



**Green  
Opportunities for  
Developing  
Economy  
Conference**

4-6 October 2019



İ M O

# Role of Energy Efficiency in Environmental Sustainability and Green Jobs

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*October 5, 2019 (13:00 – 13:30 PM)*

**Partners:**



**Sponsor:**



**Project:** Awareness Raising for Civil Engineers on Green Economy  
**Grant Program:** EU Funded *INNOVATION AND CHANGE IN EDUCATION*  
**Grant Contract number:** 2016/373-593



# TECHNOLOGY PENETRATION- NEW JOBS!



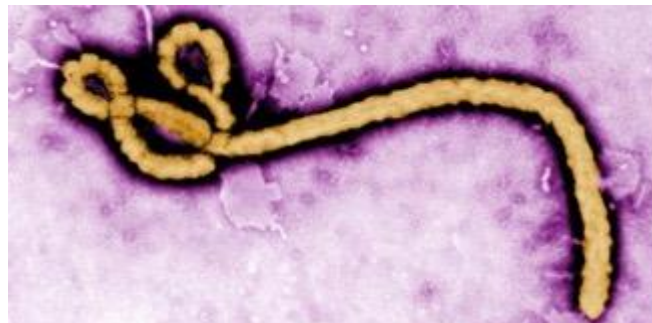


# Companies that Did Not Exist in 2000

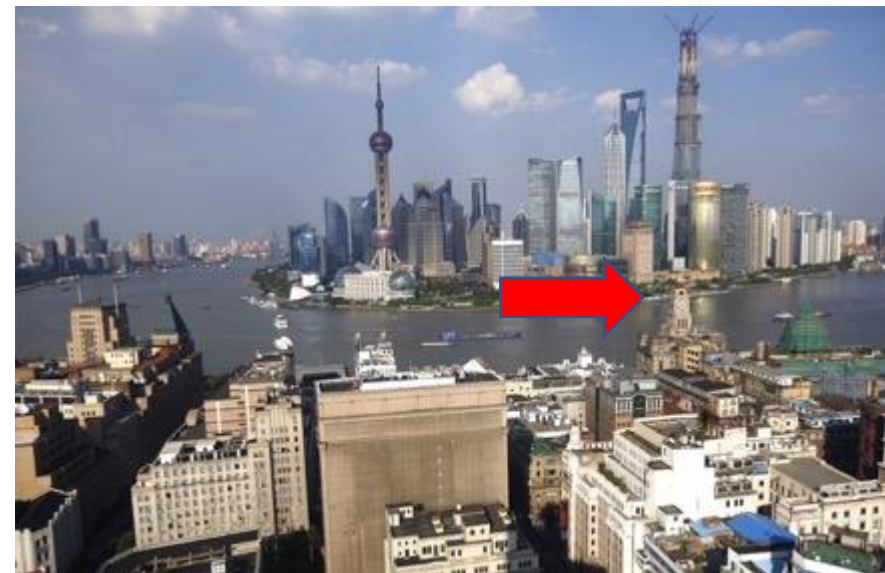
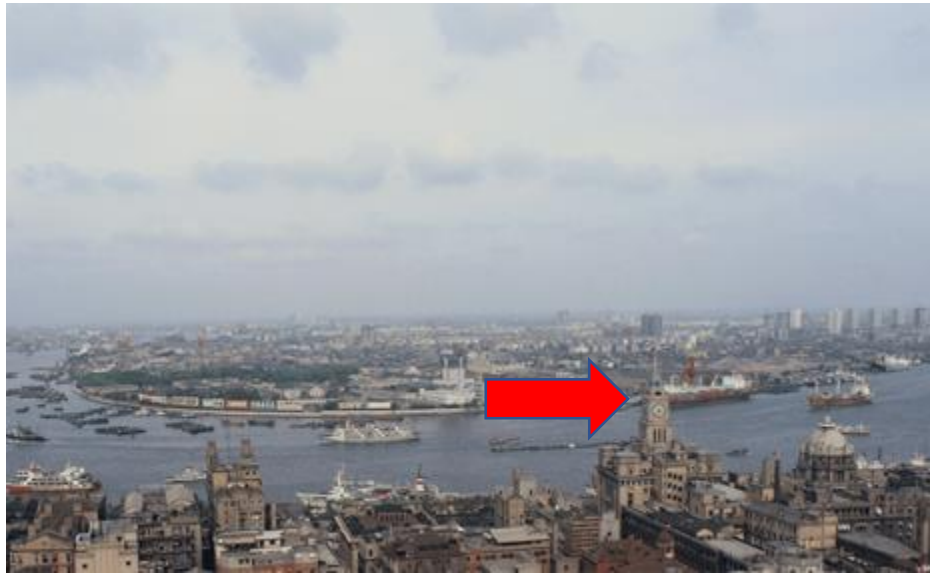
- Facebook
- Instagram
- WhatsApp
- Uber
- Airbnb
- Dropbox
- Skype
- Just missing the list – Google ('98)
- **WIFI** was a misspelled word in 2000.
- Keep in mind – the **jobs** the students we are educating in universities TODAY will have, **DON'T EXIST TODAY.**

# Millennial Challenges

- Global Warming and Climate
- Urbanization and Pollution (Waste)
- Energy and Cyber Security
- Emerging Disease Threats
- Poverty
- Wars and Terrorism...
- Refugees...



Shanghai – 1987 ----> today



**Global Trends**

**World population**

**Urbanization**

**Energy / Electricity Demand**



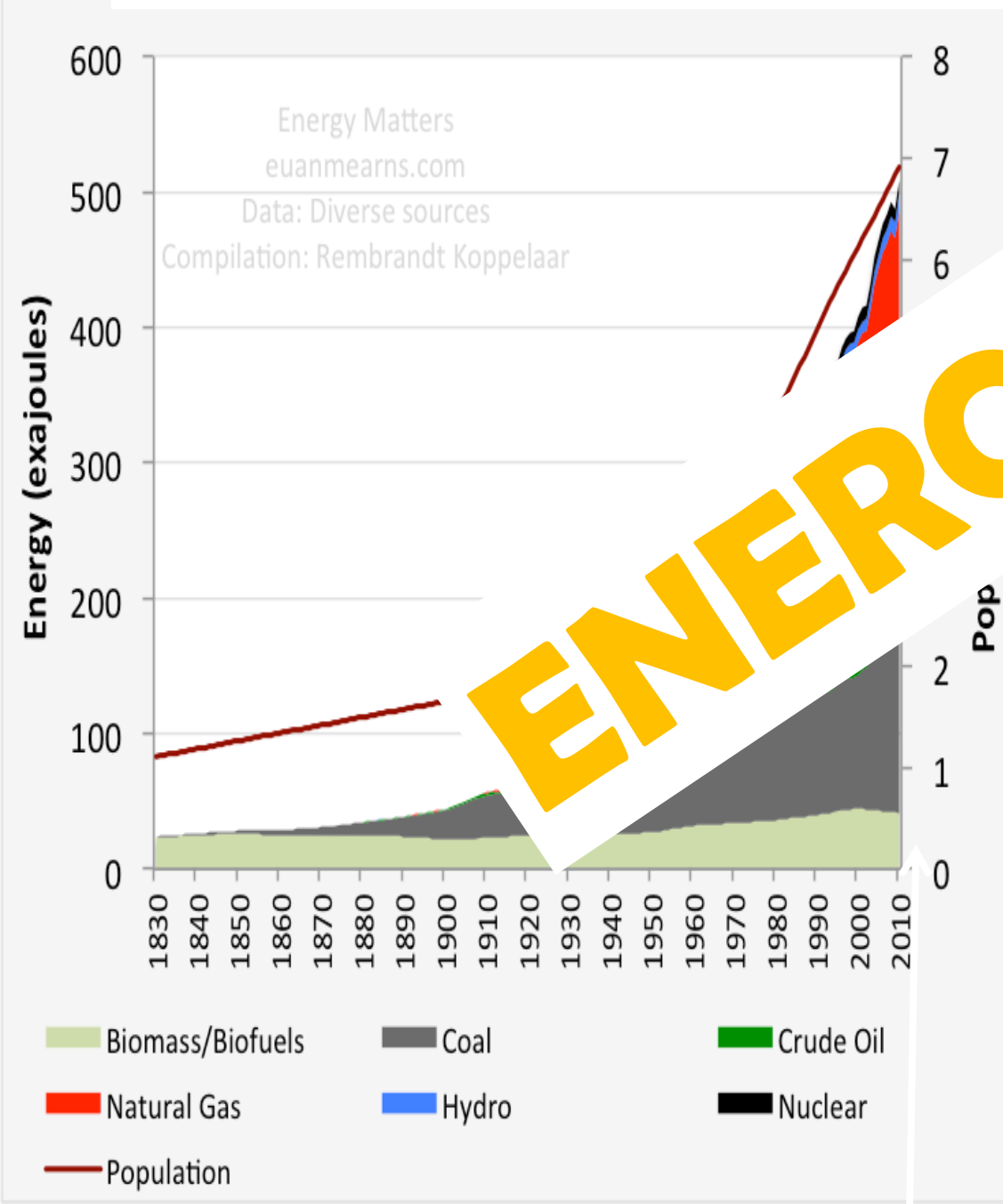
# GLOBAL TRENDS:

