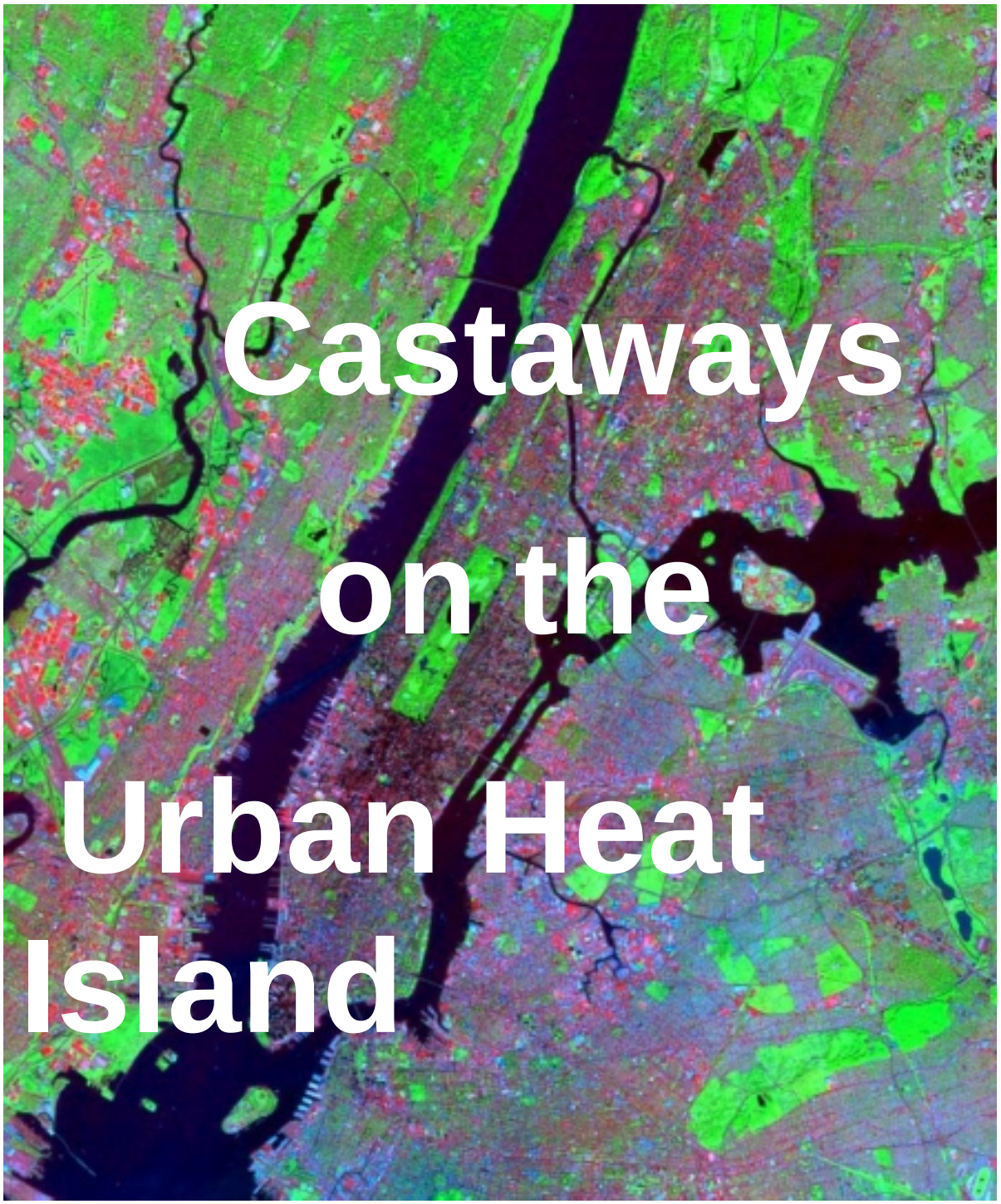


Castaways on the Urban Heat Island

Presented to the North American Urban Heat Island Summit

