

# What Can We Agree On?

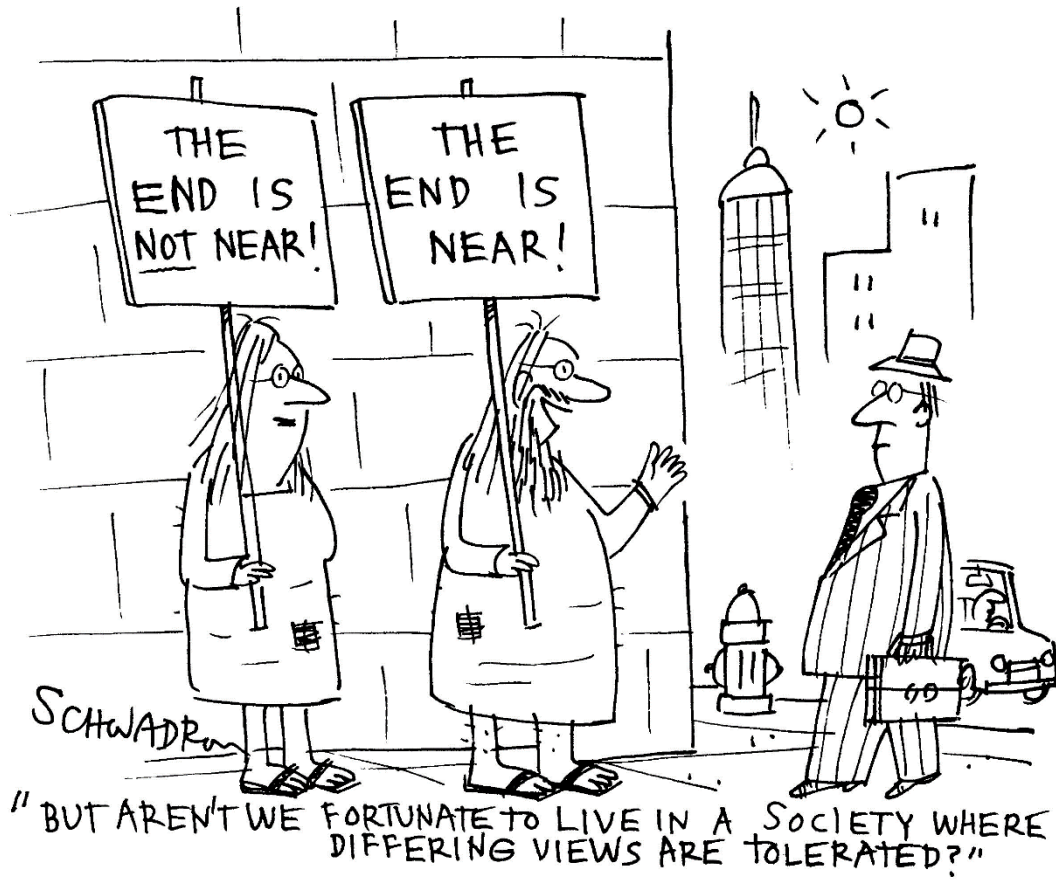
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## Innovation for Progress in Environmental Protection

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Former Assistant Administrator  
US EPA Office of Enforcement and Compliance  
Assurance

Michigan Joint Environmental Conference  
November 7, 2017



CartoonStock.com

# Where We Agree

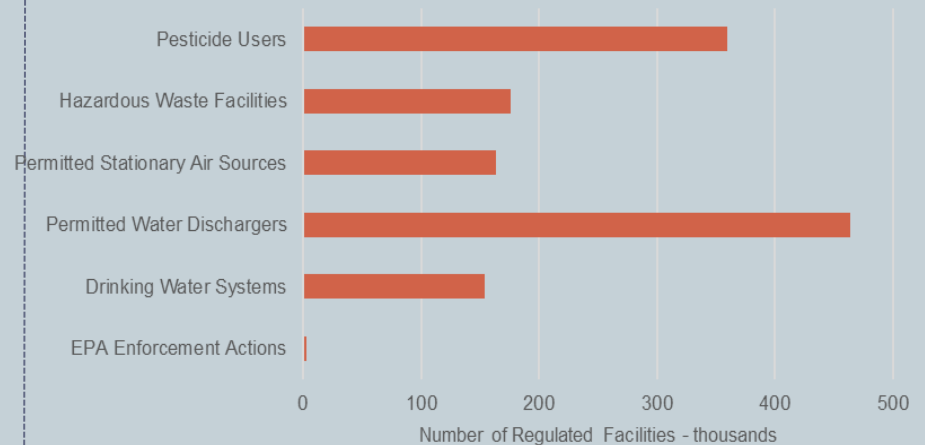
3



- The public wants clean air and water
- Businesses want certainty, and protection from competitors that cut corners
- Everyone wants economic growth

