



Putting the Natural Gas Dilemma in context: Finding real solutions for the short and long term

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“You never let a serious crisis go to waste. And what I mean by that it's an opportunity to do things you think you could not do before.”

Rahm Emanuel

The perceived crisis: Insufficient gas supply will cause reliability problems in an electric system increasingly dependent on gas. This real but short-term concern could cause pipeline overbuild, leading to stranded investment and fossil fuel lock-in that undermines much needed emissions reductions.

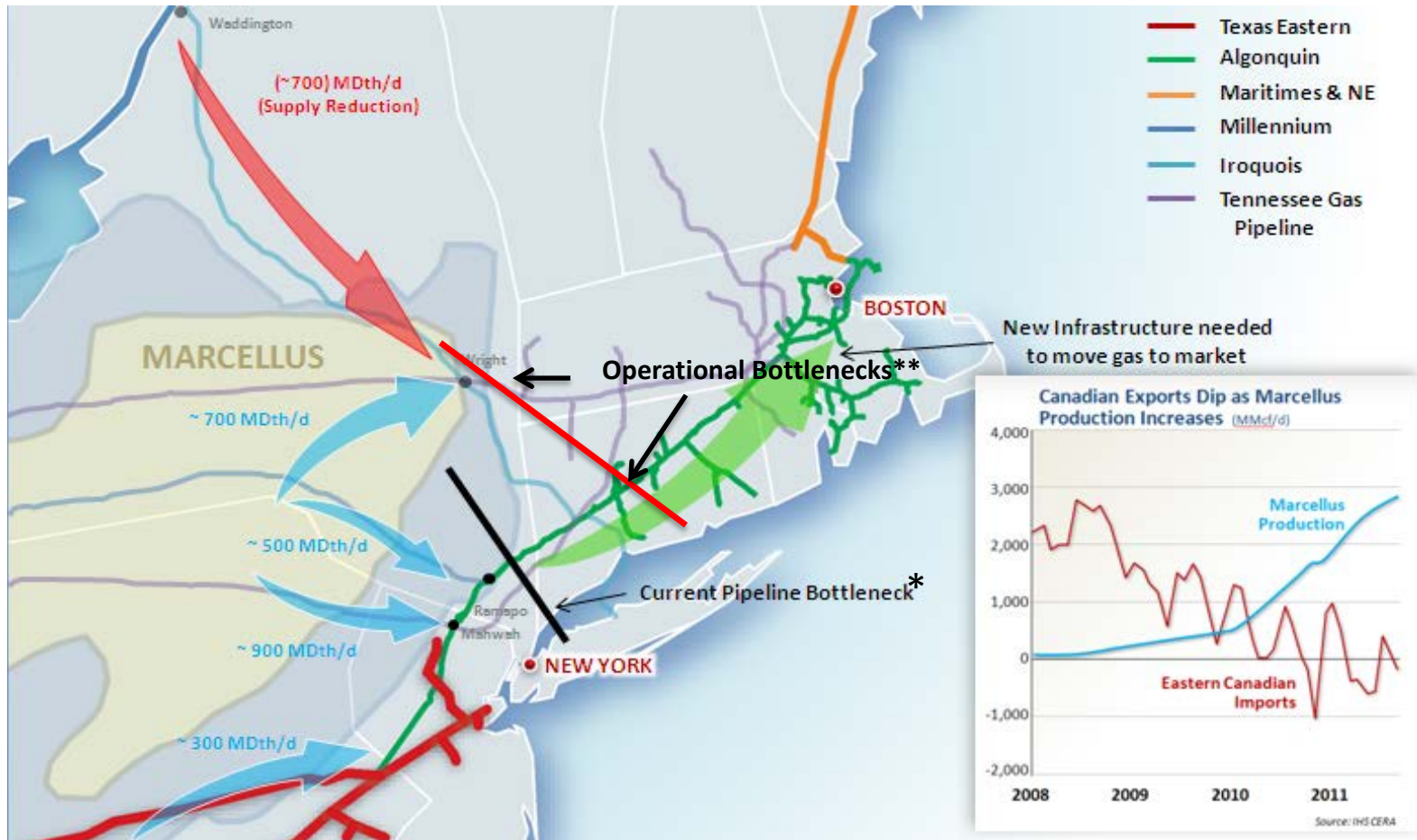
But isn't this just a New England problem? No, as gas use increases nationally demand for pipeline capacity will rise. How will we respond?

