Leadership and Resiliency
… *Preparing for What Lies Ahead*

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Bob Dixon
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Building Performance & Sustainability
Siemens Industry, Inc
Building Technologies Division

Siemens – Sustainable Solutions for the World's Largest Economies

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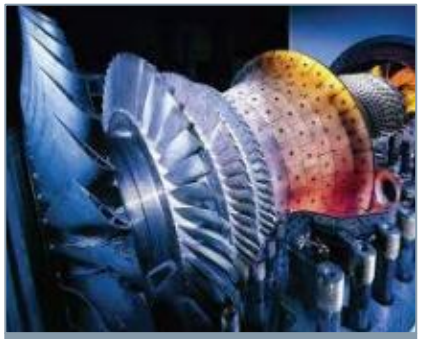


Gas Turbines

Wind Power

HVDC Transmission

Building Automation & Energy Management

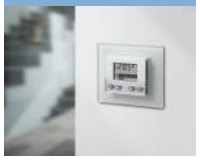
Smart / Micro Grid Technologies

High-Speed and Light Rail

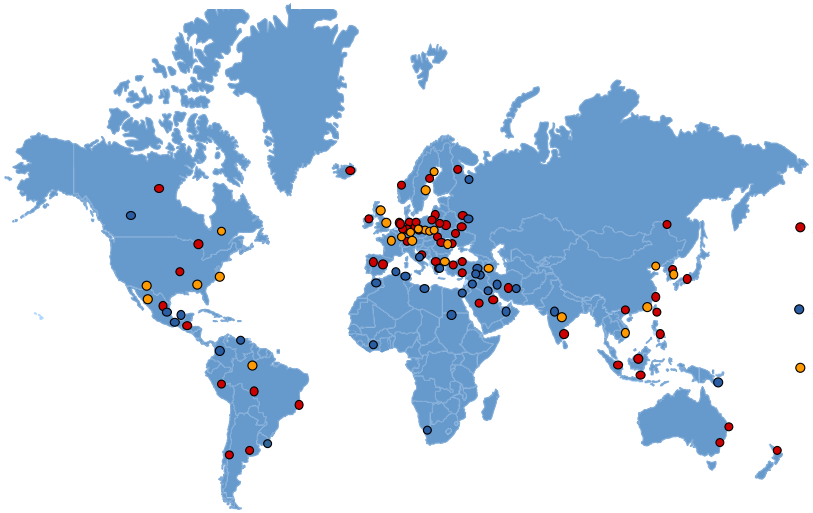
Industrial Lifecycle Management

Imaging & Therapy Systems

Building Technologies

Security	Fire Safety	Building Automation	Electrical Installation	Energy Efficiency	Total Building Solutions
					
▪ Security systems, solutions and services	▪ Fire Safety products and solutions	▪ Integrated building solutions incl. HVAC control applications	▪ Electrical installation equipment and systems ▪ Circuit protection	▪ Energy and environmental solutions, e.g. Energy Performance Contracting	▪ Innovative solutions from building automation to fire safety and security

Energy efficiency and security are the value drivers of Building Technologies



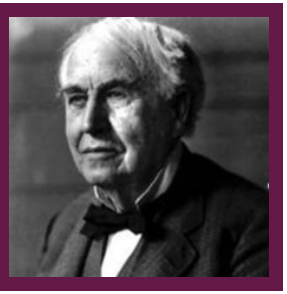
- Around 500 BT branch offices in 51 countries
- Approx. 130 distributors
- 32 manufacturing locations in 16 countries

Why are Michelangelo, Edison, and Kay important to my Grand Kids?

