle Emissions Simulator) model is presently used for the transportation sector since it allows for a wider array of inputs.
- State-specific data, such as air traffic information from the RI Airport Corporation, is used in the SIT 'localize' data.
- More 'local' data translates to more accurate emissions estimates for Rhode Island.

Transportation	Electricity Consumption	Residential Heating
Motor Vehicle Emission Simulator (MOVES)	New England Power Pool Generation Information System (NEPOOL GIS)	EPA State Inventory Tool (SIT)
<i>Rhode Island Airport Corporation (RIAC)</i>	<i>EPA State Inventory Tool (SIT)</i>	<i>Energy Information Administration (EIA) State Energy Data</i>
<i>FHWA Highway Statistics</i>		
<i>EIA Adjusted Sales of Fuel Oil by End Use</i>		

Federal Government

State Government

Private Sector

BOLD: Primary Data Source
Italicized: Secondary Data Source

State Inventory Tool (SIT)



- Developed by the U.S. Environmental Protection Agency (EPA).
- Rhode Island relies heavily on this tool for most economy-wide greenhouse gas emissions accounting.
- Consists of 11 excel-based modules that calculate sector-by-sector GHG emissions using numerous state-level data sets.
- Includes energy-related data provided by the U.S. Energy Information Administration (EIA).
- SIT estimates GHG emissions by applying pollutant-specific emissions factors to Rhode Island activity data.
- EPA updates the SIT annually
- Examples of state-specific activity data for agriculture sector: number of animals, tons of crops, and tons of fertilizer used.

Simplified SIT Equation:

$$\text{Activity Data} \times \text{Emissions Factor} = \text{Emissions [MMTCO}_2\text{e]}$$

Example SIT Calculation:

$$\begin{aligned} \text{\# of Cows [cows]} \times \text{Emissions Factor [kg CH}_4\text{ / cow]} \\ = \text{Emissions from Dairy Cows [kg CH}_4\text{]} \end{aligned}$$



Photo Courtesy of USDA

Transportation Sector Methodology



- Transportation sector includes:
 - Highway vehicles
 - Aviation
 - Non-Road (Marine & diesel off-road)
- For highway vehicles, EPA **MOVES** model used.



I-195 Washington Bridge, Providence
Photo Courtesy of RIDOT

SIT Inputs (Prior to 2017)	MOVES Inputs (2017)
Fuel Consumption	Age Distribution
Vehicle Miles Traveled	Fuel Blends
	Inspection Program (I/M)
	Meteorology
	Vehicle Population
	Road Distribution
	Speed Distribution
	Vehicle Miles Traveled

Electricity Consumption Sector Methodology



- Up until Year 2016, the GHG emissions associated with Electricity Consumption sector were calculated with the SIT.
- RI methodology aligned with MA & CT.
- The key difference between the SIT and our refined methodology is the accounting for Renewable Energy Certificates (RECs) purchased and sold by RI retail electricity sellers.



Manchester Street Power Station, Providence
Photo Courtesy of RIDEM Office of Air Resources



Block Island Wind Farm, New Shoreham
Photo Courtesy of Rhode Island Seagrant

Residential Heating Sector Methodology



- Rely on SIT Tool to estimate GHG emissions.
- SIT tool data is populated by the U.S Energy Information Administration (EIA).
 - *Example: in RI, National Grid provides natural gas consumption data to EIA.*
- CO₂ emissions from fossil fuel combustion are calculated by multiplying energy consumption by the emission factors for each fuel (natural gas, distillate fuel, kerosene, LPG).
- <http://www.dem.ri.gov/programs/air/ghg-emissions-inventory.php>



Winter in Providence, RI
Photo Courtesy of The Providence Journal



Time for clarifying questions



Facilitated Discussion



- **Considerations for re-estimating land use impacts**
 - Discussion
- **Considerations for updating the 1990 baseline**
 - Discussion
- **Other considerations?**

Considerations for re-estimating land use impacts



- Land use impacts are captured within the sector **Land-Use, Land-Use Change, and Forestry** (abbreviated LULUCF)
- LULUCF acts as a “sink” and absorbs greenhouse gas emissions.
- The International Panel on Climate Change (IPCC) recommends accounting for the LULUCF sector.
- LULUCF is challenging to account for due to data reliability constraints at the state level.
- Currently, only Year 1990 accounts for LULUCF in Rhode Island.