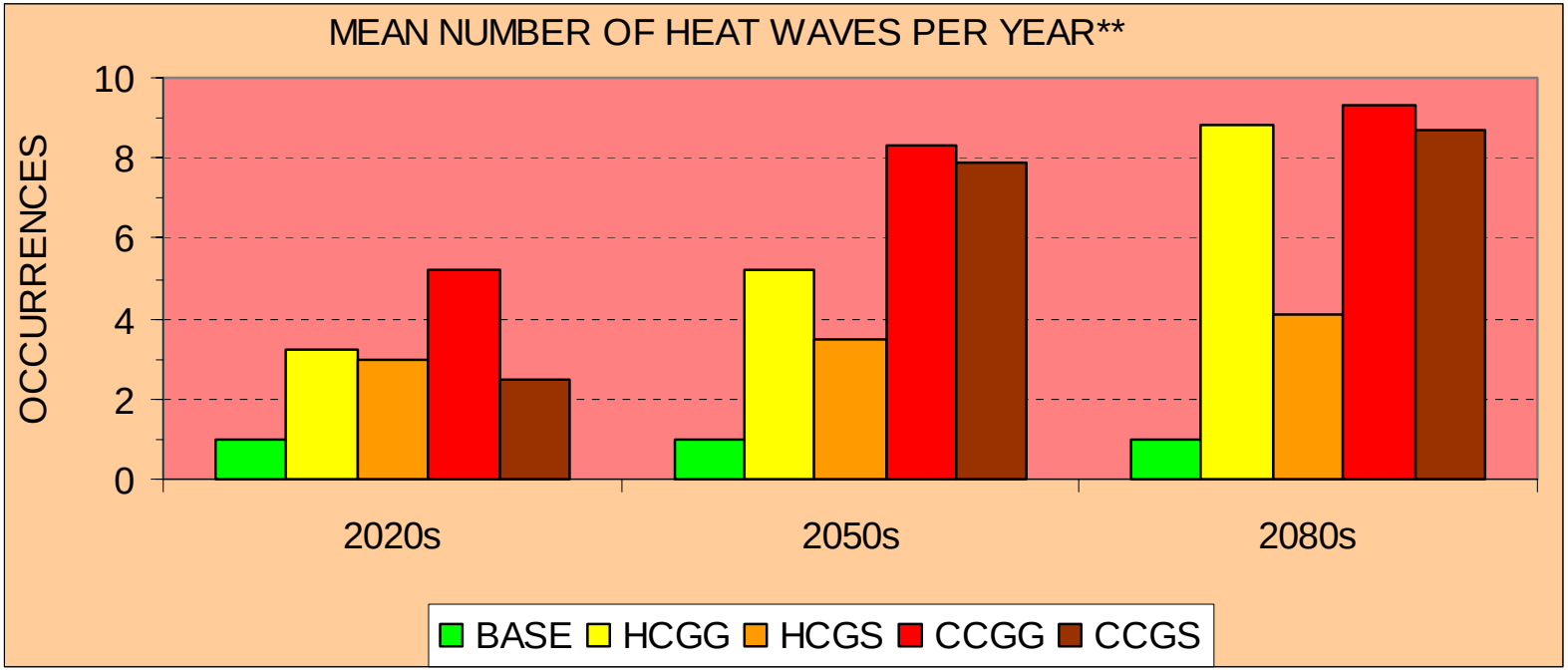
Toronto

May 2, 2002

Douglas Hill

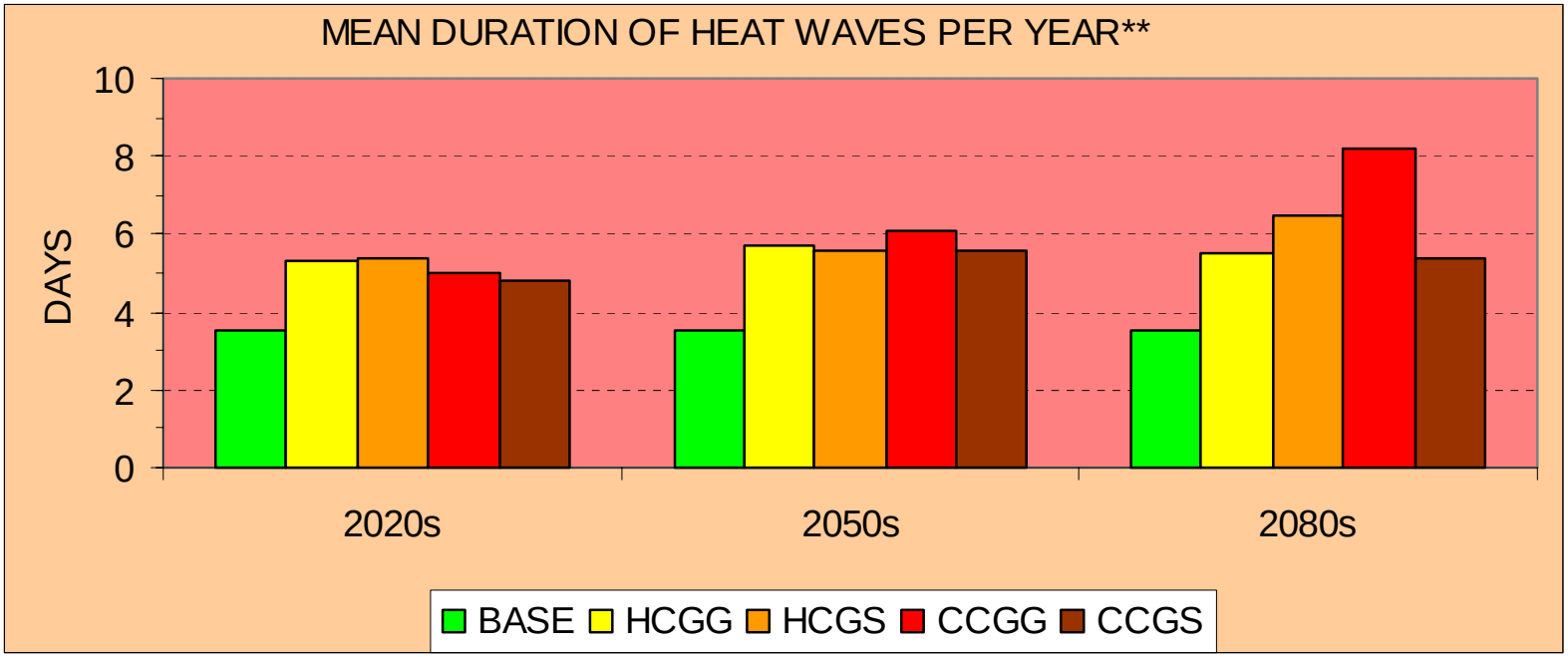
Regional Plan Association

Projected Number of Heat Waves



