



THEME: 6

**ENERGY POLICY AND
DEVELOPMENT IN LAO PDR**

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OUTLINES

1. Introduction
2. Overview of policies
3. Renewable Energy Policy
 1. Overview of worldwide energy
 2. Current Energy Development in Laos
 3. Potential of Renewable Energy in Laos
 4. Status of RE Development in Laos
 5. Policy and strategies of Renewable Energy
 6. Financial Mechanism
 7. Implementation measures



INTRODUCTION

- Energy is essential for meeting the peoples' basic needs as well as vital in fuelling economic development.
- The rapid increasing in population and economic growth has been generating high level demand for Energy
- According to the IEA, primary energy demand is projected to almost double 2007 to 2030
(80mb/d in 2007 to 106mb/d in 2030)
- This growth is not sustainable if most of this energy has to be met by fossil fuel
- The fossil fuels are estimated to be depleted within the next few decades.



INTRODUCTION

- Many countries in the world have recognized the importance of energies,
- Therefore, they have undertaken technology research and development,
- and have set up goals for the development and effective use of their Renewable energy resources.
- Sustainable Energy - Must take actions in conservation, efficiency, and renewable
- End result - preserve more fossil fuel reserves for the future generation



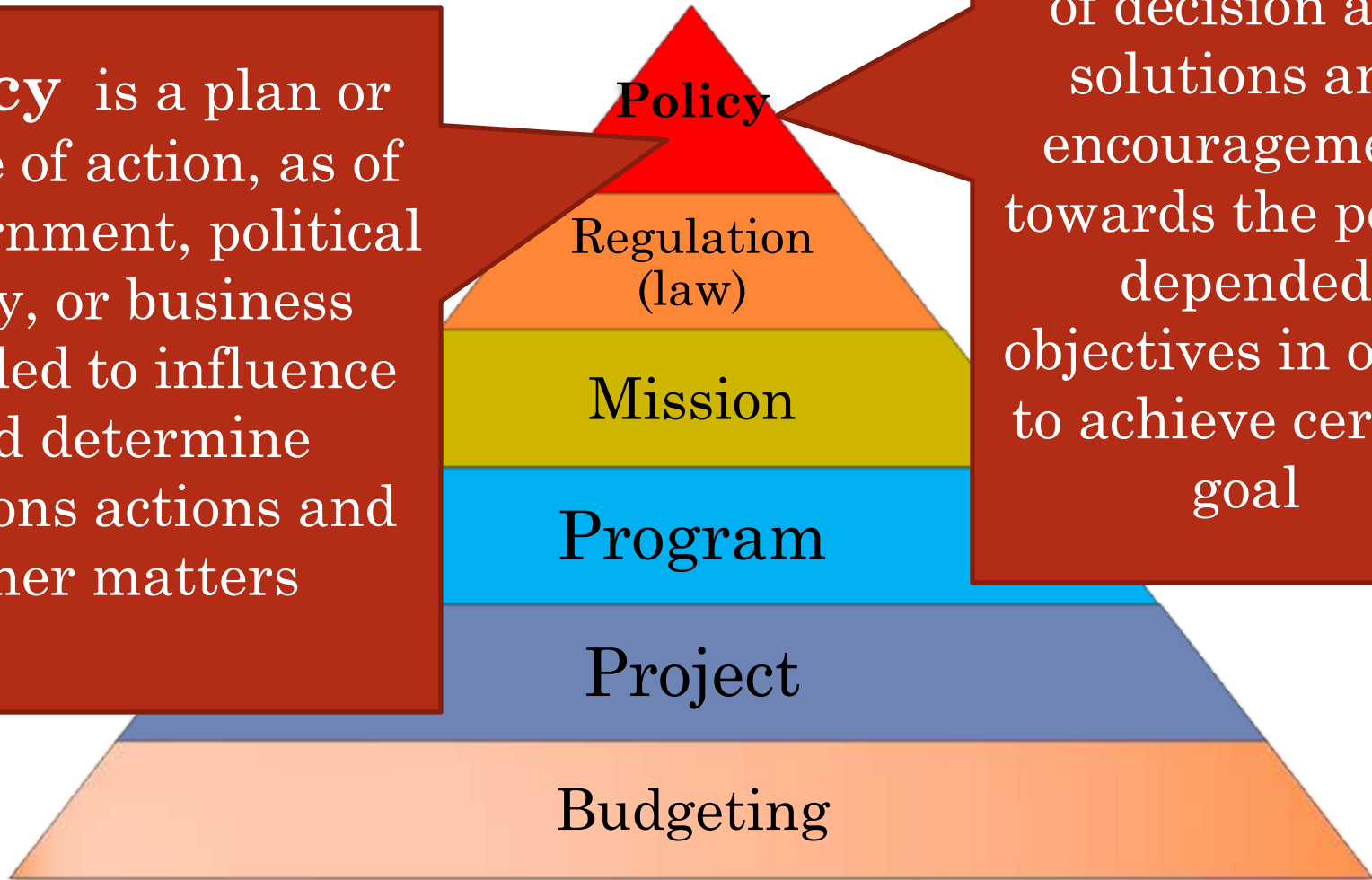


OVERVIEW OF POLICY

THE CONCEPT OF POLICY

Policy is a plan or course of action, as of a government, political party, or business intended to influence and determine decisions actions and other matters

Policy is a course of decision and solutions and encouragement towards the policy depended objectives in order to achieve certain goal



PROCESS OF POLICY

○ Policy Study

- In theory
- In practice
- Comparison

○ Policy Making

- Determine objects that have benefits from policy
- Encouraged/limited objectives
- Decision and solution
- Determine purposes of policy



POLICY CLASSIFICATION

1. Specific Policy

1. Policy
2. Circular
3. Degree of Government
4. Prime minister's decision
5. Resolution

2. General Policy

1. A course of official texts from Government on specific fields in a certain period

3. Time Base policy

1. Short-term policy: less than 3 years
2. Medium-term policy : less than 10 years
3. Long-term policy : more than 10 years



BASIC STRUCTURE OF POLICY

- Statement
- Reason – urgent requirements
- Status analysis
- Development background- word trend- development demand of Lao PDR
- General point of view
- Objectives / Goal/ target/purpose
- Priorities
- Solutions: Finance- Material facilities – Human resource – Particular solution
- Action pathway



