A METHODOLOGY FOR CALCULATING INTEGRATED NOx EMISSIONS REDUCTIONS FROM ENERGY EFFICIENCY AND RENEWABLE ENERGY (EE/RE) PROGRAMS ACROSS STATE AGENCIES IN TEXAS

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Legislative Response

41 Counties in Texas designated non-attainment or affected.

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INTEGRATED NOx SAVINGS

IN 2005 TCEQ INITIATED A PROGRAM TO DETERMINE INTEGRATED EMISSIONS SAVINGS (2009 & BEYOND) TO REPORT SAVINGS TO EPA

State Agencies included:
- TEES/ESL
- PUC
- SECO
- ERCOT/Wind

Savings Integration allows:
- Annual, OSD savings
- By County
- By SIP
- By Program

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INTEGRATED NOx SAVINGS

Process Flow Diagram of the NOx Emissions Reduction Calculations
It was assumed that the same amount of electricity savings from the code-compliant construction would be achieved for each year after 2006 through 2020. This would include the appropriate discount and degradation factors for each year.

Single and multi-family programs include the energy savings attained by constructing new residences in Texas according to the IECC 2000-2001 building code (IECC 2000).

Electricity savings due to the code adoption for new SF & MF residences were estimated using DOE-2.1 simulation program. Pre-code houses: average new house built in 1999 in Texas.

It was assumed that the same amount of electricity savings from the code-complaint construction would be achieved for each year after 2006 through 2020. This would include the appropriate discount and degradation factors for each year.

These savings include new construction in office, assembly, education, retail, food, lodging and warehouse construction as defined by Dodge building type (Dodge 1999, 1999, 2003), using energy savings from the Pacific Northwest National Laboratory (USDOE 2005), and data from CBECS (2005).

Electricity savings due to the code adoption for new commercial buildings were estimated using DOE-2.1 simulation program.


The 2006 savings include projects implemented in 14 Federal buildings reported by the regional office of the Department of Energy.

It was assumed that the electricity savings from 2006 would also be achieved for each year from 2006 through 2020 after the appropriate degradation factors were applied.
INTEGRATED NOx SAVINGS: PUC SB7 Savings and Projection

- The Texas Public Utility Commission’s (PUC) Senate Bill 5 and Senate Bill 7 programs include their incentive and rebates programs managed by the different Utilities for Texas (PUC 2007).
- These include the Residential Energy Efficiency Programs (REEP) as well as the Commercial & Industrial Standard Offer Programs (C&I SOP).

INTEGRATED NOx SAVINGS: Wind Savings and Projection

- For saving projections, annual growth factors were chosen to comply with the yearly goals set forth by the Senate Bill 20, Section 39.994, Utilities Code: 3,700 MW in 2009, and 7,000 MW in 2015.
- Actual measured electricity production for 2001 through 2006 were also included.

INTEGRATED NOx SAVINGS: SEER13 Single Family Savings and Projection

- The annual and OSD electricity savings due to replacement of SEER 13 air conditioning units for existing residences are estimated using DOE-2.1 simulation.
- In this analysis it was assumed that an equal number of existing houses had their air conditioners replaced as reported for 2006 by the air conditioner manufacturers using the ARI data (i.e., Texas Manufacturer’s Shipments of 1 phase unitary products).
- This replacement rate continued until all the existing air conditioner stock was replaced with SEER 13 air conditioners.

INTEGRATED NOx SAVINGS: SEER13 Multi-Family Savings and Projection

- The annual and OSD electricity savings due to replacement of SEER 13 air conditioning units for existing residences are estimated using DOE-2.1 simulation.
- In this analysis it was assumed that an equal number of existing houses had their air conditioners replaced as reported for 2006 by the air conditioner manufacturers using the ARI data (i.e., Texas Manufacturer’s Shipments of 1 phase unitary products).
- This replacement rate continued until all the existing air conditioner stock was replaced with SEER 13 air conditioners.
INTEGRATED NOx SAVINGS

Total NOx Emissions Reductions (SF, MF, and Commercial Buildings)

CUMULATIVE NOx EMISSIONS SAVINGS (2010)

- Federal Buildings (18.76 tons/day) (26.3%)  
- Furnace Pilot Lights (0.32 tons/day) (0.8%)  
- SECO Political Sub. (0.84 tons/day) (2.0%)  
- Non-attainment and Affected Counties  
  - Residential – 11 measures  
  - Commercial – 10 measures

NEW TOOLS TO HELP REDUCE ENERGY AND NOx EMISSIONS

- eCalc Energy & Emissions Calculator
  - Residential, Commercial
  - Municipal buildings, traffic lights, street lights, water
  - Solar, thermal, PV, wind
- Synchronous NOx Emissions Calculator
  - Quick results for MWh savings in any county
- International Code Compliance Calculator (ICCC)
  - Calculates code compliance for 2001 IEC + SEER 13
  - Allows for 15% above code compliance calculations
- 15% above-code measures (41 Cos.)
  - Residential – 11 measures
  - Commercial – 10 measures
INTEGRATED NOx SAVINGS

Summary

This paper has presented the detailed results at the Laboratory’s integrated NOx emissions reductions calculations, which were develop to satisfy the legislative requirements of Senate Bill 5. Additional information about these procedures can be found in the laboratory’s annual Report to the TCEQ.

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