

# Three Points about Offshore Wind in Rhode Island

**J. Timmons Roberts**  
**Climate and Development Lab, Brown University**

“Institutions of higher education are essential at this moment – and Brown in particular has the privilege and the responsibility to be a force for necessary change.”

University Provost Richard Locke  
September 9th, 2020



# The CDL model



1. Co-identification of topic and research with partner orgs

2. Team-based research with student engagement



3. Initial release of simplified results in policy briefings



4. Blogging, tweeting, press release, side events at UNFCCC,



5. Take onboard input from practitioners and academics

6. Compilation and rewriting for scholarly journals and books



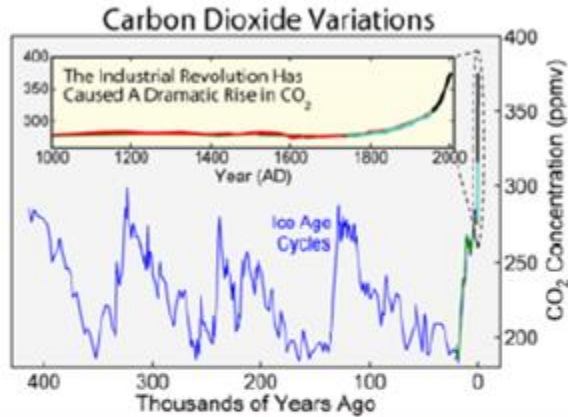
Climatedevlab.brown.edu



Point 1: Urgent climate action is  
needed.

By us.

# Climate Change: The Global Challenge



Earth has warmed 1° C since the 19<sup>th</sup> century

The Paris Agreement strives to reduce emissions so warming is limited to 1.5° C



Atlantic Mills, Olneyville, 1800s.

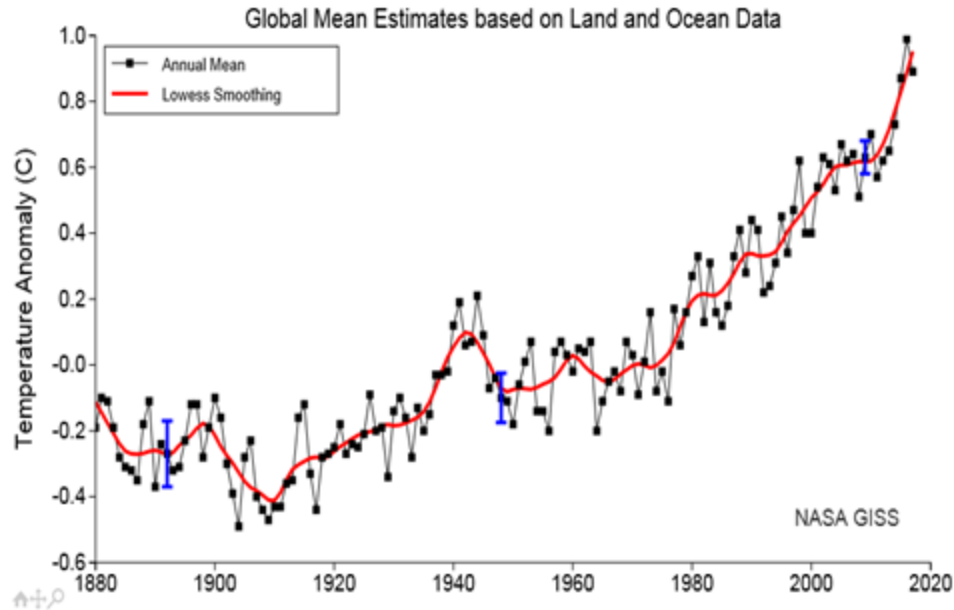


Just about every city across the planet, today.



# There is Clear Evidence of Global Warming

- Temperature has increased over 1°C compared to pre-industrial period.