- This is latest in long tradition of New England being place where issues are played out that become national later
 - This history includes *Public Util. Comm'n of R. I. v. Attleboro Steam & Elec. Co.*, 273 U.S. 83 (1927) which sparked Title II of the Federal Power Act and (much more recently) restructuring and utility divestiture of generation
- Rising use of gas in generation as coal retires will put pressure on pipeline capacity across the nation – New England as “end of the pipe” and one of the early places to switch to gas as primary generating fuel is just seeing this dynamic play out first and most intensely
- The fundamental question is the same everywhere as gas use rises: will we respond by optimizing current infrastructure and making markets more efficient or as suggested by some, will we just flood the market with gas by building pipelines in order to keep the price down?

The Dilemma

- Plentiful, accessible and moderately priced natural gas has played a key role in displacing coal generation and reducing the emissions, both greenhouse gas and pollutants with direct health effects, from those plants
- In the longer term we need to move beyond fossil fuels. Building long-lived fossil fuel infrastructure is contrary to: 1) state and regional emissions reduction mandates, 2) what science tells us we need to do and 3) is a really bad investment for customers, states and most market participants

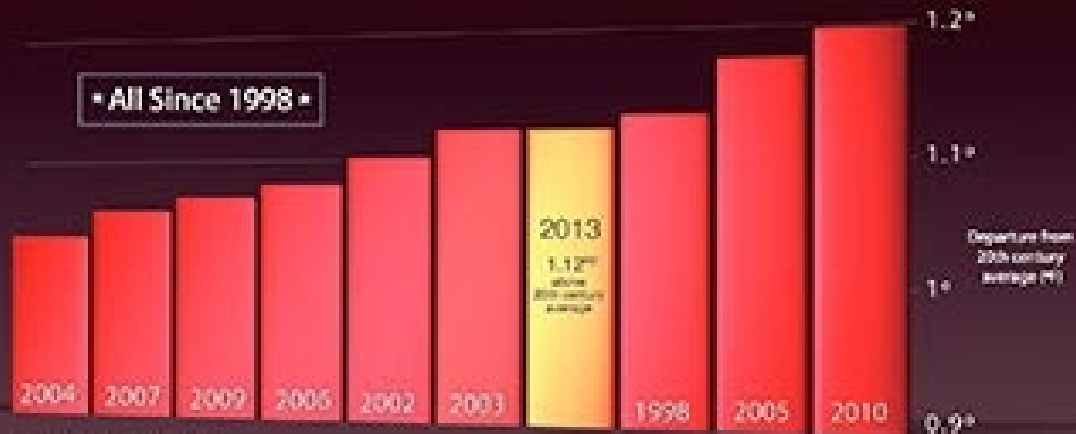
Perceived Need for New Pipeline Spurring Rush to Build



Source: Spectra Energy*

**Annotated by Skipping Stone – Greg Lander

10 WARMEST YEARS ON RECORD GLOBALLY

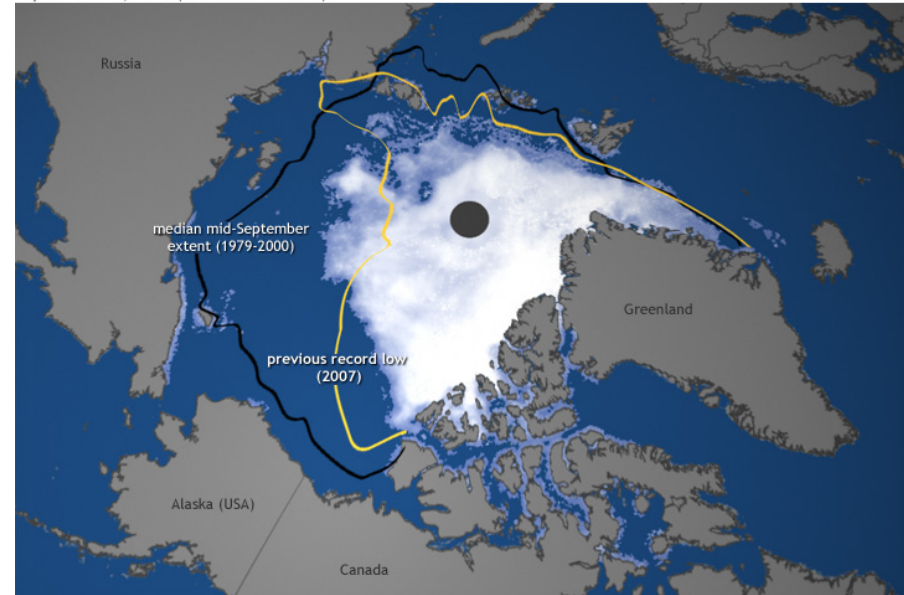


Source: NOAA/NCDC
Record since 1880

CLIMATE CENTRAL

Climate is the systemic crisis. It can't be ignored.