- Large number of regulated sources
- Noncompliance widespread
- Budgets declining

Number of Regulated Sources



# In Real Life Things are Messy

4

## Real world barriers to compliance:

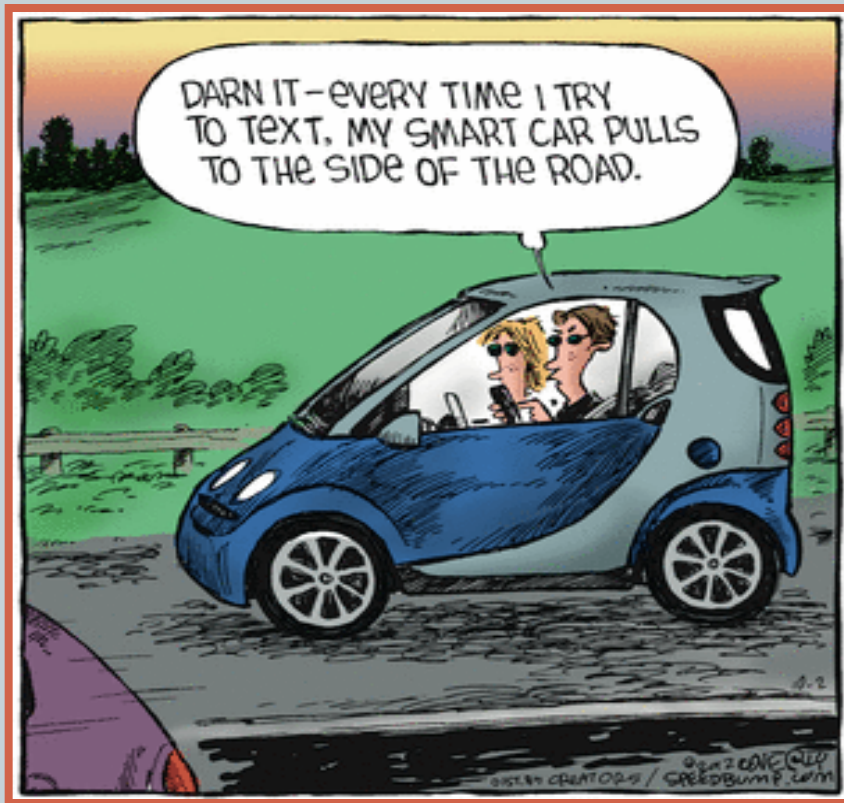
- Costs
- No credible enforcement
- Managers not paying attention
- Pollution controls don't work as expected
- Staff not trained
- Estimated emissions are wrong
- Standards complex or unclear
- Fraud
- No social norm



Leads to gap between what we expected from policy and what really happens

# Innovation for the Real World

5



Making compliance more self-implementing

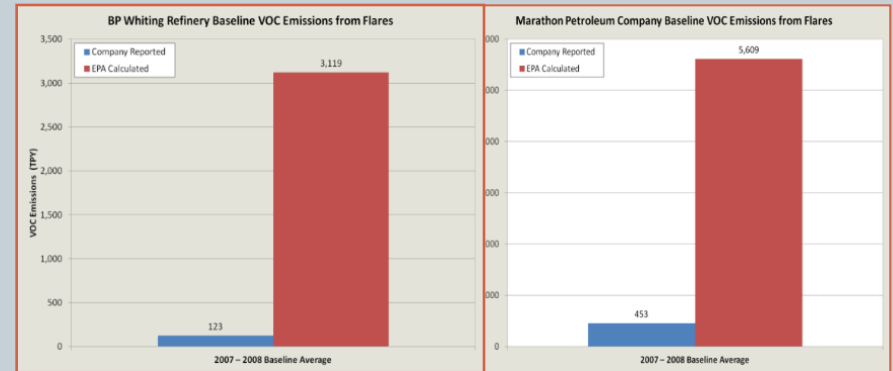
- New technologies
- New strategies

**A Rose By Any Other Name:**  
Next Generation Compliance, Rule  
Implementability, Practical Enforceability

# Innovations: Advanced Monitoring

6

- Real-time monitoring
- Fence line monitoring
- Community monitoring
- Remote sensing, including ground, aerial and satellites



