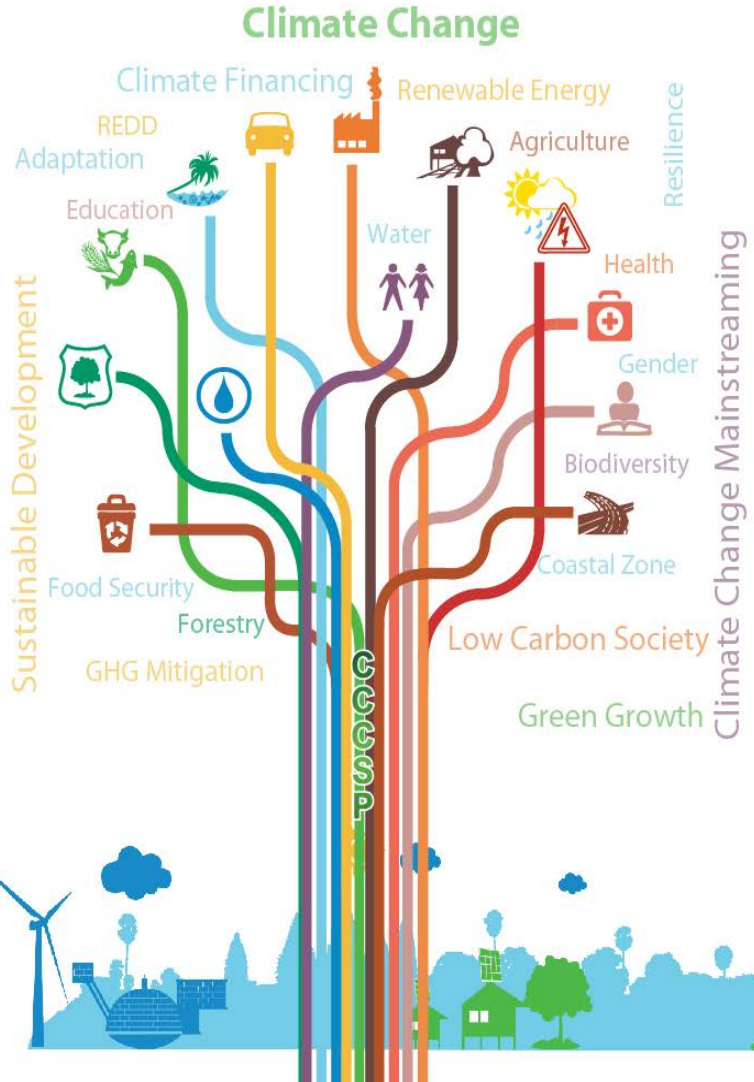
3rd National Forum on Climate Change

5 – 7 November 2013, Cambodia

"Taking Action for Sustainable Development in the Changing Climate"



The Renewable and Energy Efficiency Development in Cambodia(Climate Change Plan on Energy)

Toch Sovanna

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Ministry of Industry, Mines and Energy

6 November 2013

CAMBODIA CLIMATE CHANGE ALLIANCE

Implemented by: Ministry of Environment

Supported by: European Union

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Master Plan on Rural Electrification

- **Three levels of electrification**

  Level 3: National Grid (grid electrification)

