

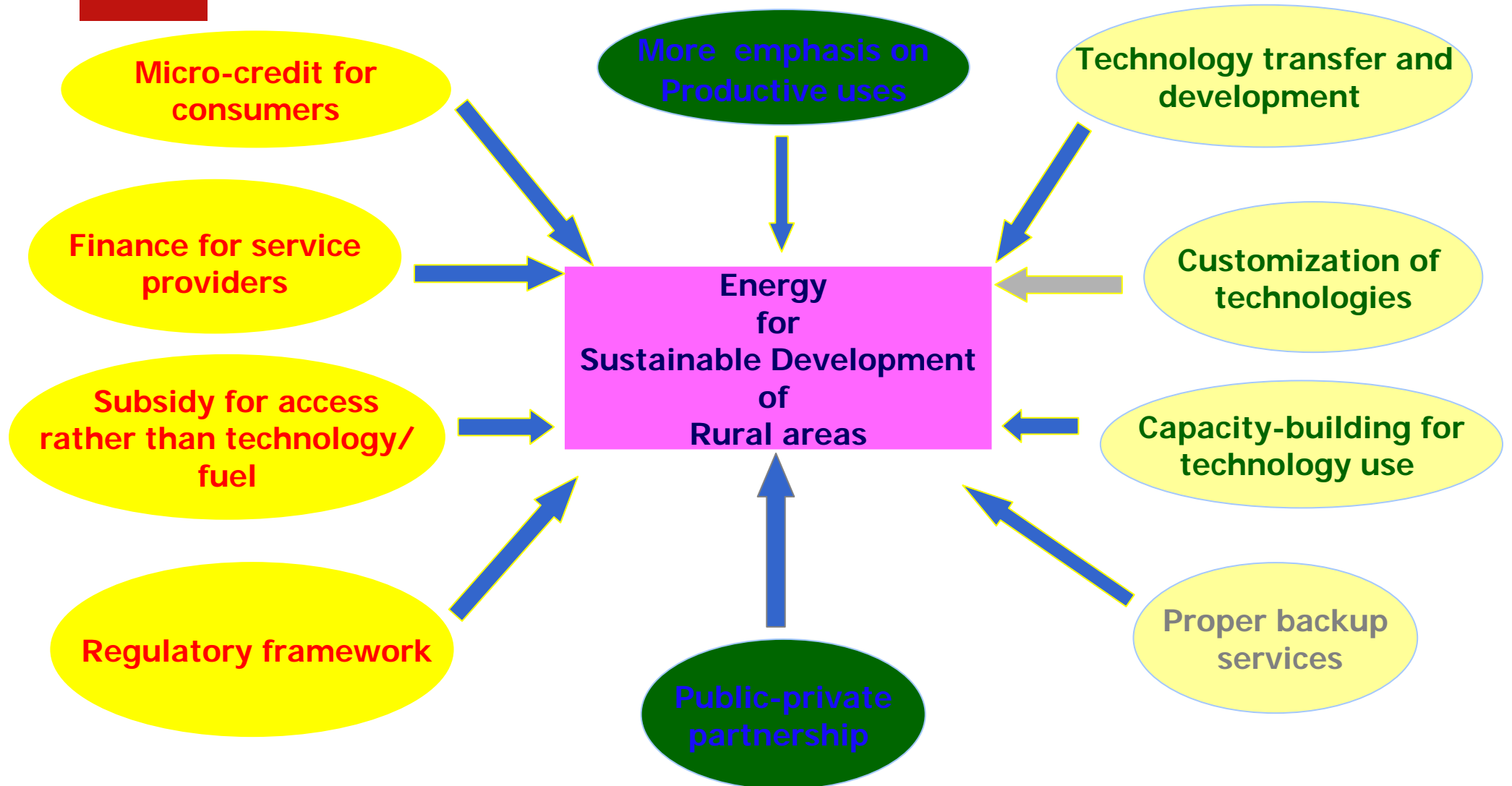


REP PoR

thematic areas for developing country papers

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Institute, New Delhi**

Rural energy for sustainable development





INSTITUTIONAL FRAMEWORK



Institutional arrangements

Objective

Integrate rural energy with development factors such as health, education, infrastructure, financing, etc.

Two types of institutions

- Government (100% government owned, ministry department, corporation, state owned utility, etc.)
- Non government (contract partnership, MoUs, piecemeal privatization, PPPs, 100% privatization etc.)

Rural energy planning needs a network of nodal agencies for planning and implementation process

<div data-bbox="197 73 371 363" style="background-color: #800000; width: 78px; height: 182px; position: absolute; top: -182px; left: -78px;"></div> <div data-bbox="174 308 342 339" style="background-color: #800000; color: white; padding: 2px;">Component</div> <div data-bbox="163 507 291 571" style="color: #800000; font-weight: bold;">Key Variables</div>	<div data-bbox="748 395 1093 483" style="color: #800000; font-weight: bold;">Overview (Rural energy scenario)</div>	<div data-bbox="1520 308 1910 347" style="color: #800000; font-weight: bold;">Policy mapping/ advocacy</div>
<div data-bbox="123 834 331 914" style="color: #800000; font-weight: bold;">Institutional arrangements</div>	<div data-bbox="573 699 1261 1441" style="color: #800000;"> <p>Map, assess and identify gaps related to:</p> <ul style="list-style-type: none"> existing institutional framework (roles and responsibilities at national, sub national and local levels) for energy service delivery and its linkages with poverty alleviation related institutional arrangements; nature and extent of decentralization in institutional arrangements to cater to local development concerns; public-private partnerships (including civil society) for energy service delivery and determine incorporation of poverty and MDG related concerns in such partnerships ; and role of multi lateral and bilateral agencies related to energy services delivery (for incorporating poverty concerns). </div>	<div data-bbox="1350 699 2078 1361" style="color: #800000;"> <p>A. Assess policies related to public-private participation (including civil society) and the reform of institutions involved in delivery of energy services.</p> <p>Map policies related to decentralization of energy agenda to local level (grassroots institutions)-and incorporate learning from micro to macro levels regulatory framework and identify mechanism facilitating or hindering the process of energy service delivery for meeting development (poverty) and gender concerns.</p> <p>B. Identify policy gaps and suggest modalities and tools for advocacy related to above mentioned issues.</p> </div>

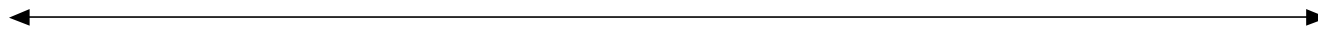


Component Key Variables	Capacity development	Knowledge Management
Institutional arrangements	<p>Map, assess capacities and identify gaps related to, modern tools and frameworks for planning, policy formulation, and implementation.</p> <p>Map and assess the capacities of public institutions for partnering with private sector and vice versa.</p> <p>Map and assess capacities related to developing cross-sectoral synergies.</p> <p>Identify capacity gaps in the above mentioned issues and suggest modalities to address the capacity concerns.</p>	<p>Modalities for knowledge sharing and transfer related to institutional arrangements - within the country and with the countries in the region.</p> <p>Identify existing institutional good practices and knowledge of energy utilization at local and national levels (not necessarily documented).</p> <p>Modalities for developing consensus around institutional good practices and knowledge of energy utilization (for meeting poverty concerns) at local and national levels.</p>

Institutional arrangements for energy service delivery (for poverty alleviation)

Centralised

Decentralised



Institution	Role	Specific activity	National	Sub-regional	Local level
NEA					
AEPIC					



Gap analysis framework at Institutional level

Present situation

- Understand organizational/institutional arrangements at various levels-national, sub-national and local
- Focus on 'the' issues in rural energy planning-roles and responsibilities of different institutions
- Assess institutional role in technology/fuels promotion (region specific--biogas plants, improved cook-stoves, solar cookers)
- Assess Training Programs/Capacity Building/ Information Dissemination needs at institutional level to promote access to rural energy
- Ways to promote decentralized renewable energy options



Focus on factors such as..

- **Assess policy framework wrt cross sectoral synergies across institutions**
- **Identify gaps related to planning and coordination across various authorities at national/regional/local levels**
- **Assess role of financial institutions (including funding agencies) and identify gaps thereof**



Future directions..

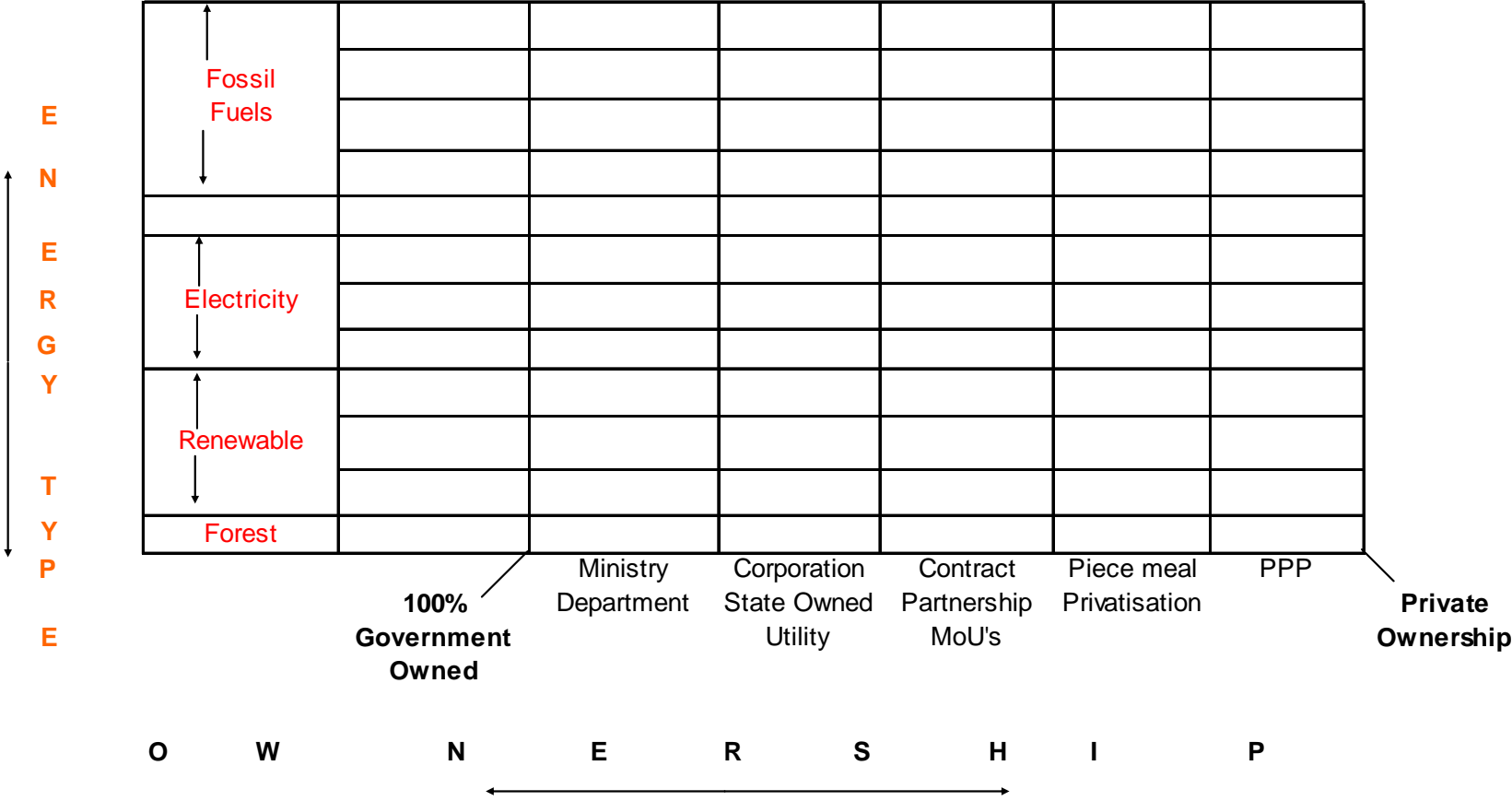
- **Identify gaps related to changing institutional modalities with the energy consumption patterns in rural areas (consumer category- wise etc.)**
- **Critically assess the evolution of rural energy development plans for each country**
- **Critically assess the institutional coordination/planning efforts? (For example: Energy acts as a catalyst for rural development. Thus, to be most effective, certain forms of energy, for example grid-based electricity, should only be introduced into rural areas after or along with a series of other development inputs or infrastructure components!)**