Source NASA

# 1.5° is bad. 2° is REALLY bad.

## 1.5° C

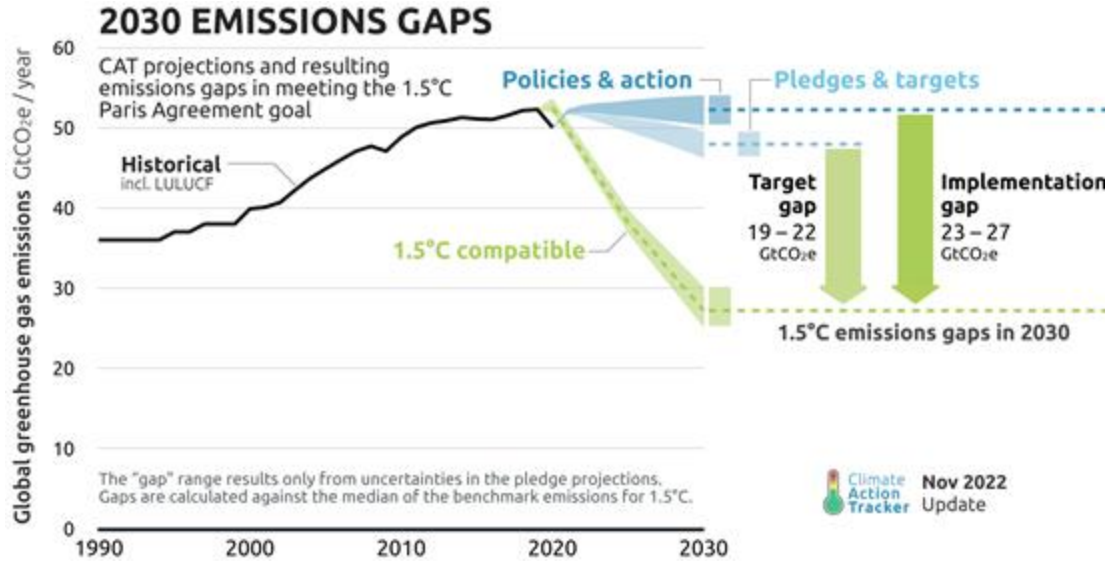
- Sea ice will remain during most summers
- ~14% of world's population will be exposed to severe heat waves at least once every five years
- +350 million people will be exposed to severe drought
- Will likely to lose 6% of insects, and 8% of plants
- Frequent mass mortalities of coral reefs
- 31 to 69 million people worldwide will be exposed to flooding from sea level rise.

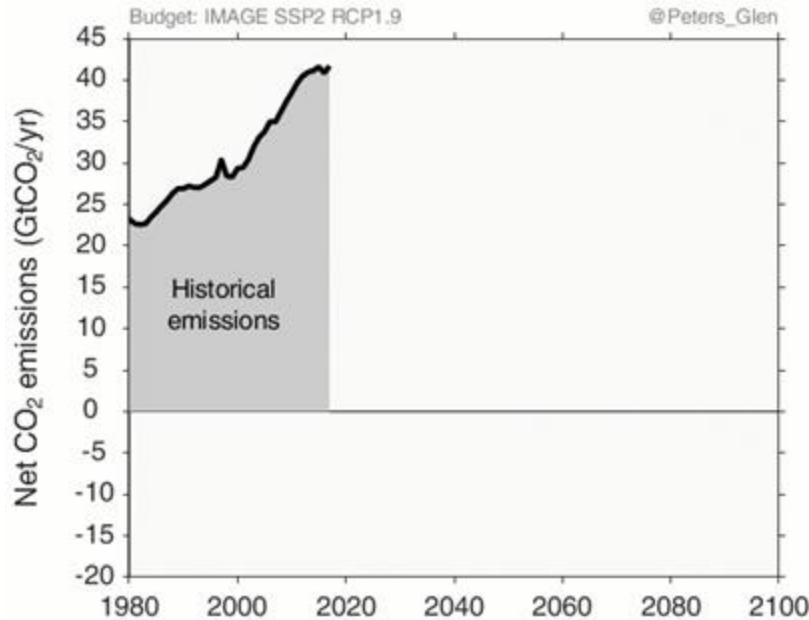
## 2° C

- Ice-free summers are 10x more likely
- ~27% of world's population will be exposed to severe heat waves at least once every five years
- +411 million people will be exposed to severe drought
- Will likely to lose 18% of insects, and 16% of plants
- Coral reefs will mostly disappear
- 32 to 80 million people worldwide will be exposed to flooding from sea level rise.



