ICF International's Marine Related Projects

NEDC Goods Movement Work Group

March 18, 2009

ICF International's Current Marine Projects

- Best Practices and Current Methodologies for Preparing Port Emissions Inventories
- Development of 117 US Port Inventories for ECA Application
- OGV Tier 2 and Tier 3 Emission Reduction Technologies and Costs
- Fuel Switching Project with Port of Houston and a Mexican Port
- Tug-Tow Emission Reductions
- GHGs in the Port Sector
- Addition of OGVs to DEQ

Best Practices and Current Methodologies for Preparing Port Emission Inventories

- Original Best Practices document published January 2006
  - Available at http://www.epa.gov/sectors/ports/#bestpractices
- Currently updating document to incorporate new information and provide more details on non-OGV sectors

New Current Methodologies Report

- Updates emission factors and load factors for OGVs and other sectors
- Provides methodology to calculate GHG emissions
- Expands on methodology for harbor craft, cargo handling equipment, rail and trucks
- Provides a more streamlined approach for ports with less resources
- In Draft form – Being sent out for Peer Review
- Available Spring 2009

National Port Inventories for ECA Proposal

- Purpose
  - Help EPA determine the effect of various ECA distances as well as various control strategies and implementation dates
  - Develop Baseline and Control Scenario inventories for 117 top US ports (89 deep sea and 28 Great Lake)
  - Provide Gridded Inventories to EPA for Air Quality Modeling

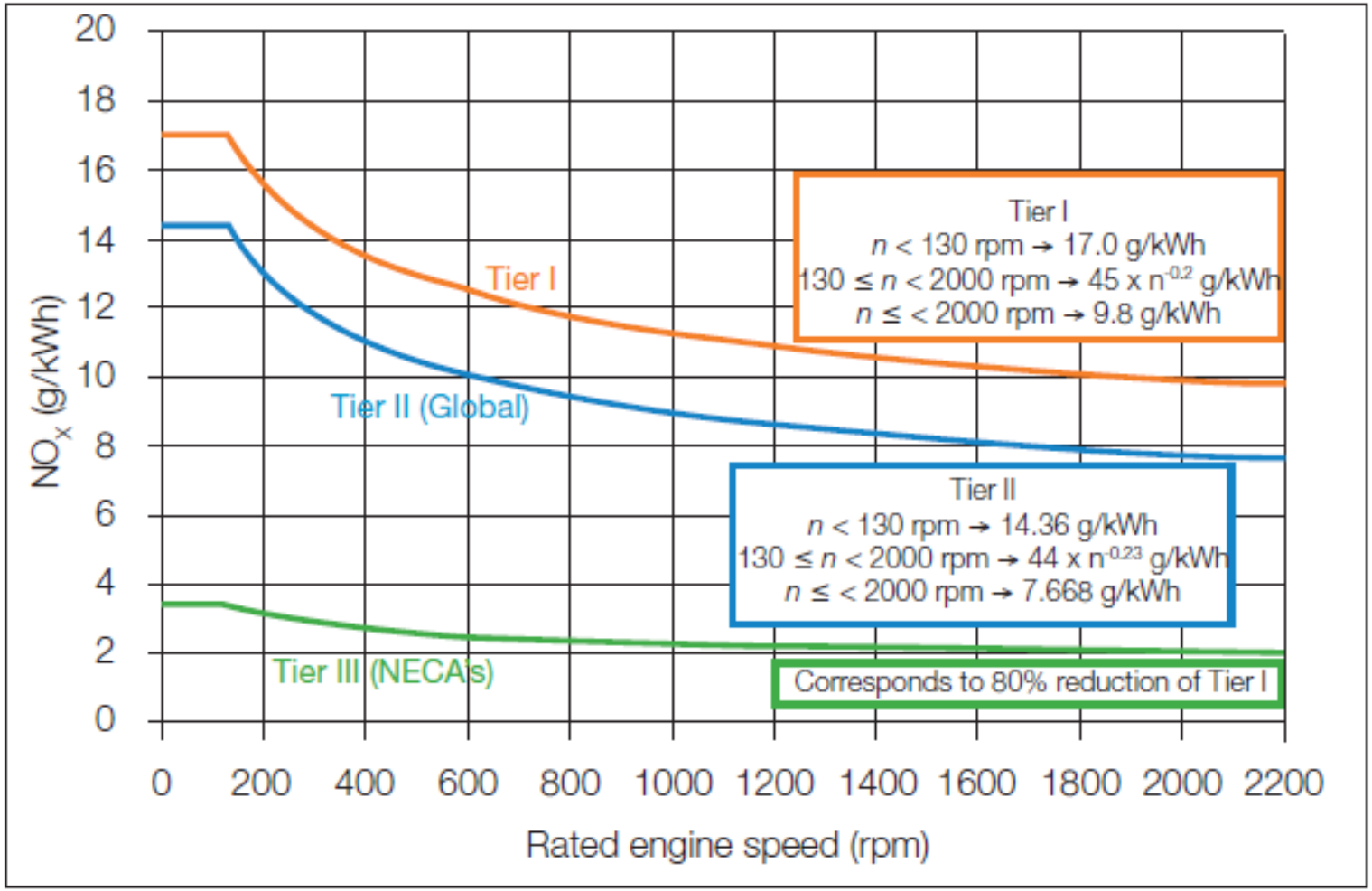
National Port Inventories for ECA Proposal