  2: Mini-grids

  1: Battery lighting

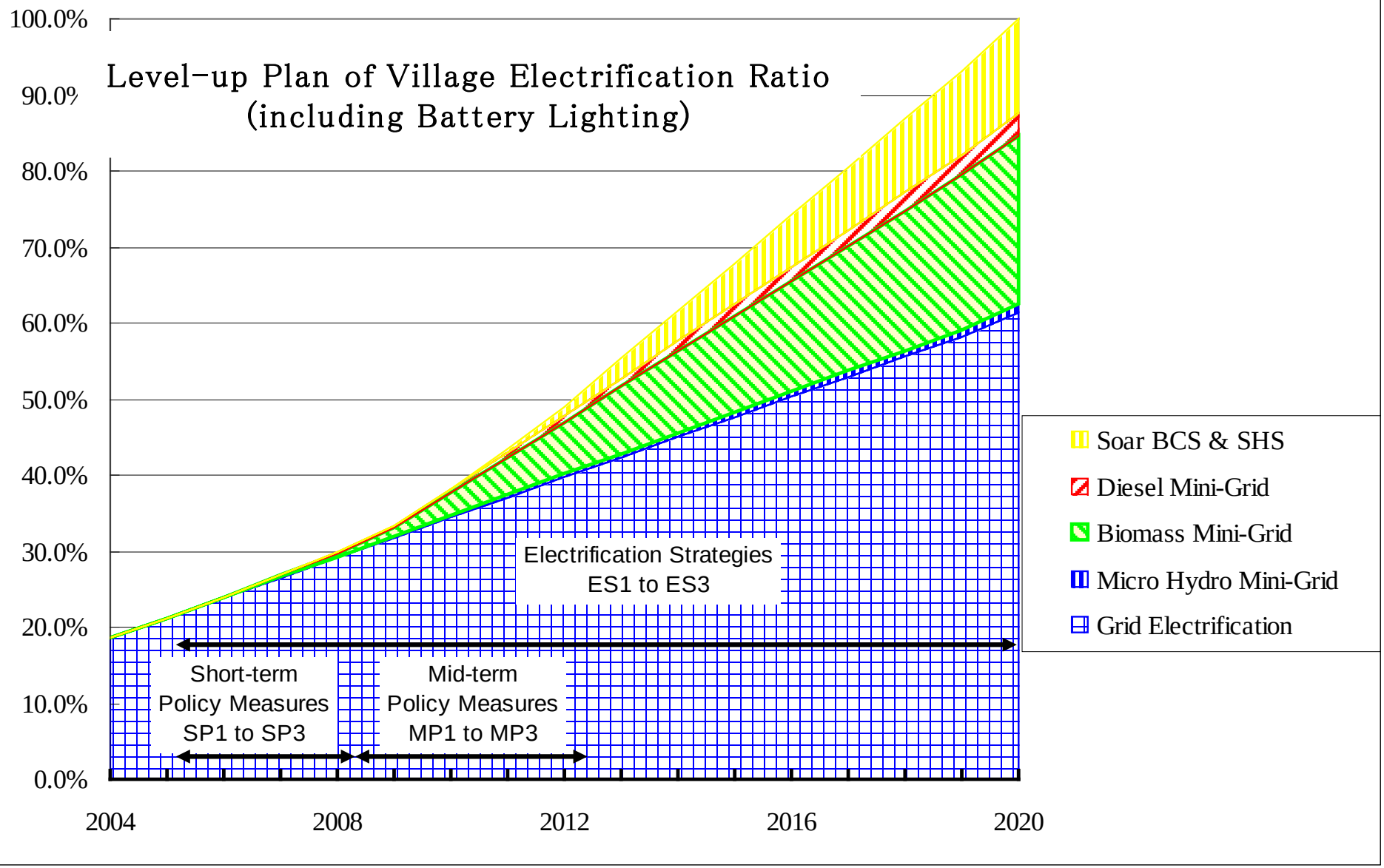
  } off-grid areas

- **Use of renewable energy**

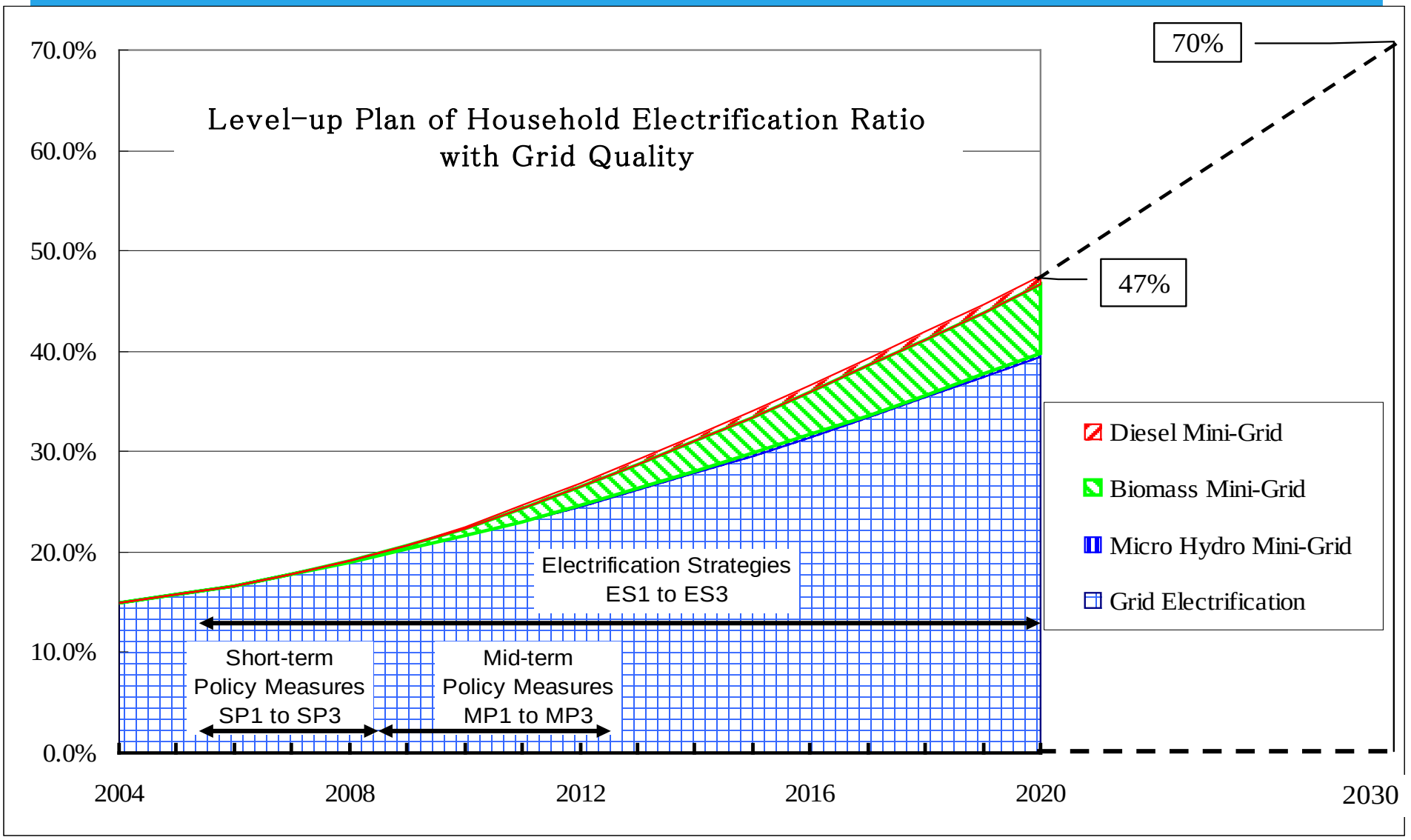
  Mini-grids: biomass and micro hydro

  BCS: solar, (locally wind)

Village Electrification Plan



Household Electrification Plan



Summary of Installed Capacity and Construction Costs

Energy Source	Number of villages	Number of households	Number of households to be electrified	Installed Capacity (Kw)	Construction Cost (x 1,000 US$)	
				Total	Total	Estimated cost per household
Grid Extension	753	208,520	208,250	42,000	62,000	300
Solar BCS	1,720	237,570	190,000	8,487	52,891	280
Individual SHS (planned by the WB)	-	-	12,000	-	4,800	400
Mini-grid						
Micro hydro	137	18,541	14,833	2,078	14,069	950
Hybrid (micro hydro and biomass gasification)						
Biomass gasification	3,071	501,636	804,844	104,644	342,537	430
Grid extension or Biomass gasification	3,257	504,397				
Diesel	392	69,390	291,011	37,831	87,303	300
Grid extension or Diesel	1,875	294,374				
Sub Total	11,205	1,834,428	1,521,208	194,740	564,200	370
Indirect costs (Sub Total x 30%) (including the administrative management, technical and operational supports, and reserves)					169,260	110
Total	11,205	1,834,428	1,521,208	194,740	733,460	480