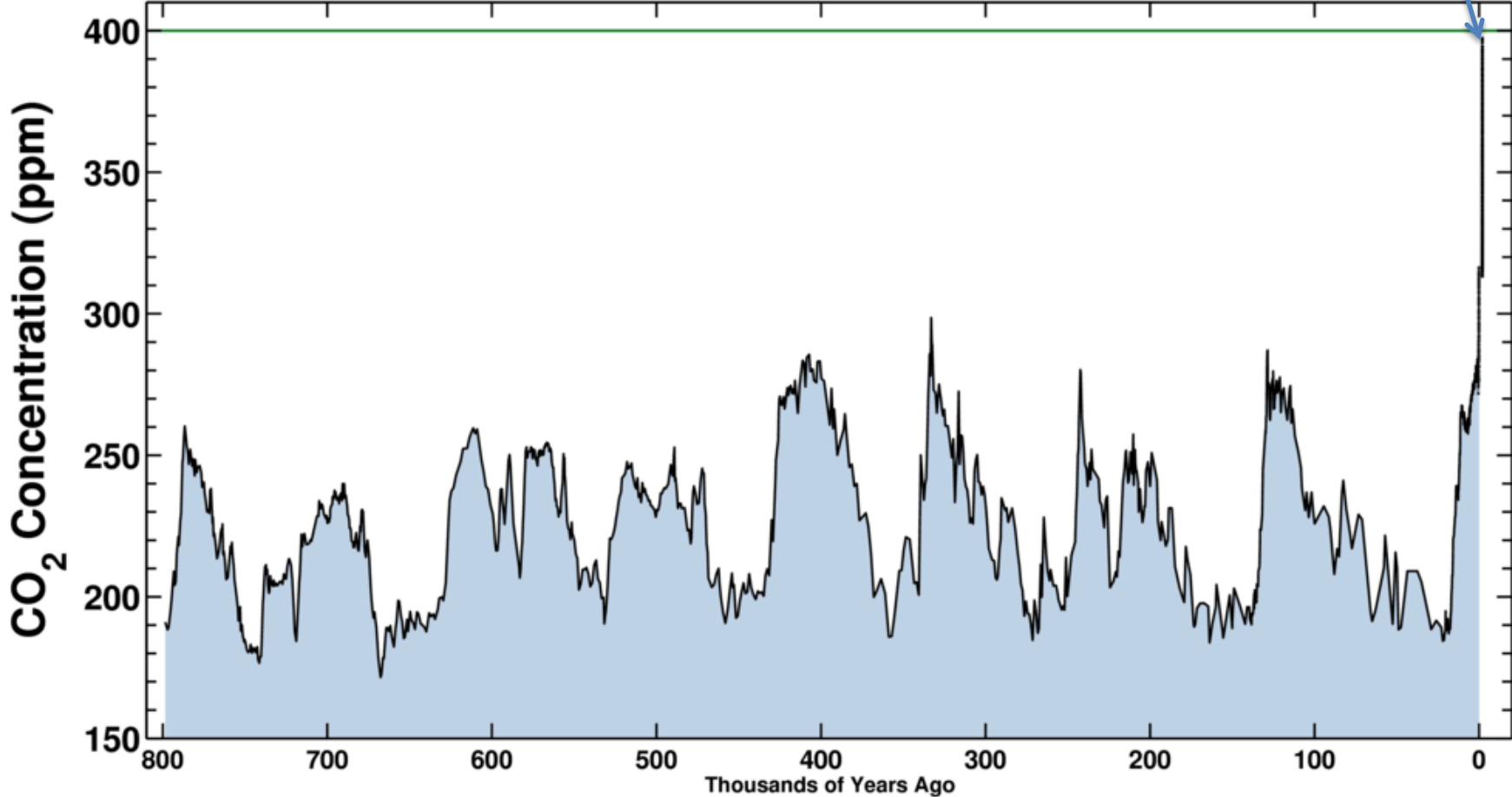
September 16, 2012 (summer minimum)



The Big Context: We are at 400 PPM of CO₂ for first time in millions of year. On trajectory to go even higher.