# The Emission Gap - 2





**Glen Peters**  
@Peters\_Glen



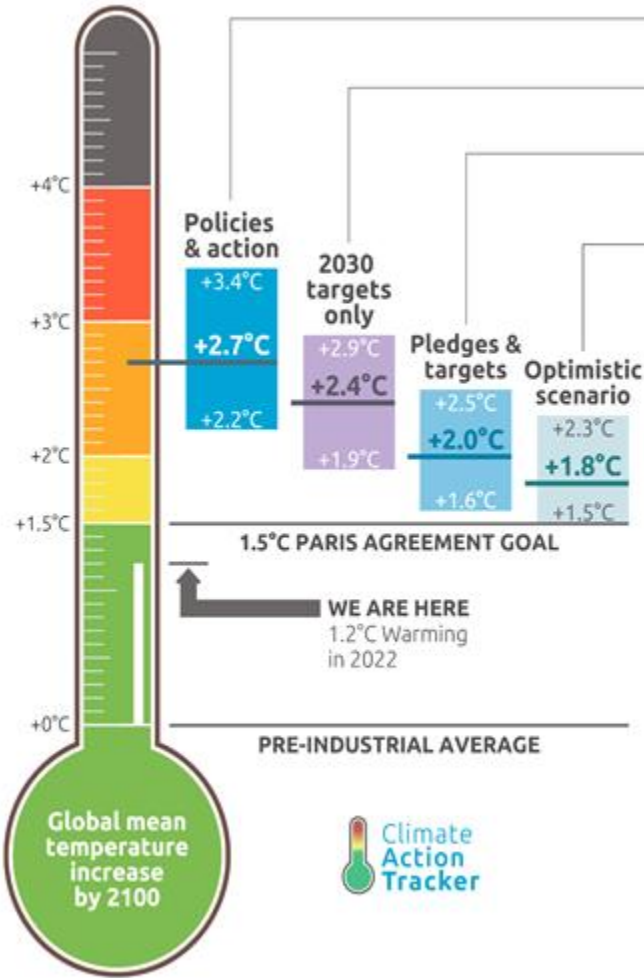
If we are heading for a [#HothouseEarth](#), or just want to stay "well below 2°C", the challenge is the same.

Emissions must go to zero in the space of decades, or we need large-scale negative emissions (with the associated risks) to compensate for slower emission reductions.

5:37 AM - Aug 12, 2018

684 722 people are talki...





- Policies & action**  
Real world action based on current policies †
  - 2030 targets only**  
Based on 2030 NDC targets\* †
  - Pledges & targets**  
Based on 2030 NDC targets\* and submitted and binding long-term targets
  - Optimistic scenario**  
Best case scenario and assumes full implementation of all **announced** targets including net zero targets, LTSs and NDCs\*
- † Temperatures continue to rise after 2100
- \* If 2030 NDC targets are weaker than projected emissions levels under policies & action, we use levels from policy & action.

CAT warming projections  
**Global temperature increase by 2100**  
 November 2022 Update

# Climate Action Plans



- INSUFFICIENT
- AUSTRALIA
- BRAZIL
- CHILE
- COLOMBIA
- EU
- GERMANY
- JAPAN
- KAZAKHSTAN
- PERU
- SOUTH AFRICA
- SWITZERLAND
- USA

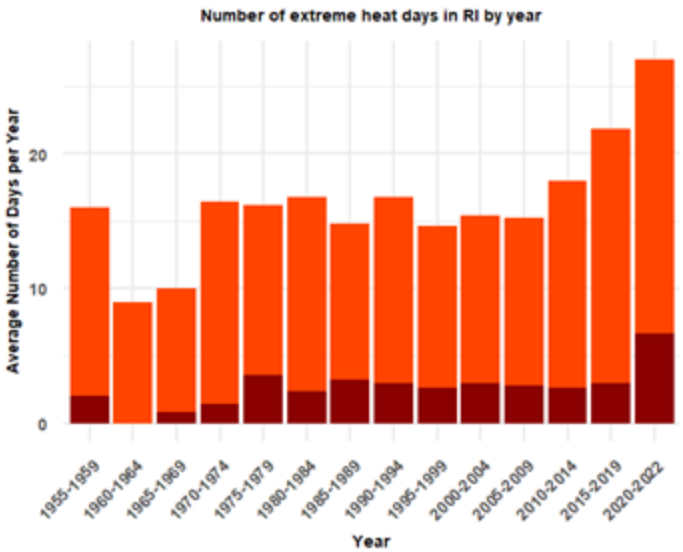
Why us? If we do not act, others will not act.



