2030 Challenge & Zero Energy Buildings

Ashley McGraw Architects, P.C.

September 2008

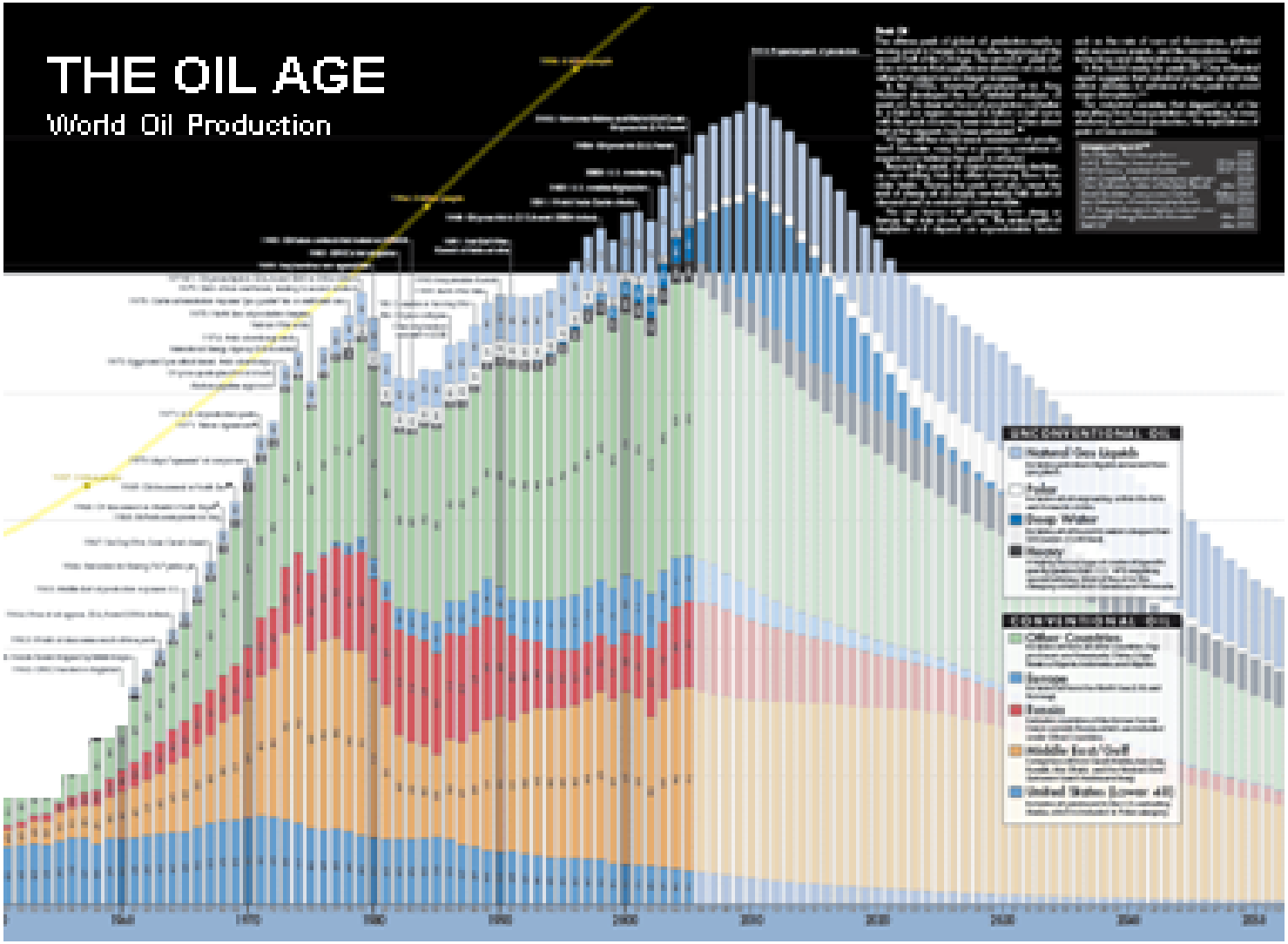
2030 & Zero Energy Buildings

Presented by:

