

# Successful Innovation for Emissions Inventories

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# Past and Future Challenges

## Resources



- In the ~2000, EPA expected an increase in demand for emissions data for air quality modeling
- Past paradigm was slow, error prone, and caused costly rework



+ Multi-Jurisdictional Organizations

# Past and Future Challenges

## Resources



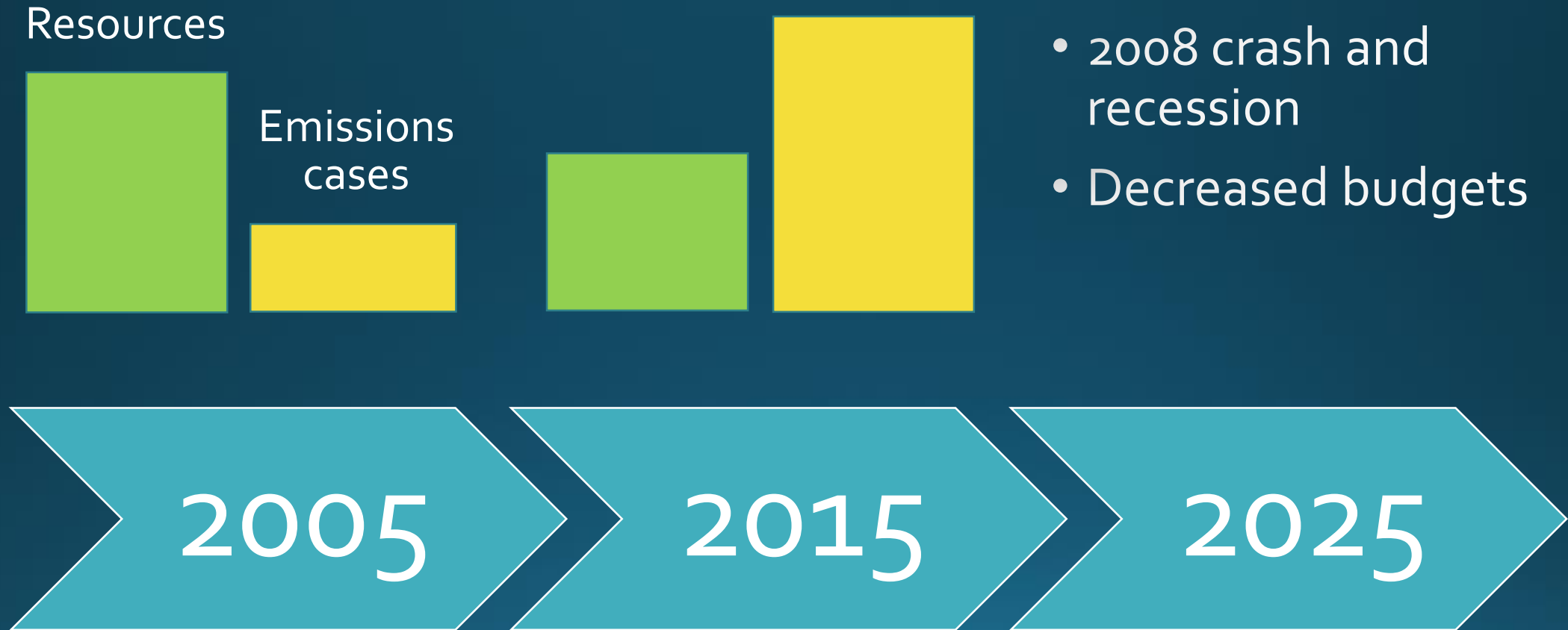
## Innovation helped with those challenges

- Emissions Inventory System (EIS)
- Emissions Modeling Framework (EMF)