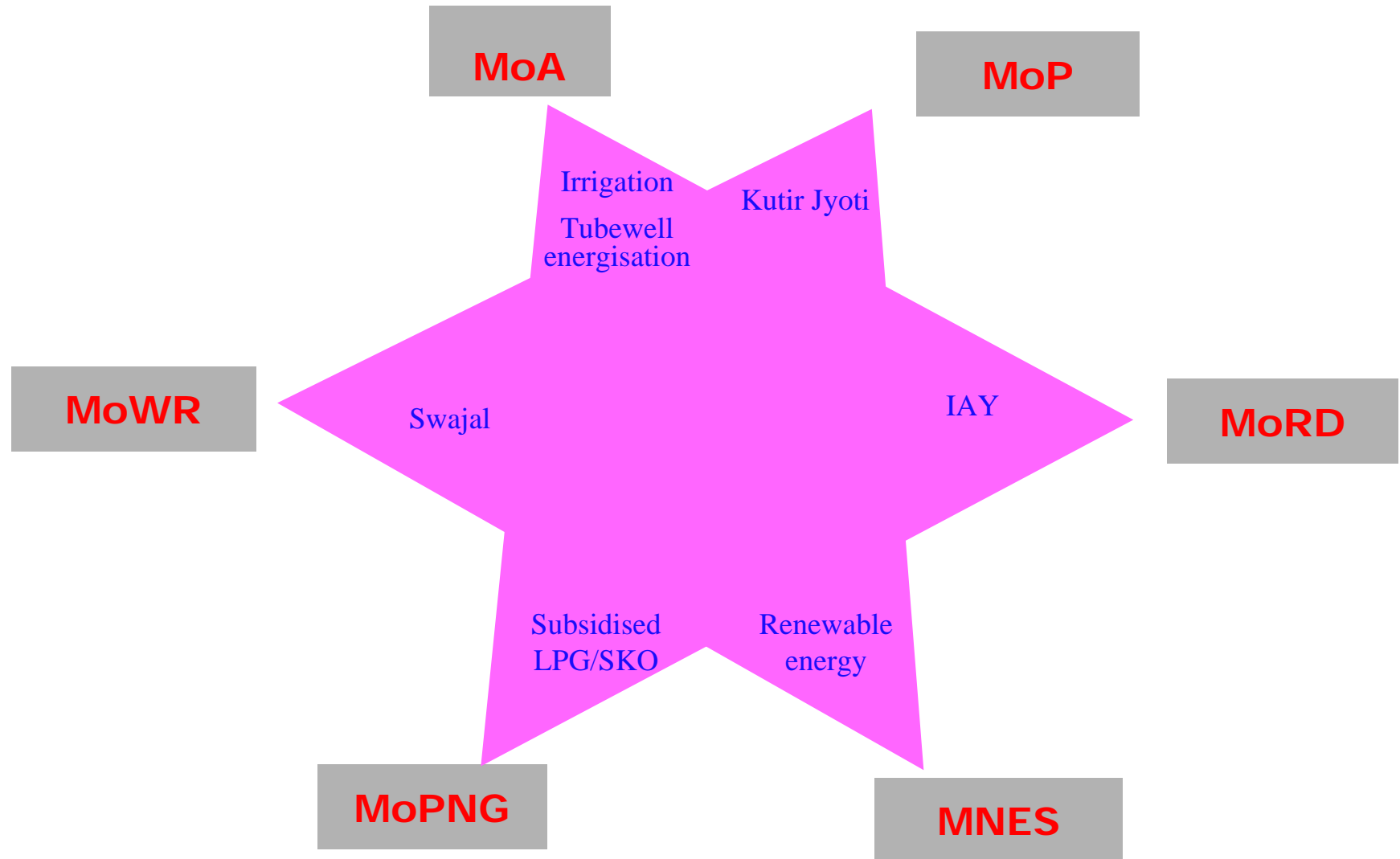
Contd..

- Review efforts of the government to coordinate national level planning at the decentralized level- getting consensus on policy decisions, establishing common guidelines for planning, etc.
- Assess linkages between decentralized levels of local governments and other local agencies to implement the plans, etc.
- Assess vertical/horizontal modes of communication between all agencies involved in rural development and energy. (Presently, the lack of information exchange and horizontal co-operation, particularly between government agencies, inhibits the implementation of well-integrated programs in many countries)

Institutional Mapping



Mapping cross sectoral synergies





PROGRAM FRAMEWORK



Component Key Variables	Overview (Rural energy scenario)	Policy mapping/ advocacy
Program framework	Map, assess and identify gaps related to: past/on-going programmes, and fresh/innovative dimensions that the program or their development partners are adding to energy service delivery for meeting development (poverty) and gender concerns; and program conflicts and synergies and cross sectoral linkages (incorporating development and gender concerns).	Assess role of policies in resolving/compounding program related conflicts and synergies, cross sectoral linkages (incorporating development and gender concerns). Map and assess policies facilitating program innovation for incorporating poverty concerns.



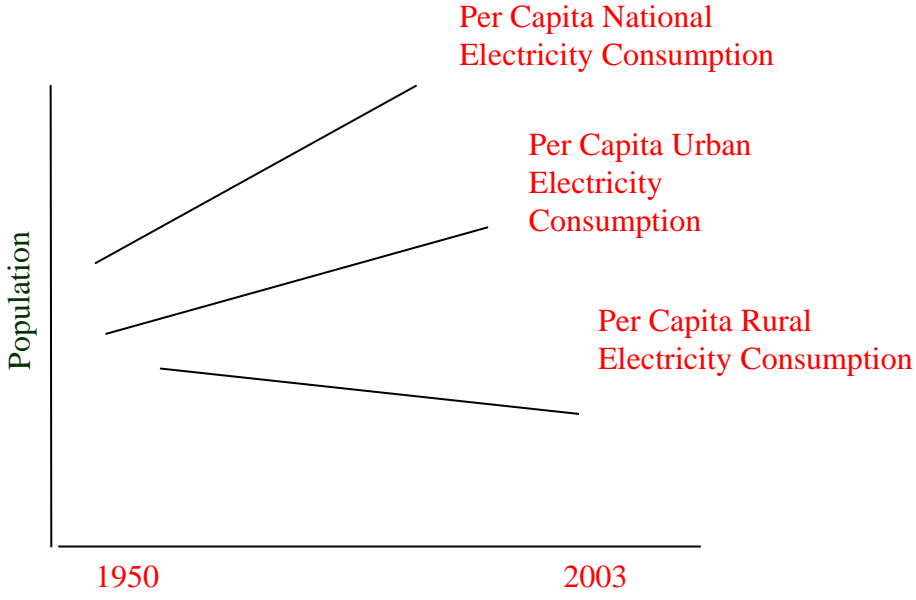
Component Key Variables	Capacity development	Knowledge Management
Program framework	Map and assess capacities for designing, integrating cross sectoral programs related to energy service delivery for meeting poverty and gender concerns.	Determine existing documentation of successful programs at national and local levels. Modalities for knowledge sharing and transfer within the country at local levels (also national) and with the countries in the region

Program Framework (Timeframe analysis)

Regulator											
M & E											
Implementation											
M & E Programs (Partnerships, etc.)											
Training & capacity building											
Planning											
Policy		Solar	Wind	Biomass	Generati on	Tansmis sion	Distributi on	LPG	Kerosene	Petrol	Diesel
	Forest	← Renewables →			← Electricity →			← Conventional Fuels →			

