
Why, AI.
BUSTED
MYTH


AI will save us from climate change!
MYTH

LET’S TALK ABOUT CLIMATE CHANGE

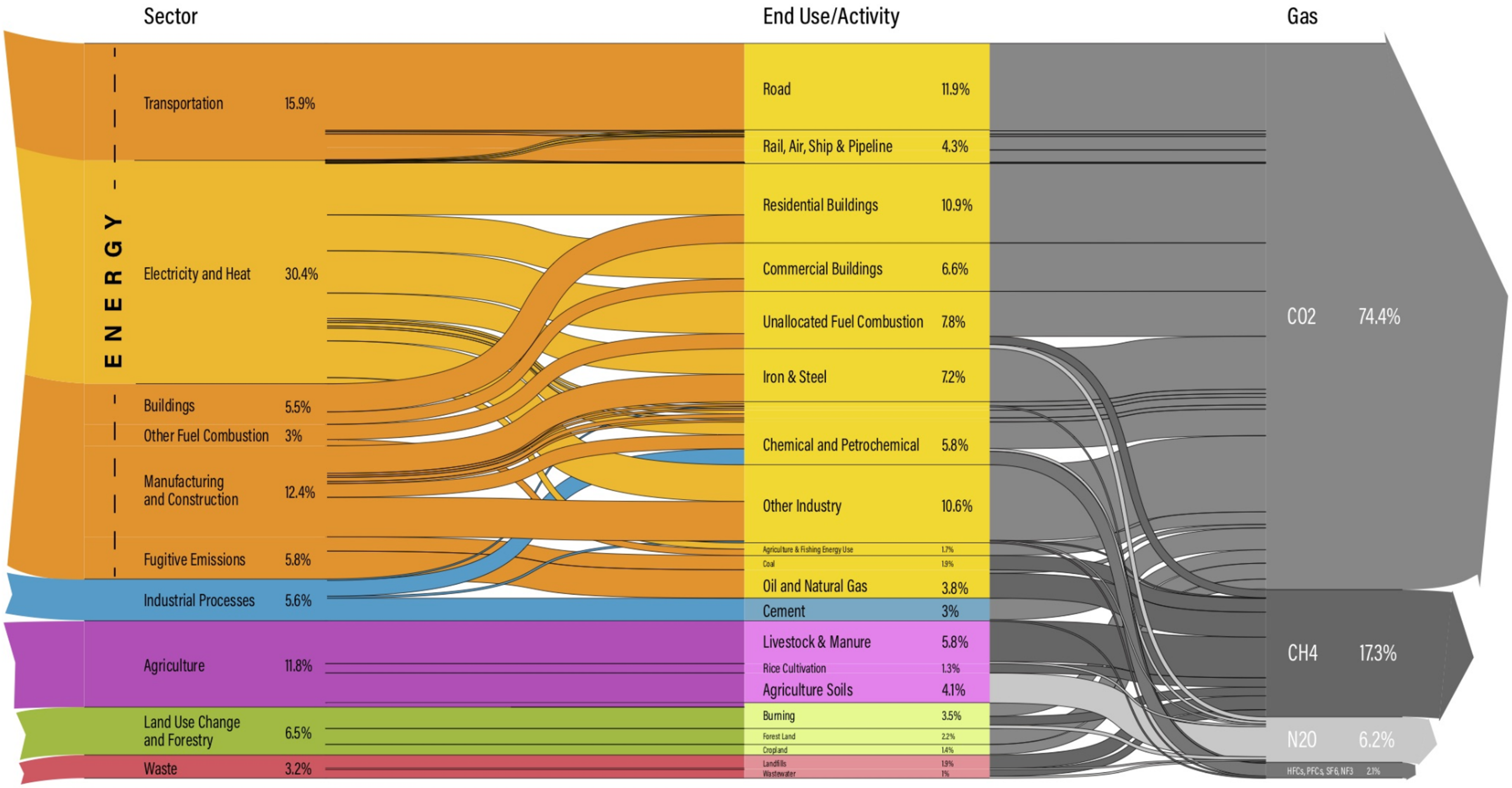
How to address Climate Change

Mitigation: Reducing greenhouse gas emissions

Adaptation: Resilience to consequences of climate change

World Greenhouse Gas Emissions in 2016

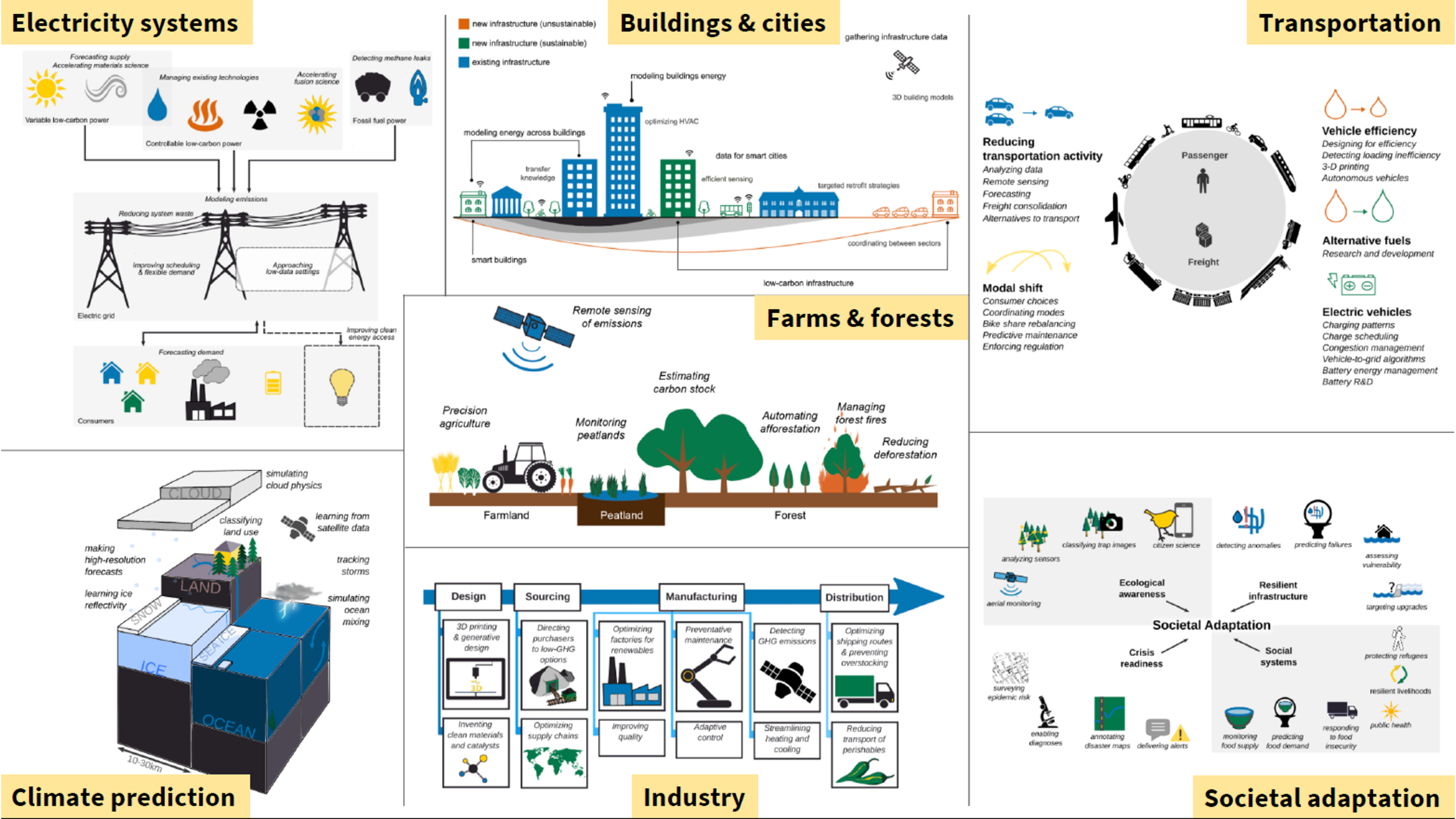
Total: 49.4 $GtCO_2e$



Source: Greenhouse gas emissions on Climate Watch. Available at: https://www.climatewatchdata.org