OBJECTIVES OF THE NATIONAL ENERGY POLICY

- The main objective of the national energy policy is to help Lao PDR provide reliable, adequate and affordable for inclusive growth in socially, economically and environmentally sustainable way.
- It should emphasize :
 - Energy Efficiency
 - Renewable Energy
 - Access to energy for all
 - Energy reform
 - Capacity building
 - Governance



MEASURES USED TO PRODUCE AN ENERGY POLICY

A national energy policy comprises a set of measures:

- country's laws,
- Treaties and agency directives
- National energy planning, energy generation, transmission and usage
- Legislation on commercial energy activities (trading, transport, storage, etc.)
- legislation affecting energy use, such as efficiency standards, emission standards
- instructions for state-owned energy sector assets and organizations
- Energy security and international policy measures



FACTORS WITHIN AN ENERGY POLICY

- The energy self-sufficiency for the nation
- The future energy sources
- The future energy consumption (e.g. among sectors)
- The fraction of the population poverty reduction
- The goals for future energy intensity
- The reliability standard for distribution reliability
- The environmental externalities are acceptable and are forecast
- The form of "portable energy" is forecast (e.g. sources of fuel for motor vehicles)
- The energy efficient hardware (e.g. hybrid vehicles, household appliances) be encouraged
- The specific mechanisms (e.g. taxes, incentives, manufacturing standards)





RENEWABLE ENERGY

POLICY IN LAO PDR

OVERVIEW OF WORLDWIDE ENERGY

- A huge amount of these fossil fuels had already been consumed in the 20th century
- Furthermore, future extraction will be more challenging and more costly
- With present fossil fuel use rate , all available reserves of petroleum and natural gas will be exploited within the 21st century



OVERVIEW OF WORLDWIDE ENERGY

- The usage of fossil energy resources also creates harmful effects to environment, particularly Green House Gas emission
- That is the main cause for Global Climate changes
- While, nuclear power shall not be the right solution due to the limited reserve uranium in the world and security concerns from nuclear energy utilization



What do humans do that increases atmospheric CO₂?



Mainly, we burn fossil fuels - coal, oil, and gas.

➡ *80% of the CO₂ increase*

Secondarily, we cut down forests (particularly in the tropics)

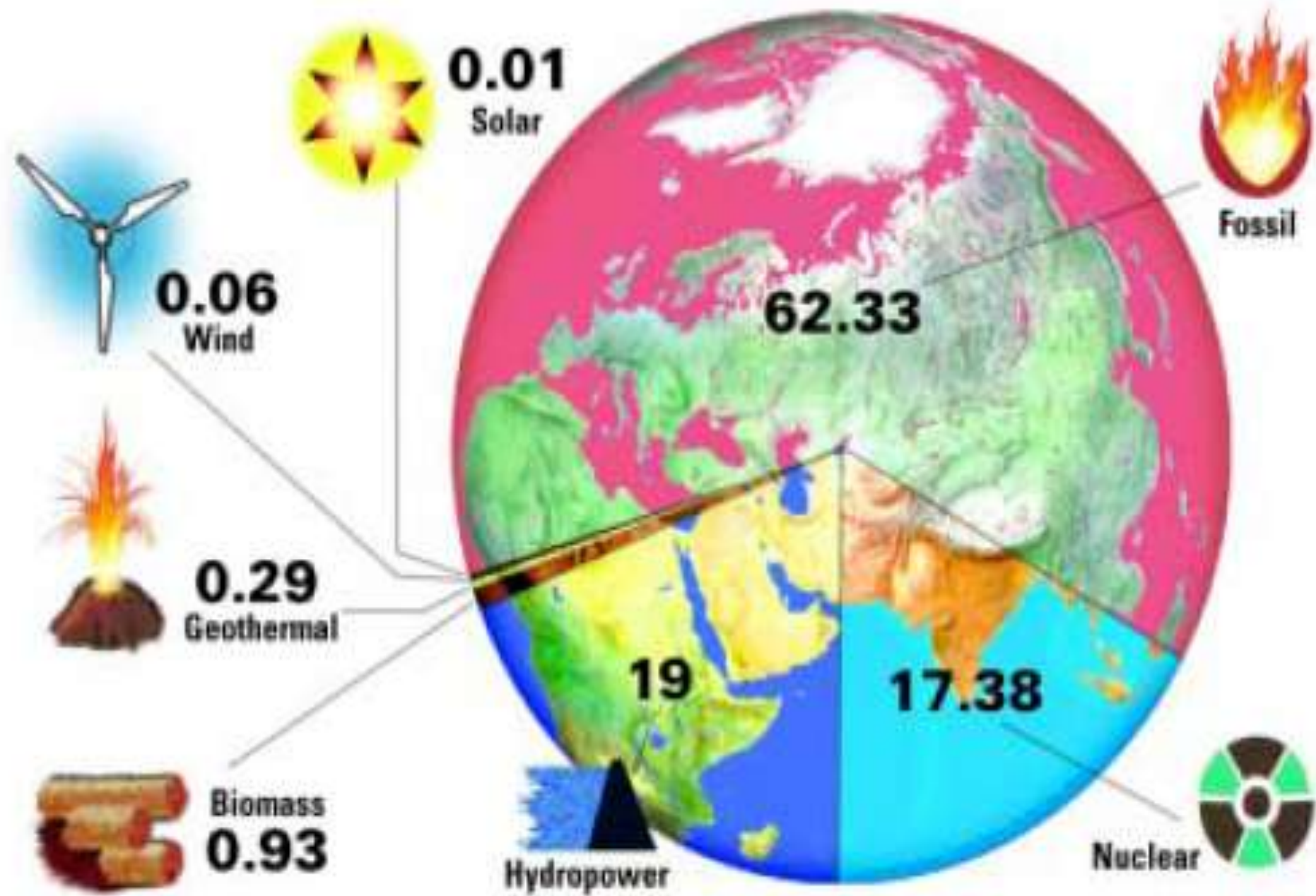
➡ *20% of the CO₂ increase*



OVERVIEW OF WORLDWIDE ENERGY

- Many countries have turned to reformulation of their energy strategy in order to be self sufficient and secured in energy supply
- The first step is to promote the *efficiency of energy usage* from still available
- the second step, turn to development of inexhaustible and environmental friendly renewable energy resources.



