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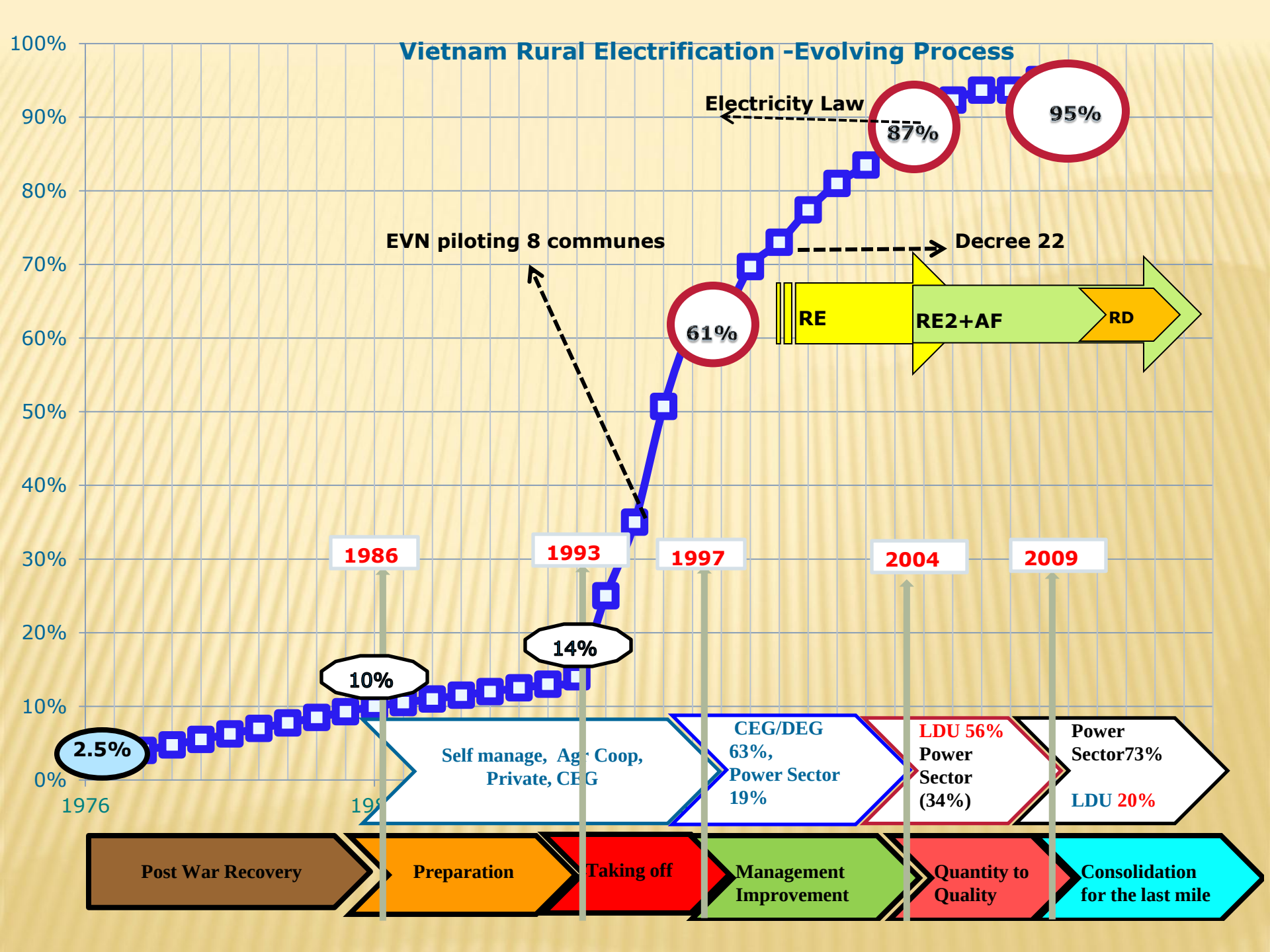
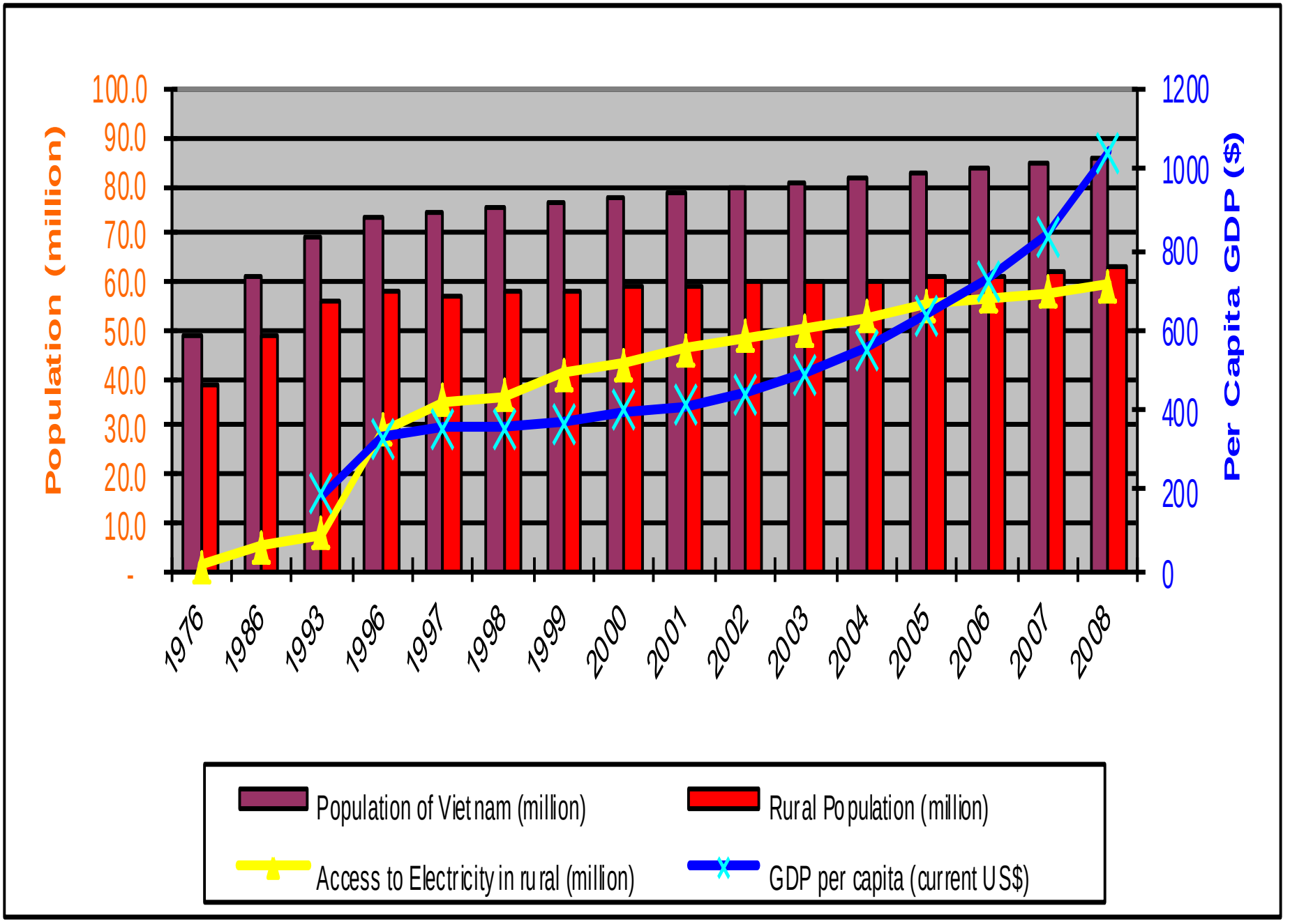
RURAL ELECTRIFICATION OVERVIEW

