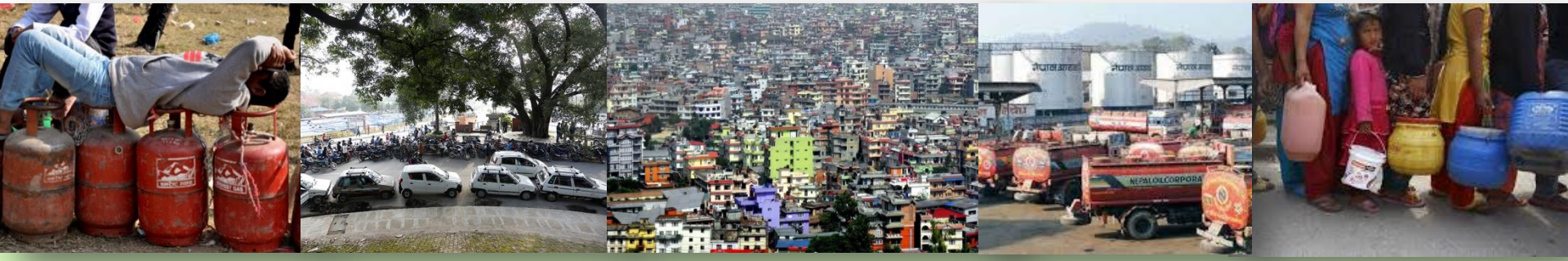
RE in Urban context: Challenges and Opportunities

Hotel Himalaya, Lalitpur, Nov 22, 2015



Challenges and Options of Future Energy Development in Kathmandu Valley

Picture Source: ekantipur, nagariknews

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- Energy Consumption Mix in Kathmandu
- Future Energy Development and Challenges
- Options for Sustainable Energy Development
- Concluding Remarks

