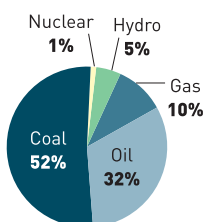


India's energy worries

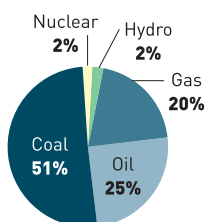
What the country needs

India currently writes a cheque for about Rs.1,480 crore every day for its energy imports, say Ashok Sreenivas and Shantanu Dixit of the Prayas Energy Group, Pune (*EPW*, May 19, 2012). The total energy import bill for 2011-12 at current prices is likely to be about Rs. 5.4 lakh crore (\$108 billion). They expect it to increase to \$196 billion by 2016-17, an annual increase of 13 per cent.

Indian energy basket-2009



Estimated Indian energy basket-2025



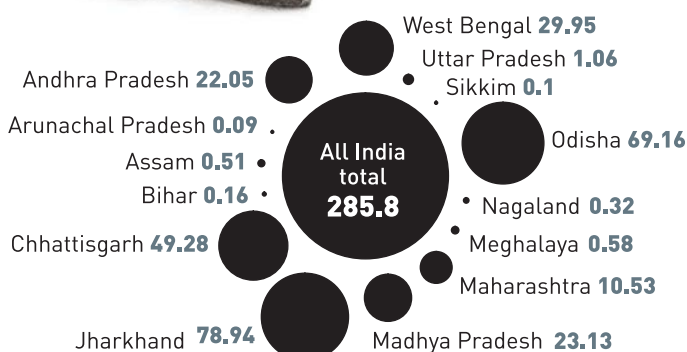
Economic Survey 2011-12 admits as much and says that one of the foremost challenges in the coming years is to meet the energy requirement. The Twelfth Plan projections made by the Planning Commission indicate that for a GDP growth rate of 9 per cent, energy supply has to grow at around 6.5 per cent. The Planning Commission says India will need to import 80.5 per cent of its oil, 28.4 per cent of its natural gas and LNG and 22.1 per cent of its coal requirements in the Twelfth Plan period (2016-17). The corresponding figures were 76.4 per cent, 19 per cent and 19.8 per cent respectively in 2010-11 (provisional data).

What it has



Statewise estimated reserves of coal

(in billion tonnes)



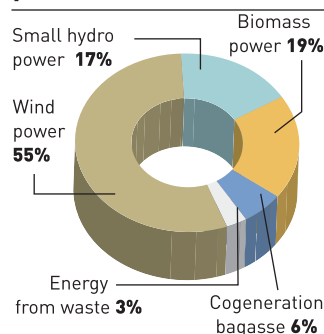
* Coal is a primary energy input for thermal power generation and for the steel and cement sectors. The gap between demand for coal and its domestic availability is widening at a fast pace.

Estimated reserves of crude oil, natural gas (in per cent)

Area	Crude oil	Natural gas
Assam	23	8
Andhra Pradesh	1	3
Western Offshore	44	33
Tamil Nadu	1	3
Rajasthan	10	1
Gujarat	18	6
Eastern Offshore	3	35
Tripura	--	3

Total reserves: Crude oil 757.44 million tonnes;
Natural gas: 1,240.92 billion cubic metres
(coal-bed methane constitutes 8% of NG reserves)

Estimated renewable potential



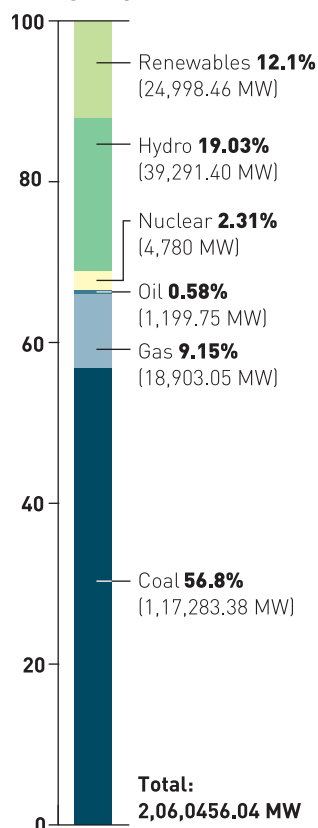
Total reserves = 89,760 megawatt

- * India currently has around 12,000 km of natural gas pipeline.
- * Coal-bed methane offers potential owing to high reserves.
- * No credible estimates of shale gas are available.
- * India has only moderate reserves of uranium but has large reserves of thorium; the indigenous nuclear programme is, therefore, focussed on using the large resource base of thorium.
- * Solar energy offers a viable long-term alternative.

All data on reserves as on 31-3-2011

Power for all...

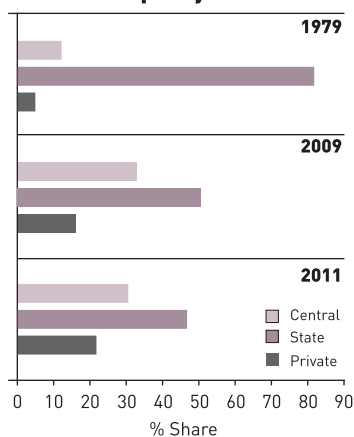
Installed generation capacity (as on 31-7-2012)



The goal of 'Power for all by 2012' remains a pipe dream. According to Census 2011, 7.5 crore rural and 0.6 crore urban households have no electricity.

The demand for grid power is estimated to grow by 6 per cent per annum by the end of the Twelfth Plan. In order to achieve the projected capacity addition and build the necessary transmission and distribution capacity, investment to the tune of Rs.11,18,375 crore will be needed. Apart from the financing issue, the power sector will be constrained by shortage of fuel and environmental issues. Mismatch in coal supply and shortage of gas for the power sector have been impacting the output currently. High dependence on imports leads to higher energy costs. Higher costs, compounded by inefficient transmission and distribution, make it hard for the country's poor to access energy. With the country's energy security still heavily dependent on polluting conventional, non-renewable sources, it is imperative that for a sustainable energy future India shifts its focus towards renewables.

Sectorwise share in installed capacity



Cost comparison of power

Source	Cost per MW (Rs. crore)	Levelised cost per Kwh (Rs.)
Wind	5.5-6.5	2.5-4.5
Small hydro	6-10	1.8-3.4
Biomass	4.5-5.5	2.2-3.2
Solar	10-12	8-10
Thermal	4-4.8	2-3
Nuclear	9.5-11	2-3

Levelised tariff refers to the average fixed and variable tariff over the entire term of the Power Purchase Agreement.

...and the problems

- ★ Land acquisition and environmental concerns and high levels of coal import in the case of thermal projects.
- ★ Fuel supply, environmental hazards, and dependence on foreign technologies in the case of nuclear projects.
- ★ Large hydel projects will have to address resettlement and rehabilitation of the displaced people and damage to the environment.
- ★ Solar projects involve very high technology and installation costs and require large areas of land; wind energy is unreliable; availability of feedstock is a concern for biogas plants.
- ★ High imports will drain the foreign exchange reserves and impact domestic growth. Fuel imports contribute to more than half of India's trade deficit which increases reliance on foreign capital and weakens the rupee against other currencies.



★ Remote areas will need huge investment in the transmission infrastructure to get their share of energy.

Source: Planning Commission, Ministry of Statistics and Programme Implementation, Economic Survey 2011-12, Ministry of Power, Census 2011, Economic & Political Weekly, World Energy Council, ICRA, Ernst & Young, and others.

COMPILED BY R. SURESH, INFOGRAPHICS BY V. SRINIVASAN