

Policy Risk Prevents Scaling-Up

"The greatest obstacle to development of the renewable chemicals and materials industry is obtaining capital for commercialization of first-of-a kind technologies" (Report to USDA)

Scaling-Up Conference

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Diverse Efforts to Support Project Funding

Program	How It Works	Current US Opportunities
Investment Tax Credit	Project investors allowed to write off investment	IRC Section 48 30% of facility cost
Production Tax Credit	Each unit of production generates a tax benefit	IRC Section 48 1-2 cents per kilowatt hour
Loan Guarantees	Government assumes lender's risks in the event of a default	DOE and USDA Loan Guarantee Programs
Technology Development Grants	Proposals evaluated against specific criteria set by government and existing funds divided among selected projects	Various
Purchasing Mandates	Private or government entity required to utilize required amounts of innovative product	Bio-preferred Renewable Electricity Standard Low Carbon Fuel Standard



None Is A Silver Bullet

Program	Strength	Weakness
Investment Tax Credit	Accelerates project capital payback and attracts investors with a tax appetite	Best for fully commercial technology and facility may not operate once tax credit is claimed
Production Tax Credit	Increases project revenue and attracts investors with a tax appetite	Best for fully commercial technology or projects with small capital needs/short payback
Loan Guarantees	De-risking project loans for commercial lenders	Few innovative technologies are ready for commercial loans
Technology Development Grants	Facilitates technology progress	Small scale usually targets an isolated development in an enormously complex system
Purchasing Mandates	Creates product demand	Subject to political or regulatory revision

Is Government Learning from Its Setbacks?

September 2013

- ❑ US Department of Energy reports that + \$600,000,000 spent on integrated Biorefineries has failed to achieve the agency's "*biorefinery development and production goals*".
- ❑ "*The Program awarded funding for commercial-scale projects even though the proposed technology had not been fully validated at pilot-scale or demonstration-scale facilities*"

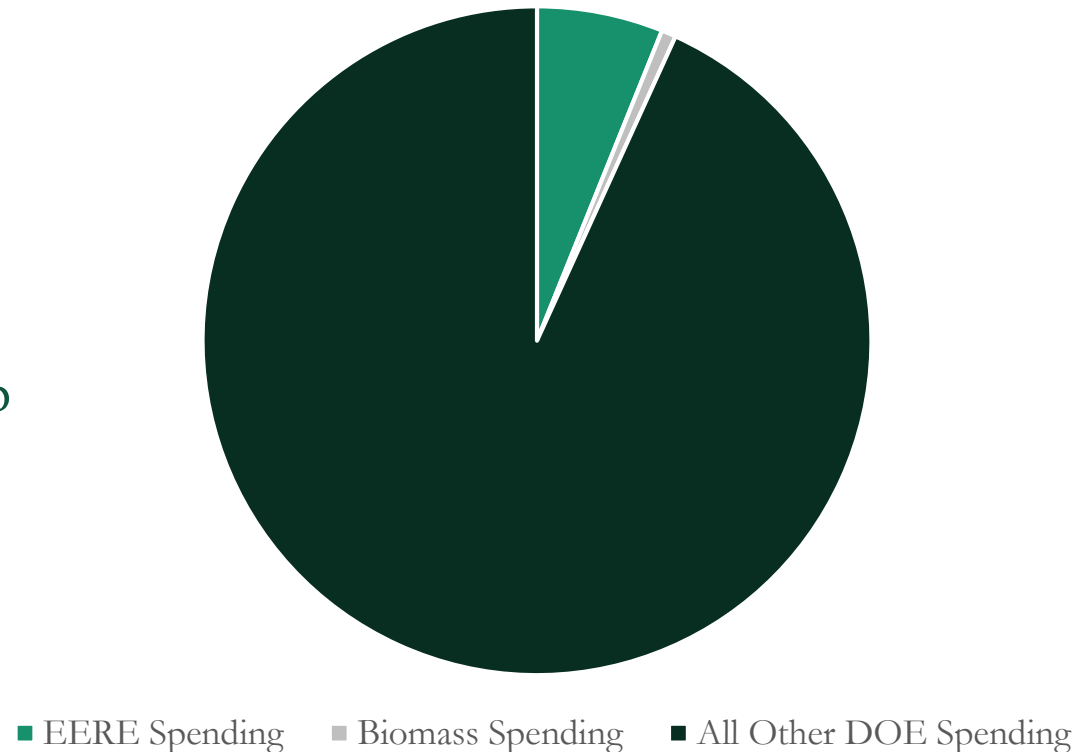
January 2014

- ❑ A US Department of Agriculture report recommends significant investment in renewable chemical production specifically through:
 - ❑ Investment tax credits
 - ❑ Loan guarantees
 - ❑ Production credits
- ❑ "...the greatest obstacle to development of the renewable chemicals and materials industry is obtaining capital for commercialization of first-of-a kind technologies"

Can Government Use Its Limited Funds Effectively?