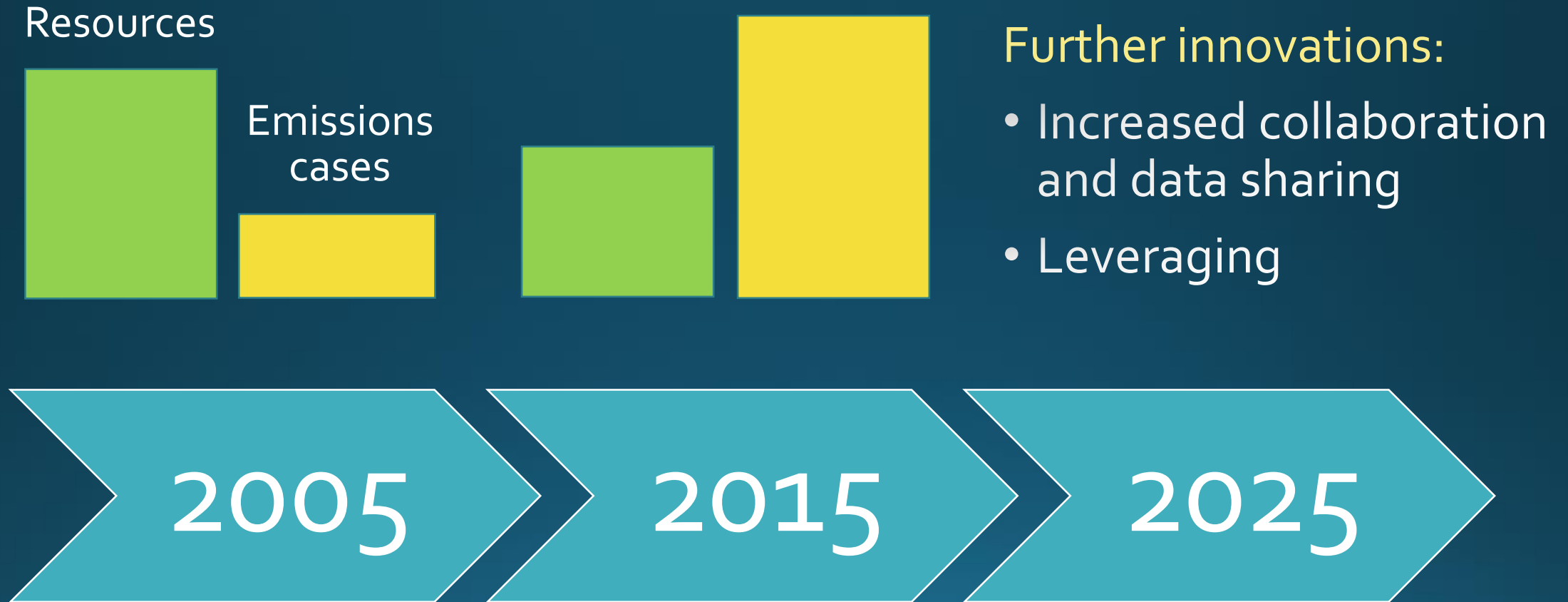


+ Multi-Jurisdictional Organizations

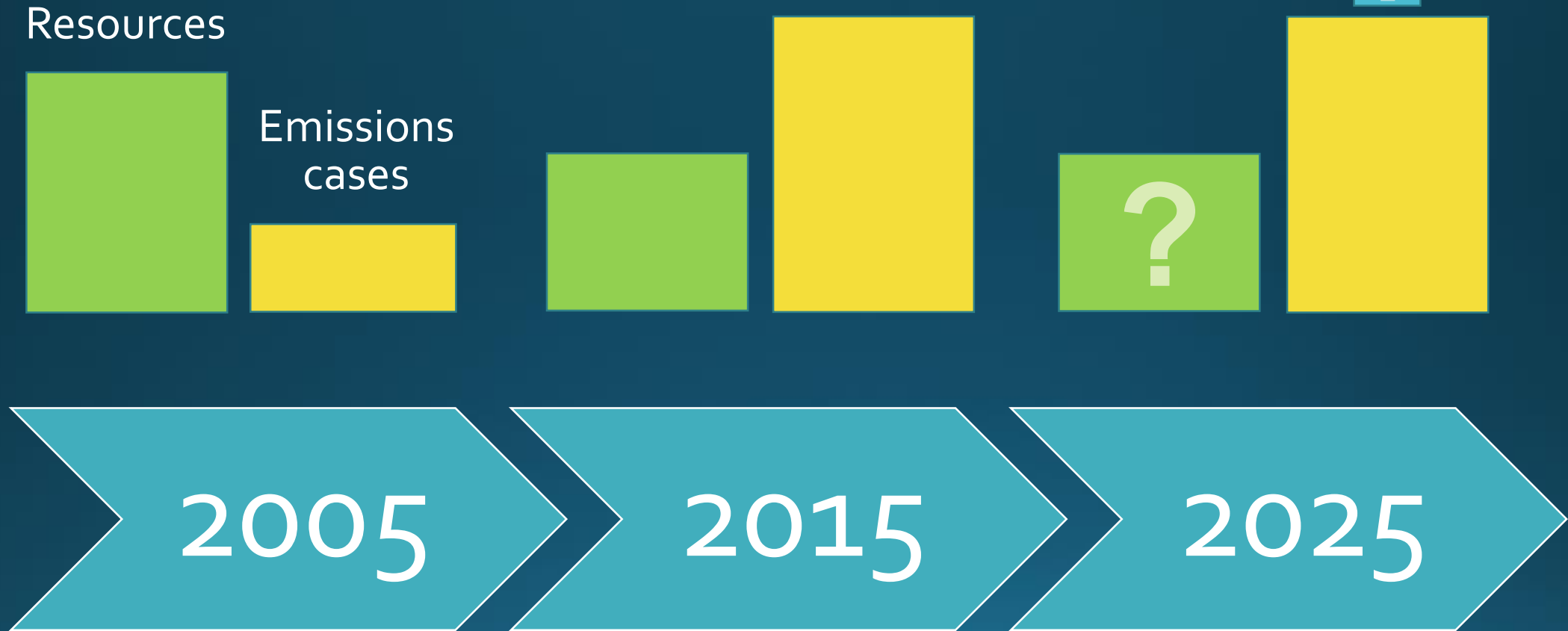
# Past and Future Challenges



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# Emissions Work Forms the Foundation for Air Quality Improvement

## Industry roles

- Data collection
- Ensuring compliance and reporting

## State, local, and tribal roles

- Permits and inventories
  - Data and tools
- State Implementation Plans

## EPA and other national roles

- Regulatory structures
  - Data, tools, methods, and gap filling
- Encourage connections across partners and collaboration

# Our Challenge Now

- Decreasing and uncertain resources
- Continuous and increasing need for ever better emissions information
- Focus on reducing regulatory burden
- Rapidly changing technologies and related expectations



***How do we identify and create new innovations that will meet the challenges for the next 10 years?***

# Many Roles of Inventory Developers



in·no·vate    'inə,vāt/

*verb*

make changes in something established, especially by introducing new methods, ideas, or products

A buzzword, but...

The “buzz” is justified, because innovating can make huge leaps forward

“

If you have always done it that way, it is probably wrong.

”

- Charles Kettering,  
inventor all-electric starting, ignition, and lighting system for automobiles  
and holder of 186 U.S. patents

# Innovation is Needed to Meet the Challenges of Emissions Inventories

- What are the methods, ideas, and products that we should consider changing?
- What obstacles exist?
- How will we overcome those obstacles?

# What Needs Innovation?

- This conference is a testament to the innovation that is already happening
- You have identified the needs and starting taking steps to make those next improvements



# Examples of Ongoing Innovations

- Collaboration across all levels of government
  - States, locals, and tribes continue to step up to take leadership roles
- National Oil and Gas Committee
- Combined Air Emissions Reporting and E-Enterprise
- Multi-Jurisdiction Organizations
- Working with Tribal Nations on oil and gas

“