Some Dimensions of Energy Crisis in Kathmandu



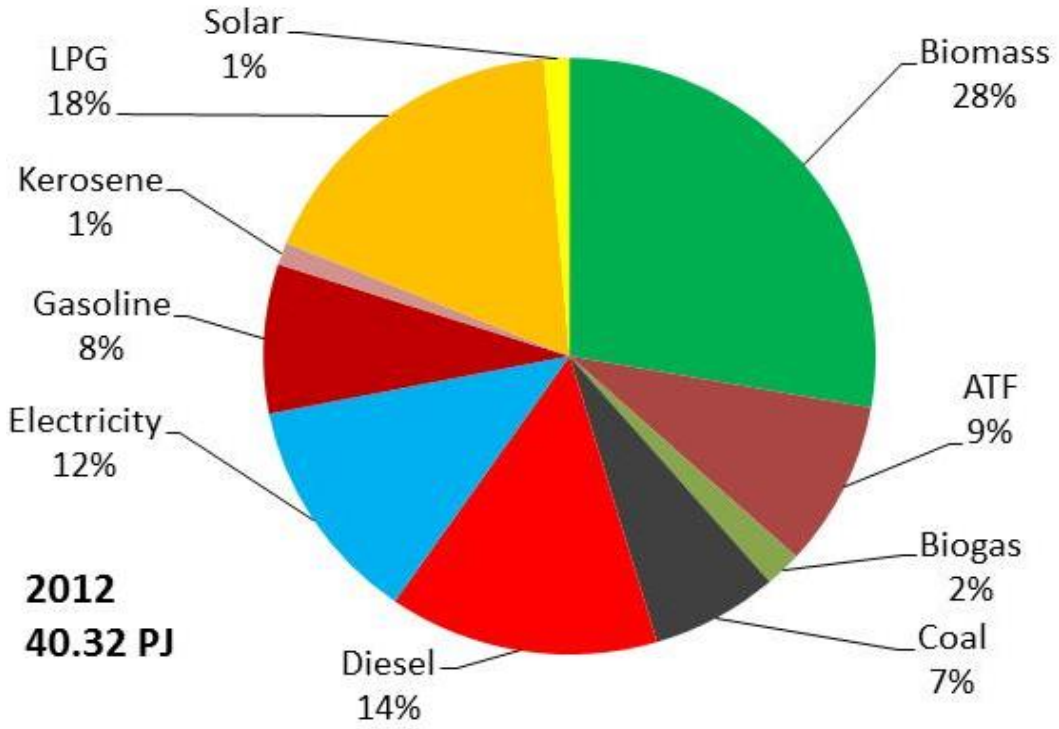






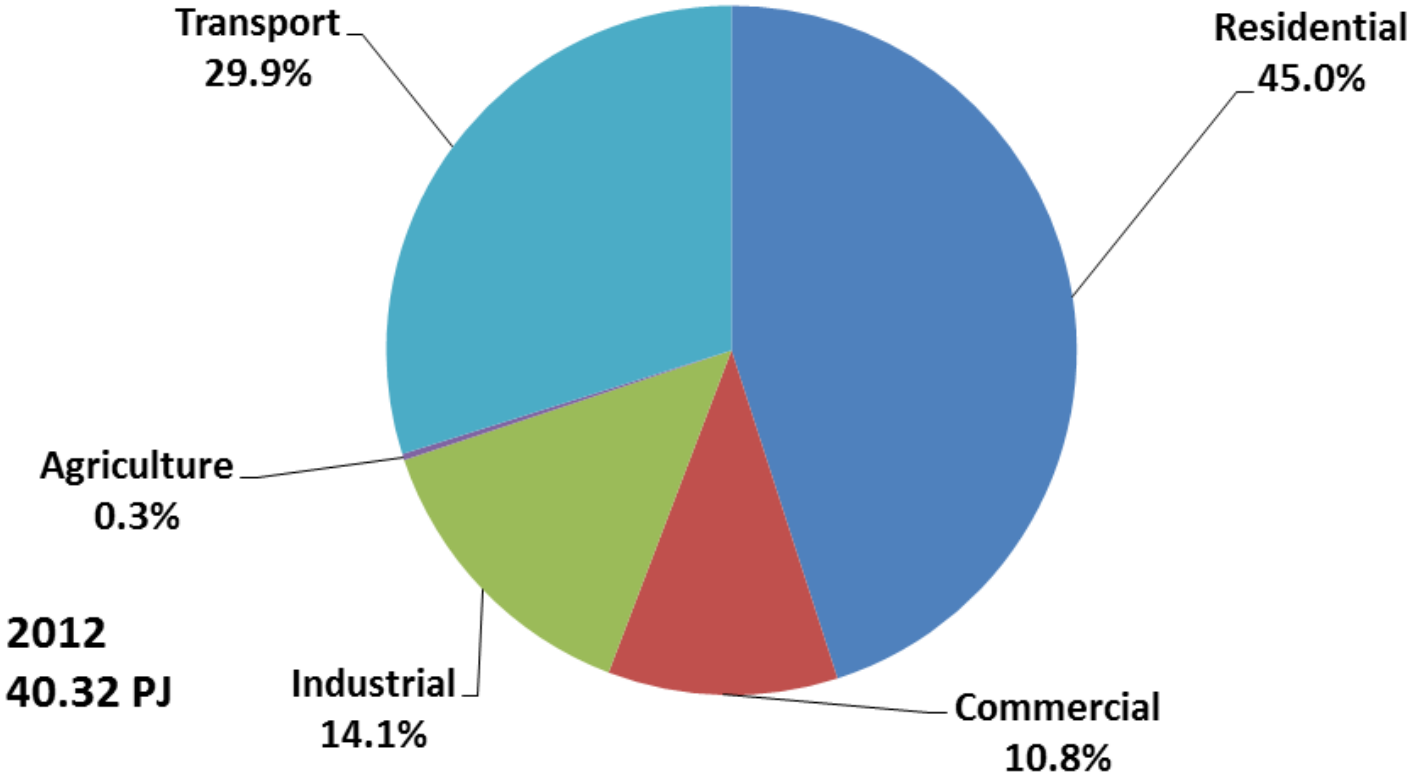

Energy Consumption Mix in Kathmandu

Energy Consumption Mix (2012)



- **Share of imported fossil fuels 57%**
  - **Share of petroleum product 32%**
  - **Share of LPG 18%**
  - **Import dependency ? Energy Security ?**