WORLD RESOURCES INSTITUTE

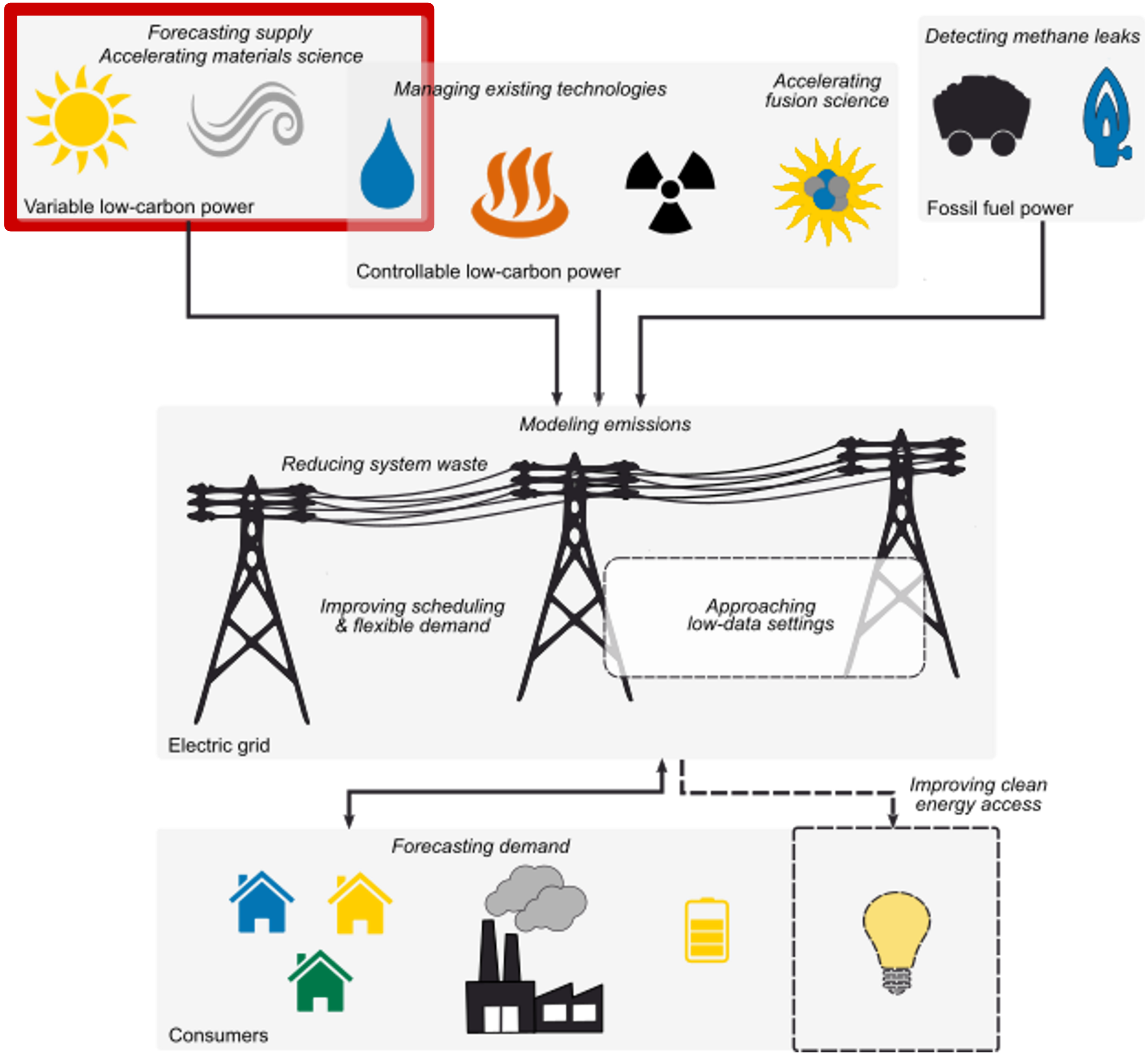
TACKLING CLIMATE CHANGE WITH AI



Electricity systems
Forecasting supply
Accelerating materials science
Variable low-carbon power
Managing existing technologies
Accelerating fusion science
Controllable low-carbon power
Detecting methane leaks
Fossil fuel power
Modeling emissions
Reducing system waste
Improving scheduling & flexible demand
Approaching low-data settings
Electric grid
Improving clean energy access
Forecasting demand
Consumers
Buildings & cities
new infrastructure (unsustainable)
new infrastructure (sustainable)
existing infrastructure
gathering infrastructure data
3D building models
modeling buildings energy
optimizing HVAC
modeling energy across buildings
transfer knowledge
data for smart cities
efficient sensing
targeted retrofit strategies
smart buildings
coordinating between sectors
low-carbon infrastructure
Transportation
Reducing transportation activity
Analyzing data
Remote sensing
Forecasting
Freight consolidation
Alternatives to transport
Modal shift
Consumer choices
Coordinating modes
Bike share rebalancing
Predictive maintenance
Enforcing regulation
Passenger
Freight
Vehicle efficiency
Designing for efficiency
Detecting loading inefficiency
3-D printing
Autonomous vehicles
Alternative fuels
Research and development
Electric vehicles
Charging patterns
Charge scheduling
Congestion management
Vehicle-to-grid algorithms
Battery energy management
Battery R&D
Farms & forests
Remote sensing of emissions
Estimating carbon stock
Precision agriculture
Monitoring peatlands
Automating afforestation
Managing forest fires
Reducing deforestation
Farmland
Peatland
Forest
Climate prediction
simulating cloud physics
CLOUD
classifying land use
learning from satellite data
making high-resolution forecasts
tracking storms
learning ice reflectivity
simulating ocean mixing
LAND
SNOW
SEA ICE
ICE
OCEAN
10-30km
Industry
Design
Sourcing
Manufacturing
Distribution
3D printing & generative design
3D
Directing purchasers to low-GHG options
Optimizing factories for renewables
Preventative maintenance
Detecting GHG emissions
Optimizing shipping routes & preventing overstocking
Inventing clean materials and catalysts
Optimizing supply chains
Improving quality
Adaptive control
Streamlining heating and cooling
Reducing transport of perishables
Societal adaptation
analyzing sensors
classifying trap images
citizen science
detecting anomalies
predicting failures
assessing vulnerability
aerial monitoring
Ecological awareness
Resilient infrastructure
targeting upgrades
Societal Adaptation
Crisis readiness
Social systems
protecting refugees
resilient livelihoods
surveying epidemic risk
enabling diagnoses
annotating disaster maps
delivering alerts
monitoring food supply
predicting food demand
responding to food insecurity
public health