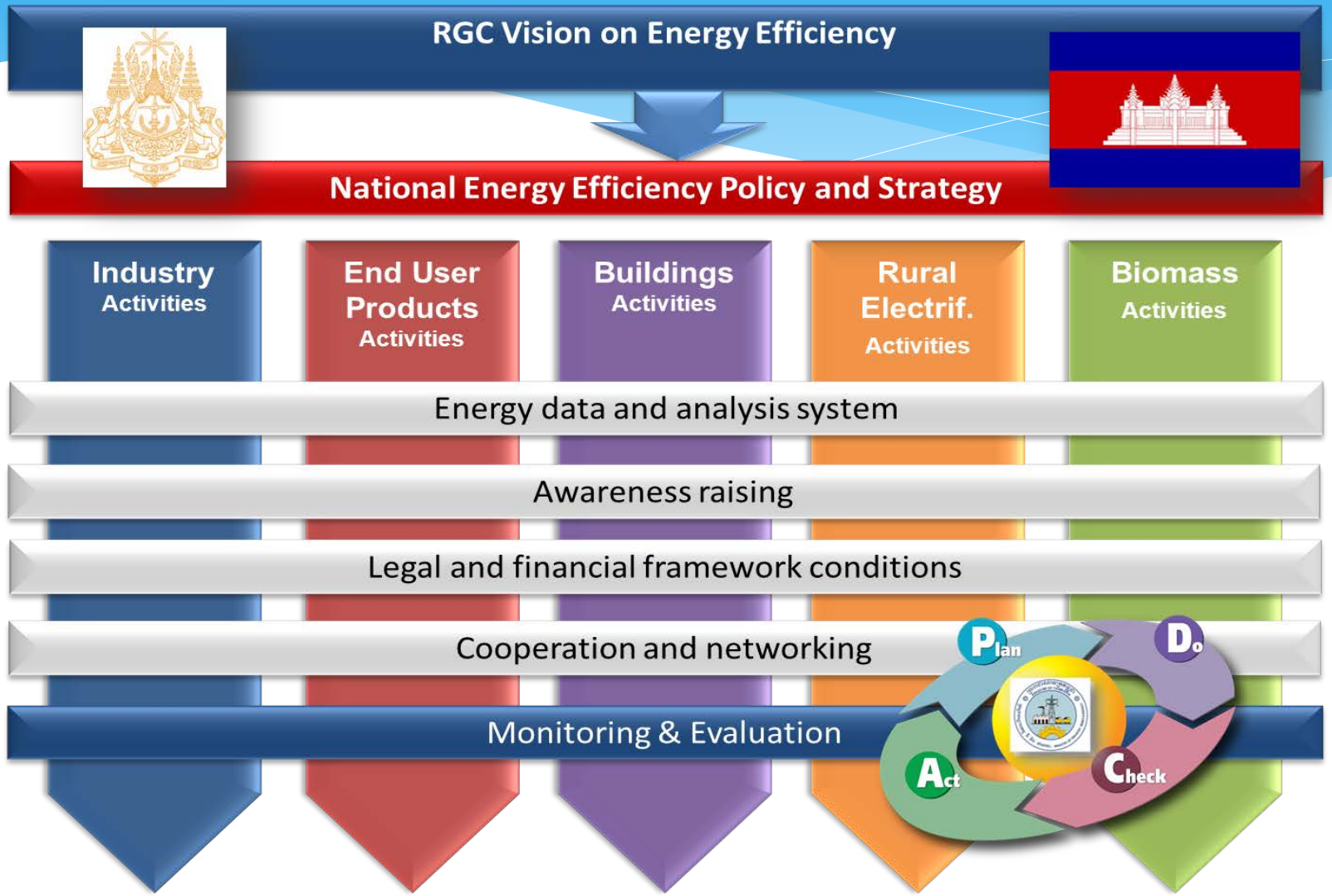
I. Energy Efficiency Policies

The Cambodian Ministry of Industry, Mines and Energy (MIME) is eager to increase **energy efficiency as the most cost-effective strategy for economic and social development, at reduced energy consumption and costs.**