Innovation is fostered by information gathered from new connections; from insights gained by journeys into other disciplines or places; from active, collegial networks and fluid, open boundaries.

”

- Meg Wheatley,  
author and management consultant



# Examples of Ongoing Innovations

- Collaboration across all levels of government
- End-user input from the regulated community
  - Combined Air Emissions Reporting
  - Utah and Region 8 Oil & Gas Methods
  - Consolidated Emissions Data Reporting Interface
  - Greenhouse Gas Reporting Program updates

# Examples of Ongoing Innovations

- Collaboration across all levels of government
- End-user input from the regulated community
- New data approaches and technologies
  - Use of high resolution tracking information for mobile sources
  - EPA nonpoint approach improvements
  - Use of remote sensing data
  - Shared services for information technologies
  - Emissions projections methods improvements

# Examples of Ongoing Innovations

- Collaboration across all levels of government
- End-user input from the regulated community
- New data approaches and technologies
- Leveraging shared interests and resources
  - Coordinated Research Council mobile source improvements
  - Commission for Environmental Cooperation local scale biomass

# Examples of Ongoing Innovations

- Collaboration across all levels of government
- End-user input from the regulated community
- New data approaches and technologies
- Leveraging shared interests and resources
- Open Source Tools
  - ERTAC EGU Tool
  - Spatial Surrogate Tool
  - Community Emissions Database System

# What Obstacles Exist?

- Natural resistance to change
- Complexity of the problem
- Resources



# Resistance to Change

## Synonyms for *innovation*:

change, alteration, revolution, upheaval, transformation, metamorphosis, breakthrough; new measures, new methods, modernization, novelty, newness

## We Fear Change

- Loss of control
- Excess uncertainty
- Loss of face
- Concerns about competence
- More work
- Ripple effects

“

Where do you put the fear when you choose to innovate? The fear is there, but you have to find a place to put it.