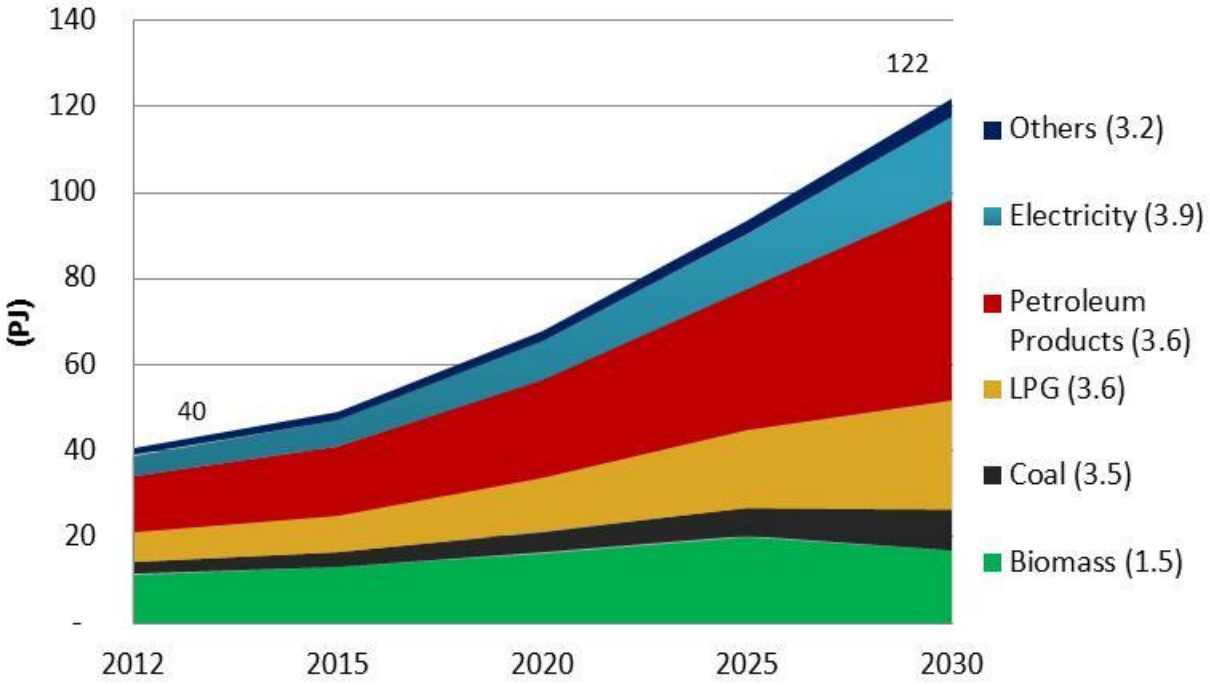
Sectoral Share of Energy Consumption (2012)

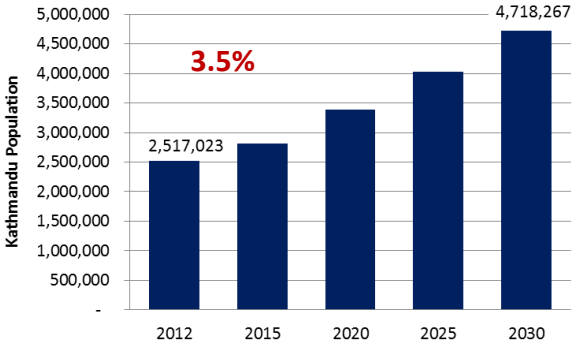


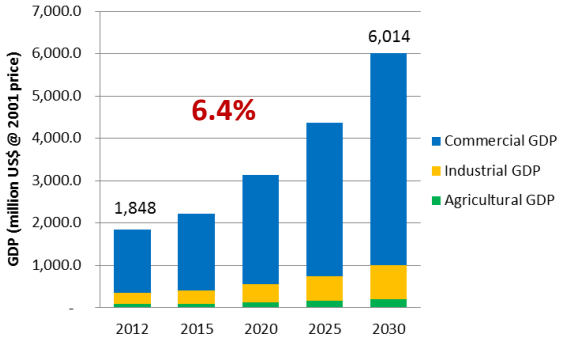
- Residential sector has highest share
- Followed by Transport and Industrial