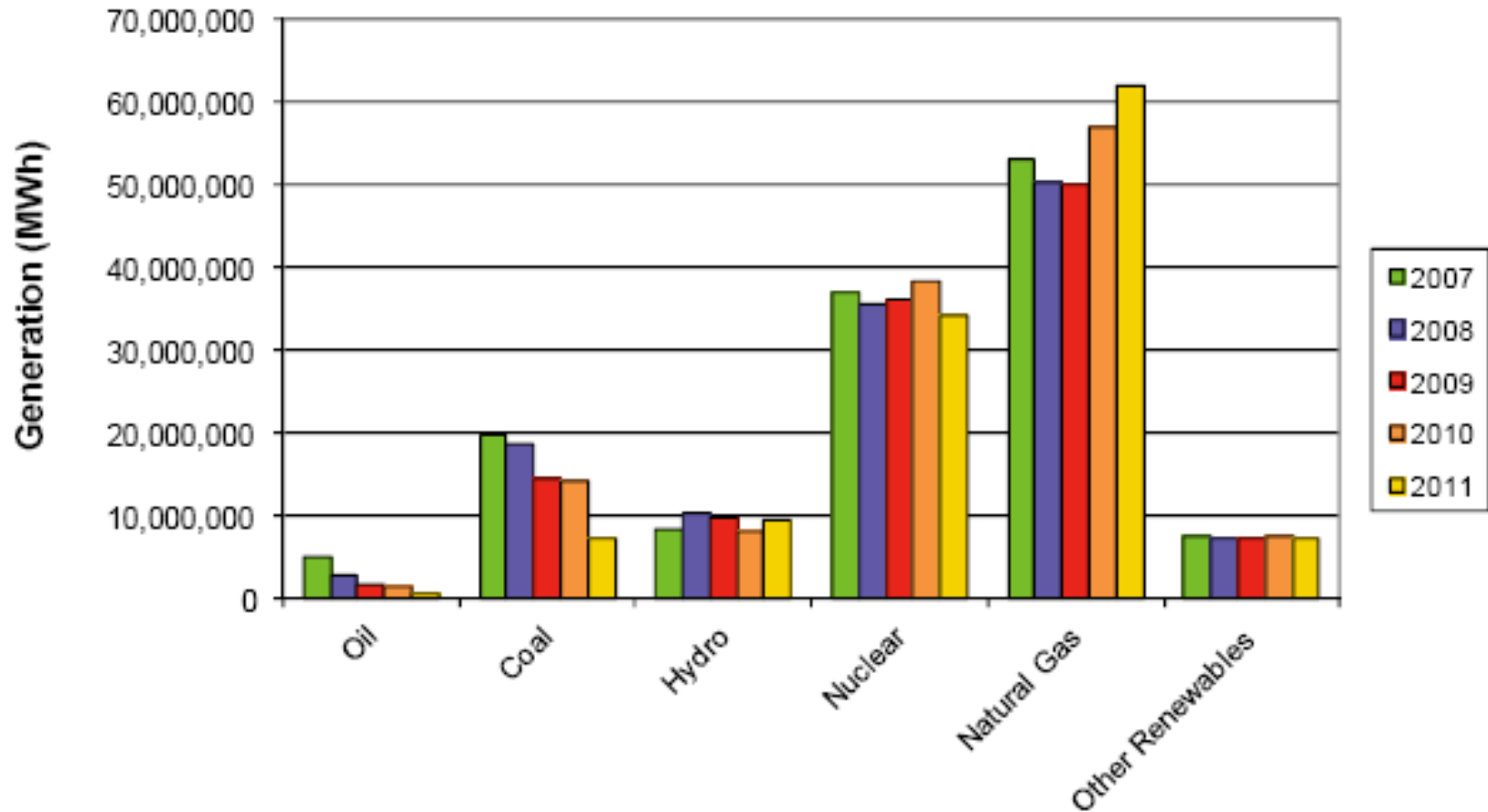
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Ice-core data before 1958. Mauna Loa data after 1958.