## World Population & Urbanization



- **World population in 2050 is estimated to reach 10 billion.**
- **Urbanization:**
  - **By 2050, more than two-thirds of the world population will live in cities, increasing demand for electrical energy.**
  - **This is against a backdrop that currently 2 billion people are without electricity--2011 world population 7 billion.**
- **Electricity Demand: It is expected that electrical energy demand in the world will double by 2030 and fastest growth will be in the residential sector.**

# Population and Global Energy Consumption



## ➤ MORE PEOPLE ... MORE

- Housing (cement, brick, windows)- electricity!
- Cars, phones, internet, ...

## MORE ECONOMIC GROWTH

INCREASED ENERGY SUPPLY --- >

ENERGY SUPPLY



GNP RATE OF GROWTH

GROWTH = 0

YEARS

## Climate Change & Environment



“Paris Accord” acknowledges that:

- energy-environment and green house gases are all intertwined.
- The UN Framework Convention on Climate Change signed in December 2015
  - Limit global warming to 2°C
  - Urgent need to decarbonize
  - Reduce damage to the environment
- 196 nations, will follow Kyoto Protocol when it ends in 2020.
- will enter into force if ratified by at least 55 countries, covering at least 55% of global greenhouse gas emissions.



## International Climate Finance

[https://ec.europa.eu/clima/policies/international/finance\\_en](https://ec.europa.eu/clima/policies/international/finance_en)

Energy efficiency and investment in renewables **now** is a must for climate change.



### INVESTMENTS IN RENEWABLES (2020 onwards)

**\$100 billion USD per year**

to help developing countries deal with climate change.

**EU is the largest contributor of climate finances.**



## Climate and energy priorities for Europe: the way forward

**Presentation of J.M. Barroso**

President of the European Commission,  
to the European Council of 20-21 March 2014



## Europe 2020 targets

**Reduce greenhouse  
gas levels by 20%\***

**Increase share of  
renewables to 20%**

**Reduce energy  
consumption by 20%**



*\*Compared to 1990 levels*

## Europe 2030 targets

**Reduce greenhouse  
gas levels by 40%\***

**Increase share of  
renewables to 27%**

**Reduce energy  
consumption by  
additional 27%**

# Europe is on its way to meeting its 2020 targets

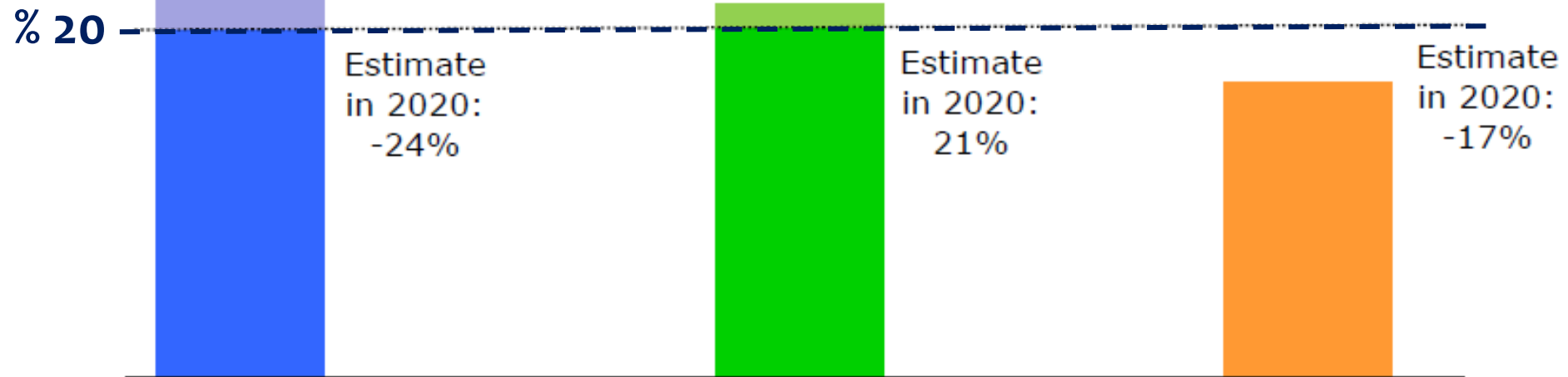
**Reduce greenhouse  
gas levels by 20%**