Tillinghast Pond Management Area
Photo Courtesy of the Nature Conservancy

Considerations for re-estimating land use impacts



- The 1990 baseline includes a greenhouse gas emissions sink, called LULUCF
- Most states account for their GHG emissions in two ways:
 - Gross Emissions = **Sources** ONLY
 - Net Emissions = **Sources – Sinks**
- RI's 1990 Baseline represents a *net emission* total, whereas all-other years (2010-2017) are *gross emission* totals
 - Gross totals do **not** include the LULUCF sector

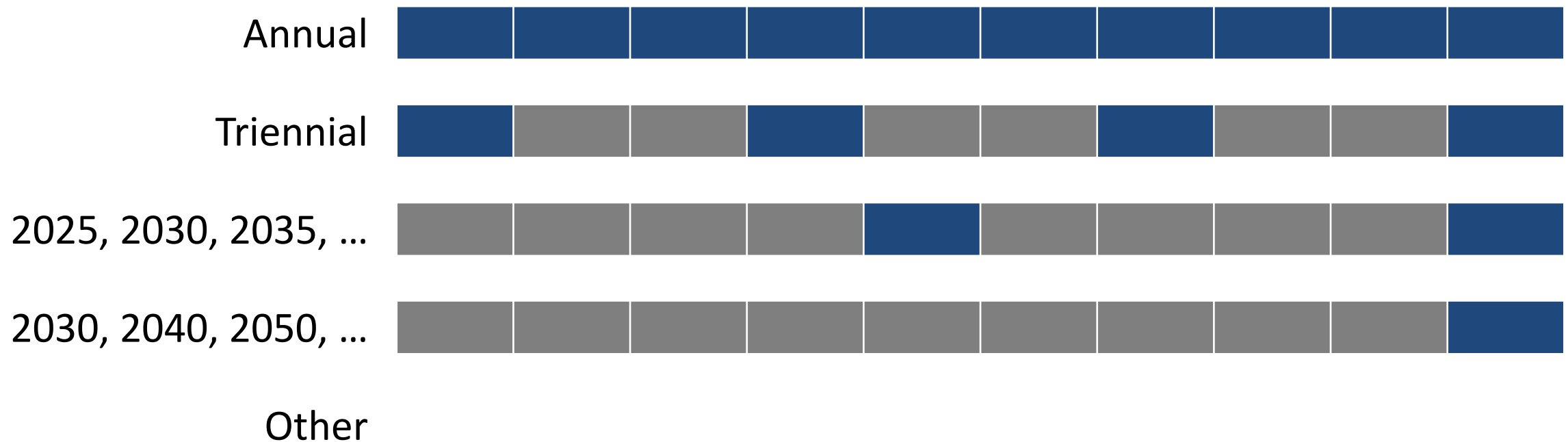
RI Greenhouse Gas Emissions by Sector (MMTCO ₂ e)	1990	2017
Total Gross Emissions (all sources):	12.77	11.74
<i>Land Use, Land Use Change, and Forestry (LULUCF)</i>	-0.29	N/A
Total Net GHG Emissions	12.48	11.74

Considerations for re-estimating land use impacts



The 2021 Act on Climate mandates that Rhode Island reach net-zero emissions by 2050. Therefore, we need to account for land use (LULUCF) in our emissions inventory.

What are the considerations for how frequently we estimate emissions reductions due to LULUCF?



Considerations for re-estimating land use impacts



What are the considerations for how frequently we estimate emissions reductions due to LULUCF?

