



Promoting Renewable Energy
Regulatory Framework and Policy Direction
Workshop No. 2, Energy Summit
Catherine P. Maceda, RE Coalition

Snapshots of RE

Iceland: Highest proportion of RE

- Renewable energy supplies over 70% of Iceland's primary energy needs since 1999
- At the forefront of renewable energy research, with plans to become the world's first hydrogen economy
- Iceland is well on its way to achieving complete energy security and independence



Mojave Desert in the state of California



- Collectively known as the Solar Energy Generating Systems (SEGS)
- Combined capacity of 354 MW
- The state obtains 10% of its energy needs from renewable energy sources



Denmark: Harnessing the Power of the Wind and Boosting the Country's Economy

- By the year 1900, there were already 2500 windmills in the country of Denmark
- accounts 20% of the country's electricity production
- Target is to produce 35% of the country's electricity by 2015
- Research and development play crucial roles in strengthening Denmark's position as the leader in wind energy.



RE and the Philippines

2008 PHILIPPINE ENERGY SUMMIT

Congress urged to approve RE Act

THE NATIONAL GEOTHERMAL Association of the Philippines (NGAP) urged Congress to fast track the approval of the Renewable Energy (RE) Act before its three-month break in February.

The Renewable Energy Bill, which provides for mechanisms and incentives to promote the development of renewable energy sources, was passed on third reading

Artists call for renewable energy



Ms. Philippines-Earth beauties showing off their "Renewables Now" bands

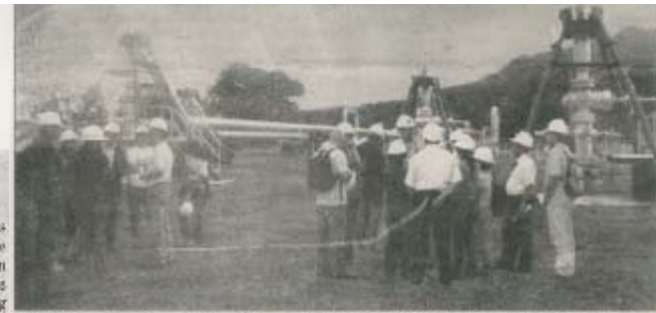
ARTISTS and musicians joined calls for the passage of the Renewable Energy Bill, echoing other groups hoping for the bill's passage.

The Renewable Energy Bill has been passed on the third reading at the House of Representatives, but is still pending at the Senate. The bill provides for incentives and mechanisms to speed up the development of renewable energy projects in the country.

The country's renewable energy sources include wind, solar, geothermal, biomass, and ocean energy.

The passage of the bill is expected to lessen the country's dependence on traditional fossil fuel sources such as coal and oil, bringing about environmental benefits as well as foreign exchange savings to the country.

At the Earth Day Jam concert held in Quezon City over the Earth Day weekend, performers came onstage sporting the newly launched "Renewables Now" green baller band distributed by members of the Renewable Energy Coalition, a multi-sectoral group campaigning for renewable energy development in the country.



Key technical staff of the Senate committee on energy visit the Makiling-Banawa (Ma-Ban) geothermal complex in Laguna.

Quick passage of renewable energy bill urged

THE country stands to benefit by as much as \$1.23 billion over the next 10 years if it will pursue the development of its renewable energy resources, but the appropriate incentives and policy framework have to be put in place.

According to Mario Manatigan, director of the Energy Department Energy Utilization Bureau, the Philippines has considerable renewable energy resources which

various senators and senate committees, including the Senate Committee on Energy. The tour was organized by the Renewable Energy Coalition which has been advocating for the swift passage of the Renewable Energy Bill. The House committee on energy recently adopted and endorsed HB 5563 for plenary consideration. The Senate Committee on Energy is also considering a counterpart

created by the country's geothermal pioneer Unocal Philippines, Inc., and the micro-hydro facilities which supplies power to the Villa Escudero plantation-resort. Among the country's renewable energy sources, geothermal and hydro are relatively the most developed, accounting for 18 percent and 15 percent of the total power generation. The Philippines is also the world's second largest pro-



ROSALES

Rosales airs call to help against global warming

By LESLIE ANN G. AQUINO

Manila Archbishop Gaudencio Cardinal Rosales has called on Filipinos to save the country from the effects of climate change by reforming their ways. "The warming of our planet is not a natural occurrence; it is mostly man-made. Unless we reform our ways, there will be no miracles for us in the future," Rosales said in his pastoral letter dated Sept. 11, 2007.

Rosales issued the statement contending that the environmental dangers that Filipinos face are coming true now, adding that the problem has become global. Almost 20 years ago, bishops warned of a similar climate change in a pastoral letter, he said.

GMA pushes renewable energy measure

By DONNABELLE L. GATDULA

To underscore the need to increase energy independence, President Arroyo is pushing for the speedy passage of the Renewable Energy Bill.

The chief executive made the call in her speech during the recent inauguration of Shell group's compressed natural gas (CNG) pilot project which is also considered as part of the government's program to promote the use of renewable en-

ergy sources, not only in power but also in the transport sector.