Electricity Systems

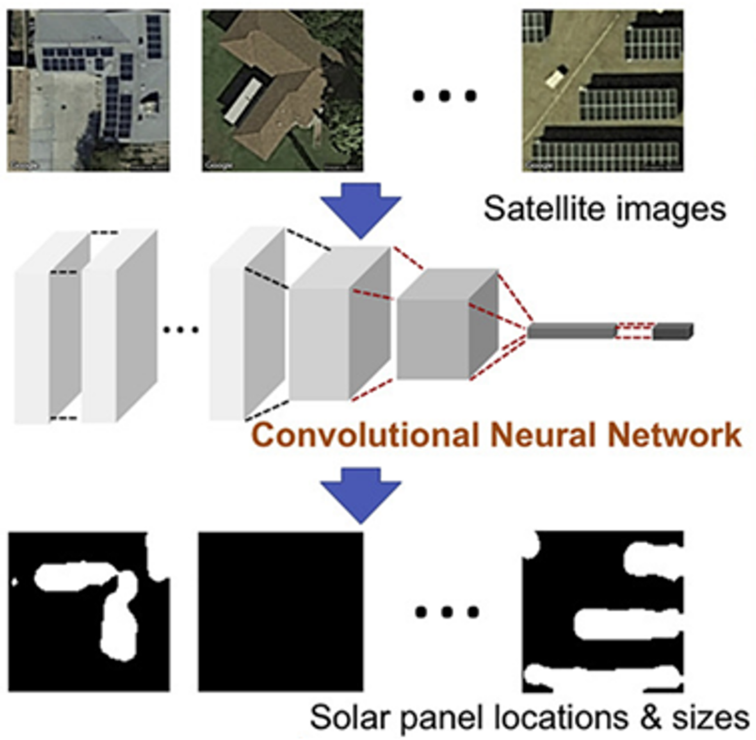
Forecast Solar and Wind Generation

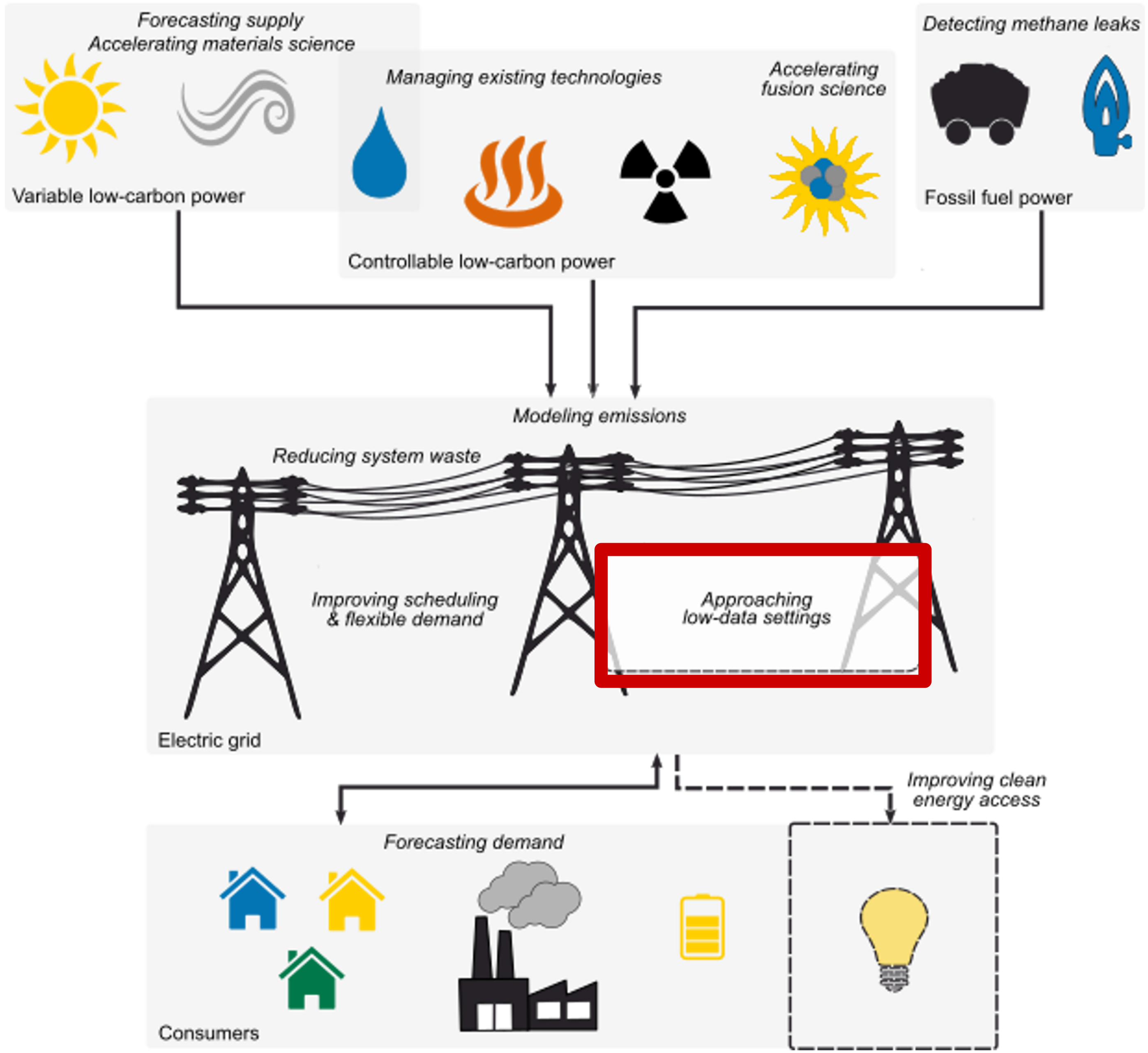


Electricity Systems

Identifying Rooftop Solar PV

DeepSolar from Yu et al. (2019)

