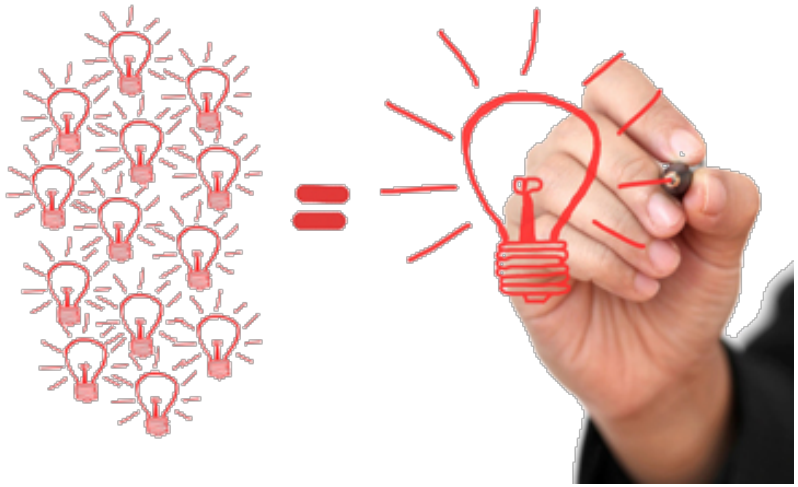


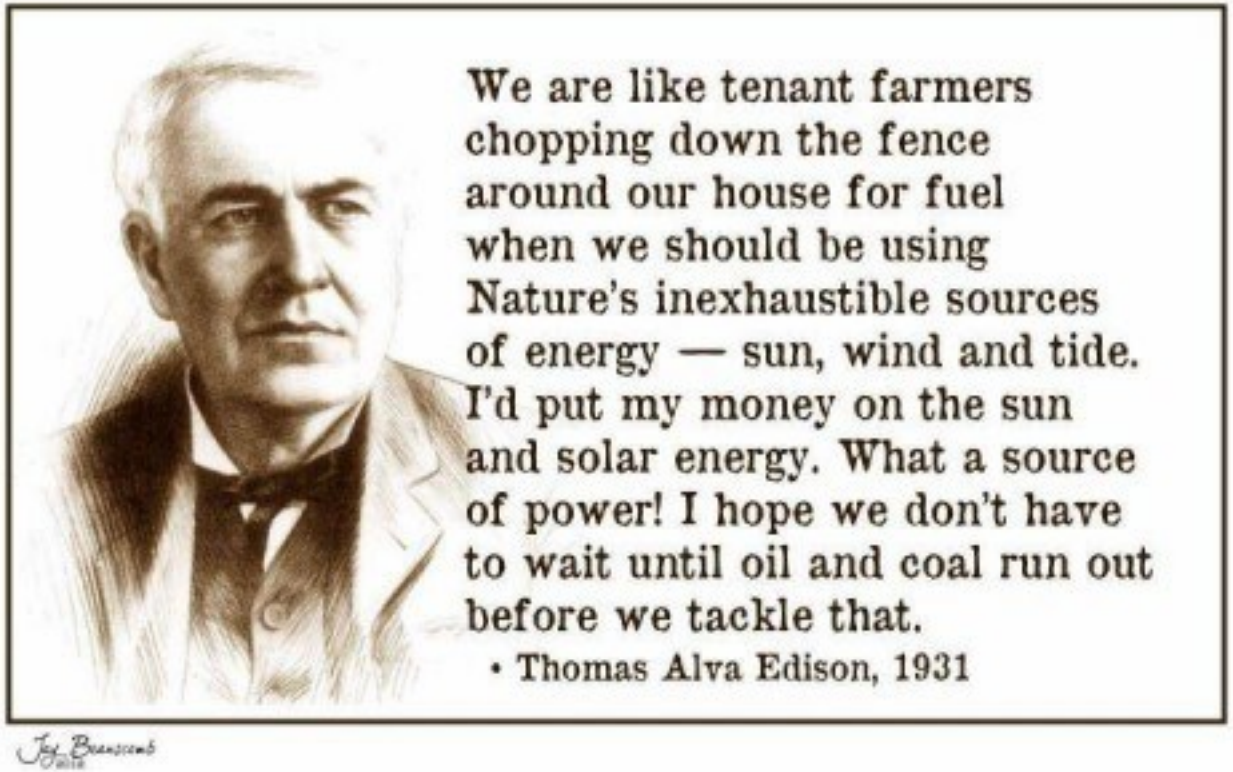
SCIENCE, TECHNOLOGY & INNOVATION

Transforming Development

Akash Bhavsar, B.S., MBA

Managing Director, Skyquest Technology Group

www.skyquestt.com

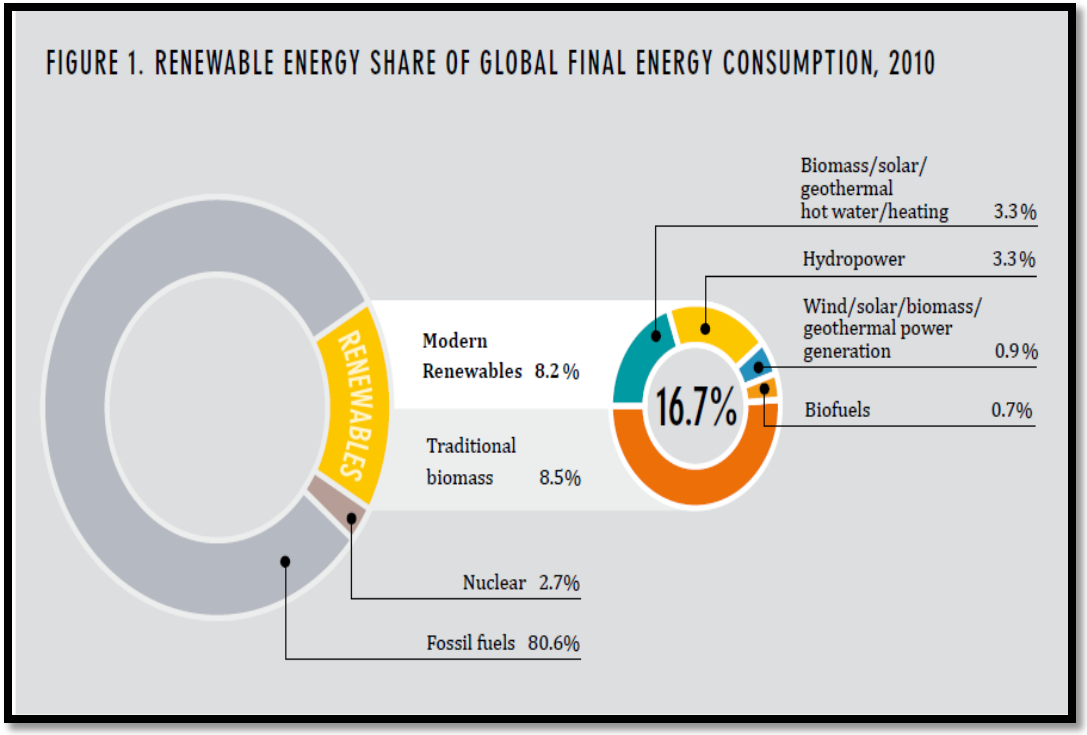


Global Energy Consumption (2010)

- Non-renewable Energy Sources Running Out fast – **Oil & Natural** Gas will be over in **70 Years** and Around **250 years** for complete depletion of **Coal**

- UN Secretary General's goal is to double the share of Renewable Energy in the global energy mix by 2030

- **'GREEN ECONOMY'** is the New Mantra



SOURCE: Renewable 2012 Global Status Report, BBC

Green Economy

- Economic development that is cognizant of environmental and equity considerations and promotes the earth's environment while contributing to poverty alleviation

- Three main aspects:
  - Environmental Sustainability and reduces Ecological Scarcities
  - Socially Justified
  - Locally rooted making the region Self Sufficient