Emissions from refinery flares:  
estimated and actual

# Innovations: Real Time Monitoring

7

## Total Petroleum Puerto Rico

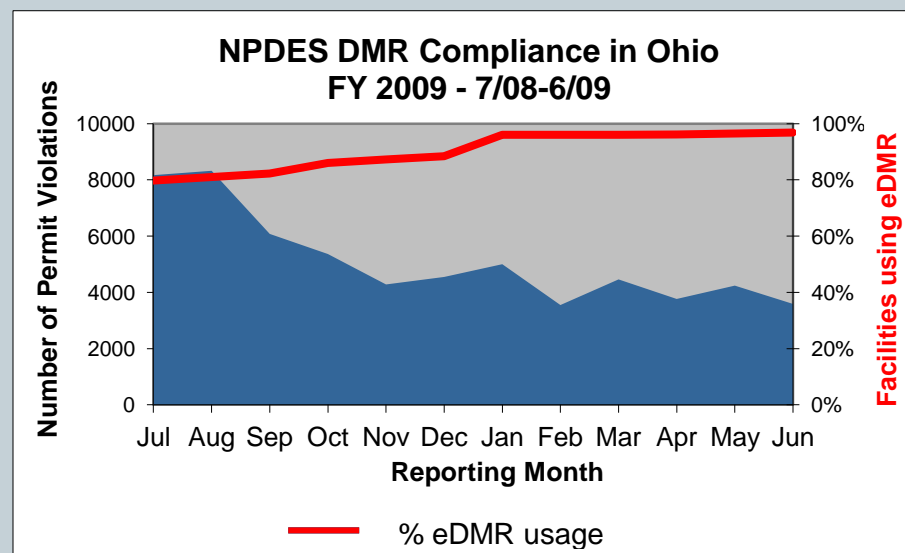
- Fully automated release detection monitoring at 125 facilities.
- Transmit monitoring data to central location.



# Innovations: Electronic Reporting

8

- Information technologies make new solutions possible
- Smart tools and two-way communication
- Examples:
  - NPDES e-reporting rule
  - e-manifest





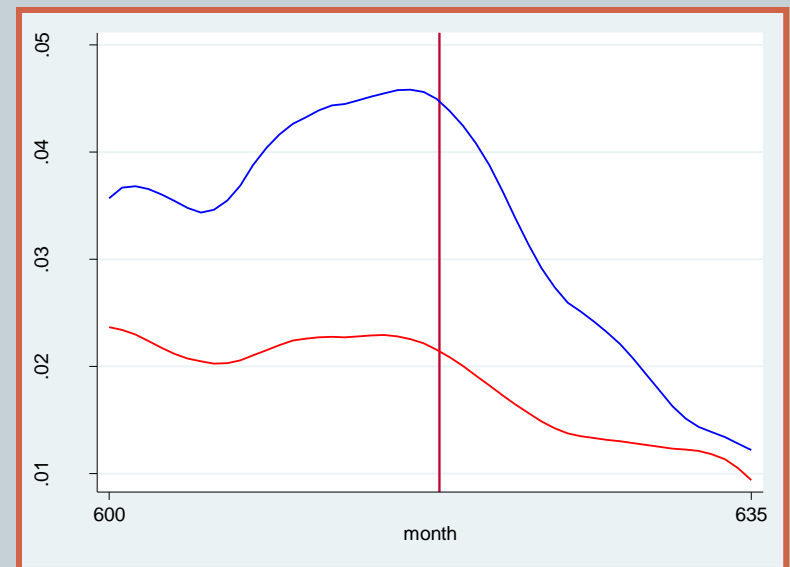
# Innovations: Public Disclosure

9



Liu and Shimshack: working paper 2016 (used by permission)