- It's a lot harder than many expected
- Government funding efforts are
 - small (relatively), and
 - new (inexperienced)
- Is government smart money or dumb money?
 - VHS vs. Beta Case Study
 - Even the smartest investors make bad bets on new technologies

Department Of Energy Budget



Policy Risk

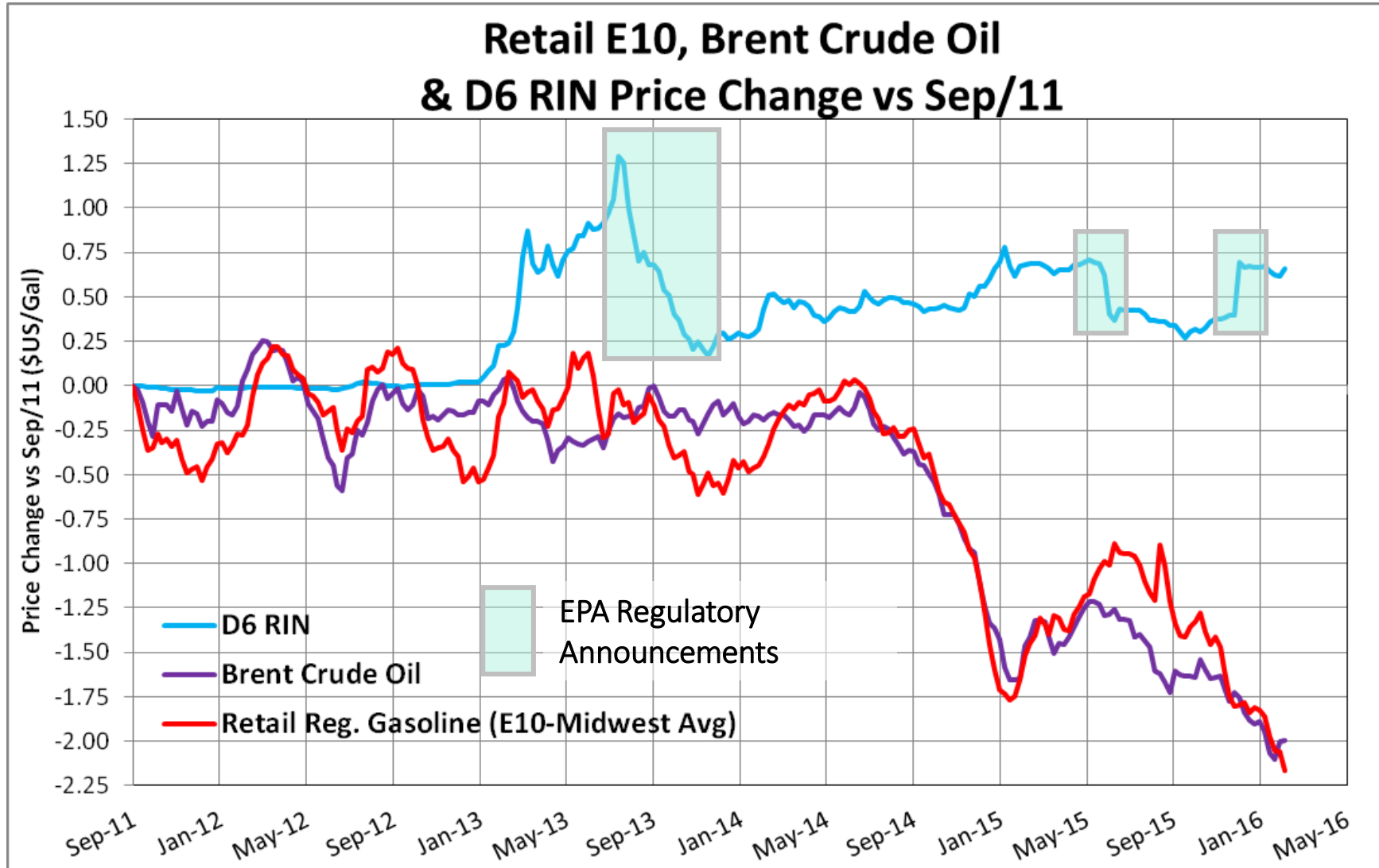
What Is Policy Risk?

- A policy risk is present to the extent the government can change the way a market values any innovative product.
- If the government could change
 - Size of the market
 - Definition of qualifying products or production process
 - Definition of qualified uses/applications

Why Does It Matter?