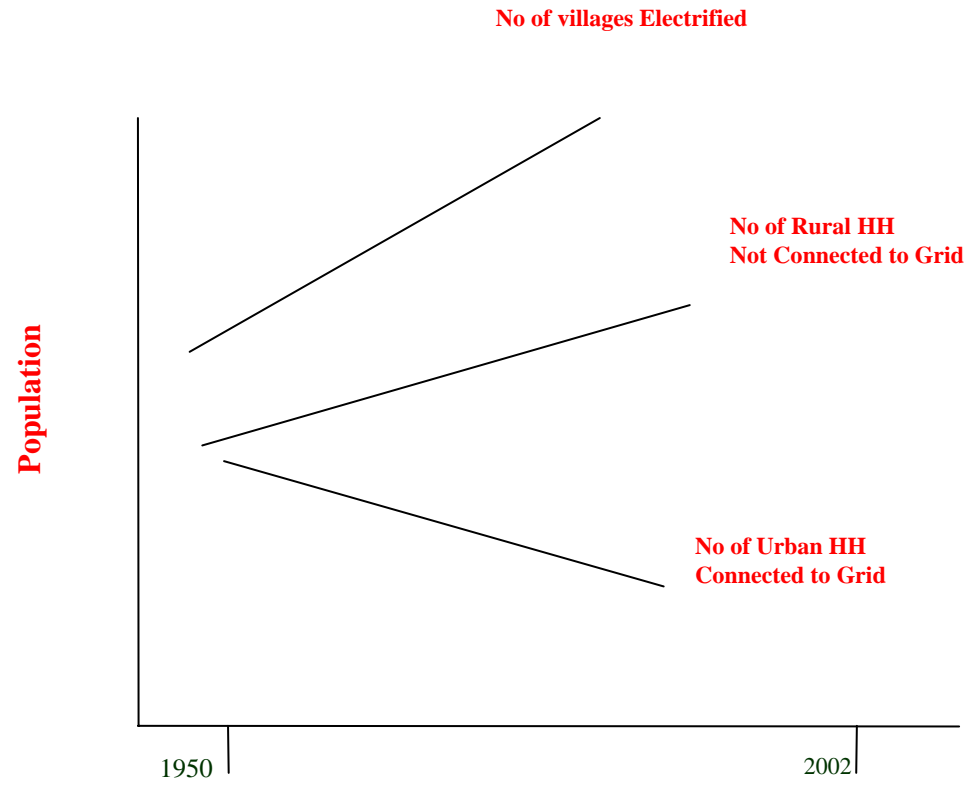


Verification of secondary wrt electricity consumption





Access to Electricity





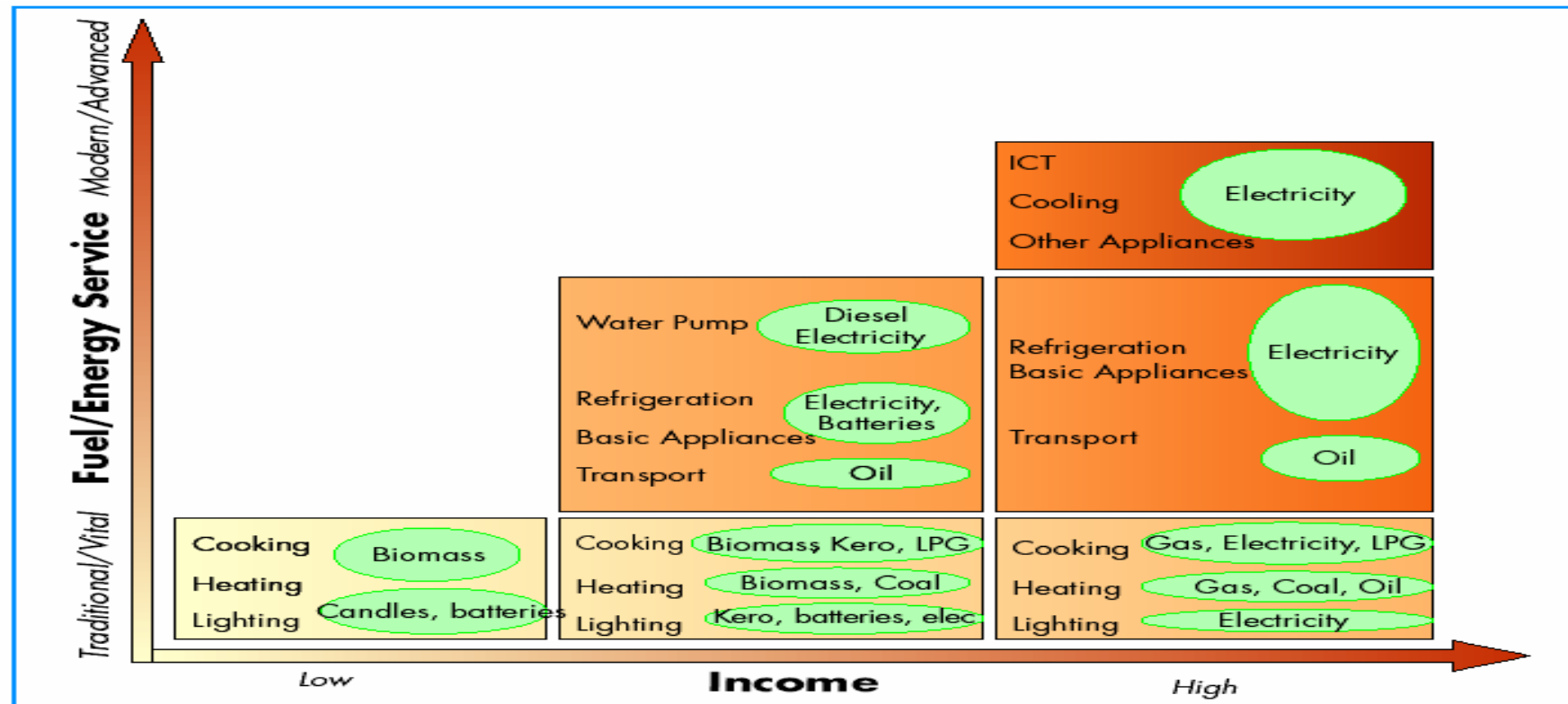
TECHNOLOGY EFFICIENCY AND FUEL OPTIONS/ACCESS TO ENERGY SERVICES

Component Key Variables	Overview (Rural energy scenario)	Policy mapping/ advocacy
Technology efficiency and fuel options	<p>Map, assess and identify gaps related to:</p> <p>dissemination of modern technologies/fuels (their penetration levels in rural areas, efficiencies, level of decentralization in supply, demand and access);</p> <p>existing rural energy supplies chain, the rungs on the energy ladder; and</p> <p>technology provision versus development parameters (GDP, growth of SMEs and micro-enterprises, SSIs, energized pump sets, increase in agriculture yields).</p>	<p>A. Map policy trends that facilitate leapfrogging the energy ladder from low efficiency and environmentally unfriendly technologies/fuels to highly efficient and environmentally friendly technologies/fuels.</p> <p>Map policies related to promotion of energy efficiency in SME, micro-enterprise and other sectors related to rural development, identify gaps thereof and give recommendations.</p> <p>Assess incorporation of forward (viz. energy use and application-improving efficiency and economy of production) and backward linkages (viz. factoring in potential/projected demand at local level for entrepreneurial activities) for energy provision at the policy (macro and micro) level.</p> <p>B. Identify policy gaps and suggest modalities and tools for advocacy related to above mentioned issues.</p>
Access to energy services	<p>Map, assess and identify gaps related to access to energy services (largely from a productive aspect) for meeting lighting, thermal, motive and related energy needs.</p>	<p>A. Assess policies related to energy service provision (largely from a productive aspect) for meeting lighting, cooking, motive and other sectoral/enterprise related needs</p> <p>B. Identify policy gaps and suggest modalities and tools for advocacy for improving energy service for different sectoral needs</p>



Component Key Variables	Capacity development	Knowledge Management
Technology efficiency and fuel options	<p>A. Map and assess capacities - constantly expanding menu of technologies for meeting electricity requirements, thermal and motive energy needs (apart from electricity) that link to poverty alleviation.</p> <p>Map capacities related to fuel and technology procurement-management and maintenance; capacity with regard to services (local or relying on foreign expertise).</p> <p>Map capacities for energy based business development/ entrepreneurial opportunities (SMEs and micro-enterprises).</p> <p>Map trends and direction for development of capacities - fuel and technology procurement-management/ maintenance-gaps</p> <p>B. Identify capacity gaps in the above mentioned issues and give recommendations to address the capacity concerns.</p>	<p>Identify experiences/good practices (not necessarily documented) related to introduction of modern technologies and fuels and their contribution to alleviating poverty.</p>
Access to energy services	<p>Map assess capacities related to provision of energy services (largely from a productive aspect) for meeting lighting, cooking, motive and other sectoral/enterprise related needs</p>	<p>Identify experiences/good practices (not necessarily documented) related to energy service access for productive purposes</p>

Illustrative example of household fuel transition

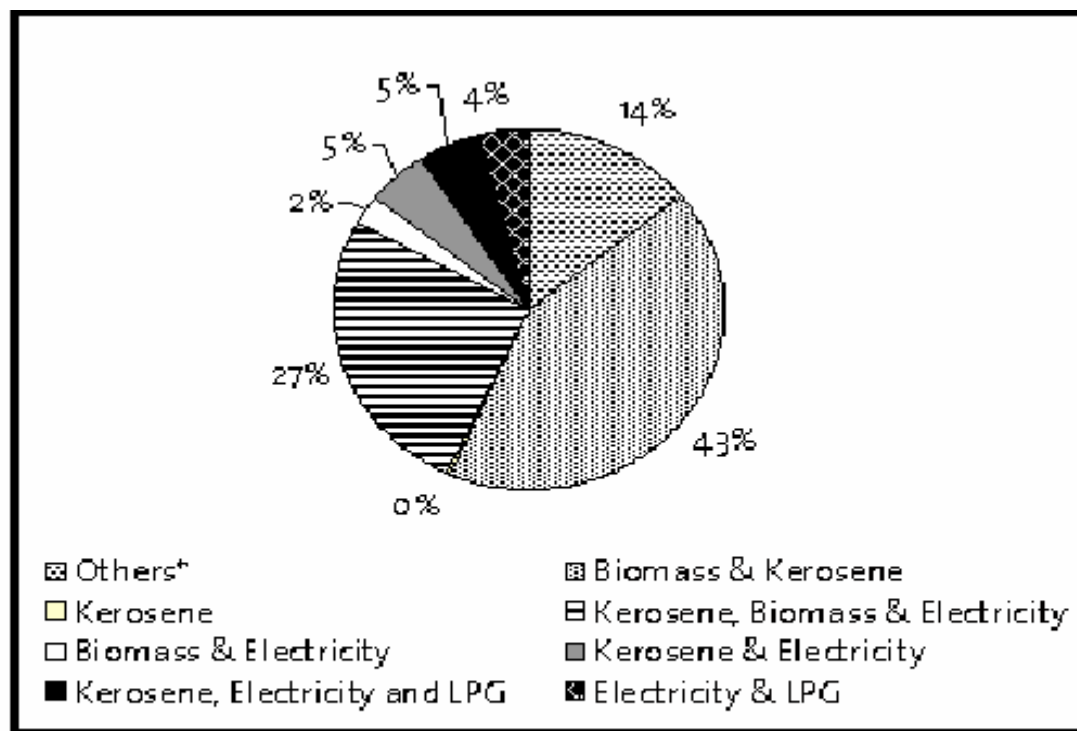


Note: ICT is information and communication technology.
 Source: IEA analysis.

Framework for Technology / Fuel options

↑ Fuel availability ↓				
↑ Technology options (imported/indigenous) ↓				
↑ Policy options ↓				
↑ Scope for efficiency improvements (Production, Distribution, Consumption) ↓				
		1990	2005	2020

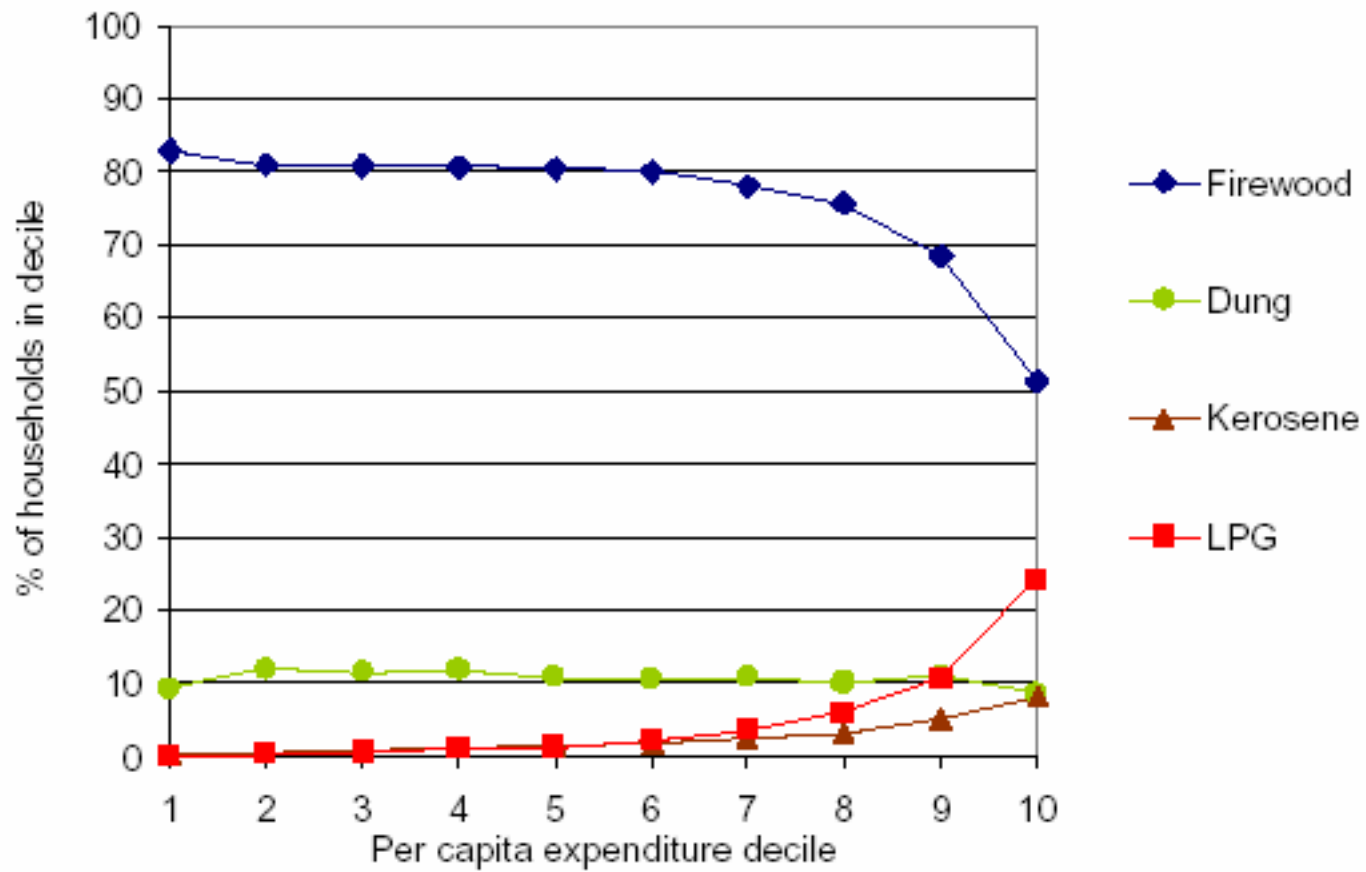
Distribution of households by type of fuel used