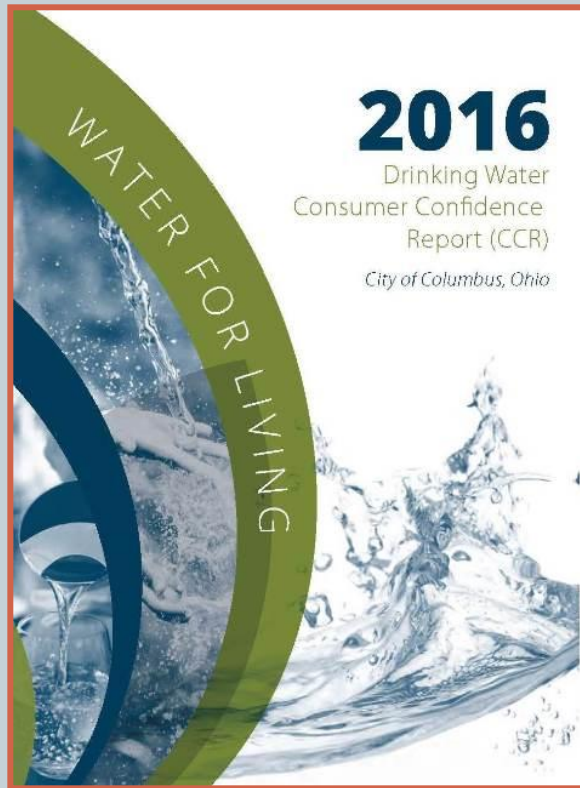
## Posting signs and compliance: evidence from Ohio



Self reported violations before and after sign posting requirement: OH in blue, other region 5 states in red

# Innovations: Targeted Disclosure

10



## Drinking water consumer confidence reports (CCR)

Mailing CCR directly to consumers (v. posting):

- Reduced violations by between 30 and 38 percent
- Reduced violations of health based standards by 57 percent

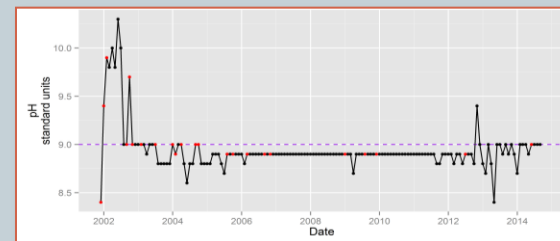
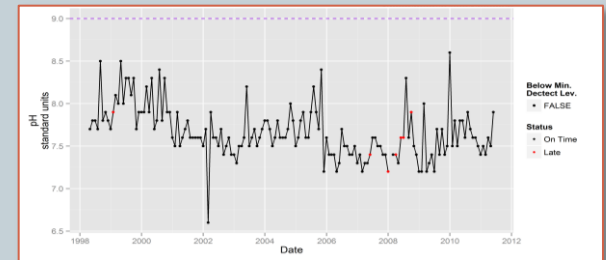
# Innovations: Data Analytics

11

- Finding the signal in the noise
- Statistical footprint of fraud
- Predictive analytics for targeting inspections

## Detecting fraud

Normal

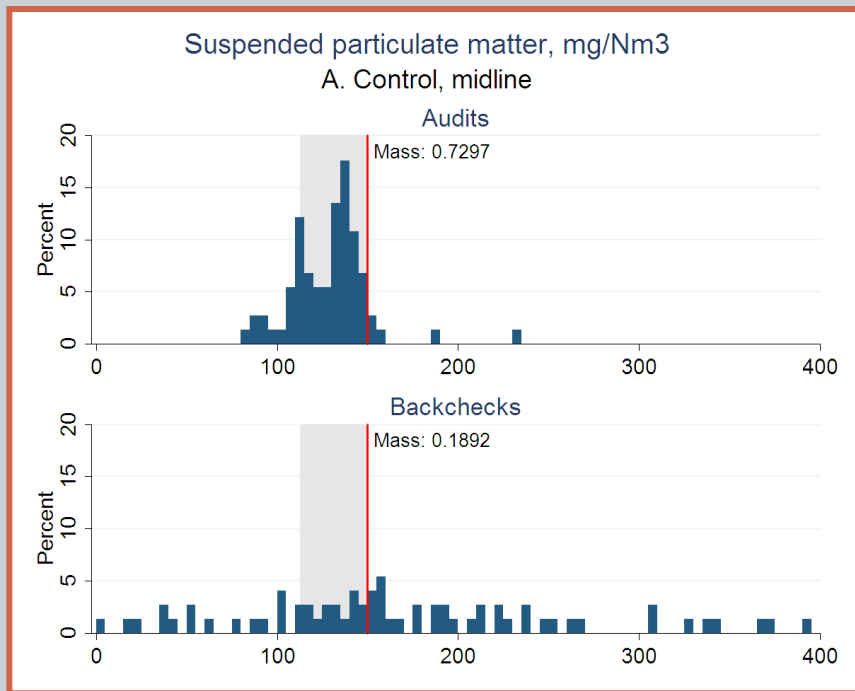


Suspicious

# Innovations: Third Party Auditing

12

## Greenstone study



- Is third party check a real check?
- Financial incentives are a powerful driver
- BUT: better design makes a big difference

# Innovations: Automated Compliance

13

## Cashman Dredging & Marine

- Dredged material dumped outside of authorized ocean disposal sites.
- Innovative solution: GeoFence - GPS system that tracks position of the scow prevents dumping unless inside permitted zone; eliminates human error.

