



WELCOME

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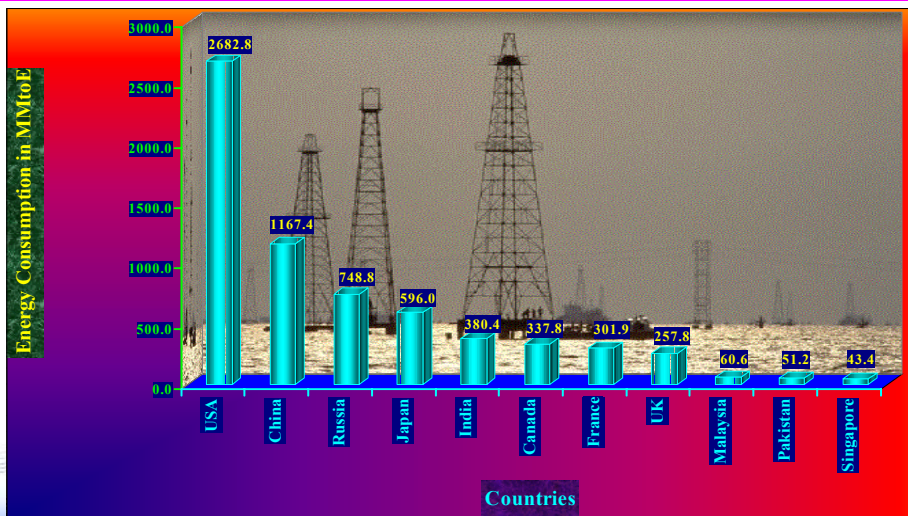
Energy Efficiency & Demand Side Management

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Primary Commercial Energy Consumption (in MMtoE)

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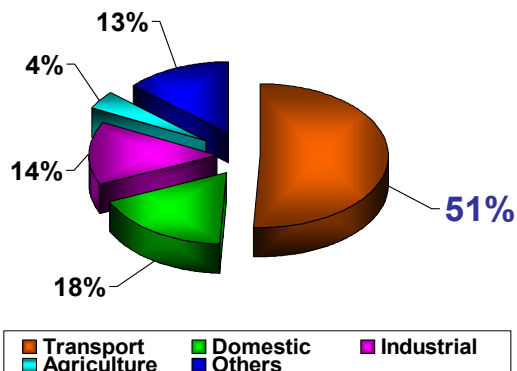
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Sector-wise Consumption of Petroleum Products (2004)

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Sector	Petroleum Product Consumption (MMT)
Transport	61
Domestic	21
Industrial	17
Agriculture	05
Others	16
Total	120



Energy Security for Transport Sector is the corner stone of our Petroleum Strategy

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Current Energy Scenario

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- ❖ Total Primary Commercial Energy Consumption – 380 MMTOE
- ❖ Oil & Gas Consumption – 158 MMTOE
- ❖ Growth rate for crude demand – 5.8 %
- ❖ Crude import bill > Rs. 1,50,000 Cr (\$ 32 Billion)



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India's Growth Scenario

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With sustained GDP growth of around 8 % per annum, India's energy consumption at a conservative estimate will increase @ 5% per annum.

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Potential for Energy Saving

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➤ Total Energy Consumption	– 380 MMTOE
➤ Oil & Gas Consumption	– 158 MMTOE
➤ Average Saving Potential	– 20%
➤ Total Energy Saving Potential	– 76 MMTOE
➤ Money Equivalent	– Rs. 1,52,000 Crores (@ Rs. 20000 per ton)