With the technical assistance of the EU Energy Initiative Partnership Dialogue Facility (EUEI PDF) it has developed and publicly presented for consultation in April 2013 the:

* **National Energy Efficiency Policy** (definition of policy targets)
* **National Energy Efficiency Strategy** (how to achieve the policy targets)
* **National Energy Efficiency Action Plan** (how to implement the strategies proposed).

From the Policy to the Strategy and Action Plan



Five Priorities of the National Energy Efficiency Policy in Cambodia

1. Energy Efficiency in Industry:

Sub Sector	Energy saving target	Recommended actions
Rice mills	Up to 70%	Substitution of fossil fuels by rice husk gasification
Garment industry	20 to 35%	More efficient wood boilers Application of thermal insulation More efficient sewing machines
Ice factories	Up to 80% of diesel	Introduction of biomass gasifiers
Food industry	15-20%	Replacement of inefficient lights Replacement of inefficient air compressors Optimization of material flow
Rubber factories	25%	Improvement of drying process, use of more efficient electrical motors
Brick factories	Up to 70%	Replacement of tunnel kilns by vertical shaft kilns Improvement of brick molding

Five Priorities of the National Energy Efficiency Policy in Cambodia (Cont)

2. Energy Efficiency of End-User Products:

Five Priorities of the National Energy Efficiency Policy in Cambodia (Cont)

3. Energy Efficiency in Building:

Objectives

1. Improve EE in New buildings
2. " " Existing buildings
3. " " Public buildings
4. Improve Education and Awareness

Five Priorities of the National Energy Efficiency Policy in Cambodia (Cont)

4. Energy Efficiency of Rural Electrification and Distribution:

Overview activities and prioritization						
Sect	Obj	No.	Activities	Impact	Feasibility	Timing
Rural Electrification	1	1	Pilot generation projects are installed and analyzed			S
		2	Establish and enforce distribution standards			M
		3	Training of REEs to improve operational efficiency			S
	2	1	Inventory of unlicensed REEs and electrification database			S
		2	Improve renewable energy system installation capacity and supply chain.			M
		3	Increase consumer awareness of rural electrification options and energy efficiency			M