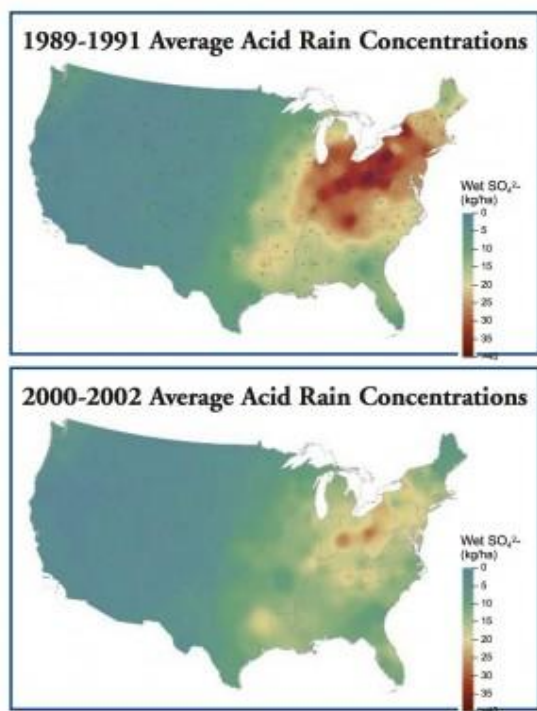


# Innovations: Market Based Approaches

4

Potentially More Effective, Lower Cost, Higher Compliance

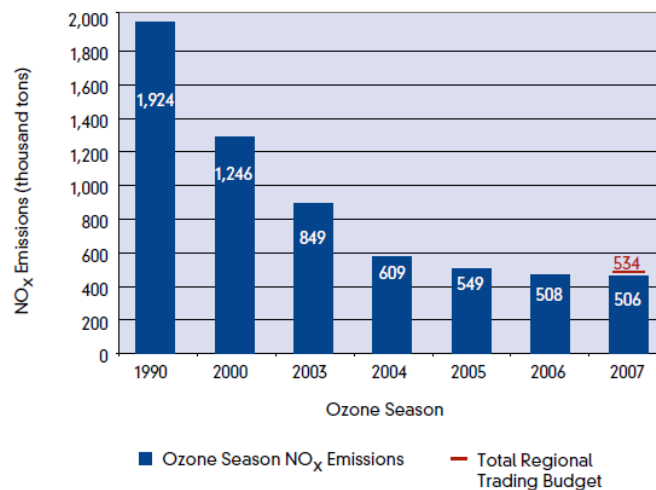
## Acid Rain Program



*Monitors show significant decreases in wet sulfate deposition in the Eastern U. S. Source: NADP*

## NO<sub>x</sub> Budget Trading Program

Figure 5: Ozone Season NO<sub>x</sub> Emissions from All NBP Sources



# When Do Market Approaches Work Well?

5

- Accurate and consistent monitoring (e.g., CEMs)
- Identifiable, known responsible entities
- Transparency in market
- Simple compliance determinations
- Ton = ton

