



## Security And Sustainability Forum

Convening Global Experts to Guide Decision Making



# [Prove I Made a Low Carbon Choice – Can smart systems do this?](#)

Wednesday, October 28, 2020



**[Andrew Maynard](#)**

Director, Risk Innovation Lab,  
Associate Dean,  
College of Global Futures  
ASU



**[Ben Goertzel](#)**

CEO and Founder  
SingularityNET



**[David Aronchick](#)**

Head of Open Source Machine  
Learning Strategy  
Microsoft



**[Suchi Gopal](#)**

CEO  
ESGAnalytics.AI



**Edward Saltzberg**

Executive Director  
Security & Sustainability  
Forum

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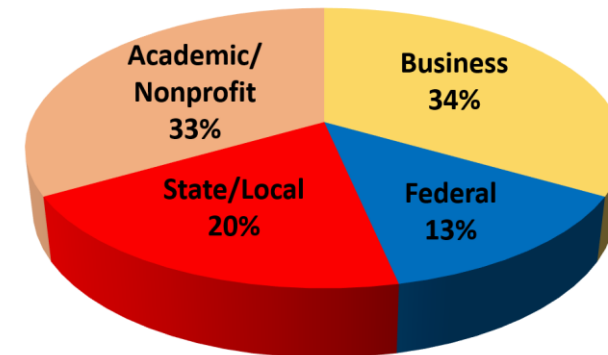
## SSF Webinars Address Critical Issues

- Smart Energy/Smart Cities
- Resilience & Sustainability
- The Circular Economy
- Restoring the Carbon Balance
- Climate Adaptation
- Urbanization and Sustainable Economies
- Extreme Weather Events
- Others

## Who Follows Us?

>25,000 Global Sustainability Professionals

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220 recordings in the SSF Archive

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- Thurs. June 4: [Using Design Thinking to Employ Smart Systems to Decarbonize Our Future](#)
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- Fri. August 21: [Better Food, Less Carbon in the New Digital Economy](#)



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1. **Welcome:** Ed Saltzberg, *Executive Director, SSF*
2. **Panel Introduction & Context:** **Prof. Andrew Maynard**, *Director, ASU Risk Innovation Lab & Associate Dean, College of Global Futures, ASU*
  - **David Arconchick**, *Head of Open Source Machine Learning Strategy, Microsoft*
  - **Ben Goertzel**, *CEO and Founder, SingularityNET*
  - **Suchi Gopal**, *CEO, ESGAnalytics.Ai*
3. **Panel Discussion with Audience Q + A:** *Use the box in the Go To Webinar window*
4. **Panel Summary**
5. **Closing**

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*CEO  
ESGAnalytics.AI*

# Who Am I?



**I am:**  
David Aronchick

**I believe:**  
**TECHNOLOGY IS  
NOT NEUTRAL.**

**So:**  
We must **ACTIVELY** use our skill, passion

**Work:** Open Source Machine Learning Strategy Lead, Azure

**Worked:** Google, Chef, Amazon & Microsoft (Exchange, IE, Vista, Research)

**Co-founder:** [Hark](#), [MTS](#) and [Formatta](#)

## Lead open source ML strategy for Azure Machine Learning

- Worked in open source communities (led Kubernetes and started Kubeflow)
- I worked on sustainability and data centers for them
- I also care a lot about the environment and just want to help



# Energy and Policy Considerations for Deep Learning in NLP

Emma Strubell    Ananya Ganesh    Andrew McCallum

College of Information and Computer Sciences

University of Massachusetts Amherst

{strubell, aganesh, mccallum}@cs.umass.edu

## Abstract

Recent progress in hardware and methodology for training neural networks has ushered in a new generation of large networks trained on abundant data. These models have obtained notable gains in accuracy across many NLP tasks. However, these accuracy improvements depend on the availability of exceptionally large computational resources that necessitate similarly substantial energy consumption. As a result these models are costly to train and develop, both financially, due to the cost of hardware and electricity or cloud compute time, and environmentally, due to the carbon footprint required to fuel modern tensor

<u>Consumption</u>	<u>CO<sub>2</sub>e (lbs)</u>
Air travel, 1 passenger, NY↔SF	1984
Human life, avg, 1 year	11,023
American life, avg, 1 year	36,156
Car, avg incl. fuel, 1 lifetime	126,000
<b>Training one model (GPU)</b>	
NLP pipeline (parsing, SRL)	39
w/ tuning & experimentation	78,468
Transformer (big)	192
w/ neural architecture search	626,155

Table 1: Estimated CO<sub>2</sub> emissions from training common NLP models, compared to familiar consumption.<sup>1</sup>

INNOVATION / AI

# Training AI Is Shockingly Costly to the Environment

Training AI models has a huge carbon footprint.