**Increase share of  
renewables to 20%**



**Reduce energy  
consumption by 20%**



**Goal (2014):** To increase energy efficiency and reduce consumption by  
**USA** 20% ... *President Obama*

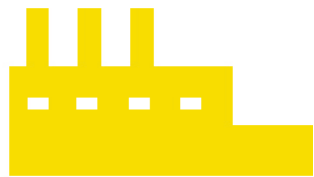


**California continues (... CALEXIT...)**

**By 2020 one-third (33%) of the energy  
in California to be produced from  
renewable energy sources.**



## Buildings: 48 % of the Total Energy Consumption (USA)



**INDUSTRY**  
25%



**TRANSPORTATION**  
27%



**BUILDINGS**  
approx. 48 %

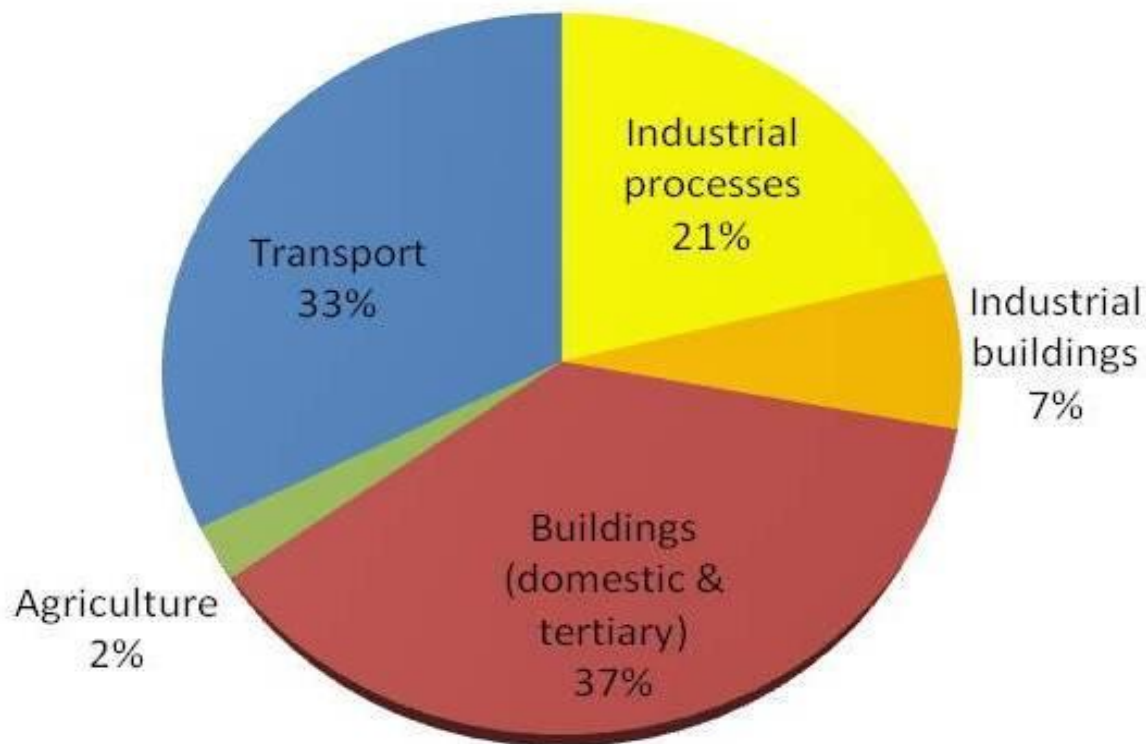
**Buildings (operations) consume A LOT of ELECTRICITY ( 71% in USA)**



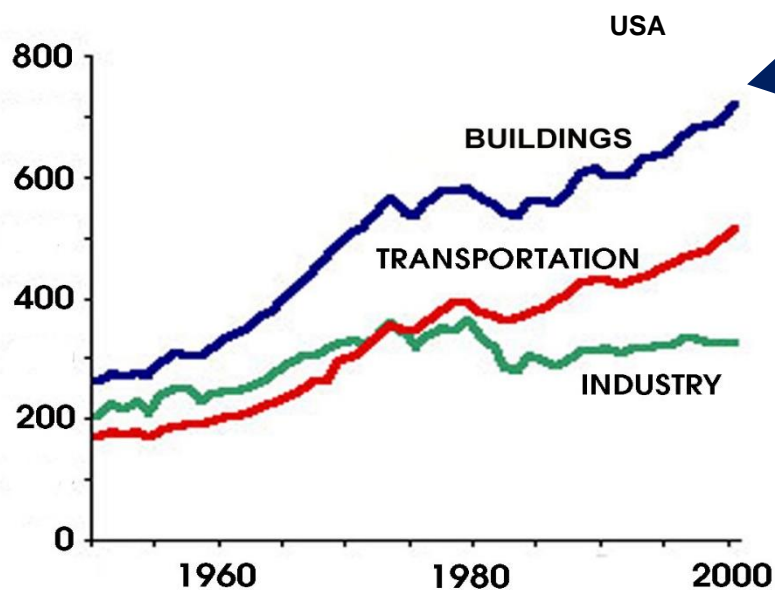
EUROPEAN UNION

## Share of total EU energy consumption

**Buildings: 44% (37% + 7 %)**



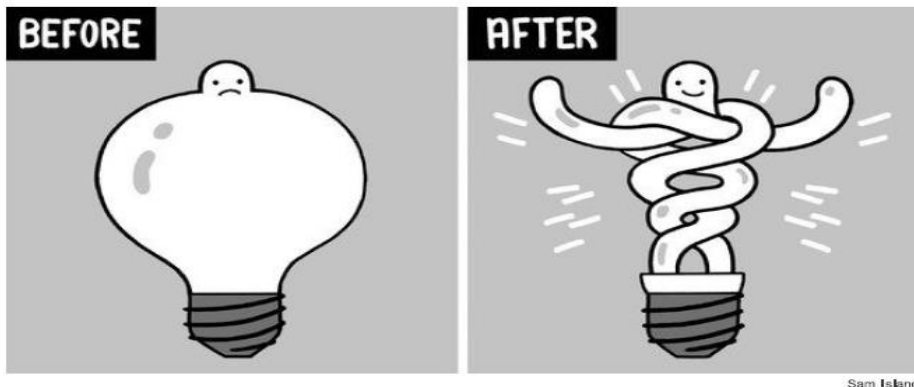
## Buildings: 40 % of Greenhouse gas emissions



**CO2 EMISSIONS by SECTOR**  
(Million Metric Tons of Carbon)



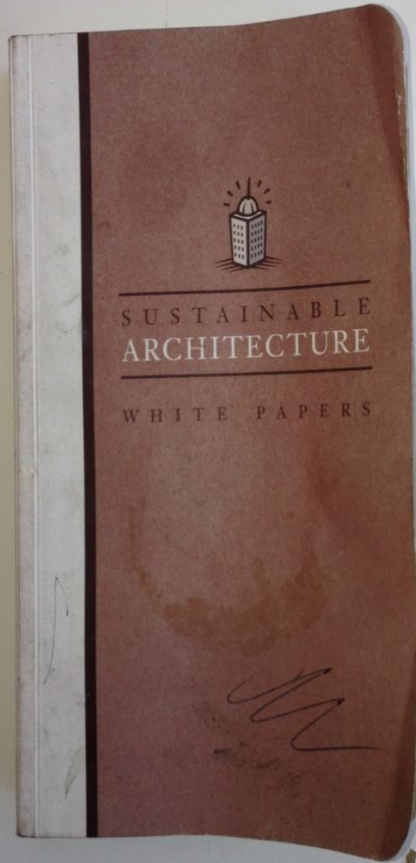
## REDUCING GREEN HOUSE GASES REQUIRES...



- increasing energy efficiency in all sectors /segments of life:
  - industrial,
  - commercial,
  - **Residential.**

## NET ZERO ENERGY BUILDINGS

(Generates as much--or more --energy than it consumes)



([http://architecture2030.org/2030\\_challenge/the\\_2030\\_challenge](http://architecture2030.org/2030_challenge/the_2030_challenge))

- Changing Architectural Priorities: Sustainability
- USGBC: LEED certification for buildings:
  - Silver
  - Gold
  - Platinum
- 2030 Challenge (Architecture 2030)
  - 2020 – 80%
  - 2025 – 90%
  - 2030 – 100%

By 2030 all new buildings will be Net Zero and “Carbon Neutral”.