Electricity access in 2009 - Regional aggregates				
	Population without electricity	Electrification rate	Urban electrification rate	Rural electrification rate
	million	%	%	%
Africa	587	41.8	68.8	25
North Africa	2	99	99.6	98.4
Sub-Saharan Africa	585	30.5	59.9	14.2
Developing Asia	675	81	94	73.2
China & East Asia	182	90.8	96.4	86.4
South Asia	493	68.5	89.5	59.9
Latin America	31	93.2	98.8	73.6
Middle East	21	89	98.5	71.8
Developing countries	1,314	74.7	90.6	63.2
World*	1,317	80.5	93.7	68
Myanmar	13% (WB data of 2009)			
* World total includes OECD and Eastern Europe / Eurasia				
Source: WEO-2011				


Vietnam Rural Electrification -Evolving Process
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
1976
Electricity Law
EVN piloting 8 communes
Decree 22
2.5%
10%
14%
61%
87%
95%
RE
RE2+AF
RD
1986
1993
1997
2004
2009
Self manage, Ag Coop, Private, CEG
CEG/DEG 63%, Power Sector 19%
LDU 56% Power Sector (34%)
Power Sector73%
LDU 20%
Post War Recovery
Preparation
Taking off
Management Improvement
Quantity to Quality
Consolidation for the last mile


Population (million)
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
-
1200
1000
800
600
400
200
0
Per Capita GDP ($)
1976
1986
1993
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
Population of Vietnam (million)
Rural Population (million)
Access to Electricity in rural (million)
GDP per capita (current US$)

PERIOD FROM 1976-1985: RECOVERING (2.5% TO 9.3%)

- This period was characterized by the following:
  - Whole the economy of Vietnam during this period was basically recovering from the war, per capita income of the people was less than US$200.
  - The power system was still not developed; the power supply was only for the cities and large industries, and by the isolated systems. The average consumption per capita was just about 44 kWh in 1976 and increased to about 70 kWh in 1985.
  - The rural electrification in the north was basically confined to the supply power to the pumping stations. Residential use of electricity of rural households was just the by product.

PERIOD 1986 TO 1993: PREPARATION (10% TO 14%)