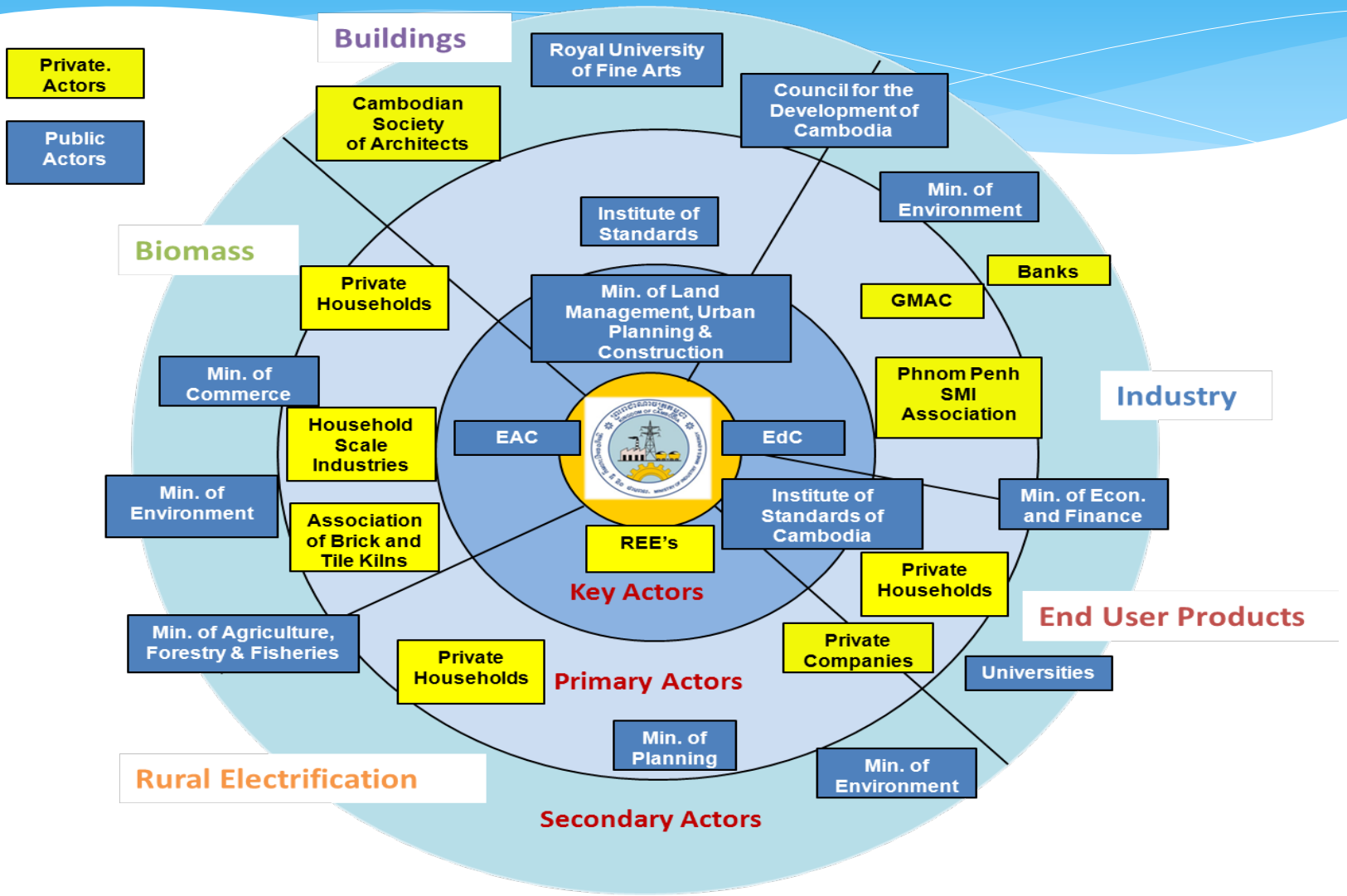
Five Priorities of the National Energy Efficiency Policy in Cambodia (Cont)

5. Efficient use of Biomass Resources for Residential and Industrial purposes :

1. Biomass energy consumption for domestic cooking
2. Sustainable charcoal & improved charcoal kiln
3. Biomass energy consumption for HH Industries
4. Promotion of char briquette, an alternative cooking fuel
5. Sustainable forest management for biomass fuel supply

II. Energy Efficiency Strategy

2.1 Strategic Framework



II. Energy Efficiency Strategy (con.)

2.2 Strategic Objectives per Sector

#	Strategic Objective	Outcome
1	The Energy Efficiency of the industrial sector is improved	The energy intensity per unit of production is reduced
2	Capacity building in the field of EE&C in industry is strengthened	Owners and managers of factories are trained in energy management and apply its principles
3	Attention of factory owners/managers about EE is raised	The owners and managers of factories are interested in knowing more about energy conservation measures and are ready to implement energy saving solutions

II. Energy Efficiency Strategy (con.)

2.2.1 Energy Efficiency Strategy in End User Products

#	Strategic Objective	Outcome
1	Energy efficiency of end-user products has increased and residential electricity consumption is reduced	Energy efficiency of end user products is improved
2	The market share of energy efficient residential appliances has increased	End users select more energy efficient products and reduce their energy consumption accordingly
3	End users are aware of the concept of energy efficiency and behave accordingly	End users change their behaviour and use their electrical appliances in a more efficient way