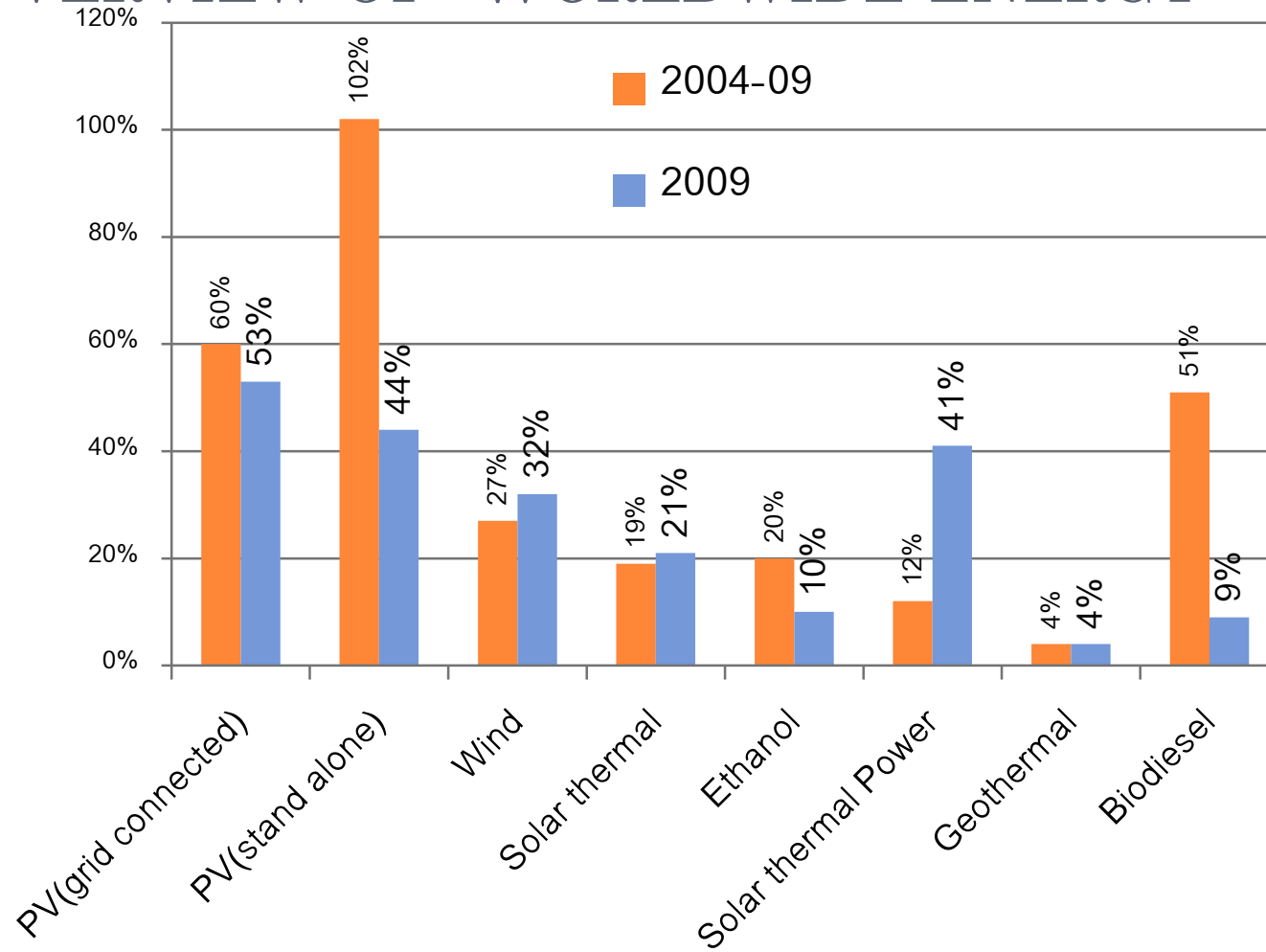


OVERVIEW OF WORLDWIDE ENERGY

- During a period 2004-09, development of RE in the world grown at a rate of 10–60% per annum
- Wind Power installation capacity has fastest growth in 2009, comparing to other RE .
- Grid-connected Solar PV has also high growth rate, around 60 % per year during the same period.
- Biofuels also rapidly increased, about 20% per annum for bio ethanol and 51% for Biodiesel.
- Besides, it was observed that biofuels production mainly happened in North and Latin America countries, followed by Europe.



OVERVIEW OF WORLDWIDE ENERGY



OVERVIEW OF WORLDWIDE ENERGY

- Biofuels for transport include ethanol, which mainly produced from corn and sugarcane, and
- Biodiesel, producing mainly from vegetable oil.
Corn
- Currently Produced biofuels still belong to first generation.
- In 2009 world's bio ethanol production was 76 thousand million liters, increased 10% as comparing to 2008.
- Use of biogas in transportation sector is still limited. In Sweden, for example, biogas and other energy sources are used to run trains, buses, and other vehicles.



