



# Educational Session: Defining the Problem

Tualatin City Council Meeting

June 13, 2022

# Overview

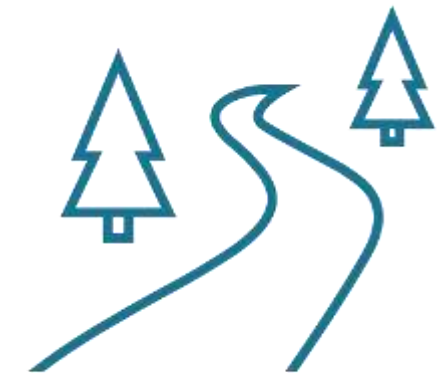
Planning process update

**Defining the problem**

- Climate 101
- Future Physical Conditions

**Next steps**

**Discussion**



# Planning process update

# Greenhouse gas emissions inventory



Data collection  
complete



Data analysis in  
progress



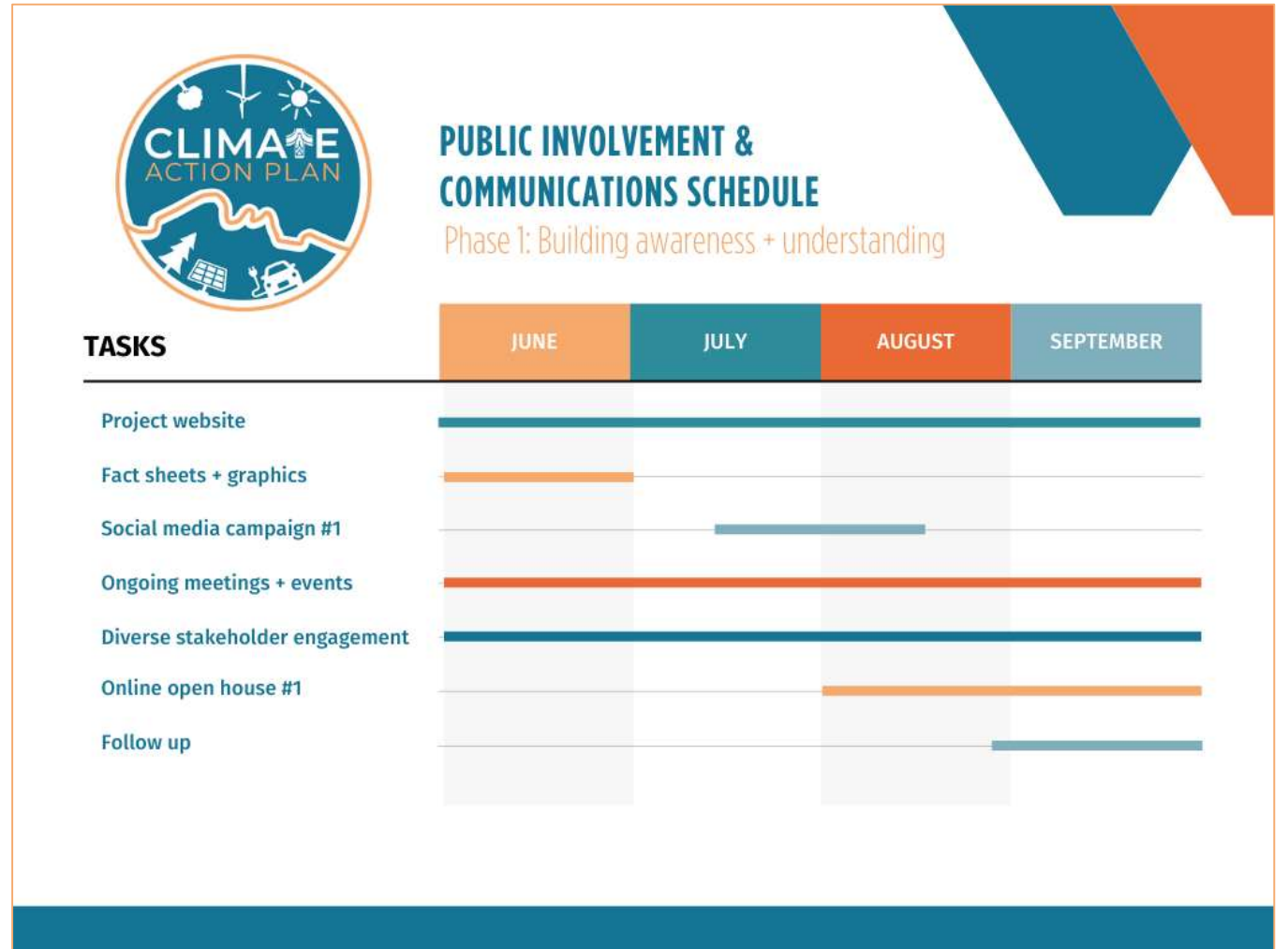
2019 is baseline  
year



Inventory report  
complete at end of  
summer

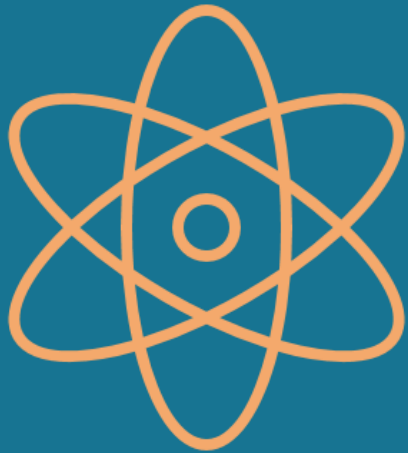
# Stakeholder + public engagement

- Adaptation-themed stakeholder meetings – June 14-16
- Public Involvement + Communications Plan
- Phase 1: Building awareness and understanding