- Expanded Corbett's STEEM data to provide details near ports
- Developed near-port inventories for 117 US ports for 2002, 2005, 2008, 2014, 2020, 2022, 2030
- Control Scenarios included 0.1% and 0.5% sulfur fuel plus Tier 2 and Tier 3 NOx controls at various distances from US Coastline
- EPA using this information for developing proposals to IMO to become an ECA

OGV Emission Reduction Technologies and Costs

- Purpose
  - Help EPA understand the technologies and costs associated with meeting Tier 2 and Tier 3 NOx emission standards under IMO Annex VI
  - Examine costs to retrofit 1990-1999 C3 engines to meet Tier 1 emission levels
  - Results will help EPA develop their RIA for rulemaking

OGV Emission Reduction Technologies and Costs



OGV Emission Reduction Technologies and Costs

- Technologies Examined
  - Engine Modifications
  - Common Rail Fuel Injection
  - Fumigation
  - Fuel Emulsions
  - Direct Water Injection
  - EGR
  - SCR
  - Sea Water Scrubbers
  - Fuel Switching
- Incremental Costs to Consumers estimated
- Report to be finished Spring 2009

Fuel Switching Project - Overview

- Purpose
  - Study the use of low sulfur distillate fuels in ocean going vessels
  - Develop a demonstration of fuel switching with Port of Houston and a Mexican Gulf Port
  - Develop a business case to replicate demonstration at other ports

Fuel Switching Project - Overview

- **Activities to be completed:**

1. Examine Feasibility of Fuel Switching at Port of Houston and a foreign "Sister-City" Port in the Western Hemisphere
2. Help EPA develop a demonstration of fuel switching at Port of Houston and a Latin American Port
3. Examine the air emission reductions from fuel switching
4. Help build a business case to replicate this demonstration at other ports both domestically and in Latin America

Tug and Towboat Emission Reduction Project - Overview

- Purpose:
  1. Catalog and evaluate technologies and strategies to reduce tug and towboat emissions
  2. Provide the tug and towboat industry with guidance to facilitate and maximize emissions reductions
- Accomplished through three tasks:
  1. Technology and Project Review
  2. Strategy Analysis and Evaluation
  3. Strategy Application and Outreach Material Production
- Status
  - In progress.
  - Expected completion by March, 2009

Tug and Towboat Emission Reduction Project – Focus Areas

- **Focus on Inland River and Waterways activity with specific examples in:**
  - St. Louis, MO
  - New Orleans, LA

- **Explore options generally for**
  - Inland River
  - Harbor, and
  - Ocean Service boats

Tug and Towboat Emission Reduction Project – Status and Achievements

- **Technology and Strategy Review**
  - Rely on published and/or enacted strategies worldwide and engineering judgment for feasibility and cost
    - Have produced a comprehensive review of mitigation strategies worldwide
    - Have produced detailed bibliography of industry contacts and details
- **Technology Evaluation**
  - Focus on feasible technologies and strategies
    - Have qualitatively selected best strategies to evaluate further
- **Strategy Application and Outreach**
  - Baseline tugboat emission inventory underway at two ports
  - Will apply selected strategies and evaluate cost effectiveness
  - Will publish results for industry and policy makers to facilitate investment strategies

Impact of GHG Regulation Scenarios on Ports

- **Purpose**
  - Provide a qualitative analysis of the impact of three GHG regulation scenarios on ports
    - Industry-wide cap and trade
    - Low carbon fuel standard with a utility cap and trade program
    - Regulation of GHG emissions under the Clean Air Act
- **Activities**
  - Interviewed officials from ports\industry and conducted background research to identify impacts
  - Prepared working paper outlining the findings of the research
- **Status**
  - Draft paper completed. Final version to be finished in Spring 2009

Preparation of a National GHG Emissions Estimate for the Ports Sector

- **Purpose**
  - Provide a methodology to estimate GHG emissions from the ports sector
  - Provide a sector emissions inventory that is parallel to those available for other sectors in EPA's Sector Strategies Program
- **Activities**
  - Reviewed potential data sources, port emissions inventories and technical reports on port related emissions sources
  - Drafted a working paper outlining a mid-tier approach to producing a national ports sector inventory
- **Status**
  - Draft methodology prepared. Final methodology to be finished in Spring 2009. Implementation of the methodology will depend on evaluation by EPA

OGVs in the Diesel Emission Quantifier

- DEQ an interactive tool to help users to estimate emission reductions from various emission control strategies
- http://cfpub.epa.gov/quantifier/view/index.cfm
- Currently does not contain C3 OGVs
- ICF will develop strategies and default values for adding C3 OGV main and auxiliary engines to DEQ

Further Information

Contact

Dr. Lou Browning
Technical Director
LBrowning@icfi.com
831-662-3683