Renewable Fuels Standard Program and Agriculture

Farm, Ranch, and Rural Communities
Federal Advisory Committee Meeting

August 2009

Agenda

- Process update and review of key provisions in EISA and the Notice of Proposed Rulemaking (NPRM) – The key relations to Agriculture
- Lifecycle impacts and GHG thresholds
  - Direction
  - Results
  - Recent Peer Review
- Other important interpretations and provisions in NPRM
- Overview of proposed program impacts assessments
- Concluding thoughts and questions

RFS2 Process Overview / Update

- **On May 5, Administrator Jackson signed the Renewable Fuel Standard (RFS2) proposal**
  - Proposal interprets EISA 2007 revisions to the original EPAct RFS program
  - Lays out these proposed changes, including alternative options, for public comment

- **Some of the revisions that are interpreted and discussed in the proposal include:**
  - Significantly increased volumes of renewable fuel
  - Separation of the volume requirements into four separate categories of renewable fuel:
  - Changes to the definition of renewable fuels to include minimum lifecycle GHG reduction thresholds
  - Restrictions on the types of feedstocks that can be used to make renewable fuel, and the types of land that can be used to grow feedstocks
  - Inclusion of specific types of waivers

- **May 26th Publication of NPRM in Federal Register opened 60-day public comment period**
  - Comment Period Originally Set to Close July 27th
  - **Extended until September 25th**

- **Public hearing on proposal held for June 9 in Washington**

- **Two-day lifecycle workshop held June 10-11 in Washington,**

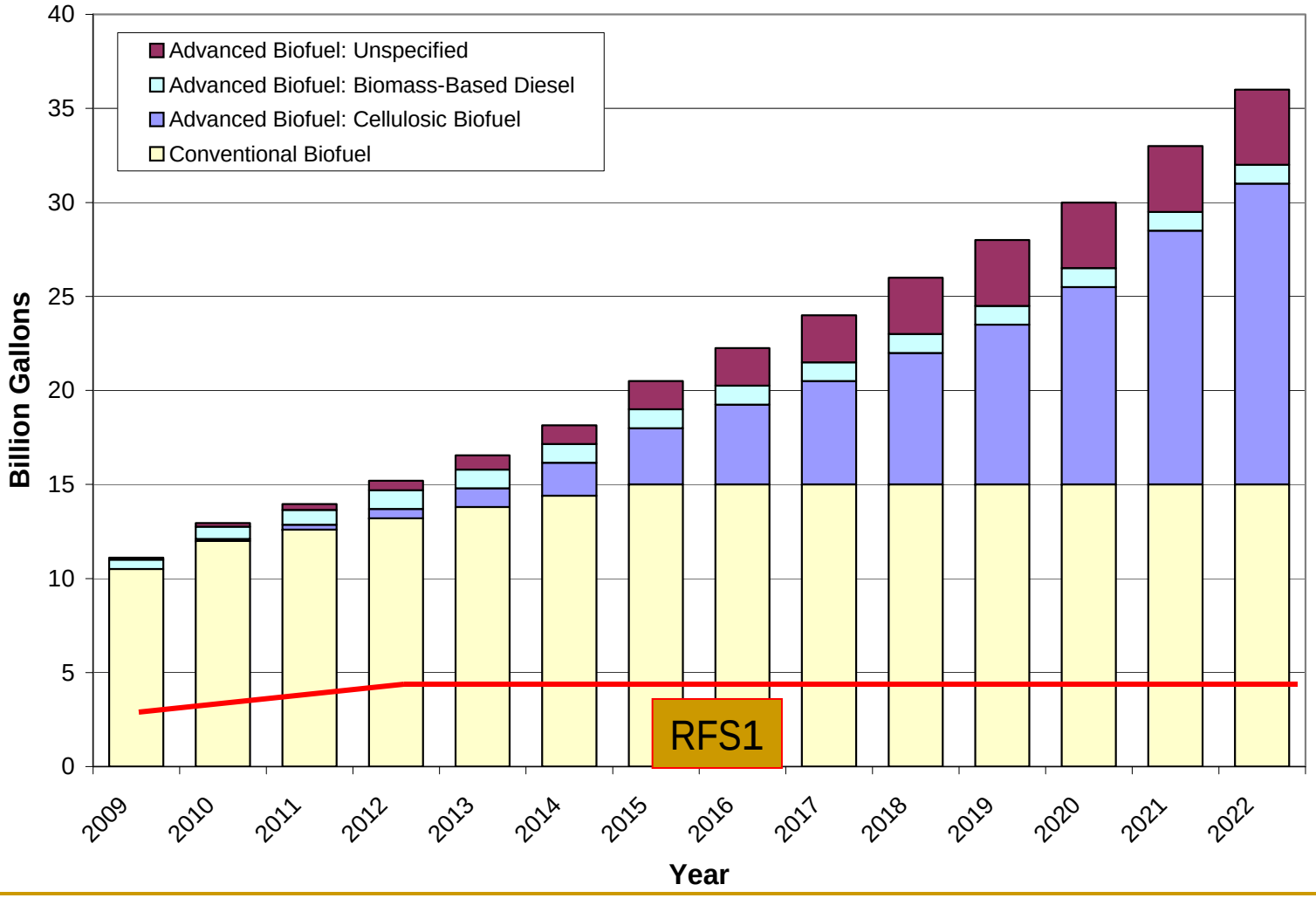
- **Peer reviews conducted / completed of several key aspects of lifecycle methodology**
  - **Availability Announced August 7th**