- Projects are financed based on expected revenues vs. expected costs
- Products aimed at serving government-driven markets must quantify potential revenues from environmental attributes (RECs, RINs, GHG credits, etc.)
- In the face of policy risks, financiers will discount environmental revenues by 100%

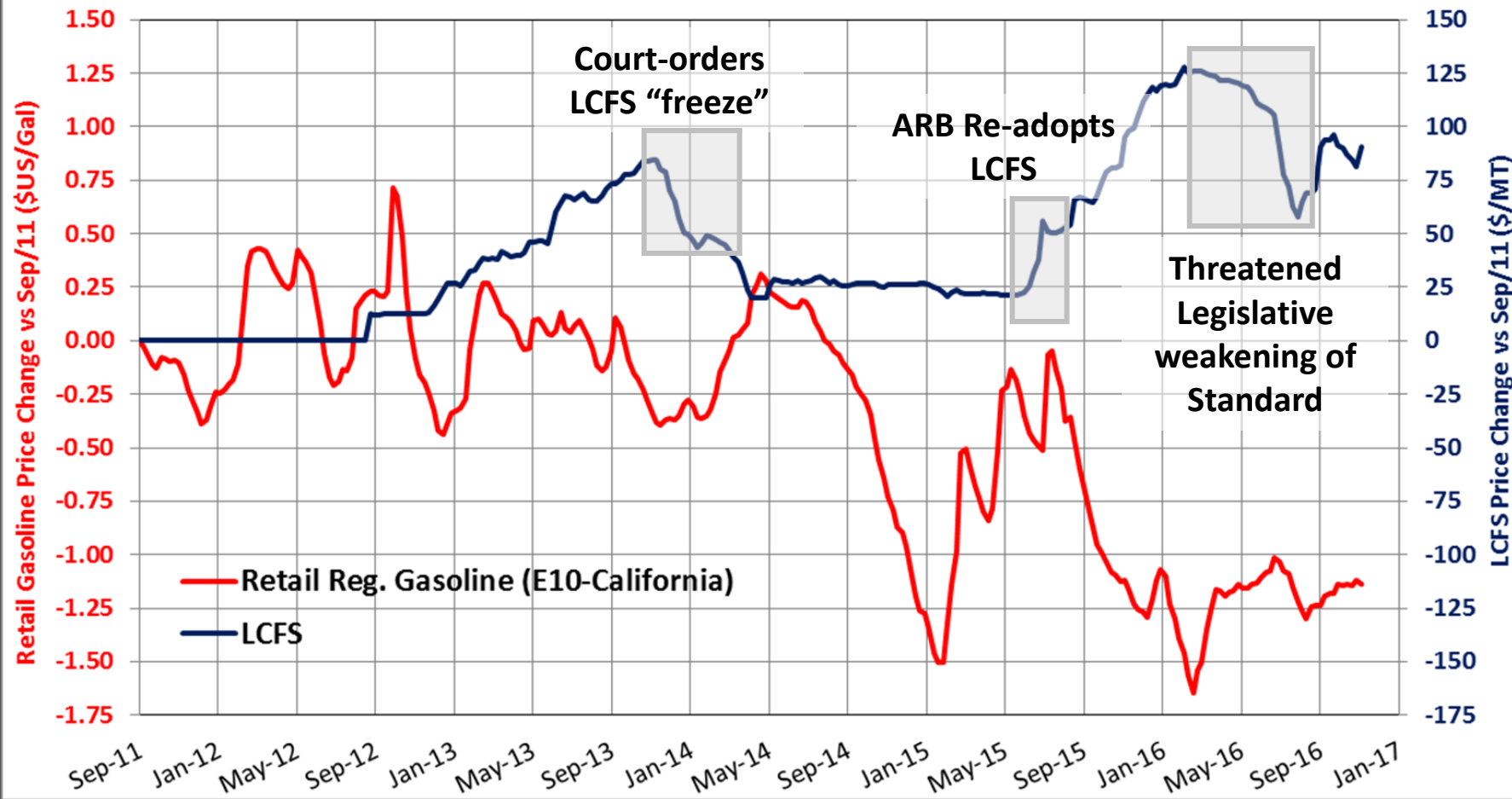
Federal Renewable Fuel Standard



- Episodic crashes in the value of renewable fuel
- Investors see regulatory risk
- Private sector has no way to mitigate this government-induced risk

Low Carbon Fuel Standard

Retail E10 (California) & LCFS Price Change vs Sep/11



Fuel producers must meet carbon intensity targets or buy credits

Technology neutral carbon intensity generates credits for wide range of biomass uses

Credit value capped at \$200 US

One of the most open platforms for value creation

Market value disrupted by political & regulatory uncertainty



Why Aren't Clean Technologies Developing Faster?



- Policy Risk Is the Central Problem
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What Can We Do Better?