- Having just a baseline isn't enough – we need multiple estimates to understand trends
- Are there correlating factors that can help us understand how LULUCF is changing (housing, population growth)? A mathematical relationship; indicators that can flag changes
- What is the impact of clear cutting (such as what is happening currently in the state)?
- More frequent estimation may help us compare decarbonization strategies and impacts
- Are there any ocean-based carbon removal projects anticipated? How are oceans included in LULUCF? How should we consider the role oceans in updating methods and decarbonization strategies
 - What about ponds, rivers, wildlife?
- Consider administrative burden and opportunity cost and financial cost of potential consulting services since LULUCF is a small portion of the emissions inventory
- Emissions sinks should be prioritized following reducing emissions sources
- Understanding LULUCF emissions reductions may help us strategize with how much we need to decarbonize ← but this should not de-emphasize the importance of reducing emissions
- Are there land use-related sources of emissions? What factors go into LULUCF methods?
- Is land conversation from housing and development being included in any other sector of our inventory?
- What new equipment, technology, sensing, etc. might inform advanced estimation methods? What's the right cadence based on new ways of data collection?
- Is tree age factored in?
- Can we gain insight into the level of statistical uncertainty of our emissions estimates? How does that compare between LULUCF and other sectors?



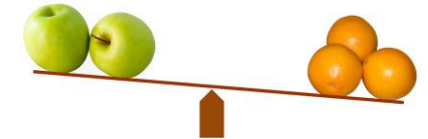
- **Considerations for re-estimating land use impacts**
 - Discussion
- **Considerations for updating the 1990 baseline**
 - Discussion
- **Other considerations?**

Considerations for updating the 1990 baseline



- GWP: A measure of how much heat a GHG traps in the atmosphere up to a specific time horizon relative to CO₂. CO₂ has a GWP of 1 because it is the reference gas.

Greenhouse Gas	Second Assessment Report (SAR)	4 th Assessment Report (AR4) (2007)	5 th Assessment Report (AR5) (2014)	AR6 (To be Published 2022)
Carbon dioxide (CO ₂)	1	1	1	
Methane (CH ₄)	21	25	28	
Nitrous oxide (N ₂ O)	310	298	265	
	1990 Baseline			



- 2011-2017: IPCC AR4 GWP
- EPA updates the SIT (State Inventory Tool) occasionally.
- If EPA updates GHG Emissions Inventory tools to use AR5 GWP, then Rhode Island's GHG inventory would reflect updated AR5 GWP's in subsequent inventory years.
- We are not aware of any other New England state currently using AR5 GWP's to calculate GHG emissions.

Considerations for updating the 1990 baseline



Science is always evolving. The greenhouse gas inventory tools are updated periodically to reflect the best science. Updates may include updated global warming potentials in response to Assessment Reports, re-estimating emissions impacts from the land use sector, or other as-yet unforeseen updates to methodology.

What are the considerations with how frequently we update the 1990 baseline?



Never:
Don't change
what we have



Somewhere in
between /
strategically



Anytime updated
science is
available

Considerations for updating the 1990 baseline



What are the considerations with how frequently we update the baseline?

- Major updates to science occur when major assessment reports are released (about once every seven years), so updating the baseline when ARs are released may not be too burdensome
- 20 versus 100 year warming potential
- Should strive to update our understanding and resulting policies as frequently as possible, since we have limited time to mitigate the worst impacts of climate change
- Our decisions today have long-term ramifications, so we need to be using the most updated science now to inform policy choices
- Is there an opportunity for collaboration with communities, schools, etc. to support this work?
- Do we anticipate substantial changes to the baseline?
After all, the accounting is just accounting and what matters is the emissions in the atmosphere and our actions to reduce them
- However, there is value in comparing apples to apples so that we can get feedback on our strategies



- **Considerations for re-estimating land use impacts**
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Other considerations?



- Methane
- Emissions scopes – how should we account for scope 3 emissions in our inventory (e.g. emissions due to food we consume, products we purchase, etc.) – downstream impacts