Future Energy Development and Challenges

Future Energy Development (2012-2030)

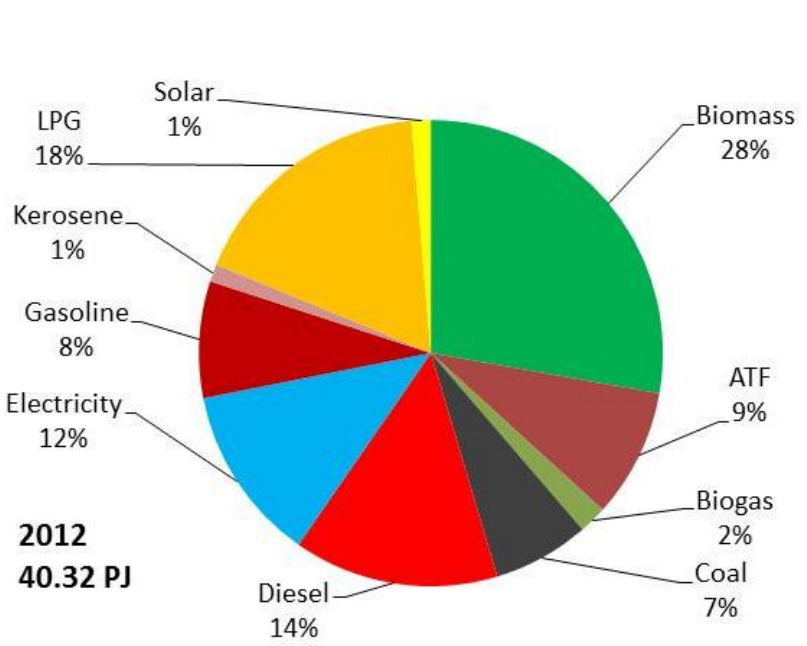


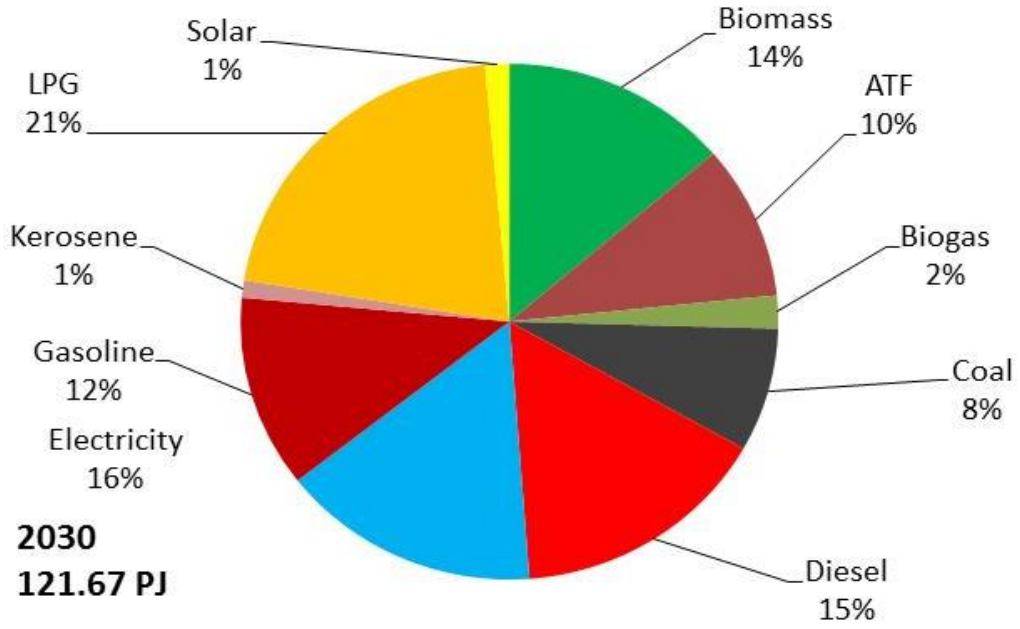




- **Total final energy consumption is estimated to grow at 6.3% (i.e., from 40 PJ in 2012 to 122 PJ in 2030**
  - **faster growth rate of 7.3% in the consumption of imported fossil fuels consisting of petroleum products, LPG and coal**
  - **Electricity demand grows even faster at 7.8%**