OVERVIEW OF WORLDWIDE ENERGY

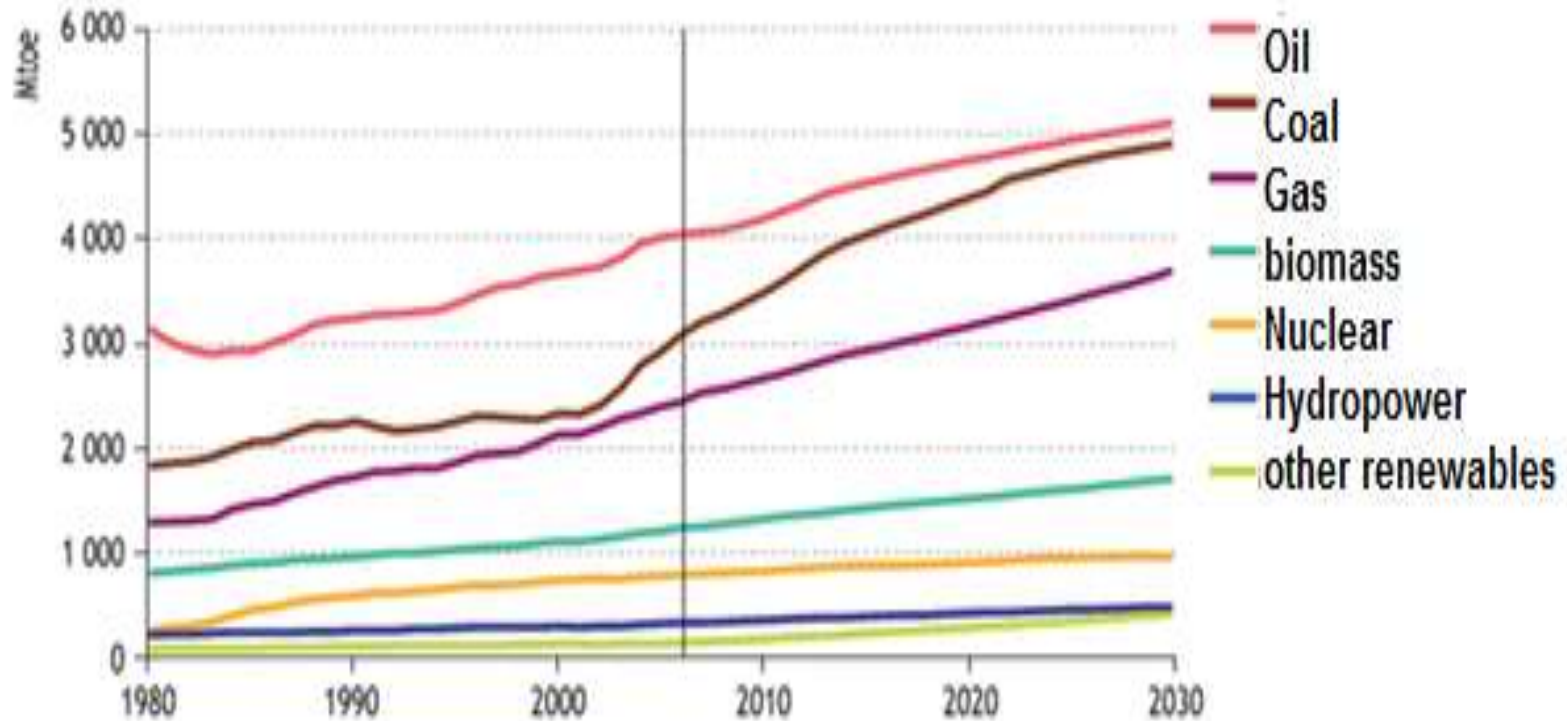
International Challenge

- Climate change due to the release of carbon dioxide in the atmosphere
- Developing economies are transforming from agriculture to industrial based economies. This results in the growth of energy use
- Expansion of urbanization and modern cities shows change in energy consumption patterns.
- Renewable energy developments are still dependent on foreign donors and investors.
- Income generation and employment derived from renewable energy development are not very high.

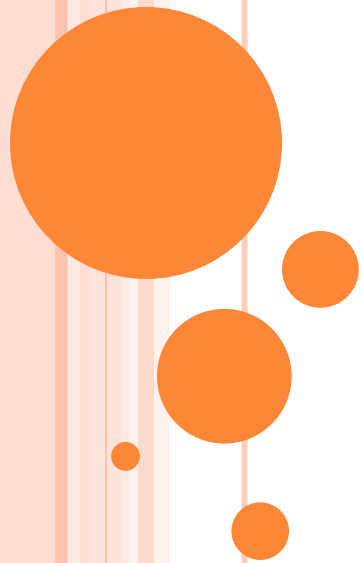


OVERVIEW OF WORLDWIDE ENERGY

Trend of the world's TPES demand 1980-2030) (WEO IEA 2008)



CURRENT ENERGY DEVELOPMENT IN LAOS



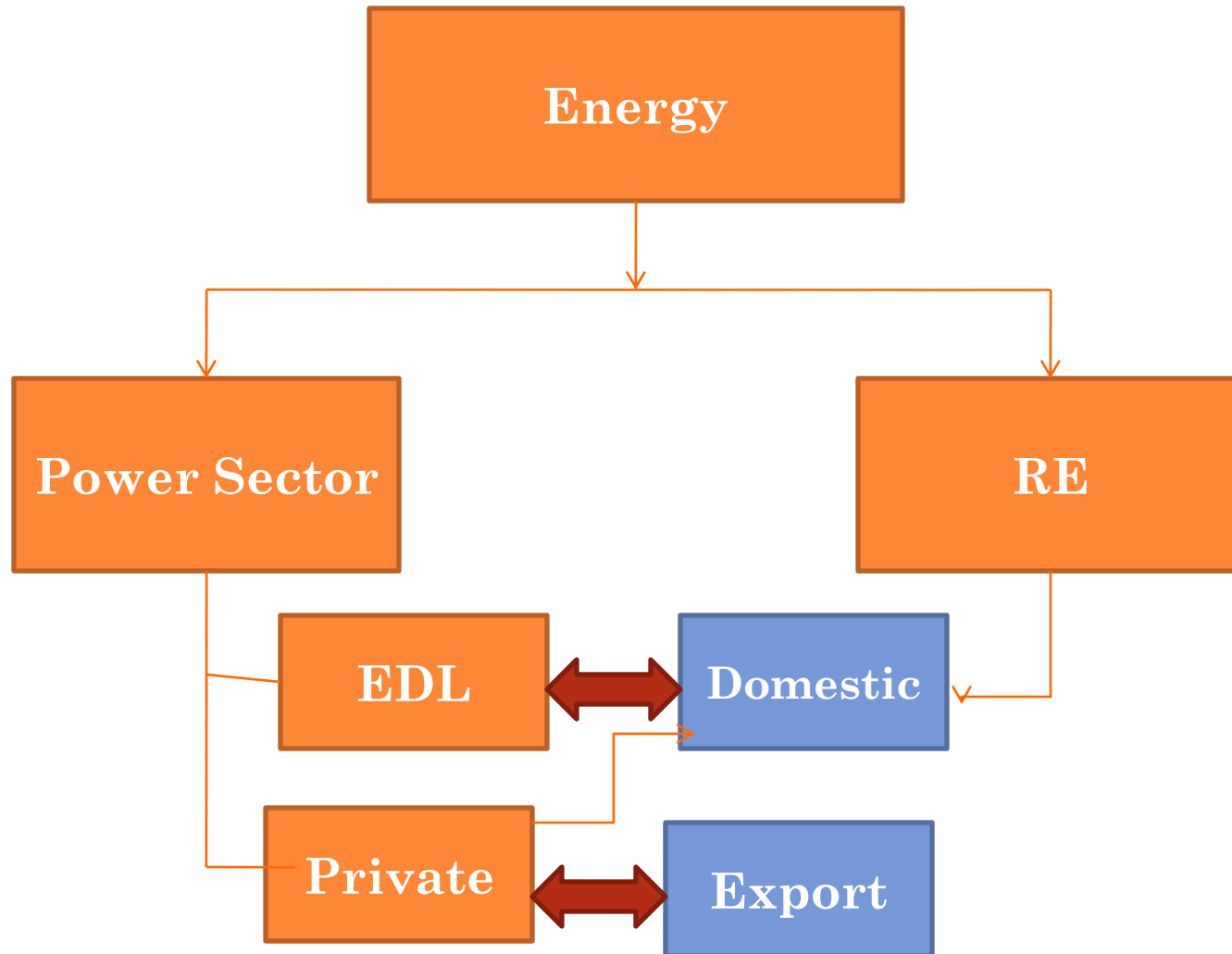
CURRENT ENERGY DEVELOPMENT IN LAOS

The Goals

1. To provide a reliable and affordable power supply to Lao Society and industry
 2. To earn foreigner exchange from electricity export
- Currently about 41% of total households in Laos are electrified
 - GOL has committed to increasing this to 90% in 2020