By Jessica Miley

June 11, 2019





# Our data centers now work harder when the sun shines and wind blows

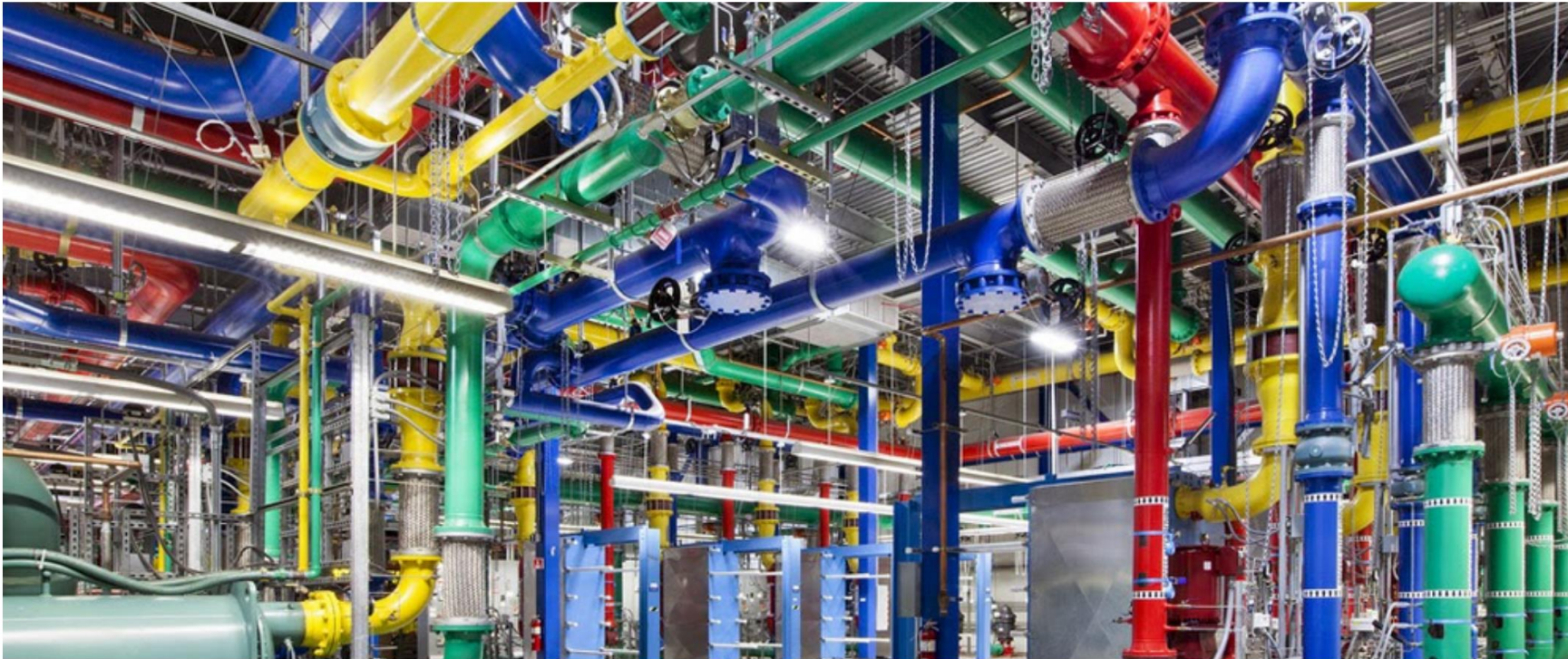


<https://blog.google/inside-google/infrastructure/data-centers-work-harder-sun-shines-wind-blows/>



SUSTAINABILITY

# DeepMind AI reduces energy used for cooling Google data centers by 40%



<https://blog.google/topics/environment/deepmind-ai-reduces-energy-used-for/>





# AWS & Sustainability

AWS is committed to running our business in the most environmentally friendly way possible

[Home](#)

[Renewable Energy](#)

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In addition to the environmental benefits inherently associated with running applications in the cloud, AWS is committed to achieving 100% renewable energy usage for our global infrastructure

**Still 90%+ backed by polluting coal ☹️ (and will be through 2030)**



© George Nikitin / Greenpeace

## ENERGY

# Greenpeace Accuses AWS of Fueling Virginia Data Center Growth with Dirty Energy

The Greenpeace Airship A.E. Bates flies over Silicon Valley in 2014 with a banner asking "Who's The Next To Go Green?"