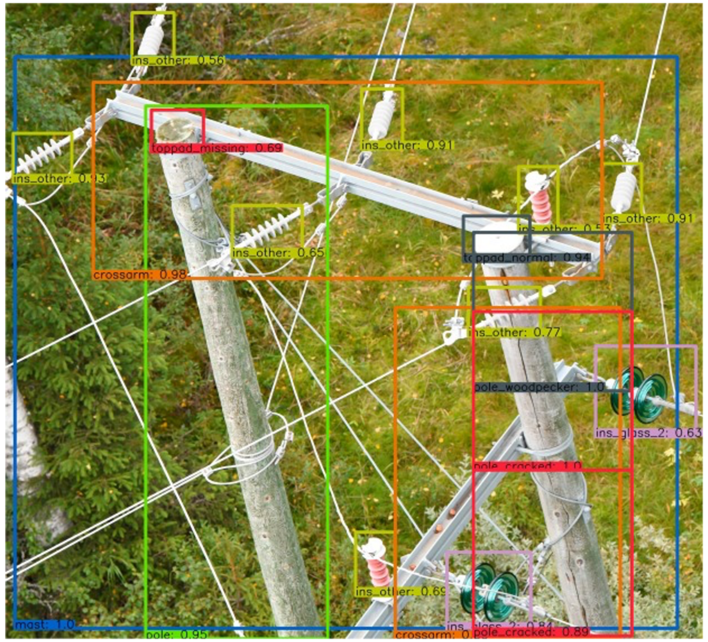


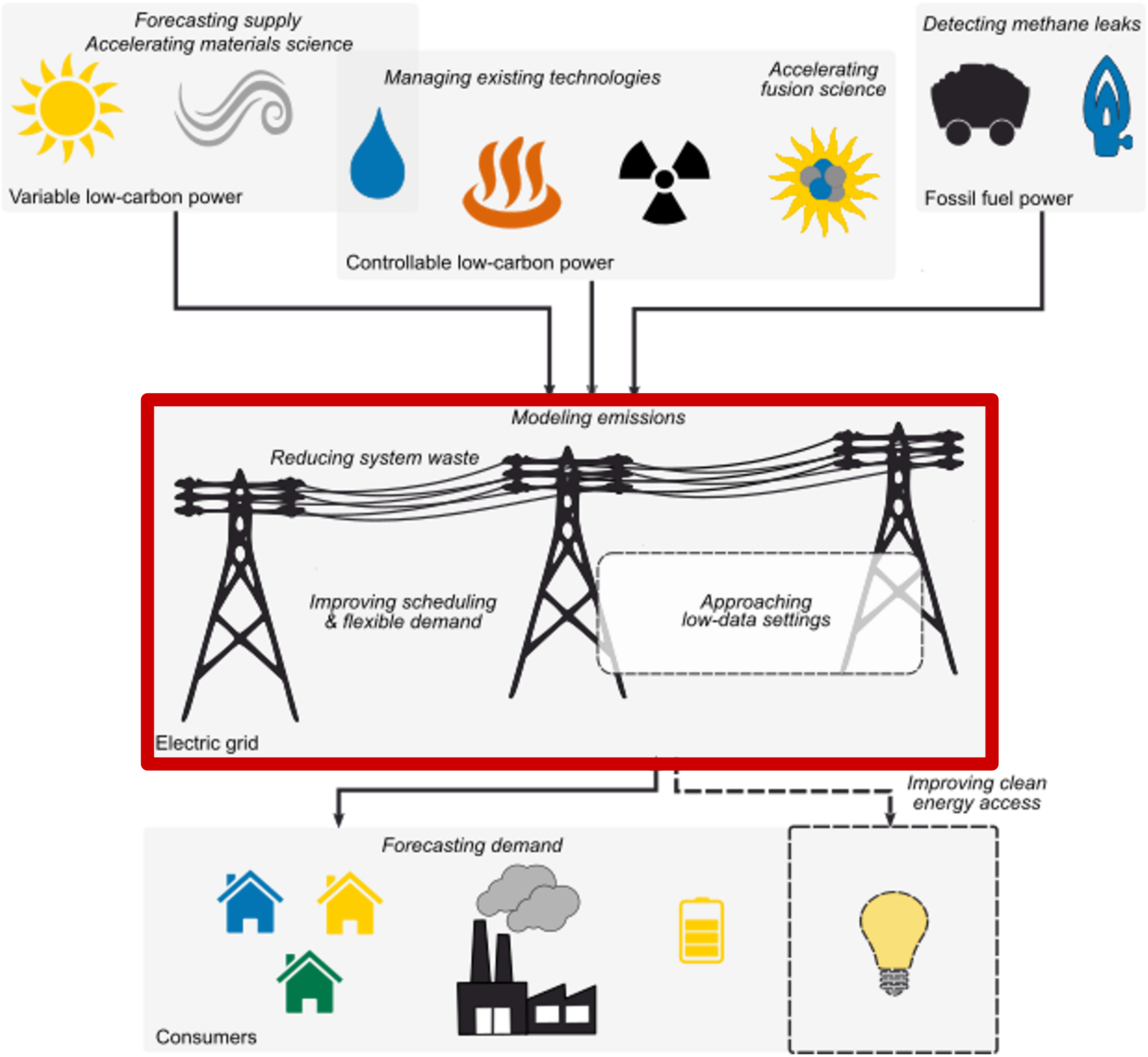


Electricity Systems

Predictive maintenance:

Power line inspection (Nguyen et al. 2018)