Alan Kay

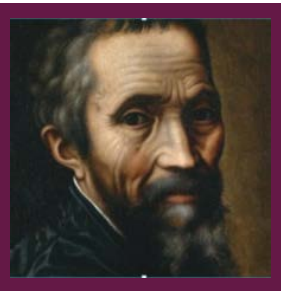
Lilliana Heiring

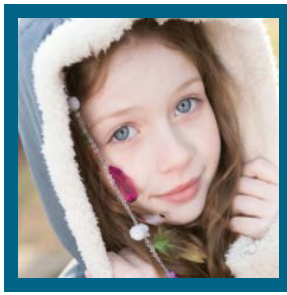
Thomas Edison



Rocky Martin Olsen III

Michelangelo





Isabella Koza

Megatrends to Understand

IT'S GETTING WARMER

SCARCITY OF NATURAL RESOURCES

POPULATION GROWTH

WE ARE GETTING OLDER

URBANIZATION

DIGITAL TRANSFORMATION

GLOBALIZATION

Our Impact

	Population		Average Lifespan		Consump-tion		Impact
1900	1	X	1	X	1	=	1
1950	900 Mio	X	15.3	X	15X	=	206,550,000,000
2014	4.5 Bio	X	36.8	X	45X	=	7,452,000,000,000
2050	7.1 Bio	X	44.4	X	???X	=	14,281,650,000,000

