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The Value of Carbon Credits

International Biomass Conference & Expo
April 21, 2015
Minneapolis, MN

Our Vision and Purpose



A GLOBAL LEADER IN DEVELOPING SOLUTIONS TO BUILD A SUSTAINABLE WORLD

WHAT WE DO:

1. Understand clean fuel regulations & standards
2. Connect our clients to carbon credit and fuel markets
3. Give our clients confidence in the compliance status and value of new investments
4. Help create a world less dependent on non-renewable energy sources – Design, Build, Own, Operate

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Kansas Waste Water Project Co-located with Beef Processing

- Awarded to EcoEngineers in 2014
- Upgrading raw biogas to pipeline quality methane
- 40:1 Return on energy
- 10,000 DGE/ day low carbon fuel
- 54,000 MT/Year CO₂ reduction
- \$8.5 million capital investment
- 43% ROI



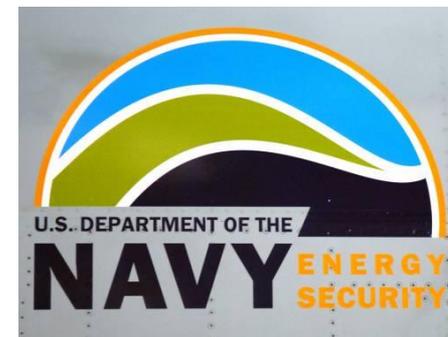
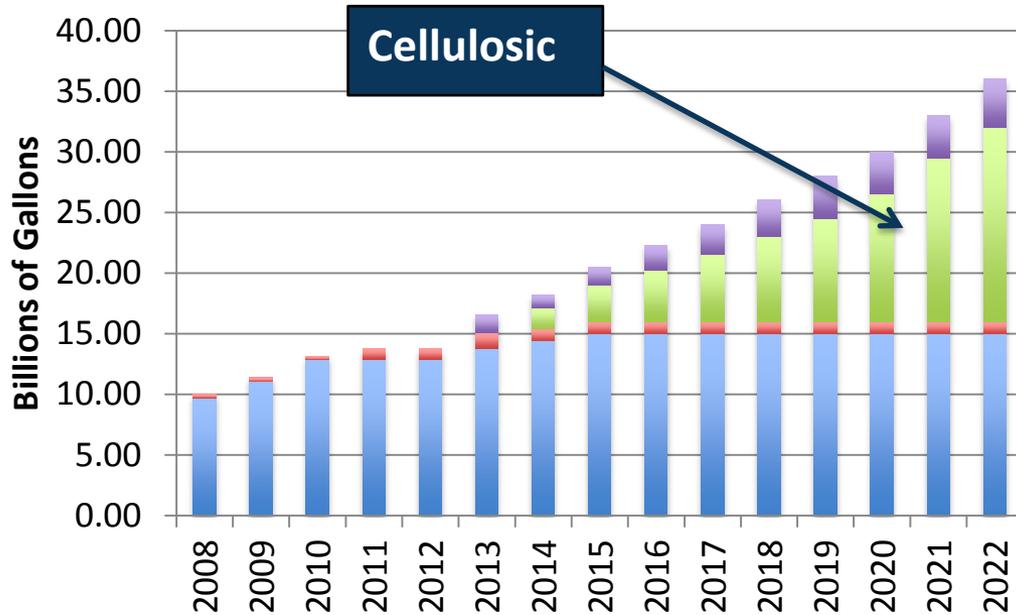
Federal Regulations Are Driving Clean Fuel Use



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RFS



State Regulations Are Driving Sustainability



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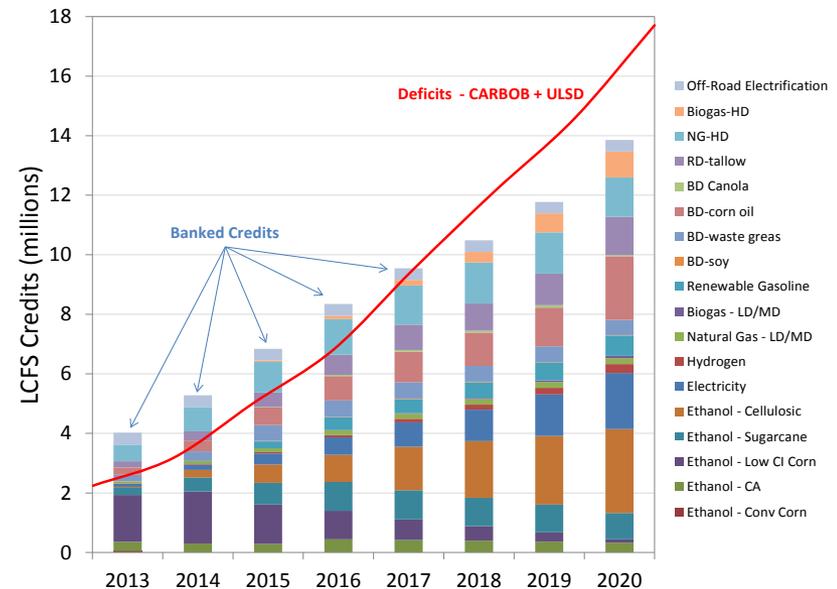