Future Energy Mix (2012-2030)





- **Share of imported fossil fuels increase from 57% to 67%**
  - **Share of petroleum products 32% to 38%**
  - **Share of LPG 18% to 21%**
  - **Import Dependency => Energy Supply Security ?**
- **Share of imported Electricity increase from 12% to 16%**
  - **Investment ?**

Energy Security from International Perspective

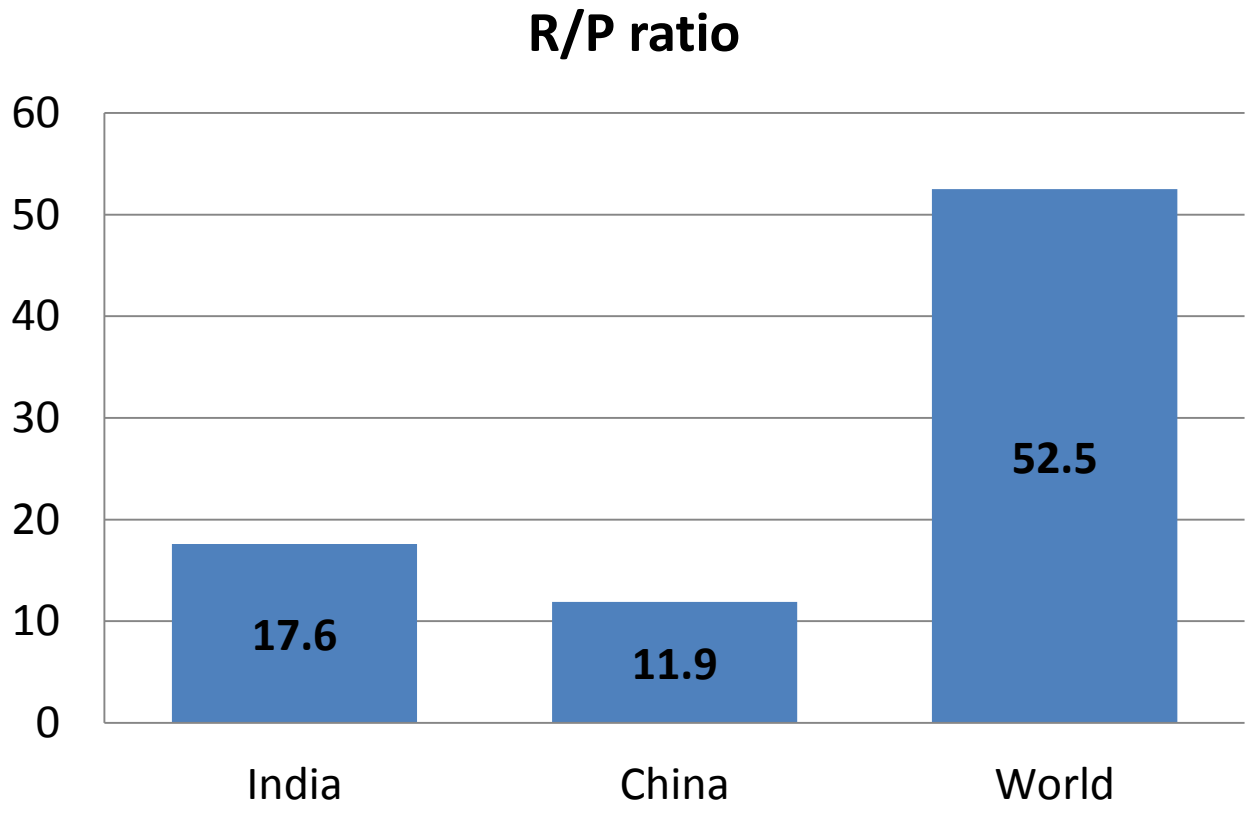
Production and Consumption of Petroleum Oil (2014)