”



- Seth Godin,  
author and entrepreneur, from the 2010 World Innovation forum

# You Might Be Wrong, but... You Might Be Right

- **1876:** *"This 'telephone' has too many shortcomings to be seriously considered as a means of communication."*  
— William Orton, President of Western Union
- **1966:** *"Remote shopping, while entirely feasible, will flop."*  
— Time Magazine
- **2007:** *"There's no chance that the iPhone is going to get any significant market share."*  
— Steve Ballmer, Microsoft CEO



# Dealing with Complexity

- Organizations and teams
  - Create a dynamic culture of learning and improvement
  - Break the complexity down to the parts and connections
  - Distribute leadership
  - Try “Lean”
- Individuals
  - Build creativity
  - Get comfortable with ambiguity
  - Be willing to learn new things
  - Collaborate

# Facing Limited Resources

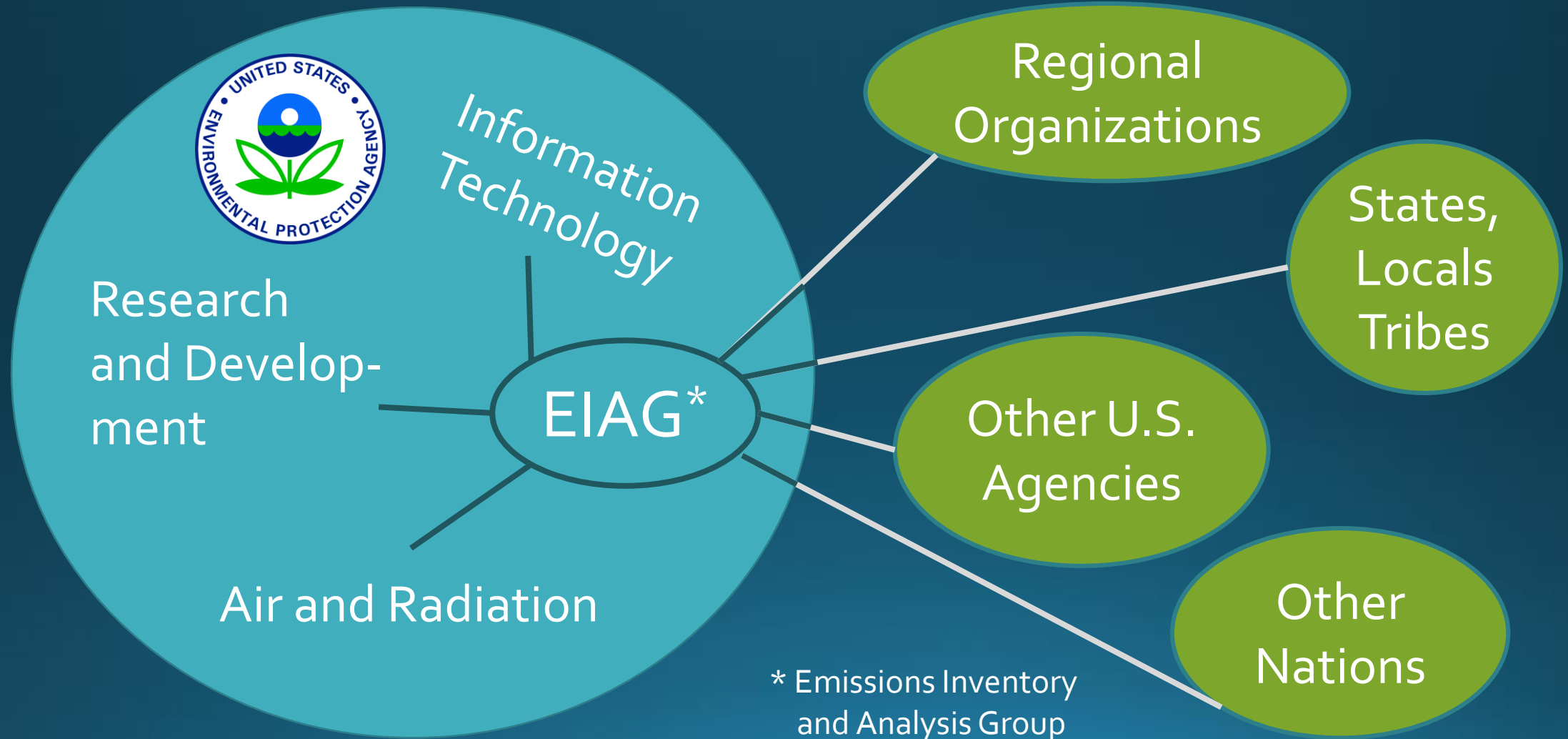
- Collaboration and leveraging the work of others
- Useful and low cost technologies