- **Agency intends to finalize rule by end of 2009 and implement program in 2010**

New Provisions Are Focus of Primary Discussions on NPRM

- **Lifecycle assessments require groundbreaking analysis and model development**
  - Formal independent expert peer reviews were conducted on four areas of the lifecycle assessment that in particular charted new ground:
    1. Land use modeling (use of satellite data/land conversion GHG emission factors)
    2. Methods to account for variable timing of GHG emissions (time horizon and discounting)
    3. GHG emissions from foreign crop production (modeling and data used)
    4. How the models EPA relied upon are used together to provide overall lifecycle estimates
- **Renewable Biomass Definition and implementation approaches**
  - Subject of many individual stakeholder discussions
  - Subject of various legislative proposals
- **Program Structure / Compliance Changes**
  - Key interest of obligated parties and others affected by the regulations
- **Standards come up against the "blend wall"**
  - Growth Energy Petition - March 6th, 2009 - requesting waiver for E15 blends
  - Comment period closed July 20
  - EPA decision required by Dec 1

Increase Mainly From Cellulosic/Advanced Biofuel



Year	Conventional Biofuels (Grandfathered or 20% Reduction)	Advanced Biofuel				Total Renewable Fuel
		Biomass-Based Diesel (50% Reduction)	Non Cellulosic Advanced (50% Reduction)	Cellulosic Biofuel (60% Reduction)	Total Advanced Biofuel	
2006	4.00					4.0
2007	7.70					4.7
2008	9.00					9.0
2009	10.50	0.5	0.1		0.6	11.1
2010	12.00	0.65	0.2	0.1	0.95	12.95
2011	12.60	0.80	0.3	0.25	1.35	13.95
2012	13.20	1.0	0.5	0.5	2.0	15.2
2013	13.80	1.0	0.75	1.0	2.75	16.55
2014	14.50	1.0	1.00	1.75	3.75	18.15
2015	15.00	1.0	1.50	3.0	5.5	20.5
2016	15.00	1.0	2.00	4.25	7.25	22.25
2017	15.00	1.0	2.50	5.5	9.0	24.0
2018	15.00	1.0	3.00	7.0	11.0	26.0
2019	15.00	1.0	3.50	8.5	13.0	28.0
2020	15.00	1.0	3.50	10.5	15.0	30.0
2021	15.00	1.0	3.50	13.5	18.0	33.0
2022	15.00	1.0	4.00	16.0	21.0	36.0