**The Washington Post**

Md. man convicted  
in biodiesel scam

June 25, 2012



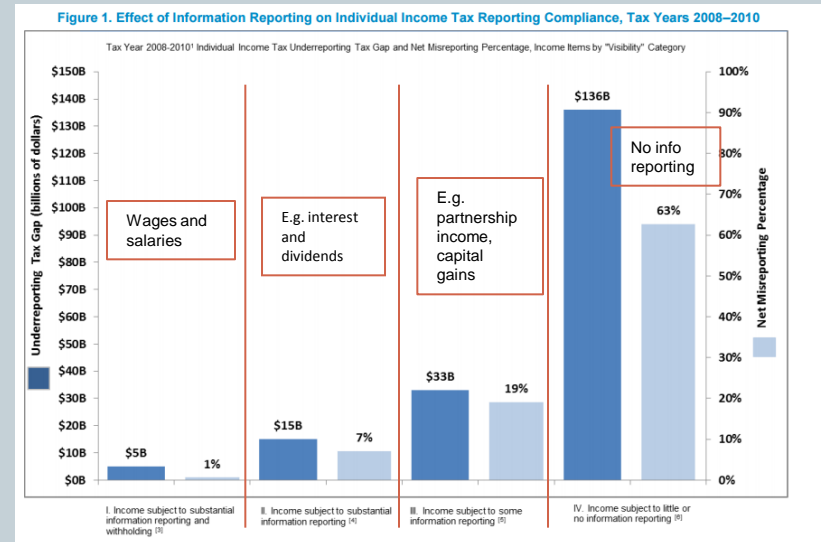
Fla. Men Get Lengthy  
Prison Terms For  
Biofuel Fraud

November 8, 2016

# Innovations: Better Design of Rules and Permits

16

- Simplicity
- Clarity
- Design for compliance as default using all the tools
  - Example: IRS information reporting



Information reporting and compliance rates: IRS



# (Counter) Example: New Source Review

17

## Partial list of utilities sued to clean up coal fired power emissions:

- American Electric Power
- Southern Company
- Duke Energy
- Tennessee Valley Authority
- Ameren
- Interstate Power and Light
- Four Corners Power Plant
- Consumer's Energy
- Minnesota Power
- Wisconsin Power and Light
- Dominion Energy
- American Municipal Power
- Westar Energy
- Ohio Edison Company
- Kentucky Utilities Company
- Nevada Power Company
- Alabama Power Company
- Illinois Power Company
- South Carolina Public Service Authority
- Wisconsin Electric Power Company
- Virginia Electric Power Company
- PSEG Fossil

Why was compliance with NSR/PSD for coal fired power so abysmal?



# The Research/Regulatory Gap

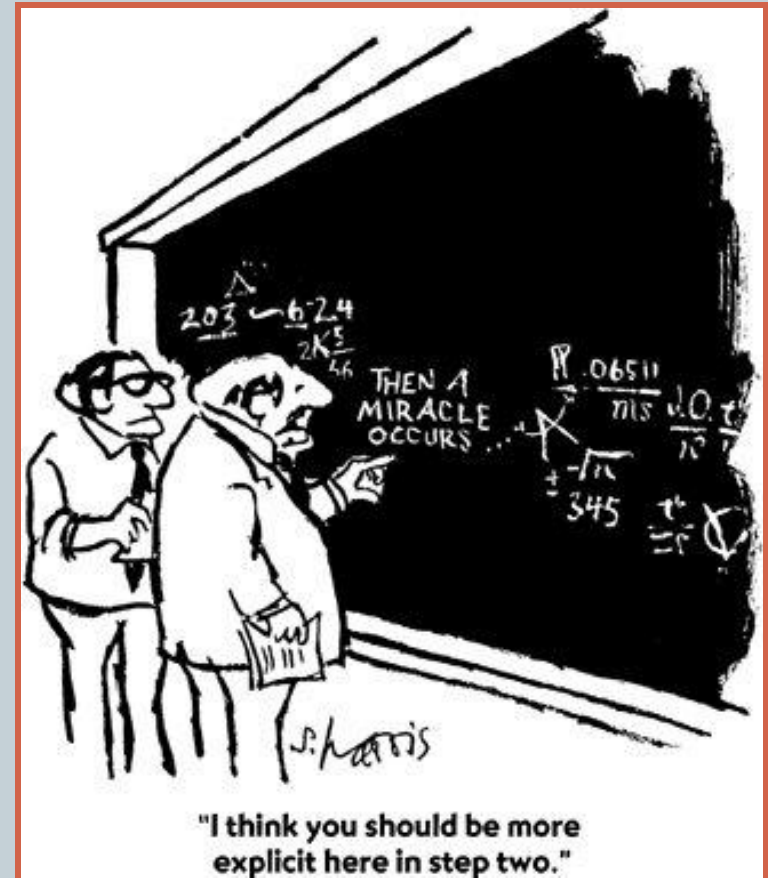
18

## Researchers

- Know a lot about what drives better performance (but much more needed)
- What researchers know isn't known by regulators

## Regulators

- Implementation not just for enforcement
- Not aware of existing research
- Field research opportunities



# Big Improvements Possible

19

- Compliance for the real world
- Partnerships between researchers and government to drive innovation