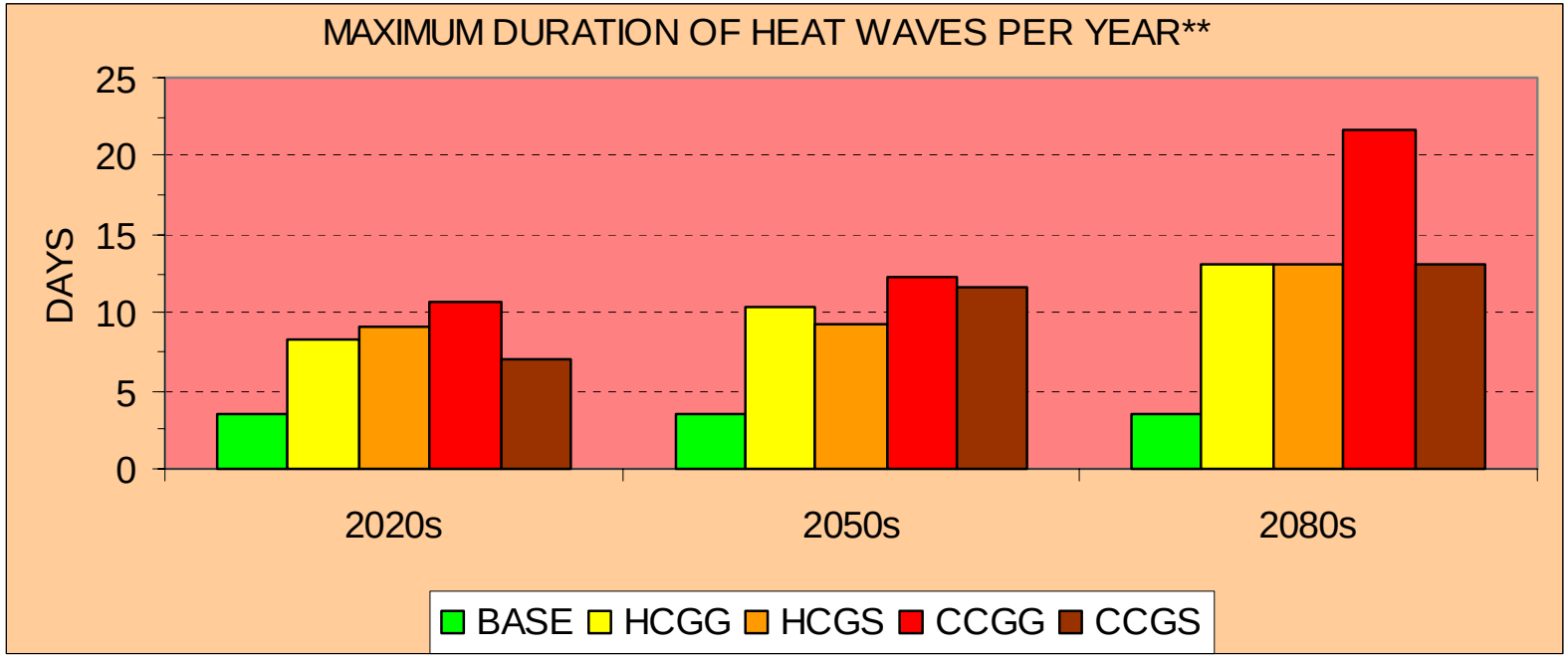
Source: Source: R. Goldberg, Center for Climate Systems Research, Columbia University, 2001.