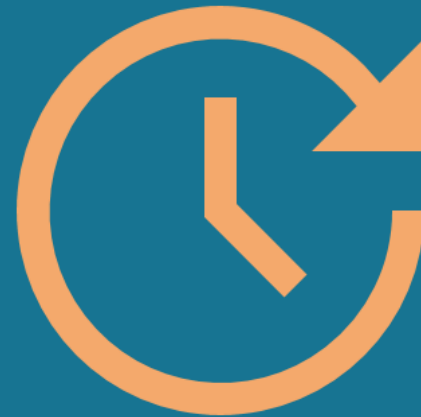


# Defining the problem

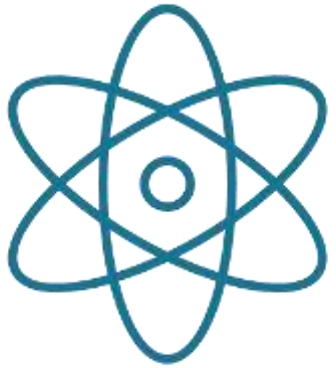
## Climate 101



## Future Physical Conditions



Understanding the problem is critical to selecting the appropriate strategies to adapt to and mitigate climate change



# Climate 101

# Greenhouse gases (GHGs)



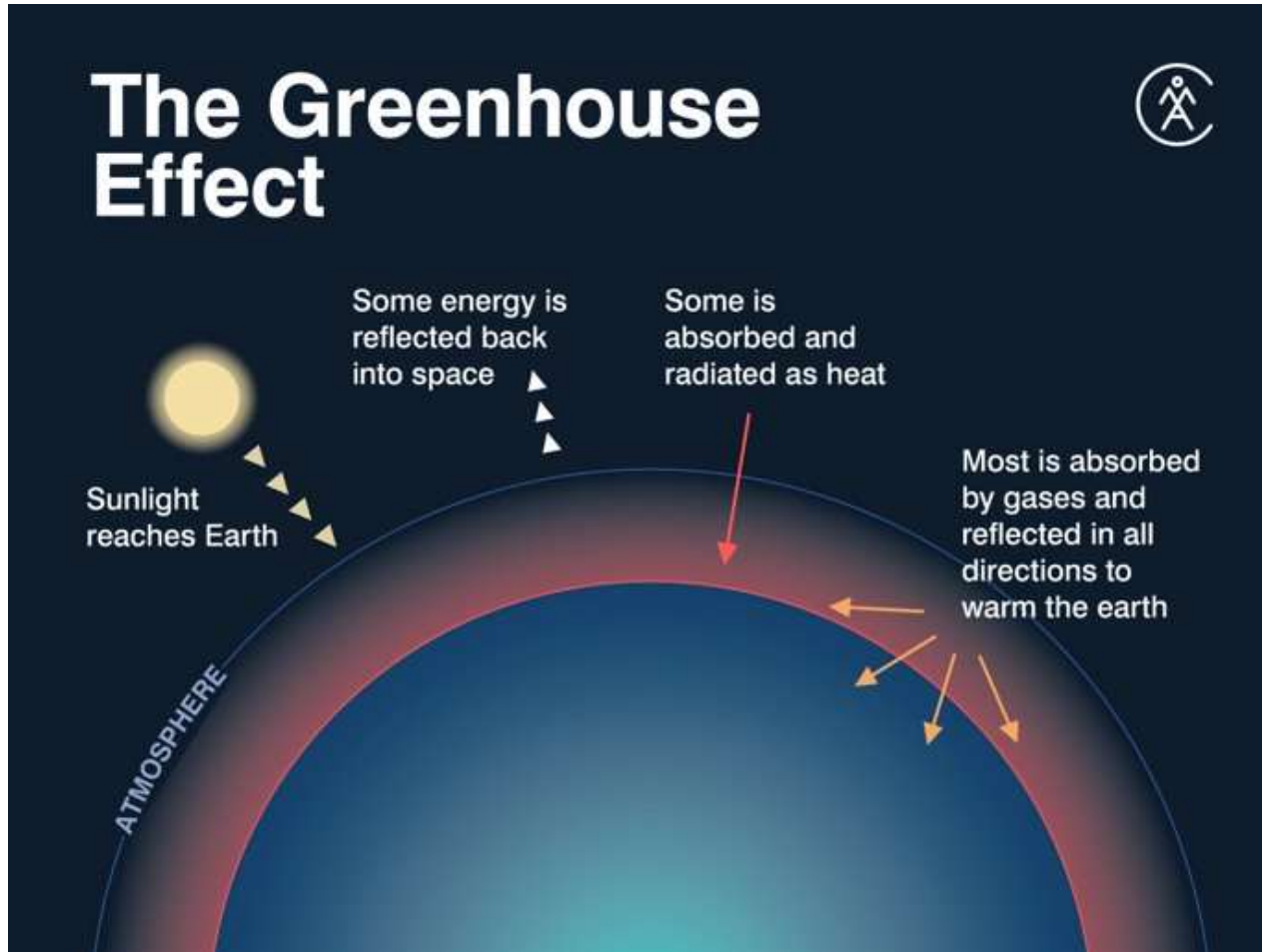
- Greenhouse gases (GHGs) = **gases that trap heat in the atmosphere**, causing the greenhouse effect
- **Examples of GHGs**
  - Carbon dioxide (CO<sub>2</sub>)
    - E.g. burning of wood, coal, and other fossil fuels
  - Methane (CH<sub>4</sub>)
    - E.g. decomposition in landfills, transportation of natural gas
  - Nitrous oxide (N<sub>2</sub>O)
    - E.g. agricultural activities, burning of fuel for vehicles
- Can be **naturally produced** or **synthetic**
- Burning fossil fuels, like coal and natural gas, accounts for **85% of the human-caused carbon dioxide emissions**