Green Economy

HYDRO

BIOMASS

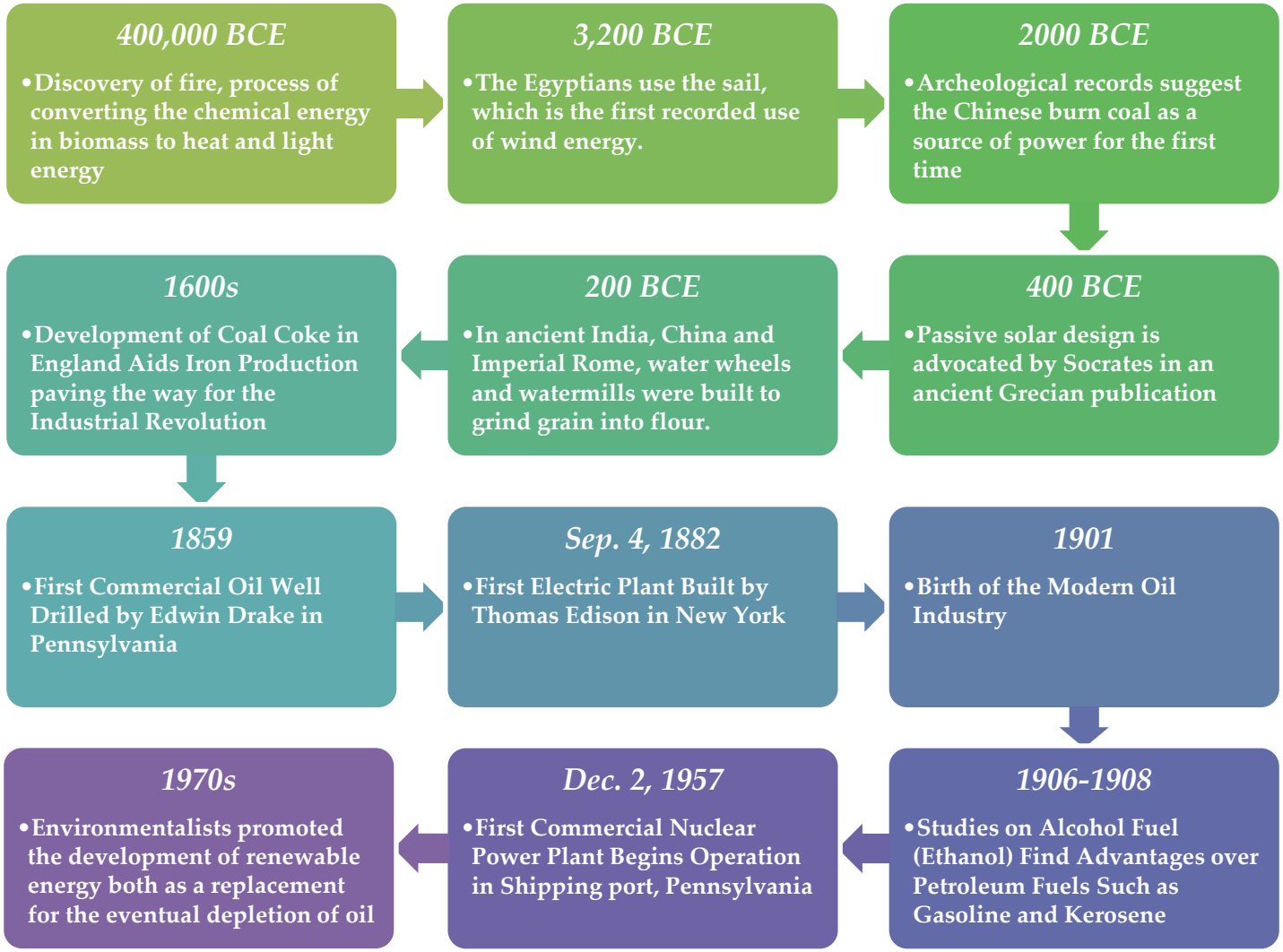
SOLAR

WIND

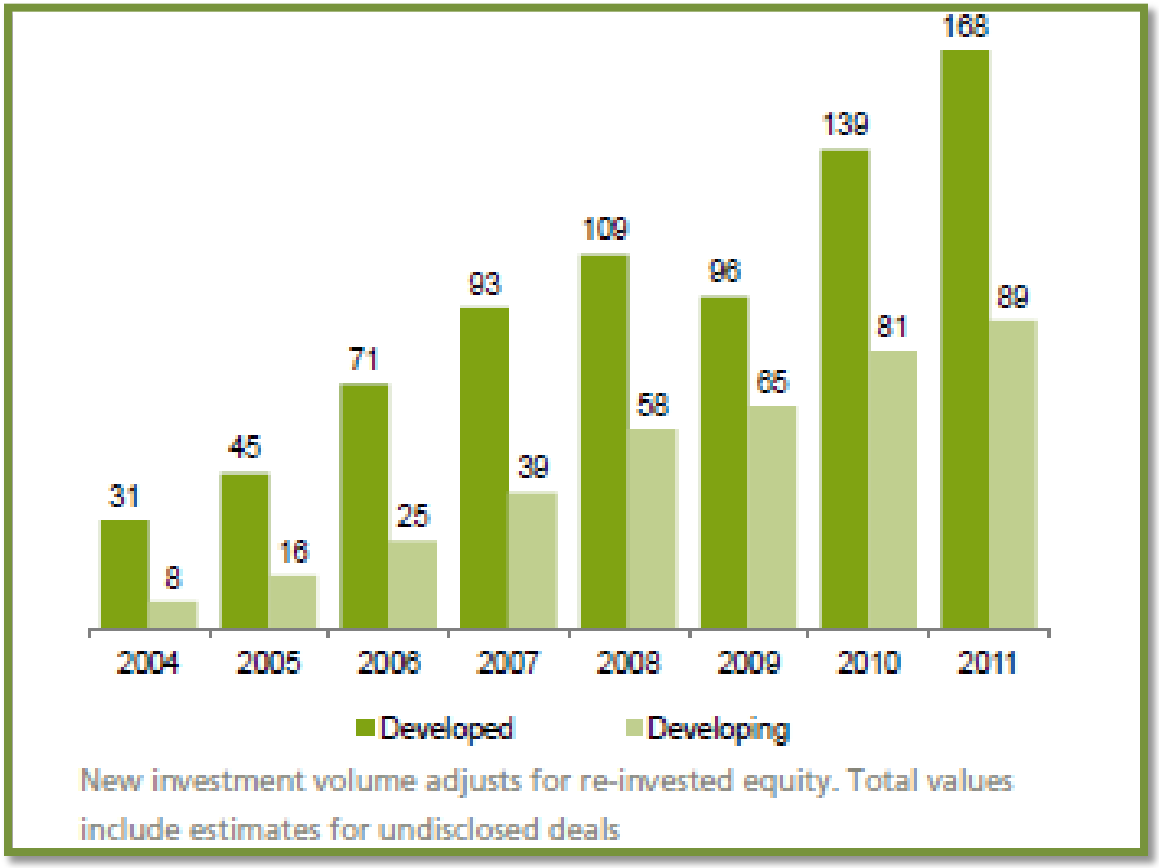
BIOFUEL