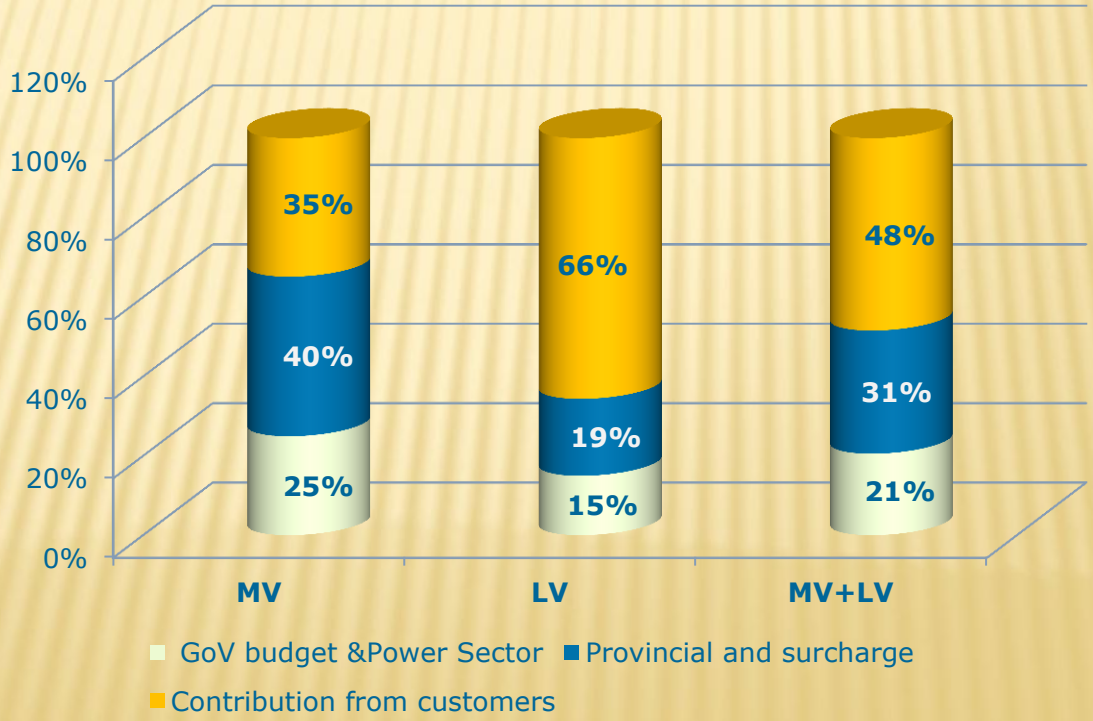
- The most important policy that had the large impact not only for the rural electrification in Vietnam, but for the whole economy of Vietnam, this was the “Doi Moi” or Renovation Policy in 1996. Two year after the “ Doi Moi”, from 1988 Vietnam changed from rice importer to the rice exporter.
- In 1990 the GoV had exempted the agriculture taxes for the farmers; many agriculture cooperatives had decided to used these exempted taxes for the construction of the rural electricity networks.
- Power sources started to increase with large Hydropower sources like Tri an, Hoa binh
- 500 kV North to South Transmission line was started

PERIOD FROM 1994 TO 1997:
TAKING OFF
(14% TO 61%)

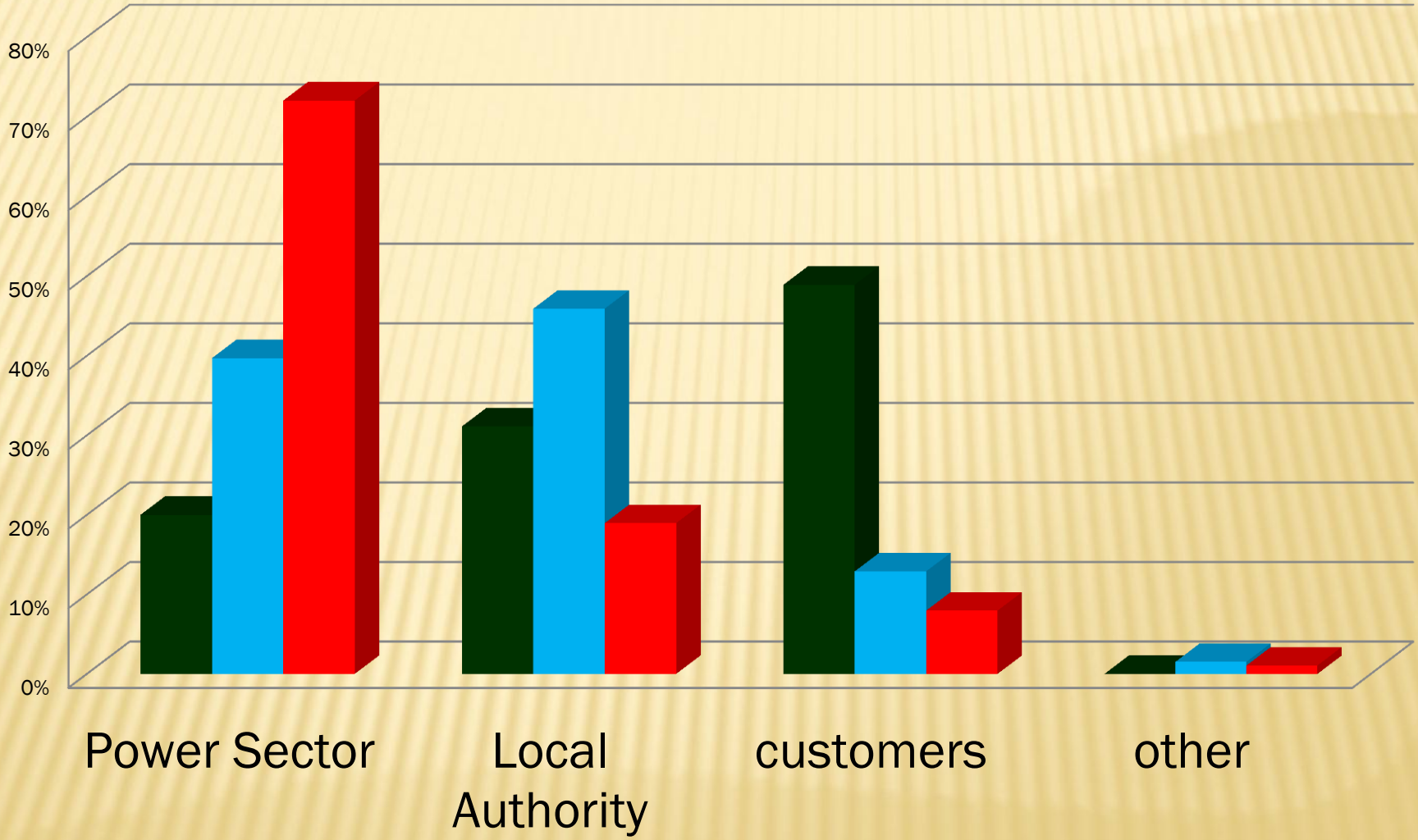
- **This period could be characterized by :**
  i. **booming up the household connection for the residential uses,**
  ii. **demand driven, bottom –up process,**
  iii. **lacking of the institutional set up, and**
  iv. **lacking of the technical specification for the rural networks.**
- **This period created a strong push for the RE program, but also left many issues for the next period.**