david ashley, AIA, LEED AP

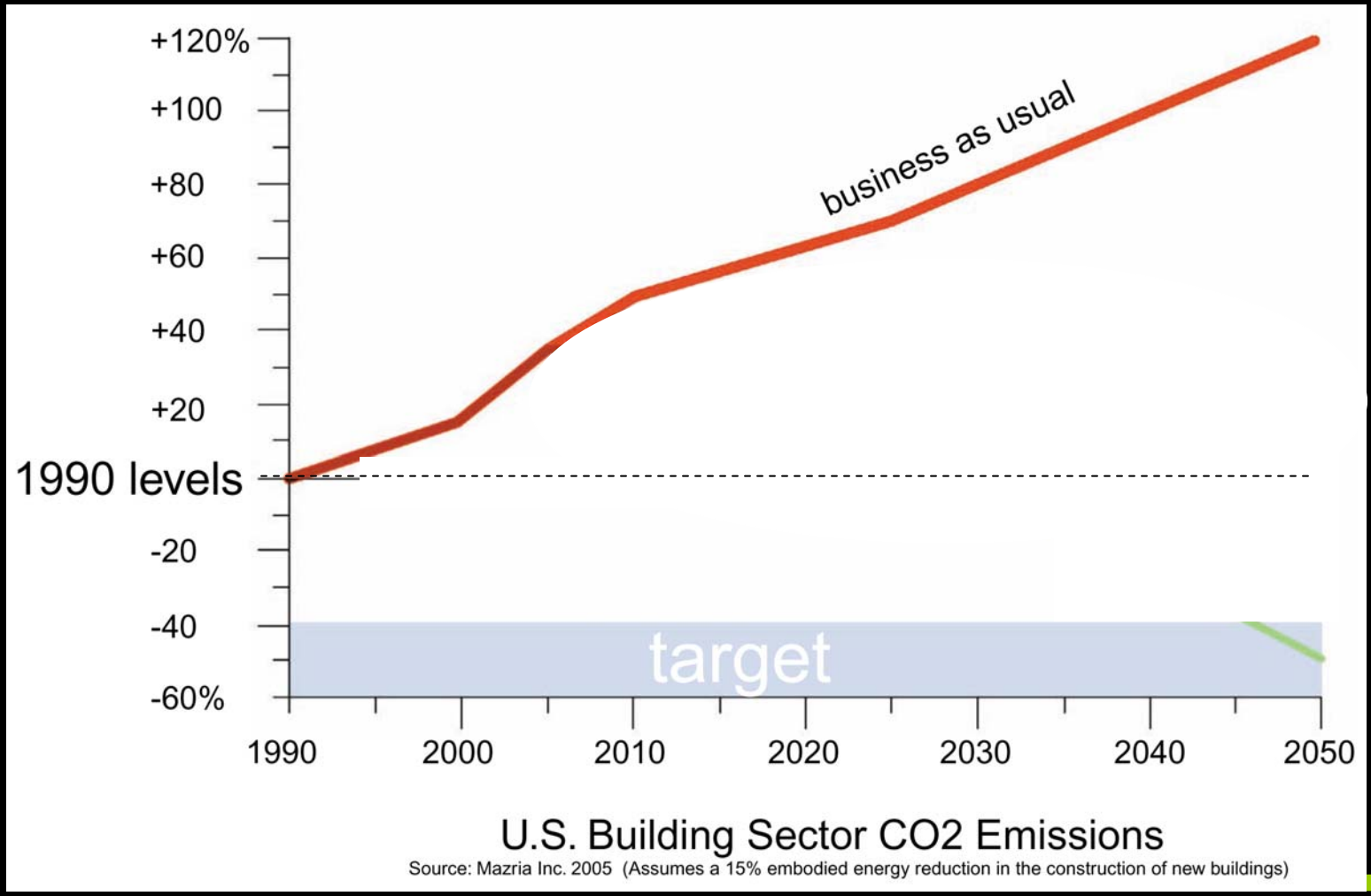
Director of Healthy & High Performance Design