"Two years from now, all fossil gasoline fuel actually sold and distributed by every oil company in the Philippines shall contain a minimum of five percent bio-ethanol blend. And now, especially that we have this pilot on natural gas, we call on Congress to pass urgent legislation on the development

and promotion of renewable energy sources with a Renewable Energy Bill," Arroyo said.

In a similar note, Energy Secretary Angelo T. Reyes, during the recently-concluded National Conference on Climate Change Adaptation in Legazpi City in Albay, said the initiative to mitigate climate change could also hinge on the ability of the country to utilize more

Investors await passage of renewable energy bill

By PAUL ANTONIO A. JELA

Manila

GMA—Several investors have expressed interest to help the government achieve its target of increasing its generation capacity in the next 10 years, however the realization of such investments in the environment contingent on the passage of the Renewable Energy Bill by Senate, Mario C. Rosasagat, Director for Energy Utilization Management Bureau (EUMB) said Tuesday.

In a formalization tour of Manila's formalization tour of Renewable Energy Initiative, Manatigan said that there is around 4,000 power to 4,700 megawatts in internal capacity needed, based on Philippine Development Plan 2005 to 2014.

Manatigan said that as a rule of thumb, a power plant could cost an average \$2 million per megawatt.

"We have already received formal investments from international

investors, but we are waiting for the passage of the renewable energy bill," Manatigan said.

The energy official said DOE believes that the renewable energy bill pending in the Senate could help speed up the realization of these investments and address the issues that hold back the development of renewable energy.

Manatigan said the bill provides both fiscal and non-fiscal incentives not only to developers, but even to the technology providers in the event that these technologies become commercially operational.

"We remain optimistic that the bill will speed up the development of the renewable energy development in the country.

The bill should also help the development of renewable energy to be more competitive, he said.

He said that the bill does not ask for more investment other than what is provided by the Department of Finance with regard to its effort to

attract investments, and that the provided incentives are all in line with the rationalized investment and incentive package of the government.

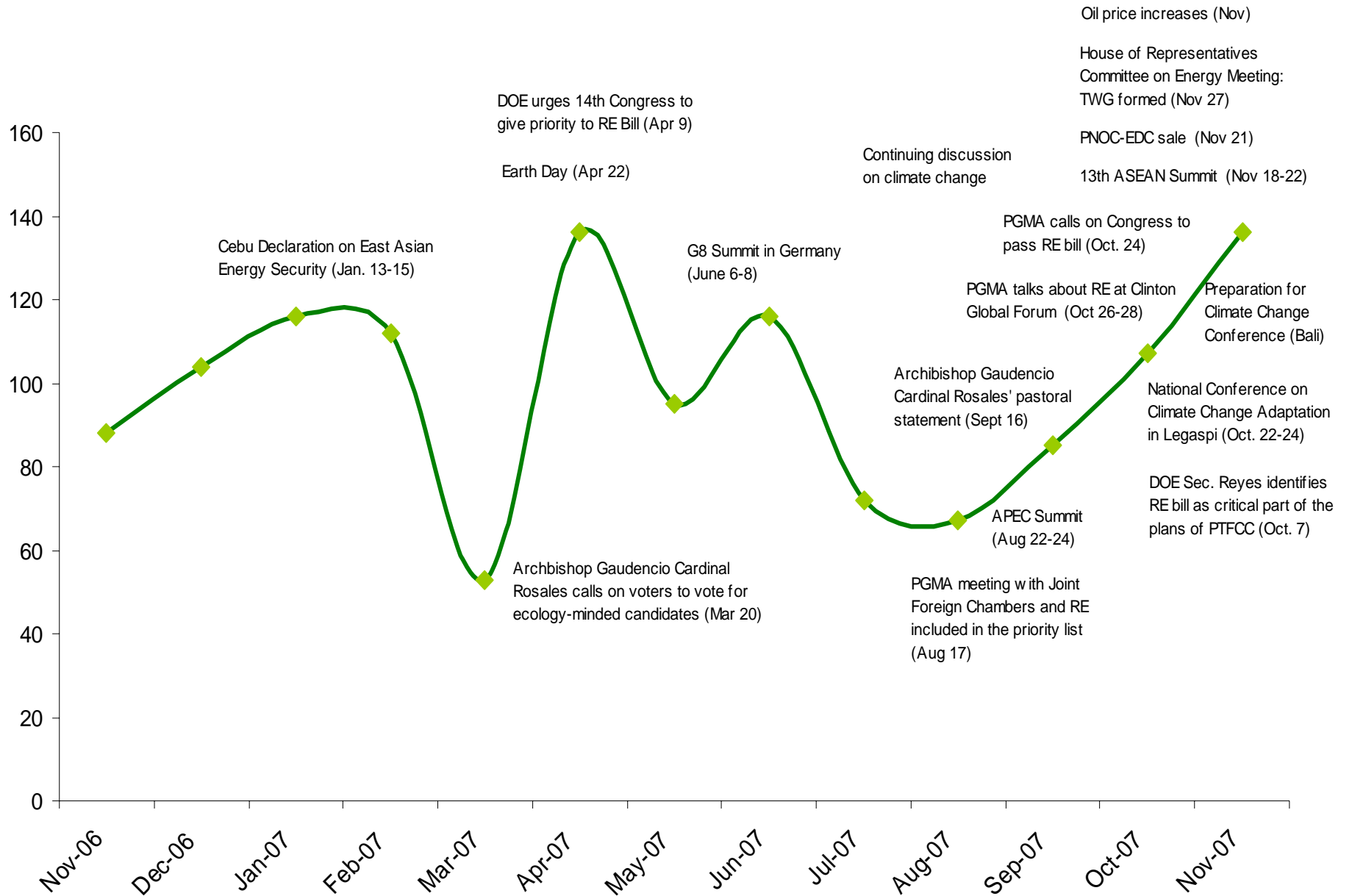
While renewable energy power plants entail higher initial capital outlay, Manatigan said that in the long term its benefits include energy savings.