Key Standard: Lifecycle Thresholds

Four Separate Standards

- **Cellulosic Biofuel: 16 billion gallons by 2022 – Minimum 60% GHG Reduction**
  - Renewable fuel produced from cellulose, hemicellulose, or lignin
  - E.g., cellulosic ethanol, BTL diesel, green gasoline, etc.
- **Biomass-Based Diesel: 1 billion gallons by 2012 and beyond – Minimum 50%**
  - Biodiesel, "renewable diesel" if fats and oils not co-processed with petroleum
- **Advanced Biofuel: Minimum of 4 billion additional gallons by 2022 – Minimum 50%**
  - Essentially anything but corn starch ethanol
  - Includes cellulosic biofuels and biomass-based diesel
- **Conventional Biofuel**: **Up to 15 billion gallons** – Minimum 20%
  - Ethanol derived from corn starch – or any other qualifying renewable fuel
  - Only applies to fuel produced in new facilities*

NOTES:

***Existing biofuel facilities not required to meet conventional biofuel GHG threshold**

EISA language permits EPA to adjust the lifecycle GHG thresholds by as much as 10% (60% to 50%; 50% to 40%; 20% to 10%)

- Based on the market availability of fuels that could count as advanced biofuel, we have proposed that the GHG threshold for advanced biofuel be adjusted to 44% or as low as 40%

Lifecycle Methodology and Results

Lifecycle GHG Thresholds

- **Lifecycle GHG analysis is integral to the new RFS2 Standards**
  - Defined and required by EISA
  - Without a determination of whether a fuel does or does not comply with the thresholds, the program cannot be implemented as intended by Congress
- **GHG thresholds are defined as the % reduction in lifecycle GHGs for a renewable fuel in comparison to the 2005 baseline gasoline or diesel that it displaces**
  - Lifecycle GHG estimates are only used to categorize renewable fuels into the four standards, not to value them (market determines value)
- **We have conducted lifecycle analysis for a variety of renewable fuel pathways**
  - Additional analysis for final rule is expected to expand the list of pathways and revise input assumptions based on new information
  - Also proposing a "default" mechanism that would allow some renewable fuels to temporarily generate RINs even if we did not explicitly analyze their lifecycle GHG impacts
- **While each renewable fuel pathway has a unique lifecycle GHG emissions impact in grams/mmBtu, for RFS2 regulatory purposes these lifecycle emissions are used only to compare each pathway to the applicable threshold and assign it to one of the four renewable fuel categories**