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# The greenhouse effect

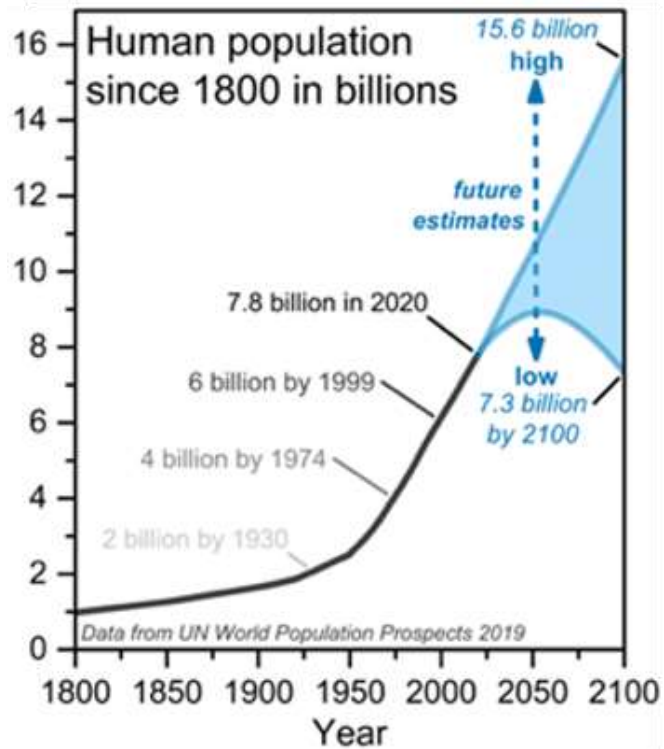


The **more greenhouse gases** in the atmosphere, the **more heat** is prevented from escaping the Earth and **the hotter things get.**