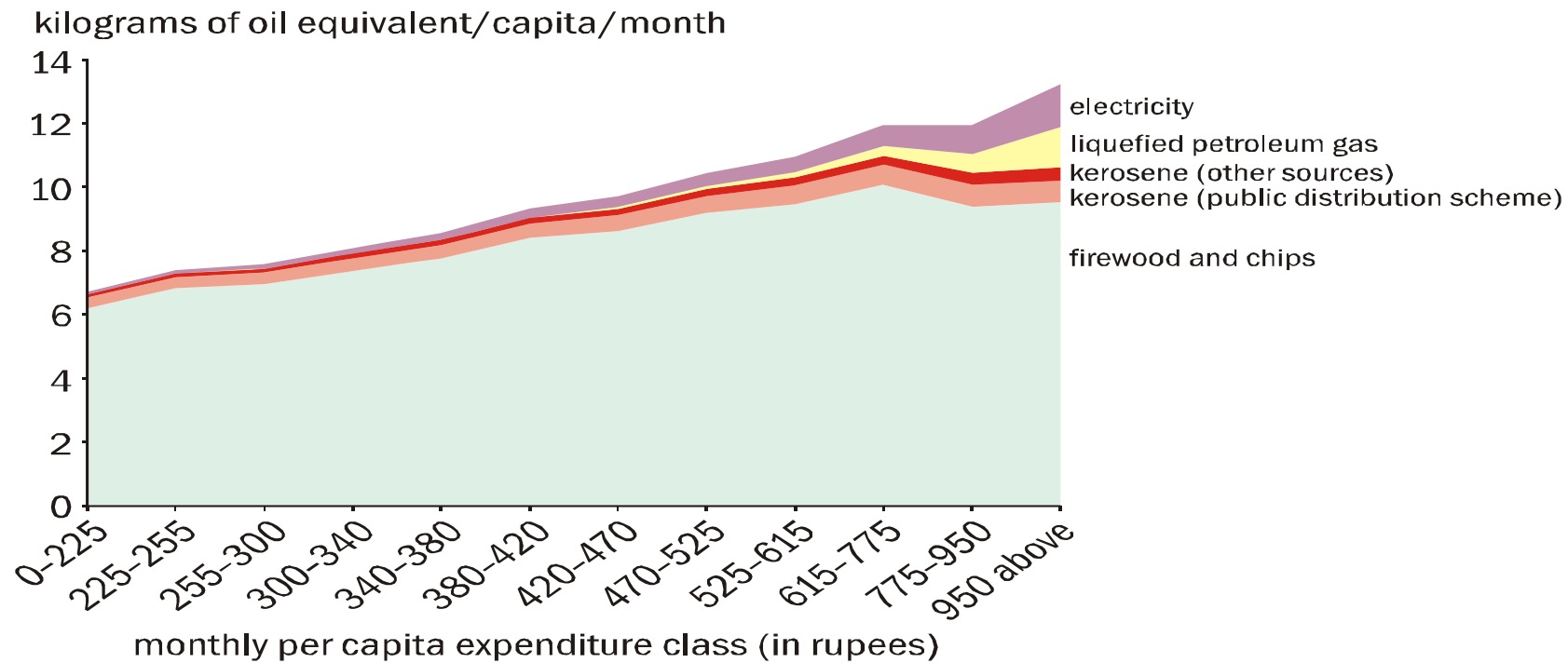
Note: * The category 'Others' includes those households where the data for fuel use from the NSSO survey data was inconsistent. In other words, where values for quantity of fuel were missing, even though the household reported the use of certain fuels in another part of the questionnaire.

Cooking fuels in rural India

Primary Cooking Fuels in Rural India, 1999-2000



Dependency of different expenditure classes of the rural population on various fuel types



India: Gross energy consumption: rural, by expenditure class

Source NSSO(2001)

Mapping energy use for household sector

Energy Source/Task	Current term	Medium term	Long term
Source Electricity Fuel used			
End Use			
Cooking			
Lighting			
Cooling			
Heating			

Energy requirements for energy services demanded by households

Energy Services		Average power per household (in W)		
		useful energy	end-use energy	primary energy
1	Lighting electric bulb (60W) ^a	10	13	45
2	Lighting ~1 kerosene lamp ^b	0.01	19	22
3	kerosene pressure 1 lamp ^b	0.5	76	90
4	back-up kerosene (lightning) ^b	0.01	11	13
5	Cooking tradi.biomass 1 meal daily ^c	55	393	401
6	Cooking kerosene stove 1 meal daily ^c	55	123	144
7	Cooking LPG stove 1 meal daily ^c	56	93	109
8	Space cooling 1 room ^d	292	146	530
9	warm water (fuelwood; 5 litres/day) ^c	7	52	53
10	warm water (kerosene; 5 litres/day) ^c	7	16	19
11	electric geyser (10 litres/day) ^c	15	22	82
12	Refrigerator small ^d	40	20	72
13	Refrigerator large ^d	75	37	136
14	washing machine ^d	10	14	52
15	household devices ^e	1	2.5	9
16	Radio ^e	3	5.8	21
17	TV (Black & White or Color) ^e	7	14	52
18	Computer ^e	8	17	61
19	Car (per 10km/day) ^f	66	356	456
20	Scooter per 5km/day) ^f	13	73	91

Notes:

a) Source : <http://www.energieinfo.de/eglossar/node204.html>

For electricity we assumed a conversion factor of 0.75 for going from end-use to useful energy.

b) Source : Plas R. & A.B. de Graaff (1988)

c) Source : Reddy (2003), Ravindranath & Hall (1995), OTA (1991) and Gupta & Rao (1979)

d) Source : http://www.physik.uni-muenchen.de/didaktik/U_materialien/leifiphysik/web_ph10/

e) Source : Cremer et al. (2003)

f) Source : <http://www.energieinfo.de/eglossar/node129.html>

(Source: Shonali Pachauri/Daniel Spreng)

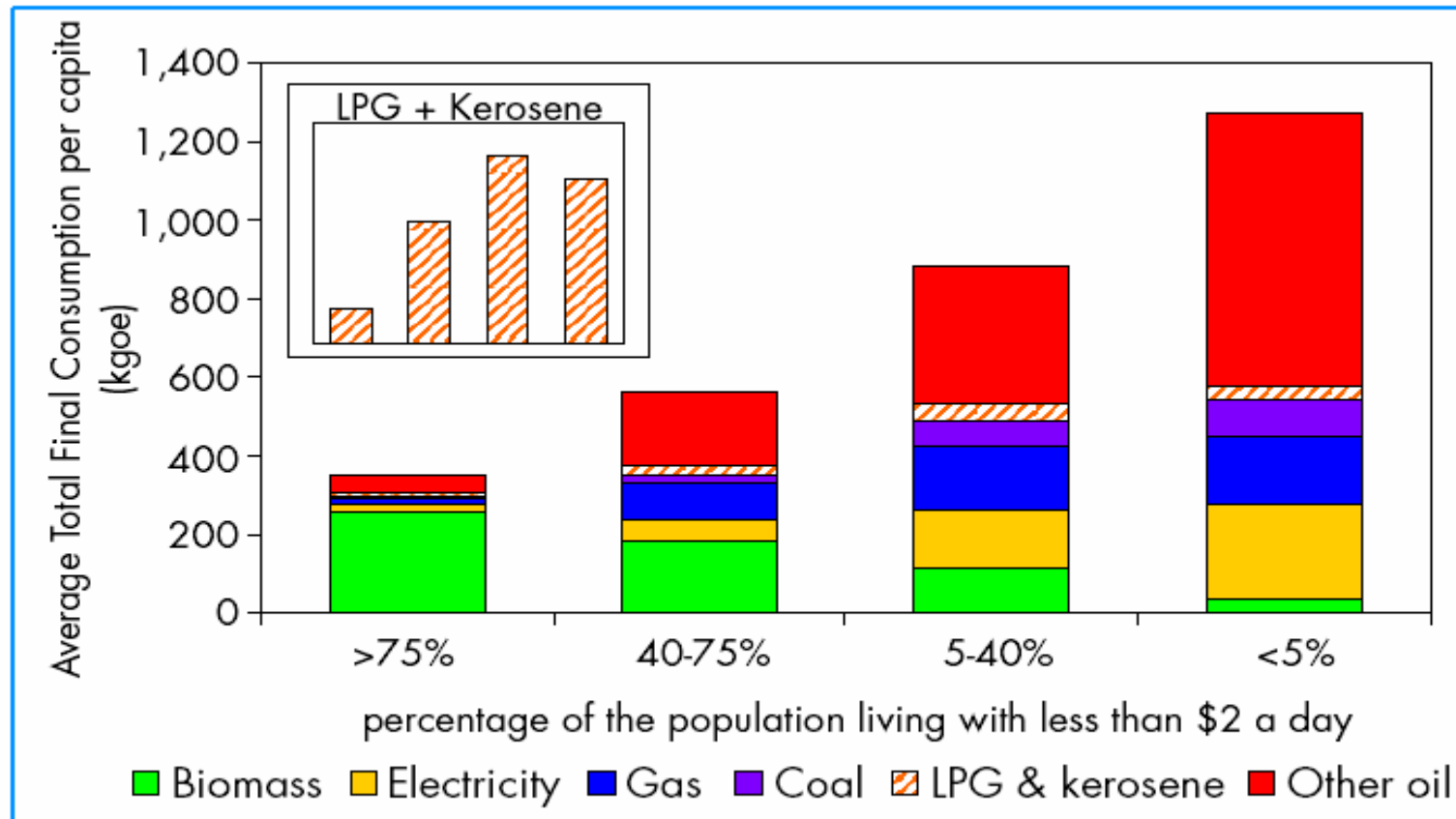
Time taken and distance travelled for firewood collection in different regions

State/region	Year of data	Firewood collection*		Data source
		Time taken	Distance travelled	
Bihar (plains)	c.1972	NA	1-2 km/day	}Bhaduri and Surin (1980) }
	1980	NA	8-10 km/day	
Gujarat (plains)		once every 4 days	NA	}Nagbrahman and Sambrani (1983) }
(a) Forested	}	once every 2 days	4-5 km	
(b) Depleted	}1980	4-5 hr/day	NA	
(c) Severely depleted	}			
Karnataka (plains)	NA	1 hr/day	5.4 km/trip	Batliwala (1983)
Madhya Pradesh (plains)	1980	1-2 times/week	5 km	Chand and Bezboruah (1980)
Rajasthan				
Alwar plains	1986	5 hr/day (winter)	4 km	Author's observation in 1988
Ajmer plains (average all seasons)	1970s	2 hr/journey	1.9 km	}Survey by author in 1993 }
	1990s	2 hr/journey	2.1 km	
Uttar Pradesh				
Chamoli (hills)				
(a) Dwing	}1982	5 hr/day [@]	over 5 km	}Swaminathan (1984) }
(b) Pakhi	}	4 hr/day		
Garhwal (hills)	NA	5 hr/day	10 km	Agarwal (1983)
Kumaon (hills)	1982	3 days/week	5-7 km	Folger and Dewan (1983)
Kumaon (hills) (average all seasons)	1970s	1.6 hrs/journey	1.6 km	}Survey by author in 1993 }
	1990s	3-4 hrs/journey	4.5 km	

Notes: * firewood collected mainly by women and children. [@] average computed from information given in the study.