California implements EUI for all new and renovated buildings

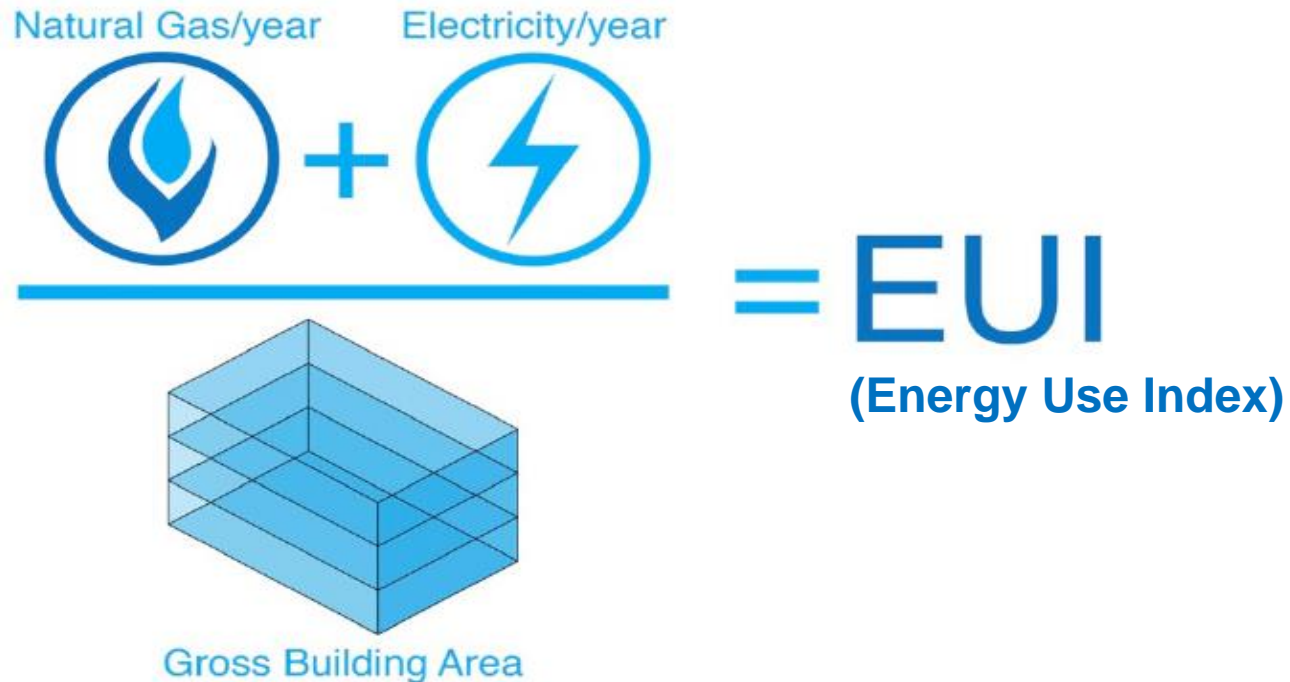
(Carbon Neutral : No fossil fuels used in the operation of the building)



# ENERGY USE INTENSITY

$$\frac{\text{Natural Gas/year} + \text{Electricity/year}}{\text{Gross Building Area}} = \text{EUI}$$

(Energy Use Index)



**110 kWh / m<sup>2</sup> / Year**

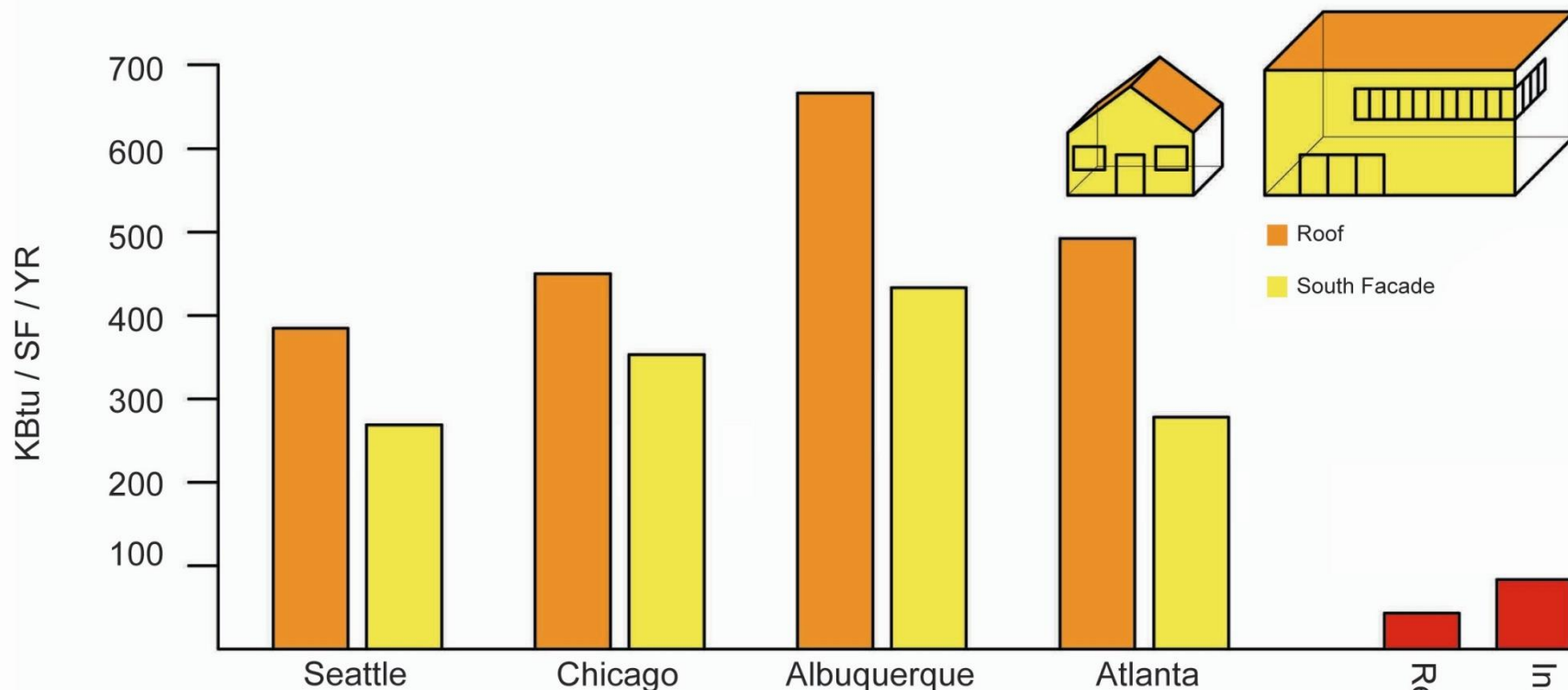




CALIFORNIA – USA







Solar Energy that Falls on Each Square Foot in a Year by Surface

The average energy consumption in the US per square foot of floor area in a year:  
 Single-Family Residential: 42.7 KBtu / SF / YR  
 Commercial/Institutional: 85 KBtu's /SF / YR