Ashley McGraw Architects



ASHLEY McGRAW

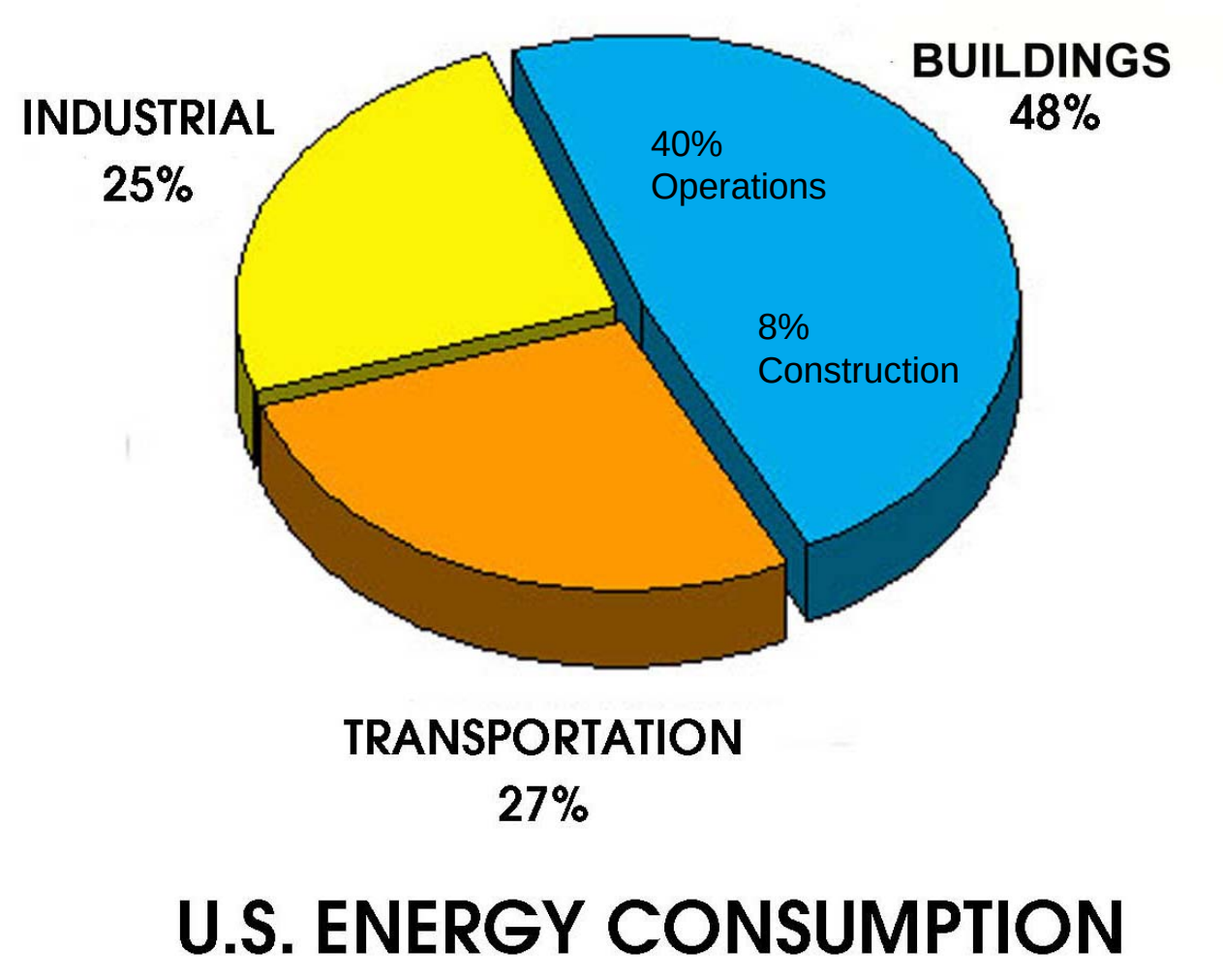
The BIG Picture – Climate Change



Source: Energy Information Administration Statistics (Architecture 2030)

