



# ***CT Roundtable on Climate & Jobs***



July 15, 2015

**To: Commissioner Robert Klee  
Chair of Governor's Council on Climate Change**

**Re: GHG Emissions Reduction Trajectories**

As a member of the Governor's Council on Climate Change (GC3), I would like to submit the attached document for consideration by the Council, as it prepares for discussions related to GHG emissions reduction trajectories and setting appropriate interim goals.

The document proposes an "equity curve" approach that features a consistent year-to-year percentage reduction over the next 35 years to achieve the 2050 reduction goal. This approach would involve deeper cuts in the early years, with enhanced benefits for climate protection and faster growth in the clean energy economy. It would also fulfill the Governor's charge to be bold and to achieve our goals faster.

I look forward to discussing these ideas more thoroughly with Council members, DEEP staff and NESCAUM staff in the coming months.

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## Connecticut's Climate Change Mitigation Goals: Charting a Course to 2050

In considering the greenhouse gas emissions reduction trajectory for reaching CT's 2050 goal (80% below the 2001 level), two logical boundaries define a sort of "feasibility zone". The lower boundary is the extension of the trend line for the period 2004-2012, a period of fairly rapid decline in the state's emissions. The resulting straight line has a slope of -1.35MMT/yr. At this rate of reduction, we would achieve the 2050 goal by the year 2034.

The upper boundary of the "feasibility zone" is a straight line connecting the 2012 emissions level with the 2050 emissions goal. This line has a slope of -0.80MMT/yr and represents the least-aggressive average trajectory capable of hitting the 2050 target. Any trajectory above this straight line would represent a policy of "starting off slow" and would require much more aggressive measures later to bend the curve back down to reach the 2050 goal. (These two boundary lines are shown in the attached graphic: "Connecticut GHG Reduction Trajectories.")

### Why is a straight-line emissions reduction trajectory problematic?

A straight-line trajectory, by definition, envisions the same volumetric (MMT) reduction in emissions each year. But that means increasingly higher proportional reductions from one year to the next. For example, 0.8MMT represents only 2.0% of the 2012 emissions (39.55MMT). But by 2040 (with a projected emissions total of 17.27MMT), 0.8MMT would represent a 4.6% reduction, and in 2049, we would face a nearly 8% reduction to reach the goal the following year. Thus, a straight-line trajectory imposes increasingly more significant cuts at the end of the timeline.

Another way to illustrate this feature of the straight-line trajectory is to note that the projected emissions level in 2030 (25.22MMT) would require a 36% reduction from the 2012 level (over a period of 18 years). But then looking ahead to 2050 from 2030, we would face a 63% reduction (from 25.22MMT to 9.31MMT) in the final 20 years. Thus, we are imposing a proportional reduction on the next generation nearly double what we are asking of ourselves.

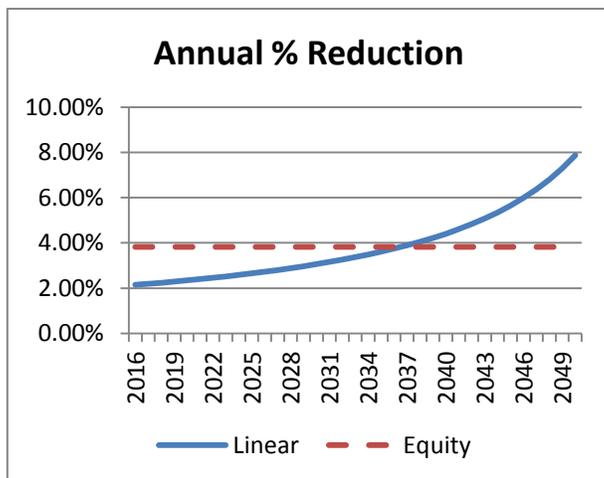
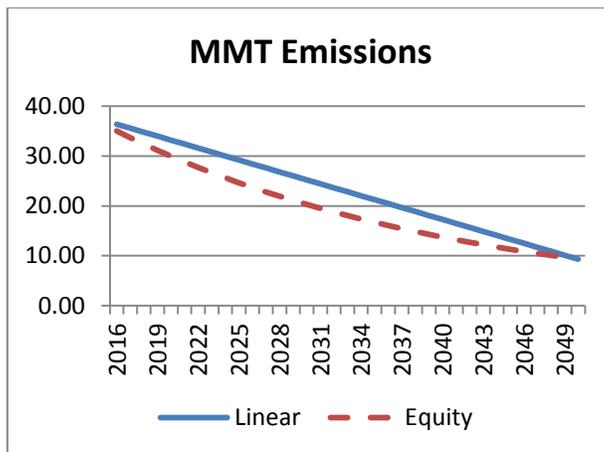
### The "Equity Curve"

A straight-line trajectory is defined by a constant annual volumetric reduction. Another approach is to define a consistent year-to-year percentage reduction that would require the same proportional reduction between the years 2021 and 2022 as between 2036 and 2037. That annual percentage is about 3.7%. And the percentage reduction for every ten-year period is also identical: 2022-2032 has the same reduction as 2040-2050 (32%).