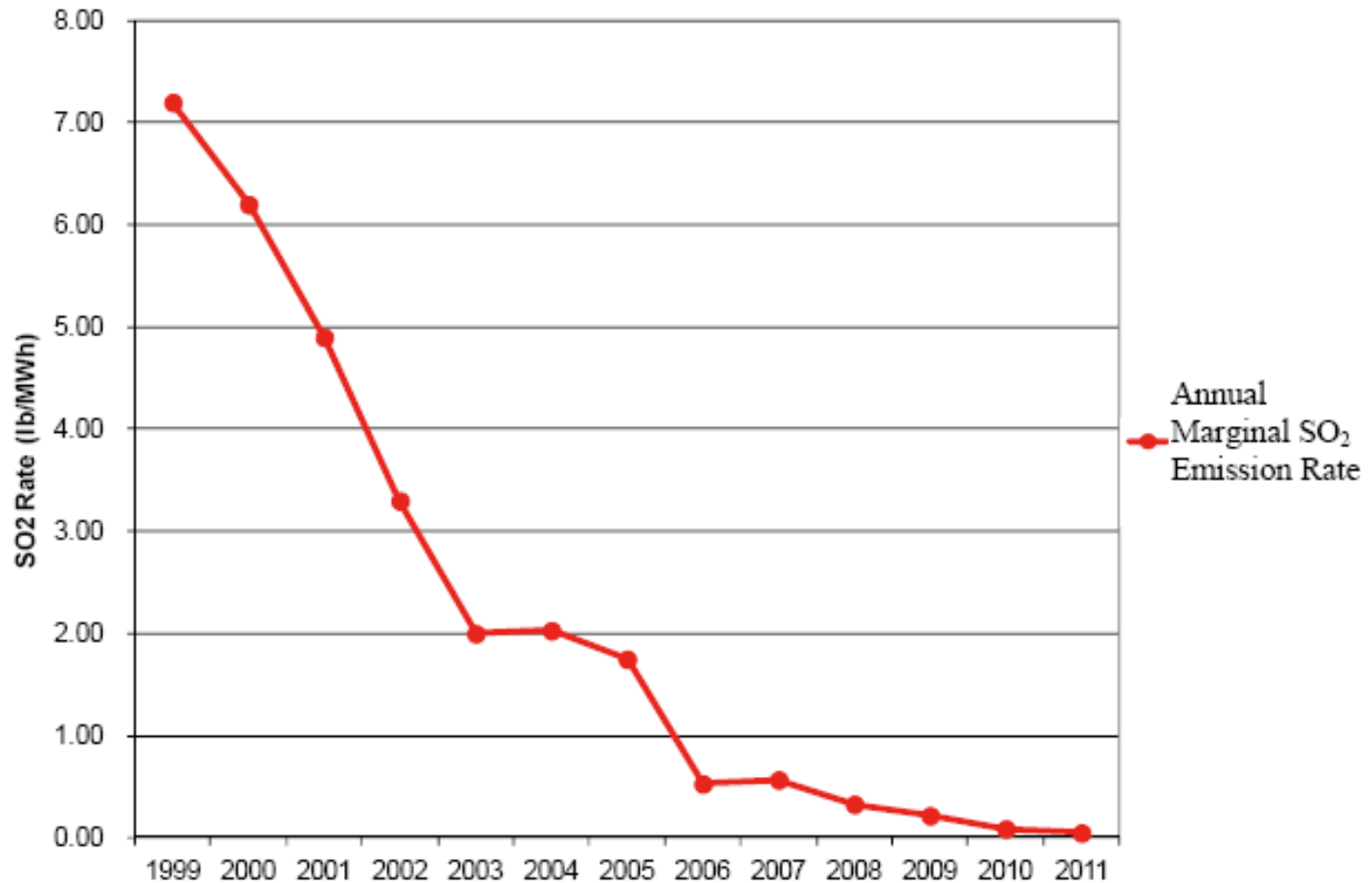
The Immediate Context: Gas has been replacing coal (and oil) in New England's generating mix