II. Energy Efficiency Strategy (con.)

2.2.2 Energy Efficiency Strategy in Buildings

#	Strategic Objective	Outcome
1	Energy efficiency of new buildings is improved	An energy efficiency building code for new buildings is established
2	Energy efficiency in existing buildings is improved	An Energy Manager Certification program is established
3	Energy efficiency in public buildings is improved	A green standard is applied to all new public buildings
4	Education and awareness of energy efficiency in buildings has increased	Classes and information for building professionals and the public

II. Energy Efficiency Strategy (con.)

2.2.3 Energy Efficiency Strategy in Rural Electricity Generation

]	Strategic Objective	Outcome
1	Rural energy entrepreneurs (REEs) operate more efficient businesses	Rural energy entrepreneurs (REEs) can provide their energy services more efficiently and at lower costs
2	Increase knowledge around rural electrification efficiency	Government, private organisations, and rural households are better informed and prepared to tackle energy efficiency in rural electrification.

II. Energy Efficiency Strategy (con.)

2.4 Energy Efficiency Strategy use of Biomass Resources for Domestic and Industrial Purpose

#	Strategic Objective	Outcome
1	The National forest resources are protected by the sustainable and efficient use of biomass	Firewood and charcoal consumption is reduced by utilization of more efficient technologies. Community-based sustainable forest management is being implemented effectively within a context of province, district and commune level planning and delivering concrete benefits to local communities. A strong demand and supply chain of energy efficient cook stoves is established.
2	Combustible solid biomass residues are utilized optimally to substitute firewood and/or charcoal.	Forest resources are protected by reducing firewood and charcoal consumption. Sustainable Supply of Solid Biomass is achieved by disseminating improved Solid Biomass Fuel Technology.

III. National Energy Efficiency Action Plan

3.1 Energy Efficiency Action plan in Industry

Overview and prioritization of activities

Sect	Obj	No.	Activities	Impact	Feasi-bility	Timing
Industry	1	1	Improve energy data collection and processing in the industry	■	●	S
		2	Promotion of good energy management practice in industrial enterprises	■	●	S
		3	Promotion of biomass use for decentralized production of energy (thermal or electrical) through gasification or bio digestion	■	●	M
		4	Implementation of voluntary standards on energy efficiency in industrial enterprises consuming more than a certain amount (to be determined) of energy per year	■	●	S
		5	Implementation of energy efficiency/conservation laws/regulations on industrial energy use	■	●	M
	2	1	Support the development of energy service companies (ESCO's)	■	●	M/L

III. National Energy Efficiency Action Plan (Con.)

Overview and prioritization of activities

Sect	Obj	No.	Activities	Impact	Feasi-bility	Timing
		2	Technical training for engineers and technicians in the field of energy efficiency, performing energy audits, establishing EMS and implementing energy saving measures in the industry	■	●	S/M
		3	Support the local development and manufacturing of energy efficient equipment	■	●	M/L
	3	1	Organize awareness raising campaigns about energy efficiency in industry	■	●	M
		2	Provide financial incentives to interested companies to implement energy efficiency strategies and measures	■	●	L
		3	Support, especially to small and medium industrial enterprises, for auditing of their facilities and implementation of energy efficient solutions	■	●	M

III. National Energy Efficiency Action Plan (Con.)

3.2 Energy Efficiency Action plan in End User Products

Overview and prioritization of activities

Sect	Obj	No.	Activities	Impact	Feasi-bility	Timing
End User Products	1	1	A compulsory national energy efficiency labeling system for household appliances is being elaborated and introduced in Cambodia	■	●	S/M
		2	Electricity consumption of household appliances is measured/tested by certified institutions/ laboratories	▪	●	M
		3	Energy efficiency standards, laws and regulations concerning energy efficiency of end-user appliances are being elaborated and promulgated by government	■	●	M/L
	2	1	Regular information campaigns on energy efficiency of appliances are organized in TV, radio and newspapers	■	●	M/L
		2	Ministries and other public institutions are demonstrating the usefulness of EE by applying EE minimum standards in the procurement of their energy consuming devices such as computers, AC, refrigerators, lights	▪	●	M/L
	3	1	Education programs in energy efficient behaviour are performed in schools	■	●	M/L
		2	Publicity campaigns on energy efficient behaviour are published in the public media	■	●	M/L