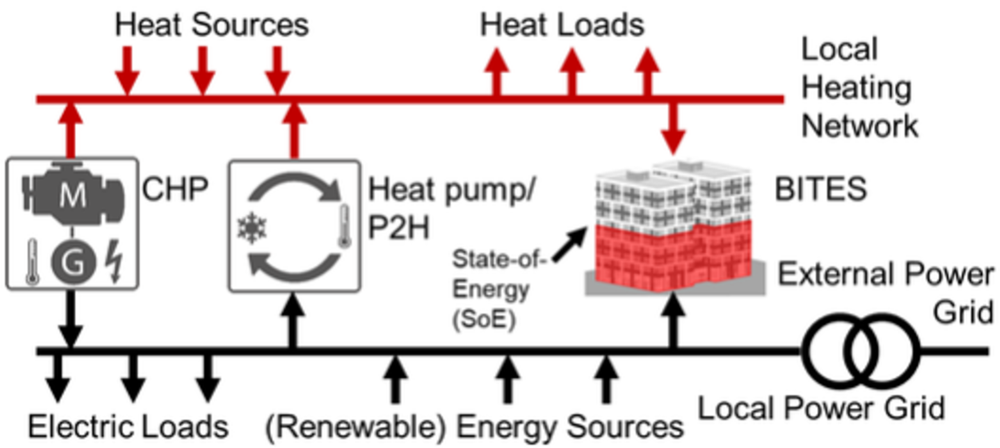


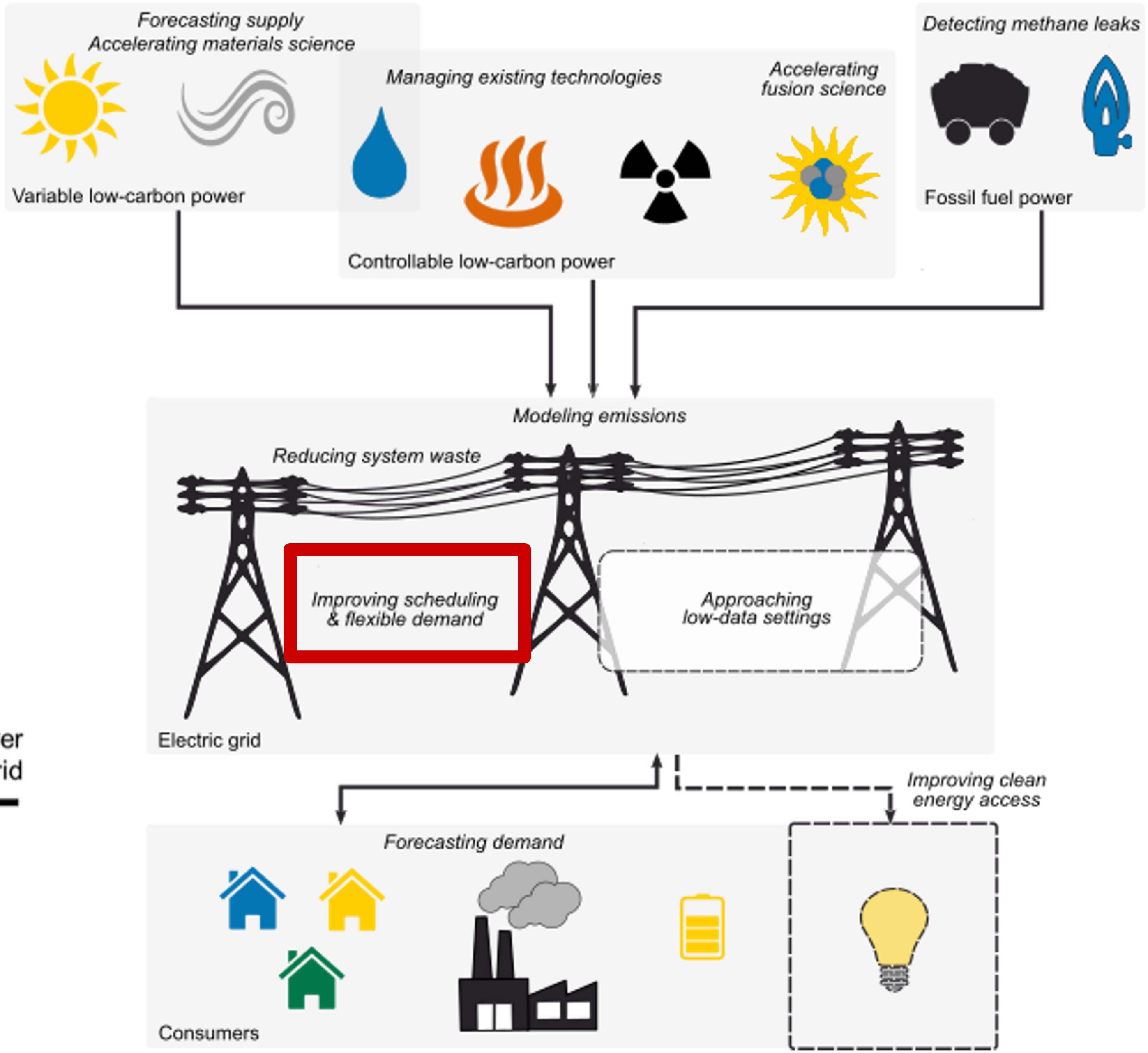


Electricity Systems

Flexibility

Buildings as energy storage (Voss et al. 2021)

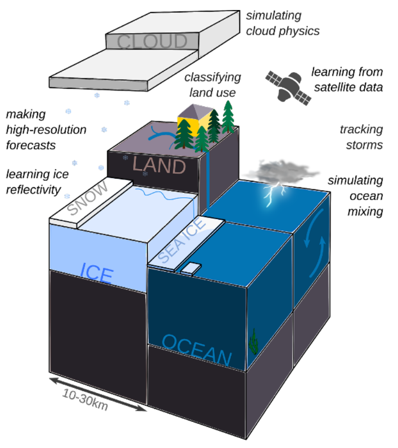




Climate impacts: Integrated Assessment Models for assess Financial Climate Risk and calculate Social cost of carbon

Integrated Assessment Models (IAMs)