GEOTHERMAL

Breaking The Myth

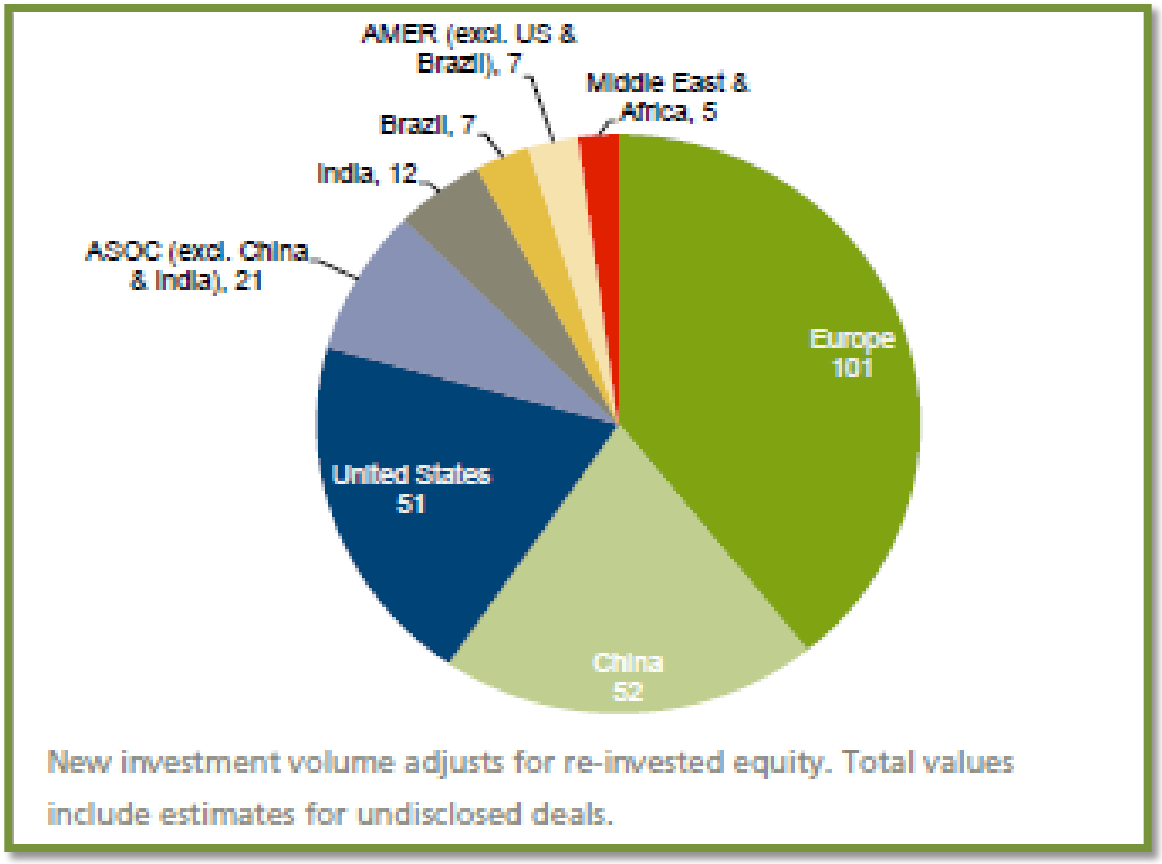


Renewable Energy Investment (Developing v/s Developed)