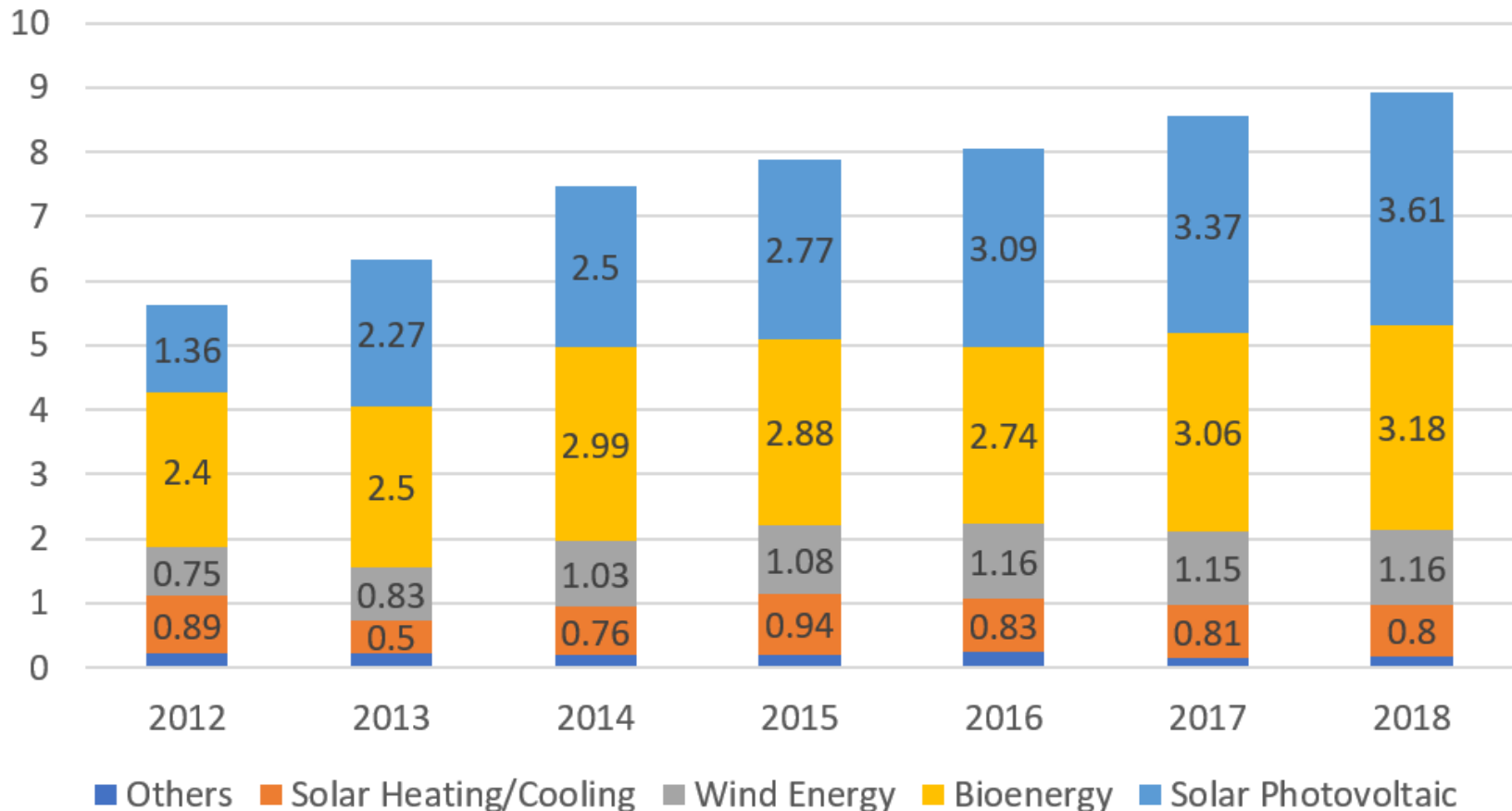
## GREEN JOBS

Green jobs help:

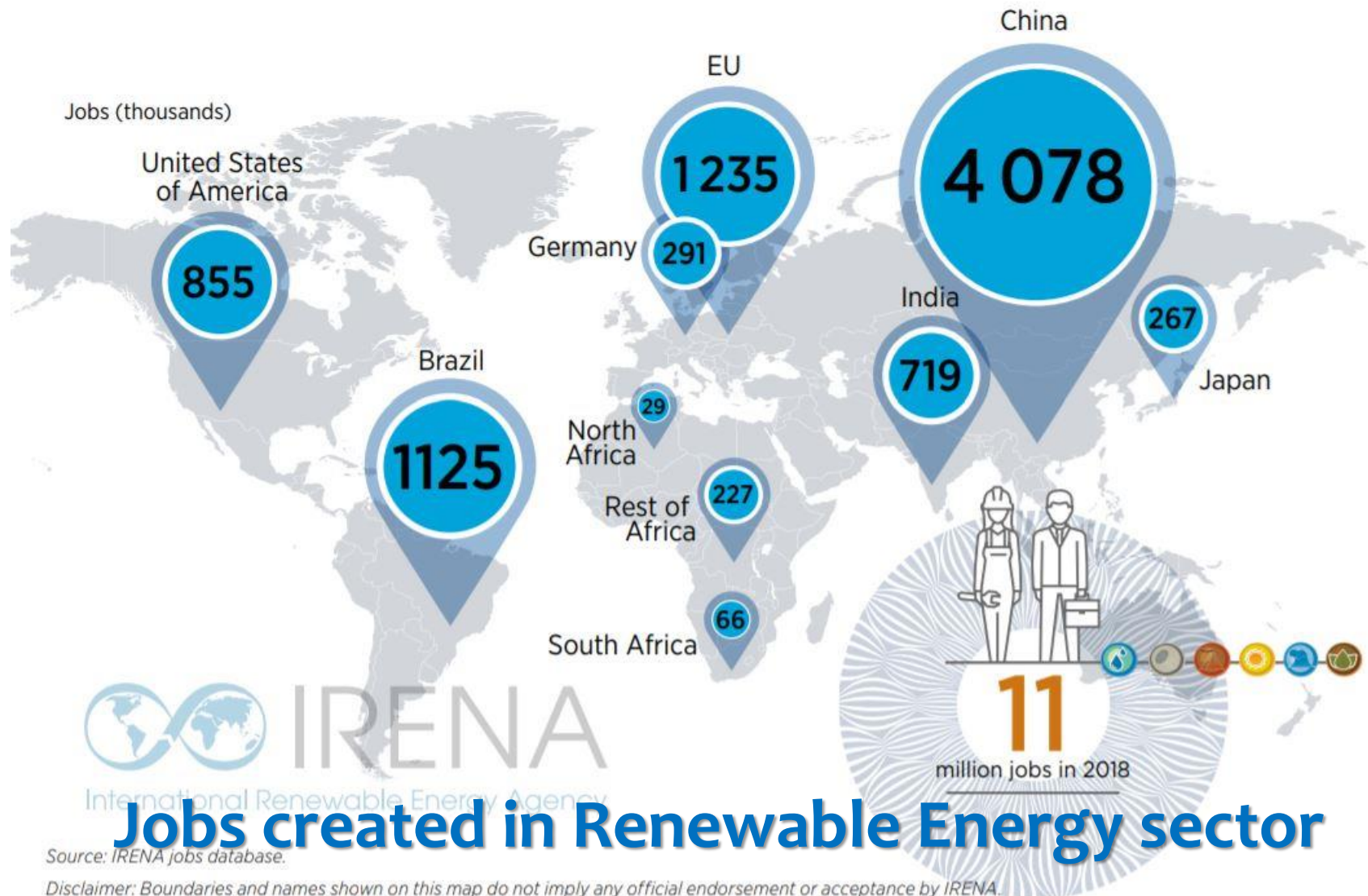
- Improve energy and raw materials efficiency
- Limit greenhouse gas emissions
- Minimize waste and pollution
- Protect and restore ecosystems
- Support adaptation to the effects of climate change



## Global Renewable Energy Employment by Technology, 2012-2018







Estimated direct and indirect jobs in renewable energy worldwide, by industry, 2017-2018

Industry	World	China	Brazil	United States	India	European Union
Solar Photovoltaic	3,605	2,194	15.6	225	115	96
Liquid biofuels	2,063	51	832	311	35	208
Hydropower	2,054	308	203	66.5	347	74
Wind power	1,160	510	34	114	58	314
Solar heating/cooling	801	670	41	12	20.7	24
Solid biomass	787	186		79	58	387
Biogas	334	145		7	85	67
Geothermal energy	94	2.5		35		23
CSP	34	11		5		5
Total	10,983	4,078	1,125	855	719	1,235

in thousands

## Jobs created in Renewable Energy sector

## CONCLUSIONS

- PV projects need to be implemented at a fast pace.
- Incentives are important in the growth of the renewable energy sector
- A lot of new employment opportunities.