ASHLEY McGRAW

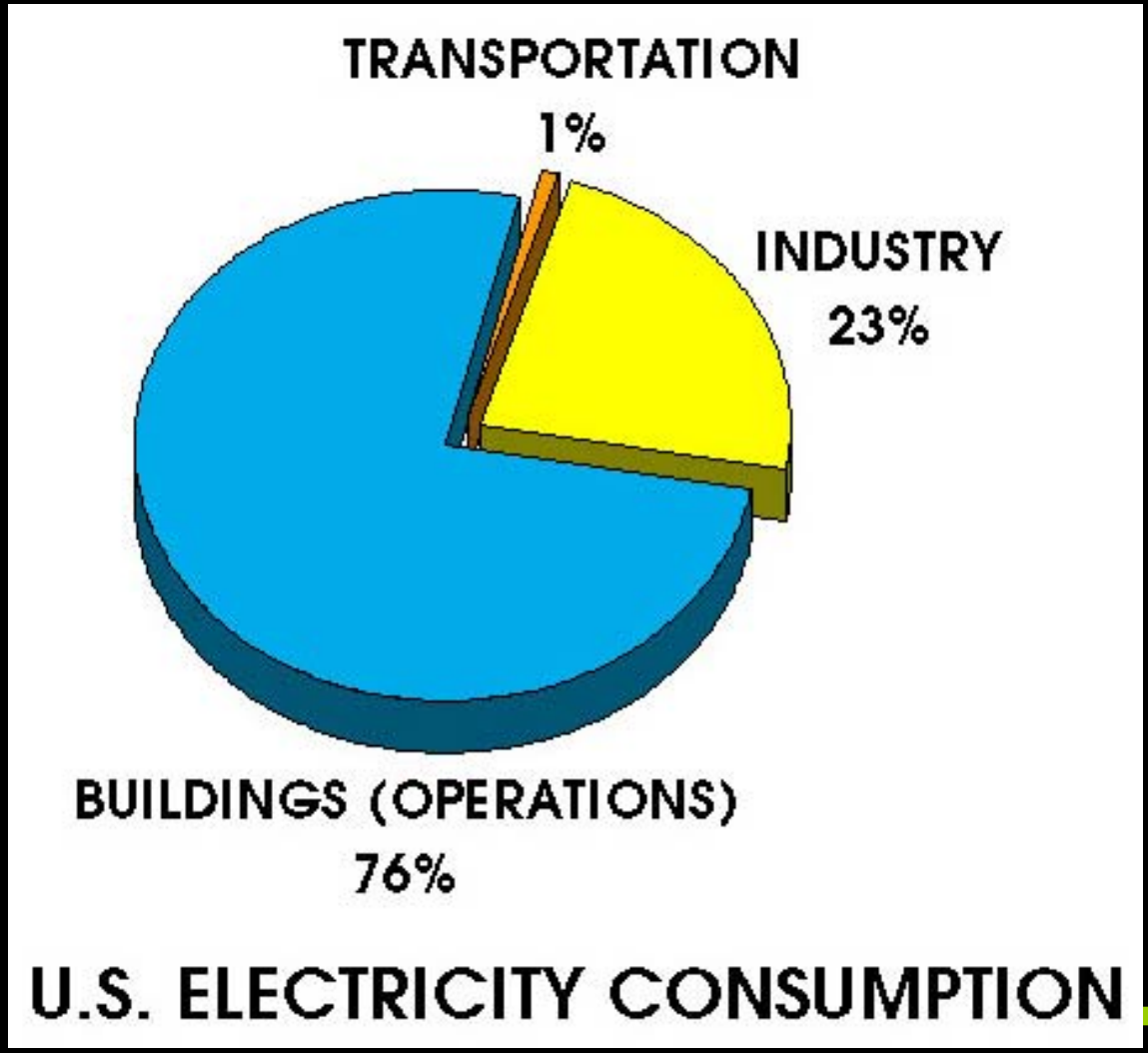
The BIG Picture – Buildings Matter



Source: Energy Information Administration Statistics (Architecture 2030)