SOURCE: Bloomberg New Energy Finance, UNEP

Renewable Energy Investment (Region)

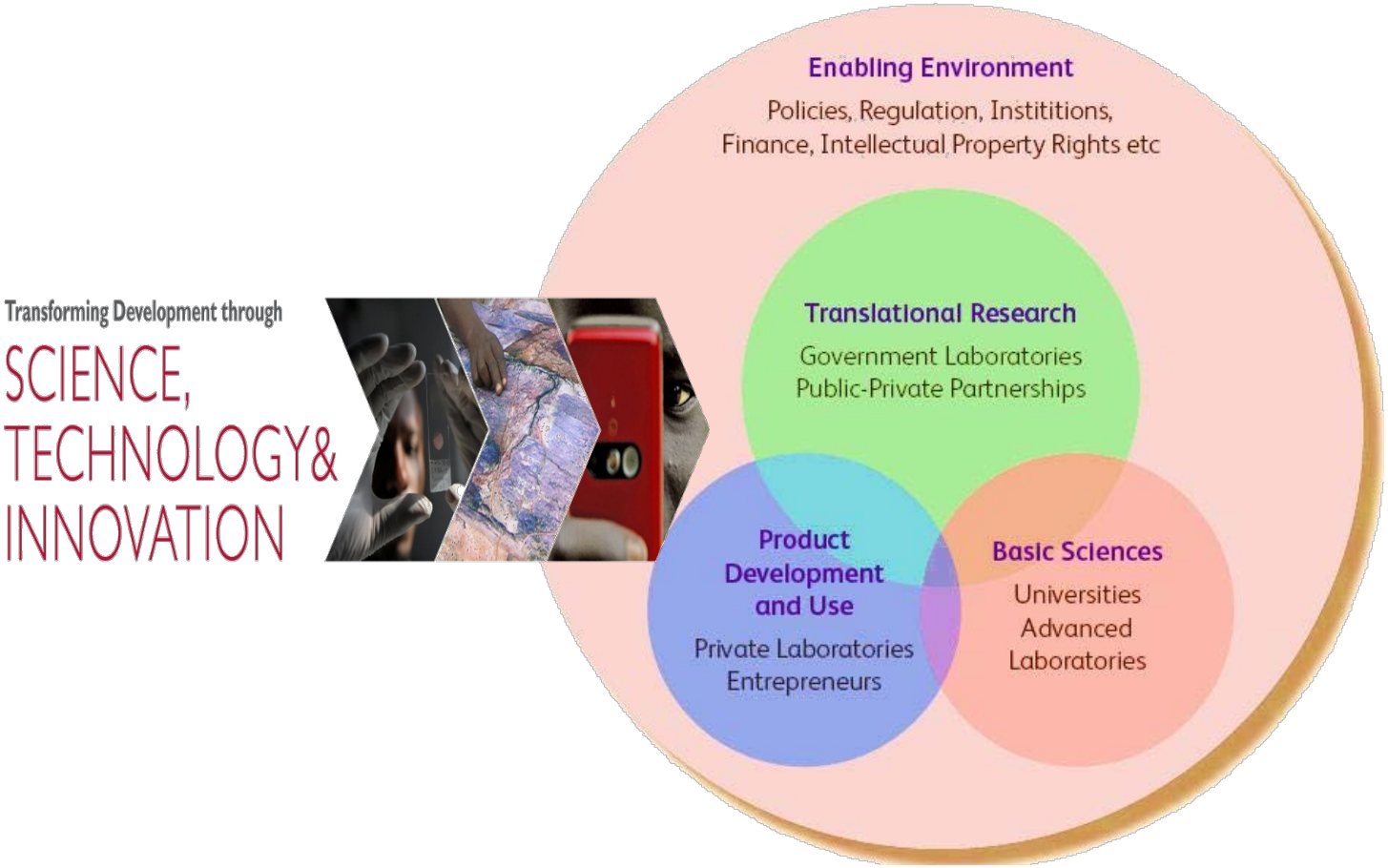


SOURCE: Bloomberg New Energy Finance, UNEP

Renewable Energy Technology

- Technologies that can harness energy from renewable source to usable form of energy like Fuel, Electricity or Heat Energy
- Renewable energy can contribute to grid-connected generation while having a large scope for off-grid applications
- Have been implemented in developing countries for a whole variety of different applications
- When executed with correct policy and solution control can be very suitable for remote and rural applications in developing countries

Components of RET Innovation System



RET Development

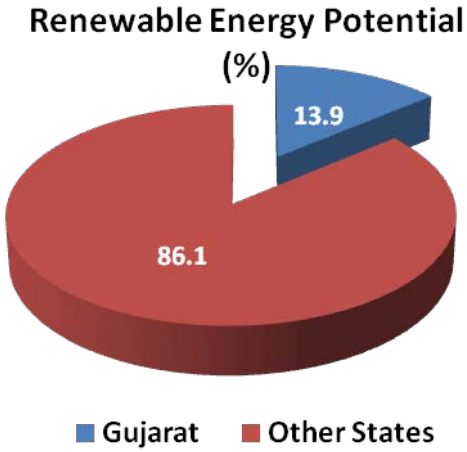
- Local Energy Needs
- Regional Capacity for Production
- Natural Resources
- Impact on Poverty Alleviation
- Co-operation and Collaboration
- Research and Innovation

Success Stories

Regional Capacity for Production & Available Natural Resources

Gujarat, INDIA: Energy Surplus State

- State with highest potential of renewable energy generation from various sources
- Stable Energy Policies and Project Implementation Plans
- Renewable Energy Sources potential not properly tapped