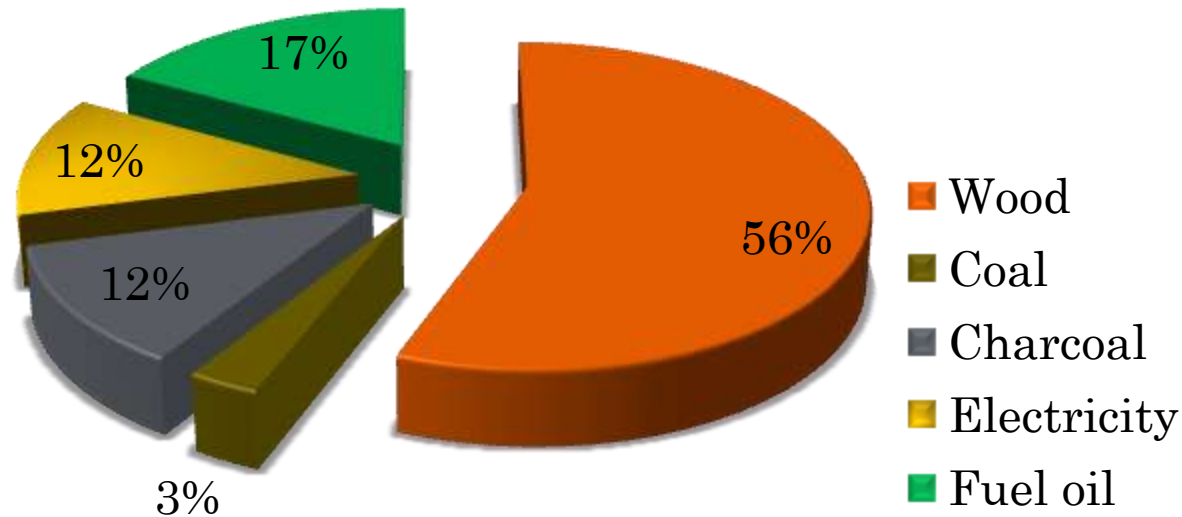


CURRENT ENERGY DEVELOPMENT IN LAOS



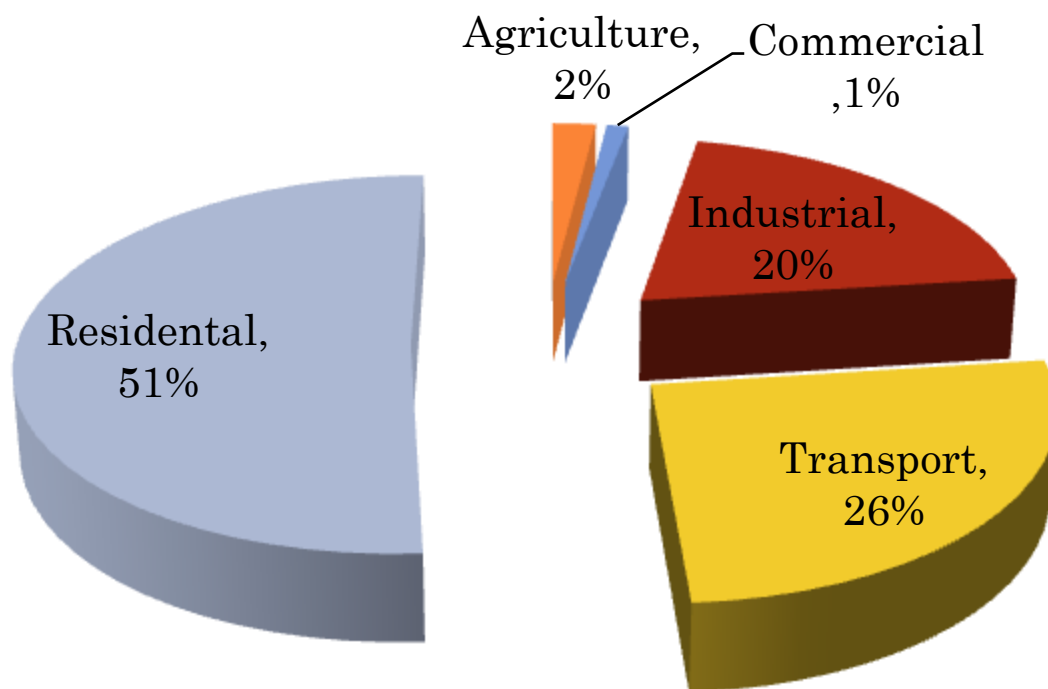
CURRENT ENERGY DEVELOPMENT IN LAOS

Energy consumption by types



CURRENT ENERGY DEVELOPMENT IN LAOS

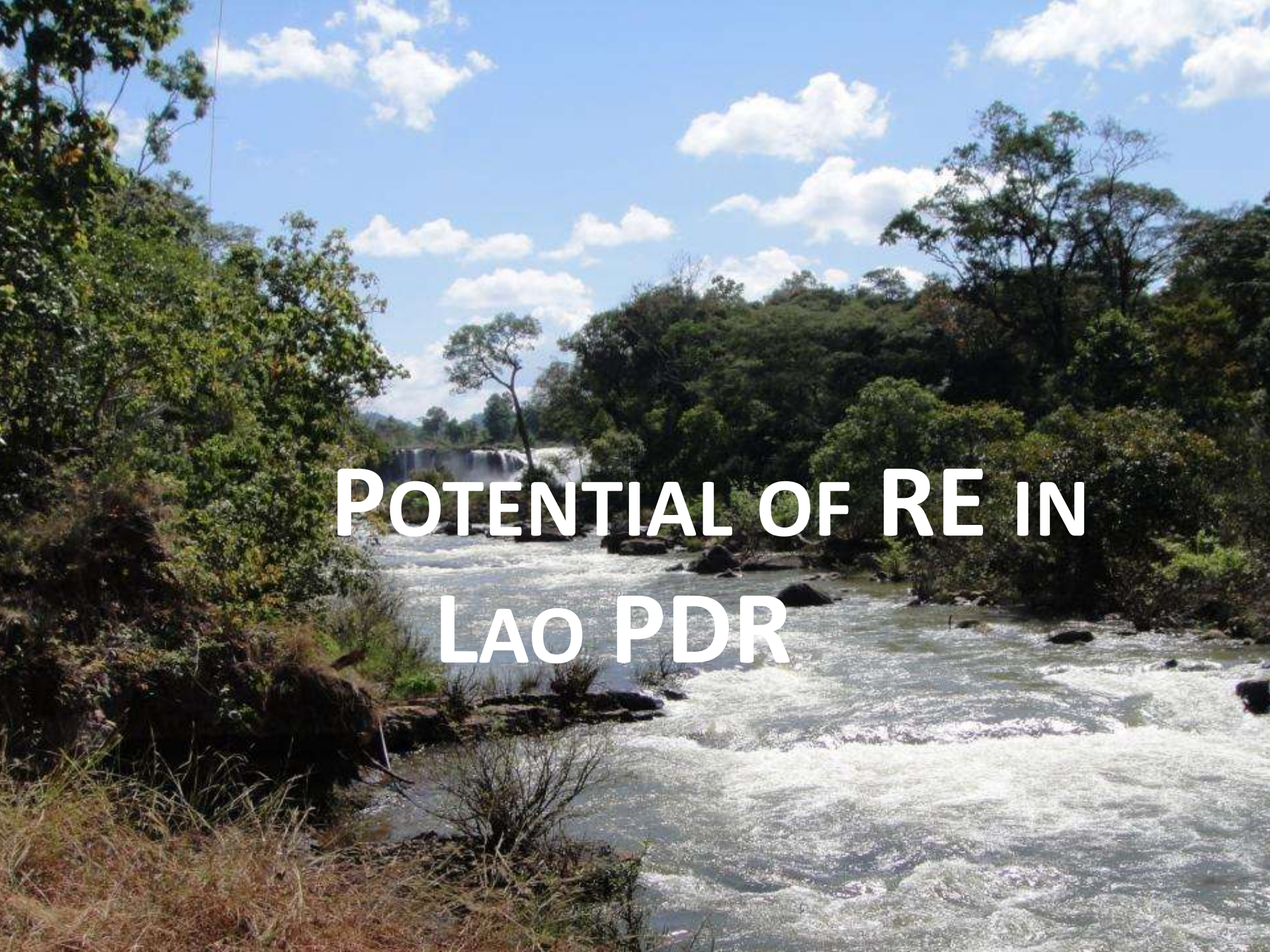
Energy consumption by Sectors (MEM)



Economic growth:
~ 7% a year



Energy Demand
increase



**POTENTIAL OF RE IN
LAO PDR**

POTENTIAL OF RE IN LAO PDR

- Lao PDR lacks of conventional energy resources (e.g., Oil or Natural Gas) and has some reserve of coal,
- But there are abundant renewable energy resources, such as Biomass, hydropower, solar energy.
- In some part of the country there are some potential of wind and geothermal energy



POTENTIAL OF RE IN LAO PDR

○ Biomass :

- **Energy crops**

- Oily crop (Palm, Jatropha, Vernicia Montana, Sun flower, Beans, coconut, etc),
- sugar and starch (sugarcane, Cassava, corn) and
- quick growing trees

- **Organic wastes**

- include residues of agriculture-Forestry production, By- (sawdust, wood chips, rice husk, corn cobs, livestock manures...)
- municipal wastes (Households' wastes, communal wastes, food processing wastes...).



POTENTIAL OF RE IN LAO PDR

○ Hydropower :

Hydropower is the most important energy resources in Lao PDR,

- Large Cap. hydropower : Technical potential is around 26,000 MW,
- Small scale hydropower below 15 MW, potential is about 2000 MW.

In the Lao PDR hydropower projects with capacity bellow 15 MW are classified as small-scale hydropower.



POTENTIAL OF RE IN LAO PDR

○ Solar :

- Solar irradiance on Lao PDR is 3.6-5.5 kWh/m²,
- Sunshine 1800-2000 hrs/year.
- Solar energy potential 146 kWh/m²/year,
if photovoltaic technology was used

○ Geothermal

- Lao PDR has rather low Geothermal energy potential and currently not suitable for energy utilization.
- There some small geothermal resources in the form of hot springs only



POTENTIAL OF RE IN LAO PDR

○ Wind :

- There is lack of data on wind energy potential, particularly at a height above 50 m.
- There are some wind potential in central provinces of Laos (Savannakhet and Khammouane) where at a height 50 m and above, wind speeds 5.8 m/s .
- The theoretical potential for wind energy in Laos is about 182,000 MW
- The potential under very good and excellent wind regimes is relatively small at around 2,800 MW.
- These resources are not ensure due to lack of measurements.