<https://twitter.com/mrchrisadams/status/1184854192428605441/photo/1>



# Sustainable Servers by 2024



[Coed:Ethics](#) started this petition to Mark Russinovich and [4 others](#)

**Tech's data centres run on fossil fuel power. They don't need to. We want them to become 100% carbon neutral by 2024.**

**According to estimates, our data centres currently produce as much greenhouse gas emissions as the aviation industry. That's 2% of the world's emissions now and as data centre usage is projected to increase five times by 2025, emissions are set to soar. Bitcoin mining alone could require 0.5% of**

2,327 have signed. Let's get to 2,500!



 **Annika Garbers** signed 22 hours ago

 **Si Chen** signed 1 week ago

Last name

Email

Seattle, 98125  
United States

- Please share my name and email address with Coed:Ethics, so that I can receive updates on this campaign and others.
- Display my name and comment on this petition

 **Sign this petition**

By signing, you accept Change.org's [Terms of Service](#) and [Privacy Policy](#), and agree to receive occasional emails about campaigns on Change.org. You can unsubscribe at any time.

<https://www.change.org/p/sustainable-servers-by-2024>

## 2020 Cloud League Table

Cloud	Rating	Sustainable Servers?
Google	A-	100% with offsets today, with commitment to 'real time matching' (i.e. no carbon release)
Azure	A-	100% with offsets and energy certificates today, with commitment to be carbon negative by 2030
AWS	C-	100% with offsets only in four public regions today, elsewhere unknown with estimates in the less than 30-50% range. New commitment to
		carbon neutrality by 2030 and carbon zero (no carbon release) by 2040. The rating here would be higher but for the continuing lack of transparency on energy usage.
Oracle	C-	100% with offsets in a few regions <30% overall
IBM	C-	~50% overall
Alibaba	D-	Unknown but China a major market, and not known what energy is purchased

(for reference) 2018 Cloud League Table

Cloud	Rating	Sustainable Servers?
Google	B+	100% with offsets
Azure	B	100% with offsets and energy certificates
AWS	C	100% with offsets in 5 regions, elsewhere unknown with estimates in <30-40% range
Oracle	C-	100% with offsets in a few regions <30% overall
IBM	C-	~50% overall

[https://docs.google.com/document/d/1eCCb3rgqtQxcRwLdTr0P\\_hCK\\_drlZrm1Dpb4dIPeG6M/edit](https://docs.google.com/document/d/1eCCb3rgqtQxcRwLdTr0P_hCK_drlZrm1Dpb4dIPeG6M/edit)

# **Our Opportunity (& Responsibility) with AI**

- **Work to publish more data (starting with government publications – NOAA, JPL, etc.)**
- **Use AI to intelligently process data so that people can use it to make better decisions (e.g. no more PB datasets)**
- **Live our values – nothing engenders more trust than giving back and being authentic**

# SingularityNET -- Decentralized AI

SingularityNET is a blockchain-based platform enabling multiple AI agents to cooperate to solve problems leveraging multiple AI paradigms

Singularity Studio helps global enterprises **grow, optimize and differentiate their business** through flexible, scalable and price-competitive AI solutions, using proprietary neuro-symbolic AI techniques.

## Previous and Current Clients Include



NTAID



ArcelorMittal



HUAWEI



LOCKHEED MARTIN



IARPA  
BE THE FUTURE



CISCO

Serviceware  
WE LIVE SERVICE!



NIH



CDC  
CENTERS FOR DISEASE  
CONTROL AND PREVENTION



PICC

## Moving Toward Artificial General Intelligence

SingularityNET fosters a "society of minds" whose intelligence exceeds the sum of the intelligences of the parts, and is designed to help bridge the gap between narrow AI and AGI

## Proven AI Solutions

For Healthtech, Finance, Smart City and other vertical markets

## World Class AI Expertise

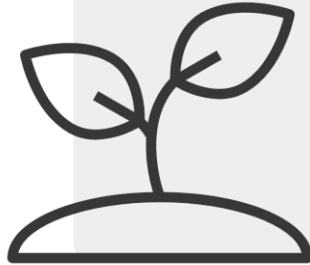
Vertically-driven, world leading enterprise artificial intelligence software expertise

## AI Developer Community

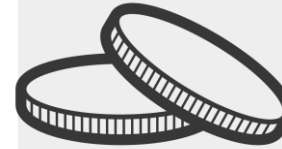
A global community of thousands of AI engineers uniquely empowering innovation



# ML-Powered Carbon Credit Economy: Solution Flow



Farmers infuse their soil with carbon during the photosynthesis process, promoting healthier soil.