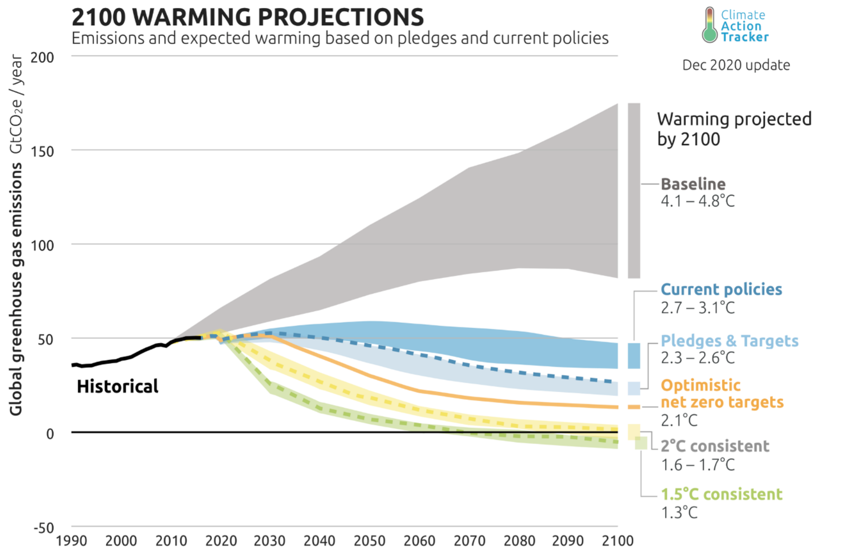
Climate models



Socio-economic models

Policy scenarios

Global Warming Projections

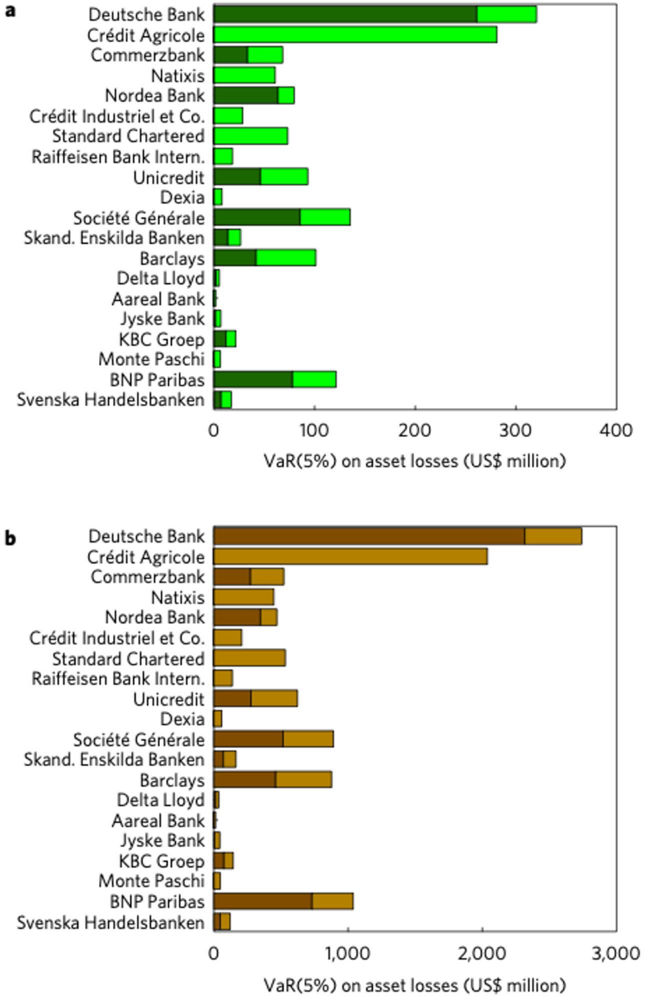


Financial climate risk

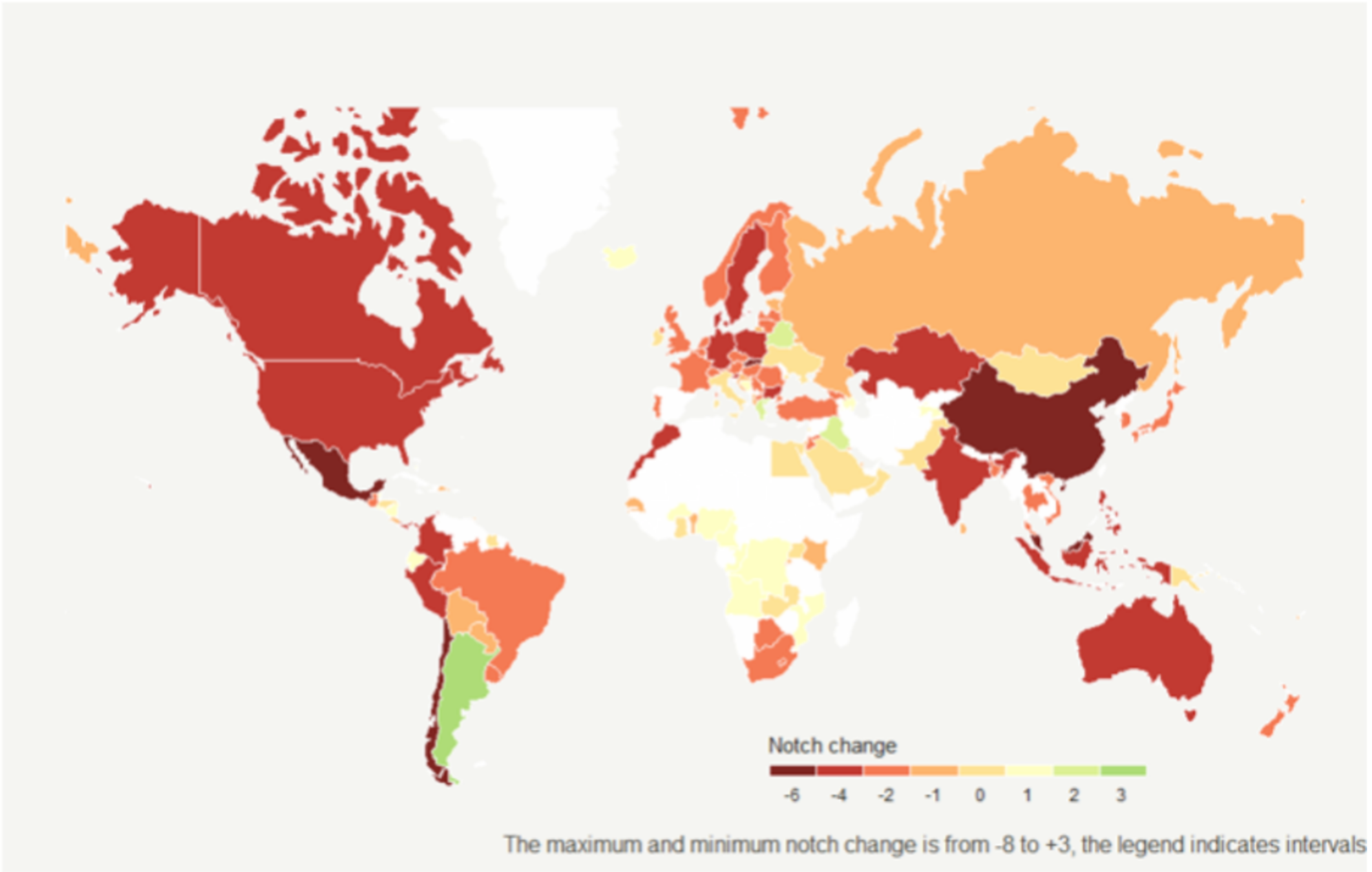
Social cost of carbon

Image sources:
https://climateactiontracker.org/global/temperatures/
https://cicero.oslo.no/en/CF-transitional-risk

Financial climate risk prediction



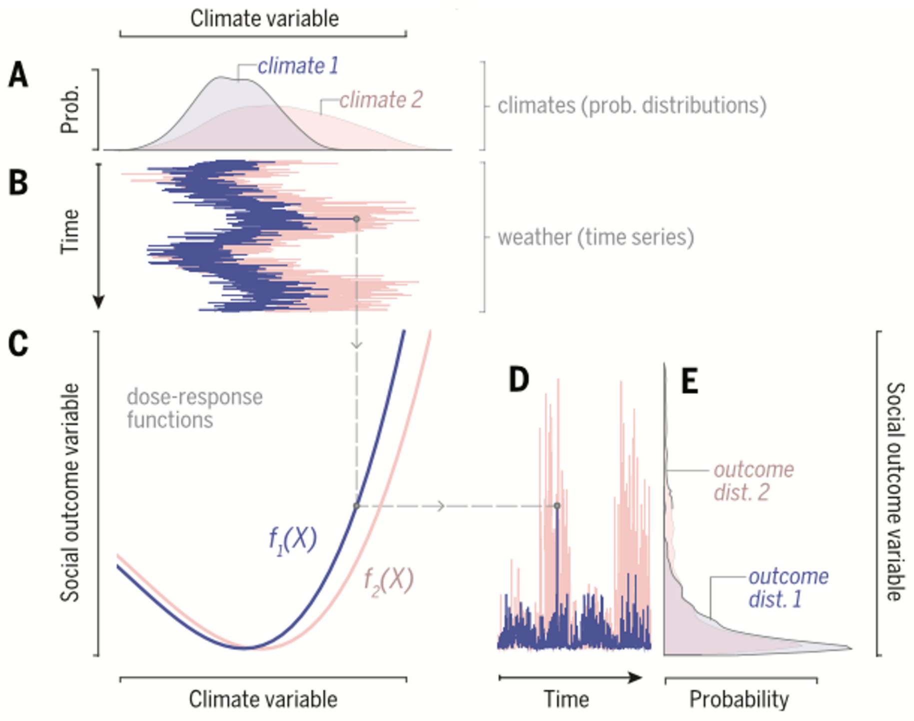
Individual banks' value at risk under green and brown investment strategies (Battiston et al. 2017)



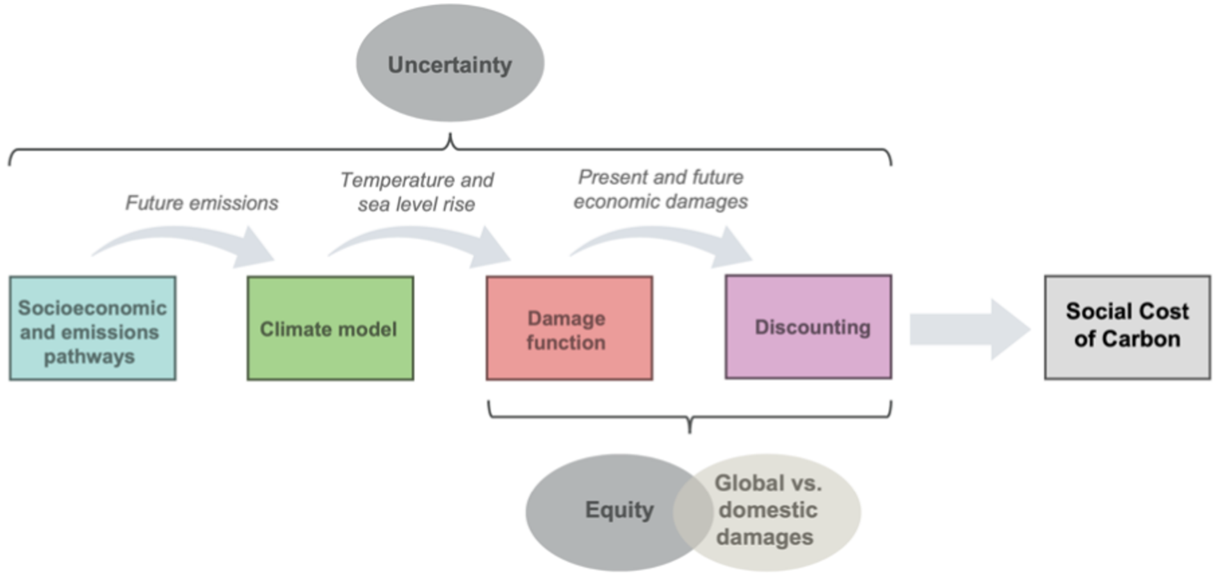
Global climate-induced sovereign ratings changes (2100, RP 8.5) (Klusak et al. 2021)