MAIN FACTORS AND FINANCING OF THE TAKING OFF PERIOD

- Demand for the acess in the rural araes became urgent
- Power sources, the necessary conditions was granted : particularly 1920 MW of Hoa Binh Hydropower station was fully put into operation
- Transmission networks, the other basic condition was also granted, particularly the 500 kV north to south was put into operation.
- The main finacing sources were from customers and the local budgets



INVESTMENT SHARE OF THE MAIN ACTORS



PERIOD FROM 1998 TO 2004:
MANAGEMENT IMPROVEMENT
: (61% TO 87%):

- This period was characterized by the following:
- **The average annual access rate dropped to 3.7%**
- **Percentage of financing from power sector was increasing**
- **Institutional and legal frameworks started with the Decree 22, 25 and the Electricity Law**
- **Technical specifications for rural system was established.**
- **International donors, particularly WB, started to assist the GoV program.**

PERIOD FROM 2005 TO 2009:
FROM QUANTITY TO QUALITY
(92% TO 95%)

- **This period could be characterized by:**
  - **Strengthened the management requirements.**
  - **Moving from expansion to rehabilitation**
  - **Direct funding from the central government budget for the remote areas for the minority people (Central Highland Project with 85% from GoV budget, 15% from EVN)**

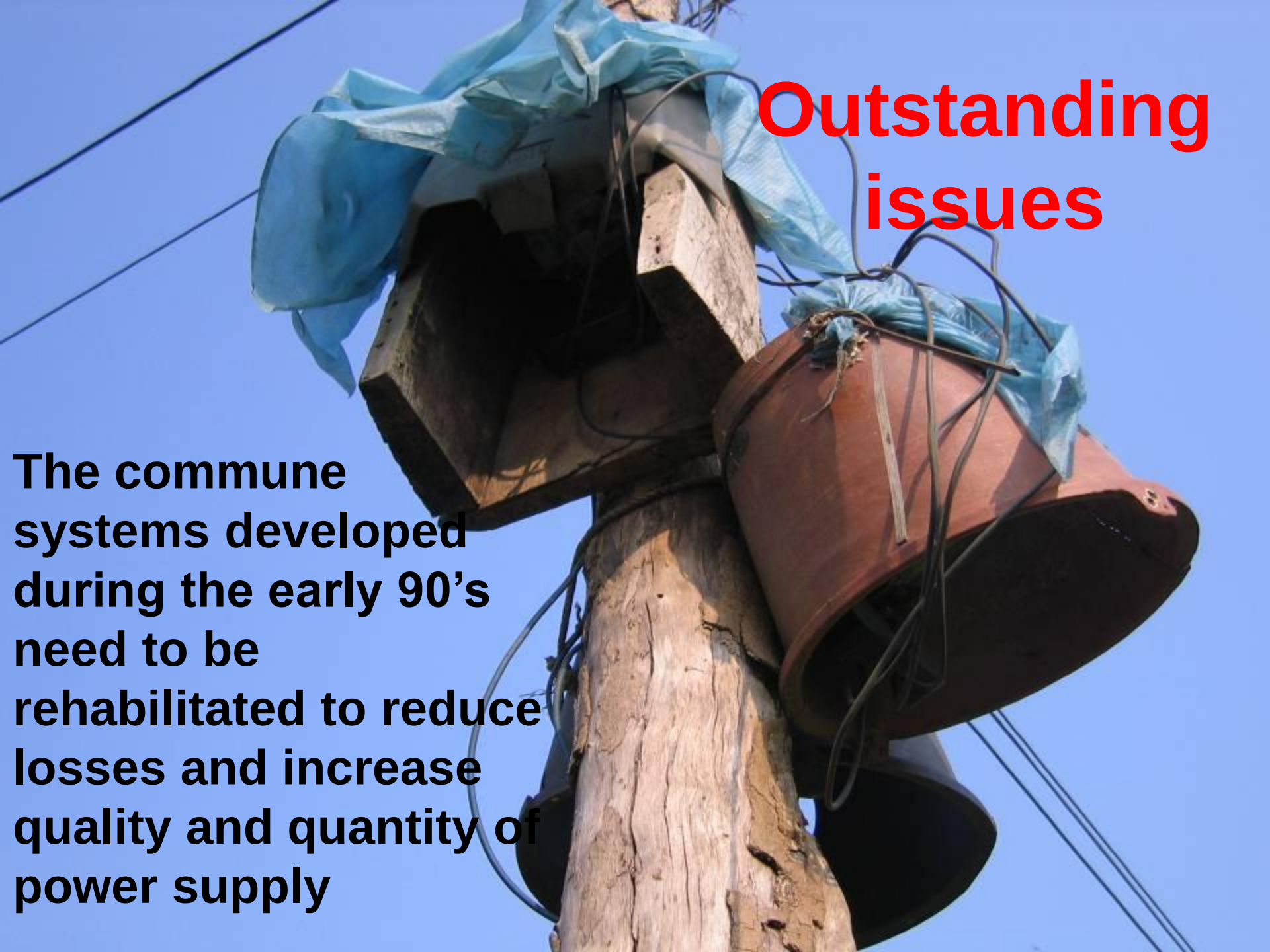
Access rate for poorest provinces in 1997

Access rate for the poorese provinces in 2009

PERIOD FROM 2009:
CONSOLIDATION FOR THE LAST MILE

- The important benchmark of this period was the Decision 21 of the Prime Minister in March 2009.
- Uniform power tariff for all the customers, both rural and urban
- Most of the LDU with low financial capacity are merging to the power companies.