STATUS OF RE DEVELOPMENT IN LAOS

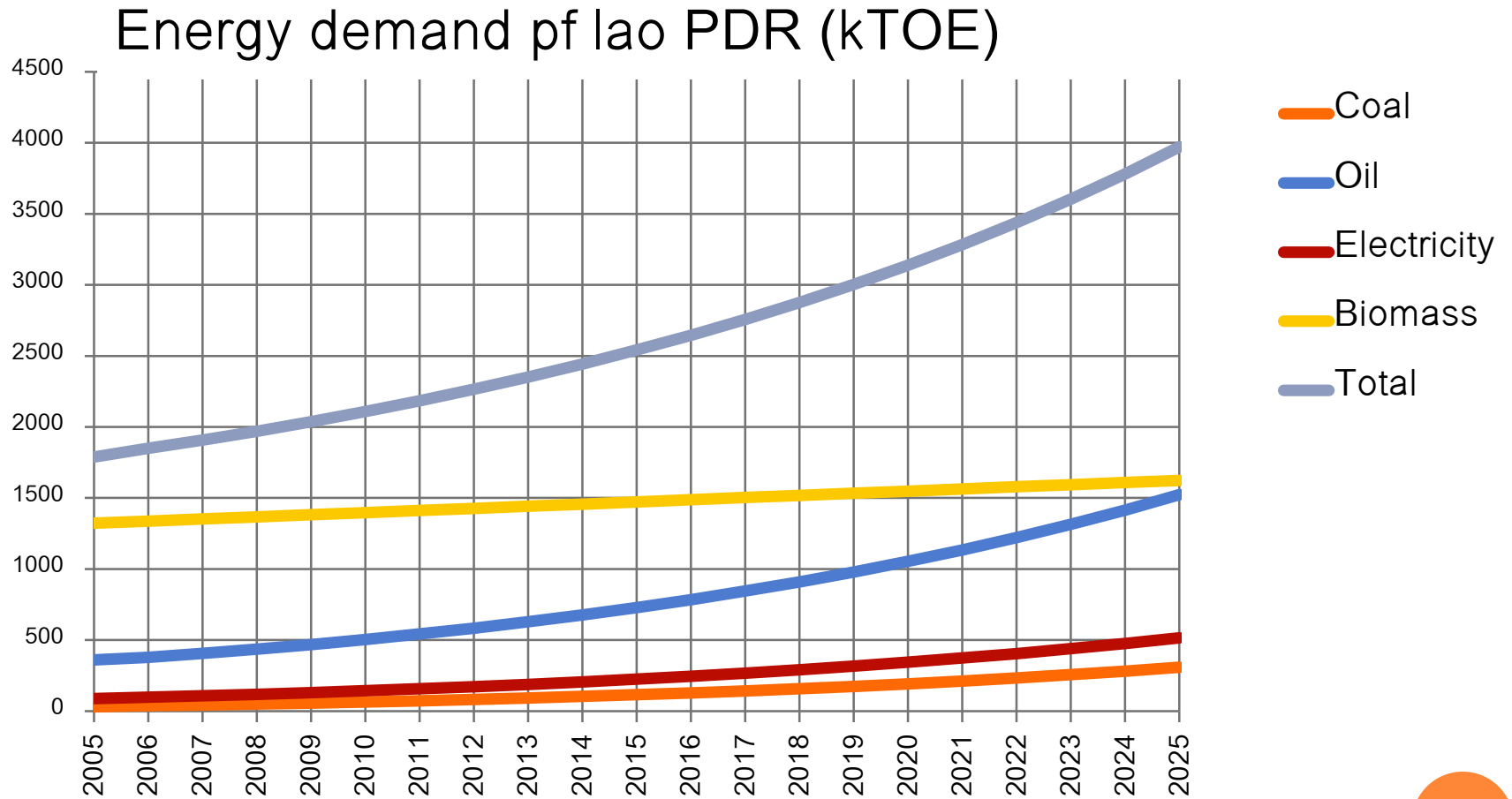


STATUS OF RE DEVELOPMENT IN LAOS

- Micro hydropower installed 23 MW
- Fuel crops plantation for biofuel production had been initiated by private investors.
- Around 20,000 small solar home system have been installed with funding from world bank and other donors
- Larger PV systems (capacity up to 40-100 kW) have also been piloted within cooperation project between MEM and NEDO (Japan),



FUTURE TREND OF RE IN LAOS



FUTURE TREND OF RE IN LAOS

- The total domestic energy demand is increasing by 3.6 % per annum, increasing from 1.8 million TOE in 2005 to 3.9 million TOE in 2025
- Energy demand in the industrial sector is increasing at around 8 % during the period 2005 to 2025,
- The transportation sector grows at 6.8 %
- By 2025, the total demand for refined petroleum products will reach 1,174 million liters,



FUTURE TREND OF RE IN LAOS

- Electricity generation is predicted to increase at 11 percent annually for the period 2005 to 2025.
- Most of produced electricity are for export to neighboring countries and only 10 percent is used domestically.
- The domestic demand for electricity will increase from 425 megawatts in 2006 to 2,863 megawatts in 2025.
- This increase will be covered mainly by development of hydropower and coal-fired power plants.



Potential and capacity to meet 30% target of renewable energy development until 2025

Item	Renewable energy types	Potential	Existing	2015		2020		2025	
		MW	MW	MW	Ktoe	MW	Ktoe	MW	Ktoe
A	Electricity			140		243		728	416
1	Small Hydropower	2000	12	80	51	134	85	400	256
2	Solar	511	1	22	14	36	23	33	21
3	Wind	>40		6	4	12	8	73	47
4	Biomass	938		13	8	24	16	58	37
5	Biogas	313		10	6	19	12	51	33
6	Solid waste	216		9	6	17	11	36	23
7	Geothermal	59							
B	Bio-fuel	ML	ML	ML		ML		ML	
1	Ethanol	600		10	7	106	178	150	279
2	Biodiesel	1200	0.01	15	13	205	239	300	383
C	Thermal energy	Ktoe	Ktoe						
1	Biomass	227			23		29		113
2	Biogas	444			22		44		178
3	Solar	218			17		22		109
Total									
Energy demand (Ktoe)		2145			2504		4064		4930
Renewable energy contribution					172		668		1479
Proportion		30%			7 %		20%		30%

A photograph of a waterfall in a dense, green forest. The water is white and foamy as it falls from a rocky ledge. The surrounding trees are lush and green, with some mist or spray visible at the base of the waterfall. The overall scene is serene and natural.

POLICY AND STRATEGIES OF RENEWABLE ENERGY

POLICY AND STRATEGIES OF RE

- Mission

The Government of Lao PDR promotes the development of renewable energies as an important component of the national economic development to ensure energy security, sustain socio-economic development, and enhance environmental and social sustainability



POLICY AND STRATEGIES OF RE

- It is one of priority policies of GOL to stabilize energy supply and to assist in the social and economic improvement of the country.
- The GOL supports domestic and foreign entrepreneurs and investors to invest in energy projects at the village level.
- The development of renewable energy resources:
 - Self-sufficient in energy supply
 - Energy export



POLICY AND STRATEGIES OF RE

- The Policies on RE focus on
 - Small power development for self sufficiency and grid connection,
 - Biofuels production and marketing, and
 - other clean energies in the country
- The government defines priorities for development as follows:
 - Facilitate private sector investments in rural electrification
 - Development of small power systems, biofuels, solar and biomass energy at the village level.



OBJECTIVES

- To ensure **adequate supply of energy, energy efficiency and conservation**
- **To bring socio-economic benefits, including:**
 - development of RE industry
 - contribution to poverty reduction
 - increased gender equality,
- To ensure environmentally and socially sustainable development



TARGET OF 2025

- The Government aims to increase the share of renewable energies to 30% of the total energy consumption in 2025.
- To reduce the importation of fossil fuels,
 - to reach 10% of the total transport energy consumption from biofuels.



