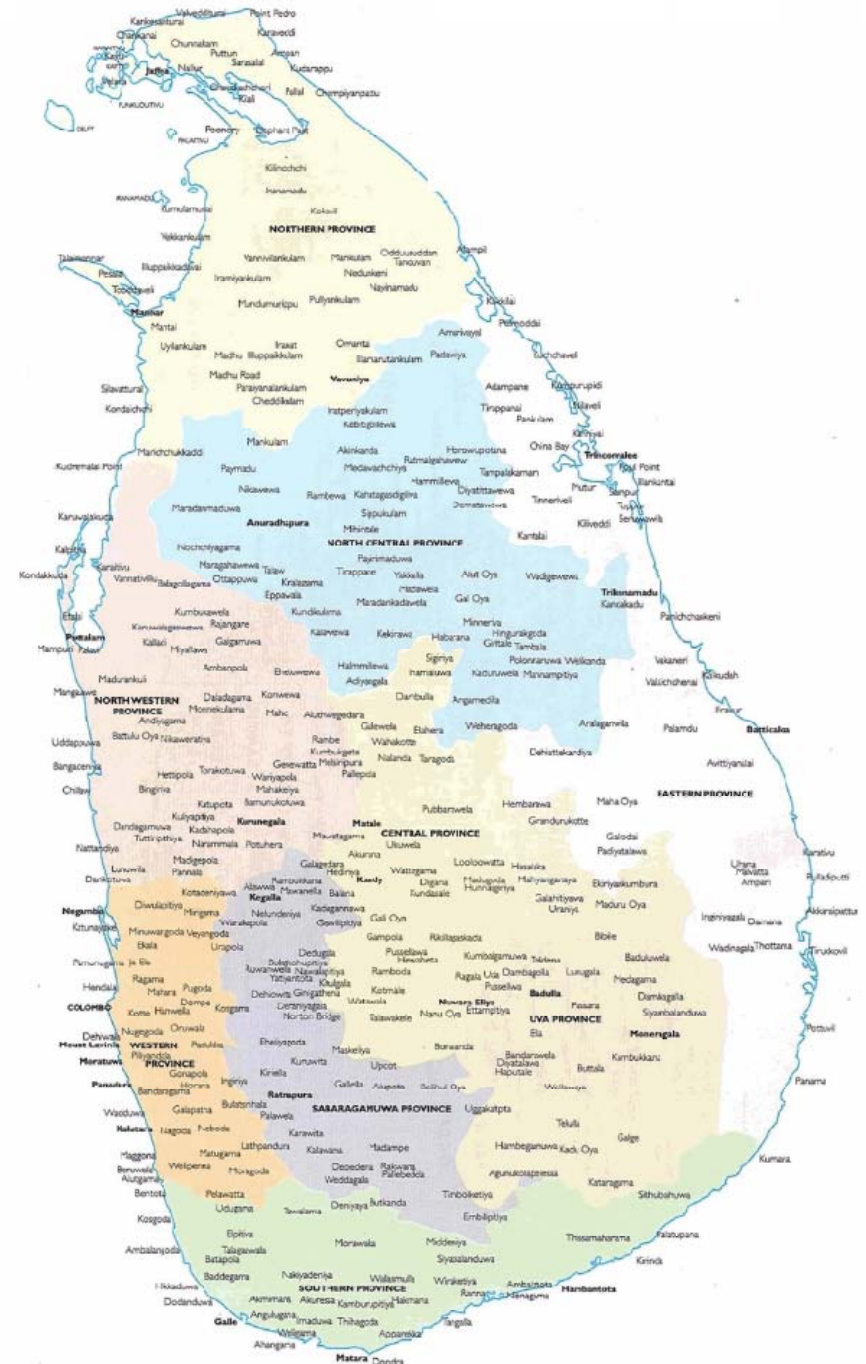


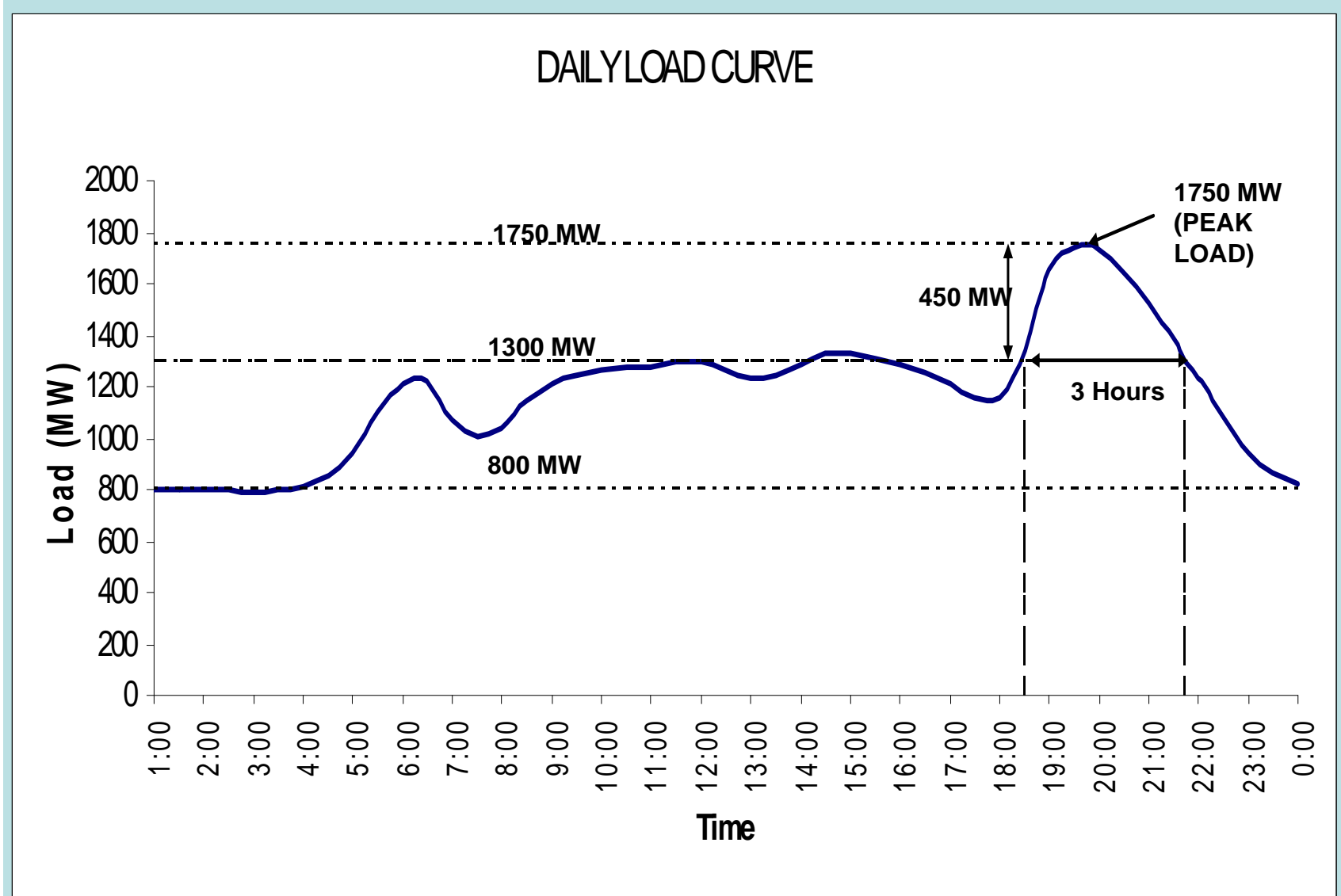
DEVELOPMENT OF  
RENEWABLE ENERGY  
IN SRI LANKA