- Problems to be Address:
  - Grid connected power installation channels
  - Installing off-grid and decentralized renewable energy systems
  - Installation of decentralized solar energy devices like solar street lighting and solar lamps

SOURCE: www.sustainuance.com

Gujarat, INDIA: Energy Surplus State

- Reforms being made with New Government policies
- Applications to establish new projects under REC
- Exploring the potential of off-grid and decentralized renewable energy systems
- Taking Benefit of 'The Solar Energy Policy 2009' of India

- Solar Park
- Gujarat Solar Cities
- Integrated Solar City
- Rooftop Solar Power and Photovoltaic Program in Gujarat

SOURCE: www.sustainuance.com

Australian Renewable Energy Cluster

- Australia is developed country with huge economic and social prosperity.
- Prospect of similar growth in future is dependant on moving from an economy based on Natural Resources to Renewable Energy Resources
- Australia exhibits world's best natural conditions for Renewable Energy Generation along with strong intellectual assets to capitalize on it
- Great Renewable Energy Technologies developed and marketed across the globe
  - Pacific Solar
  - Areva Solar
- Gap in turning good ideas from such resources to successful business
- Lack in policies supporting such developments

SOURCE: Harvard Business School

Australian Renewable Energy Cluster

- Great opportunities around Renewable Energy with right structuring

- Reforms being implemented:
  - Tariff Support
  - Low Emissions Technology and Abatement Program
  - Market Support via Trade able Certificates
  - Grant and Community Programs
  - Clean Business Australia Green Building fund
  - Energy Innovation and Renewable Energy Funds

- Reforms needed:
  - National gross feed-in tariff for all renewable energy technologies
  - Mandatory Renewable Energy Target

SOURCE: WA Policy Forum

Success Stories

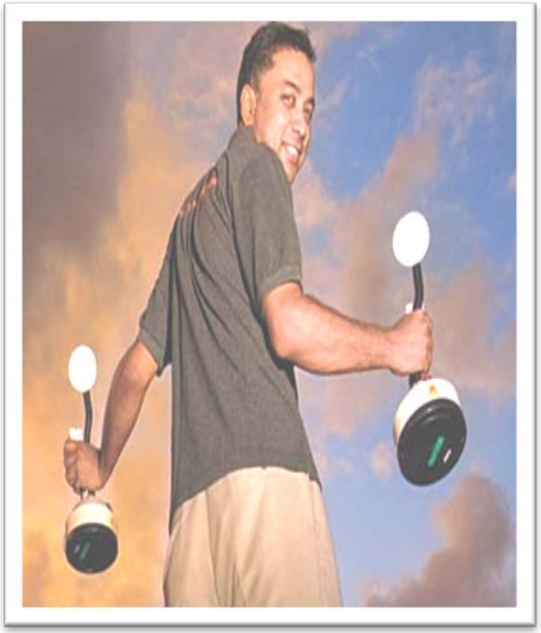
Fulfilling Local Needs & Energy Poverty Mitigation

SELCO, INDIA: Spreading Sunshine

- Over 400 million homes - **NO ACCESS** to ELECTRICITY
- Solar Electric Light Company (SELCO), set up in 1995 in Bangalore by Mr. Harish Hande and Neville Williams
- Renewable solar energy based lighting system products
- Giving power to 145,000 homes and small businesses
- Steady growth reflected with the profit of US$ 3.8 Million in 2012

SOURCE: Business Today

SELCO, INDIA: Spreading Sunshine



- The systems cost anywhere between US$ 170 – US$ 450 – No subsidies
- Caters to street vendors with solar lamps at a daily rental of 20 Cents to 25 Cents
- Aids customers in getting loans from banks and raises awareness about various market channels
- Today, even some areas that are connected to the grid use SELCO's lighting system as a backup
- System comprises of simple Panel, Battery & Charge Regulator

SOURCE: Business Today

TIDE, INDIA

- TIDE, India is a not for profit organization established in 1993
- Recipient of 2008 **Ashden Energy Champion Award**
- Recognized for commercialization of affordable wood saving stoves in Kerala, Karnataka, Tamil Nadu and Andhra Pradesh
- Works through network of extension agents
- Funded through grants from government, funding agencies and private donors.
- Basic design of stove remains same

SOURCE: Ashden Energy Champion Award

Traditional Stove

TIDE's New Technology Stove

TIDE, INDIA

- Subsidies are industry based, hence not a key factor in designing costs
- Full payment done by customer, may or may not be loan based
- Benefits:
  - Affordable
  - Environmental
  - Social
  - Economic and Employment
- Great scope in future for development
- Obstacles common in growth are breaking the mindset of people to get in the field and resource availability

SOURCE: Ashden Energy Champion Award

Success Stories

Co-operation and Collaboration

British Columbia Canada

- British Columbia, Canada's gateway to the Asia-Pacific
- Instrumental in Science and innovation for RET development
- Cluster of Canada based companies like Greenlight Innovation, IMW, CB Williams, Xebec, Carmanah Technologies and Tahtsa Pellets working towards Clean Energy Technology Development
- Renewable Energy investment $100 billion, $15 billion in investment-ready projects and 37,000MW of renewable power ready to be tapped
- Developed power projects in British Columbia amounting for 14% of domestic electricity requirements

SOURCE: British Columbia, Canada Official Website

British Columbia Canada

- Incentives provided:
  - Research and Development
  - Venture Capital
  - Up to 100% recoup on income taxes from patents in Renewable Power Generation
  - Target Based Incentives

- Success Stories
  - In May 2011, **Shanghai University** signed a $400,000 deal with BC based **Greenlight Innovation** for purchase of fuel cell testing system.

  - Surrey based **Endurance Wind Power** finalized seven deals to export their advanced wind turbines to UK with the help of 10 distributors.

  - March 2011, **Daimler** in collaboration with **Automotive Fuel Cell Cooperative** announced opening of fuel cell stack manufacturing plant underscoring its key role in Clean Technology.

SOURCE: British Columbia, Canada Official Website

Norway to Support Renewable Energy Sector in Angola

- The governments of Angola and Norway signed a cooperation protocol in the area of renewable energy, for the 2013-2015 period.