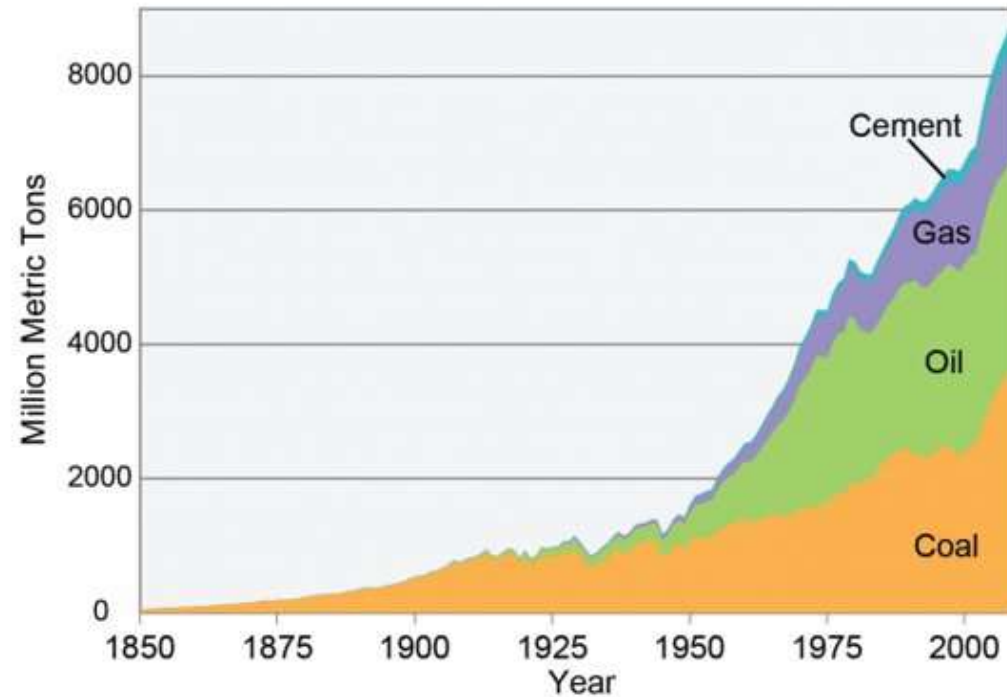
# Drivers of climate change



Figure 1: Increasing human population



Carbon Emissions in the Industrial Age

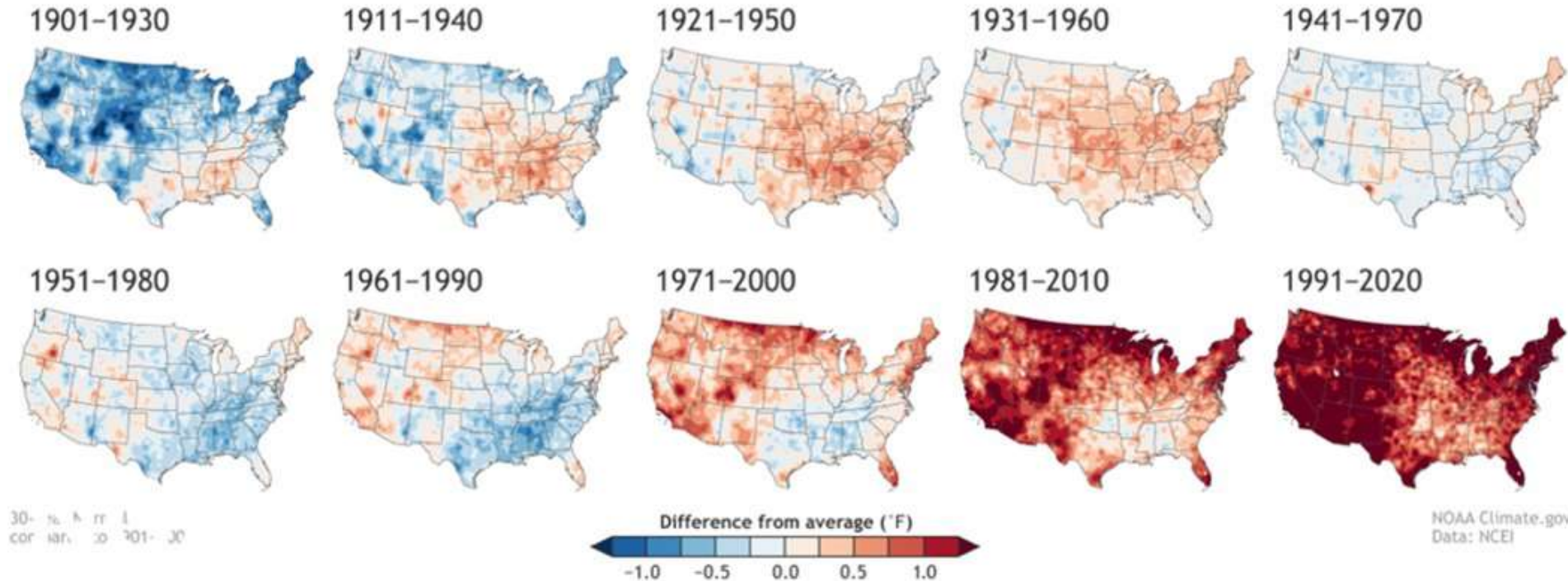


Dramatically **more people** on earth and **more people burning fossil fuels** is filling our atmosphere rapidly and causing the climate to change.