III. National Energy Efficiency Action Plan (Con.)

3.3 Energy Efficiency Action plan in Buildings

Overview and prioritization of activities

Sect	Obj	No.	Activities	Impact	Feasi-bility	Timing
	1	1	An energy efficiency building code for new buildings is established	■	●	M/L
		2	Energy efficiency building codes in other countries are evaluated	▪	●	S/M
		3	Energy efficiency building requirements are attached to large developments and luxury hotels	■	●	S
	2	1	Establish an energy manager program	■	●	M/L
		2	Establishment of an energy data base at MIME	■	●	M/L
		3	Energy managers are trained and certified	■	●	M

III. National Energy Efficiency Action Plan (Con.)

Buildings	3	1	Existing public buildings are held to a high energy efficiency performance standard	■	●	M
		2	Public buildings are designed according to an established green building standard	■	●	M
	4	1	Education of architecture students in energy efficiency (knowledge)	■	●	S/M
		2	Education of architects and planners in energy efficiency (basics)	■	●	S/M
		3	An Energy Efficiency Information Resource Center is established	■	●	S/M
		4	Study tours to selected examples of good practice of energy efficient buildings	■	●	S
		5	Public lectures by architects with expertise in energy efficient buildings	■	●	S

III. National Energy Efficiency Action Plan (Con.)

3.4 Energy Efficiency Action plan in Rural Electrification

Overview and prioritization of activities

Sect	Obj	No.	Activities	Impact	Feasi-bility	Timing
Rural Electrification	1	1	Pilot generation projects are installed and analyzed	■	●	S
		2	Establish and enforce distribution standards	■	●	M
		3	Training of REEs to improve operational efficiency	■	●	S
	2	1	Inventory of unlicensed REEs and electrification database	■	●	S
		2	Improve renewable energy system installation capacity and supply chain.	■	●	M
		3	Increase consumer awareness of rural electrification options and energy efficiency	■	●	M

III. National Energy Efficiency Action Plan (Con.)

3.5 Energy Efficiency Action plan in Biomass

Overview and prioritization of activities

Sect	Obj	No.	Activities	Impact	Feasi-bility	Timing
Biomass	1	1	Promotion of improved and efficient cookstoves for rural households	■	●	S/M
		2	Promotion of sustainable forest management for biomass fuel supply	■	●	L
		3	Promotion of sustainable charcoal production applying improved charcoal kiln technologies	■	●	M
		4	Promotion of improved and efficient cookstoves for urban households	■	●	S/M
		5	Promotion of improved and efficient cookstoves for household scale industries in rural areas	■	●	S/M
	2	1	Promotion of production, distribution and utilization of char briquette as alternative cooking fuel for households and household scale industries in urban areas	■	●	S/M

Impact		Feasibility		Timing	
High	■	Easy	●	Upto 1 year	S
Medium	■	Medium	●	2 to 3 years	M
Low	■	Not easy	●	> 3 years	L

Conclusion

- **Establish a sound and comprehensive database upon the energy demand of all sectors**
- **Ensure inter institutional collaboration of all stakeholders**
- **Establish laws and regulations to enforce EE**
- **Provide sufficient technical and financial support for sustainable structures of EE promotion**
- **Create public awareness for EE by publicity campaigns, educational measures , expositions and pilot projects**


ASEAN VILLAGE

Thank You !

Toch Sovanna

Director of Department of Energy Technique

Ministry of Industry, Mines and Energy

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