Partners:



## CONCLUSIONS

- NEED:
  - **Changes in Family and Individual Priorities** (use green electricity – live in green buildings, protect environment)
  - **Changes in Societal Priorities** (goals)
    - **KIB-TEK NEEDS TO GET INTO BUSINESS OF ACTIVELY PROMOTING “ENERGY EFFICIENCY” AND CREATION OF GREEN JOBS**
    - **UNIONS AND CHAMBERS (KTMMO, IMO, EMO, ETC.), TEAM UP WITH ENERGY COMPANIES AND MINISTRY OF ECONOMY TO CREATE JOBS.**

Partners:

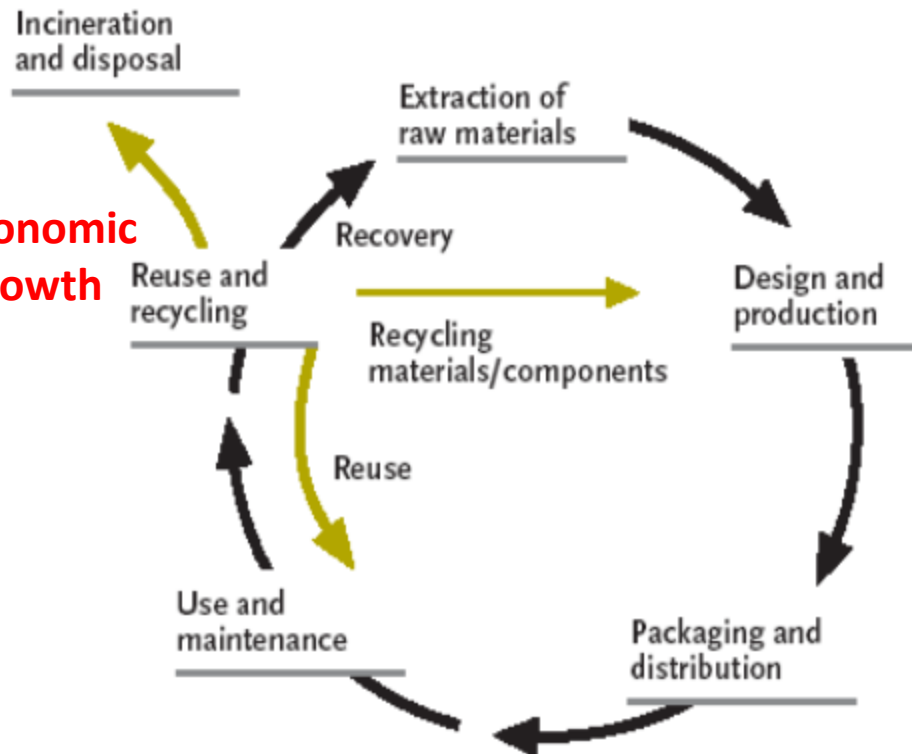


### 3. Sustainability of Environment: Eco-Money





**Nothing is created,  
Nothing is destroyed  
Everything is transformed**



**For a sustainable economic  
development and growth  
RECYCLING IS MUST**

## WHAT TO DO?

For a **sustainable economic development** and growth, we must employ:

- **RENEWABLE RESOURCES**
- **CONSERVATION**
- **RECYCLING**



## **GLOBALIZATION, URBANIZATION , WASTE GENERATION?**

- 1.000.000.000 people in the world live in the proximity of and in contact with waste.
- 500.000.000 ton of waste is generated every year.
- For example, in France 900.000 videos 1.300 .000 TV sets, and 1.800.000 washing machine is thrown to landfill waste dumps every year.
- **%80 of these are recyclable waste.**





# EXPO ECO MONEY

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- During its 150 years of history, the World Exposition has always presented "a vision of the future for society." EXPO 2005 AICHI, JAPAN had the main theme of "**Nature's Wisdom.**"
- The "EXPO Eco-Money" project was an experimental project for **a new social system** which will strengthen and promote the connection between "**Environment-friendly behaviors**" of citizens, businesses and governments, to realize the aim of the prevention of global warming and create a cyclical society.



# ECO MONEY

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- Eco-Money is the name of many Japanese community currencies, which is used to describe forms of **alternative currency** and **complementary currency** that encourage ecological and socially responsible actions.
- In spring 1999 Kusatsu in Shiga Prefecture became the first city in Japan to use eco-money.
- In 2005, Eco-money was used in World EXPO in Aichi (Nagoya), Japan.



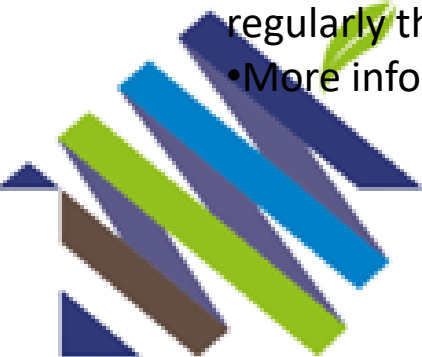


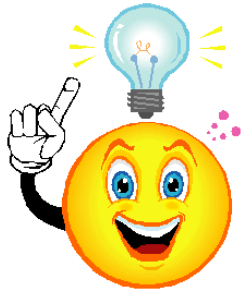


# EXPO ECO MONEY

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- "EXPO Eco-Money" was issued for "Environment-friendly activities" made by the visitors to the EXPO site. This environmental money was also issued to citizens for every-day actions outside the EXPO site, such as the reduction of plastic shopping bags and utilization of public transportation systems.
- "EXPO Eco-Money" could also be used for such things as participation in the prize competitions for eco-tours or acquisition of eco-products, and for such as tree planting in different areas.
- The amount of the reduction in CO2 emissions by all the participants' "Environment-friendly activities" were added up and the results made public regularly through a web site.
- More information: <http://eem.jp/jp/expo2005/en/about01.html>





# EARNING POINTS

EXPO Eco-Money is a new social system that aims at CO2 emission reduction and global environment conservation by promoting citizens' "environment-friendly behavior."