# Evidence of a changing climate



## U.S. ANNUAL TEMPERATURE COMPARED TO 20<sup>th</sup>-CENTURY AVERAGE

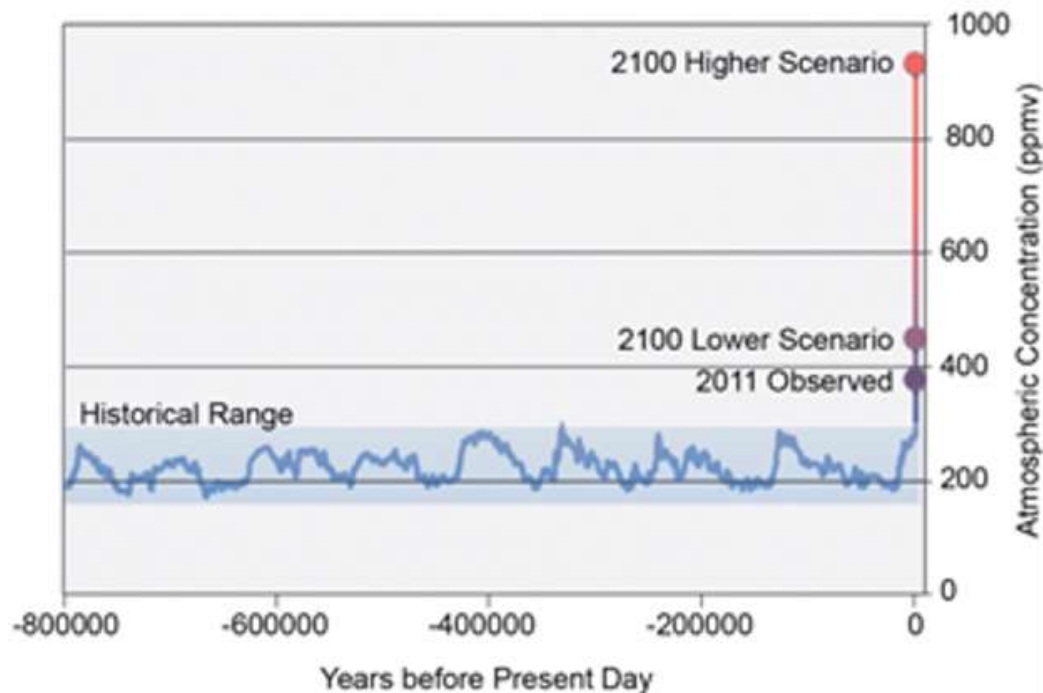


Dramatically **more people** on earth and **more people burning fossil fuels** is filling our atmosphere rapidly and causing the climate to change.

# Changes in atmospheric carbon dioxide over time



**Figure 1: Skyrocketing atmospheric CO<sub>2</sub>**  
Atmospheric Carbon Dioxide Levels



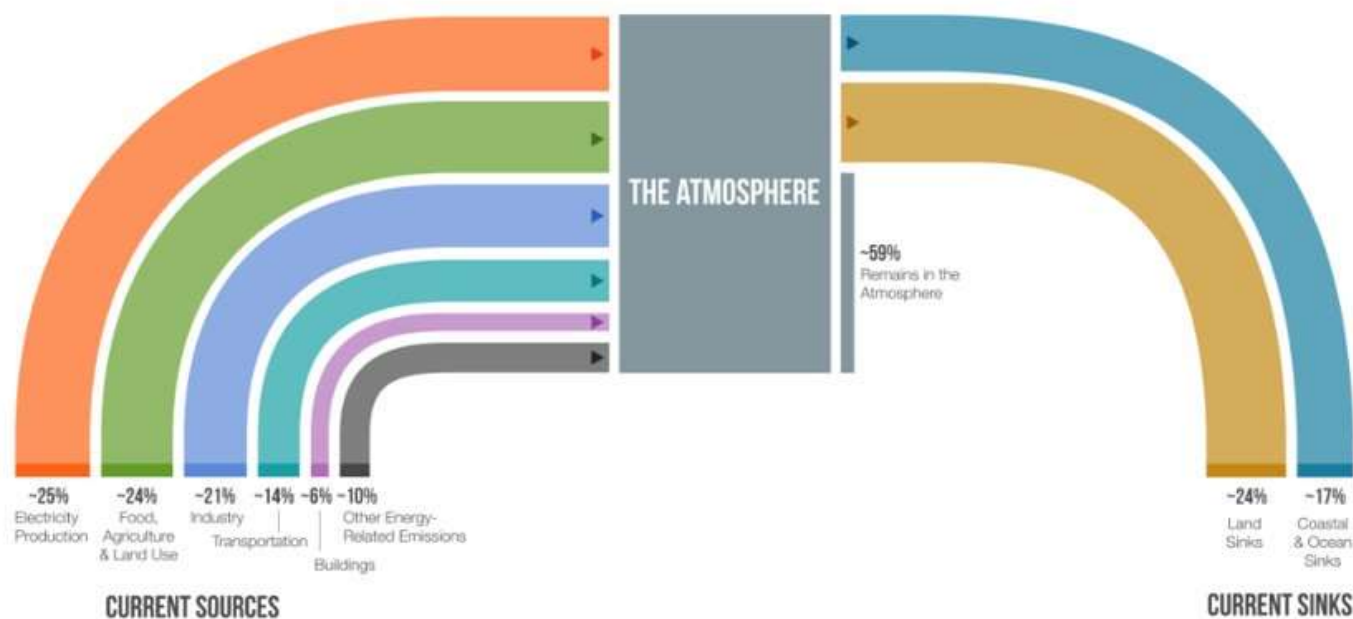
In the last 70 years, the concentration of CO<sub>2</sub> in the earth's atmosphere increased to **415 parts per million**.

It has **not been this high since 4 million years ago**, millions of years before modern humans.

# Emissions sources + sinks



## EMISSIONS SOURCES & NATURAL SINKS



There are some natural processes that remove the amount of CO<sub>2</sub> in the atmosphere, but **we must reduce our emissions first** so that natural systems can keep up.