"As a structured market, if you are allowing a certain percentage of our foreign exchange allocation to be used to buy field, what would be the impact if we use our own?" Manatigan said.

Under two simulated scenarios, Manatigan said that the Philippines would experience a net benefit of as much as \$1.23 billion or \$67 billion from developing renewable energy.

"With the renewable energy bill enacted into law, we would be able to strengthen the partnership between the private and public sector to develop our own and have 'clean energy' and to proceed with the socioeconomic development of our rural areas," Manatigan said.

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The Philippine Oil Situation

- In 2006, the country produced only 10% of its fuel demand
- In 2006, the country's net oil imports (crude and petroleum product imports less petroleum exports) went up 20% to \$6.8 billion.
- Net oil imports for Jan-Aug of 2007 was at \$4.8 billion while demand was placed at 287,000 barrels/day up by 4% from 2006

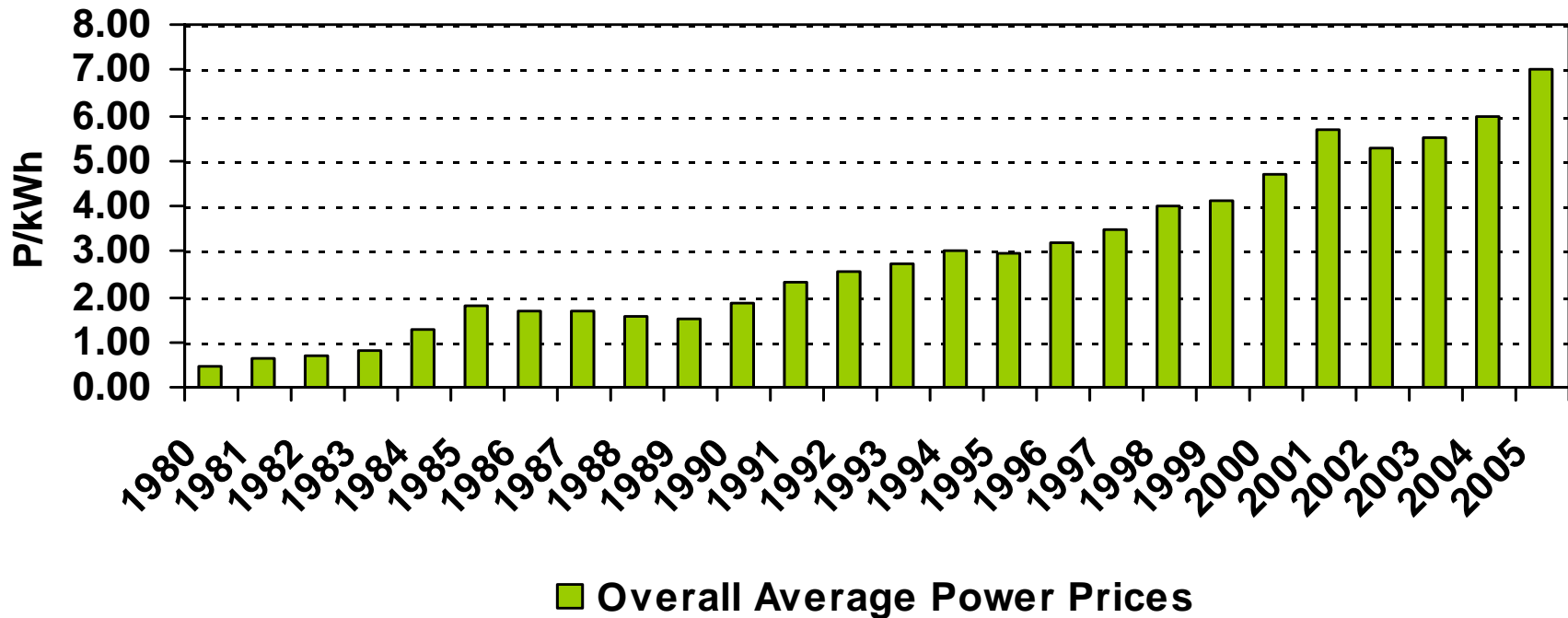


Net oil imports = \$6.8 billion

This can:

