The Northeast / Mid-Atlantic Low-Carbon Fuel Standard:
Plan for the LCFS Economic Analysis

Boston, MA

February 23, 2010

Today's Call

- Goals of the LCFS Economic Analysis
- Best practices in economic analysis
- Key Steps in the LCFS analysis:
  - Generating LCFS Compliance Scenarios
  - Developing Cost and Benefit Estimates
  - Estimating Regional Economic Impacts
  - Treatment of Uncertainty
- Data Needs and Schedule
- Items for Discussion

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Goals of the Analysis

We have the following goals for the LCFS economic analysis:

- Estimate relative magnitude of potential costs and benefits resulting from LCFS implementation
- Generate insights into the outcomes of various policy options
- Identify key issues for LCFS decision-makers
- Provide stakeholders with opportunities for review and input
- Adhere to “best practices” in regulatory economic analysis

The LCFS Economic Analysis is not intended to:

- Predict future economic conditions or the likelihood of any policy outcome
- Limit possible policy options available to decision-makers

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Best Practices in Economic Analysis (1)

In early 1990s, federal government began to establish "best practices" for regulatory economic analyses. Our LCFS analysis will be consistent with these:

- Baseline definition—
  - Establish clear reference case, i.e., the "world without the program," to avoid double-counting
  - Clearly identify all uncertainties in baseline conditions
  - Use reference case(s) consistently throughout the analysis

- Assessment of costs and benefits—
  - Be clear about what costs and benefits are quantified and/or monetized or not, and why
  - Focus resources on major costs and benefit categories

Sources: 1) US EPA, "Guidelines for Preparing Economic Analyses," September 2000; 2) Executive Order 12866, "Regulatory Planning and Review," Oct. 4, 1993.

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Best Practices in Economic Analysis (2)

- Analysis of other impacts—
  - Analysis should also provide insights on the distribution of aggregate costs and benefits across different groups (e.g., low-income populations)
- Treatment of uncertainty—
  - Describe all key assumptions, biases, and omissions and present clearly
  - Focus on key variables in sensitivity analyses
- Transparency/Communication to Decision-makers
  - Strive for maximum clarity and transparency
  - Present full range of uncertainties examined

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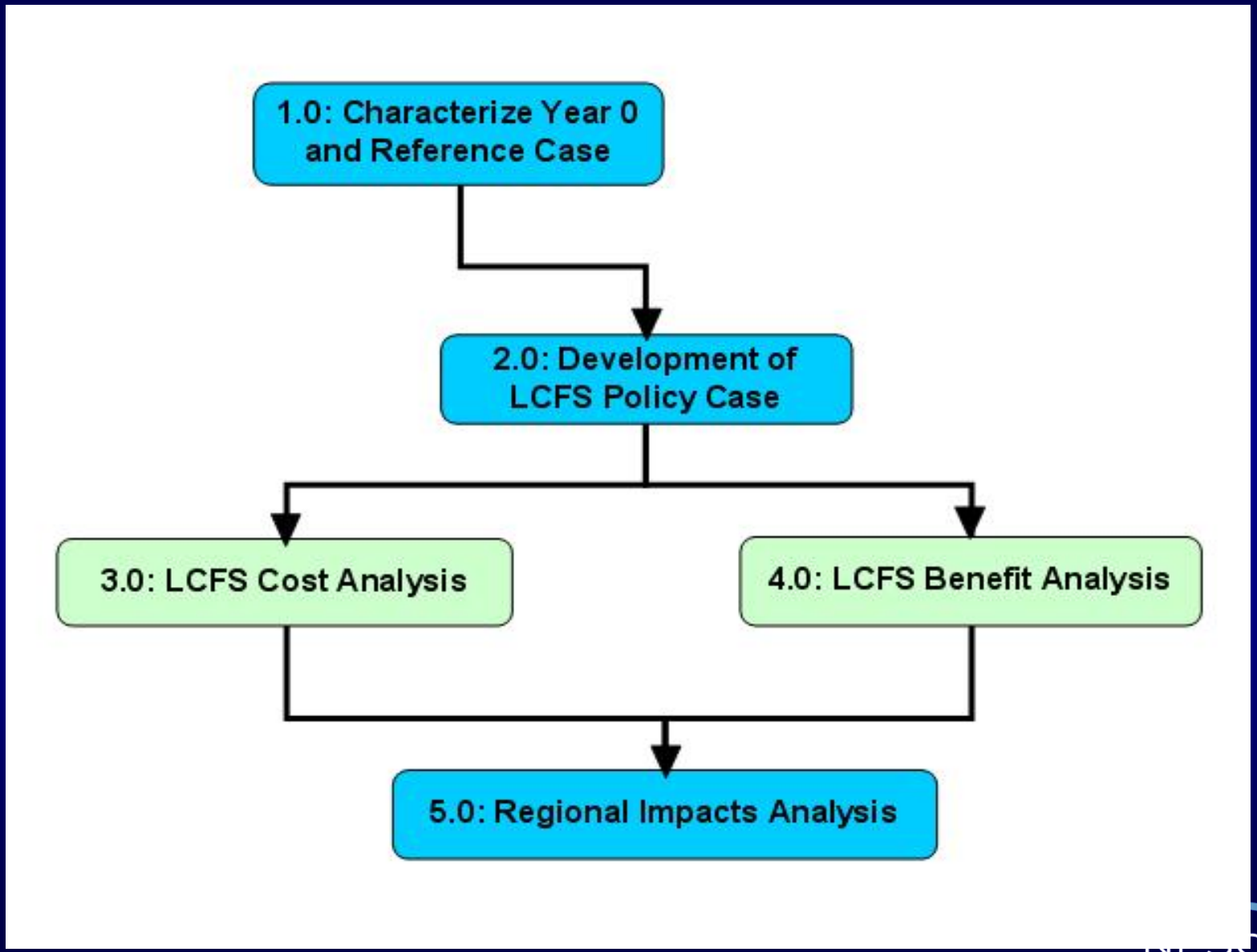
Key Steps in the LCFS Economic Analysis