# Conte

- Present Status
- Our Vision
- New policy and targets
- Success factors
- New cost based tariff policy
- A slowdown in investments
- Constraints

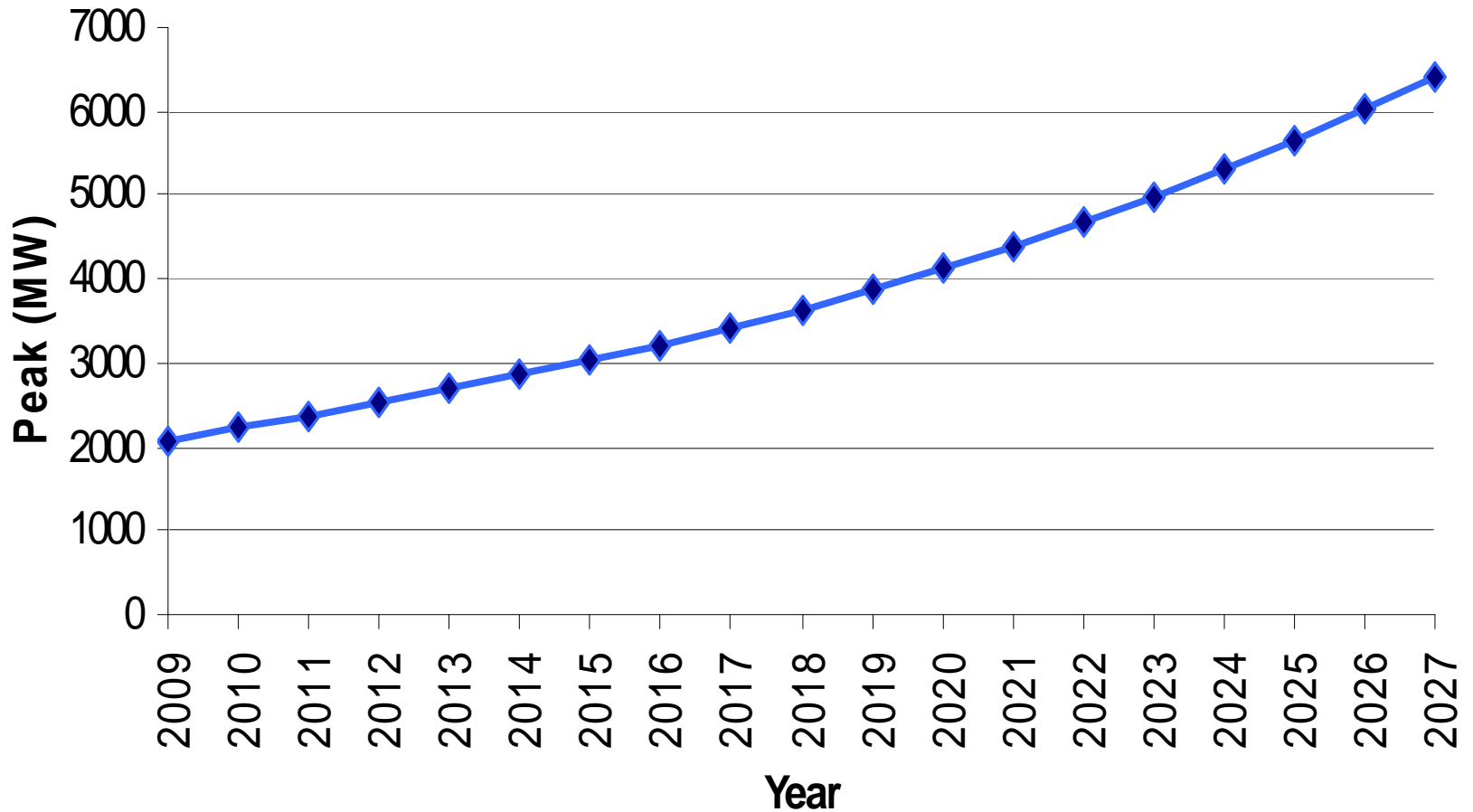


# Present Daily Load Curve

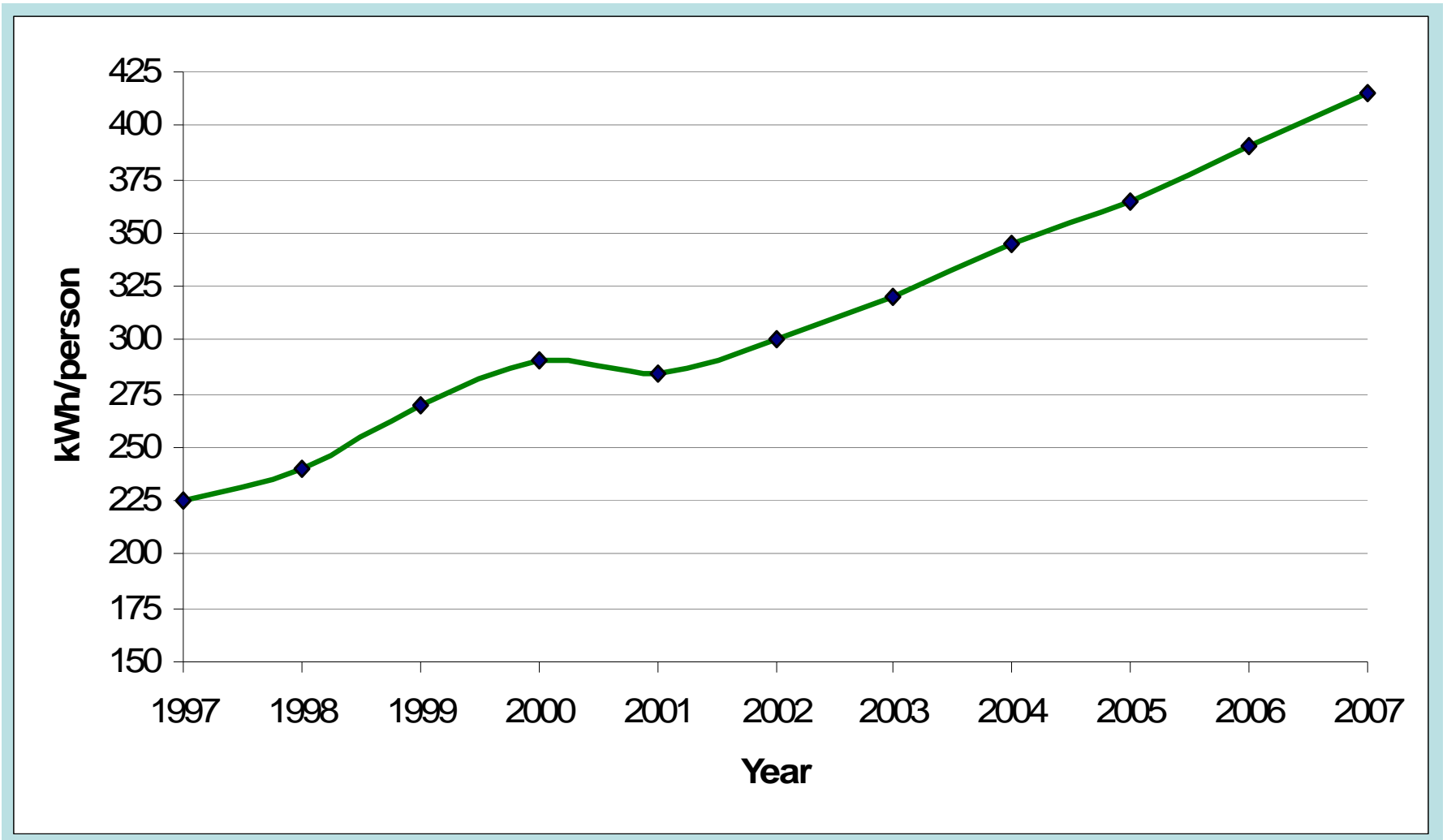


# Base Load Forecast – 2008

## Peak Forecast

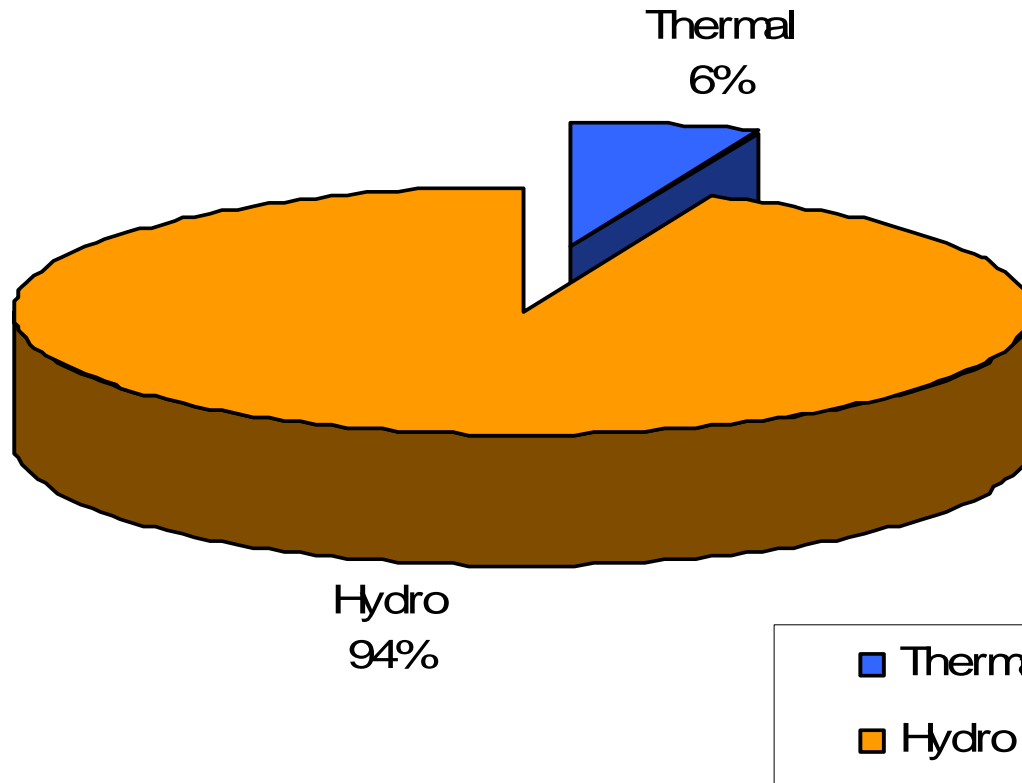


# Per Capita Electricity Consumption (1997- 2007)



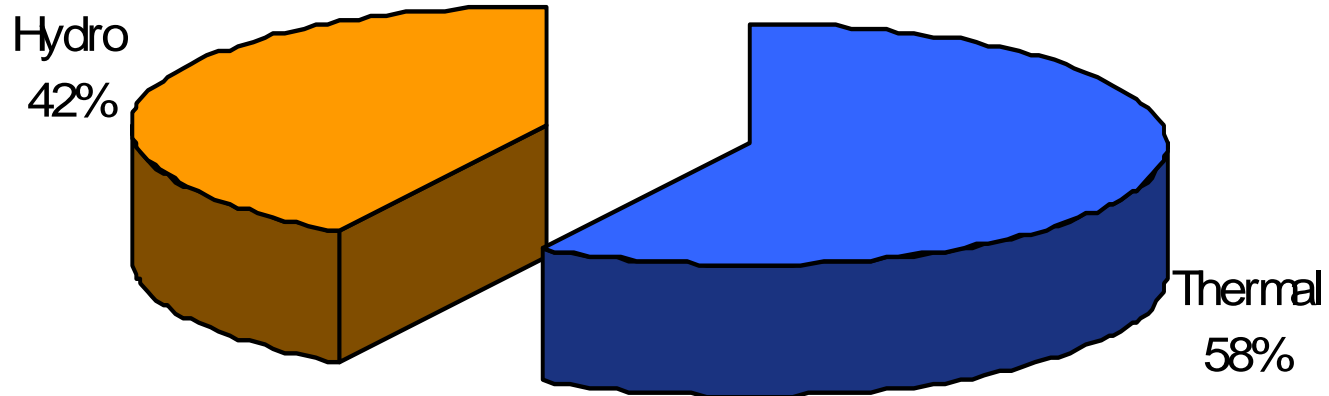
# Power Supply Situation in Sri Lanka

1995



# Power Supply Situation in Sri Lanka

2008



■ Thermal

■ Hydro

# Our vision

- Sri Lanka Reaping the full benefit of Renewable Energy – 10% by 2015
  - Country to tap the maximum possible economic potential of renewables, gaining from developed capacity
  - A complete resource inventory, an information and data vending centre