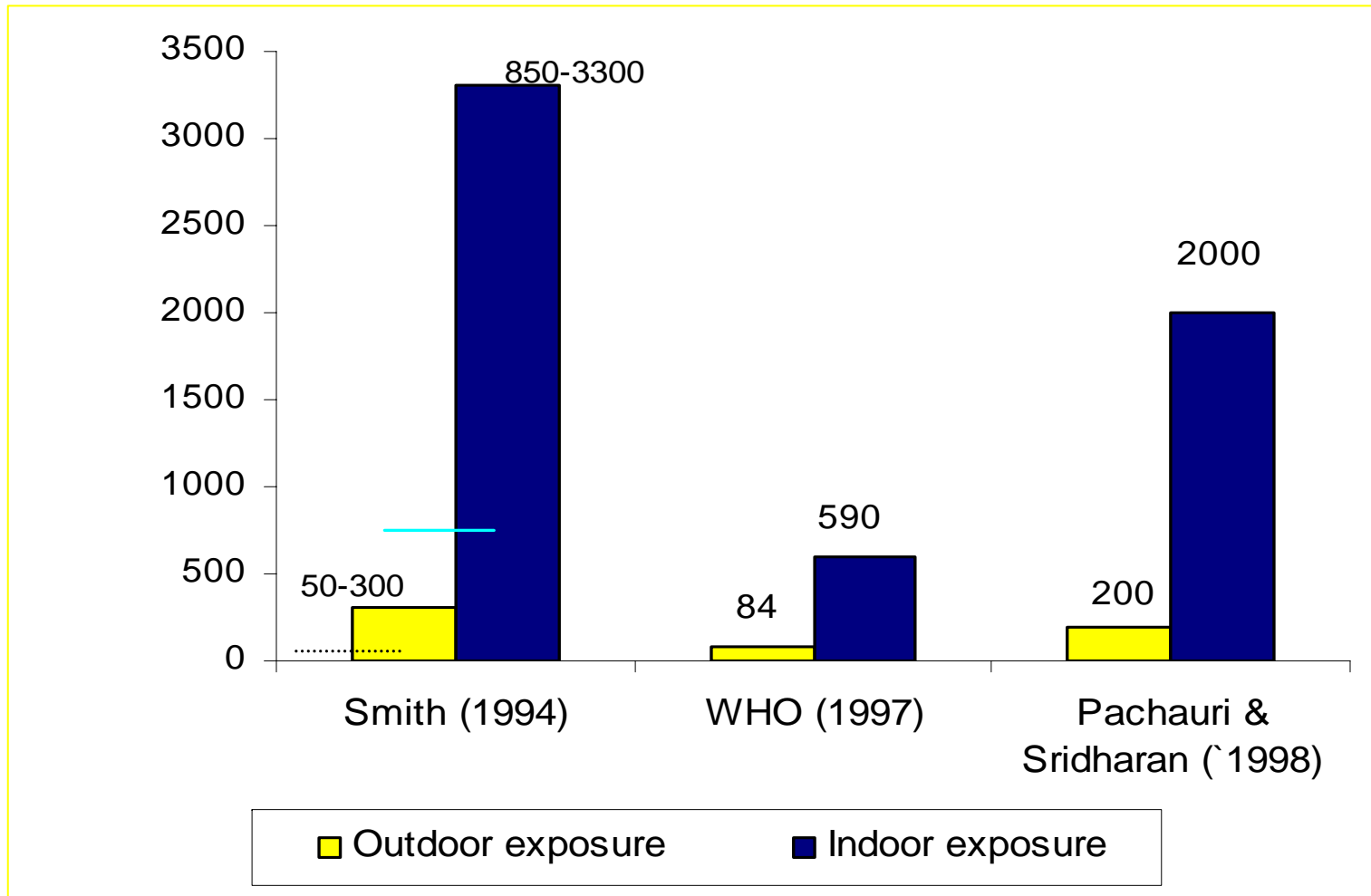
NA: information not available

Average per Capita Final Energy Consumption and Share of Population Living under Poverty Line, 2000

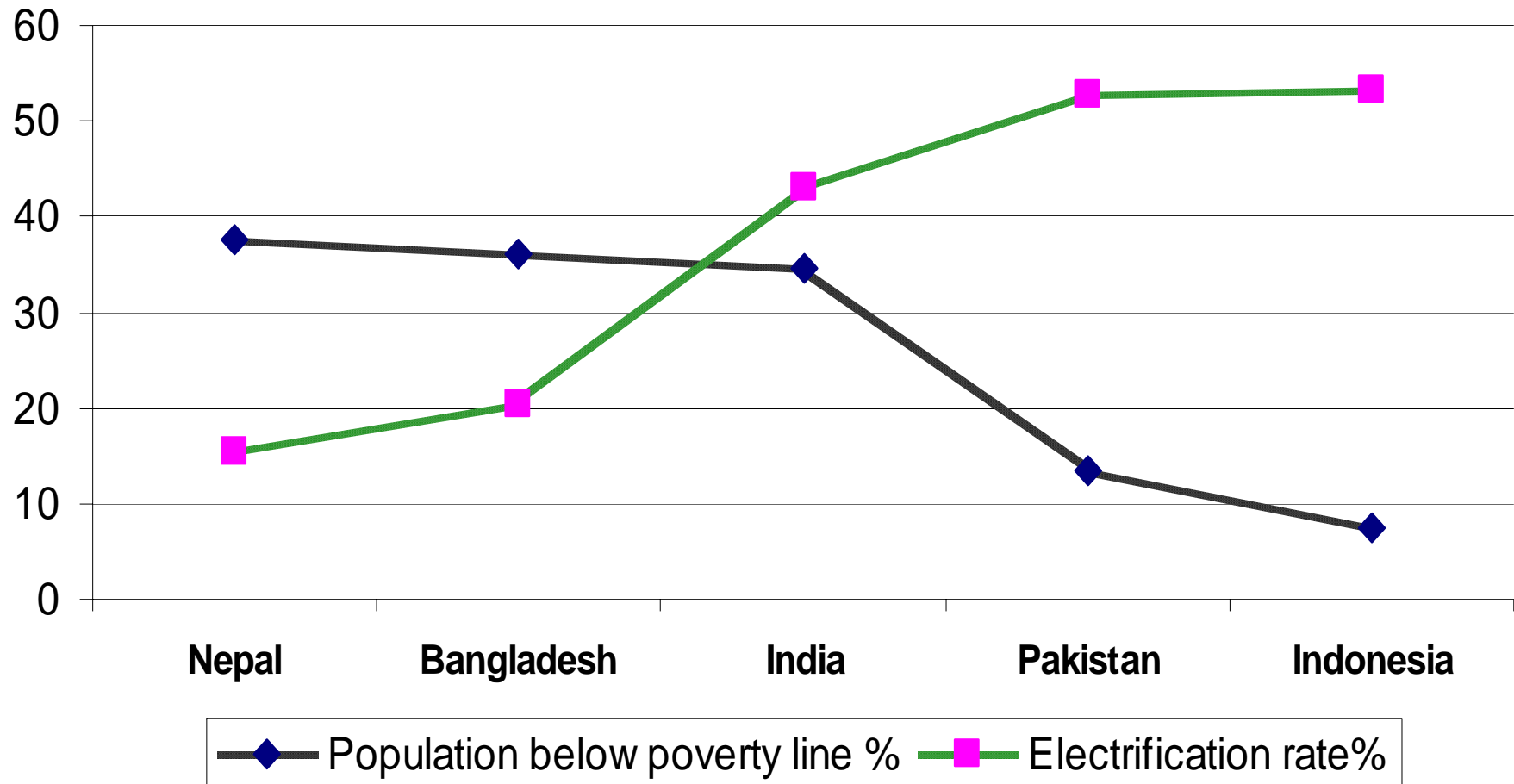


Source: IEA analysis.

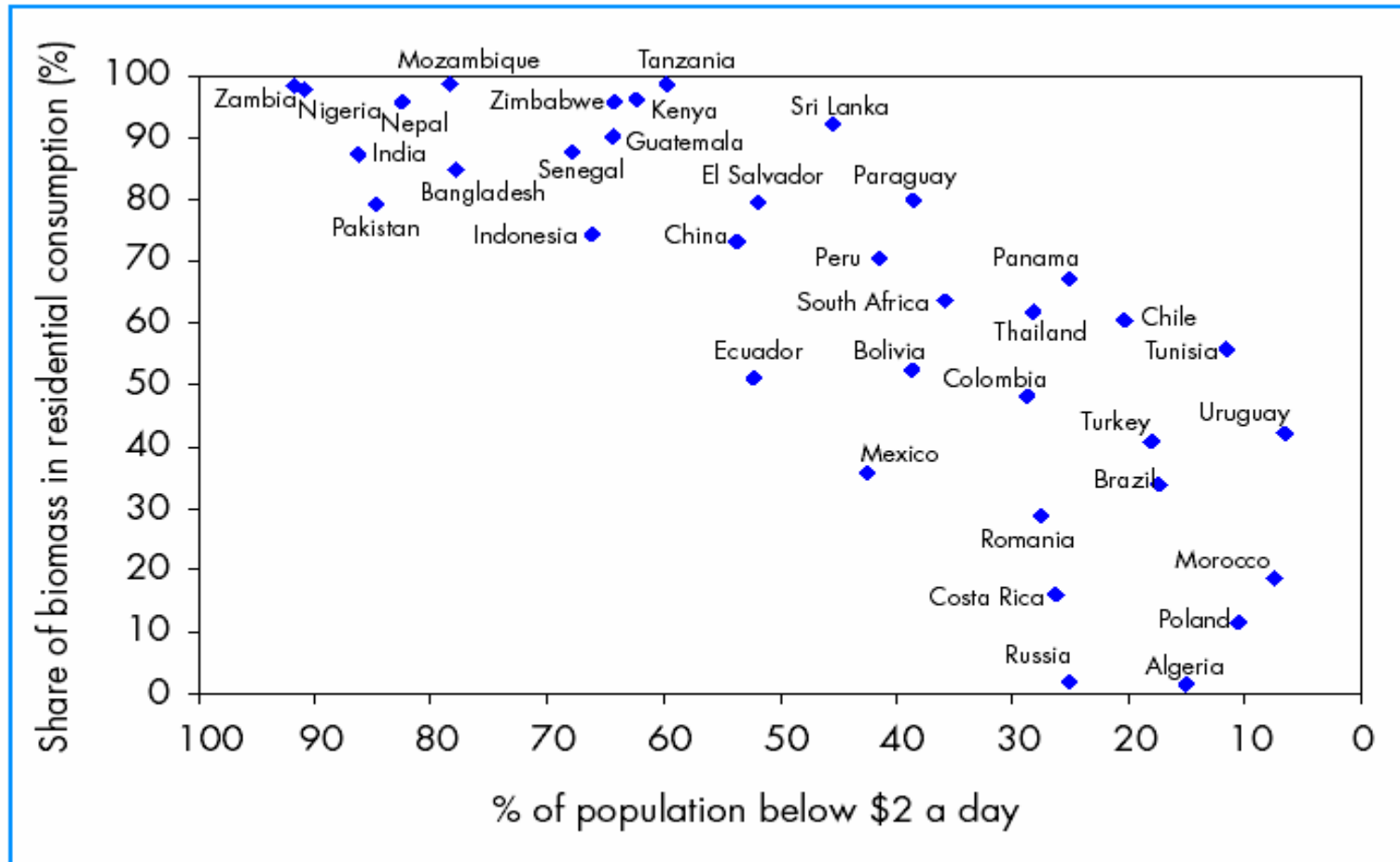
Premature mortality (per ten thousand)



Poverty electrification nexus



The Link between Poverty and Share of Traditional Biomass in Residential Energy Consumption



Source: IEA analysis and the World Bank's *World Development Indicators* for income statistics.