Figure 4.2 : 2007 - 2011 Generation by Selected Fuel Types



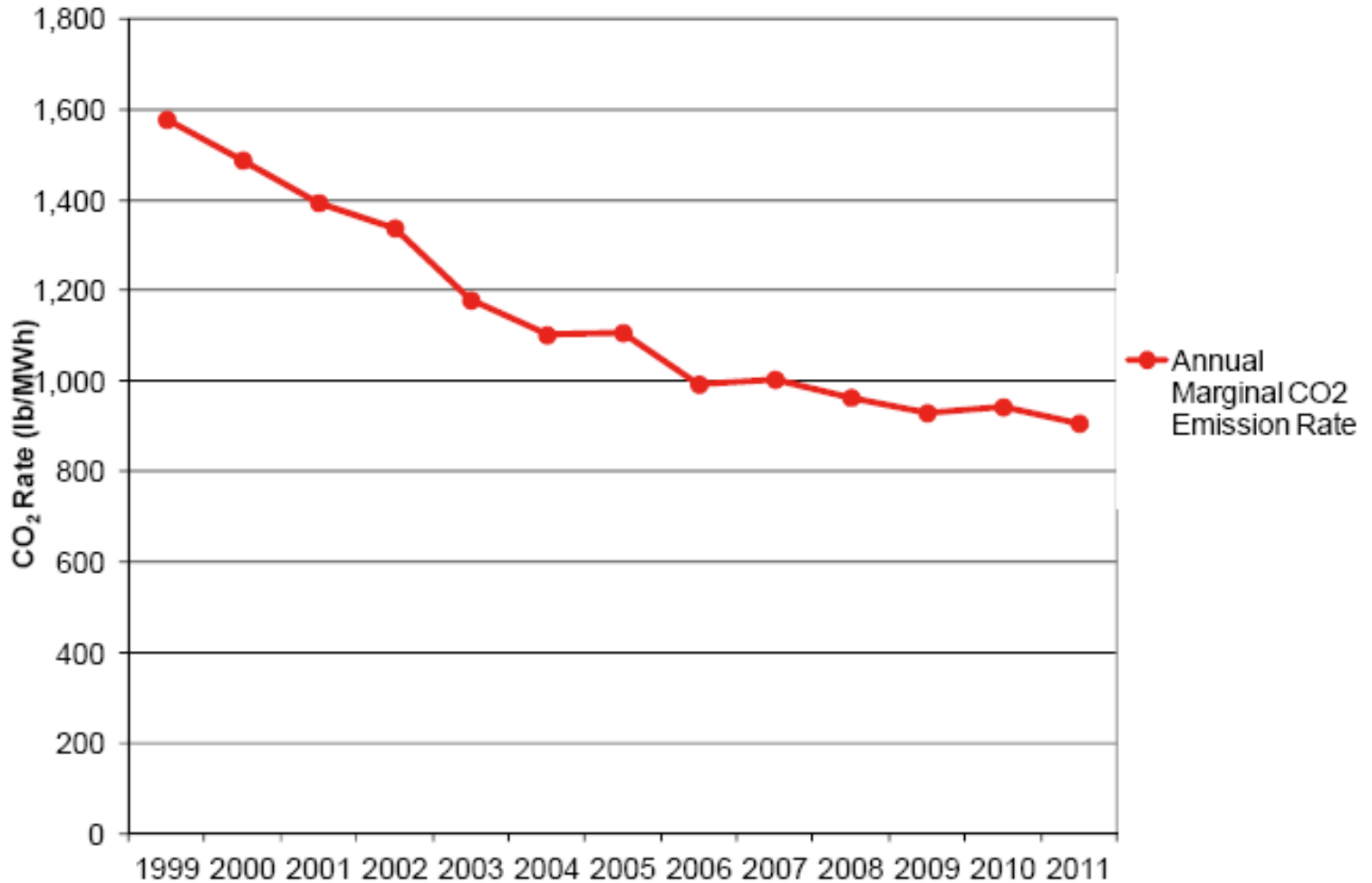
The emissions benefits of this shift have been very real in terms of the pollutants directly harmful to the public health

Figure 5.3: Historically Calculated New England SO₂ Marginal Emission Rates



Effect of shift to gas from coal and oil on CO₂ (key greenhouse gas) emissions real, but less dramatic

Figure 5.4: Historically Calculated New England CO₂ Marginal Emission Rates



Facing the Facts: There is a long-run collision between increased gas infrastructure and climate policies of states (and what science says is needed)