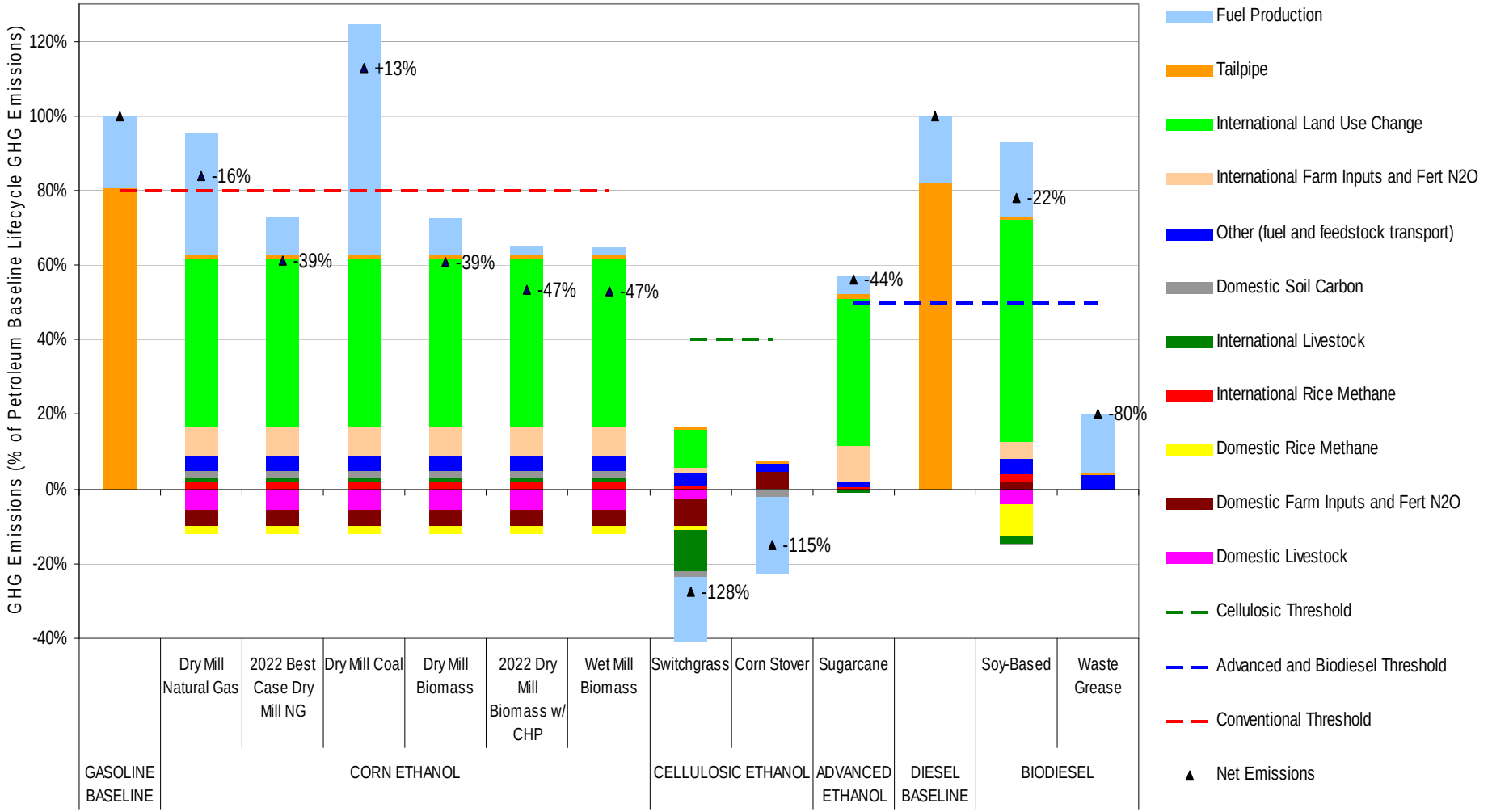
Key Factors in Land Use Assessment

- **Analysis revealed which factors have the most significant impact on the final results including:**
  - **What type of land is converted?**
    - Use of historic satellite data to project type of land converted
    - Alternative approach - use economic models to predict type of land converted
  - **What time period to consider and whether to apply a discount rate to emissions over time?**
- **We conducted additional sensitivity analyses around these and other factors**