Technical Framework

- Policy framework at national/local government levels
- Issues related to energy security
- Availability/access to spare parts, credit and good after sales services
- Energy & environmental nexus
- Regional cooperation or trading options
- Knowledge sharing, information accessibility, etc.



Access to energy: Need to study

- **Relationships between energy, poverty and gender**
- **Present thinking on sustainable energy development and poverty**
- **Approach to the new thinking on poverty and its implications on energy sector**
- **Review the plans and programmes of governments that promise to widen access to rural electrification to the poor. Key empirical questions to be identified related to energy- poverty links**
- **Key issues of rural electrification programs for poor rural women: gender disaggregated data and analysis; wood energy, cooking, and their impact on health; gender-specific electricity needs; and equal access to credit and other resources for micro-enterprises**

Grouping of five-member households according to energy access and levels of useful energy consumption

Useful energy services, which may be available in the given intervals of useful energy access	Less than 15 watt/cap <i>Less than one Warm meal per day, a kerosene lamp, possibly a little hot water</i>	15 to 30 watt/cap <i>One to two Warm meals per day (for farmers and manual labourers below basic need), a few kerosene lamps or one electric bulb, some hot water</i>	30 to 60 watt/cap <i>Two Warm meals per day (group without electricity has "farmers portions"), hot water and lighting. Some small electric appliances (TV, telephone, fridge) for groups with electricity. Possibly a scooter</i>	More than 60 watt/cap <i>Two or more Warm meals per day, hot water, lighting, some space heating and – in case of groups with electricity, possibly some space cooling, as well as other electric appliances. Possibly a scooter or a car</i>
<i>Biomass and kerosene</i>	8.1% of 5-memb.-HH pop. 12% tap water 63% illiterate 93% rural HH-land holding: 0.55 ha expend./cap: 1101 Rs./m primary energy/cap: direct 46 watt, total 151 watt	26.2% of 5-memb.-HH pop. 10% tap water 58% illiterate 92% rural HH-land holding: 0.65 ha expend./cap: 1150 Rs./m primary energy/cap: direct 100 watt, total 211 watt	11.1% of 5-memb.-HH pop. 14% tap water 54% illiterate 95% rural HH-land holding: 0.89 ha expend./cap: 1381 Rs./m primary energy/cap: direct 182 watt, total 309 watt	1.3% of 5-memb.-HH pop. 14% tap water 49% illiterate 95% rural HH-land holding: 1.15 ha expend./cap: 1466 Rs./m primary energy/cap: direct 405 watt, total 559 watt
<i>Electricity, biomass and/or kerosene</i>	3.8% of 5-memb.-HH pop. 35% tap water 37% illiterate 67% rural HH-land holding: 0.75 ha expend./cap: 1493 Rs./m primary energy/cap: direct 51 watt, total 178 watt	17.8% of 5-memb.-HH pop. 44% tap water 25% illiterate 65% rural HH-land holding: 0.72 ha expend./cap: 1536 Rs./m primary energy/cap: direct 100 watt, total 232 watt	17.1% of 5-memb.-HH pop. 46% tap water 30% illiterate 63% rural HH-land holding: 1.0 ha expend./cap: 1873 Rs./m primary energy/cap: direct 174 watt, total 335 watt	2.1% of 5-memb.-HH pop. 46% tap water 31% illiterate 81% rural HH-land holding: 1.5 ha expend./cap: 2359 Rs./m primary energy/cap: direct 385 watt, total 587 watt
<i>LPG, electricity, and possibly kerosene</i>	Less than 0.1% of the 5-member-HH population	19% of 5-memb.-HH pop. 81% tap water 10% illiterate 14% rural HH-land holding: 0.27 ha expend./cap: 2590 Rs./m primary energy/cap: direct 76 watt, total 265 watt	8.1% of 5-memb.-HH pop. 81% tap water 4% illiterate 15% rural HH-land holding: 0.24 ha expend./cap: 2904 Rs./m primary energy/cap: direct 139 watt, total 368 watt	0.3% of 5-memb.-HH pop. 87% tap water 2% illiterate 12% rural HH-land holding: 0.39 ha expend./cap: 4764 Rs./m primary energy/cap: direct 311 watt, total 653 watt

(Source: Shonali Pachauri/Daniel Spreng)



ENERGY BASED ENTREPRENEURSHIP

<div style="background-color: red; color: white; padding: 5px; text-align: center;">Component</div> <div style="background-color: red; color: white; padding: 5px; text-align: center;">Key Variables</div>	<p style="text-align: center;">Overview (Rural energy scenario)</p>	<p style="text-align: center;">Policy mapping/ advocacy</p>
<p style="text-align: center;">Energy based entrepreneurship</p>	<p>Map, assess and identify gaps related to: growth of SMEs and micro-enterprises in relation to energy service provision and use, profiling SMEs (including micro-enterprises), determining energy efficiency in SMEs (and micro-enterprises), growth of energized pump-sets and increase in agriculture yields, decrease in population below poverty line with increasing rates of electrification, increase in women's entrepreneurial activities with electrification, etc.; and determining financial mechanisms related to incorporation of entrepreneurial and business concerns in rural energy service delivery</p>	<p>A. The trends of national policy need to be assessed critically to evaluate its enabling and disabling features in meeting the objectives of promoting decentralized energy based entrepreneurship B. Identify policy gaps and suggest modalities and tools for advocacy related to above mentioned issue</p>



Component Key Variables	Capacity development	Knowledge management
Energy based entrepreneurship	Identify critical local level capacities related to promoting energy entrepreneurship Identify capacity gaps in linking energy provision to entrepreneurship development and recommend strategies for overcoming the same.	Identify experiences/good practices (not necessarily documented) related to energy service use for entrepreneurship and livelihoods enhancement

GDP per capita, energy consumption and poverty in selected countries, with emphasis on Sub-Saharan Africa.

Sources: UN Human Development Report, 2004: http://hdr.undp.org/statistics/data/ ; United Nations Common Database: http://unstats.un.org/unsd/cdb/cdb_help/cdb_quick_start.asp								
HDI rank	Country	GDP Per Capita		Electricity consumption per capita	Commercial energy consumption per capita	Population below income poverty line (%)		
		US\$ 2002	PPP US\$ 2002	(kWh) 2001	kg oil equivalent, 2000	\$1 a day ^c 1990-2002 ^b	\$2 a day ^d 1990-2002 ^b	Nat'l poverty line 1990-2001 ^b
8	United States	36006 (a)	35750 (a)	13,241	7725			
9	Japan	31,407	26,940	8,203	3730			
28	Korea, Rep. Of	10,006	16,950	6,632	3284	<2	<2	..
72	Brazil	2,593	7,770	2,122	717	8.2	22.4	17.4
94	China	989	4,580	1,139	561 (b)	16.6	46.7	4.6
119	South Africa	2,299	10,070	4313 (g)	2649 (c)	7.1	23.8	..
127	India	487	2,670	561	318	34.7	79.9	28.6
130	Cambodia	321	2,060	18	14 (a)	34.1	77.7	36.1
131	Ghana	304	2,130	404	120	44.8	78.5	39.5
146	Uganda	236	1,390	66	26	82.2 (a)	96.4 (a)	44
148	Kenya	393	1,020	140	96	23	58.6	52
157	Senegal	503	1,580	151	128.	26.3	67.8	33.4
162	Tanzania, U. Rep. of	267	580	85	41	19.9	59.7	35.7
163	Côte d'Ivoire	707	1,520	233	174	15.5	50.4	36.8
165	Malawi	177	580	76	27 (a)	41.7	76.1	65.3
167	Chad	240	1,020	12	5 (a)	64
170	Ethiopia	90	780	30	29	26.3	80.7	44.2
174	Mali	296	930	34	18 (a)	72.8	90.6	63.8
176	Niger	190	800	41	33 (a)	61.4	85.3	63
		Source: GDP and population data from World Bank. 2004. World Development Indicators 2004. CD-ROM. Washington, DC. a. practical issues arising in the calculation of the PPP US dollar GDP make these values different.		Source: correspondence, UN DESA, Statistics Division, NY. 03/2004.	Source: UN Common Database, code: 17510 a: Estimate, UN Statistics Division b: does not include Hong Kong, Macao and Taiwan. c: South African Customs Union.	Source: World Bank. 2004. World Development Indicators 2004. CD-ROM. Washington, DC. a. HDR 2003/WB Dev. Indicators, 2003. b. Data refer to the most recent year available during the period specified. c. Poverty line is equivalent to \$1.05 (1993 PPP US\$). d. Poverty line is equivalent to \$2.15 (1993 PPP US\$).		