- Send 34.921 million children to elementary school
- Construct 494,545 classrooms
- Build 272,000 health centers
- Feed 28,169,000 families in a year
- Build 77,714 kilometers of farm-to-market roads

Philippine Energy Scenario



- Dependence on foreign oil has also translated to higher power prices that are passed on to the consumers
- This in turn impacts the vibrancy of our economy, business interests, and employment

Energy Sector Agenda: Energy Independence and Power Market Reforms

- To realize 60% self-sufficiency, the DOE has laid out specific sectoral targets
 - RE Sector's contribution would be to increase its capacity by 100% in 10 years

Primary Energy Mix, in Percent

| Energy Source | 2005 | 2010 | 2014 |
|--------------------------------|-------------|-------------|-------------|
| <i>Imported Energy</i> | 42.9 | 38.5 | 42.1 |
| Oil | 36.5 | 28.4 | 29.8 |
| Coal | 6.4 | 8 | 7.7 |
| Natural Gas | - | 2.1 | 4.6 |
| <i>Indigenous Energy</i> | 57.1 | 61.5 | 57.8 |
| Oil | 4.6 | 3.6 | 2.3 |
| Coal | 3.2 | 4.9 | 4.8 |
| Natural Gas | 7.7 | 10.7 | 10.7 |
| <i>Renewable Energy</i> | 41.7 | 42.4 | 40.1 |
| Hydro | 4.6 | 4.3 | 4.5 |
| Geothermal | 6.3 | 6.6 | 5.8 |
| Biomass, solar & wind | 30.8 | 31.5 | 29.8 |

Source: DOE, PEP 2005 Update

The Power Sector

| Installed Capacity by Plant Type (2006) | | |
|--|--------------------------------|------------------|
| <i>Plant Type</i> | <i>Installed Capacity (MW)</i> | <i>Share (%)</i> |
| Coal | 4,177 | 25.4 |
| Oil-based | 3,602 | 23.4 |
| Hydro | 3,257 | 20.6 |
| Natural Gas | 2,763 | 17.7 |
| Geothermal | 1,978 | 12.7 |
| Wind | 25 | 0.2 |
| Total | 15,803 | 100 |

33.5

Source: DOE

- As of 2006, Coal and Oil remains to be the most utilized means of energy taking 48.8 percent of the country's energy mix
- Meanwhile, Renewable Energy provides 5,260 MW or 33.5 % of our installed capacity
- The DOE has developed the Renewable Energy Policy Framework (REPF, 2003-2013) which calls for the aggressive development of renewable energy resources, as part of the efforts to achieve the energy independence agenda

Is there a demand?

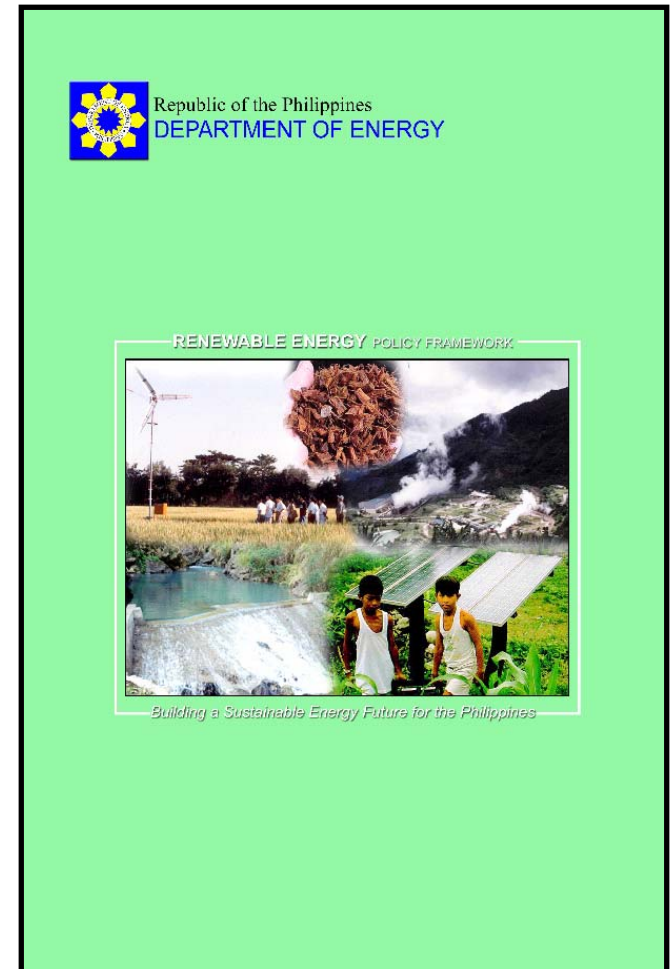
| Grid | Capacity Requirement, MW | Period Required |
|-------------|--------------------------|-----------------|
| Luzon | 1,990 – 2,290 | 2010 – 2014 |
| Visayas | 980 | 2008 – 2014 |
| Mindanao | 1,030 – 1,080 | 2006 – 2014 |
| Philippines | 4,000 – 4,350 MW | 2006 - 2014 |