- Norway being highly developed country in terms of hydroelectricity, Angola hopes to benefit from their learning.

- Terms of Protocol, Norway will:

- Provide technical assistance in organizing training for Angolan Energy and Water Ministry
- Support Angola in campaigning for efficient electricity use.
- Provide technological assistance in execution of the investment program for pre-paid electricity meters

SOURCE: MacauHub News

Success Stories

Drawing Inspiration From The European Union

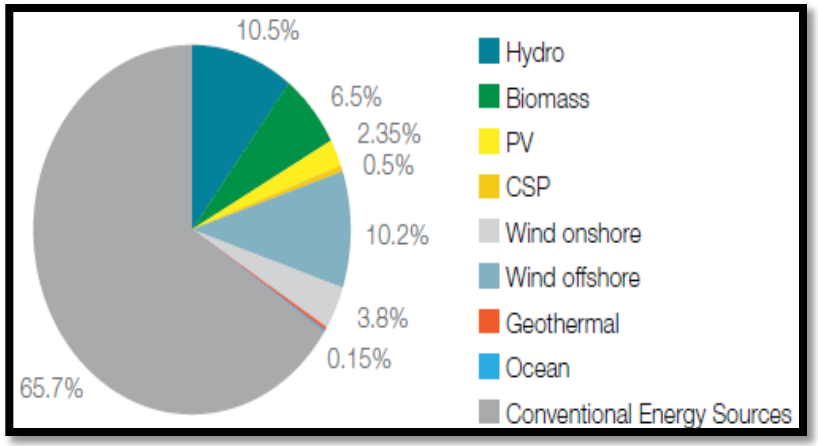
RE-Thinking 2050

- A 100% Renewable Energy Vision for the European Union

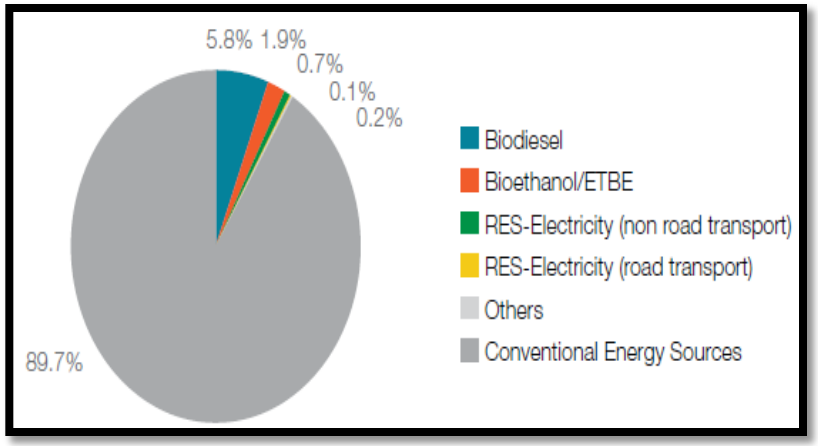
- Three main objectives:
  - Reduce GHGs to 20% below.
  - Increase share of Energy from Renewable sources by 20%.
  - Reduce emissions by 20% by using energy efficient appliances.

- Policy measures:
  - Supporting the transition towards a 100% renewable energy economy with all EU policy areas
  - Less is more – an ambitious framework for Europe's energy demand
  - Effective and full implementation of the new RES Directive
  - Binding renewable energy targets for 2020
  - Full liberalization of the energy market
  - Phasing out all subsidies for fossil and nuclear energy and introducing an EU-wide carbon and energy tax

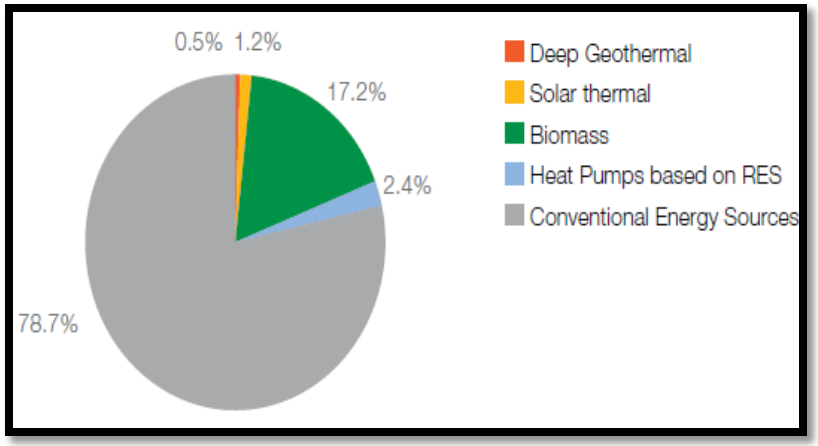
Energy Mix for Different Sectors (Target 2020)



Electricity



Transport



Heating & Cooling

SOURCE: EREC based on NREAPs

The European Union Approach

UK State Action Plan to Reach target of 15% by 2020

- Defined individual sector targets:
  - 30% Electricity
  - 12% Heating/Cooling
  - 10% Transportation

- Three main steps to reach the target:
  - Obtain Financial support for renewable Energy
  - Remove barriers in delivery of Renewable Energy
  - Invest in Innovation and develop New Technologies