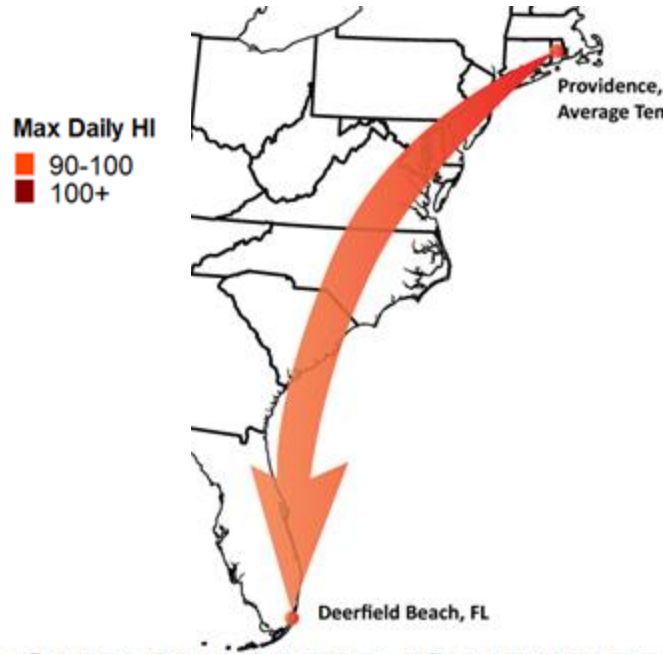
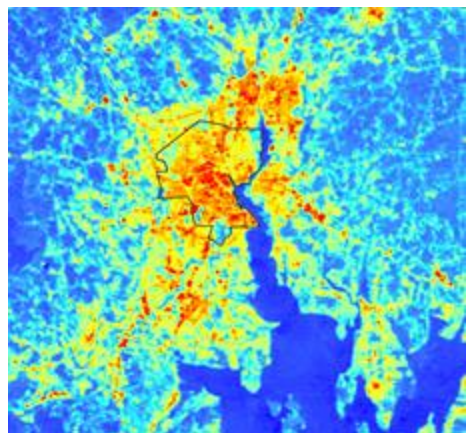
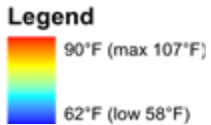
Point 2: Rhode Island will suffer from climate change.

And can benefit from large-scale deployment of OSW.

Days at TF Green Airport over 90 degrees heat index 1950-2022, by 5 year average;  
 Credit: Melissa Eliot, Greg Wellenius, Timmons Roberts