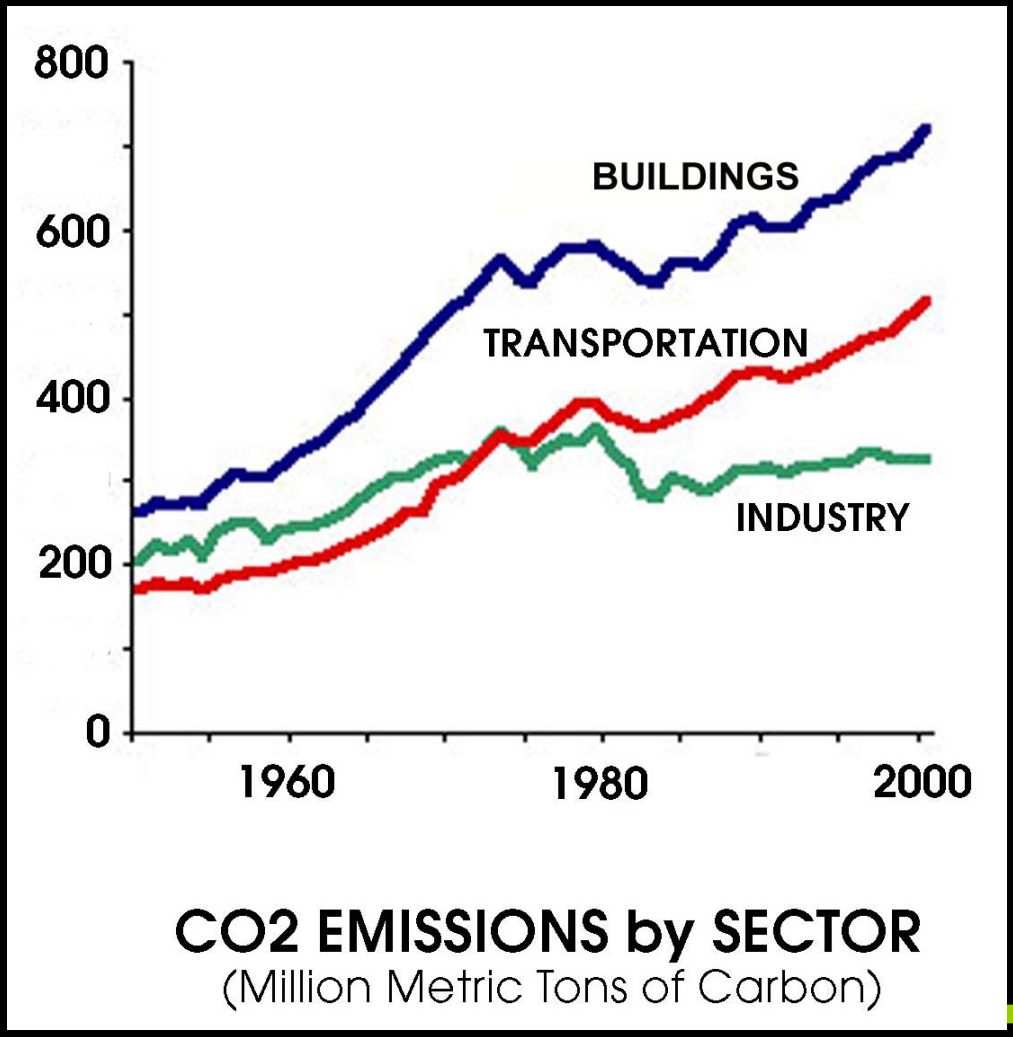
ASHLEY McGRAW

The BIG Picture – Buildings Matter



Source: Energy Information Administration Statistics (Architecture 2030)

The BIG Picture – Buildings Matter



1.5 – 2% increase/year

Source: Energy Information Administration Statistics (Architecture 2030)