Social cost of carbon

CCAI webinar with Tamma Carleton on the Social Cost of Carbon : https://www.youtube.com/watch?v=_9oWvXg3dzw

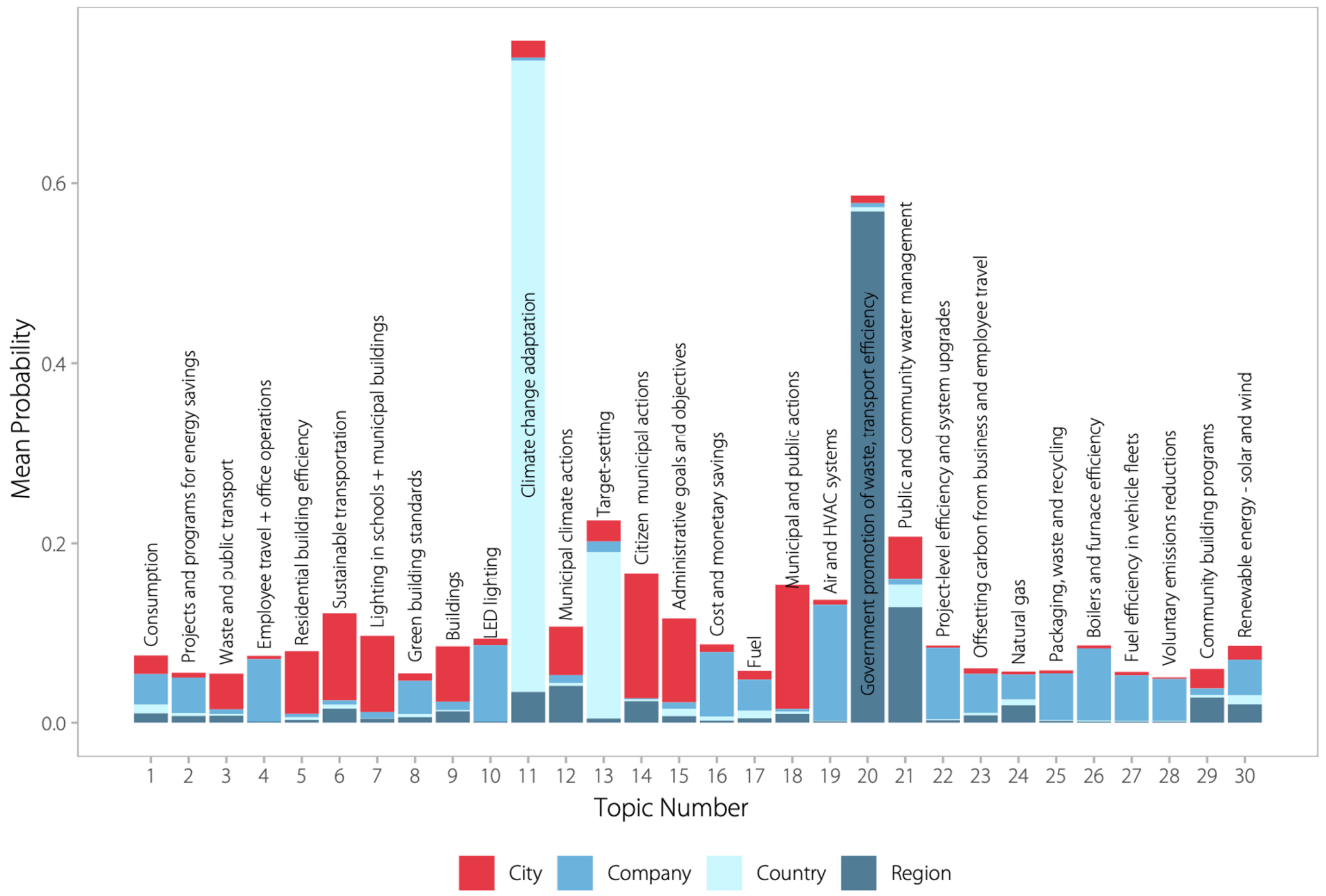


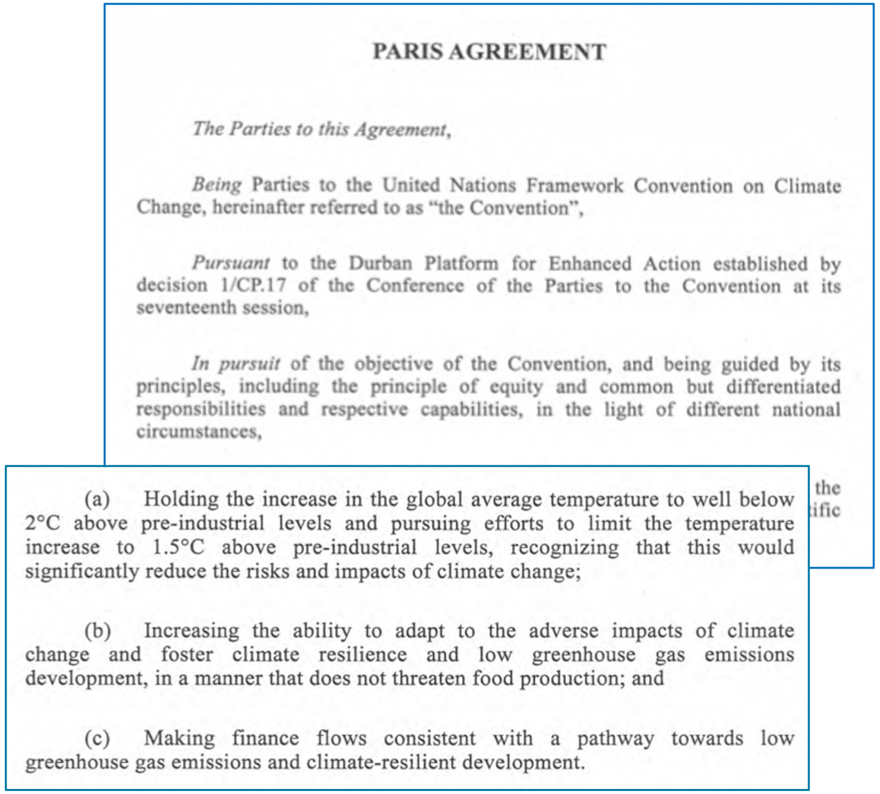
Modeling the influence of the climate on social outcomes (Carleton & Hsiang 2016)



Components of improved models to estimate the social cost of carbon (Carleton & Greenstone 2021)

Text as data for climate policy





PARIS AGREEMENT

The Parties to this Agreement,

Being Parties to the United Nations Framework Convention on Climate Change, hereinafter referred to as "the Convention",

Pursuant to the Durban Platform for Enhanced Action established by decision 1/CP.17 of the Conference of the Parties to the Convention at its seventeenth session,

In pursuit of the objective of the Convention, and being guided by its principles, including the principle of equity and common but differentiated responsibilities and respective capabilities, in the light of different national circumstances,

(a) Holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change;

(b) Increasing the ability to adapt to the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development, in a manner that does not threaten food production; and

(c) Making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development.