Source: DOE, PDP 2006 Update

Existing RE Policy Framework

Overall Policy for RE Development

- Renewable Energy Policy Framework launched in August 2003
- Policy bias towards the development and utilization of renewable energy
 - Promote more private sector participation in RE development
 - Encourage the use of renewable energy in rural development & off-grid electrification
 - RE projects given “priority” for special incentives
- RE Bill filed in Congress to promote development & utilization of clean energy



Objectives

- Increase RE-based capacity by 100% - “100 in 10”
4,450 MW → **9,148MW**
- Be the No.1 geothermal energy producer in the world
- Be the No. 1 wind energy producer in SE Asia
- Double hydro capacity
- Be the solar cell manufacturing hub in ASEAN
- New contribution of biomass, solar and ocean by more than 100 MW
- Increase non-power contribution of RE to the energy mix by 10 MMBFOE within the next ten years



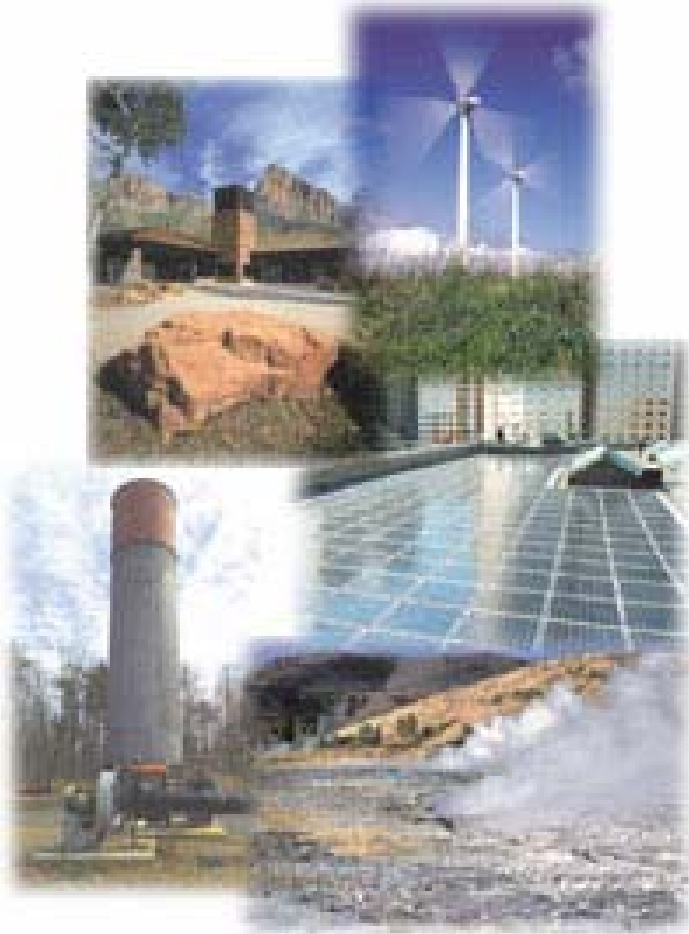
Ten Year Targets

(in MW)

| | 2002 | Target Additional Capacity | 2013 |
|-----------------------|--------------|----------------------------|--------------|
| Geothermal | 1,932 | 1,200 | 3,132 |
| Hydro | 2,518 | 2,950 | 5,468 |
| Wind | 0 | 417 | 417 |
| Solar, Biomass, Ocean | 0 | 131 | 131 |
| TOTAL | 4,450 | 4,698 | 9,148 |

RE Resources

Resource Overview



- A US-NREL study shows :
 - Wind resources – over 10,000 km² with 76,600 MW of potential installed capacity
 - Micro-hydro applications – potential capacity of at least 500 kW in Northern Luzon & Mindanao.
 - Solar radiation nationwide – an annual potential average of 5.0 - 5.1 kWh/m²/day
- Mini-hydro potential capacity of 1,784 MW from 888 sites
- Ocean energy resource – potential capacity of about 170,000 MW
- Biomass (bagasse) total potential of 235 MMBFOE

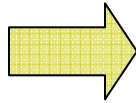
Challenges

- Market
 - Integration into grid operations
 - Market-oriented development rather than grant-based
 - Financial incentives need to be rationalized
- Financing
 - High initial cost
 - Lack of appropriate financing mechanisms
 - Lack of expertise in business development
- Technical
 - Limited technical expertise
 - Undefined quality control standards
 - RE development has relatively few success models

RE: Pursuing Policy Options

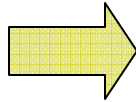
Why RE Bill?