	India	China	World
Consumption, *thousand barrels daily*	**3,846** **(4.2%)**	**11,399** **(12.4%)**	**92,086** **(100%)**
Production, *thousand barrels daily*	**895** **(1.0%)**	**4,246** **(4.8%)**	**88,673** **(100%)**
Import Share, *%*	**76.8%**	**60.7%**	

Source: BP Statistics 2015

- **Our Suppliers Global Share and Import dependency ?**
- **Future Economic Growth ? Energy Demand ? Import Dependency ?**

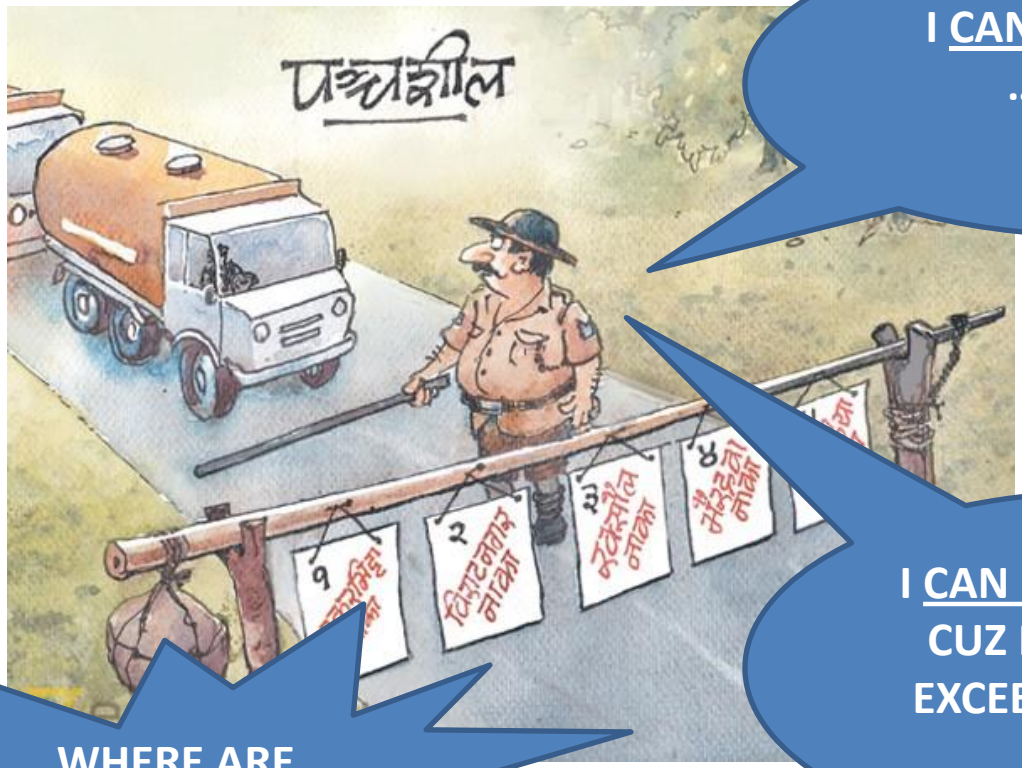
Reserves to Production Ratio of Petroleum Oil (2014)