Beliefs to Question

A MYTH

ENERGY COSTS

ENVIRONMENTAL REGULATIONS

SILVER BULLET

BIG DATA SOLVES EVERTHING

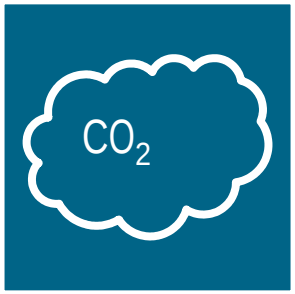
INVESTMENT DILEMMA

Megatrends pose urgent challenges to cities

1%
of the earth's surface

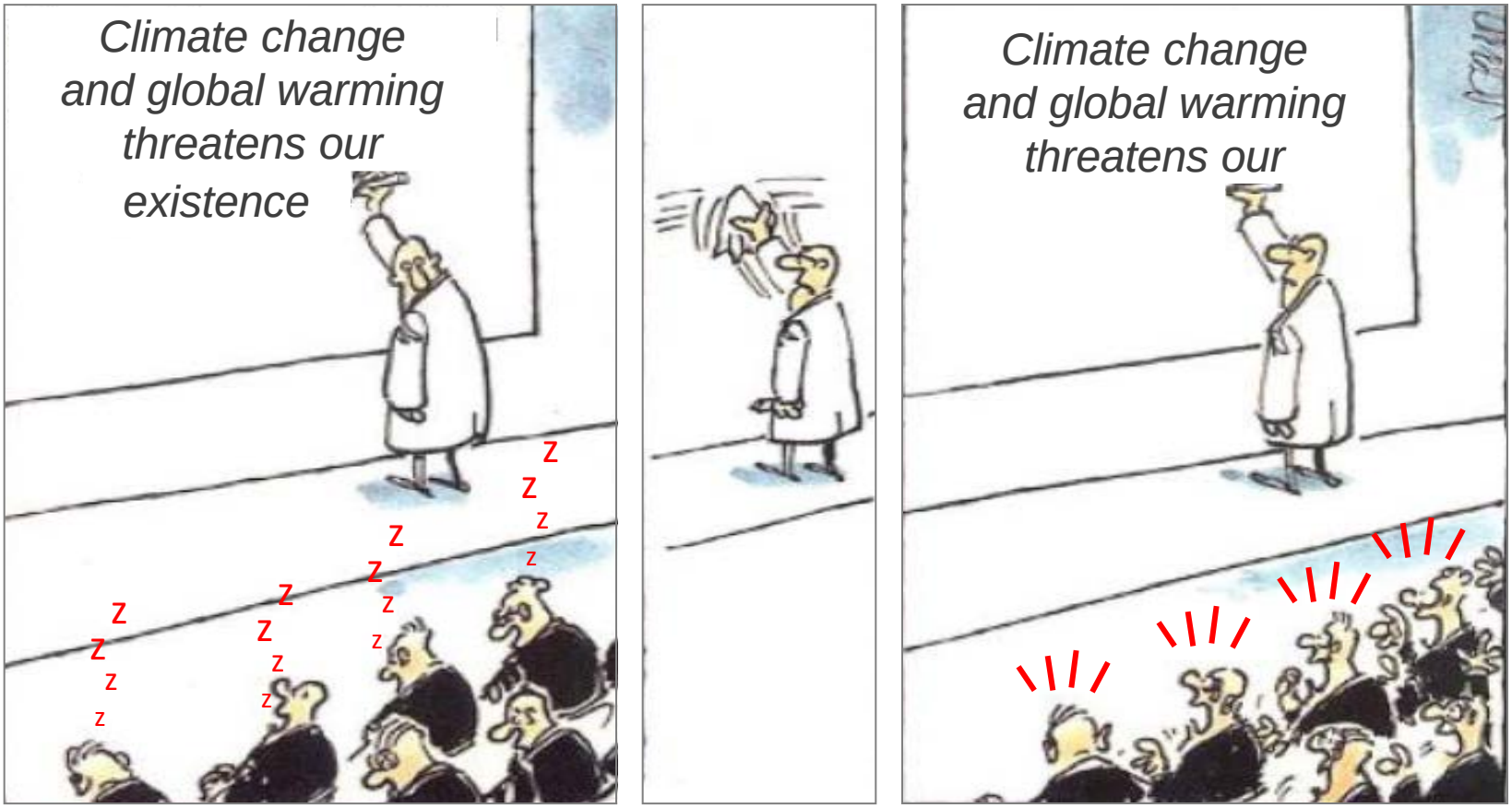
50%
of the world's population

75%
of the world's energy



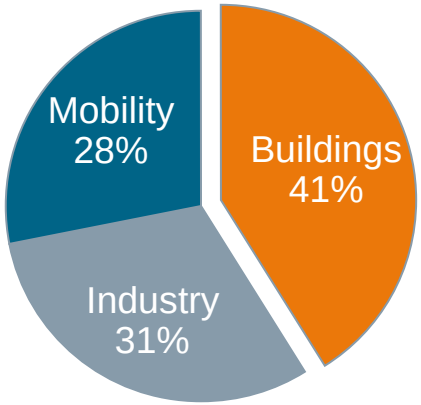
75%
of CO_2 emissions

Climate change, global warming, and the economies

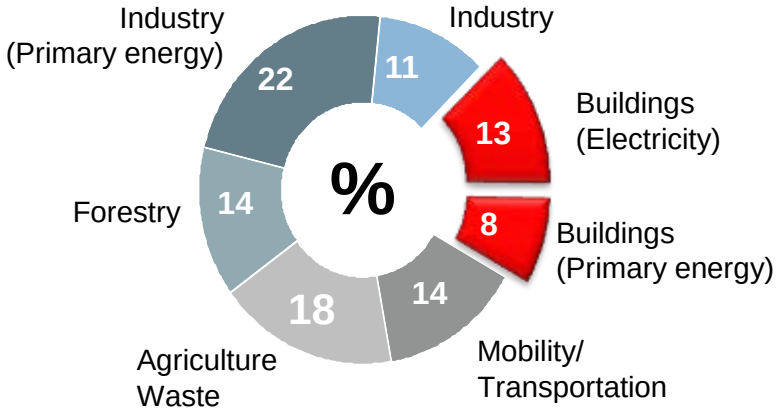


Why Buildings?