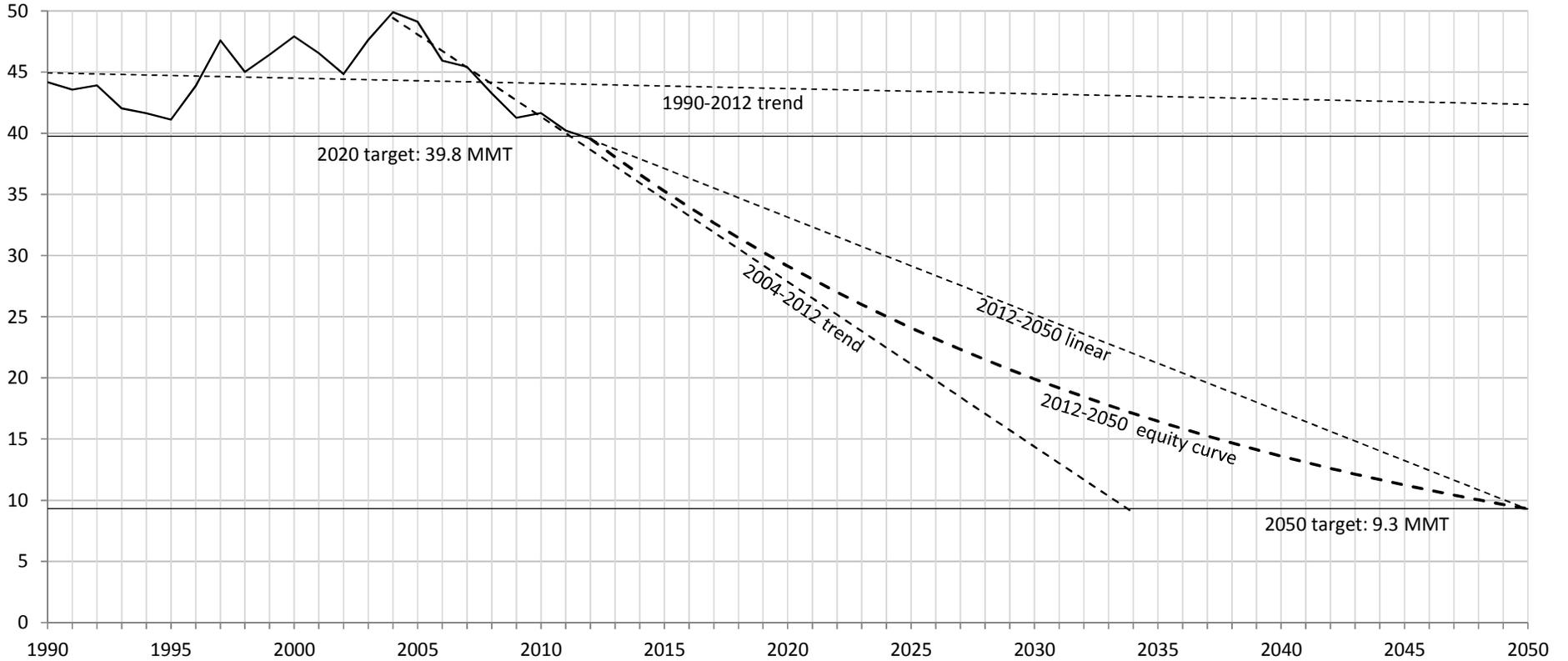
Mathematically, this approach generates a curve, with greater annual volumetric reductions in the early years, tapering off to much smaller volumetric reductions in the final years.

**The Risk:** The risk involved with a straight-line trajectory is that we will get to 2030 or 2040 having achieved the prescribed level of reductions but then look ahead at the rate of reductions required in the final one or two decades and decide that it's impossible to achieve the 2050 goal.

**The Benefits:** The deeper emissions cuts required in the early years by the Equity Curve will create more jobs in a rapidly expanding green economy, improve air quality and public health, and enhance the long-term impacts on climate change mitigation.



# Connecticut GHG Reduction Trajectories



## Important features

- A** The 2020 target is lax and has already been met. But reduction since 1990 has been slow, and the 1990-2012 trend will not hit the 2050 target.
- B** Reduction since 2004 has been rapid, however. The 2004-2012 trend will hit the 2050 target by 2034.
- C** The linear trajectory between 2012 and 2050 represents the least-aggressive average trajectory capable of hitting the 2050 target. For a credible course to the 2050 target, interim targets for the period 2025-2045 must be below this line.
- D** Crucially, however, the linear trajectory for 2012-2050 (representing an annual reduction of 0.80 MMT) has an insidious feature: it imposes sharply increasing year-to-year percentage reductions, starting at 2% but culminating in a reduction of nearly 8% from 2049 to 2050.
- E** The stable year-to-year reduction necessary to avoid this problem is 3.74%. The 2012-2050 "equity curve" is based on this reduction.
- F** The "equity curve" also offers important benefits for job creation, green economic growth, air quality, public health, and climate change mitigation.