

# **ROLE OF LIFE CYCLE ANALYSIS OF CARBON EMISSIONS IN INTEGRATED RESOURCE PLANS**

**Indiana Utility Regulatory Commission**

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**ENERGY VENTURES ANALYSIS**

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## ABOUT ENERGY VENTURES ANALYSIS

Energy Ventures Analysis is an energy consulting firm located in Arlington, Virginia. Since 1981, EVA has been publishing supply, demand, and price forecasts as part of its FUELCAST subscription service for the electric power, coal, natural gas, petroleum, renewable, and environmental sectors.

EVA's cutting-edge expertise in energy market, economic, financial, and operation management matters has led our firm to international recognition. For over three decades, our innovative insights have helped our clients make confident, informed investment and operational decisions to maximize value and spur financial growth.

Our clients include:

- power & natural gas utilities
- fuel producers
- fuel transporters
- commodity traders
- regulators
- financial institutions



## OUTLINE

- **Why carbon is different than other air emissions**
- **Current approach IRP approach to consideration of carbon emissions**
- **What is LCA analysis?**
- **How LCA analysis can be incorporated into the IRP process**
- **Is LCA a best practice?**

## WHY CARBON IS DIFFERENT

- **Greenhouse Gas (GHG) emissions, like CO<sub>2</sub>, have significantly different behavior in the atmosphere than other air emissions.**
  - GHG emissions such as CO<sub>2</sub>, have long residence times in the atmosphere and are distributed globally.
- **Most of the CO<sub>2</sub> produced is “stored” in the atmosphere and accumulates over time.**
  - Approximately, 65-80% of the CO<sub>2</sub> released into the atmosphere is absorbed by the oceans over 200 years.
  - The balance remains in the atmosphere over an even greater period of time.
- **Carbon management therefore is a marathon not a sprint**
  - The issue is total carbon emissions over the life of assets, not simply emission rates, emission intensity or annual loadings associated with the generator alone.

## CURRENT APPROACH TO CONSIDERATION OF CARBON

- Some utilities elect to consider carbon in their IRPs whether or not states require them to do so
- This consideration can be based upon carbon specific metrics or through environmental metrics that previously were applied to criteria air pollutants.
- The environmental metrics used in current Indiana IRPs are carbon emission rates (#/MMBtu), carbon intensity (#/MWH), or inside-the-fence carbon emissions over the IRP period.
- These are consistent with prior considerations of sulfur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), and particulate matter (PM) emissions, as these pollutants have local and regional impacts but not global ones.
- As carbon differs from these other pollutants, emission rates and/or total emissions do not reflect the long residence times for carbon.
- Therefore, this historic approach may distort the carbon contributions of alternative resource plans.

## LIFE CYCLE ANALYSIS

- **In recent years, life cycle analysis (LCA) has become the norm. The National Energy Technology Laboratory (NETL) which is part of the U.S. Department of Energy (DOE) national laboratory system, performs and sponsors a range of energy and environmental research and development. NETL alone lists over 100 publications related to its work in LCA on its website, a number of which focus on the LCA of new natural gas plants. In a 2015 report, NETL explains its adoption of LCA analysis as follows:**
  - *In recent years, the National Energy Technology Laboratory (NETL) has been using life cycle analysis (LCA) as a new and innovative way to analyze and compare different power production and transportation fuel production pathways. By using LCA, NETL has integrated a holistic approach to comparing energy production pathways instead of solely considering combustion emissions at energy conversion facilities (i.e., power plant or fuels refinery).*
- **In determining the contribution of carbon, it is important to consider upstream emissions.**
- **For a new combined cycle gas turbine (CCGT), the upstream portion includes the production of natural gas through its distribution to the consumer. The downstream portion includes the operation of the power plant and the transmission and distribution of electricity to the consumer. The sum of these emissions over the forecasted life of the plant comprise the life cycle emissions for the plant.**



## HOW LCA CAN BE INCORPORATED INTO TO THE IRP PROCESS

- **LCA analyses can be used to compare the carbon profiles of alternative resource plans.**
- **This is important is it allows a comparison of the carbon profile of (a) an existing carbon generator with a limited life followed by renewables to (b) a new carbon generator with a likely 35 plus year life.**
- **LCA analyses also appropriately consider upstream emissions as well as inside-the-fence emissions.**

## IS LCA BEST PRACTICE?

### Some state resource planning requirements explicitly include an LCA requirement

#### Georgia

- **Subject 515-3-4 INTEGRATED RESOURCE PLANNING**
- **Rule 515-3-4-.02. Definitions**
- Utility Cost Test: An analytic test which considers only the direct utility economics of resource options. A resource option is cost effective under the utility cost test when **present value life cycle benefits exceed present value life cycle costs**, evaluated at a market discount rate. Direct benefits equal the direct avoided costs multiplied by the energy/capacity supplied by the resource option. Direct costs equal the utility cost of installing the resource option plus the utility's operating costs.

#### Delaware

- **TITLE 26 PUBLIC UTILITIES DELAWARE ADMINISTRATIVE CODE 1 Public Service Commission 3010 Integrated Resource Planning for the Provision of Standard Offer Service by Delmarva Power & Light Company**
- 6.1.4 Include a current evaluation, detailing and giving consideration to environmental benefits and externalities associated with the utilization of specific methods of energy production. This evaluation need not be based on original research by the Company and may rely on published research and peer reviewed scientific and/or medical studies commonly available. **To the extent that any reliable, relevant peer reviewed published research and scientific and/or medical studies commonly available include life cycle analyses encompassing energy extraction, transport, generation and/or use, the Company shall include such research and studies in its evaluation.**



## INDIANA ADMINISTRATIVE CODE ENCOURAGES BEST PRACTICES

- Indiana code, as stated in 170 IAC 4-7, as amended which provides such guidelines as to content of an IRP.
- With respect to environmental considerations, Indiana code includes environmental considerations under “contemporary issues” and states that utilities should use “contemporary methods” to evaluate. Contemporary methods is defined as “any methodological aspect involved with developing an IRP that represents the best practice of the electric industry to improve the quality of an IRP analysis.”

# Thanks

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