  - Networks of agencies for R&D and rural energy services
  - New renewables and new uses for renewables such as biofuels and wave energy
  - Catalyse the growth of renewable related industry
  - Consulting and all services including local manufacture of conversion equipment

# New policy and targets

## National Energy Policy Declaration – 9 elements

1. Providing Basic Energy Needs
2. Ensuring Energy Security
3. Promoting Energy Efficiency and Conservation
4. Promoting Indigenous Resources
5. Adopting an Appropriate Pricing Policy
6. Enhancing Energy Sector Management Capacity
7. Consumer Protection and Ensuring a Level Playing Field
8. Enhancing the Quality of Supply
9. Protection from Adverse Environmental Impacts of Energy Facilities

# Ensuring energy security

- **Fuel diversity in electricity generation (diversifying into non-oil resources)**
  - **The Government will endeavour to reach a level of 10% of grid electricity using NRE by 2015.**
  - **The Government recognizes that certain NRE technologies would require incentives to ensure their capacity build-up to reach the national NRE target.**
  - **Creation of an Energy Fund.**

Year	Conventional Hydroelectric	Maximum from Oil	Coal	Minimum from NRE	Comments
1995	94%	6%	0%		Actual
2000	45%	54%	0%	1%	Actual
2005	36%	61%	0%	3%	Moratorium on power plants burning oil or similarly priced oil/gas products
2010	42%	31%	20%	7%	Progressive diversification into coal and NRE
2015	28%	8%	54%	10%	Moratorium on power plants burning oil or similarly priced oil/gas products may be lifted