Carbon purchasers buy Verified Emission Reduction Credits as tokens on the marketplace and the farmer is reimbursed for their carbon sequestration.



The use of crop residues as mulch, intercropping food crops with trees, and integrated nutrient and water management can use to sequester carbon in the soil.



The carbon credit token is then listed for sale on the marketplace.



An independent measurement service (AES) measures baseline and subsequent improvements, **leveraging machine learning to improve accuracy based on limited data**. This is verified by another independent verifier organization. Verified Emission Reduction Credits certificate is issued.

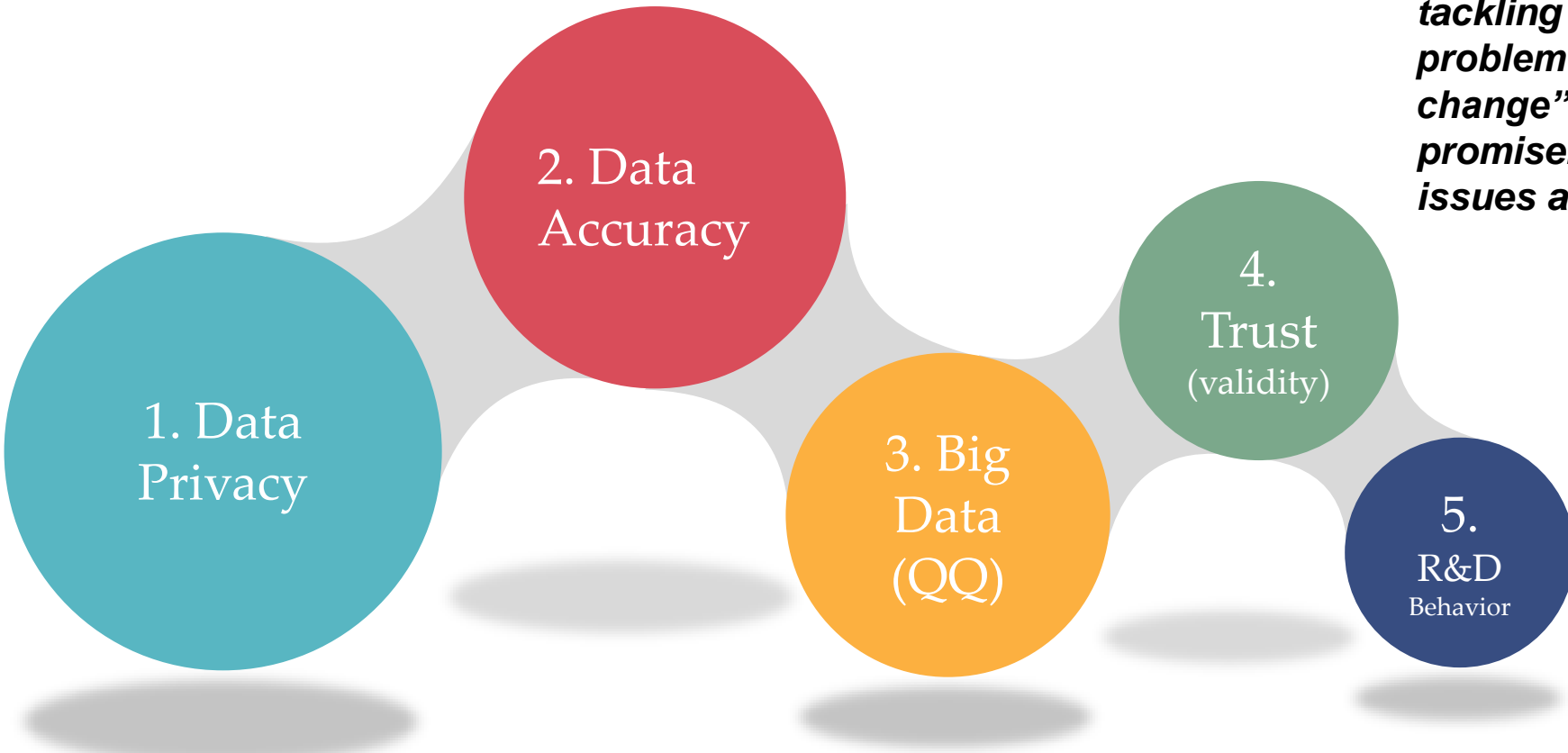


Confirm that the sequestration is valid and that the CO<sub>2</sub> has been removed and measured correctly. The verification is inputted into the smart contract and a "carbon credit" token is created.