The European Union Approach

Germany State Action Plan to Reach target of 18% by 2020

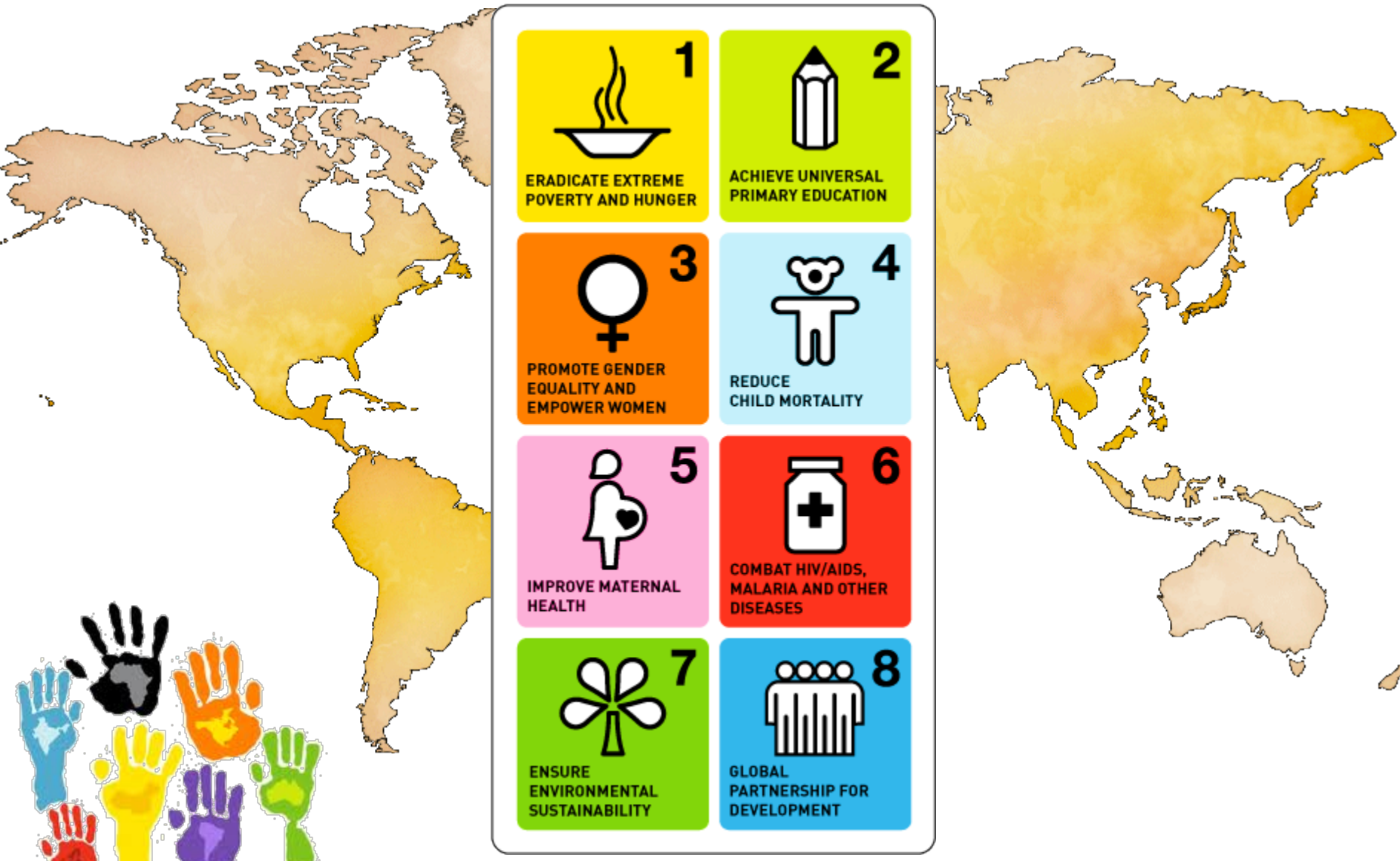
- Individual sector targets:
  - 38.6% Electricity
  - 15.5% Heating/Cooling
  - 13.2% Transportation

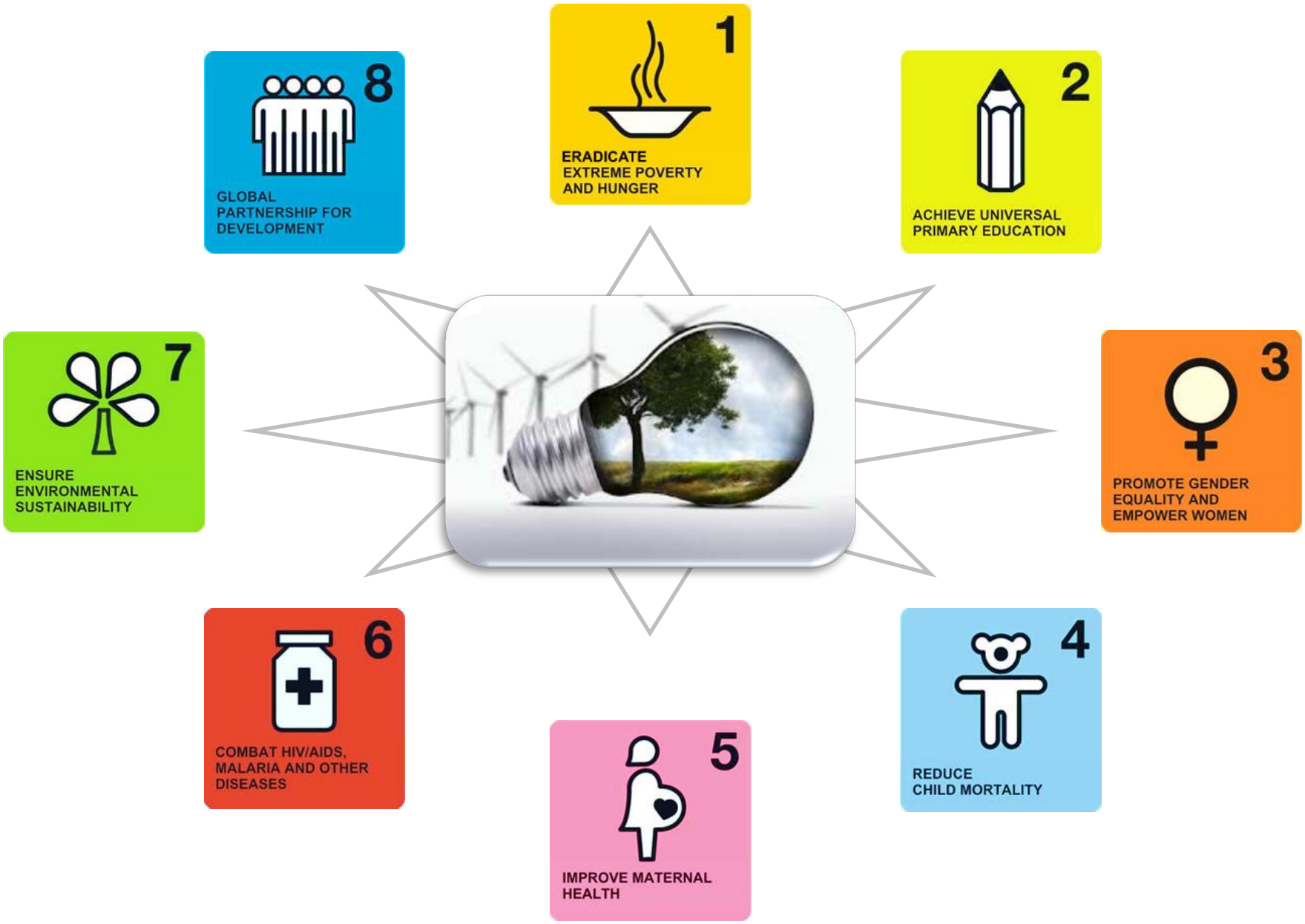
- Aiming for 19.6% Energy from Renewable Energy