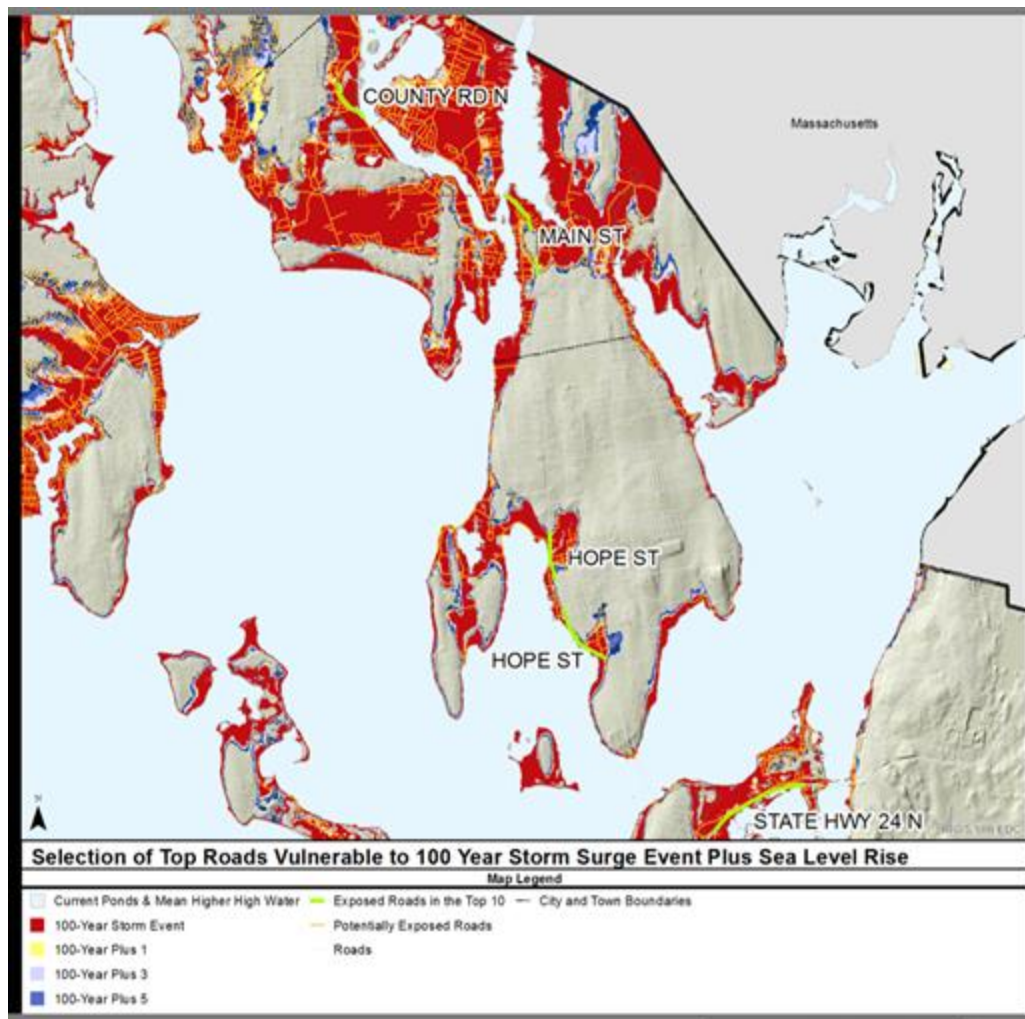


Landsat 5 TM Data for surface temperature, Band 6, July 10, 2009. Glovis Website; Time: 11:15EST



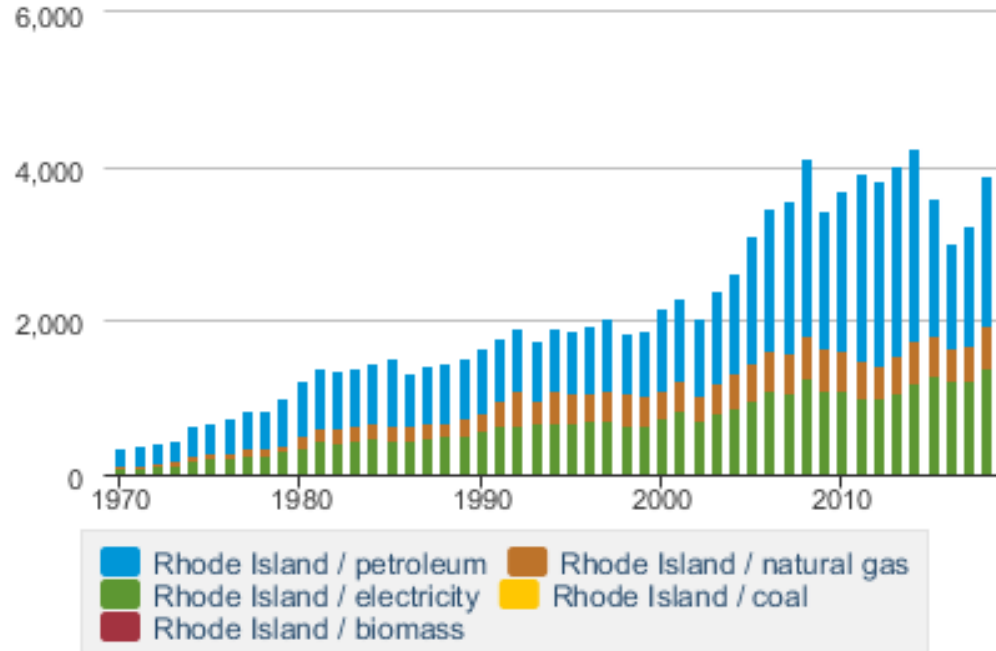
9.1° Hotter By 2100  
**WHERE OUR SUMMER IS HEADED**





## Total end-use energy expenditure estimates by source, annual

million dollars



## Why RI should be a climate leader:

- No fossil fuel extraction (RI spends ~\$4b/y on imported energy)
- Vulnerable: 400 miles coastline
- Strong public concern
- Highest Catholic population
- Democratic supermajorities in both chambers; Democratic governor



State Energy Data System (SEDS)

Point 3: Offshore wind is the only resource we have at scale to allow the decarbonization that science says is needed.