Next Steps

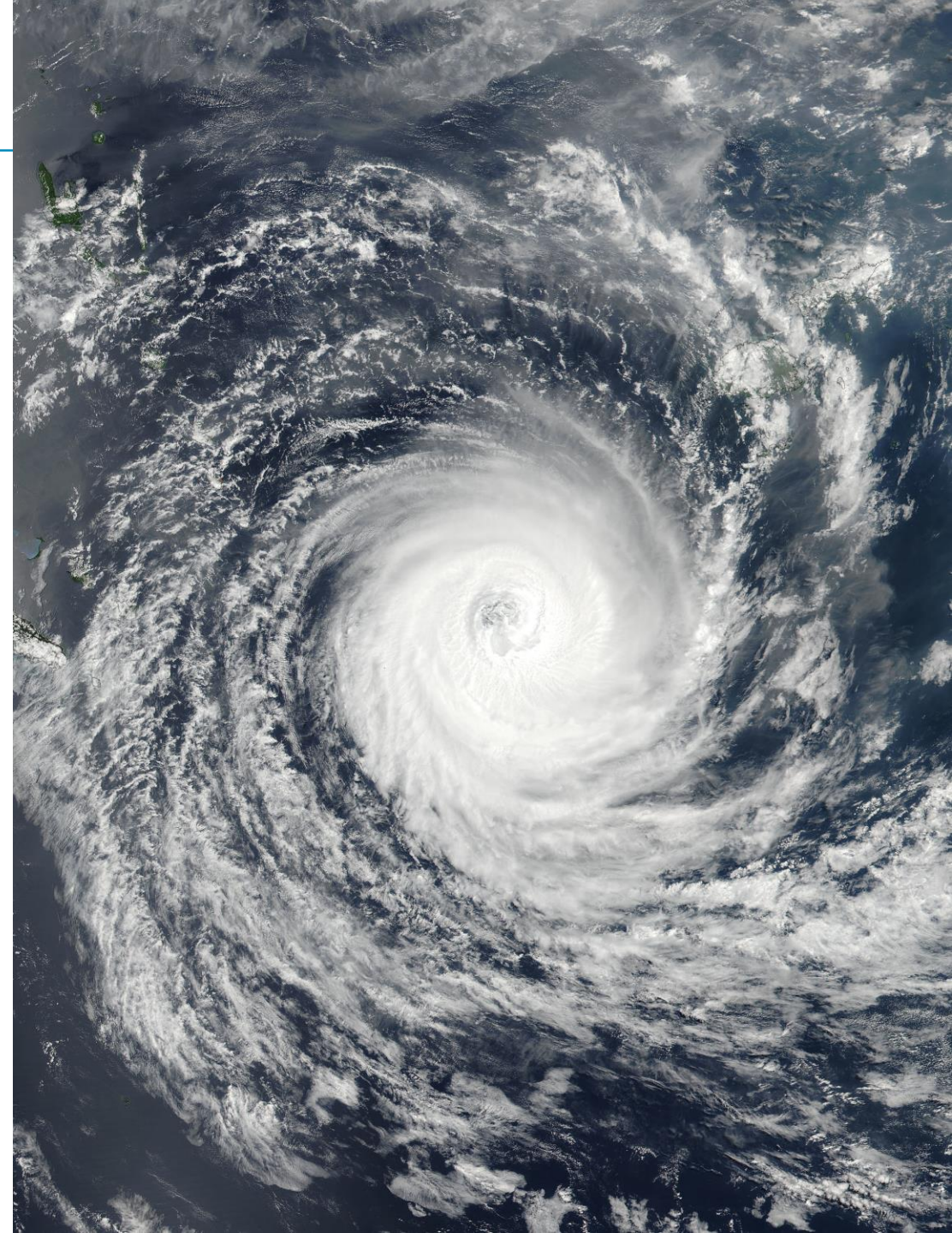
March

- Draft 'Progress Since 2016' chapter ready for review
- 2018 RI GHG Emissions Inventory to be released
- March 24, 25, 28: EC4 Advisory Board Sharing Sessions on tracking climate progress

April

- April 7: EC4 Council Meeting
- April 19, 20, 21: EC4 Sharing Sessions on priority actions for the electric sector to meet the 2030 mandate
- Draft 'Greenhouse Gases' chapter ready for review

More info & comment form:
www.climatechange.ri.gov/aoc



Act on Climate

Thank you!

Please complete this post-session survey so we can continue to improve opportunities for engagement: www.pollev.com/eresources411

Comments may be submitted: www.climatechange.ri.gov/aoc

Check back for updated project materials: www.climatechange.ri.gov/aoc

All climate-related activities will be posted to the EC4 calendar: www.climatechange.ri.gov