ASHLEY McGRAW

The 2030 Challenge

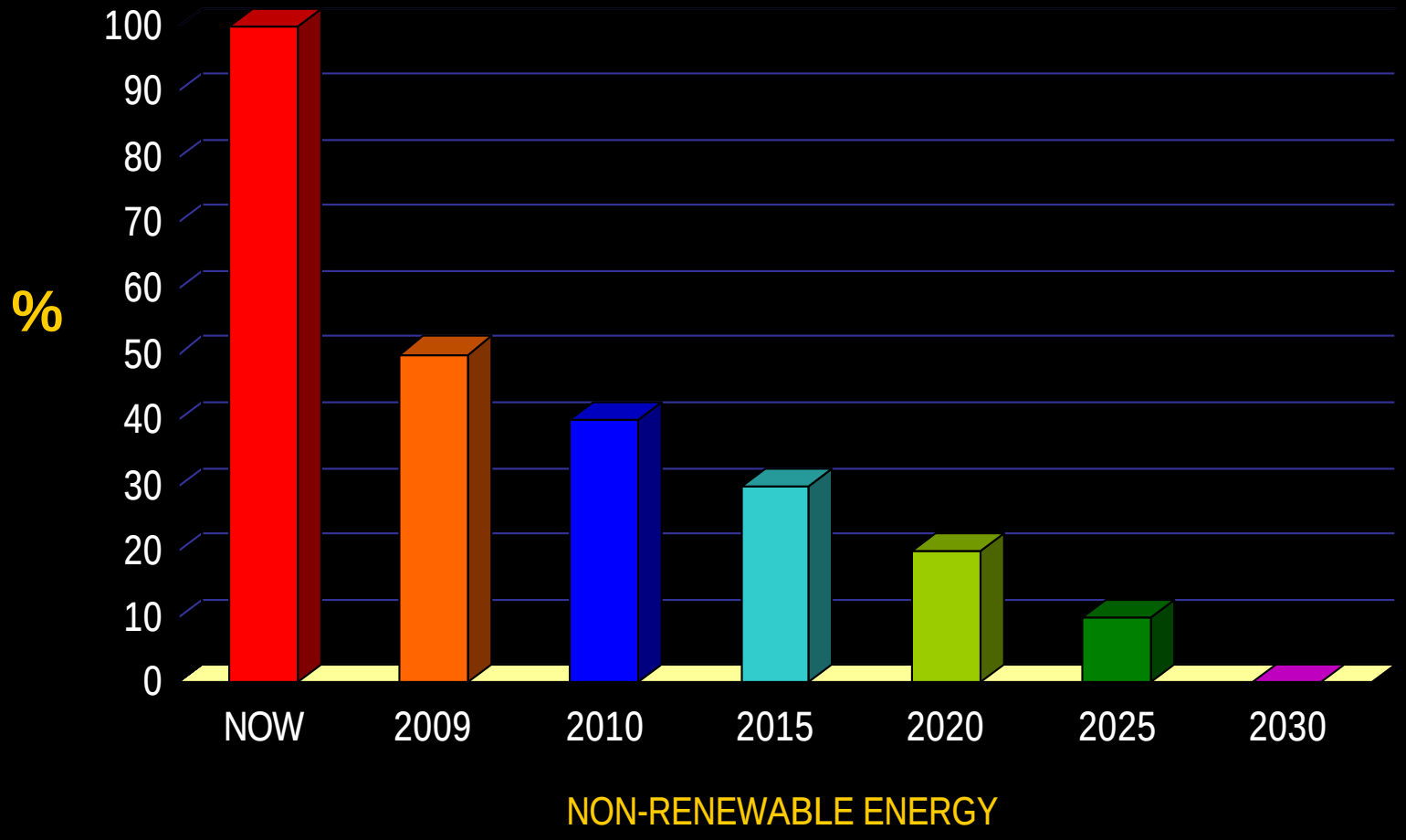
What is it?

- Architecture 2030: independent organization established in response to the global warming crisis
- Goal: dramatic reduction in greenhouse gas emissions by changing the way buildings are planned, designed and constructed
- Plan to reduce non-renewable energy to 0 by 2030, also endorsed by the American Institute of Architects

Slowing the growth rate of greenhouse gas emissions and then reversing it over the next ten years will require immediate action and a concerted global effort.