Outstanding issues



The commune systems developed during the early 90’s need to be rehabilitated to reduce losses and increase quality and quantity of power supply

Outstanding Issues

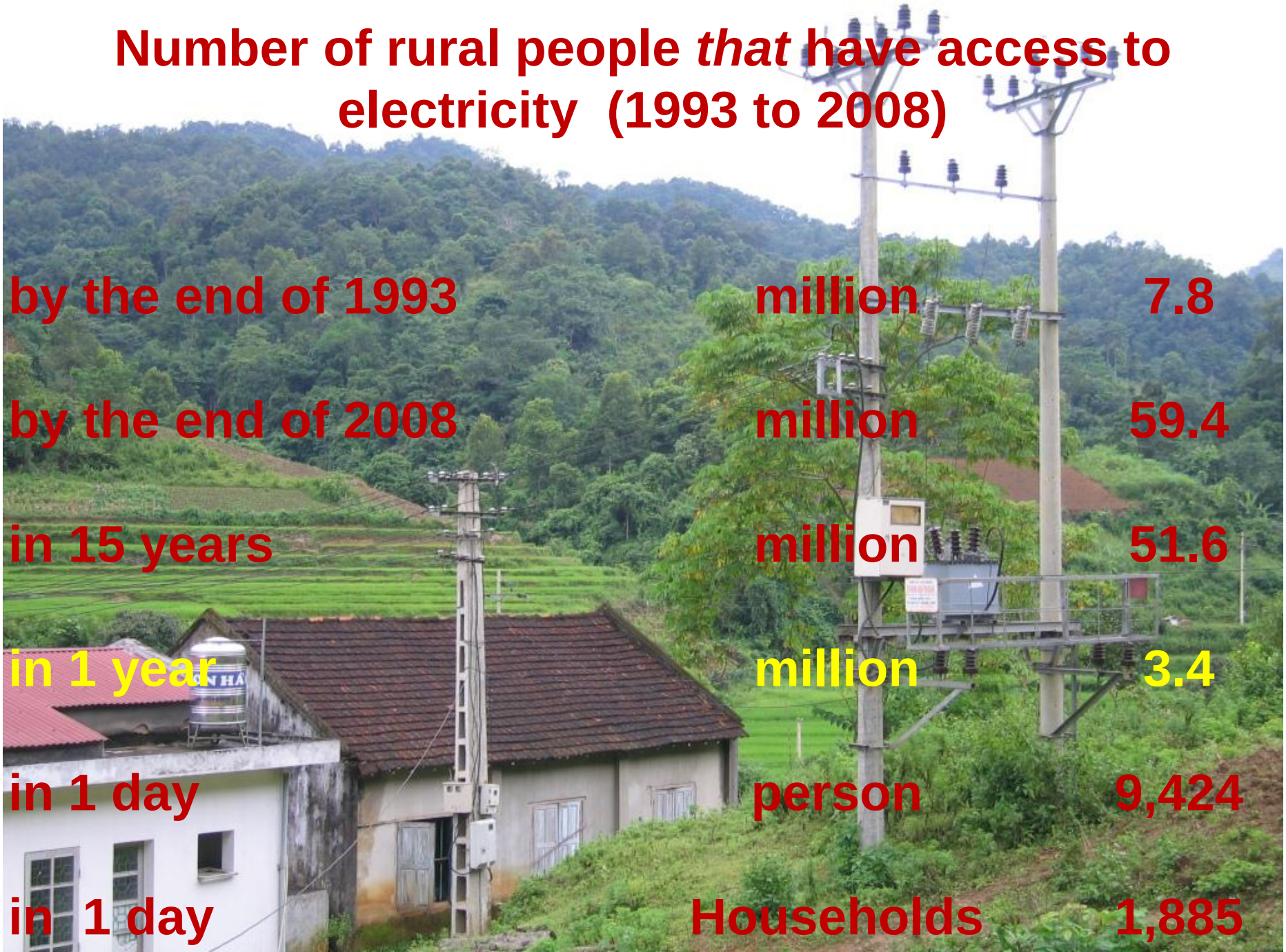
There are about one million households mainly in mountainous areas and islands still looking for electricity

TASKS AND CHALLENGES FOR THE PERIOD TO COME

- Tasks
  - Rehabilitate about 3,000 commune
  - Expansion to about 5% of the HH
- Challenges
  - Funding
    - 3,000 com x 400,000 $/com= US$ 1,2 billion
    - 1,000,000 HH x 2,000 S/HH= US$ 2 billion

      ⋆Total about US$ 3 billion required.
  - Management capacity of the power companies

Number of rural people *that* have access to electricity (1993 to 2008)



by the end of 1993	million	7.8
by the end of 2008	million	59.4
in 15 years	million	51.6
in 1 year	million	3.4
in 1 day	person	9,424
in 1 day	Households	1,885

Many Pico Hydro sets are using

WHY VIETNAM RE PROGRAM IS SUCCESSFUL

- Among basic types of infrastructure (Electricity- Roads- Schools- Clinics), most people opt for Electricity-
- Strong desire of people to have the access
- Strong commitment of the Government
- Correct policy: “State and People- Central and Local” doing together.”
- Multiple funding sources:
  - (i) customer contribution,
  - (ii) commune, district, province and central government budgets,
  - (iii) special surcharges from urban customers,
  - (iv) private investors,
  - (v) borrowings,
  - (vi) retained depreciation from EVN
  - (vii) international donors