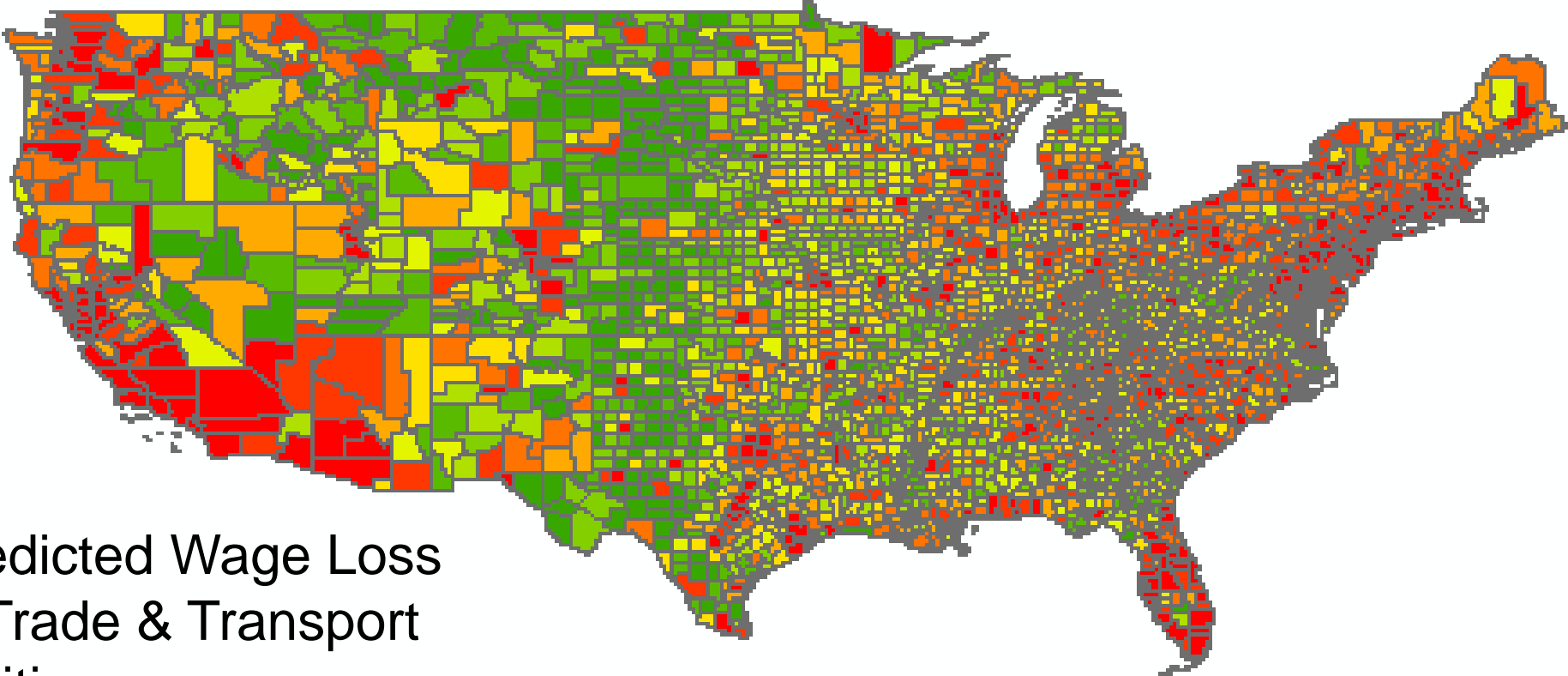
# Dr. Suchi Gopal – How Can AI Address Low Carbon Choice – Moving to a Brighter Future. Security and Sustainability Forum. Webinar October 28, 2020.