Hence the need for Demand Side Management



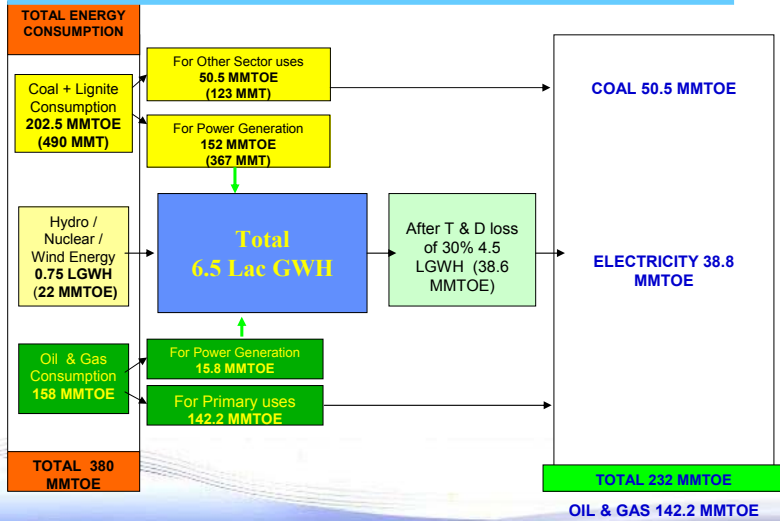
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Energy Availability from Upstream end

At consumer end the energy pattern is different

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DSM Market

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Supply side
Distribution
Transmission
Generation

Demand side
Industry
Commercial
Urban
Domestic
Agricultural

Subsidized segments are the best DSM markets

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DSM -Objective

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- **Macro objective**
 - Reducing demand supply gap
 - Improved quality & availability of power
- **Economic objective**
 - Improving bottom line of utilities
 - Expansion of market for high efficiency products
 - Development of technology and service providing industries
- **Social benefits**
 - Employment generation
 - Environment Benefit

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Factors Responsible for High Energy Efficiency in China & Japan

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PCRA has MOU with ECCJ of Japan for conservation

- **Top down approach**
- **Attitude building**
- **Dynamic thinking**
- **High degree of automation**
- **Energy Conservation budget**
- **Technological interventions including R&D**
- **Fiscal and policy measures**
- **Thrust on Renewable Energy**

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Factors Responsible for High Energy Efficiency in China & Japan

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- Using infrastructure facility as a tool for improving Energy Efficiency & Conservation
- Strict compliance of regulations
- No free Power in Japan
- Top runner scheme – other have to be within 90 % efficiency
- Incentivise conservation for consumers in Hotels
- Ice Banking
- Reid on ACs

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International Experience Learning Lessons

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1. High quality roads and infrastructure facilities.
2. Exceptionally good mass rapid transport system.
3. Synchronized signals and no traffic holdups.
4. Building architecture to use natural lights.
5. Energy efficient appliances.
6. Low temperature waste heat recovery
7. Wide spread application of sensors
8. Recycling

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International Experience Learning Lessons

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9. For planning new construction expected increase in number of vehicle is to be estimated and got approved. Building can be constructed only if adequate parking space is also provided
10. One organisation undertakes research for upstream and downstream petroleum sector so that all organisations can share benefits
11. High degree of automation for effective monitoring and control
12. High degree of IT application.
13. Energy consumed by each equipment in industry is measured through IT.

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International Experience Learning Lessons

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14. It is transferred to a computer with the help of an integrated software package for monitoring
15. Use of Software for comparison between the desired and operational parameters.
16. Mandatory training for attitude building & skill updation.
17. Active thinking and involvement of employees at all levels.
18. Improved Engine technology

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International Experience Learning Lessons

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19. Steady & non fluctuating power supply.
20. Punctuality is the watch word
21. Long term planning

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Chinese Menu for Conservation - 1996 onwards

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- **Investment in energy conservation to be > 5 billion US \$ per year.**
- **In 2003 investment on energy conservation was US\$ 3 billion**
- **Energy efficiency policies :**
 - ❖ **Targets for energy efficiency for industries.**
 - ❖ **Building energy standards.**
 - ❖ **Energy labelling on appliances.**
 - ❖ **Auto fuel economy standards.**

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- Energy subsidies removed.
- Energy efficiency policies and investments reduced energy intensity.
- Environment regulations forced inefficient plants to shut down.
- Non state enterprises became more efficient due to competition.