Overview
of the
Power Sector
And
Management System in Rural Areas
22 10 2008

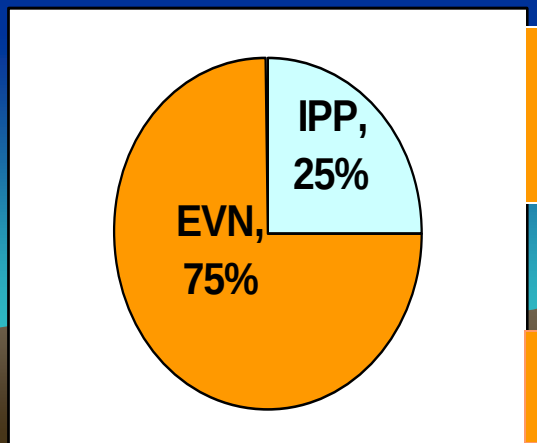
Management Structure

Ministry of Industry and Trade (MoIT)

Electricity Regulatory Authority of Vietnam (ERAV)

Provincial Authority

Generation **Transmission** **Distribution**



Transmission 500/220 Kv

Urban

EVN

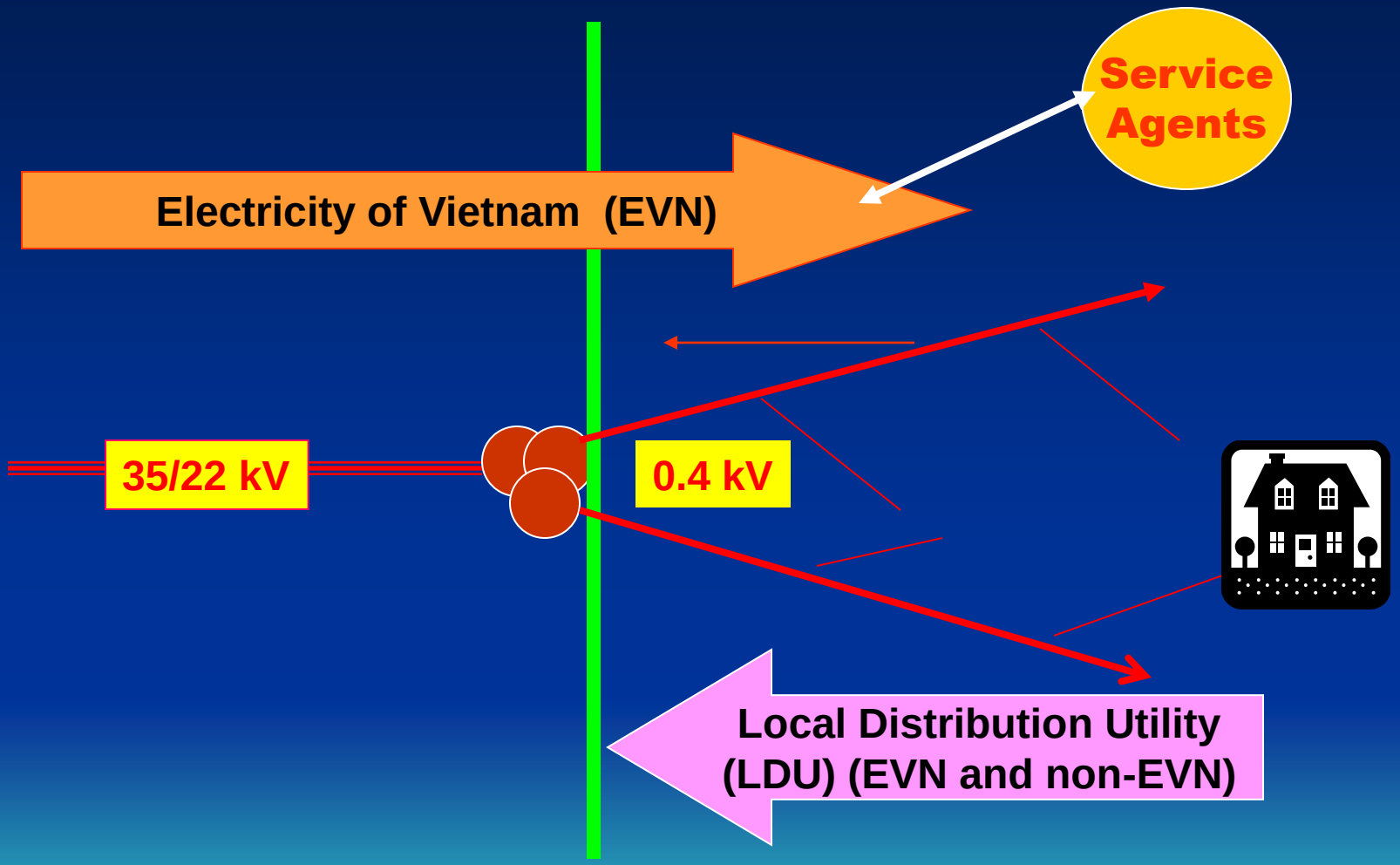
MV:35/22 kV EVN

LV:0.4 EVN

LV:0.4 Local

Transmission/Distribution 110 kV

Demarcation



Local Distribution Utility (LDU)

- LDU is a utility such as a cooperative (working under cooperative law) or a company (working under company law).
- LDUs buy power from EVN at bulk tariff and sell to final customers. LDUs in charge of development and operating the LV system in one or more rural communes.
- Typical LDU serves 1000 households.