*AI is a powerful tool for tackling the wicked problem “climate change”. It holds promise. What are the issues and hurdles?*

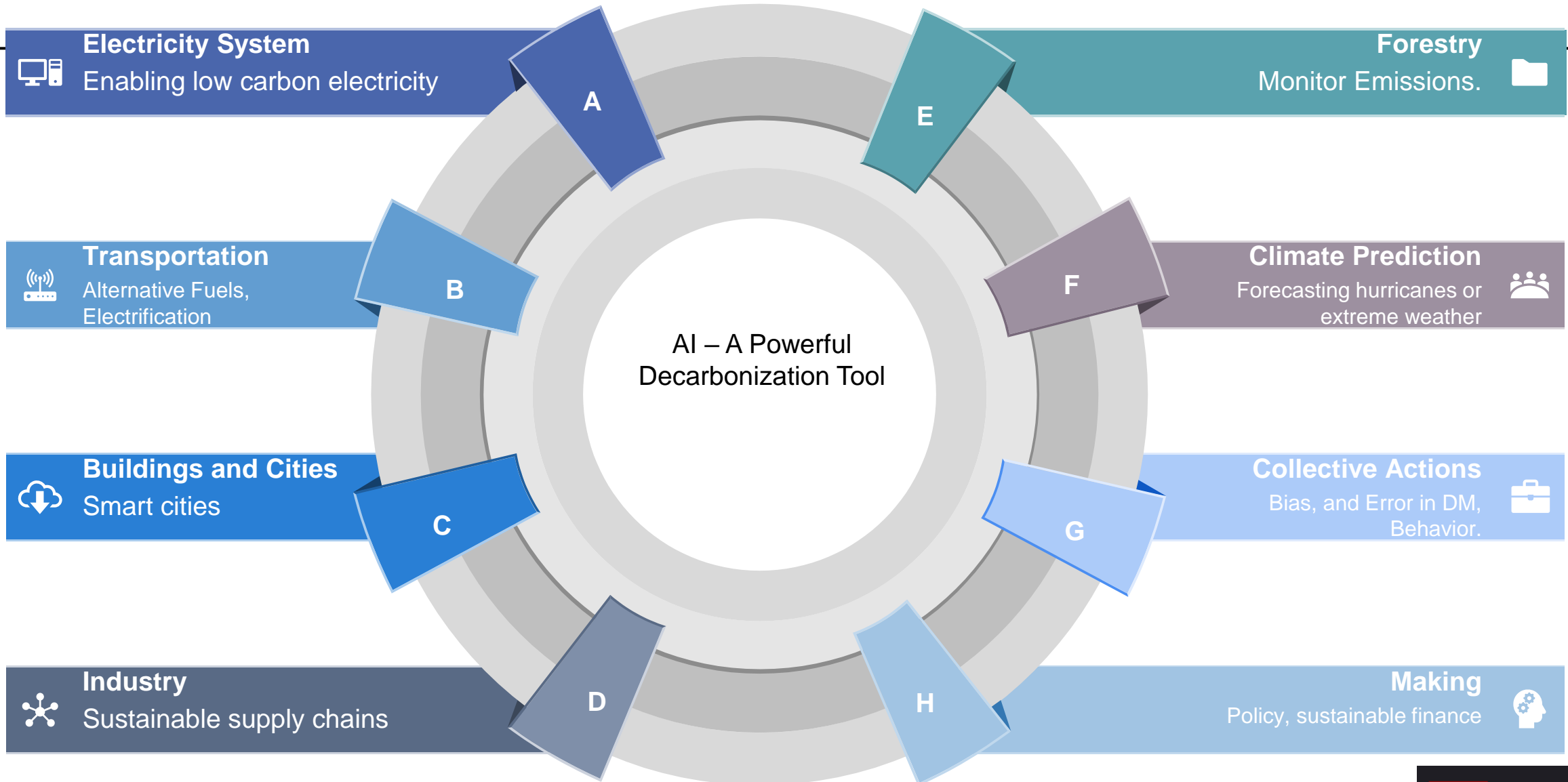
Pattern matching, segmentation, social mining (NLP), Prediction ...

# AI Will Affect so Many Sectors of the American Economy



Predicted Wage Loss  
in Trade & Transport  
Utilities (Private Employment)

## Some Applications



# ESG Investors - Millennials to Baby Boomers

Concerned with climate change; want to go carbon neutral in all aspects. (Prius cars, Beyond Meat eaters! No plastics) .

This group's affinity is to a brand that is ESG conscious but shows sophistication. . Drive Tesla or Electric BMW.



Want to invest in renewables (wind or solar energy) or social equity (invest in certain neighborhoods).

Care about their legacy and what is being left to their grandkids. Sovereign Funds.



## Audience Q&A

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