State of Oregon
Department of
Environmental Quality



CAP & TRADE

LCFS



Private Sector is Driving Change



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Walmart's Sustainability Goals:

1. **Energy** - 100% renewable energy
2. **Waste** - Create zero waste
3. **Products** - Sell products that sustain people and the environment



By 2020, General Mills commits to sourcing 100% of its...



... **oats** from growing regions that demonstrate continuous improvement against industry-based environmental metrics.



... **U.S. wheat** from growing regions that demonstrate continuous improvement against the Field-to-Market framework* or comparable environmental metrics.



... **dry milled corn** from growing regions that demonstrate continuous improvement against the Field-to-Market framework or comparable environmental metrics.



... **sugar cane** from responsible and sustainable sources.



... **fiber packaging** from recycled material or from virgin wood fiber regions that are known to not contribute to deforestation. Any high-risk regions will be independently verified.



... **cocoa** through origin-direct investment, which will improve the incomes of smallholder farmers and the quality of ingredients.



... **vanilla** through origin direct investment, which will improve the incomes of smallholder farmers and the quality of ingredients.



... **palm oil** from responsible and sustainable sources in 2015.



... directly sourced **fluid milk** from producing regions that demonstrate continuous improvement as measured by the Dairy Sustainability Framework (U.S.) or other comparable environmental metrics (globally).



... **U.S. beet sugar** from growing regions that demonstrate continuous improvement against the Field-To-Market framework or comparable environmental metrics.

*The Field-to-Market framework studies the environmental impact of crop production in different regions.

SOURCE: GENERAL MILLS, INC. | FOODBUSINESSNEWS.NET

A Global Movement



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The Future of Fueling



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Lack of Common Standards Makes Compliance Challenging



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Successful Projects Must Optimize Green Credits



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D5 RINs (cents)



Effective management of volatility requires expertise in regulations

Leader In Carbon Credit Realization



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Audits of
OVER 150
BIOFUEL PLANTS
in **18 COUNTRIES**



OVER
800 MILLION
GALLONS OF BIOFUEL CAPACITY
UNDER MANAGEMENT

3 MILLION RINs **PROCESSED EACH DAY** **»»»**
on our automated platform

OVER **50** **PRODUCERS**
have enrolled in
RIN COMPLIANCE
PROGRAM

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WHY ECOENGINEERS?



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ONE OF THE FIRST
USEPA RECOGNIZED
RIN Quality Assurance Programs

Over **200 MILLION**
QAP RINs in 2013



TRANSACTIONED OVER
1 BILLION
RINs IN 2013

"ECOENGINEERS WAS ONE OF THE
BEST CALLS I EVER MADE."



Pathway and Policy Are Keys to Success



Today's marketplace values low carbon footprint

- RIN D Codes
- Grandfathered ethanol facilities must demonstrate 20% GHG reduction to expand
- Emphasis on Advanced Biofuels D3, D4, D5, D7
- LCFS, RFS, and EU programs require new pathway modeling
- QAP programs verify qualification for low carbon footprint energy credits

Future markets will favor demonstrated and verified
low CI pathways.

A Typical Comprehensive Compliance Package



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- **Life Cycle Analysis**
 - Screening tools
 - New technology feasibility to complement economic analysis
- **LCFS Compliance**
 - Coordination of plant data requirements
 - Data analysis
 - New pathways preparation
 - Feedstock sustainability issues
- **RFS**
 - Efficient producer petitions
 - New pathway submittals
 - RIN management and QAP
 - Dialogue with regulators
- **EU RED**
 - Coordination of plant data requirements
 - Audit Prep
- **Comments/recommendations for various regulatory bodies**
- **Business development support**
 - Additional credit possibilities
 - New markets

Which Is A Better Investment?