In this system, **participating citizens can earn points through their environment-friendly behavior and trade them for certain services or products or even for a financial contribution to local environmental activities.**

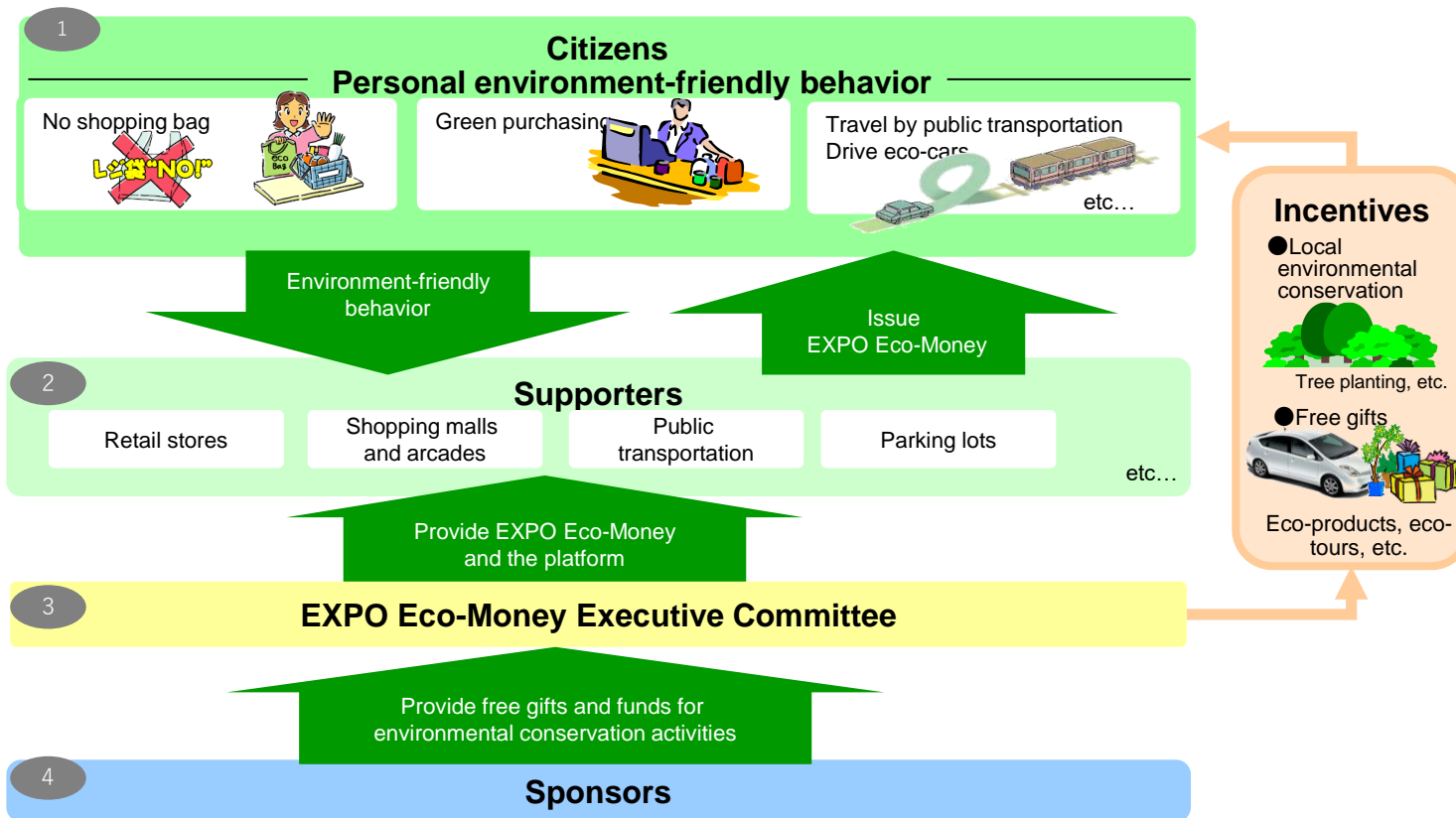
With an awareness that collaboration among the public, industry, and government is essential for the implementation of this social system, we will perform its field test in EXPO 2005 AICHI.

Official exhibitors are invited to participate in this project, once they kindly understand its goal.

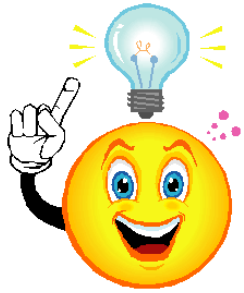




## Overview of the Eco-Money social system







# ECO MONEY

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- Some 30 more communities across Japan are introducing such currencies. Some municipalities plan to use the money to plant trees and reduce garbage.
- From Wikipedia: **Eco-Money Network Secretary General Masanari Nakayama** stated: "Eco-money is a way of getting neighbors to help each other out and to deepen their ties to the community."





# ROLE OF UNIVERSITIES

## **ENVIRONMENT AND SUSTAINABILITY INITIATIVE**

Istanbul Bilgi University (BILGI) intensified its endeavors in the topics of environment and sustainability in 2009. BILGI became a party to the UN Global Compact and signed its voluntary and complementary action platforms 'Caring for Climate' and 'Principles for Responsible Business Education'. As an institution of higher education, which has been engaged in various social responsibility movements, BILGI has taken pioneering steps with the Rector Office's Environment and Sustainability Initiative.

### **The Aims of the BILGI Environment and Sustainability Initiative**

- Creating an interdisciplinary academic and social platform to generate proper space for discussions revolving around current issues of environment and sustainability.
- Conducting scientific research about environmental issues and sustainability.
- Training of future leaders, who would raise the public conscious in terms of environmental issues and sustainability.
- Applying inferences from research to real world situations in order to embody examples for the public.



# The Methodology of the BILGI Environment and Sustainability Initiative

- A network consisting of BILGI academicians, students and administrative staff was created in order to both serve as a base for the initiative and gain support from all members of BILGI.
- The Environment and Sustainability Working Unit, which was founded at the beginning of 2010, was developed to be a full-fledged Research and Application Center at Bilgi (by laws approved by the Turkish Higher Education Council and published in Official Gazette).
- 'Green Home' is planned to be built from environmentally friendly materials and with zero carbon emissions. The planned building will include a student activity center, the headquarters of the Environment and Sustainability Research and Application Center and an exhibition hall. After the signing of a sponsorship contract with ÇEDBİK (Environmentally Friendly Green Houses Foundation), the building will be under the supervision of the BILGI Faculty of Architecture. 'Green Home' is intended to exemplify the concept of an environmentally friendly house.
- The topics of environmental issues and sustainability are framed to be included in the freshman year curriculum.
- Bilgi BOT passed a resolution to use Green Electricity at all three BILGI campuses.
- A certificate program was prepared in collaboration with REC (Regional Environmental Center) and WWF (World Wildlife Fund for Nature) to raise awareness among the public.
- BILGI created an educational program funded by the UNDP and the UN Environment Program aimed at training environmental experts from Central Asia, where serious environmental problems are present.
- The Regional Environmental Cooperation (REC) Partnership for Sustainable Development in the Black Sea Region Summer Seminar was held at BILGI in June 2010.
- Projects like 'Green Bin' or 'Environmental Film Festival' were initiated at BILGI to make students aware of environmental issues. Within the framework of the UN Global Compact, new projects like 'Paper Project', 'Wild Life Festival' or 'Orchard' are planned for the new academic year.



## 7. Green Job Creation

# San Diego Gas & Electric ENERGY INNOVATION CENTER



<http://www.sdge.com/eic>





# Many SME's (companies) in renewable energy

## ... Projects financed in cooperation with Banks and Electric Companies





## You're Invited!

Join Property Owners, Building and Sustainability Managers County-wide for

# The San Diego Sustainability Tour

A Free Insider's Tour Featuring Commercial Energy Innovators



**Solterra EcoLuxury Apartments**  
Scripps Ranch



**UCSD**  
La Jolla



**Energy Innovation Center**  
Clairemont



**Kalos Family Rental Apartments**  
North Park



**Legal Aid Society of San Diego**  
Old Town



**City View Luxury Apartments**  
Downtown San Diego

**Space is Limited! RSVP Today: 858-220-3317 SDRESTour.eventbrite.com**

The tour is a FREE public service produced by the San Diego Renewable Energy Society (SDRES) and these sponsor-partners:



Special Thanks to:



Offering Energy Efficiency and Solar Loans from \$2,000 to \$50,000



Property Assessed Clean Energy (PACE) Financing for Commercial Properties

## BE SUSTAINABLY INSPIRED! IT PAYS.

Join the SDRES's 13th San Diego Sustainability Tour (formerly the San Diego Solar Tour; now packed with more ENERGY)

**Free, Guided Commercial Tour:** Friday, September 20, 10 am to 4:30 pm

Register: [SDRESTour.eventbrite.com](http://SDRESTour.eventbrite.com) (Space is limited!)

