What do scientists do with the models?

Source: https://www.flickr.com/photos/climatesafety/4111829103/
Which Target?

Emissions

Concentrations

Temperature

1 Trillion Tonnes of Carbon

350 ppm CO$_2$e

No more than +2ºC

No more than +1.5ºC

Emissions by Sector

Source: UN Guide to Climate Neutrality

All data is for 2000. All calculations are based on CO₂ equivalents, using 100-year global warming potentials from the IPCC (1996), based on a total global estimate of 41 755 MtCO₂ equivalent. Land use change includes both emissions and absorptions. Dotted lines represent flows of less than 0.1% percent of total GHG emissions.
Where do GHG emissions come from?

Source: http://www3.epa.gov/climatechange/ghgemissions/global.html
Stabilization Wedges

Billions of Tons Carbon Emitted per Year

Current path = “ramp”

Historical emissions

Flat path

Toward Tripling CO₂

Avoid Doubling CO₂

Source: http://cmi.princeton.edu/wedges/intro.php
8 wedges are needed to build the stabilization triangle.

1 wedge avoids 1 billion tons of carbon emissions per year by 2055.

Source: http://cmi.princeton.edu/wedges/intro.php
Each Wedge

...is a strategy to reduce carbon emissions
  It starts small
    Grows in 50 years to 1.0 GtC/yr.
Each wedge must have already been commercialized at scale somewhere.

Source: http://cmi.princeton.edu/wedges/intro.php
Delay makes the problem harder:

Source: http://www.climatecentral.org/blogs/wedges-reaffirmed
Reanalysis of the Wedges

Reanalysis of the Wedges

END-USER EFFICIENCY AND CONSERVATION

1. Increase the efficiency of two billion cars from 30 to 60 mpg.

2. Drive two billion cars on ethanol, using one sixth of world cropland.

3. Cut electricity use in homes, offices, and stores by 25 percent.

4. Raise efficiency at 1,500 large coal-fired plants from 40 to 60 percent.

5. Replace 1,400 large coal-fired plants with gas-fired plants.

6. Install CCS at 800 large coal-fired power plants.

7. Install CCS at coal-to-syngas plants.

8. Install CCS at coals-to-gas plants.

9. Increase wind power output by 10-fold.

10. Increase wind power to displace coal.

11. Increase solar power by 70-fold.

12. Increase solar power to displace coal.

13. Stop all deforestation.

14. Increase bio-energy to 100 percent of cropland.

15. Increase bio-energy to 100 percent of cropland.

Source: www.thewashingtonnote.com