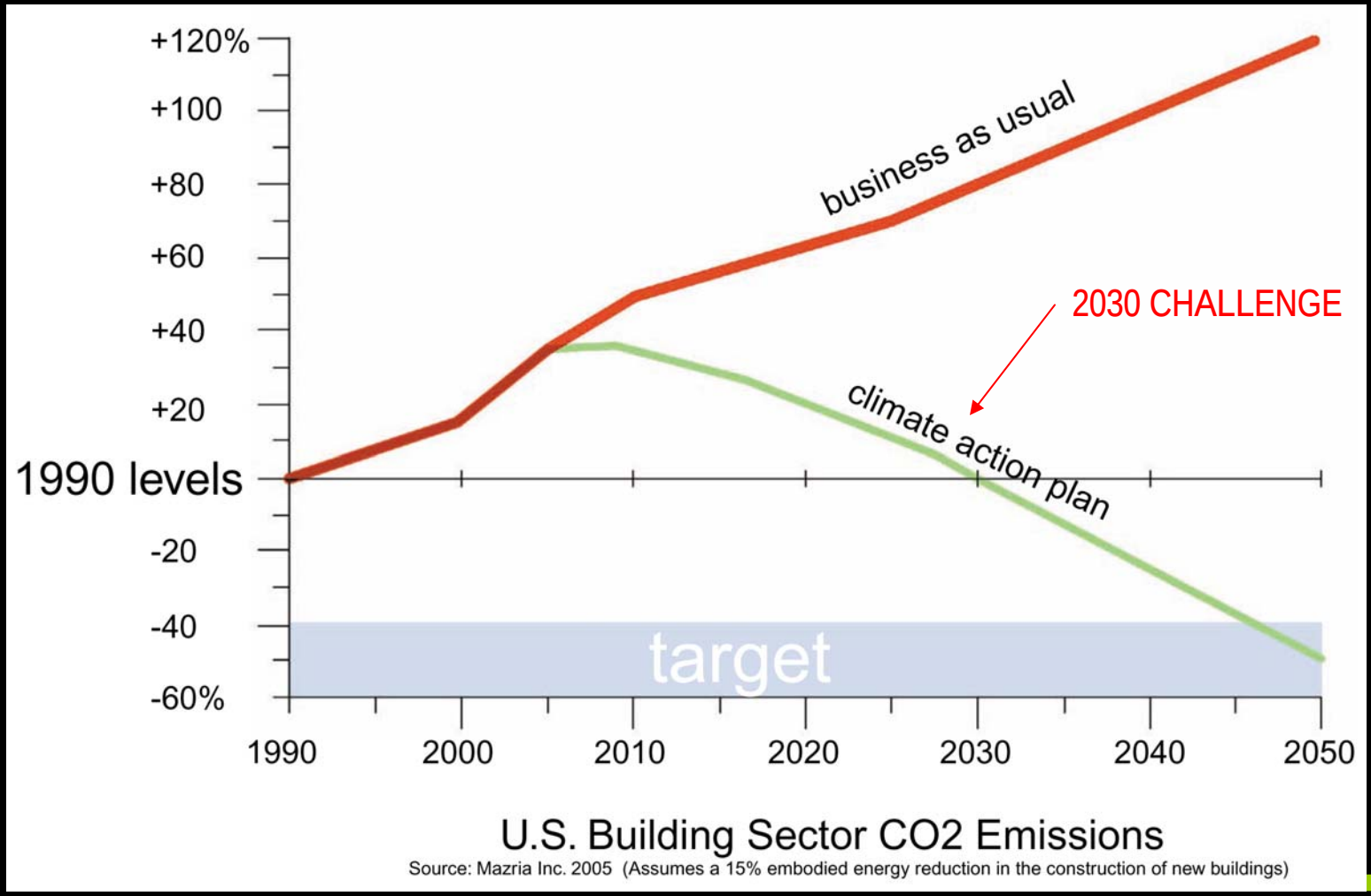
2030 & Zero Energy Buildings

The 2030 Challenge



ASHLEY McGRAW

The BIG Picture – Climate Change



Source: Energy Information Administration Statistics (Architecture 2030)