Scenario Development Process

1. Select scenario type
2. Choose number of fuel pathways
3. Identify CI for each selected pathway
4. Estimate available volumes for each pathway
5. Estimate average CI based on available volumes

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Scenario Development Constraints

- Baseline characterization and reference case
- Reduction target
- Program timeline
- Commercial volumes of fuels (preliminary estimates)
- Other?

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Options for Determining Carbon Intensity Values for Selected Pathways

- CARB Lookup Table
  - CA-specific, CA-GREET, GTAP
- NESCCAF Study
  - 8-state region, NE-GREET
- RFS2
  - National averages, NETL, GREET, FASOM/FAPRI
- Other?

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Baseline Characterization and Reference Case Considerations

Baseline Options

- EPA RFS2
- CARB LCFS
- NESCCAF
- Other?

- Reference Case Issues
  - Regional share of RFS2-mandated fuels
  - High-CI crude volumes
  - Economic growth and price forecasts
  - Reflecting influence of existing policies (e.g., RGGI, ZEV, RPS, etc.)

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Categories of LCFS Costs and Benefits

- *Costs of Low Carbon Fuel Production:*
  - cellulosic ethanol
  - low-C biodiesel
  - electricity for PHEV/EVs
  - CNG
  - Others…?

- *Costs of Related Infrastructure:*
  - Blending infrastructure
  - Delivery infrastructure (e.g., E85 delivery, CNG stations)
  - PHEV/EV infrastructure
  - Vehicle purchases (PHEV/EVs, flex-fuel)
  - Others….?

- *Program Costs:*
  - Reporting costs
  - Program implementation and enforcement costs
  - Others…..?

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Categories of LCFS Benefits

- GHG Reductions
  - Avoided GHG emissions
- Other Environmental Benefits
  - Co-reductions in criteria pollutants
  - *Others….?*
- Technological Innovation
  - Increase in rate of innovation
- Other Economic Benefits
  - Increase in energy security
  - Local fuel production
  - *Others….?*

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Estimating Regional Economic Impacts (1)

- In addition to the broad assessment of LCFS costs and benefits, we will also analyze how certain categories of LCFS costs and benefits will be realized by or accrue to specific industry and consumer groups (e.g., biofuel mfrs.) in the Northeast.

- Key outputs of the regional economic impact assessment include:
  - Changes in gross state product
  - Changes in employment, by industry group
  - Changes in total economic activity

- Our tool for the regional economic impact analysis will be the REMI© model, a 12-state economic and demographic forecasting model.

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Estimating Regional Economic Impacts (2)

- Our LCFS REMI work will be supported by consultants from Economic Development Resource Group (EDR Group).
- The REMI analysis of LCFS will generate results at both the state and regional levels.
- Collection of state-specific data (e.g., population, etc.) for REMI analysis is underway, scheduled to be complete in March.
- Inputs for REMI modeling will be developed after completing the aggregate analysis of LCFS costs and benefits.

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Treatment of Uncertainty

- Again, our goal is not to forecast the future, but to capture a range of uncertainties that will generate useful insights for policymaking;
- So, our sensitivity analyses will focus on variables which are expected to have the most significant influence on results.

Possible Sensitivity Runs

Reference Case

- Baseline fuel prices, low and high
- Rate of economic growth, low and high
- Role of existing policies (RFS, LEV, RGGI, etc.)

LCFS Policy Cases

- Rate of technological innovation and deployment
- Costs and availability of Low Carbon Fuels (e.g., biofuels, natural gas, electricity)
- LCFS Target Level and Compliance Schedule
- Carbon Intensities for Key Fuels
- Availability of Low Carbon Feedstocks and Fuels in Northeast

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Data Needs

Our goal is to rely on published and peer-review quality research and publications.

- However, costs and timing of deployment of emerging fuels and technologies are still highly uncertain and not yet reflected in the literature.

- So, we are seeking industry and other expert input on:
  - Costs and supply of emerging low-carbon fuels;
  - Estimates of technology deployment; and
  - Costs of related infrastructure

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Schedule for LCFS Economic Analysis

Task	Starts	Ends	FEB	MAR	APR	MAY	JUN	JUL	AUG
Characterize Year 0 and Reference Cases	1-Feb	31-Mar							
Development of LCFS Policy Case	1-Feb	1-Mar							
Run VISION-NE for each scenario and summa	1-May	31-May							
Analysis of LCFS Costs	1-Feb	28-Jun							
Analysis of LCFS Benefits	1-Mar	28-Jun							
Regional Impact Analysis	31-Mar	31-Aug							
LCFS States Review Results	1-Aug	30-Aug							

- Key opportunities for input from LCFS stakeholders:
  - March 31st for input data
  - April 2010 for review of data and assumptions
  - Early Sep. 2010 for review of draft results
- Contact us at lcfs@nescaum.org with Qs and comments

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Items for Discussion

Our goal is to finalize key data and assumptions for the LCFS economic analysis by April 2010. We appreciate input on the following elements of the analysis:

- Process for collecting data and information
- Role of heating oil
- Role of RFS2
- Carbon Intensity values

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