Energy Security



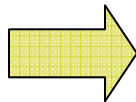
- Supports government goal of 60% energy self-sufficiency by 2010

Climate change imperative



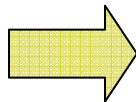
- Addresses environmental concerns
- Visionary: prepared for when consumers will demand/prefer green energy
- Widens carbon trading opportunity for RP

Economic/ Local Development



- Promotes favorable investment climate
- Leads to avoided fuel costs or foreign exchange
- Promotes rural/off-grid development
- Estimated \$1.23 B net benefits through dev't of 2,500 MW of RE until 2014 (CBRED)
- Health, welfare benefits due to less air pollution

Moral Imperative

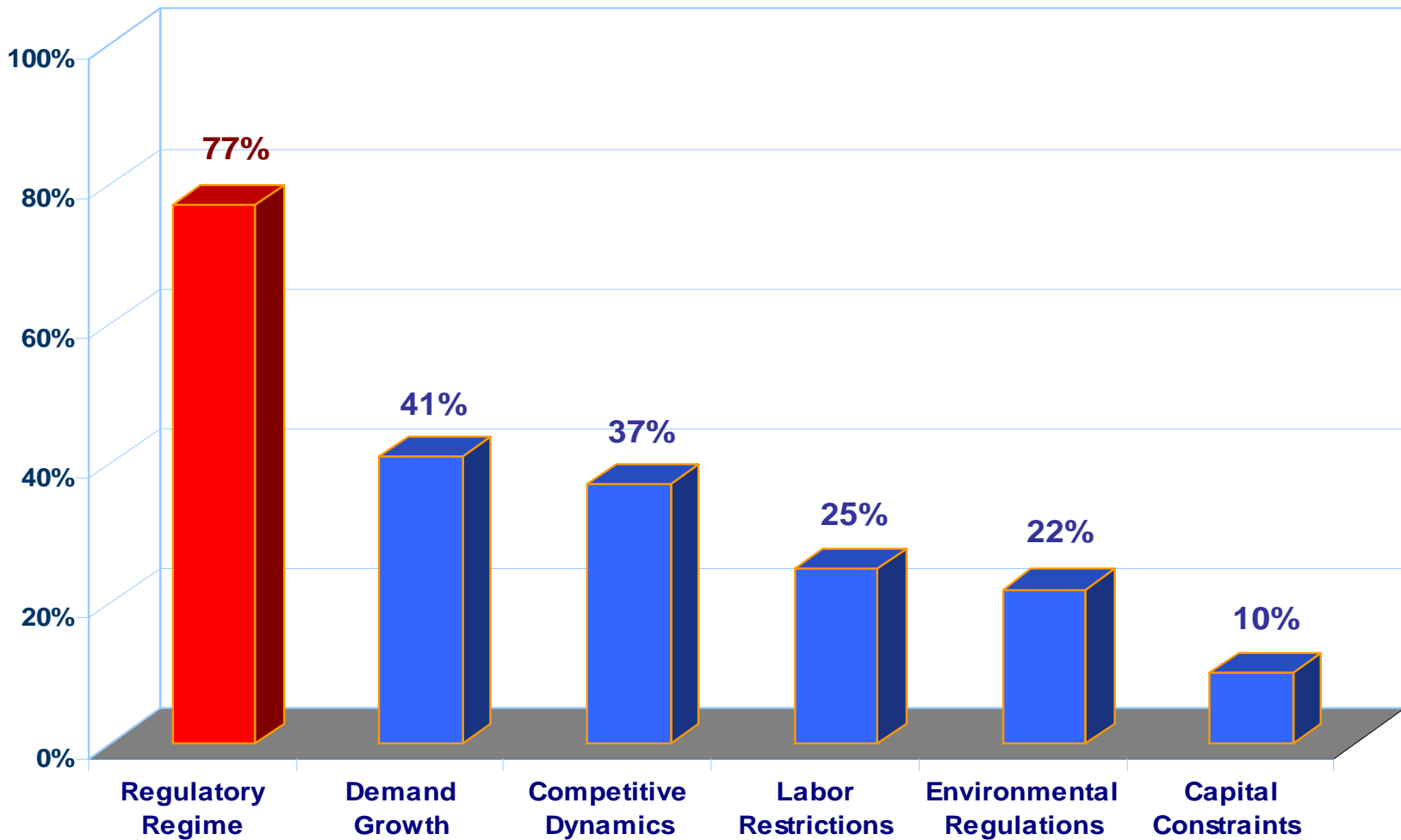


- The poor are most vulnerable to, though least responsible for, global warming
- Stewardship towards creation requires collective effort towards preservation of creation's integrity

Power Sector Environmental Performance

| Environmental Emissions | 1991 Level | 2001 Level | % Increase |
|--------------------------------|-------------------|-------------------|-------------------|
| CO₂ | 10,580,233 | 18,411,762 | 74% |
| SO₂ | 115,725 | 189,729 | 64% |
| NO_x | 58,726 | 146,807 | 150% |
| CO | 16,124 | 20,796 | 29% |
| CH₄ | 587 | 904 | 54% |
| NMVOC | 975 | 1,075 | 10% |
| N₂O | 415 | 842 | 103% |
| Particulates | 10,989 | 29,611 | 169% |
| | | | |

What companies care about when they invest



Source: Booz, Allen and Hamilton Global Survey of Senior Power Company Executives

The Renewable Energy Bill

- The RE Bill provides a mix of fiscal and non-fiscal incentives to accelerate the development and utilization of RE

- RE Bill in the 13th Congress
 - House
 - 3rd reading approved
 - Senate Committee Report

- RE Bill in the 14th Congress
 - 18 RE Bills filed
 - 10, House of Representatives
 - 8, Senate
 - One of the 28 LEDAC priority bills (August 2007)



The RE Bill

Why Incentives ?