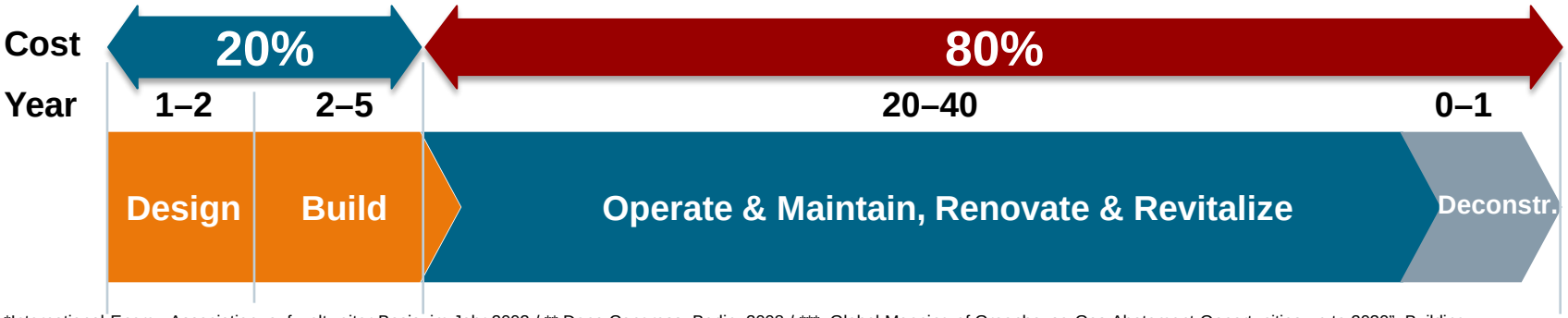
40% of the world energy consumption*



21% of the global GHG emissions***



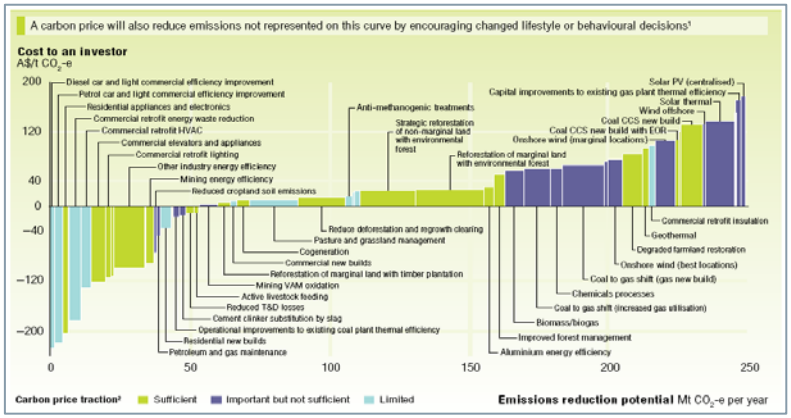
Energy accounts for 40% of the building operation cost**



*International Energy Association, auf weltweiter Basis, im Jahr 2002 / ** Dena Congress, Berlin, 2008 / *** „Global Mapping of Greenhouse Gas Abatement Opportunities up to 2030", Building Sector deep dive, June 2007, Vattenfall AB, basiert auf Information von IEA, 2002, % der weltweiten Treibhausgasemissionen; Total 40 Gt CO2e

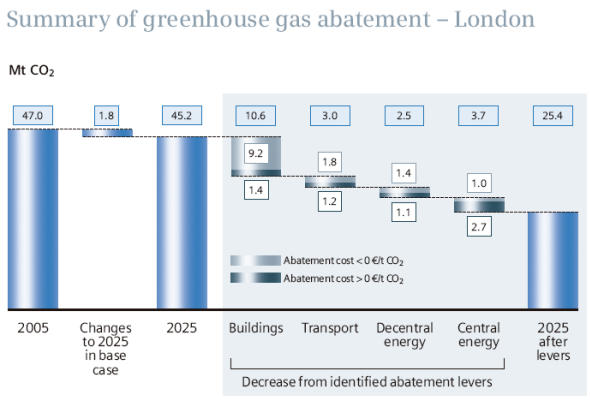
Energy Efficiency Improvements in Buildings are Good Investments

According to ClimateWorks Australia, Low carbon growth plan for Australia, 2010, p. 24. – Building technologies related investments are great opportunities.



Example: London Study Energy savings in buildings could account for more than 50% of London's emissions reduction potential

(sponsored by Siemens)



Value of efficient buildings

- Green Buildings are 0–5% more expensive
- Approx. 500 buildings analyzed in USA with Energy Star or LEED certification
- Compared with 10,000 buildings with similar location and quality standard

Financial benefits

- Overall, 6% higher rental rates
- 16% higher selling price

Source: Eichentholtz, Kok, Quingley: "Doing Well by Doing Good? Green Office Buildings" (2009), Univer. of Maastricht, Univ. of Berkley

Rethinking the Building

Dr. David Fisher's revolutionary Dynamic Tower is the world's first building in motion that challenges traditional concepts of architecture and heralds a new era of architecture, becoming the symbol of a new philosophy that will change the look of our cities and our concept of living.
Offering infinite design possibilities, each floor of the Dynamic Tower rotates independently at different speeds, in different directions, resulting in a unique and ever-evolving shape, and introducing a fourth dimension to architecture: Time.
The Dynamic Tower is the first 100% self-powered Green building with the ability to generate electricity for itself through the use of horizontal wind turbines and solar panels.

