

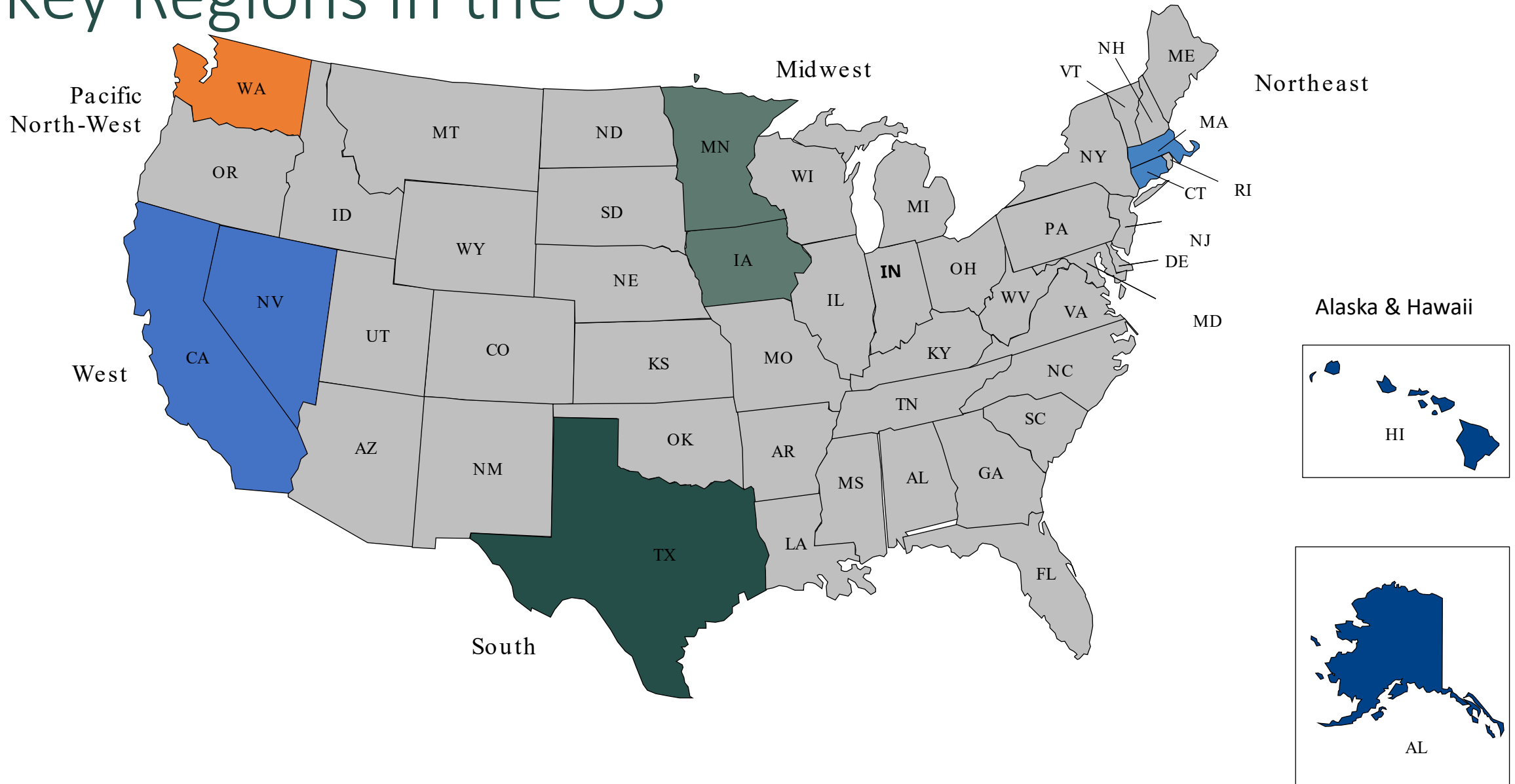
An aerial photograph of a green industrial cluster in a rural setting. The cluster includes several large black storage tanks, industrial buildings, and a road. In the background, a line of wind turbines stretches across the horizon. A white, hand-drawn mountain-like outline is superimposed over the image, framing the central text.