SCOPE OF POLICY

The government policy is to promote investments in energy production from public and private sectors, and from local and foreign investors. The focus is on the development of the following:

- Biofuels
- Small hydropower
- Other renewable energies such as solar, biomass, biogas and wind
- Other alternative fuels for transportation



(1) Promotion and development of bio-fuels

- To reduce the importation of fossil fuels, GOL will encourage and actively promote development of fuel crops
- The tentative vision for the promotion and development of biofuels are the following:
 - Substitute 10% of the transportation fuel demand by 2025
 - Increase deployment of biofuels technologies in rural areas
 - GOL Issue a Biofuel Degree
 - Establish and strengthen the capacity building
 - Formulate a Biofuel Action plan



(2). Promotion and development of small hydropower

- Lao PDR has substantial potential of 2,000MW
- The GOL intends to develop around 650 MW between 2010 and 2025 by private and community
- In the past small HP were not sustainable due to natural disaster
- To promote the small HP GOL will implement measures to address the existing technical, financial, procedural and institutional barriers to small HP development



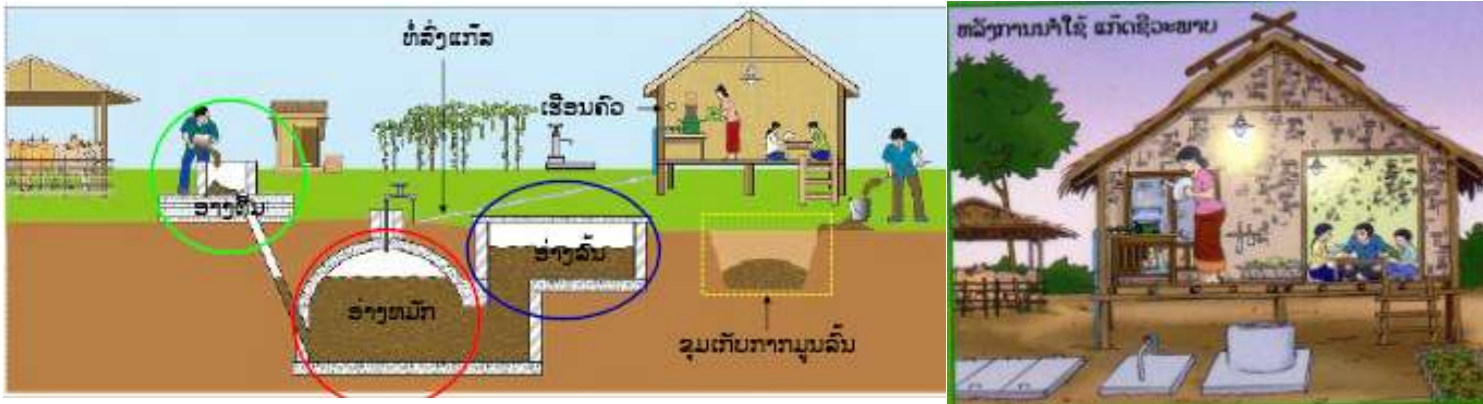
(3).Promotion and development of solar energy

The GOL promotes the development of solar energies in the following service areas:

- Provide lighting services in remote areas.
- Support the solar energy business for the installation of large-scale grid connected solar energy systems and hybrid systems
- Promote the use of solar energy in water and space heating for households and industry
- Promote the use of solar energy in productive uses such as drying agriculture produce.
- 2010-2020, GOL under the Rural Electrification Master Plan (REMP) aims to upscale the program covering additional 19,000 households within 331 villages in 11 provinces


(4) Promotion and development of biogas

- Significant potential exist in Lao PDR for biogas production from
 - animal and livestock wastes,
 - agro-industrial wastes,
 - municipal solid wastes
 - waste water treatment plants
- The Government aims to increasing the number of households using biogas by 50,000 in 2025



(5). Promotion and development of other biomass energies

In promoting biomass energy for electricity generation, the GOL will undertake the following:

- Carry out biomass resource assessment and prepare a list of priority projects
 - Formulate a framework to stimulate private sector investments in power generation from various sources of biomass
 - Carry out pilot demonstration to test the framework developed
 - Undertake information dissemination and training programs
 - Develop biomass technology-based independent power producers
- 

(6). Promotion and development of wind energy

The GOL aims to develop around 50 MW of wind power by 2025. To promote the development of wind energy in the country, the GOL will undertake the following:

- Expand the current wind measurement campaign and upgrade the current wind atlas using ground measurement data
- Identify potential sites for grid-connected and off-grid hybrid systems and priority sites for possible wind energy concessions
- In partnership with international financial and donor organizations, carry out demonstration projects
- Prepare wind concession framework, and electricity market access framework including incentives framework to stimulate private investments in wind power in Lao PDR
- Carry out information campaign and build national capacity on wind energy power generation



(7). Promotion and development of other alternative energy sources for Transport

The GOL will undertake the following

- Facilitate coordination among responsible agencies concerning urban transport development
- Support research and development and carry out feasibility studies and demonstration projects
- Upscale the current demonstration projects concerning the use of biofuels in rural transport and farm machineries
- Carry out studies and demonstration projects for the use of higher blend biofuels for freight transport
- Develop a long-tern program for sustainable transportation system in Lao PDR.



FINANCIAL MECHANISM

- Private sector is permitted to invest in small power production, grid connection, off-grid, biofuel, biogas activities with non-firm contract
- Incentives under the investment law of Lao PDR
 - Zero percent import duty on machines
 - No import duty on necessary chemical substance
 - No export duties on final product for 7 years
 - Profit tax is classified into 3 groups: 20%, 15%, and 10%
- Renewable Energy Fund
 - Sources : income from mega hydroelectricity project, GOL budget, NGOs, International organization, donor countries



IMPLEMENTATION MEASURES

- Institutional arrangement
 - MEM is the main agency
 - The main roles of the line ministries : MAF, MNRE, MST, MIC, MPWT, MOF, Bank of Lao PDR, MPI, MCT, MOES, Other agencies and provincial level
- Driving measures to kick–start short term implementation
 - Promotional policies for RE production
 - Promotion on research and studies on RE
 - Capacity building, awareness raising
- Important factors for successful implementation
 - Define the RE into National agenda
 - GOL has policy support RE





**MANY THANKS
FOR YOUR ATTENTION**

Assoc.Prof. Korakanh Pasomsouk