# 2019 Rhode Island Greenhouse Gas Reduction Study

Jason Veysey, Stockholm Environment Institute  
J. Timmons Roberts, Daniel Traver, Brett Cottler,  
Benjamin Gross, Angie Kim, Institute at Brown for  
Environment and Society





# Stockholm Environment Institute

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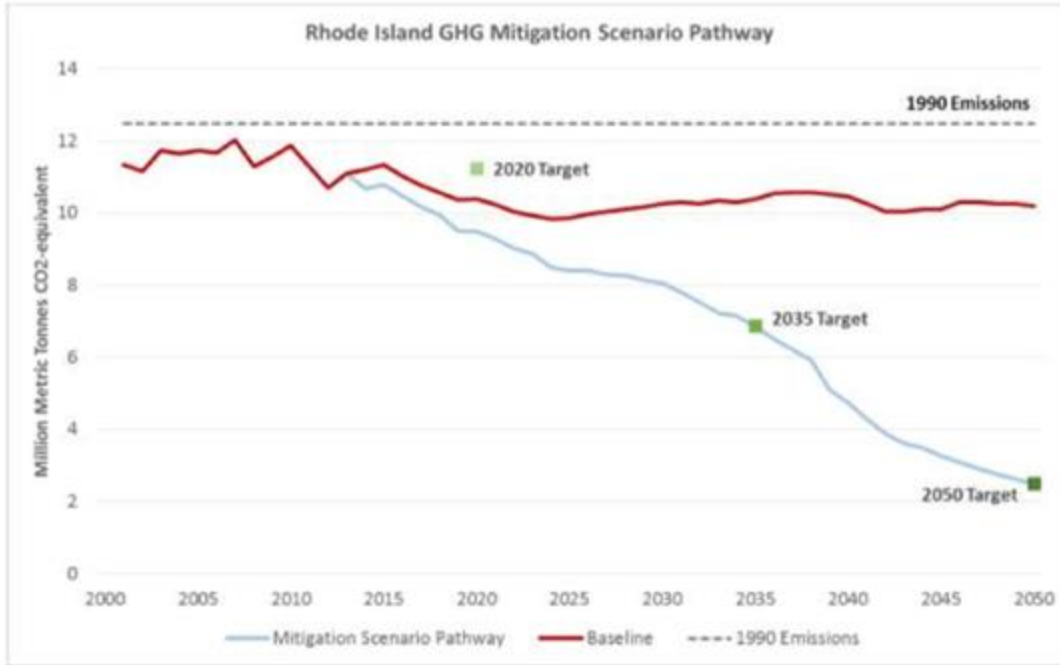
- **Bridging science and policy** – an independent, non-profit research institute focused on sustainable development
- Over 200 staff worldwide: headquarters in Sweden, centers in the **U.S.**, Kenya, Colombia, Great Britain, Thailand, Estonia
- Research emphases: **climate mitigation** and adaptation, air pollution, energy policy, water resources, climate finance, environmental economics
- Commitment to **stakeholder participation, capacity development, and transparency**



*A sustainable future for all*

# Revisiting the 2016 study

Figure 3. Rhode Island GHG Mitigation Scenario Pathway

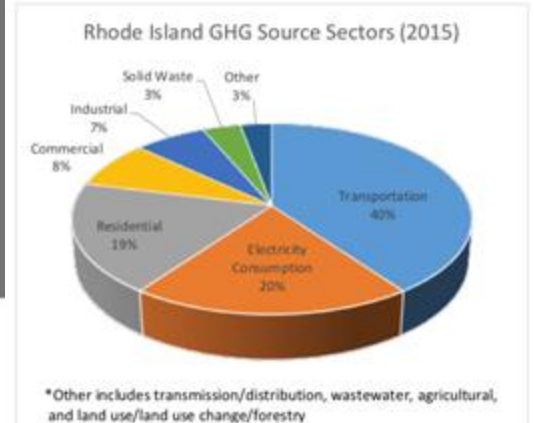


## Rhode Island Greenhouse Gas Emissions Reduction Plan

December 2016

RIEC<sup>4</sup>

Figure 1. Rhode Island GHG Source Sectors (2015)