EXPERT SESSION

Green industrial clusters' full potential in rural development and a just green transition

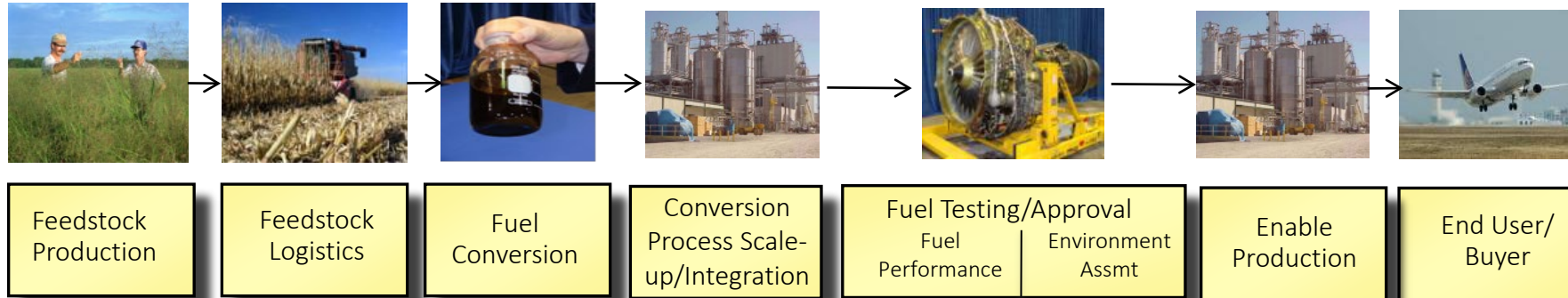
By Chris Cassidy, Renewable Energy Advisor, U.S. Department of Agriculture