To date, most of the laws governing incentives for Renewable Energy are disjointed and out-dated

- Incentives are necessary as capital costs for RE-based resources are higher compared to conventional power sources because fossil fuels are popular and easily-available
- However, most RE generation facilities would last a minimum of 25 years. The same lifespan may require two units (re-installation or full refurbishment) of some conventional fossil-fuel based facilities
- Generation costs between RE and Fossil fuels show that RE-based power plants can be cost-competitive with oil-fired power plants

Non-Fiscal Incentives

- **The Renewable Portfolio Standards** is a market-based policy that requires electricity suppliers to source a certain portion of their supply from RE
- **The Renewable Energy Market** where RE power can be traded, purchased or sold, as part of the infrastructure support to facilitate compliance with the RPS mandate. It is envisioned to be a module of, linked to and be a function of the Wholesale Electricity Spot Market (WESM)
- **The Green Energy Option**, which gives consumers the choice to use RE. In essence, the Green Energy Option accelerates the open access concept under EPIRA



Non-Fiscal Incentives Present in the RE Bill

- **The Net Metering arrangement**, which allows distribution grid users who may produce RE power and be appropriately credited with its contribution to the grid
- The **Minimum RE generation mandate** for power generators in off-grid areas, which is expected to widen access to energy services to our rural constituents