- Pre-Fabricated Construction
- Imbedded Wind Turbines
- Imbedded Solar Panels
- Rotating Floors

Rethinking the Building –
Self-sufficient Buildings

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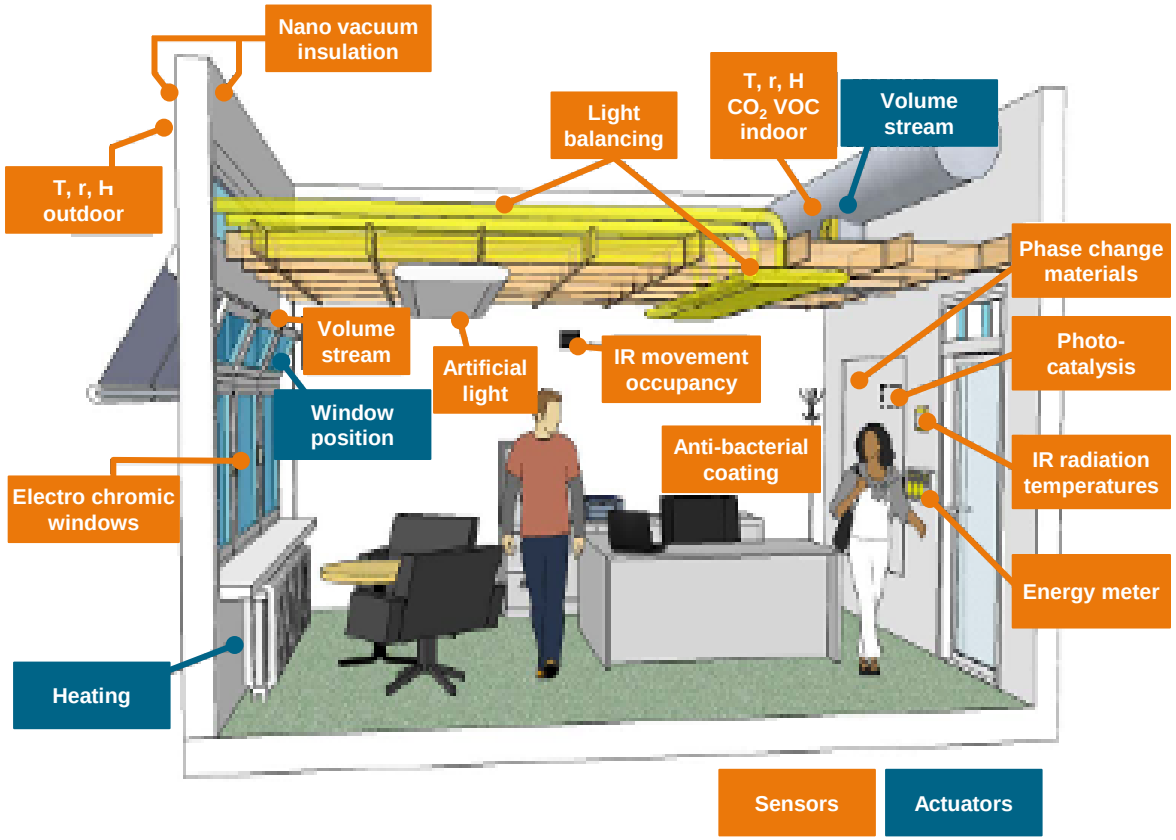
Micro- level energy management

- Energy reduction measures at micro level
- Personalized environment control
- Dynamic building modeling at micro level

Self-commissioning

- Use of technologies such as AI
- Cost savings (labor)
- Minimal emergency repairs