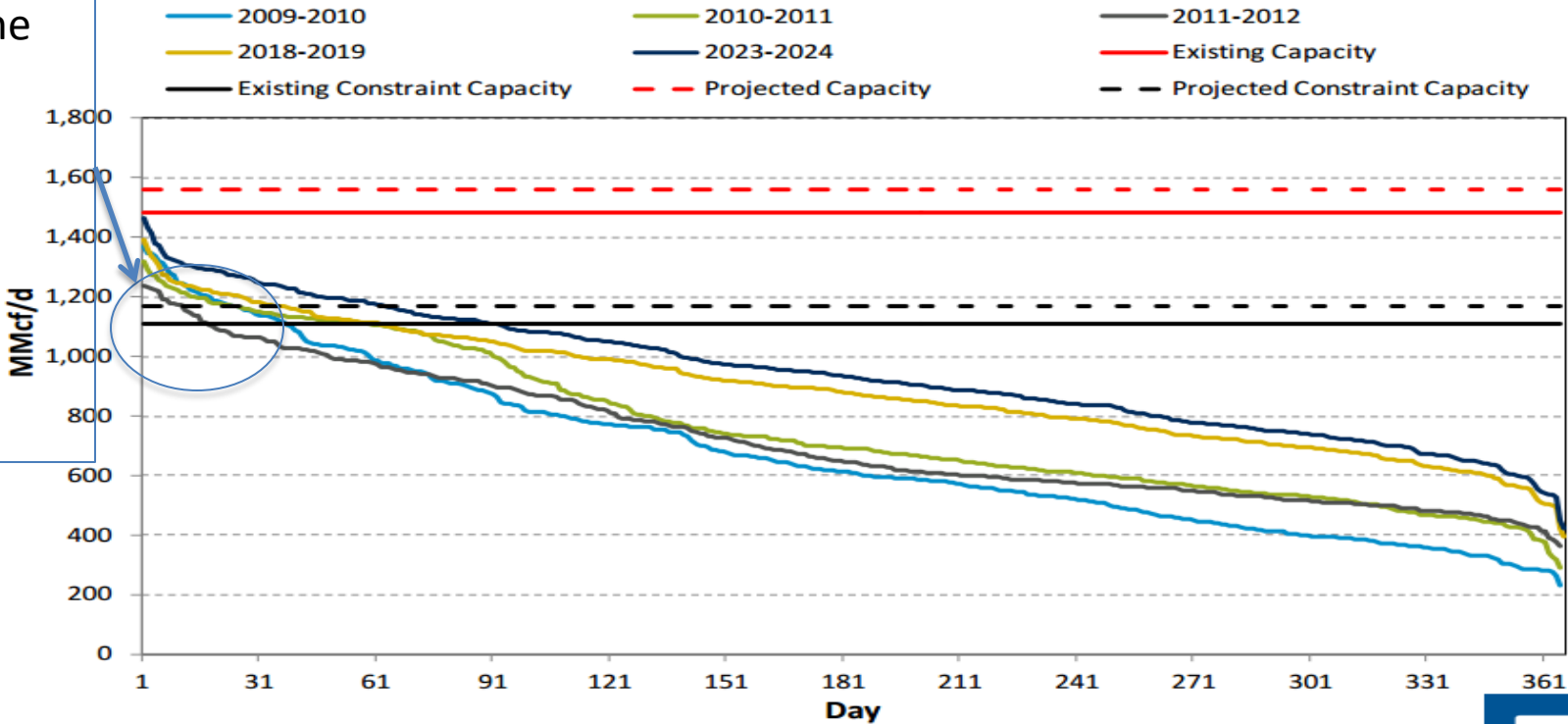
- “Substitution of gas for coal as an energy source results in increased rather than decreased global warming for many decades.” National Center for Atmospheric Research (2013)
- International Energy Agency sees 650 PPM of CO₂ in atmosphere under “Golden Age of Gas” scenario, effects would be catastrophic
- **Bottom Line: Substantial deployment of long-lived new base-load natural gas pipeline infrastructure is not consistent with 80% reduction in GHGs by 2050.**