# Future Physical Conditions

# If we take strong action now, we can minimize changes to the climate

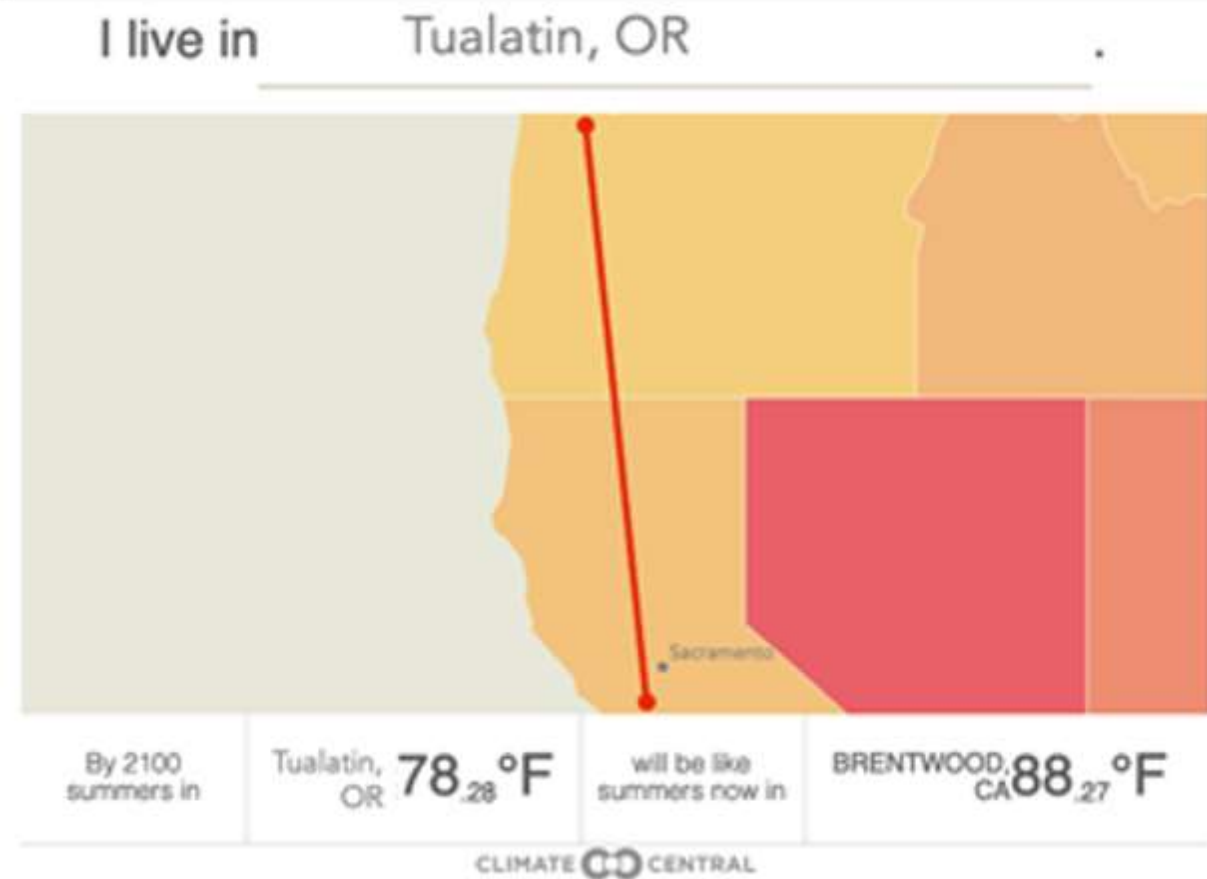


**In both scenarios, we will feel the impacts of climate change and will need to adapt. If we act quickly, we can avoid the worst of the impacts.**

# Heat



Figure 1: Tualatin will be like Central California



The number of **days over 90 degrees** every summer are expected to **increase dramatically**: from a **historical average of 6 to nearly 60** by the end of the century.

In contrast, if we take **strong climate action**, we can **constrain the number of hot days to under 30**.