# Leveraging Work of Others

- Stay informed about what is going on
  - Many available workgroups dedicated to information and data sharing
  - NEI tri-weekly updates to co-regulators
- Iterative development
- Build your tools with others in mind
  - Open source
  - Modular

# Seek and Support Connections



# Technologies

- Virtual Exchange Service (<http://www.exchangenetwork.net/virtual-exchange-service/>)
  - For EPA data partners
- Web services
  - Protocols to allow computers to talk to one another to share packets of data to build and enhance web applications
- EPA shared services (<http://www.exchangenetwork.net/shared-services/>)
  - Facility Registry Service
  - Envirofacts includes web services for all data hosted there
- Free forms, survey, and spreadsheet software
- Team collaboration software

# Example Google® Form

**EIAG Help Desk**

Please use the spaces provided below to submit your question or comment

**\* Required**

**Email address \***

Your email

**Name \***

Your answer

**Select Type of Question or Comment \***

Choose

**Inventory Data Categories (select all that apply): \***

- Point sources
- Nonpoint sources
- Mobile sources
- Fires
- Biogenic sources
- Other: \_\_\_\_\_



**EIAG support Q&A**

File Edit View Insert Format Data Tools Form Add-ons Hel

fx | Timestamp

	A	B	C
1	Timestamp	Email Address	Name
2	6/15/2017 15:42:21	houyoux.marc@epa.gov	Marc
3	6/15/2017 15:45:26	houyoux.marc@epa.gov	MH
4	6/15/2017 16:05:40	houyoux.marc@epa.gov	Marc Houyoux
5	6/15/2017 16:23:33	houyoux.marc@epa.gov	Marc Houyoux
6	6/15/2017 16:33:22	houyoux.marc@epa.gov	Marc Houyoux
7	6/16/2017 14:51:53	houyoux.marc@epa.gov	M
8			
9			
10			
11			

# Example Trello® Collaboration Board

The screenshot shows a Trello board for 'CAER Team Coordination' with the following structure:

- Boards:** CAER Team Coordination (selected), AQAD CAER Team, Team Visible
- Ice Box:**
  - Card 1: Crosswalks we have developed - want to make sure you know about these
  - Card 2: When identified, add additional S/L/Ts that are involved in beta testing of FRS data model to our existing S/L/T tracking sheet on regulatory reqmt's for emissions reporting.
  - Card 3: Investigate potential applications/connections of software solutions to RACT/BACT/LAER clearinghouse
  - Card 4: Follow-up CAER prototyping activities - Sample industry/state volunteers (4 cards, JM)
  - Card 5: Promoting free base SLEIS to SLTs which are still trying to implement electronic reporting.
- Backlog:**
  - Card 1: Get Zen Desk (4 cards)
  - Card 2: Following up from Data Harmonization STW: Overall team and management needs to decide how best to proceed on actually making decisions about which code tables to harmonize first and how that would occur. This topic has overlap with the Facility IPT and Portal Team.
  - Card 3: Thought exercise of how data model would work if "loaded" for a facility from 2 or more programs. (3 cards)
  - Card 4: Create graphic of US to show which states are 'participating' in CAER--for use at future NACAA presentation (2 cards, 2/3, JM)
- In Progress - Communications:**
  - Card 1: CAER Conference Presentations (10 cards, 1 card, 4/5, SD, JG, JM)
  - Card 2: CAER Update Webinar - July, 2017 (0/9 cards)
  - Button: Add a card...

“

When people start telling you that you're crazy, you just might be on to the most important innovation in your life.

”

- Larry Allison,  
Cofounder and CTO of Oracle



# In Summary

- Innovation is needed to overcome the challenges of the next decade
- We are already innovating
- Overcome resistance to change
- Take deliberate strategies to overcome complexity
- Collaborate and leverage to optimize resources

# This Week @ EIC 2017

- Look for opportunities
- Make new connections with people and ideas
- Encourage others' ideas
- Share your experiences

“And, thus, we are all looking for the magic formula. Well, here you go: Creativity + Iterative Development = Innovation.”

– James Dyson, founder, Dyson