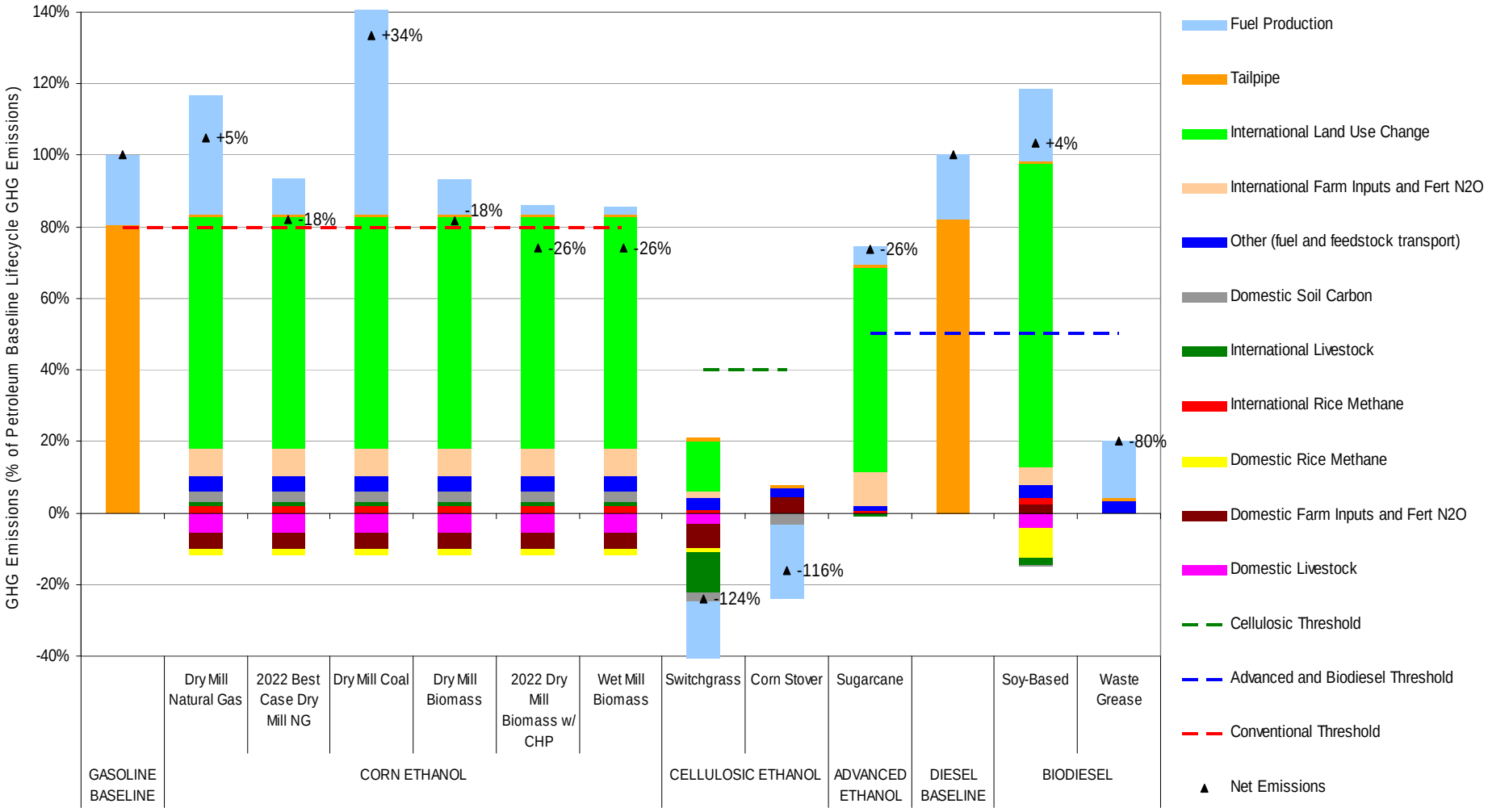
Presentation of LCA Results in NPRM

- **Thorough description of our new methodology and results**
- **Acknowledges uncertainty, particularly for land-use change impacts**
- **Presents the results, along with various sensitivity runs**
  - Corn ethanol assessments for different volumes, different years
  - Different assumptions for land use impacts
    - Bracketing pasture replacement (zero to 100%)
    - Type of land converted (assume 100% grassland)
  - Impact of foregone sequestration over time
- **Likewise we present several options for valuing the impacts over time**

Biofuel Lifecycle GHG Results: *Different Pathways with 2% Discount Rate – 100 years (2022 Values) - Illustrative*



Biofuel Lifecycle GHG Results: *Different Pathways with 0% Discount Rate – 30 years (2022 Values) - Illustrative*



Formal Peer Review

- **Conducted a formal peer review of key elements of our lifecycle analysis:**
  1. Land use modeling (use of satellite data/ land conversion GHG emission factors)
  2. Our estimates of GHG emissions from foreign crop production
  3. Methods to account for the variable timing of GHG emissions
  4. How the models we've relied upon are used together to provide overall lifecycle estimates

- **Followed OMB / EPA peer review guidelines**
  - EPA's guidelines also incorporate OMB's government-wide peer review bulletin

- **In accordance with this guidance, we used an independent, third-party contractor to conduct an external peer review**
  - Contractor identifies list of expert reviewers, checking for possible conflict of interest
  - Also conducts meetings, teleconferences, etc, in order to clarify technical components of the product and develops the peer review record

- **The peer review record is be available to the public, including:**
  - Materials provided to the peer reviewers
  - List of names and affiliations of the peer reviewers
  - Summary of comments, as well as comments attributable to individual reviewers

Peer Review Process

- The reviews were conducted following OMB and EPA's peer review guidance
- In accordance with this guidance, EPA used independent, third-party contractors to conduct an external peer review:
  - Contractor identifies list of expert reviewers, checking for possible conflict of interest. EPA provides contractor description of expertise required and examples of experts that fit the expertise needed for each review.
  - Over 80 experts were considered as potential reviewers including 8 from Senator Lugar's office.
  - EPA developed charge questions for each review (circulated to OSTP and OMB prior to commencement of peer review) which guides the review process.
  - Contractor develops the peer review record.
  - Peer reviewers work independently and are not asked to reach a consensus decision.