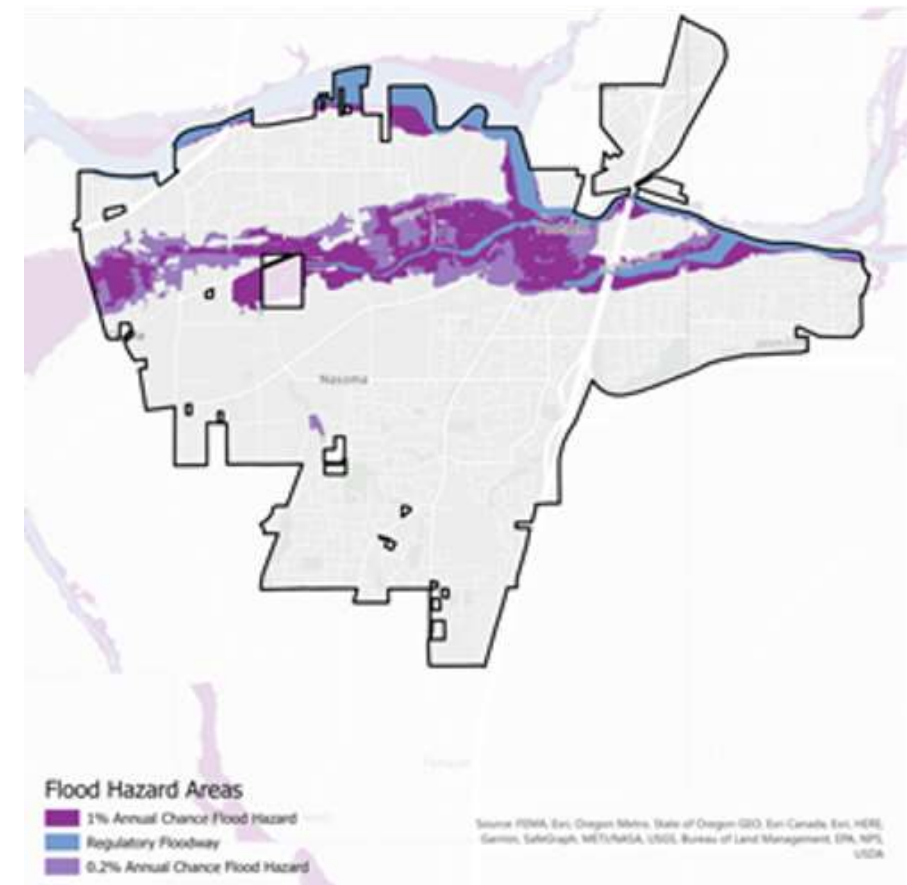
# Precipitation + flooding



The most noticeable change to precipitation patterns will be an **increase in “atmospheric rivers”**, weather systems that bring large storms with heavy precipitation.

Flooding is extremely location-specific and dependent on the local topography. The increase in heavy precipitation is **likely to increase flooding** in some areas of Tualatin.

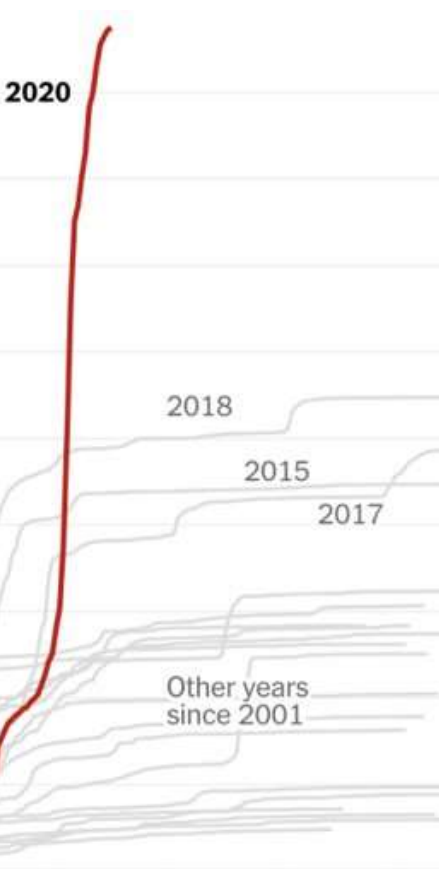
Figure 1: Current flood hazard map



# Fire + smoke



**2020 is the most active fire year on record for the West Coast**



Without climate action, the current average of 10 **days of extreme fire danger will double** to 20 by the end of the century.