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- ✓ Corn Oil Extraction and Sale
- ✓ On Site Biodiesel Production
- ✓ Converting Fiber to Cellulosic Ethanol
- ✓ Biogas Production & CHP
- ✓ Biogas Production and Sale
- ✓ Move past Grandfathered Volumes
- ✓ New Feedstock Treatment
- ✓ Other?

It Depends...

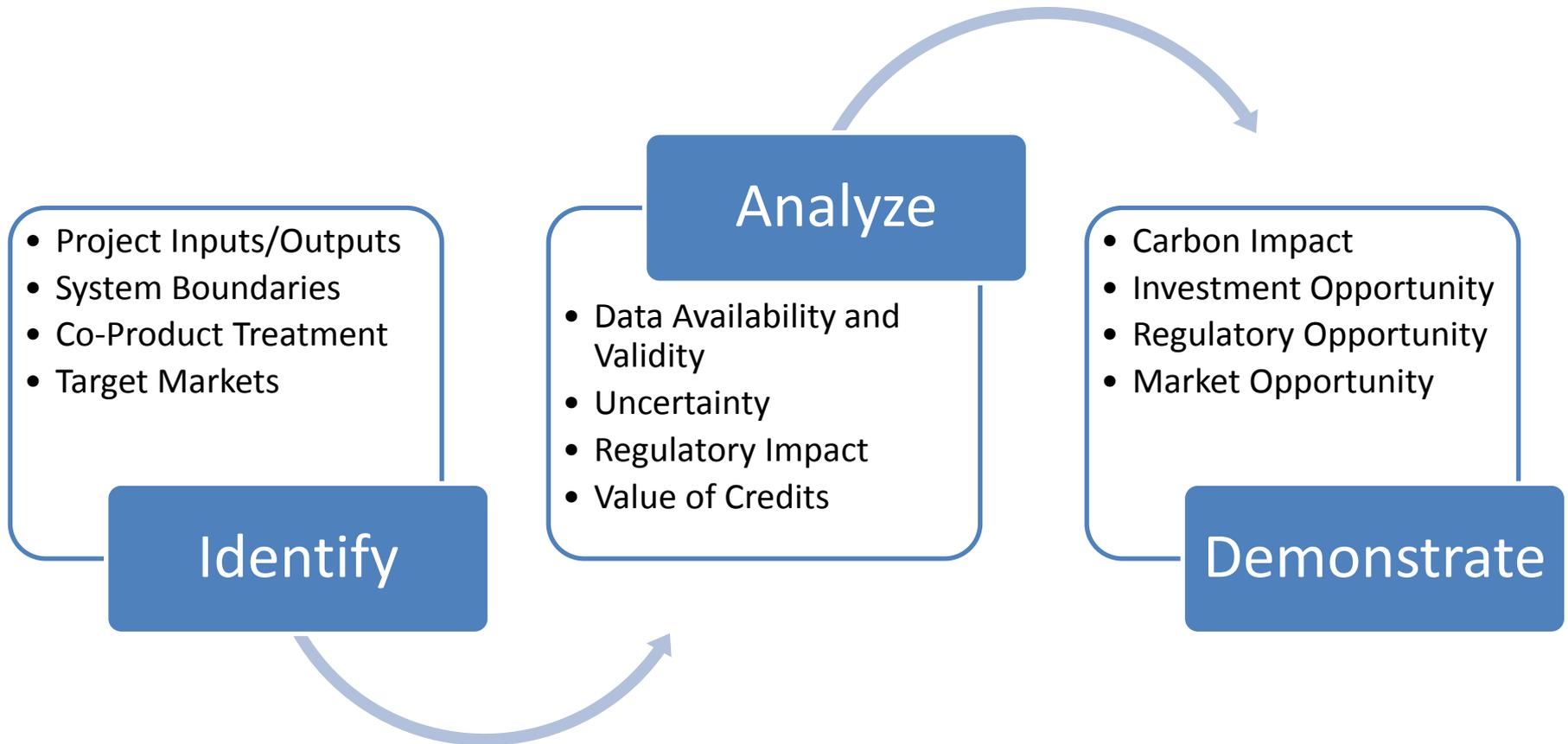


Complement Economic Analysis With Regulatory Analysis / Carbon Analysis

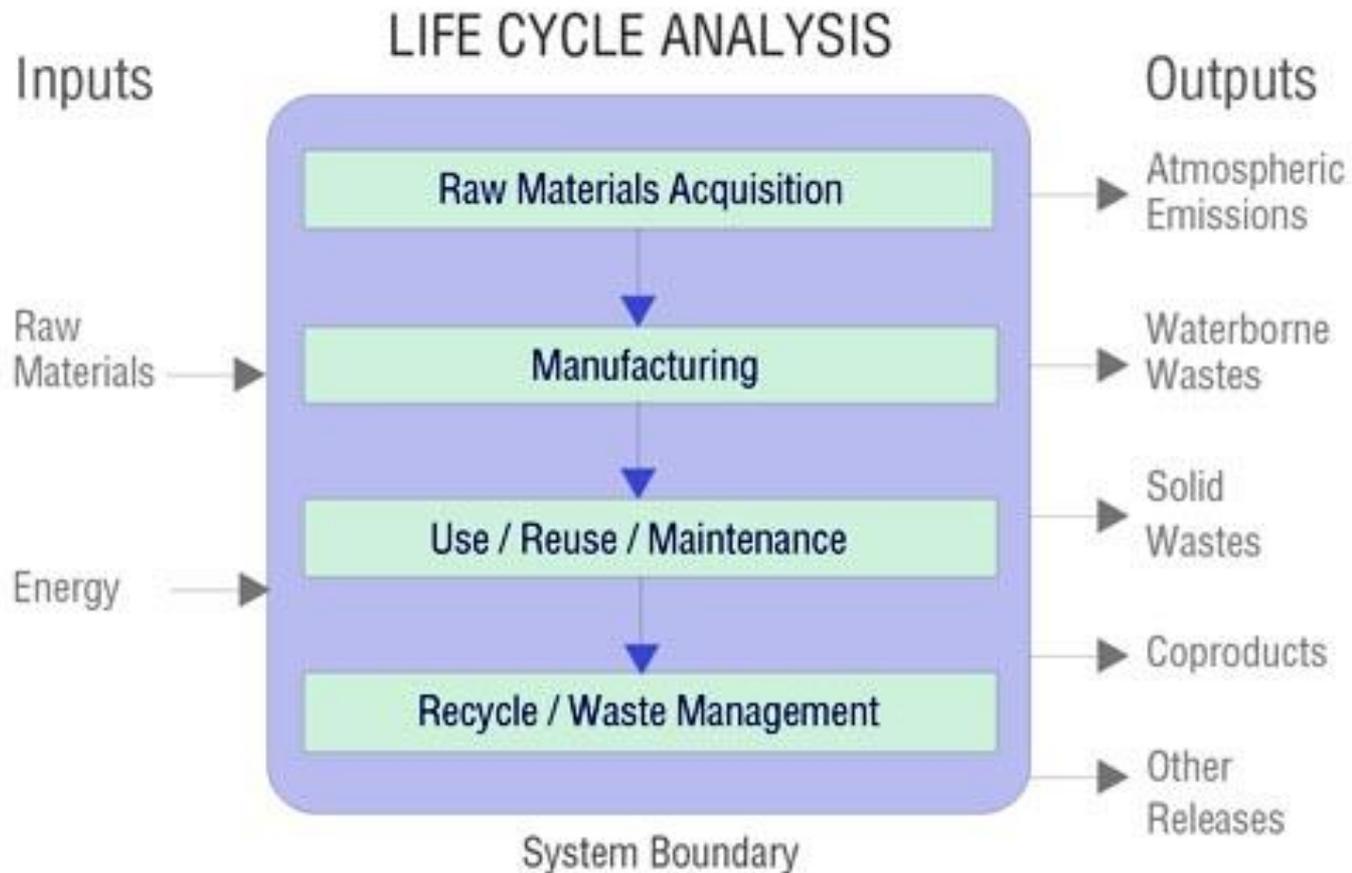


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Life Cycle Analysis (LCA) Measures Sustainability



We Can Measure Anything With The Right Tools



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- Carbon intensity
 - Global warming
 - Ozone depletion
 - Acidification
 - Eutrophication
 - Aquatic toxicity
 - Water Use
 - Land Use
 - Human health
 - And on and on...
- SimaPro
 - Gabi
 - GREET
 - GHGenius
 - And more...