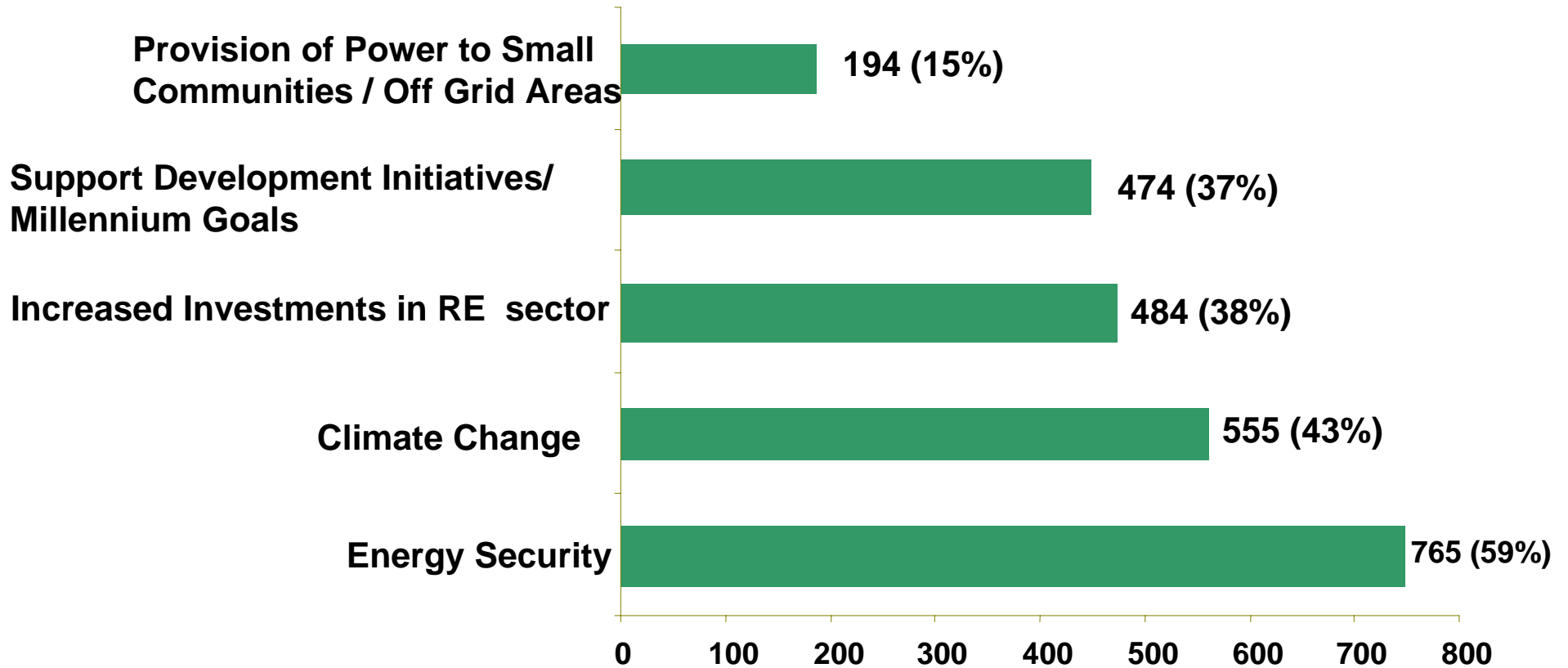


**What do others have
to say about RE?**



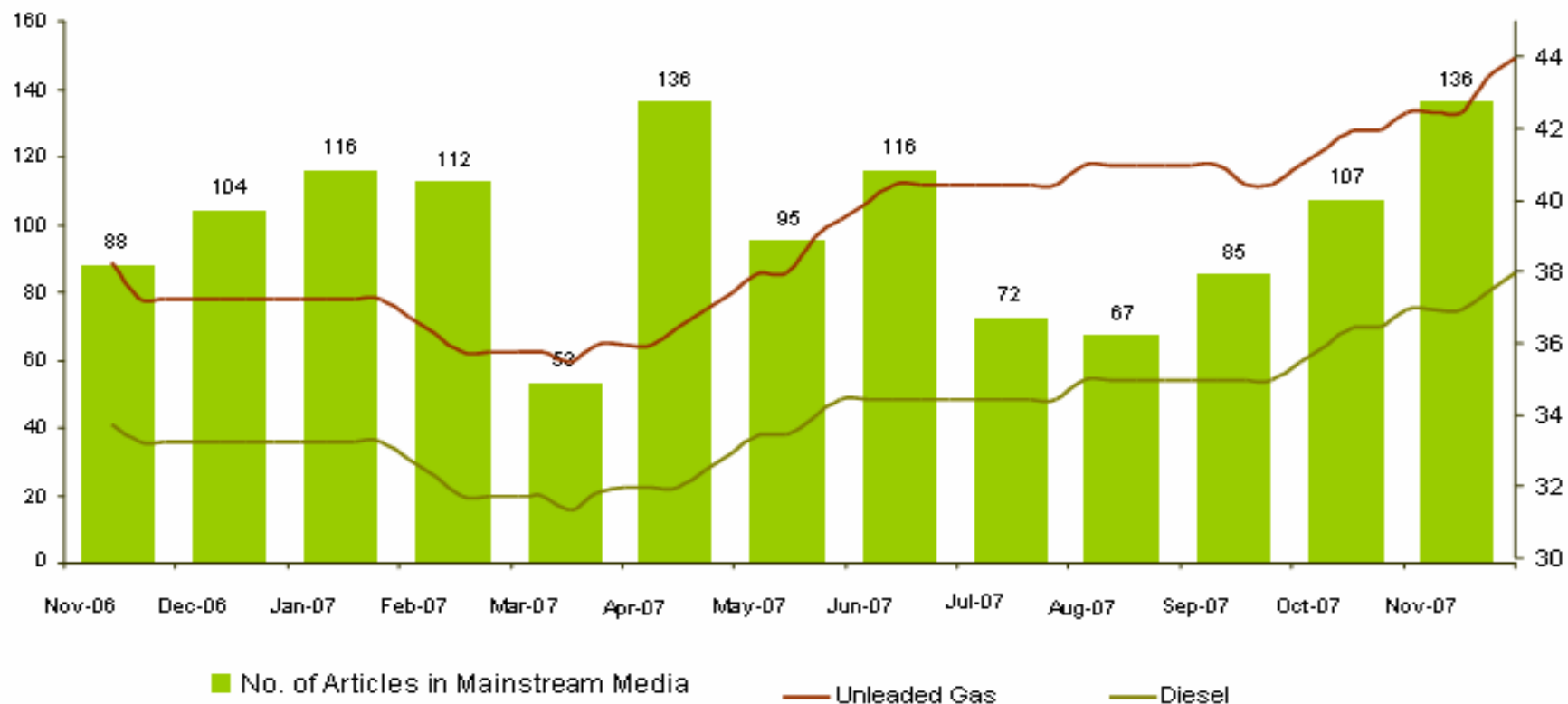
A year-long comprehensive media audit of news and social media articles covering 1,490 articles on Renewable Energy resources

Key Findings : Perceived Impacts/ Benefits of RE



Key Findings: Oil Price Increases and RE

Chart 4. News Articles on RE vis-a-vis Oil Price Increases



Conclusion

- Renewable Energy is a viable means to help ensure energy security and steady independence from fossil fuels
- The passage of the RE Bill is seen to be a consolidated and targeted solution to cleaner and more efficient sources of energy
- There is much promise for RE in the country, but the Government must take the initiative to help the effort to transition into a RE-powered future

Typically, every 600 million kWh generated by RE-based plants means not having to import one million barrels of oil. If the Philippines could develop 2,500-MW of RE-based plants until 2014, the country could avoid having to buy more than 100 million barrels of oil. This is estimated to save the country as much as \$3.6 billion or almost P200 billion in fuel purchases.

Source: CBRED

THANK YOU