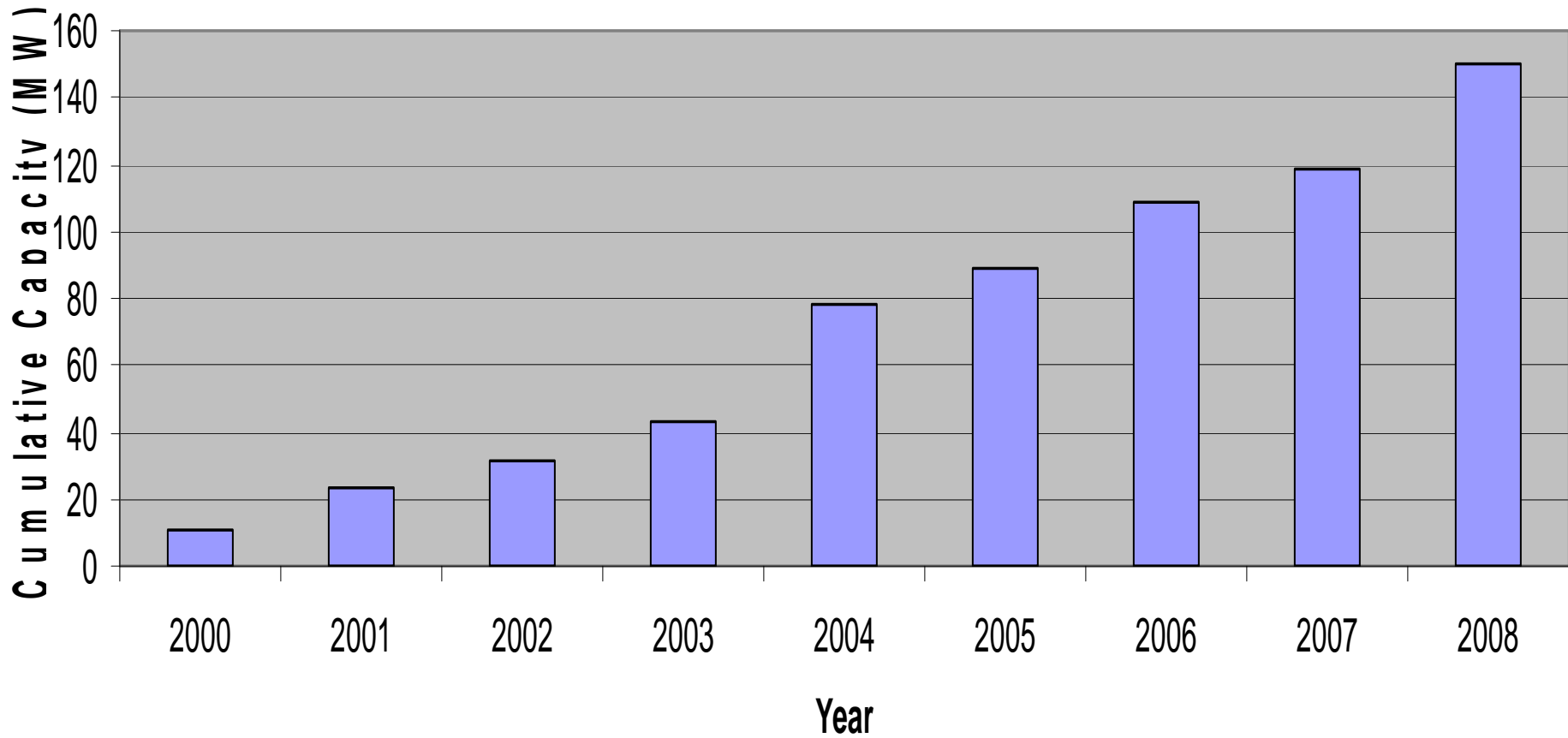
# Promoting indigenous resources

- Use of economically viable, environmentally friendly, non-conventional renewable energy sources will be promoted.
- Concessionary financing for large hydroelectric projects
- Incentives to develop other renewable non-conventional energy resources.
- Facilitation agency dedicated to the systematic planning and promotion of non-conventional renewable energy sources.
- Oil and natural gas resources will be explored and commercially exploited.
- Biomass-based energy projects will be developed.
- Initiatives of other institutions to convert biomass and other waste to energy will be encouraged and supported.

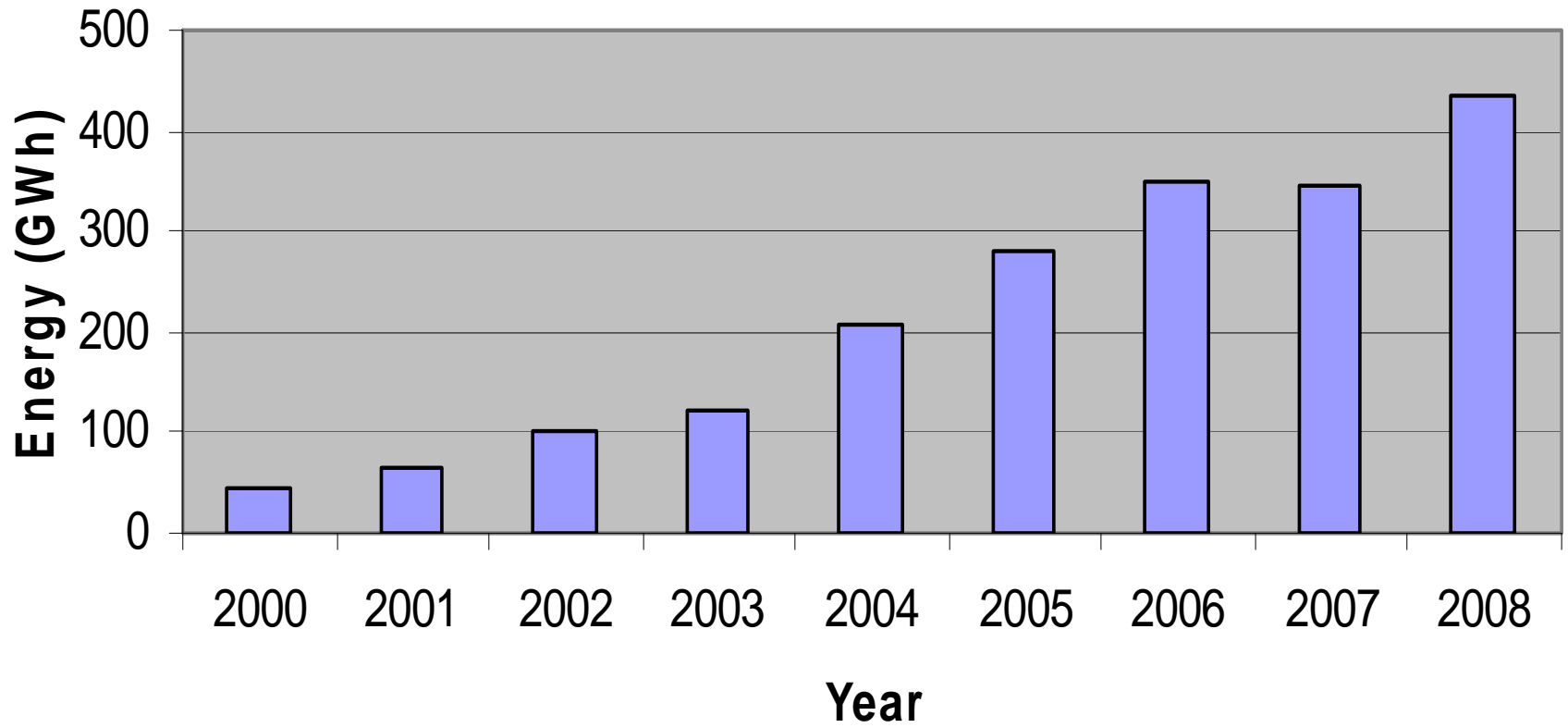
Present Status of Non-Conventional Renewable Energy (NCRE) Sector as at December 2008