Government

- Set broad, technology-neutral goals
- Provide concrete rewards
- On a project basis, insulate investors from regulatory risk
- Establish reward-based programs
- Scale the rewards to a level that will ignite private-sector competition

Private Sector

- Stop asking for technology-specific government support
- Stop asking the government to cover your technology or business risks
- Help governments create programs and policies that will provide stable, and compelling rewards for successful technologies

Can Government Use its \$\$ better?

- **Pay for performance**

- Invest in results rather than in promise
- Less political risk in use of public funds

- **Policy contracts**

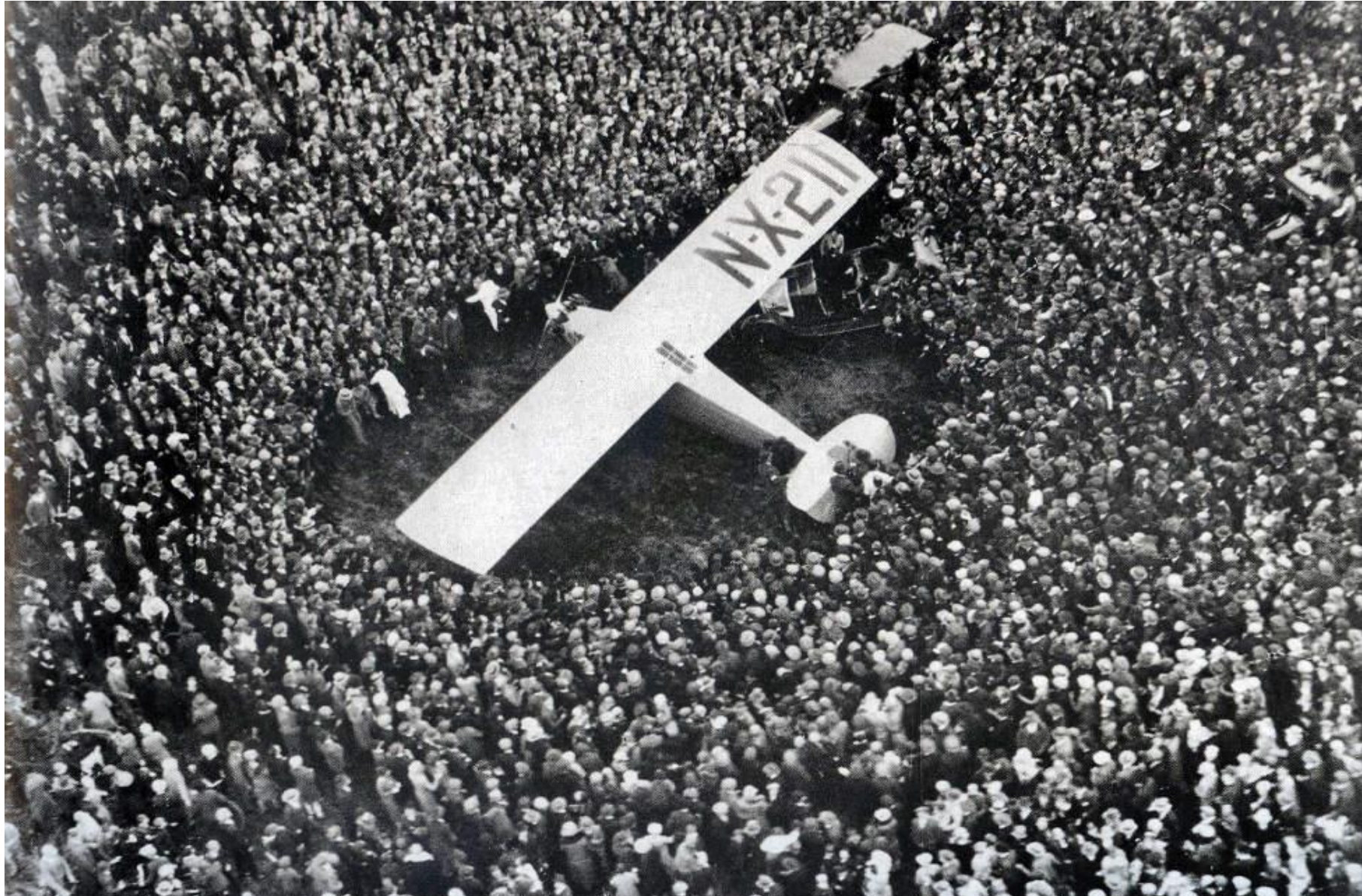
- Long-term production tax credits
- Guaranteed value of carbon credits or other environmental compliance commodities

- **Production Prizes**

- \$1 billion for the first Biorefinery to produce 10 million tons of GHG emission-avoidance*

*(excluding already-commercial production technology, e.g. starch-ethanol)

Lindy and the Restaurateur





Questions?

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