Source: BP Statistics 2015

- **Our Suppliers Demand after 20-30 years ?**

Energy Supply Security



I CAN GIVE YOU IF

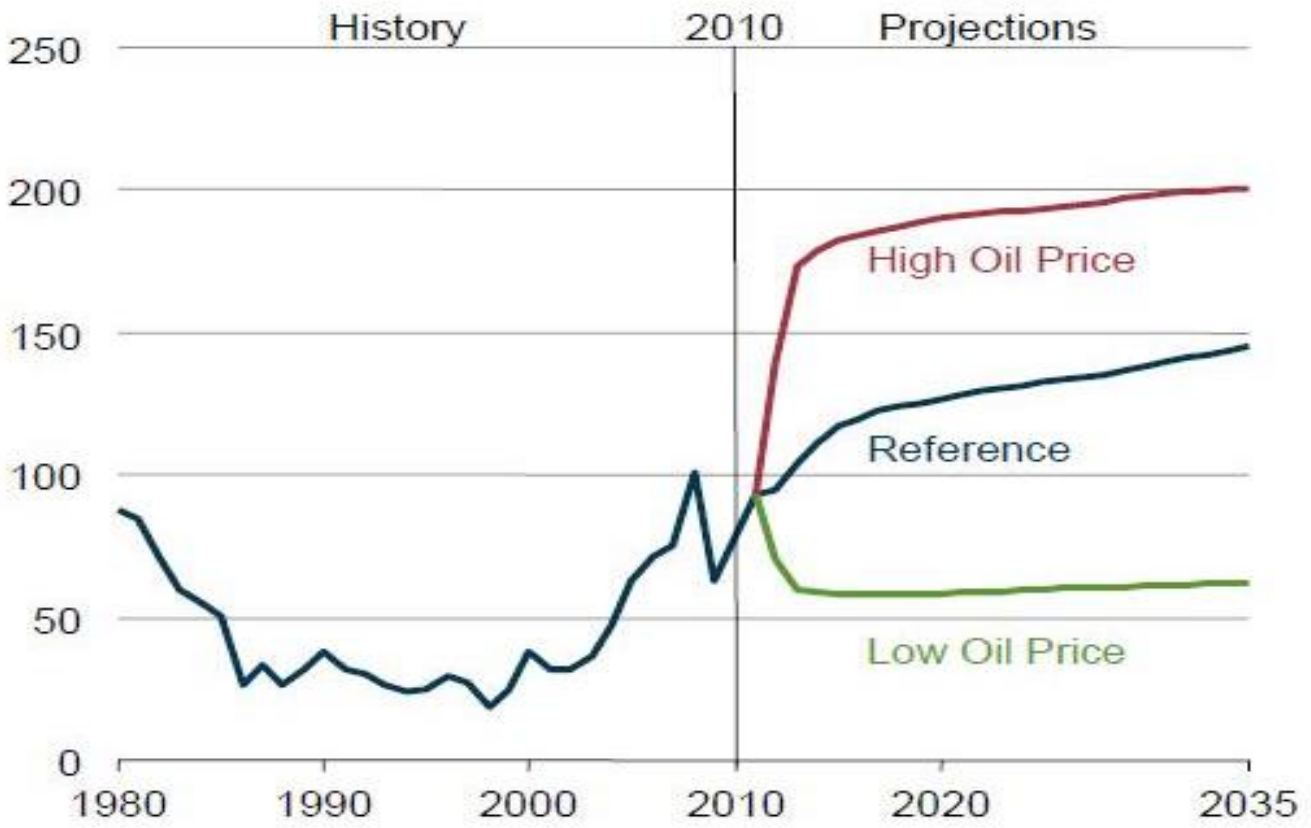
.....

2015

I CAN NOT GIVE YOU CUZ MY DEMAND EXCEED MY SUPPLY 2035

WHERE ARE ALTERNATIVES ????

Average annual world oil prices, 1980-2035 (2010 dollars per barrel)



EIA (2012)

- **Energy Security, Economic Vulnerability ?**

Energy Investment in 2010

Country	Energy Investment % GDP
Bhutan	16%
India	3.4%
Nepal	0.3%

Source: WDI (2012)