No.	Description	Project Type	No. of Projects	Capacity (MW)
1.	<b>Commissioned Projects</b>	Mini Hydro Power	73	138.134
		Biomass-Dendro Power	1	1.000
		Biomass-Agricultural & Industrial Waste Power	2	11.000
		Waste Heat Recovery Power	1	0.100
		Solar Power	1	0.018
		<b>Total Commissioned</b>	<b>78</b>	<b>150.252</b>
2.	<b>Standardized Power Purchase Agreements (SPPA) Signed Projects</b>	Mini Hydro Power	34	75.712
		Biomass-Dendro Power	2	0.950
		Biomass-Municipal Waste Power	2	12.300
		<b>Total SPPA Signed</b>	<b>38</b>	<b>88.962</b>
3.	<b>Letter of Intent (LOI) Issued Projects</b>	Mini Hydro Power	100	152.280
		Biomass-Dendro Power	10	22.470
		Biomass-Agricultural & Industrial Waste Power	5	38.300
		Biomass-Municipal Waste Power	15	142.900
		Wave Energy Power	1	10.000
		Wind Power	8	63.950
		Solar Power	2	0.047
		<b>Total – LOI issued</b>	<b>141</b>	<b>429.947</b>

## NCRE Project Development - Capacity Additions



## Annual Energy Contribution from NCRE Projects

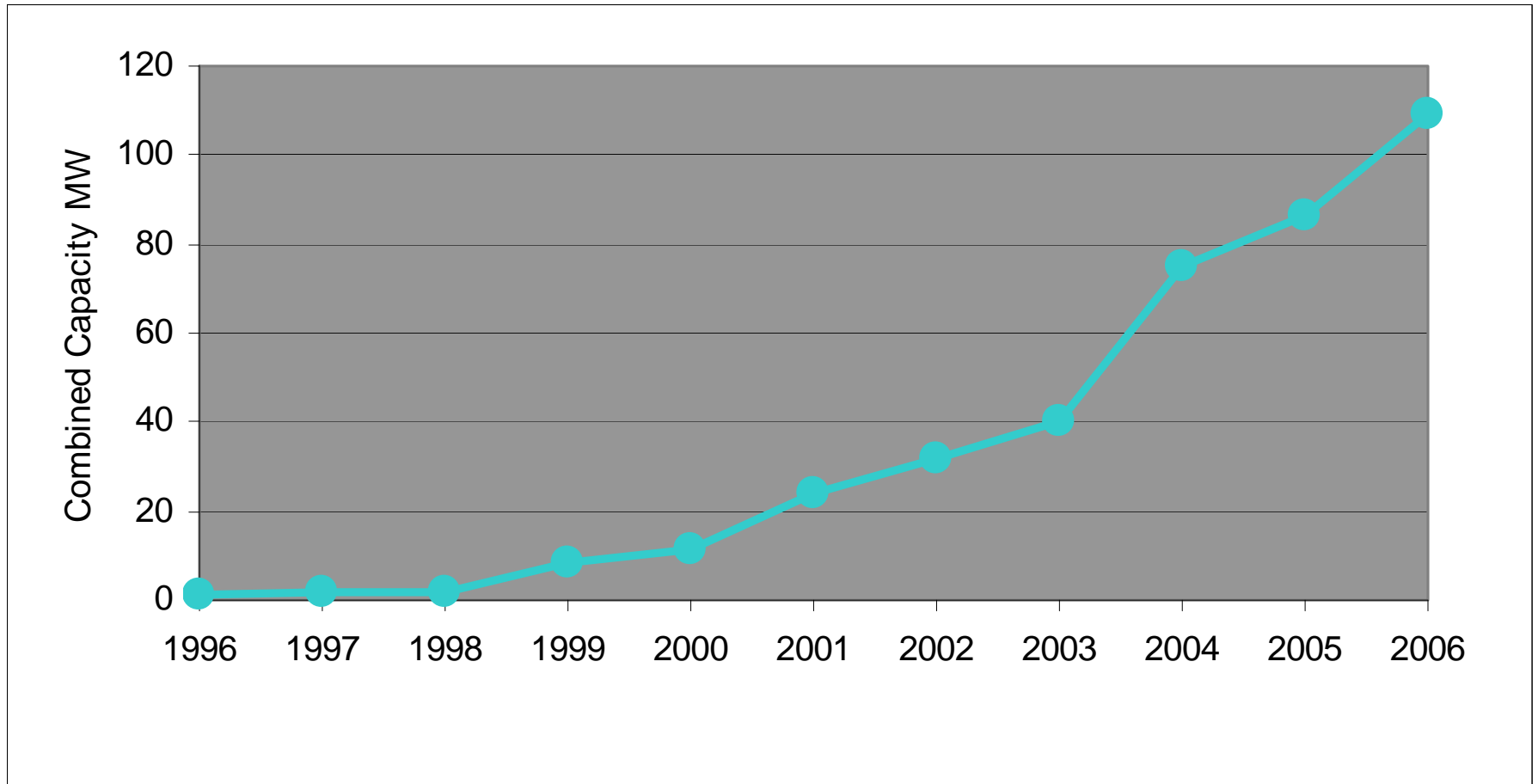


# Steady growth of SHP sector

The SHP sector grew at phenomenal phase due to the conducive environment

- High cost of generation – high avoided cost
- Acceptance of industrial norms – SPPA and procedure
- Availability of attractive funding
  - **First from ESDP**
  - **Thereafter from REREDP**
- Requirement of additional generation capacity