Mean Duration of Heat Waves



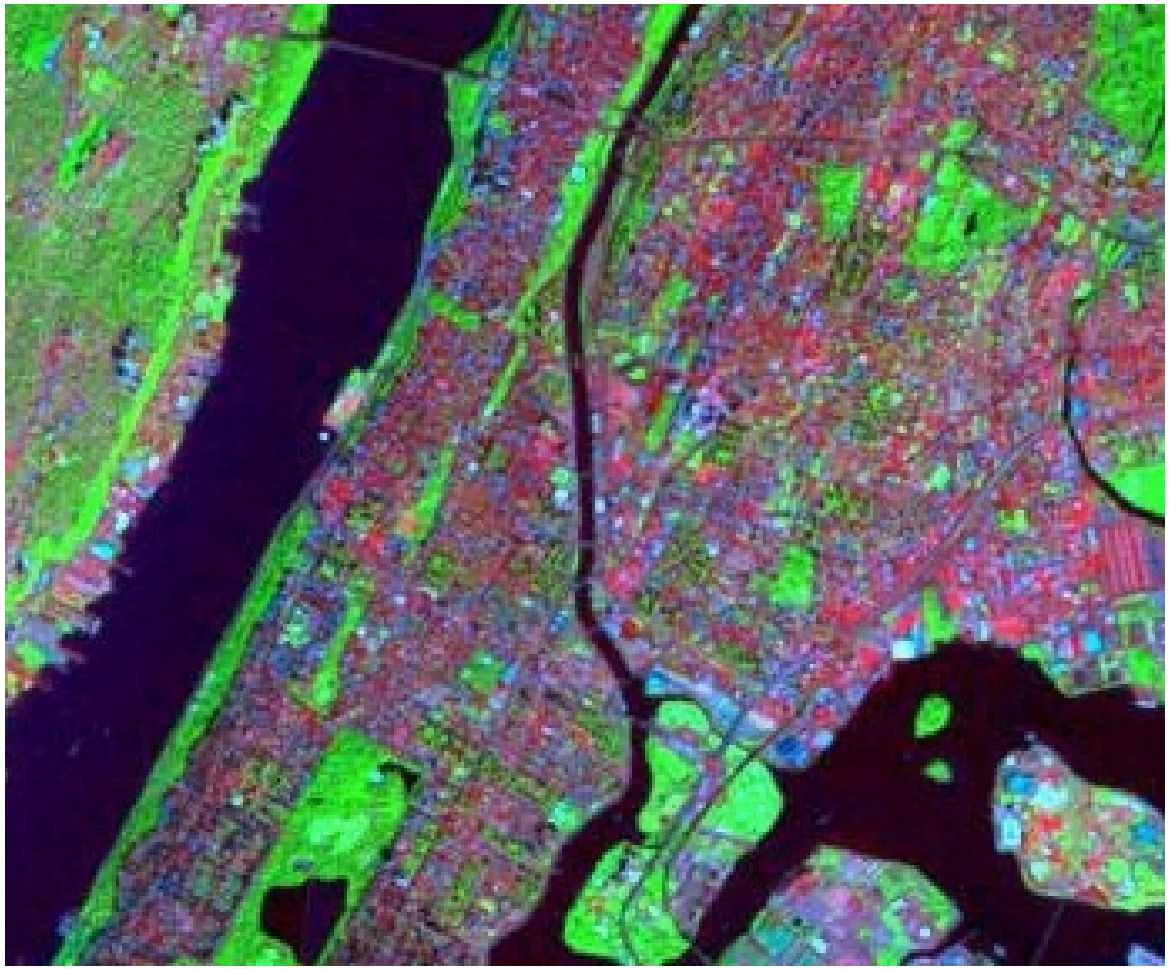
Source: Source: R. Goldberg, Center for Climate Systems Research, Columbia University, 2001.