Topics Reviewed

- **Peer Review #1 – Satellite Imagery and Land Use Change Emissions Factors**
  - Is it scientifically justifiable to use remote sensing data in conjunction with projected land use change from agricultural sector models to estimate indirect land use change emissions associated with biofuel production?
  - Given the goals of this analysis, was the most scientifically justifiable remote sensing data set selected?
  - Were emissions factors estimated using the best available data sources given the geographical scale and scope of the study?

- **Peer Review #2 – Accounting for GHG Emissions Over Time**
  - What are scientifically justifiable project and impact time frames to consider for this analysis?
  - What is the most scientifically justifiable discount rate (including the possibility of a zero discount rate) for this lifecycle analysis?

- **Peer Review #3 – International Agricultural GHG Emissions**
  - What is the best way for EPA to deal with the limitations of the data, especially those data elements to which the results are most sensitive?
  - What other factors should EPA take into account when projecting future agricultural production?

- **Peer Review #4 – Model Linkages**
  - Are appropriate models being used to represent the different aspects of the fuels lifecycle?
  - What are the possibilities for inaccurately estimating, prices, land use changes, GHG emissions, and other related impacts under this approach?
  - What models or tools are available to capture petroleum sector indirect impacts (e.g., changes in fuels markets and use based on price changes in petroleum due to biofuel use)?

Recent Release

- Availability of Peer Review Record Announced August 7
  - FRN Published August 17th
- Materials available on EPA website and in EPA docket
- Peer review record includes:
  - Materials provided to the peer reviewers
  - The procedure and criteria used to select reviewers
  - List of names, affiliations, and professional resumes of the peer reviewers
  - Contractor summaries of comments, as well as original comments attributable to individual reviewers

Selected Peer Reviewers

Name	Title, Institution
Dr. Holly Gibbs	Research Fellow, The Woods Hole Institute, Stanford University
Dr. Rattan Lal	Professor of Soil Science, Director Carbon Mgmt. and Sequestration Center, Ohio State Univ.
Dr. Jason Tullis	Asst. Professor, University of Arkansas
Dr. Brian Wardlow	Asst. Professor, Univ. of Nebraska
Dr. R.A. Houghton	Senior Scientist, Woods Hole Research Center
Dr. Joseph Fargione	Regional Science Director for the Central U.S. Region, The Nature Conservancy
Mr. Ralph Heimlich	Principal, Agricultural Conservation Economics (ACE)
Dr. Liz Marshall	Senior Economist, World Resource Institute
Dr. Kenneth Richards	Indiana University, Assoc. Dir. Lugar Center for Renewable Energy
Dr. Jeremy Martin	Senior Scientist, Union of Concerned Scientists
Dr. Ken Cassman	Professor, Agronomy & Horticulture, University of Nebraska–Lincoln
Dr. Arvin R. Mosier	Private Consultant
Dr. John R. Freney	Honorary Research Fellow, CSIRO, Div. of Plant Industry, Canberra, Australia
Dr. Beth Boyer	Associate Professor Water Resource, Penn State University, Agricultural Sciences
Dr. Martin Banse	Senior Agricultural Economist, Agricultural Economics Research Institute, The Hague
Mr. Tim Searchinger	Visiting Research Scholar and Lecturer in Public and International Affairs, Princeton University
Mr. John Sheehan	Program Coordinator, Biofuels Sustainability, University of Minnesota Institute on the Environment
Dr. Michael Wang	Section Leader, Argonne National Laboratory