# Exponential growth of SHP



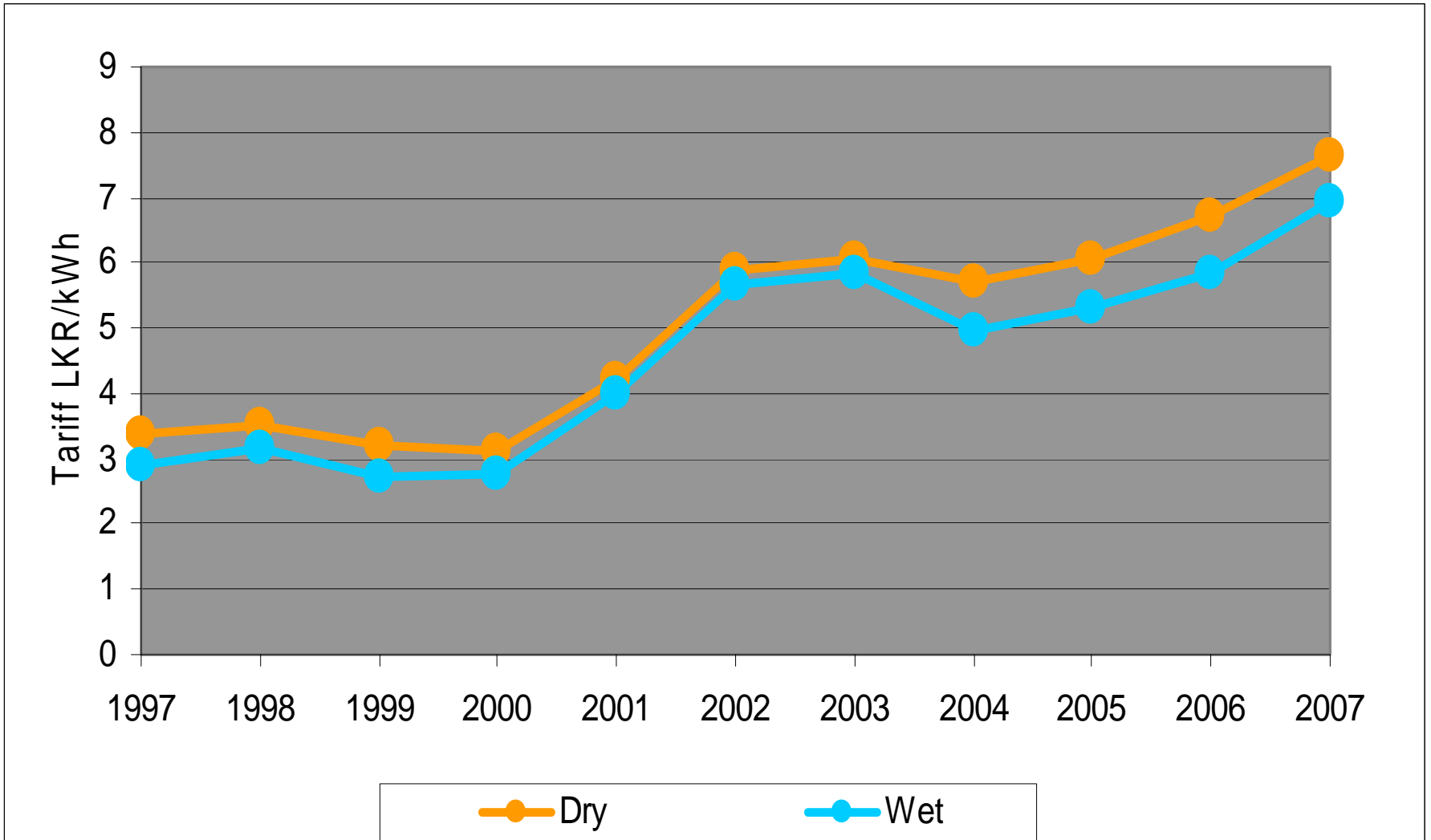
# Success factors

- **Virtually free from market risks**
  - What ever produced will be purchased
  - Guaranteed floor price sans a price ceiling
  - 'Production' free from HR related issues
- **Availability of an SPPA**
  - Simple approach
  - Acceptable to banks
  - Low transaction costs
- **Resource allocation**
  - First come first served basis
  - Devoid of cumbersome competitive processes

# Success factors... contd.

- Financing mechanism in place
  - Two consecutive World Bank projects (ESDP and REREDP) with a sound disbursement procedure
- Technology development keeping pace
  - Local Engineering know how developed to commendable levels
  - Capacity of construction companies developed
- Escalating tariffs
  - Thermal share of generation increasing
  - World oil prices sky rocketing
  - Avoided cost paid to SPPs also keeping pace

# Avoided cost tariffs



# New cost based tariff policy

- A front loaded three tiered tariff
  - Easing out cash flow problems in first few years
  - Returning the benefits to society in the last tier
- Technology specific, 6 genres
  - Small hydro power
  - Biomass (grown fuelwood)
  - Wind
  - Municipal solid waste
  - Agricultural waste
  - Waste heat recovery
- New SPPA, 20 years and tripartite
  - Utility to pay 90% of the avoided cost
  - Sustainable Energy Authority to pay / retain the difference
  - Developers to get the full cost of the technology

# **NON CONVENTIONAL RENEWABLE ENERGY**

## **FLAT TARIFF - All Inclusive Rate**

<b>Technology</b>	<b>LKR /kWh</b>	<b>US Cents /kWh</b>
<b>Mini Hydro</b>	<b>11.77</b>	<b>10.23</b>
<b>Wind</b>	<b>18.61</b>	<b>16.18</b>
<b>Biomass</b>	<b>12.77</b>	<b>11.10</b>
<b>Agricultural &amp; Industrial Waste</b>	<b>9.9</b>	<b>8.61</b>
<b>Municipal Waste</b>	<b>11.59</b>	<b>10.08</b>
<b>Waste Heat Recovery</b>	<b>7.57</b>	<b>6.58</b>
<b>Wave Energy</b>	<b>6.82</b>	<b>5.93</b>

# Cost based Vs Avoided cost

- The present increase of avoided cost is a result of wrong generation mix
  - It is not sustainable in the long run
  - Illogical to pay fossil fuel prices for hydropower
  - Having a floor price without a price ceiling was a costly mistake
  - Introduced a degree of uncertainty
- Cost based tariff
  - Very low uncertainty
  - Provides room for other renewables as well, making the 10% target a reality
  - Is sustainable through interventions such as Sri Lanka Energy Fund
  - Best economic value to country