Rethinking the Building –
Self-sufficient Buildings

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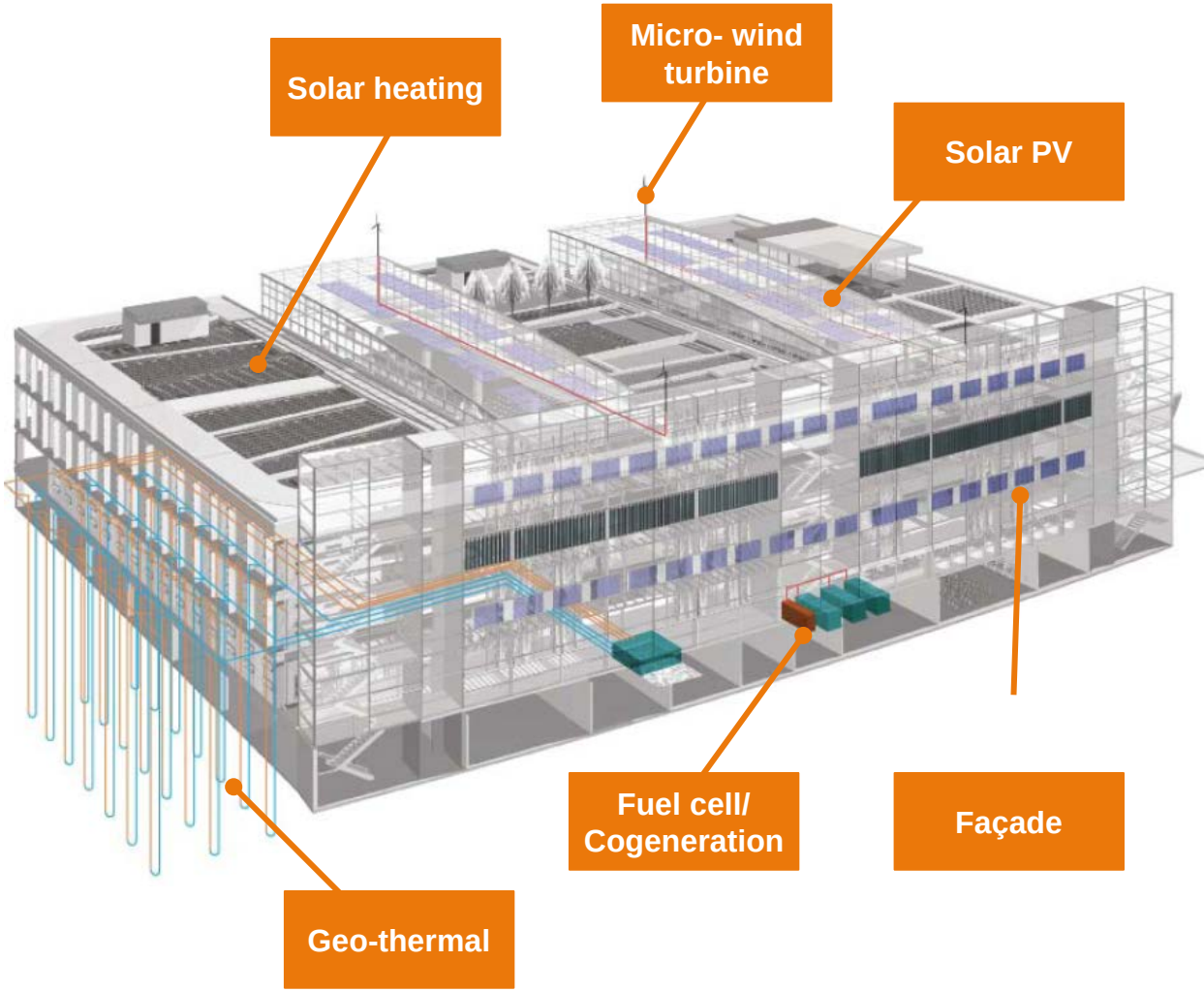
Net zero energy

- Buildings act as power plants with on-site power generation
- E.g. solar energy, geothermal energy
- Net annual energy consumption zero

Net zero carbon

- Active carbon management
- Zero emission/waste



Buildings of the Future……..

Buildings of the Future will evolve based upon…

- Lowered Operating Costs
- Government Regulations and New Standards
- New Design Techniques
- New Technologies
- Attracting Better Employees
- Public Expectations
- Green Consumers

Buildings of the Future will be….