**Free, Self-Guided Residential Tour:** Saturday, September 21, 10 am to 2 pm

Learn more: [www.sdres.org](http://www.sdres.org)



**Solterra EcoLuxury Apartments**  
(114 units, HG Fenton)  
Scripps Ranch

**Solutions:** 334 kW PV system provides up to 100% of power. Garages pre-wired for EV. Dual-glazed, low-E windows, NEST-smart thermostats, In-home energy displays, HERS-rated HVAC, Low VOC paints  
**Contractor:** Home Energy Systems

**University of California at San Diego (UCSD)**  
La Jolla

**Solutions:** Fuel Cell Technology, PV, PV with Energy Storage, the Solar Slider (a project of Engineers for a Sustainable World, ESW)  
**Contractors:** Envision Solar, Fuel Cell, Inc.

**Energy Innovation Center**  
(San Diego Gas & Electric)  
Clairemont

**Solutions:** 62 kW Solar Grove, 47 kW Rooftop Solar, Cool Roof, Intelligent HVAC, A/C Diffusers, Lighting and Energy Management Controls, Smart Appliances, Passive Solar, Moisture Recovery, Recycled Materials  
**\*\*USGBC LEED Platinum Rating\*\***



**Kalos Family Rental Apartments**  
(83 units, Community HousingWorks)  
North Park

**Solutions:** 110 kW Solar PV, 76 kW Domestic Water Heating for Affordable Housing, 24-hour EV Charging  
**\*\*Anticipated LEED Platinum Rating\*\***  
**Contractor:** Adroit Solar

**Legal Aid Society of San Diego**  
(Tenant-owned Office Space)  
Old Town

**Solutions:** Boots-on-the-roof installation in progress. Cool Roof Featuring 75 kW LG High-Efficiency Solar Electric (PV) Modules and Enphase Microinverters  
**Contractor:** PURE Solar Power

**City View Luxury Rentals**  
(122 units, Greystar)  
Downtown San Diego

**Solution:** Solar Water Heating  
**Payback:** 4.5 years  
**Contractor:** SunUp Energy



# Northern California “Sustainable Careers” Electrical Education/ Training Center “Zero Net Energy Center”



**Opening Date: 30 May 2013**

***Save the Date!***

**Ribbon Cutting/Grand Opening**

**Thursday  
May 30, 2013**

14600 Catalina St., San Leandro

4:00 PM until 7:00 PM

Details To Follow

The Zero Net Energy Center is one of only a handful of U.S. Department of Energy designated 'zero net energy buildings' in the country and the first

**Zero Net Energy Center**

Electrical Training for Sustainable Careers

**SUSTAINABLE CAREERS CENTER**

**International Brotherhood of Electrical Workers Union**

**&**

**National Electrical Contractors Association**





**CHANGE IS POSSIBLE BY:**

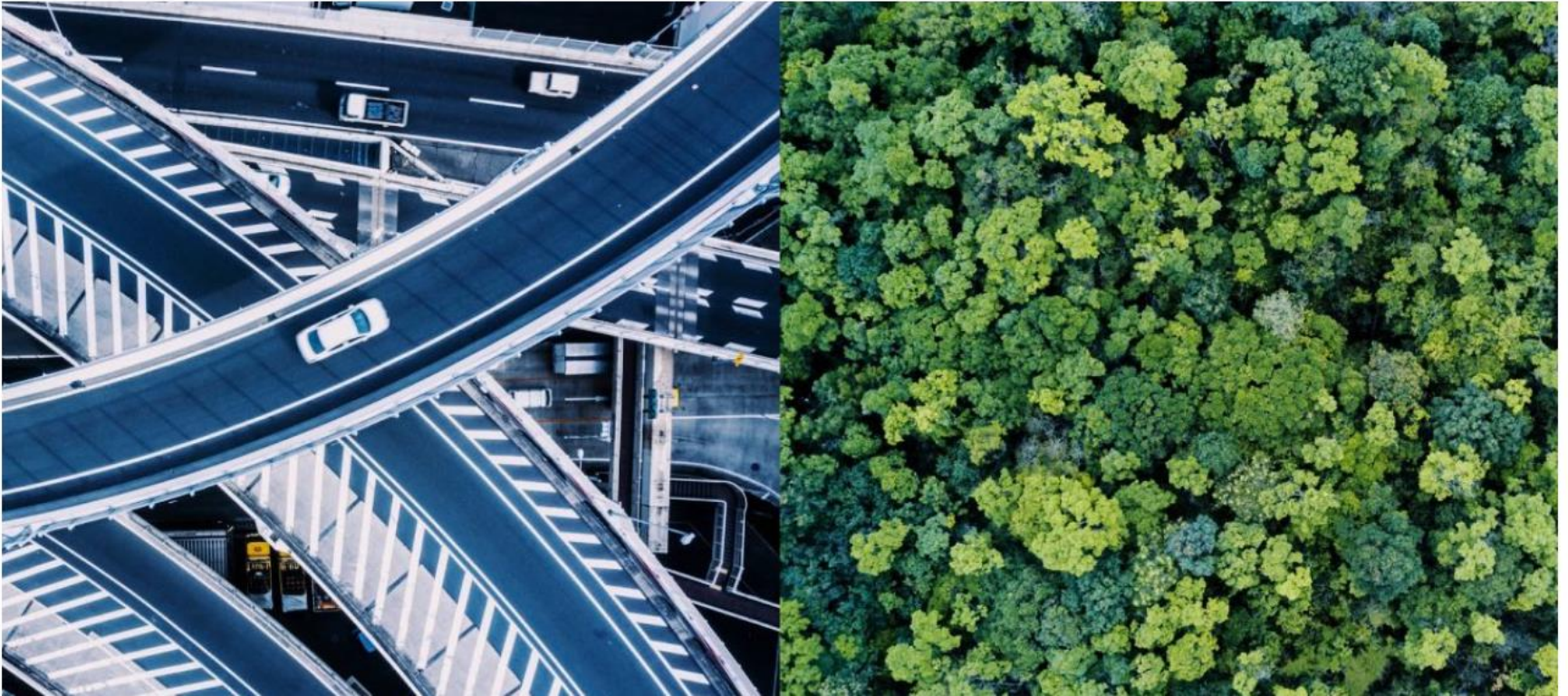
**CHANGING SOCIETAL PRIORITIES**

**CHANGING FAMILY AND INDIVIDUAL  
PRIORITIES**



# All Bolt rides in Europe are now 100% carbon-neutral

SEPTEMBER 25, 2019







**IT'S ACHIEVABLE**

**TO SWITCH TO RENEWABLES**  
**TO MAKE INDUSTRY GREENER**  
**TO INVEST IN CLIMATE ACTION**  
**TO BUILD LIVEABLE CITIES**  
**TO RESTORE OUR FORESTS**  
**TO USE ZERO EMISSION TRANSPORT**

<https://www.weforum.org/agenda/2017/04/we-ve-got-three-years-to-hit-peak-carbon-and-prevent-devastating-climate-change>

## Invest in the Future



Thank you...