Maximum Duration of Heat Waves



Source: Source: R. Goldberg, Center for Climate Systems Research, Columbia University, 2001.

Local Temperature Variations



Source: C. Small, Lamont-Doherty Earth Laboratory, 2002

Castaways on the Urban Heat Island

- Old
- Infirm
- Poor
- Isolated
- Substandard housing
- Inner city

Fatal Housing Conditions

“Other” multi-unit building	**8.1 to 1**
Top floor	**4.7 to 1**
1 or 2 rooms	**3.4 to 1**
3 or 4 rooms	**2.8 to 1**
Apartment building	**2.5 to 1**
Lived alone	**2.3 to 1**
Flat roof	**2.0 to 1**
5 or 6 rooms	**1.6 to 1**

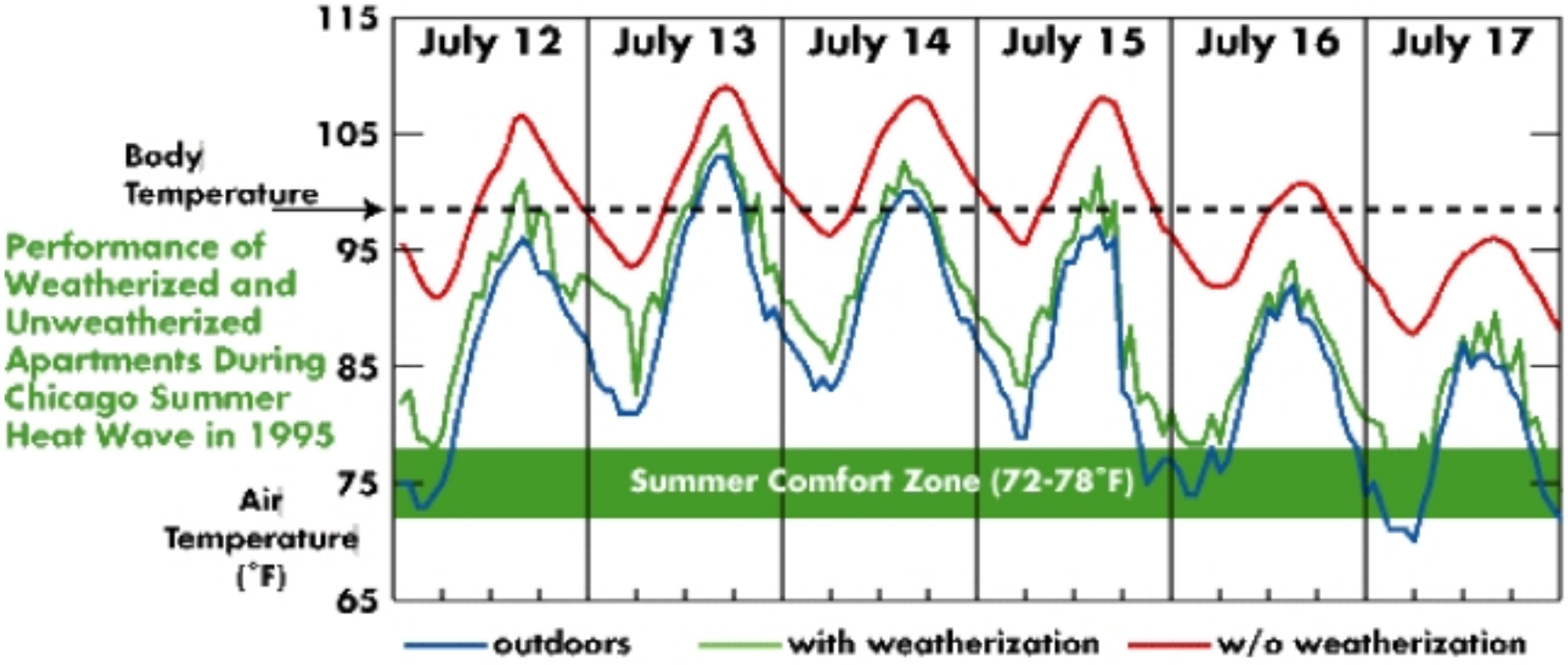
Source: J.C. Semenza et al. 1996

Decreased Risk of Death

Visited cooling shelters	0.5 to 1
Visited other air-cooled spaces	0.3 to 1
Air-conditioner in home	0.2 to 1
Access to air-conditioned lobby	0.2 to 1

Source: J.C. Semenza et al. 1996

Top-floor Temperatures



Source: J. Huang, LBL, 1996

Weatherization Assistance Program

New York State:

- Since 1976, 400,000 homes weatherized
- Cost per unit: $2,500 to $4,000
- 1.5 million eligible units
- Current rate: 10,000 units per year
- Backlog: 150 years

Typical Weatherization Measures

- Weatherstripping and caulking
- Clean, test, repair or replace heating system
- Storm windows
- Replace or repair broken windows and doors
- Insulation in walls and ceilings
- Minor repairs to ensure weatherization services

DOE Mission Statement

***To reduce heating and cooling costs* for low-income families, particularly the elderly, people with disabilities and children, by improving the energy efficiency of their homes and ensuring their health and safety.**

Authorizing Legislation