Per-document, per topic probabilities for groups of climate actors based on topic modelling approach (Hsu & Rauber 2021)

AI *alone* will not save us from climate change!

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MYTH

AI also has the potential to harm the climate

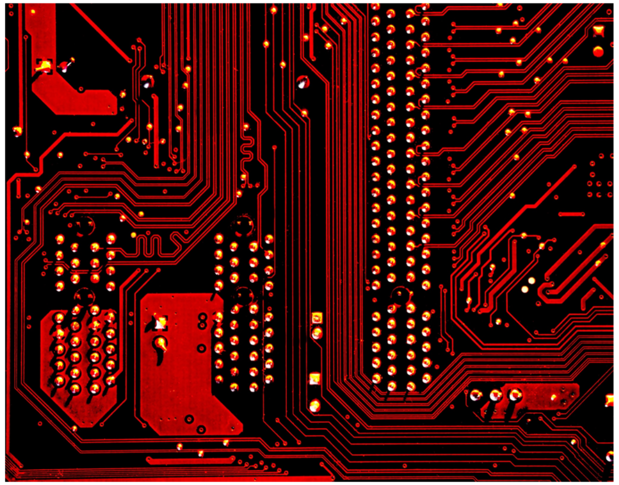
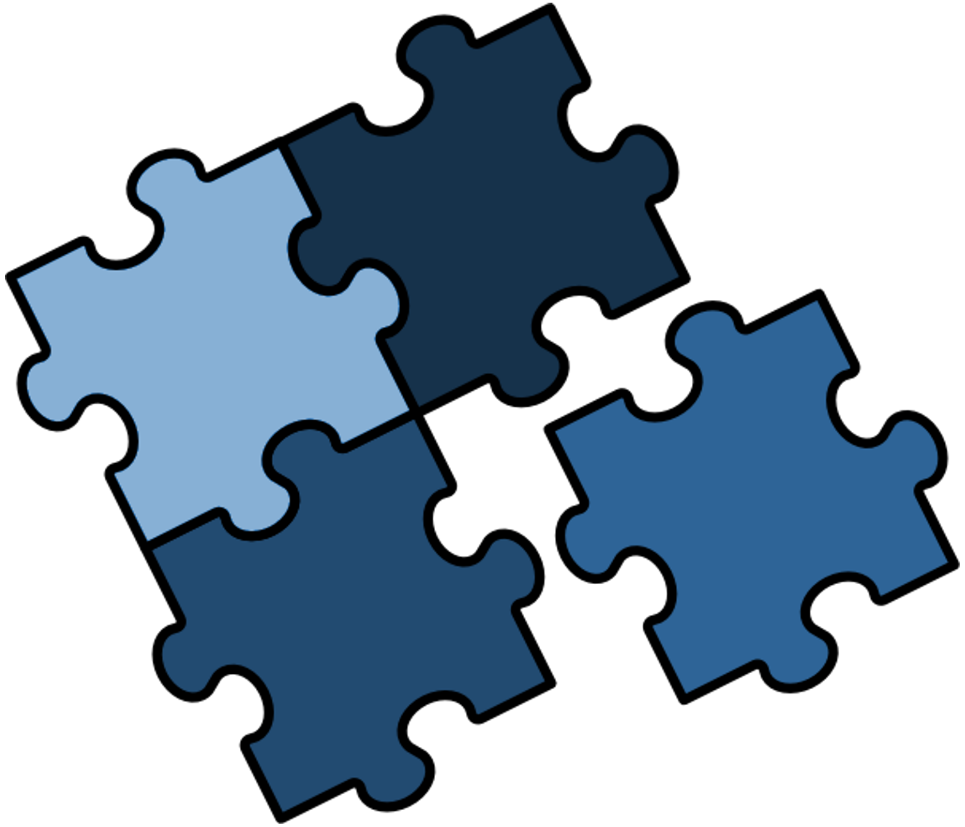
Direct impact	Indirect impact
GHG emissions from computational requirements (Strubell et al. 2019)	AI applications in areas that have a negative impact on the climate
	

Image source: https://unsplash.com/

AI is one piece of the puzzle

ML is a powerful tool
... but not a silver bullet.

Where ML is relevant, **collaboration** is key to doing meaningful work.



Climate Change AI

Catalyzing impactful work at the intersection of climate change and AI

Digital resources

Foundational report, datasets and add’l resources

Resource Wiki & meetups

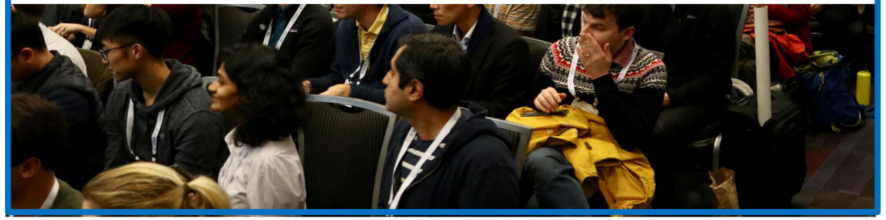
Electricity Systems

+ Forecasting supply and demand High Leverag

+ Improving scheduling and flexible demand

Conferences and events

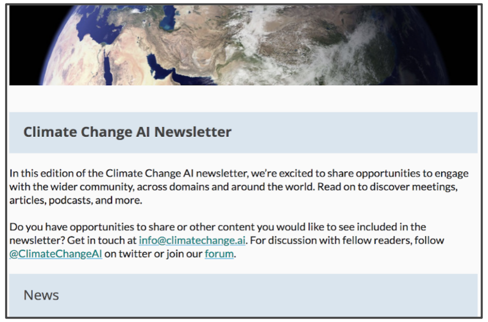
Workshops at major machine learning conferences ICML, NeuRIPS and ICLR.



Funding programs

Global research funding to be announced for impactful work in climate change + AI

Newsletter and forum


Climate Change AI Newsletter

In this edition of the Climate Change AI newsletter, we're excited to share opportunities to engage with the wider community, across domains and around the world. Read on to discover meetings, articles, podcasts, and more.

Do you have opportunities to share or other content you would like to see included in the newsletter? Get in touch at info@climatechange.ai. For discussion with fellow readers, follow @ClimateChangeAI on twitter or join our forum.

News

- Calls for Submissions
- Funding
- Projects & Courses
- Readings
- Jobs

Webinars and happy hours

Learn more:

www.climatechange.ai

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