The GREET Model by Argonne

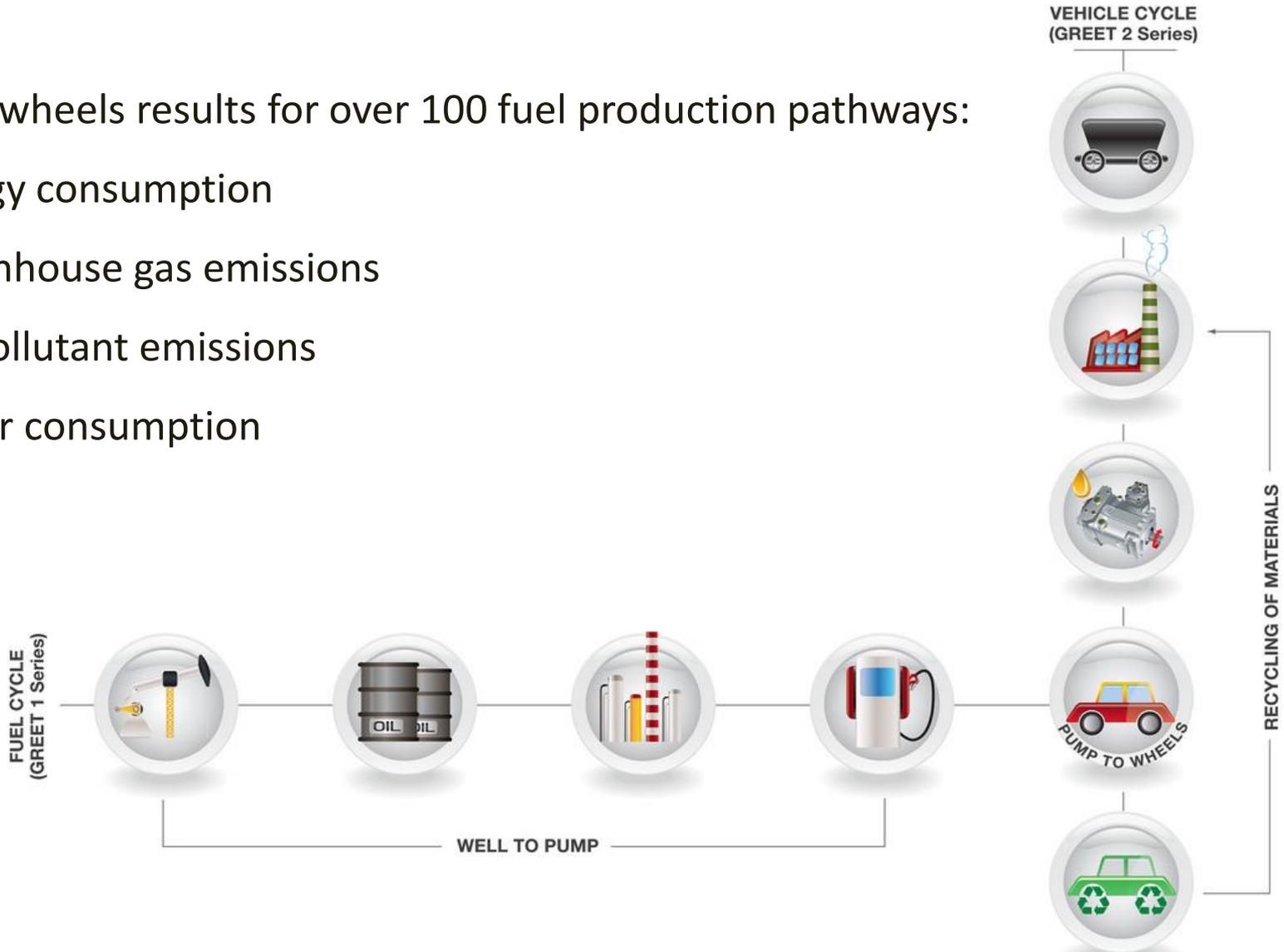


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Well-to-wheels results for over 100 fuel production pathways:

- Energy consumption
- Greenhouse gas emissions
- Air pollutant emissions
- Water consumption



Interpretation Of The Results

Model Version			
Pathway by Feedstock	1.8b	2.0	Change
Ethanol - Grain Sorghum	61.83	71.47	9.64
Corn Ethanol (100% NG)	68.32	59.86	-8.46
Biodiesel - Corn Oil, WDGS-Associated	29.27	34.55	5.08

Calculating the Value of Carbon Reduction

97.05	50.00	\$26.00	\$0.154
Target Year CI	CI of Biodiesel by type (Corn Oil, Soybean, etc...)	Value of CI Credit (\$)	Value per Gallon (\$)

Summary

- See the world in which you live. Recognize trends.
- Be prepared to take advantage of new opportunities and new markets.
- Include carbon analysis and regulatory analysis with other decision criteria, such as cost and performance, to make a well-balanced decision.
- Develop a comprehensive compliance strategy to maintain and grow low carbon impact.
- **What we need:**
 - ✓ Data
 - ✓ Data
 - ✓ Data



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