“...In various climatic, structural, and human need settings… *to achieve a balance* of a healthful dwelling environment and maximum practicable energy conservation.”

U.S. Code, Title 42, Chapter 81, Subchapter III, Sec. 6863(b)(2)(A)

NYC Case Study Objective

To demonstrate and justify

changes in weatherization needed

to add summer cooling measures

to present steps

to reduce winter heating costs

NYC Case Study Procedure

- **Identify hot spots**
- **Identify typical multi-unit buildings at risk**
- **Identify candidate cooling measures**
- **Evaluate cooling measures for each type of housing**
- **Rank measures by cost and cost-effectiveness**
- **Justify summer cooling by cost-benefit**

Candidate Cooling Measures

- **Ventilation**
- **Ventilation fans**
- **Circulation fans (?)**
- **Light-colored roof**
- **Low-emissivity windows**
- **Passive cooling: shading, etc.**
- **Access to air conditioning**

Weatherization Chronology

1976 WAP created: emergency & temporary measures

1980 More cost-effective & permanent measures

1984 Space & water heating improvements

1985 Furnace and boiler replacements

1990 Implementation of advanced audits

1994 Cooling efficiency measures in warm climates

1999 *Emergency relief funds including fans and A/Cs*

2000 Advanced energy audits nationwide

To Justify Summer Cooling

- **Unlike previous extensions of the scope of the Weatherization Assistance Program, summer cooling will add to energy costs**
- **Must be justified because it will save lives.**