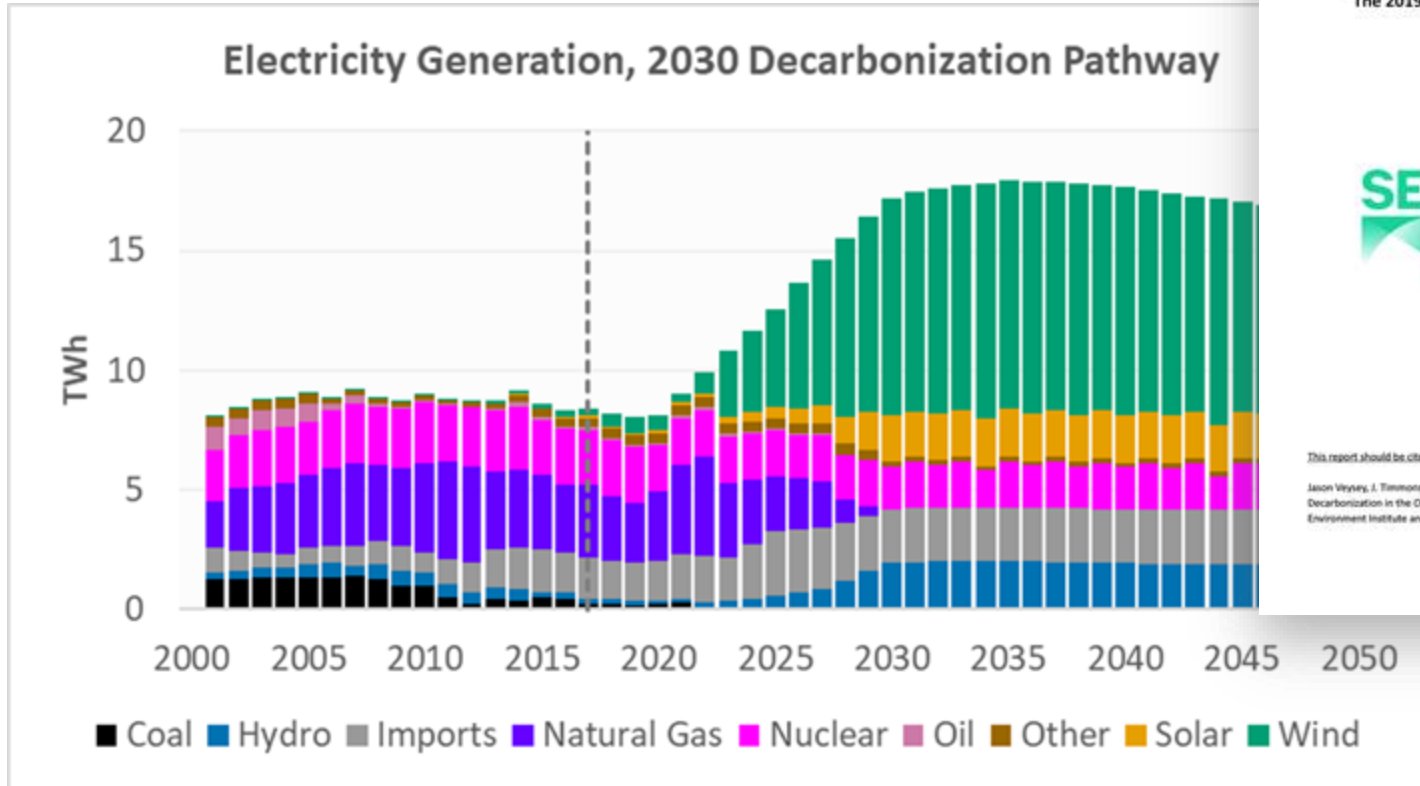


# Model scope

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- **Geographic**
  - State of R.I. (except for regional [ISO-NE] electricity grid)
  - No disaggregation of intra-state areas
- **Temporal**
  - 2001-2050
  - Default time step: annual
  - 673 sub annual time slices for electricity modeling
- **Sectoral**
  - All GHG-producing sectors and activities
- **Economic**
  - Direct costs (and cost savings) of most mitigation measures (capital, operation & maintenance, imported fuels)
  - Social costing perspective
- **Environmental**
  - All GHGs and major conventional air pollutants
  - Production-based emissions, option to calculate consumption-based emissions for electricity supply

# Policy solutions research: Deeper Decarbonization in The Ocean State



## Deeper Decarbonization in the Ocean State:

The 2019 Rhode Island Greenhouse Gas Reduction Study

September 12, 2019



This report should be cited as:

Jason Veysey, J. Timmons Roberts, Daniel Traver, Brett Cotler, Benjamin Gross and Angie Kim. 2019. "Deeper Decarbonization in the Ocean State: The 2019 Rhode Island Greenhouse Gas Reduction Study." Stockholm Environment Institute and Brown University Climate and Development Lab. Research Report.