**Strong climate action** can **decrease** the number of extreme fire danger days to 17.

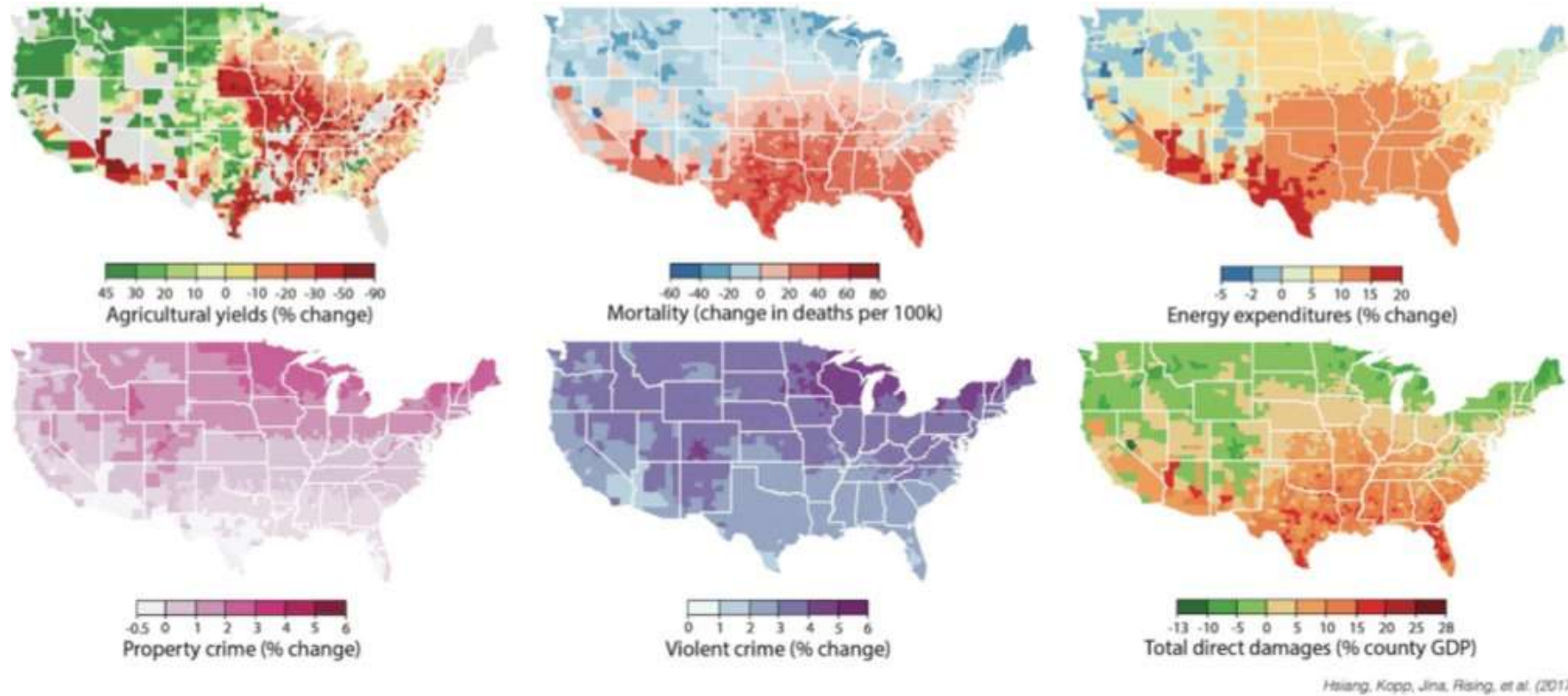
# Public health + health hazards



Climate-related drivers of health: environmental hazards	Stress factors: inequities in social, physical environment, cultural, and economic supports
Heat	Systemic inequities in policies
Infectious disease vectors	
Wildfire	Inequities and unequal investment in social determinants of health (e.g., housing, education, income, wealth, transportation access, food security, income security, access to health care)
Air quality (e.g., pollen, wildfire smoke, smog, ozone)	
Storms, floods, landslides	
Sea level rise	Capacity and adaptive capacity of infrastructure, institutions, and systems to support human health (e.g., culturally specific services, surge capacity of hospitals)
Drought, water insecurity	
Effects on human health	
Hazard-related acute conditions (e.g., heat stroke, asthma attack)	
Hazard-related chronic conditions (e.g., heart disease, diabetes, respiratory illness)	
Infectious diseases (e.g., Lyme disease)	
Mental health conditions	
Adverse pregnancy outcomes	

Increased environmental hazards due to climate change  
 +  
 Existing stress factors and inequities  
 =  
 Increased negative effects on human health

# Changes to quality of life



As other parts of the country suffer through droughts, hurricanes and intolerable heat waves, **it is likely that the increasing population trend in the Willamette Valley will continue.**

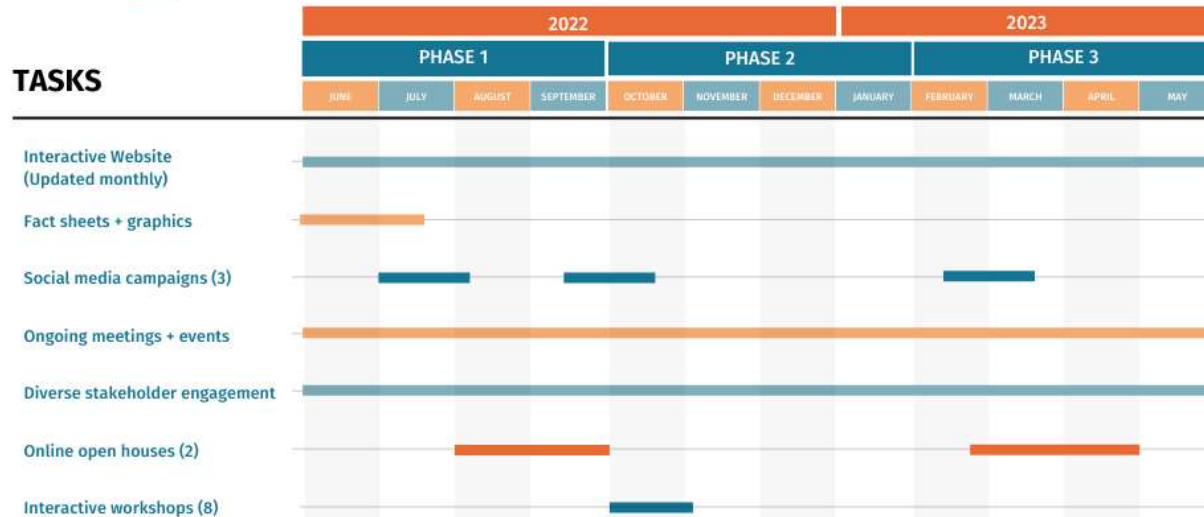


What we're doing about it + next steps

# What we're doing about it + next steps



## PUBLIC INVOLVEMENT & COMMUNICATIONS SCHEDULE



Climate change is a **big problem** that calls for **bold solutions**. Our Climate Action Plan is the **first step** towards **identifying and implementing solutions**.

The project team will **educate** and **engage with** the Tualatin community about **what can be done locally** to address climate change.

These engagement efforts will help lay the foundation for a **strong Climate Action Plan** that is both **responsive to climate science** *and* **to the needs of Tualatin community**.

# Discussion