Process 2030 & 100%

- Learn how to do 100% reduction
- Then can back off to less
- Expert team, LEED APs
- Commissioning Authority
- Computer energy analysis

Process 2030 & 100%

- Green charrettes
- Goal setting
- Integrated design
- Life cycle analysis
- Financial incentives – NYSERDA, IRS

ASHLEY McGRAW

Strategies for Non-renewable Energy Reduction by 100%

1.	Use of passive strategies	35%
2.	High performance building envelope & equipment	40%
3.	Renewable energy use on site	25% to 15%
4.	Purchase renewable energy credits	0% to 10%
	Non-Renewable Energy Reduction	100%

Use of Passive Strategies 35%

- Passive solar heating
- Building siting & window location
- Number of stories
- Earth sheltering
- 100% daylighting/ bilateral
- Shading and no direct sun
- Landscaping for shade cooling, wind control
- Mass in exterior walls
- Natural ventilation
- Exterior light reflection
- High quality infiltration control
- Building colors and SRI

Use of Passive Strategies 35%

- Volumetrics – air flow & light
- Open planning and high ceilings vs. closed rooms, low ceilings
- Window overhangs SEW
- Atriums & stack effect towers
- Sloped roofs facing south
- Site pond for geo exchange / cooling tower / firefighting / storm drainage
- Open stairs (with smoke control)
- Owner and occupant green instruction signs / manual / training
- Integrated design process
- Green charrettes
- USGBC LEED rating and green experts
- NYSERDA assistance

2030 & Zero Energy Buildings

High Performance Building Envelope & Equipment 40%

- Night purge cycle
- High performance walls (R – 48)
- High performance roof (R – 48)
- High performance windows (R – 12)
- High performance foundation
- Heavy mass exterior walls
- High quality infiltration control
- Radiant heat & cooling
- Displacement ventilation
- High performance indirect / direct lighting
- Daylight dimming system
- High performance motors
- Geoexchange earth system

ASHLEY McGRAW

2030 & Zero Energy Buildings

High Performance Building Envelope & Equipment 40%

- ENERGY STAR equipment
- Combined heat & power, CHP
- Energy management system
- Exhaust heat exchange recovery
- Condensing heat equipment
- Equipment sizing
- Off peak heat / cold storage
- CO2 ventilation control
- Service hot water use waste heat
- Commissioning
- Site lighting
- High performance elevators
- LEED AP architects, engineers, landscape architects

ASHLEY McGRAW

Renewable Energy Use on Site 15% to 30%

- Small windmill(s)
- Photovoltaic panels
- Solar thermal panels
- Solar preheat wall
- Solar hot water panels
- Bio-fuel system
- Net metering

Purchase renewable Energy Credits 0% to 15%

- Cooperative construction –
  assist with other institutions to buy/build own REC facility
- Cooperative purchase –
  with of without others, purchase long-term (10 year) REC at fixed price
- Buy market rate RECs

Conclusion

- Those of us associated with buildings have been unknowingly responsible for a large part of our nations energy and production of carbon dioxide.
- We all need to do a much better job in the future and Ashley McGraw Architects has pledged to do our part.
- We recommend that everyone sign the 2030 Challenge and start working toward 100% reduction now

2030 Challenge

Rapidly accelerating climate change, which is caused by greenhouse gas emissions, is now fueling dangerous regional and global environmental events. Data from the U.S. Energy Information Administration illustrates that buildings are responsible for almost half of all GHG emissions annually. Seventy-six percent of all electricity generated by US power plants goes to supply the Building Sector. Therefore, immediate action in the Building Sector is essential if we are to avoid hazardous climate change.

Peter Larson

Ashley McGraw Architects

2030 & Zero Energy Buildings

Syracuse Center of Excellence

- First AMA project to meet the 2030 Challenge
- Ashley McGraw – Executive Architect
- Toshiko Mori – Design Architect
- ARUP – MEP Engineers
- Transsolar – Climate Engineers

ASHLEY McGRAW

2030 Challenge & Zero Energy Buildings

Ashley McGraw Architects, P.C.

September 2008