- Smarter
- More sustainable
- Monitored and rated for performance
- Be interconnected to the Smart Grid
- Will use on-site generation and energy storage technologies
- Continuously commissioned
- Participate in new business models like utility initiated demand response

Global Best Practices

Progressive Policies, Enabling Legislation, & Tax Incentives

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USA – Government Funding

- ARRA- $787 Billion Total
- State Energy Program - $3.1 billion
- Energy Efficiency and Conservation Block Grants - $3.2 B
- Weatherization Assistance Program - $5.0 B
- Appliance Rebates - $300 M
- Smart Grid Grants and Demonstration - $4.5 B
- RD&D (EERE and ARPA-E) - $1.2 B: DOE RD&D $2.25 billion

European Union – EPBD

- Directive 2002/91: Energy Performance of Buildings
- Directive 2006/32: Energy End-Use Efficiency and Energy Services
- EU'S / National Energy Efficiency Action Plan
- Promoting the improvement of the energy performance of buildings via: Performance requirements and certification for buildings; Inspection of installations (heating & cooling)
- National action plans to achieve 1% p.a. savings

Pay Energy Efficiency Improvements with Utility Bills

- Alabama
- Arkansas
- California
- Connecticut
- Massachusetts
- New Hampshire
- Rhode Island

Property Assessed Clean Energy Loans Australia

- Leverage public funds with private capital to offer local governments a voluntary clean energy loan program for citizens.

USA – Education

- Clean Energy Workshop Training Program – California
- Green Jobs Advisory Council – Washington, DC
- Green Corps Chicago; Opportunity Austin 2.0 – Austin, TX
- Renewable and Sustainability Degree - Illinois State University

Ten Actions to Accelerate the Implementation of the Efficiency & Sustainability

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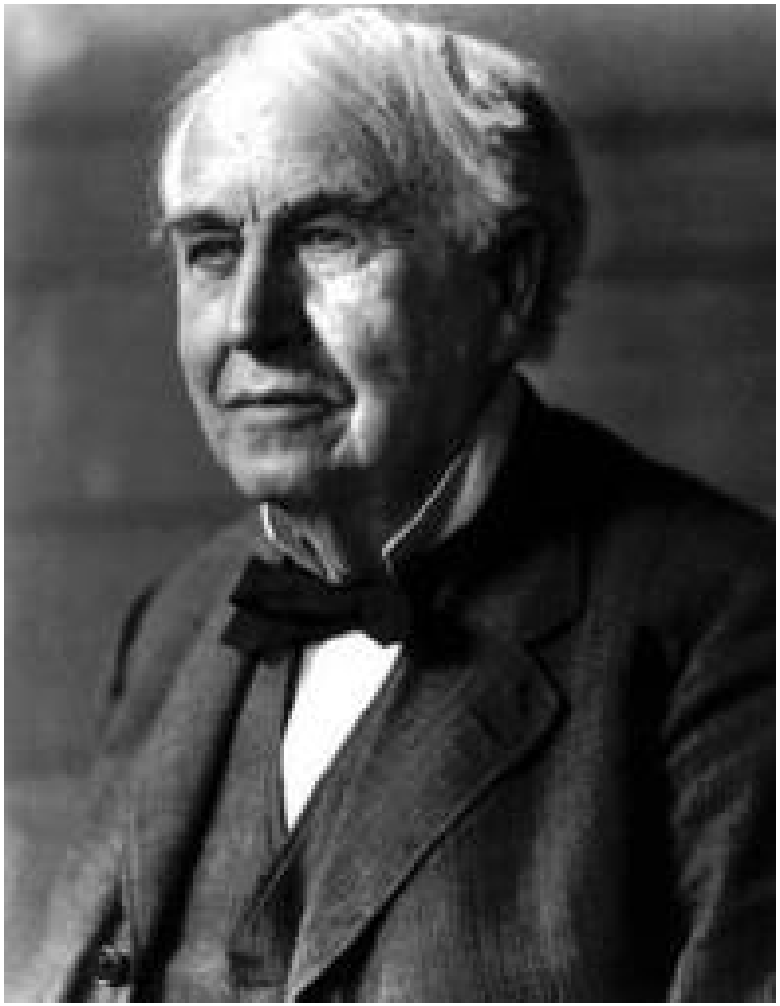
1	Mandate Efficiency & Sustainability Standards for New & Existing Buildings
2	Benchmarking / Labeling of Buildings and Homes Efficiency and Sustainability
3	Adopt Policies to Allow Payment of Energy Efficiency Improvements with Utility Bills or through Property Tax Assessments; Provide End User Tax Incentives for Energy Efficiency Improvements
4	Provide Governmental Support or Subsides to Accelerate the Development of New Technologies
5	Adopt a Holistic Approach to Energy Efficiency and Sustainability, Think Beyond the Building, Re-think the Building
6	Utilize Innovative Business Models such as Performance Contracting and Incentivizing Utilities to Fund Energy Efficiency
7	Leverage Existing Technologies
8	Increase Energy Efficiency Expertise through Education: University, Community Colleges, Trade Schools; Re-Skilling Programs
9	Every Organization Should: Appoint a Chief Sustainability Officer; require their supply chain partners to have sustainability programs
10	Do Your Part as an Individual