Key Regions in the US

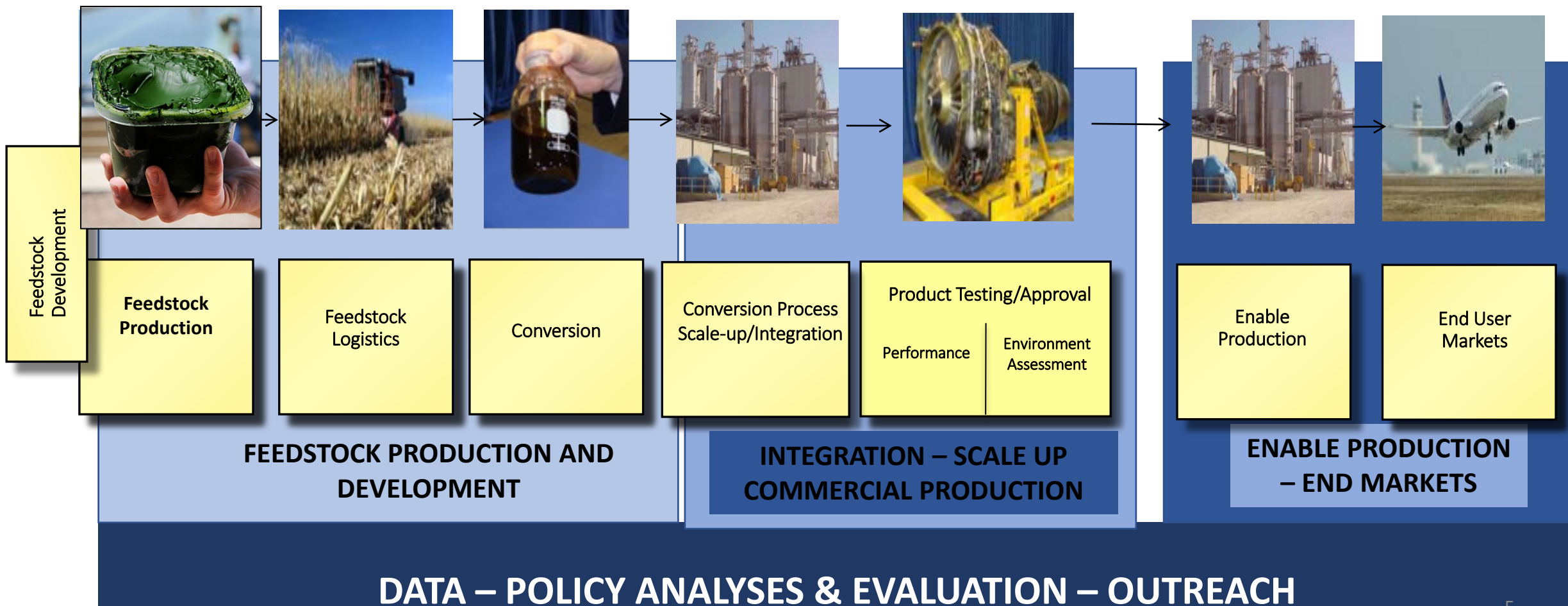


- Executive Order
- Bipartisan Infrastructure Law
- IRA Inflation Reduction Act
- SAF Grand Challenge
- Hydrogen Grand Challenge
- CI and GHG reduction
- On & Offshore wind to H₂
- Energy efficiency including process improvements

Supply Chain – Agency Effort Summary



| | Feedstock Production | Feedstock Logistics | Fuel Conversion | Conversion Process Scale-up/Integration | Fuel Performance | Environment Assmt | Enable Production | End User/Buyer |
|------|----------------------|---------------------|-----------------|---|------------------|-------------------|-------------------|----------------|
| USDA | ✓ | ✓ | ✓ | ✓ | --- | --- | ✓ | --- |
| DOC | ✓ | --- | ✓ | ✓ | ✓ | ✓ | --- | ✓ |
| DOE | ✓ | ✓ | ✓ | ✓ | --- | ✓ | ✓ | --- |
| DOD | --- | --- | --- | --- | ✓ | ✓ | --- | ✓ |
| EPA | --- | --- | --- | --- | --- | ✓ | ✓ | --- |
| FAA | --- | ✓ | --- | ✓ | ✓ | ✓ | --- | ✓ |
| NASA | --- | --- | --- | --- | ✓ | ✓ | --- | --- |
| NSF | ✓ | ✓ | ✓ | --- | --- | --- | --- | --- |



Renewable Energy System/Energy Efficiency Improvement Grants and Loans Specific Technology Categories

- **Biomass, digesters**
- **Biomass, bioenergy**
- **Geothermal, electric**
- **Geothermal, direct use**
- **Hydrogen**
- **Hydrokinetic**
- **Solar, small**
- **Solar, large**
- **Wind, small**
- **Wind, large**
- **Energy Efficiency Improvements**
- **Ocean, wave, tidal**

Inflation Reduction Act

- REAP, PACE, New ERA
- 45Q - CO₂
- 45V - H₂
- 45Z - Clean Fuels

Rural Business Cooperative Service – Energy Programs

- 1. Biorefinery, Renewable Chemical, and Biobased Product Manufacturing Assistance Program (9003)**
- 2. Rural Energy for America Program (REAP 9007)**
- 3. Biorefinery Program Advanced Biofuels (9005)**
- 4. BioPreferred (9002)**
- 5. BRDI (9008)**
- 6. BCAP (9011)**
- 7. Business and Industry Guaranteed Loan Program (B&I)**
- 8. Rural Economic Development Loan and Grant Program (REDLG)**
- 9. Intermediary Relending Program (IRP)**
- 10. Rural Business Development Grant (RBDG)**
- 11. Value-Added Producer Grant Program (VAPG)**
- 12. CIG grants**

Risk Mitigation

- Risk: Technical and Financial
- SCALE – bench, pilot, IDU, first commercial, replications
- Construction
- Monitor- definitions, pay, substantial, mechanical, commissioning, start up, steady state, guarantees, warranties, liquidated damages

Hot Trends

- Renewable Natural Gas-Anaerobic Digesters
- Green Hydrogen
- Sustainable Aviation Fuels
- Fertilizers
- HTL
- Hybrids



1 May 2019

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