Green House Gas (Boise)

Location **Idaho**
https://www.genclassifieds.com/x-720803-z

Obama want to do something about green house gas. http://www.foxnews.com/politics/2010/11/24/military-pegs-hourly-air-force-cost-g-obama-sets-travel-record.html Heating the fuel-air mixture
Burning a fuel-air mixture will add thermal energy to it, about 43 MJ for every kilogram of kerosene (if we assume complete combustion). The isobaric heat capacity or specific heat of air (close enough, the mixture has very little fuel but lots of air in it) is 29 J per mol and per K, so those 43 MJ will heat 1000 mol of air by 1483 K. The heat capacity changes slightly with humidity and temperature, but litte enough that we can consider it constant for this purpose. If the air starts at 220 K, precompression in the intake will heat it to approx. 232 K, further compression in the engine will heat it up to approx. 600 K if we assume a compression ratio of 25, and this is the temperature at the entry of the combustion chamber.

Those 1000 mol of air weigh about 29 kg, and adding a full kilo of fuel and burning the mixture will heat it to 2083 K. If you want more details about the parameters in a typical jet engine, please see the diagram in this answer. Since the mixture picks up speed as it burns, the fuel mass is also heated and combustion is never complete, the maximum temperature given here will not be reached in reality.

If we start on the ground with an air temperature of 290 K, the temperature in the intake would drop slightly because we will not be flying fast enough for any precompression to happen in the intake. Now the compressor will heat the air to 730 K, and again adding and burning that kilo of kerosene will heat 1000 mol of air to 2213 K. Ideally.

In reality, the engine control will see that the limit temperatures are not exceeded, but here we can play with numbers as well. The exact values will certainly be slightly different (more frictional heating in the compressor, heat loss to the outside, slight drift in specific heat with temperature), but the gist of the explanation is correct. Within only four stages, the air

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