Alan Kay

The best way to predict the future is to invent it.

Michelangelo

The greater danger for most of us is not that our aim is too high and we miss it, but that it is too low and we reach it



Thomas Edison

Opportunity is missed by most people as it is dressed in overalls and looks like work

Because We can Invent a Better Future by Aiming High, and Working Hard!

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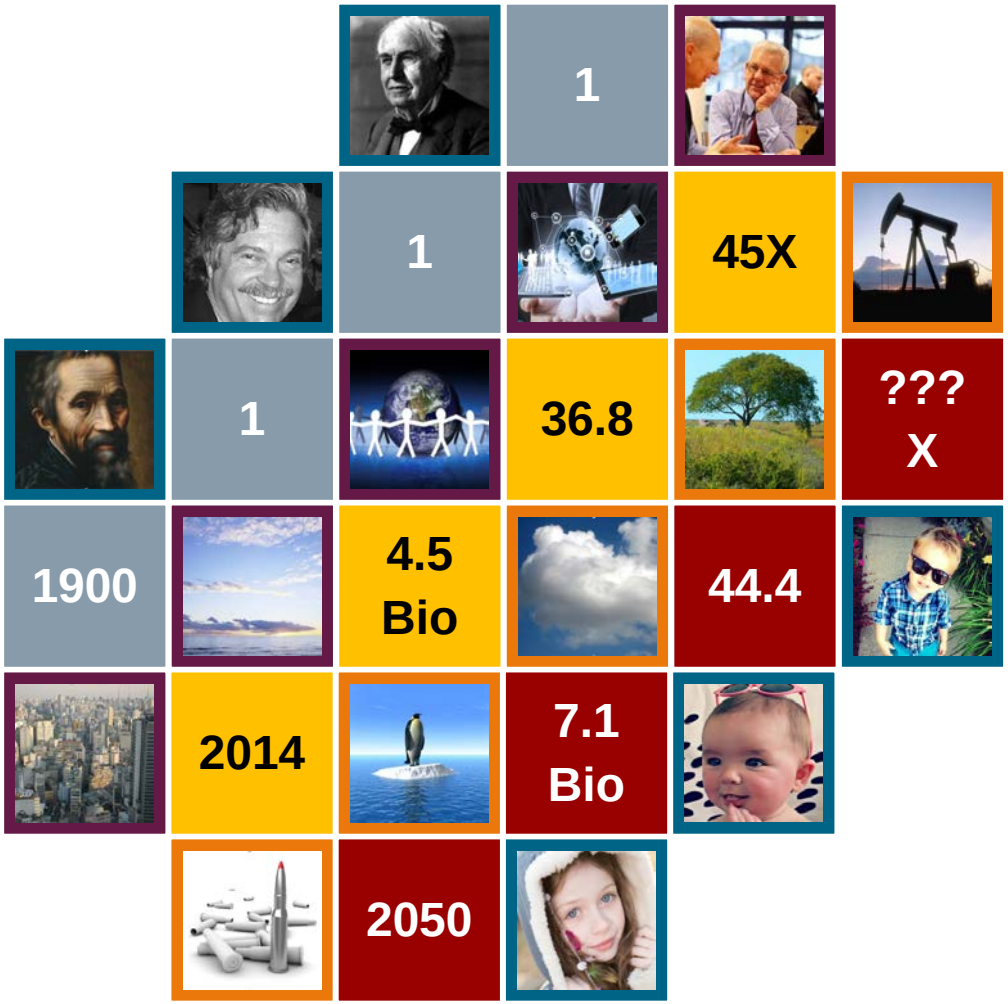

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