### Wind farm life cycle

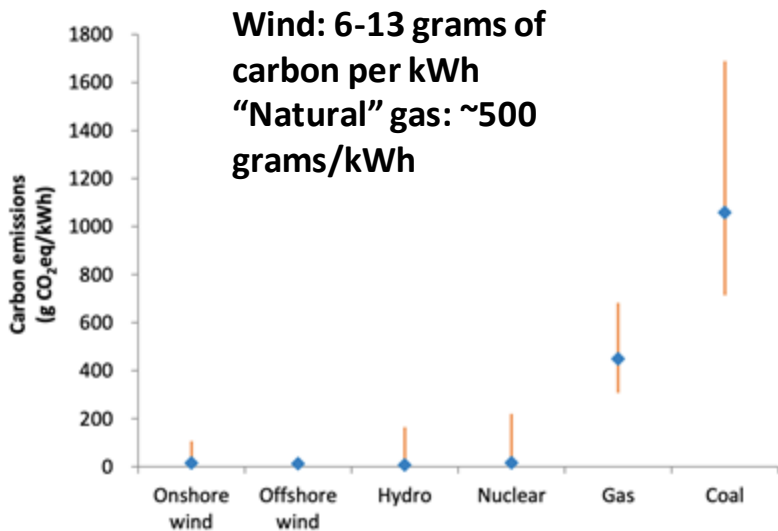
This study has analysed various estimations of the costs and greenhouse gas emissions associated with offshore wind throughout its life cycle. The lifecycle stages considered are illustrated in Figure 1.



## Life cycle costs and carbon emissions of wind power

### Executive Summary

R Camilla Thomson, Gareth P Harrison, University of Edinburgh, 2015



wind power

NREL: 2021 review of 3000 published studies  
<https://www.nrel.gov/analysis/life-cycle-assessment.html>

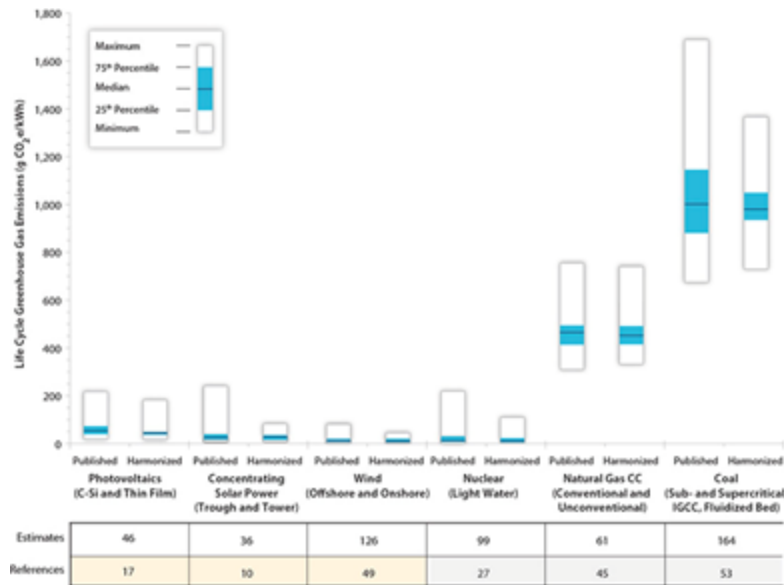


Figure 10 – Comparison of carbon emissions of wind with other types of generation

\*CC = combined cycle

# Three points about offshore wind:

**Point 1:** Urgent climate action is needed. By us.

**Point 2:** Rhode Island will suffer from climate change. And can benefit from large-scale deployment of OSW.

**Point 3:** Offshore wind is the only resource we have at scale to allow the decarbonization that science says is needed.

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