Big Opportunities in both Short and Longer Term From Simply

Eastern Massachusetts Load Duration Curve

Historical and Projected Load Duration Curves Eastern Massachusetts

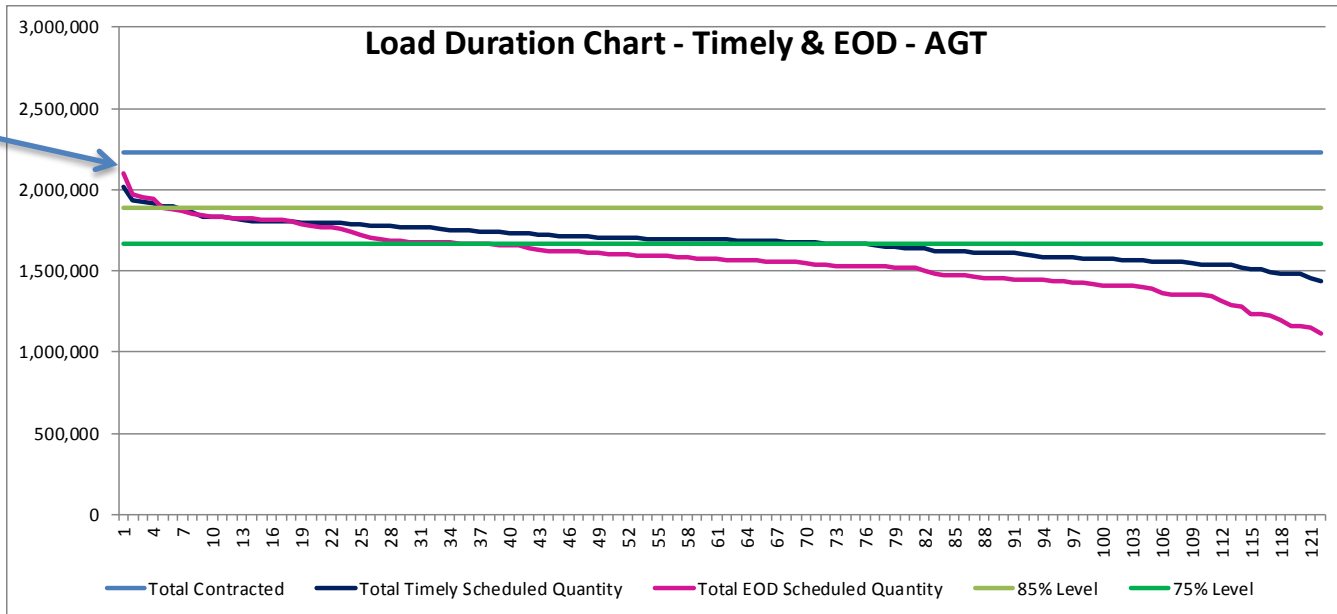
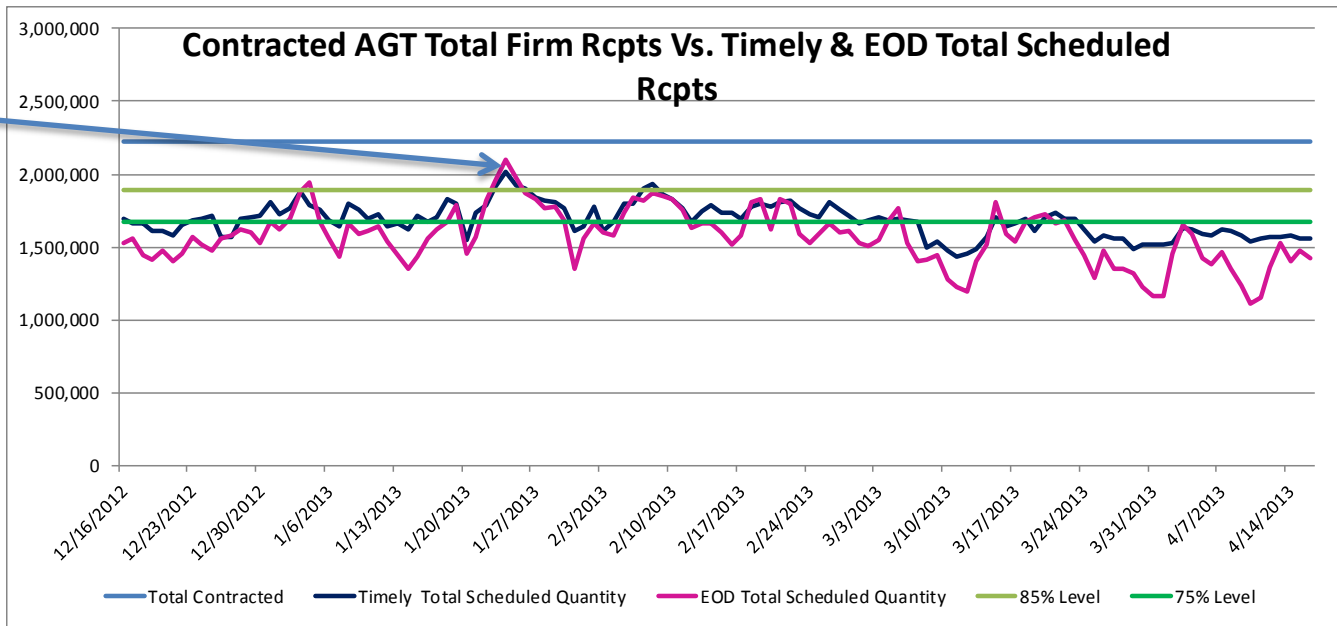
Current situation:
Pipeline truly "full" only a small part of the year



Source: Black & Veatch Analysis, Electronic Pipeline Bulletin Board



Even during the times of greatest stress on the system it is very rare for physical use of the pipelines to go over the 85% level when counting East to West in the mix



Longer Run Problem and Solutions

- **NESCOE has proposed for ISO-NE to use the electric tariff (totally unprecedented!) to pay for gas capacity to induce pipeline build and States are contemplating other unprecedented gas capacity purchase schemes**
- **The collateral effects of new pipeline build will be enormous and are not being considered**
 - **By design, the economic value of capacity once built is different than the build basis. Thus, if capacity holder is not market participant who can benefit (i.e., is without supply or market), it will get burned and only free riders will benefit.**
 - **Currently gas LDCs resell substantial capacity they buy in advance, new capacity will reduce – if not destroy - value of that capacity – LDC revenue loss will land in rates, another backdoor to cost to customers**
 - **ISO-NE is implicitly pushing against other dispatchable “fuel diversity” candidates like (in short term) LNG, Canadian hydro or (in longer term) storage that can replace retiring coal and balance variable renewables like wind and solar**

And All of this skips over other tools for reducing gas waste, maximizing use of existing infrastructure and avoiding unnecessary new pipeline building

- Efficiency:

- It appears that utilizing 1/3 of all residential gas heat efficiency potential in New England will save enough gas to run the gas-fired generators in the region in the winter at the very high levels those plants routinely run in the summer. When gas is both our heating fuel and primary fuel for power plants then insulating attics and installing efficient furnaces become electricity reliability efforts

- Gas Leaks:

- A systemic effort to reduce leaks in production and T & D systems is essential if we are going to appropriately reduce the impact of natural gas use on the climate and get full value from our societal investment in gas infrastructure
- We must focus sufficient capital investment on fixing leaks
- Changing (or ending) payments for “lost gas” is essential in order to align all incentives properly, all gas infrastructure developers, owners and operators must see leaks as cost