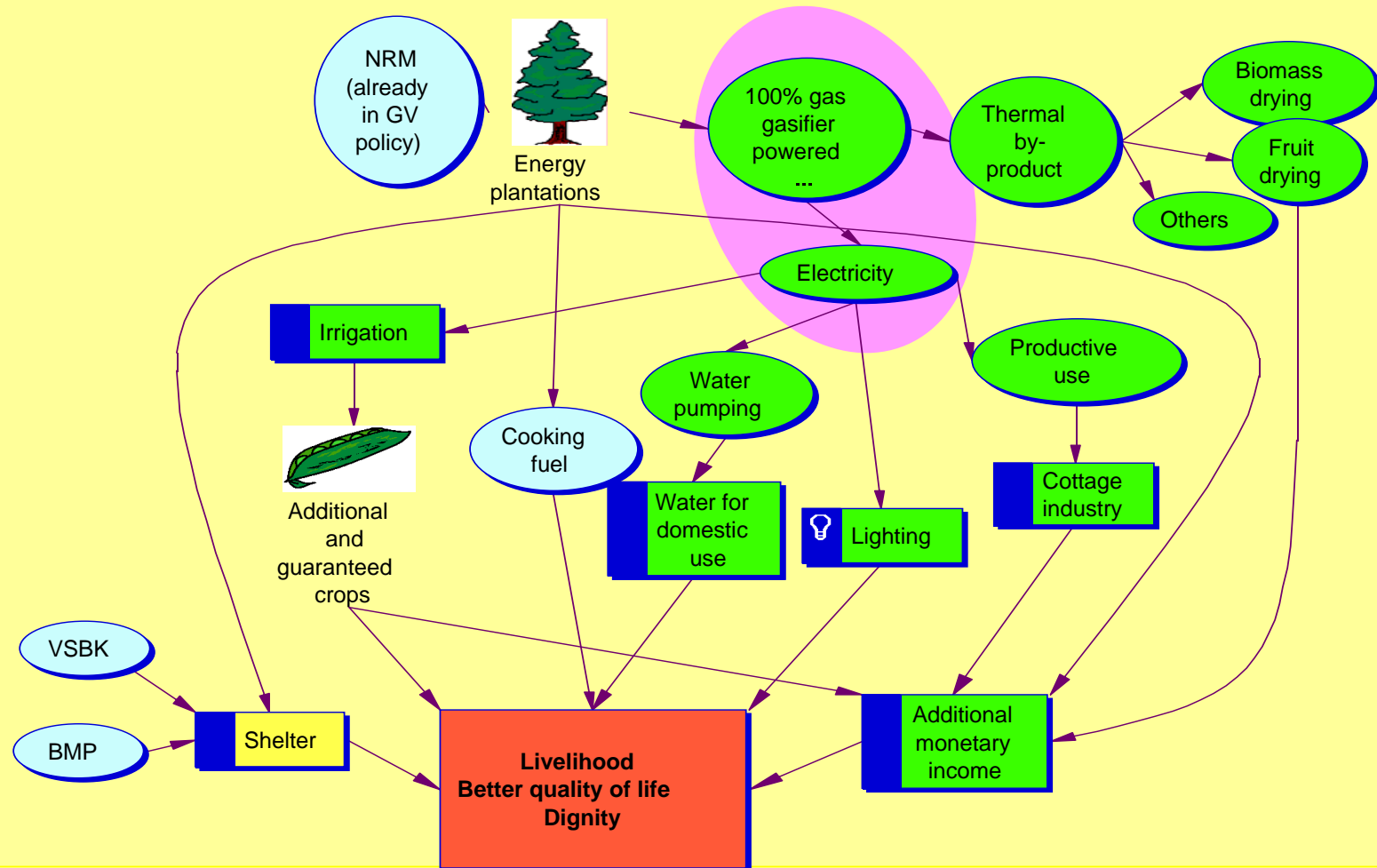


Energy based entrepreneurship

- Promotion of infrastructure/gridlines/pipelines/transport arrangement etc. – energy supply support systems
- Access to technical know how
- Training and capacity building of local people
- Access to post-sales services
- Forward and backward linkages (fuels, financing options etc.)
- Access to information at disaggregate levels

LIBERA

Livelihood Improvement through Biomass Energy in Rural Areas



Distributed generation scheme

Small-scale RETs
Ideal for isolated and vulnerable communities

Facilitates

- Minimum electricity needs
 - Dispersed productive activities
 - Increased demand for electricity in the region
- Inadequate for*
- Productive activities requiring motive power

May lead to...

Off-grid village-scale DG (or minigrid)
Ideal for a larger village or a cluster of villages

Facilitates

- Greater community welfare (health, education, telecom, etc.)
 - Rural industry
- But is still constrained by*
- Lack of innovative financing
 - Limited power supply, particularly with RET-based schemes
 - Unresolved regulatory issues and market penetration barriers

Could develop into...

Network of DG schemes connected to a localized or main grid
Ideal for villages in a region

Facilitates

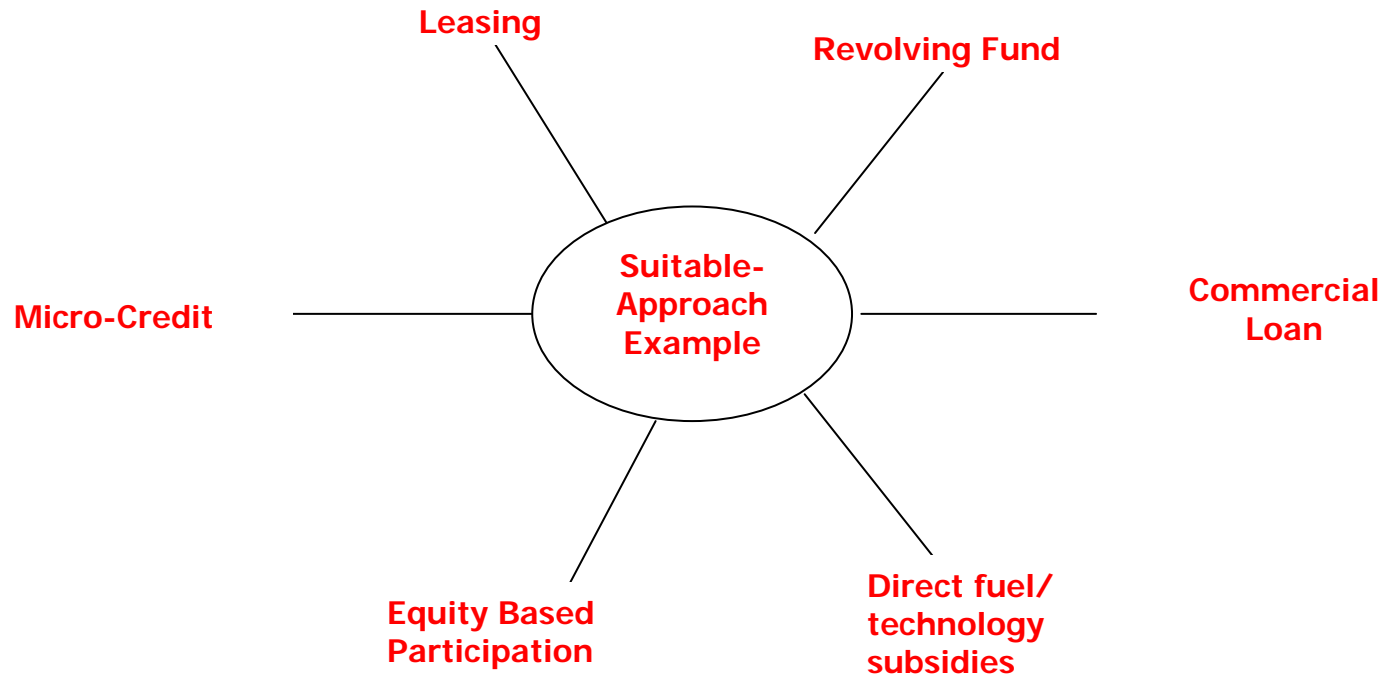
- A market orientation for rural electricity provision, with adequate regulation
- Diversification and growth of industrial and other economic activities
- Long-term grid interconnectivity and system stability