Service Agent

- Agent is used by EVN in a commune, where EVN directly manages and operates the LV system.
- Agent is a local person in a commune, hired by EVN to collect the bill, lines checking, maintaining ROW, other works, and liaison person. (See model contract on AEI prototype web)
- Agent model considerably reduced the operating cost of EVN

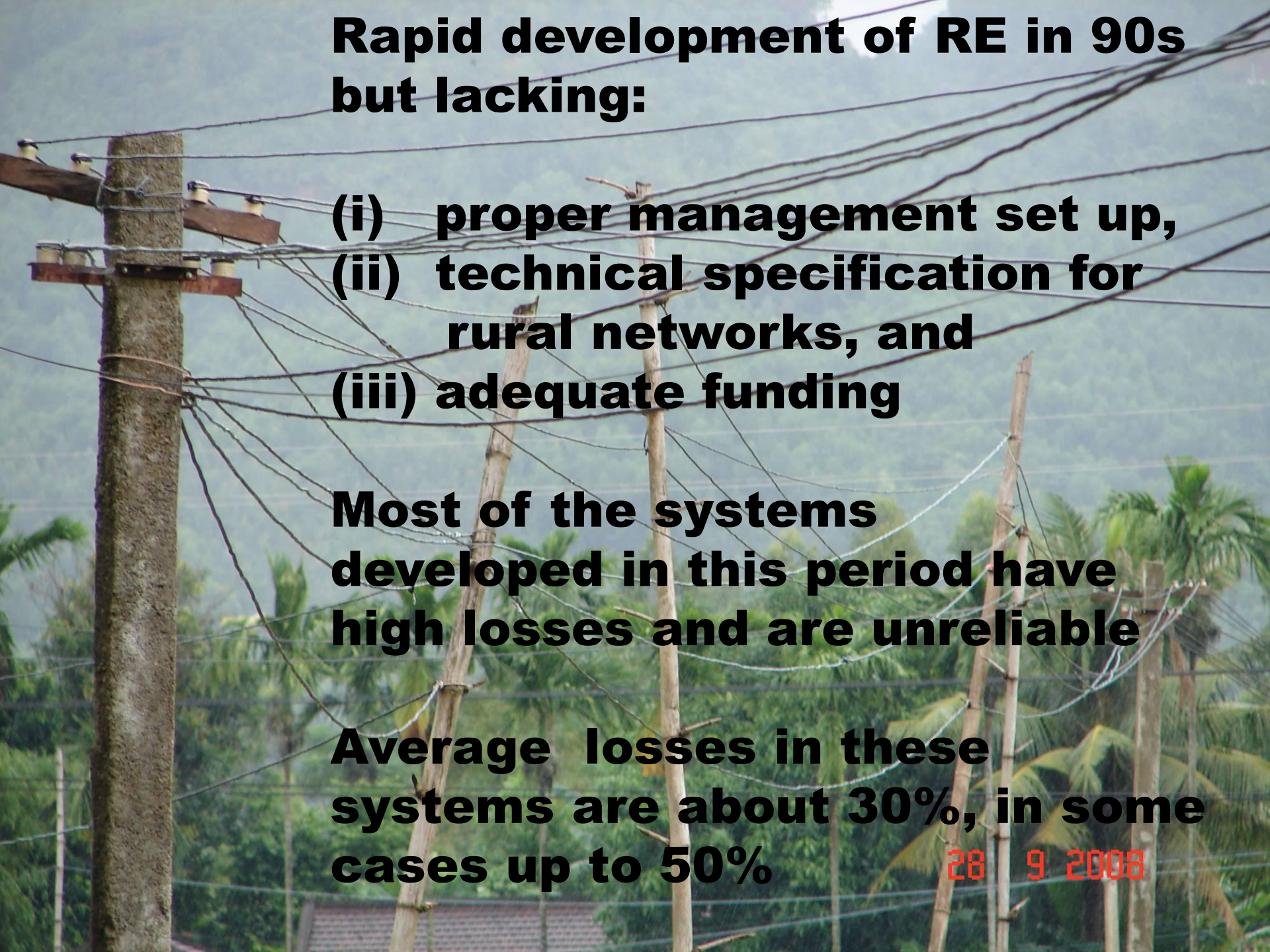
Tariff and Tariff Setting

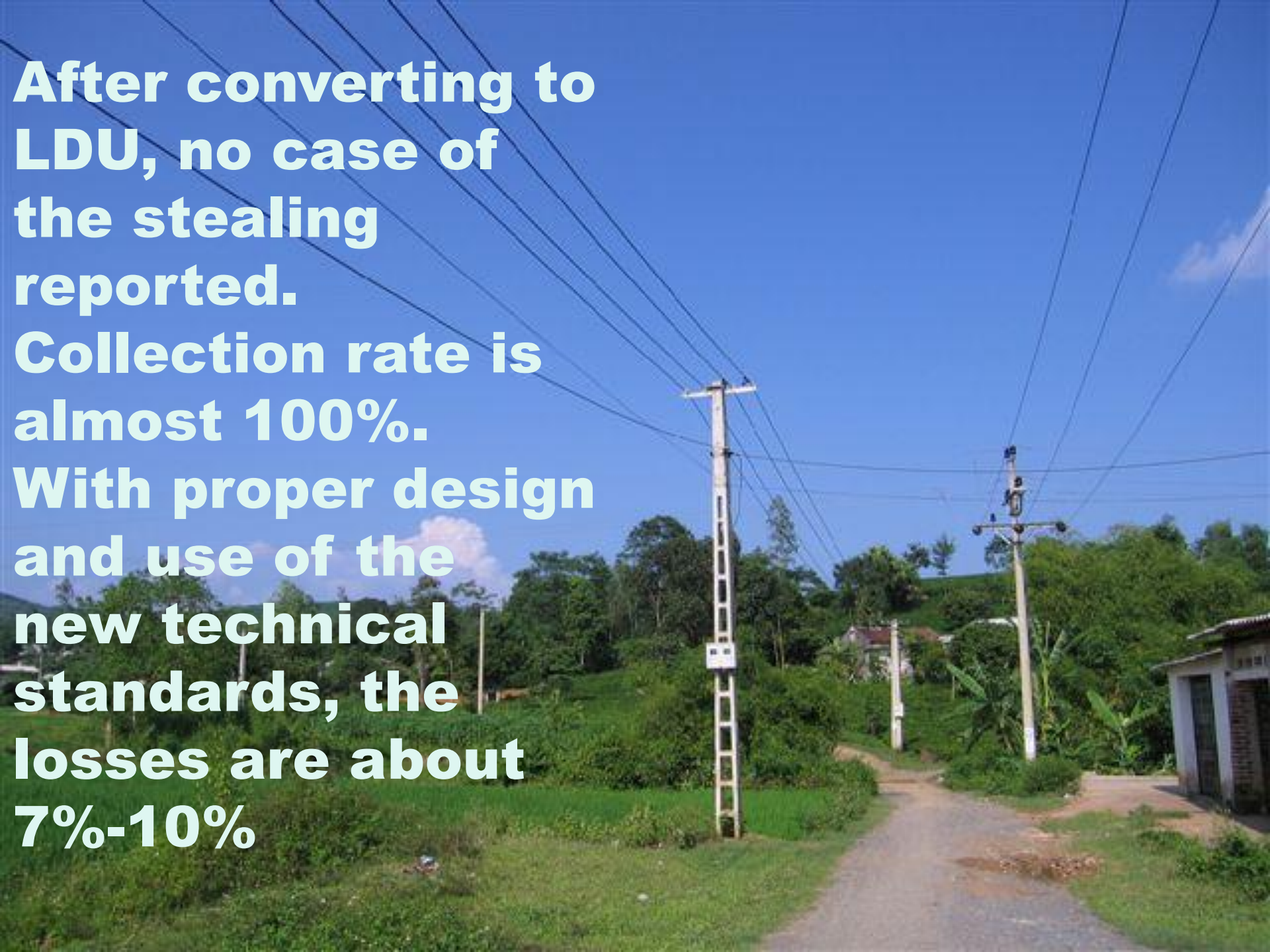
- Before 1 March 2009, Bulk tariff to the LDU at 390 d/kwh, 420 d/kwh with VAT
- Retail price from LDU was 700 d/kwh as the ceiling, set by GoV
- Province can allow tariff >700 d/kWh based on the business plan of each LDU

- From 1 March 2009 Retail Tariff is a national uniform tariff for rural and urban customers.

New tariff structure effective from December 22, 2012

Block	retailed tariff	Bulk tariff to LDU
kwh	d/kwh	d/kwh
0-50	993	807
0-100	1,350	1067
101-150	1,545	1190
151-200	1,947	1499
201-300	2,105	1631
301-400	2,249	1743
>400	2,307	1799
	1 US$=	VND20,850


Rapid development of RE in 90s but lacking:
(i) proper management set up,
(ii) technical specification for rural networks, and
(iii) adequate funding
Most of the systems developed in this period have high losses and are unreliable
Average losses in these systems are about 30%, in some cases up to 50%
28 9 2008


After converting to LDU, no case of the stealing reported.
Collection rate is almost 100%.
With proper design and use of the new technical standards, the losses are about 7%-10%

Costs and cost sharing

- Difficult to estimate, due to asset created by various parties from various sources, no reliable records
- The trend in cost sharing is:
  - Before 1995: all RE capital costs were paid by consumers and local authorities (both for MV and LV)
  - From 1999: MV system transferred to EVN, and EVN paid for the assets, EVN started taking over LV systems. EVN share of capital costs is increasing with time.
- See the following table

