“We need to be much smarter in terms of building buildings and how we use energy, and as a consequence, we are going to save money for consumers and deal with issues like climate change that have an enormous economic and health impact on Americans as a whole”

“there’s a lot of low-hanging fruit”

President Barack Obama, 30 April 2015
Remarks before signing the Energy Efficiency Improvement Act of 2015
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ARCHITECTURAL SCALE

URBAN SCALE
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SOURCES OF ANTHROPOGENIC WASTE HEAT IN NEW YORK CITY

BUILDING HEATING, VENTILATION AND COOLING SYSTEM

WATER TREATMENT PLANTS

OTHER BUILDING MECHANICAL SYSTEMS (NON-HVAC)

ELECTRIC POWER GENERATION STATIONS AND SUBSTATIONS

DOMESTIC HOT WATER

SUB-SURFACE TRANSPORTATION

GROUND LEVEL TRANSPORTATION

INDUSTRIAL PROCESS HEAT
SOURCES OF NATURAL HEAT IN NEW YORK CITY

HEAT STORED IN WATER BODIES

HEAT STORED IN SOIL AND ROCK

DIRECT SOLAR RADIATION
DEVELOPING A METHOD TO ESTIMATE SECONDARY HEAT IN NEW YORK CITY

1. [ANNUAL INCIDENT SOLAR RADIATION] + 2. [BUILDING ENERGY CONSUMPTION] = 3. NEW YORK CITY HEAT MAP