ACCESS TO FINANCE

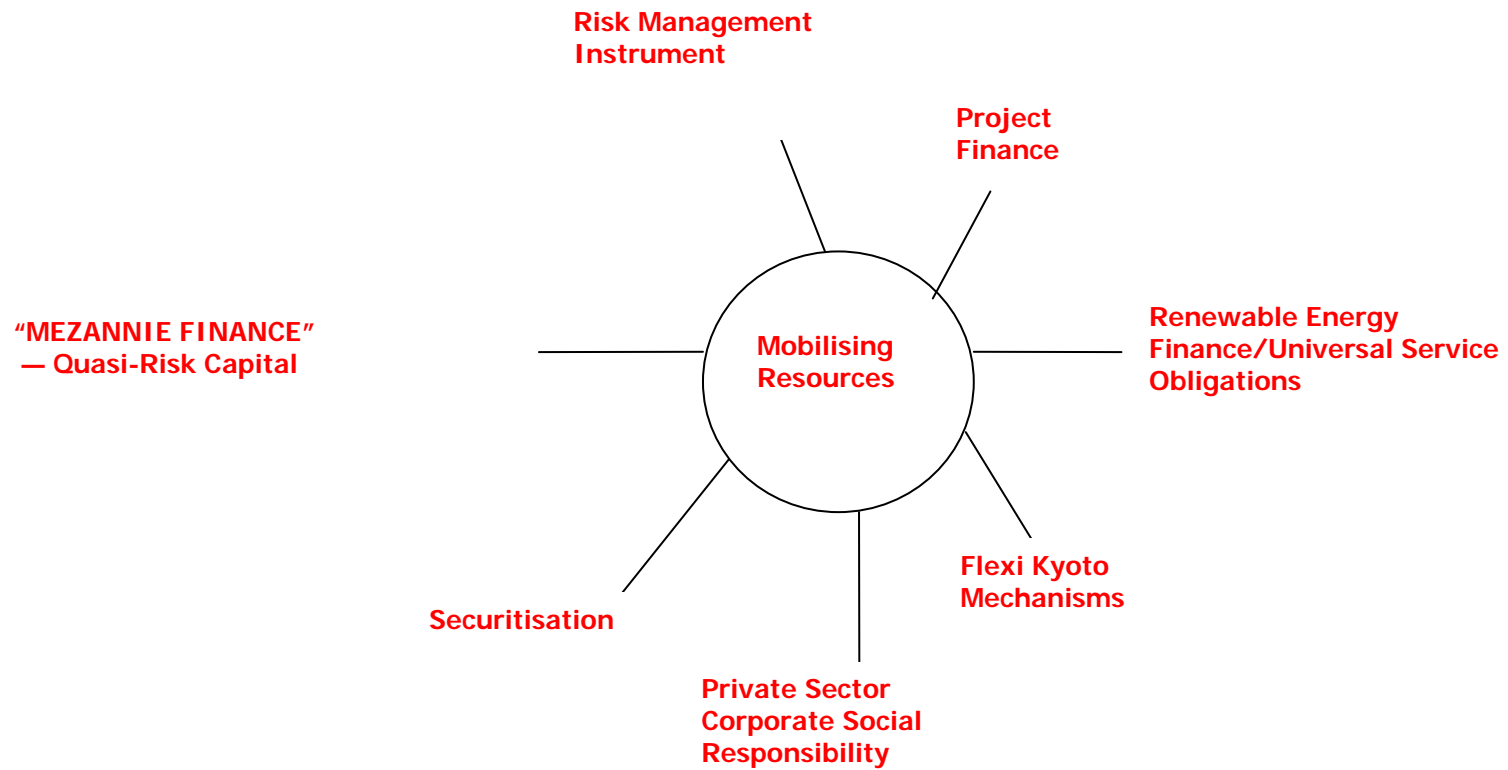


Financing options



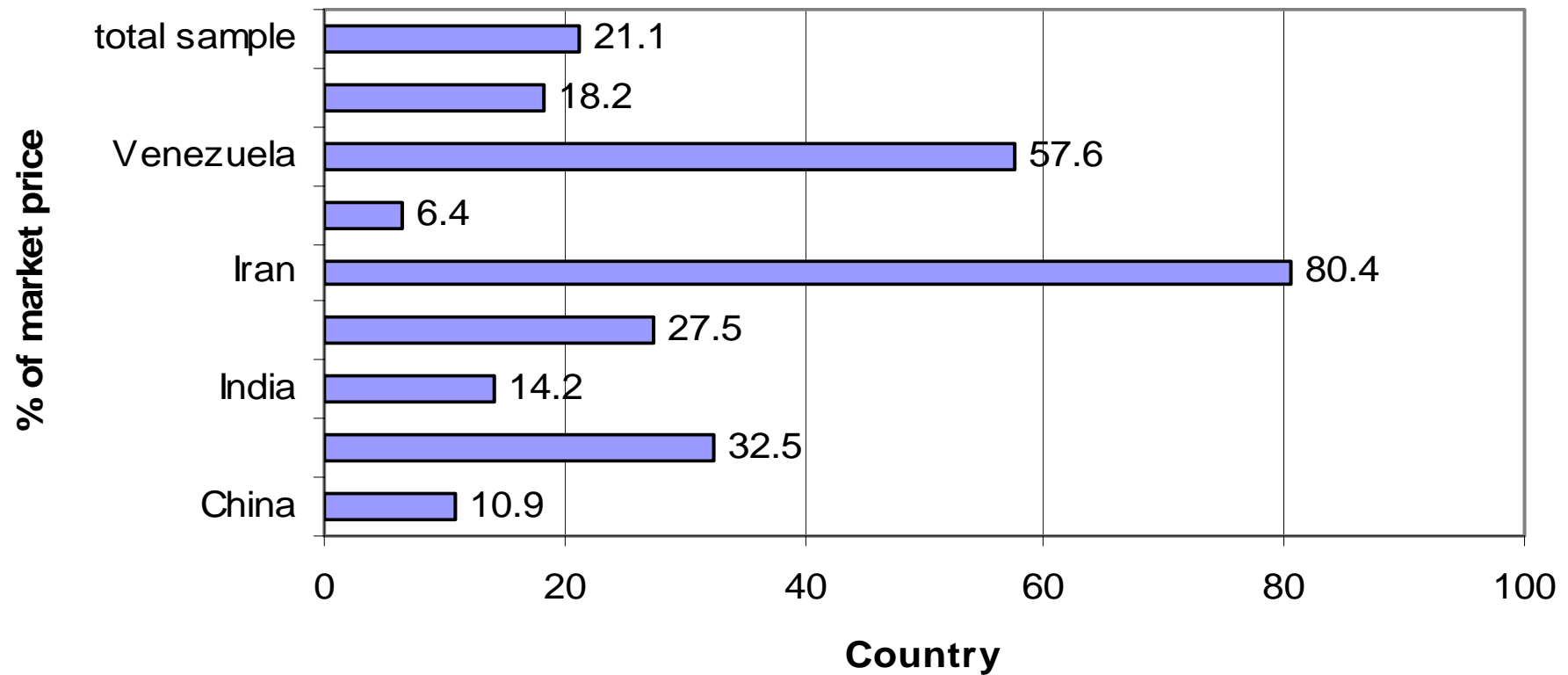


Access to Finance- Capacity Development



Direct subsidy reduction

Impact of removal of energy consumption subsidy -
Average rate of subsidy



Framework to devise subsidy schemes

End uses For e.g.	Present schemes	Emerging scenario	Innovative schemes	Future schemes (paradigm shifts)
Electricity access for lighting, agriculture, etc.	<ul style="list-style-type: none"> •Increased access •Cross subsidisation across sectors for tariffs •Kutir jyothi, pumpset energisation programme, etc. 	<ul style="list-style-type: none"> •Improved access •Promote decentralised electricity generation options •Increased per capita consumption 	<ul style="list-style-type: none"> •Subsidy in bulk connections •Subsidy linked to village revenue collections 	<ul style="list-style-type: none"> •Based on cost of electricity supply •Based on cost of non supply (CUE)
Cooking fuels (LPG, kerosene)	<ul style="list-style-type: none"> • Cross subsidisation across fuels •Deepam schemes in India (needs review): promotion of small cylinders •State schemes: subsidy on providing LPG connections 	<ul style="list-style-type: none"> •Improved access •Convenient bottling and transport facilities (privatisation) •Increased connections 	<ul style="list-style-type: none"> •Focus on better services/availability •Building awareness/environmental implications •Post impact analysis (of funding) based studies and recommendations 	<ul style="list-style-type: none"> •Discounts on bulk connections

Fuel costs per unit end-use and useful energy

Category of Users	Energy Expenditure (Rs. per year)	Energy expenditure as a percentage of total household expenditure (%)	Price per unit end-use energy (Rs per Kwh)	Price per unit useful energy (Rs per Kwh)
RURAL				
Biomass	1227	10.1	0.09	0.46
Biomass & Kerosene	1129	8.8	0.07	0.33
Biomass & Electricity	1477	8.6	0.08	0.31
Biomass, Kerosene & Electricity	1435	8.2	0.08	0.28
Kerosene & LPG	1670	6.1	0.19	0.37
Kerosene, LPG & Electricity	2105	7.1	0.18	0.31
Electricity & LPG	1896	6.4	0.20	0.33
URBAN				
Biomass	1328	9.4	0.14	0.68
Biomass & Kerosene	1185	8.8	0.08	0.37
Biomass & Electricity	1261	8.4	0.09	0.34
Biomass, Kerosene & Electricity	1595	8.7	0.09	0.33
Kerosene & LPG	2145	6.6	0.22	0.43
Kerosene, LPG & Electricity	2427	7.5	0.18	0.32
Electricity & LPG	2528	7.1	0.21	0.33

(Source: Shonali Pachauri/Daniel Spreng)



M&E FRAMEWORK

<div data-bbox="192 73 369 363" style="background-color: red; color: black; padding: 5px; display: inline-block;"> Component Key Variables </div>	<p style="text-align: center;">Overview (Rural energy scenario)</p>	<p style="text-align: center;">Policy mapping/ advocacy</p>
<p style="text-align: center;">Monitoring and evaluation framework</p>	<p>Map and assess existing monitoring and evaluation framework- tools for undertaking the same. What is being monitored (and also what is not monitored) and who is monitoring the same? Determine energy use indicators in the context of development concerns in general and MDGs in particular. Some of the examples of indicators are, share of household income spent on fuel and electricity, household energy use for each income group and corresponding fuel mix , accident fatalities per energy produced by fuel chain, economic energy use per unit of GDP, efficiency of energy conversion and distribution, Reserves-to-production ratio, resources-to-production ratio, etc.</p> <p>Identify benchmarks for improvement in energy service delivery with respect to poverty alleviation. The benchmarks need to be collated with the key baseline data</p>	<p>A. Map policies related to incorporation of decentralized M&E tools for assessing impact of energy services, identify gaps thereof and give recommendations.</p> <p>B. Identify policy gaps and suggest modalities for improving the M&E policies</p>

<div data-bbox="197 73 371 363" style="background-color: red; color: white; padding: 5px; display: inline-block;">Component</div> <div data-bbox="91 341 320 376" style="border-top: 2px solid red; padding-top: 5px;">Key Variables</div>	Capacity development	Knowledge management
Monitoring and evaluation framework	Map institutional capacities related to undertaking M&E and incorporating poverty and gender concerns Recommendation for taking forward the capacity development	Identify experiences/good practices (not necessarily documented) related to m&e for energy service delivery for meeting poverty concerns



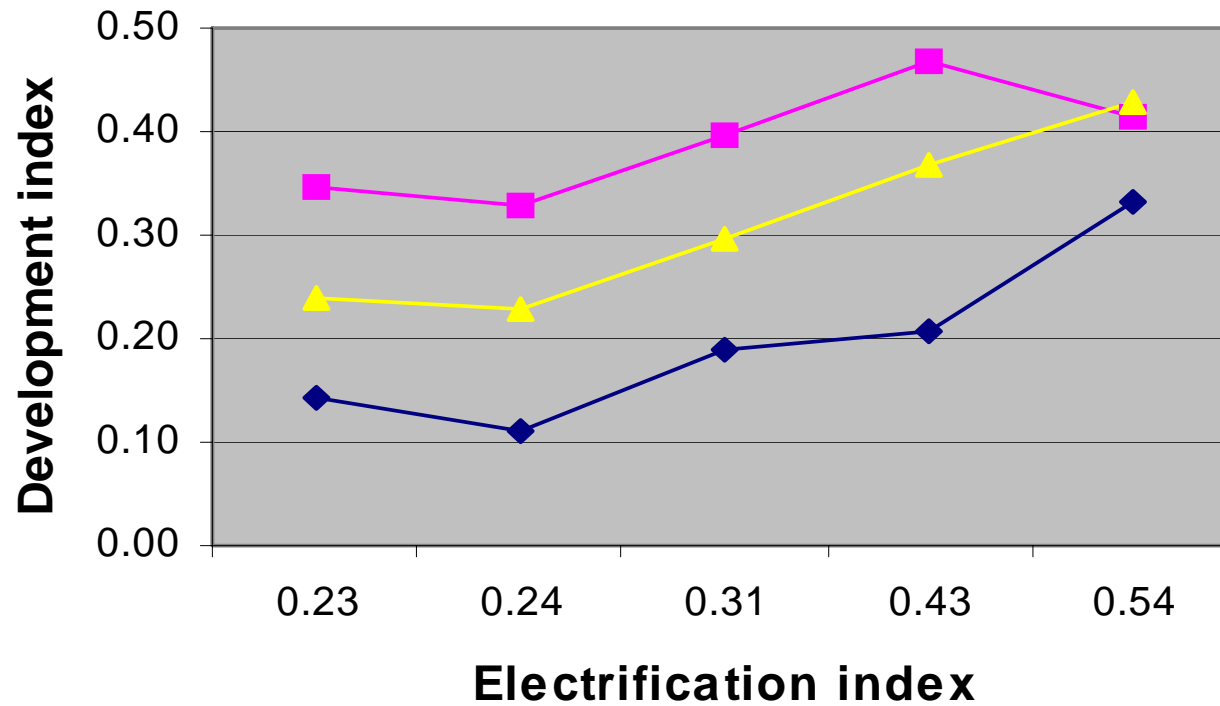
Monitoring and evaluation

- Identify and quantify the linkages between rural access to electricity, poverty alleviation, and gender equity
- Understand the methodology to monitoring and evaluating the above relationships
- Draw lessons from rural electrification projects of various funding organizations on poverty alleviation and gender equity (program-wise and in specific time frame)
- Directions/suggestions to contribute towards development of methodology for monitoring impact of rural electrification projects on the poverty and gender equity, poverty and energy linkages, energy environment nexus, etc.

Electrification and development indices

◆ Income Index ■ Social Empowerment Index ▲ Composite Index

Fig.2 Relationship between electrification and development indices





ACCESS TO INFORMATION

Component Key Variables	Capacity development	Knowledge management
Access to information	Map existing data gaps on energy issues and indicate level of consultation and decentralization in information dissemination and access.	Assess policies and frameworks for information dissemination/dialogues, identify gaps thereof and give recommendations.

<div data-bbox="197 76 371 363" style="background-color: red; color: white; padding: 5px; display: inline-block;"> Component Key Variables </div>	Overview (Rural energy scenario)	Policy mapping/ advocacy
Access to information	<p>Determine existing capacities for data collection, management and dissemination/dialogue</p> <p>Map current capacities related to improving awareness on energy issues in general and energy poverty concerns in particular</p> <p>Recommendation for taking forward the capacity development</p>	<p>Identify experiences/good practices (not necessarily documented) related to facilitating access to information</p> <p>Identify key messages about energy for poverty reduction (linking these messages to key issues -health, education, environment) and Poverty Reduction Strategies (PRS), MDGs for energy and non-energy specialists.</p> <p>Identify appropriate communication materials needs (including use of virtual information and knowledge management tools) to facilitate energy poverty dialogue.</p>



Access to information

- Analyze relationships between
 - Fuel consumption and its' usage
 - Fuel consumption vs economic classes (say BPL families, etc.)
 - Penetration of modern cleaner fuels vs economic classes
 - Economic factors and fuel consumption (change in prices of modern fuels, accessibility (distance traveled to procure fuels), etc.

Analyze funding by national/local governments towards energy projects with focus on poverty alleviation

Analyze funding by multilateral/bilateral organizations towards energy projects with focus on poverty alleviation

Suggestions on prospects of such funding to alleviate poverty

Role of IT and poverty alleviation?



**Thank you for
your kind
attention**