Costs and cost sharing

	1996-2000		2001-2004		1996-2004	
	VND Billion	%	VND Billion	%	VND Billion	%
EVN	1,402	40%	4,086	70%	5,488	58%
Local Authorities	1,637	46%	1,409	24%	3,046	32%
Other	52	1%	70	1%	122	1%
Consumers	449	13%	314	5%	763	8%
Total	3,540	100%	5,879	100 %	9,419	100 %

Data from EVN sources

Costs and cost sharing
(IRC for RE financed by WB 2000-2006)

Financing Sources	Impl. Agencies	Costs (US$)	Sources (%)
IDA	PC1	73.6	
	PC2	35.02	
	PC3	40.41	
Sub total		150.92	74%
Counterpart funds	PC1	10.9	
	PC2	11.3	
	PC3	10.5	
Sub total		32.7	16%
Local Government (for resettlement works)	PC1	1.4	
	PC2	1.9	
	PC3	2.6	
Sub total		5.9	3%
Customers (for connection to HH)	PC1	5.5	
	PC2	6.5	
	PC3	1.7	
Sub total		13.7	7%
Total		**203**	

Data from WB

Costs and cost sharing
(IRC for RE financed by WB)

	Communes electrified	Households connected	Costs	US$ per commune	Cost per HH
			$ mil	1000$	US$
PC1: for northern region	529	232,955	91.4	173	392
PC2: for southern region	187	184,472	54.72	293	297
PC3: for central region	260	137,900	55.21	212	400
Total	976	555,327	201.33	206	363

Data from WB

Development Process

Adapting Policies to Realities

From: no planning, no regulation, no technical standard; losses up to 50%

To: Electricity Law, with the technical standard for RE losses down to 7-10%

Development process

Rolling Out and Expanding

From: more economic active areas, center of communes, more contributions from customers,

To: less developed areas, isolated villages more assistances from GoV, donors

IS THERE …

- Enough power sources?
- Desire of people to have the power?
- Strong commitment of the government authorities of every level?
- Clear road maps for expanding access? By what way? Grid, off grid, household connection?
- Sustainable Management Model for rural areas?
- Low cost technical standards for the rural networks?
- Local consultancy industry
- Local supply of basic material and equipment?

Thank you for your kind attention