Emphasis on development of energy efficiency and renewable energy

- ❖ Hybrid solar lighting
- ❖ Energy efficient buildings.
- ❖ Cogeneration
- ❖ Energy efficient industrial practices.
- ❖ Enhanced hydropower generation.
- ❖ Advanced transmission conduction to reduce losses.
- ❖ Biomass and Biogas from rice husk for power generation.
- ❖ Thrust on LPG for rural market.



DSM Impact-some interesting experiences

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- USA-highly successful utility DSM program-for every dollar of government spend, four dollar of private investment
- Canada-For every dollar of investment in DSM four times employment generation compared to supply side investment.
- Brazil, Korea-DSM cess (electricity & petrol respectively) has helped in rapid development of EE market and service providing industry
- Thailand, Srilanka-Mitigation of energy shortage
- Australia, Most of EU countries-Development of high efficiency white goods and buildings
- Japan-Development of Large Utility affiliated ESCO industry

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DSM in India

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- Mandatory Energy Audit
- Energy intensity Reduction Targets
- Fuel Efficient Vehicle
- Consumer Awareness - Specifics
- Labeling
- Driver Training Programme
- Efficient combustion Technology / burners
- Cooking efficiency
- LPG Subsidy review
- Use of Railways & water ways
- Measurement & Verification
- Retrofits – PCRA experience in industry

Contd...

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DSM in India

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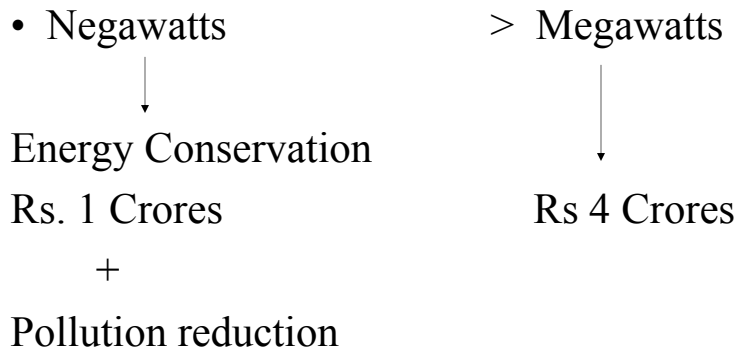
- For each commercial installation , specific targets. - mandatory
- Time & methodology to be specified.
- Fuel substitution
- Efficient Building
- Municipal Pumping stations
- Rational Energy prices
- Time of Day Tariff
- Prevention of Filament lamps in commercial sector
- Urban planning
- VSD

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Energy Efficiency

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Market Forces

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Labeling

- Consumer awareness
- Consumer empowerment
- Will bring in competition



Energy Audit

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Identifies & facilitates Energy efficiency improvement

- Brings efficiency in industry
- Potential saving 20 MTOE
- PCRA prime organisation in Energy Audits



DSM by TOD

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- Dramatically reduces requirement for extra capacity generation.
- Optimum use of installed capacity
- Financial benefit shared with consumer
- Very effective, least cost tool

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Energy Efficiency Driving Habits

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- Can save upto 20% fuel → 10 MMT
- PCRA experience, Driver Training programmes, 6000 drivers being trained for RSRTC

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Awareness

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Awareness : From general to specific

- Domestic
- Transport
- Industry
- Agriculture

PCRA runs extensive awareness Programs



Recommendations

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- Conservation chapter to be included in School Books
- Degree courses in “Energy Efficiency & Conservation”
- Standards for various Industries
- Standards for energy consuming Equipments
- Mandatory Energy Audits
- Measuring & Verification standards
- Promote ESCOs



Recommendation

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- Rationalisation of energy prices
- Incentives & disincentives to build up energy efficiency
- Adopting least cost option. DSM to have a level playing field with supply options.



Recommendation

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- **Increasing efficiency of Coal Based Plant**
- **Minimum efficiency of 38% for new coal based plants**
- **Freight traffic to Railways**
- **Urban Mass Transport**
- **Promote water ways**



Recommendation

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- Fuel efficient vehicles / Flexi fuel
- Municipal water pumping
- Variable speed drives
- Improve cooking efficiency – Urban & Rural

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