# A slowdown in investments

- Funds received under additional finances show a slower rate of disbursement compared to 2003-2007 period
- In addition to global economic downturn, there are other constraints

# Technical Constraints

- Reaching the full capacity of most grid substations
- Exceeding transmission capacities
- Reaching the permissible levels of non-dispatchable generation in the system
- With 82% grid penetration, off-grid market shrinking rapidly
- Good hydro sites already developed

# Financial Constraints

- On-lending rate now on AWFDR, signalling an increase of around 2.5%
- PCIs demanding more equity than before
- Most PCIs reaching sector exposure limits
- Repayment funds diverted away to other sectors
  - no recycling as expected
- Off-grid grants : Still the deciding factor
  - will not be available from now on
  - need a different source of funds
- Inability to assemble consortia of PCIs for larger investments
  - Worst affected – wind industry  
(PCI – Participating credit Institutes)

# Other Constraints

- **Biomass project financing**
  - PCIs avoiding biomass sector, project financing seemingly not available
  - Greater effort needed to address PCI worries
- **Net metering**
  - Net metering now offered in LECO areas, no cushioning funds as in developed countries roof-top programmes
  - Require an in-depth understanding of success stories
- **Environmental impact assessments**
  - Post project evaluations required
  - Offer a focused assessment process than the generic process presently carried out
- **Further extension of RERED**
  - Reaching 10% target require large investments
  - Also a better disbursement channel than through PCIs

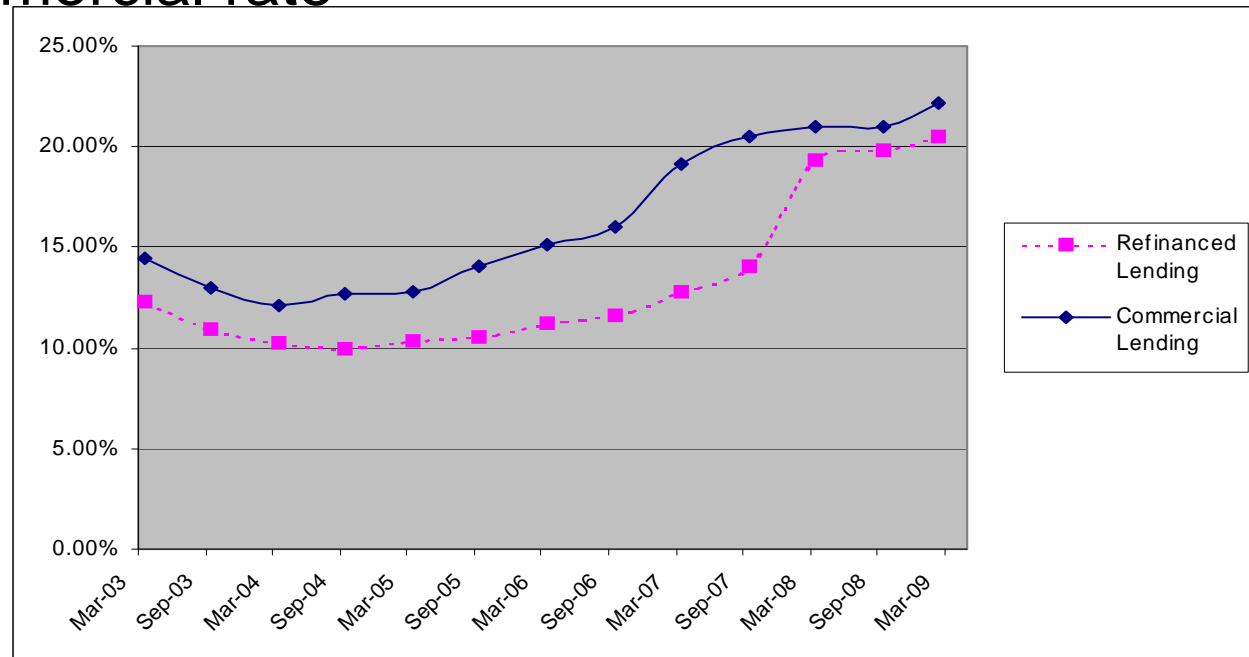
# Other Constraints

Contd...

- What ever the effort, capacity additions remain at around 12 MW per year
  - Need a fresh approach (energy parks ?)
  - Allocation of resources on a competitive process (only for pre-qualified investors ?)
- Long gestation periods
  - Streamline approval process (efforts are not yielding good results)
  - Mismatch of developer aptitudes and tasks (most good developers looking for greener pastures)
- Off-grid slow down
  - Lack of micro finance institutes
  - Lack of other financial support

# Some Solutions...

- Revert back to AWDR from AWFDR
  - A real reduction in interest rate is what is required
- A lending rate significantly better than commercial rates
  - The new rate almost touches the already high commercial rate



# Some solutions... Contd.

- Project Approving Committee of SEA, comprising of all stakeholders
  - Guidelines and regulations already formed
  - Entertaining applications now transparent and developer friendly
  - Allocating resources on a well laid out guideline
- Resource maps, inventory, energy development areas and a transparent approval process
  - To reduce gestation period
  - Claim to a resource by developers in public domain
  - Land acquisition where necessary and long leases
  - A robust appeal process

# Some solutions... Contd.

- Renewable energy permits
  - To safeguard the protection of environment
  - A key to access commercial funding
- Managing a portfolio of financial resources
  - Sri Lanka Energy Fund to bridge funding gap
    - Levying a cess on fossil fuel imports
    - Retaining additional payments from avoided cost payments
    - Managing the carbon asset / royalty payments
    - Lease of land and resources
    - Shared savings from energy efficiency projects
  - Sustainable Energy Guarantee Facility
    - Premiums on credit guarantees
    - Service charges, penalties and interest

Thank You