Other Key Provisions

Grandfathering

- **All biofuel facilities that "commenced construction" prior to EISA are grandfathered**
  - They are not required to meet the minimum 20% GHG threshold
  - Does not apply to other thresholds
- **We seek comment on a range of options based on input from stakeholders**
  - Protective of pre-EISA investments
  - Level playing field for future investments
  - Practical implementation (avoid NSR-like issues)
- **Main proposal is to grandfather a baseline volume for each facility**
  - Baseline volume would be grandfathered forever
  - Expansions would be tracked like new facilities
- **We expect at least 15 bill gal will be grandfathered**
  - All current corn-ethanol production volume
  - All current biodiesel production volume
  - All current sugarcane ethanol production volume

Renewable Biomass Provision

- **EISA restricts the types of renewable fuel feedstocks and land that feedstocks can come from. For example:**
  - Agricultural land must have been cleared or cultivated prior to Dec 19, 2007 and actively managed or fallow, and non-forested
  - Woody biomass from federal land is not allowed, except from wildfire areas
- **EISA language does not prohibit a "shell game" in which food crops are moved to new ag land while existing ag land is used for fuel feedstocks**
- **Requires new tracking of feedstocks from point of production to renewable fuel producers**
  - Applies to both domestic and foreign producers
- **We are proposing that renewable fuel producers would be required to maintain records to support their decision to generate or not to generate RINs for a given batch of renewable fuel**
  - Renewable fuel producers would be expected to work out a system with their feedstock supplier(s) to ensure they generate RINs only for fuel produced from feedstock that meets the definition of "renewable biomass
  - The practical implication is that producers would establish tracking systems up through their supply chain
  - Other options include relying on third-party verification and use of satellite imagery

Waivers for Cellulosic Biofuel

- **Irrespective of the volumes of cellulosic biofuel required in EISA, EPA is required to determine the standard for the following year based on projections of production**
  - We "may" reduce the advanced biofuel and total renewable fuel standards accordingly
- **We are proposing annual Production Outlook Reports for all renewable fuels through which renewable fuel producers will give us their expansion and new construction plans**
  - We expect to conduct a notice-and-comment rulemaking each year for setting the standards using information from the Production Outlook Reports
  - For 2010 we are proposing that the full 0.1 bill gal requirement from EISA be used as the basis for the standard
- **If the projected volume is less than the EISA volume, we must make cellulosic biofuel credits available up to the level of the standard set for that year**
  - Price is set by EISA as greater of 25¢ or $3 - wholesale price of gasoline, adjusted for inflation
  - We are proposing that credits ("allowances") only be made available to obligated parties at the time of their compliance demonstration

RFS2 Impacts Summary

(Assumes full implementation in 2022)

- **GHG Emissions from Transportation**
  - Reductions of 6.8 billion tons of CO2 equivalent (or approximately 160 million tons per year)
  - Reductions equivalent to taking about 24 million vehicles off the road.
- **Impacts on Overall Petroleum Consumption in 2022**
  - 36 billion gallons of renewable fuel will increase renewable fuel usage by approximately 22 billion gallons over 2022 base volume scenario
  - This will displace about 15 billion gallons of petroleum-based gasoline and diesel fuel.
  - This represents about 11% of annual gasoline and diesel consumption with most reductions coming from reduced imports of petroleum.
- **Fuel Cost Impacts (Nationwide Average based on low and high crude costs)**
  - Gasoline costs would increase by about 2.7 and 10.9 cents per gallon by 2022.
  - Diesel fuel costs could experience a small cost reduction of 0.1 cents per gallon, or increase by about 1.2 cent per gallon
  - Increases in gasoline and diesel fuel costs are equivalent to $4 billion to $18 billion in 2022
- **Energy Security**
  - Estimate, the total energy security benefits associated with a reduction of U.S. imported oil is $12.38/barrel.
  - Based upon the $12.38/barrel figure, total energy security benefits associated with this proposal were calculated at $3.7 billion

Thoughts and Questions

- Legislative Changes?
  - Cap and Trade
  - Definition of Renewable Biomass
  - Application of Lifecycle – Delay or Change
  - Feedstock considerations (algae, microcrops, other)
    - What counts as what?
  - Intermediate blends (E15 / Flexible Fuel Vehicles)
  - Low Carbon Fuels
  - Etc.