- Plan of Action:
  - Incentives for Renewable Energy projects
  - Range of R&D schemes

How can it help achieve MDGs?????

Millennium Development Goals





The Future of Renewable Energy

Emerging Technologies

- **Ocean Energy**
  - First commercial Tidal power Station installed in Ireland
  - Helped power thousands of homes
  - Minimal environmental impact and no danger to wildlife

- **Cellulosic Ethanol**
  - Bio-fuel from non-edible parts of a plant, grass and wood
  - Reduces GHG emissions by 85%
  - Companies like Novozymes, Diversa working on enzymes for the process

- **Hot-Dry-rock Geothermal Power**
  - Useful form of energy obtained is Steam
  - No adverse impacts and no emissions
  - Same water can be reused over an over again
  - Freedom of choice of location

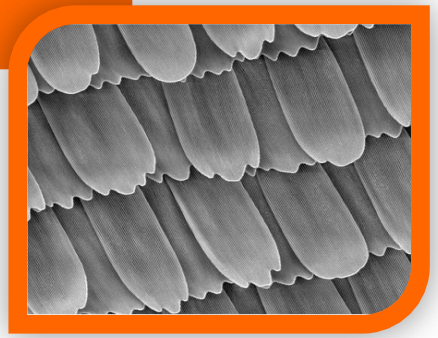
Bio-mimicry: Nature at its Best

Shorter and More Efficient Wind Turbines Mimicking Fish Schools

Imitating Humpback Whale Bumps For Power Generation

INSPIRATION FROM THE NATURE

Harvesting Ocean Power



Improvements To Solar Cells & Energy Storage Through Understanding Butterfly Wings

World's First Base-load (24/7) Solar Power Plant

Solar Cells that retain 99% of Energy for 24 hours

- **Gemasolar** is the world's first utility-scale commercial base-load Solar Power Plant
- A joint venture between Spain's Torresol Energy and Masdar - Abu Dhabi's Future Energy Company
- "**Eco-city**" proposed will derive all its energy from Solar Power Plant
- Implements the principle of Concentrating Solar Power (CSP)
- 19.9 MW Plant with 15 hour Battery and expected Production of 110.000 MWh per year

SOURCE: Forbes.com

World's First Base-load (24/7) Solar Power Plant

Masdar's Proposed New "Eco-city" In The UAE

- Technology Details:
  - Two tanks with Molten Salt Thermal Energy
  - Salt base used is 60% Potassium nitrate with 40% Sodium nitrate

"The ability to store energy when the sun is at its peak and deliver it when the market demand is at its peak changes everything in the power market. My fuel cost is zero. Natural gas can simply not compete with us."

- Mr. Arias (Chief Infrastructure Officer, Torresol's)

SOURCE: Forbes.com

Conclusion

"Preparation through education is less costly than learning through tragedy."

- Max Mayfield (Director, US National Hurricane Center)

SkyQuest
Building Invention Economy

IP Focused Research & Investment Banking

SkyQuest Technology Group

About Us

SkyQuest Technology Group is a Global Technology Aggregator & Accelerator is profoundly engaged in innovation ecosystem with myriad stakeholders in various capacities helping them leverage external sources of R&D and create value from intellectual property. It operates by way of:

SkyQuest Technology Consulting Pvt. Ltd., INDIA

Research, Investments, Technology Transfer & Market Entry (India, Israel, MENA)

Skyquest Technology Ventures, USA, CANADA

Investments, Technology Transfer & Market Entry (NA, EU)

SkyQuest IRN Associates Inc., CHINA

Research, Investment, Technology Transfer & Market Entry (China, Far East & ASEAN)

Investigators Forum Network, INDIA

Low-cost Clinical Development & Usability Studies for New Tech

Global Healthcare Innovations, INDIA, CHINA, EU, NA

MedTech Regulatory Affairs & Distribution management (India, China, ASEAN, EU, NA)

Ingenuity Ventures, EMERGING MARKETS

Early Stage Investments in Health & Nutrition, New Energy, Water tech & Agriculture

Industry Expertise

Life Sciences

- Biotechnology
- Diagnostics
- Healthcare
- Medical Devices
- Pharmaceuticals

Agritech

- Agri-Inputs & Equipment
- Seeds & Plant varieties
- Irrigation & Water mgmt.
- Dairy & Food Processing
- Veterinary Sciences
- Food Security

Cleantech

- New & Renewable
- Climate Change Solutions
- Clean Chemistry
- Waste Management
- Water Treatment & Remediation

Nanotech & Engineering

- Nano formulation & delivery Approaches
- New Materials & Nano applications
- Engineering & Manufacturing

IT & Communication

- Healthcare IT
- Agriculture Applications
- Energy Applications
- Water Applications
- Communication Platforms

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σ' ευχαριστώ

merci beaucoup

obrigado

dank u wel

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धन्यवाद

danke schön

Thank You

спасибо

謝謝你

ありがとう

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