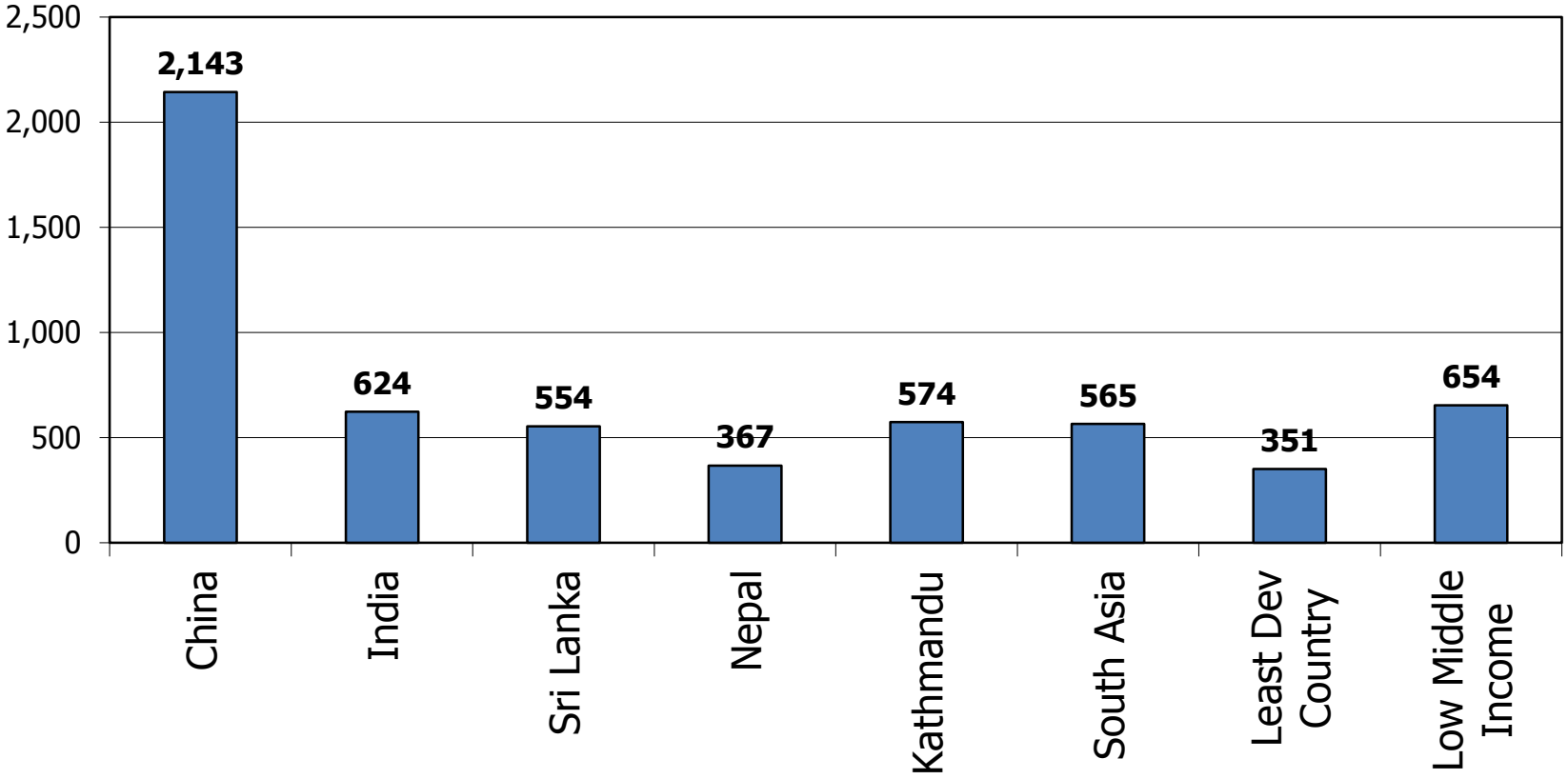
- **Very Low investment in Energy sector**

Change in Environmental Emissions in Kathmandu during 2012-2030 (thousand tons)

Emissions	2012	2015	2020	2030	Ratio 2030/2012
CO_2	1,723.68	2,110.26	3,017.59	6,043.73	3.5
CH_4	2.80	3.26	4.20	4.74	1.7
N_2O	8.93	10.88	15.39	29.48	3.3
Total GHG	**4,456.16**	**5,433.63**	**7,709.65**	**14,945.91**	**3.4**
CO	94.12	112.32	151.88	239.30	2.5
NOx	28.86	33.77	43.99	67.70	2.3
NMVOC	0.11	0.13	0.17	0.26	2.4
PM10	0.89	1.00	1.20	1.52	1.7
SO_2	2.77	3.14	3.85	4.74	1.7

- Local Pollutants Emission => Local and Regional Environment ?
- GHG Emission => Climate Change Effects ?

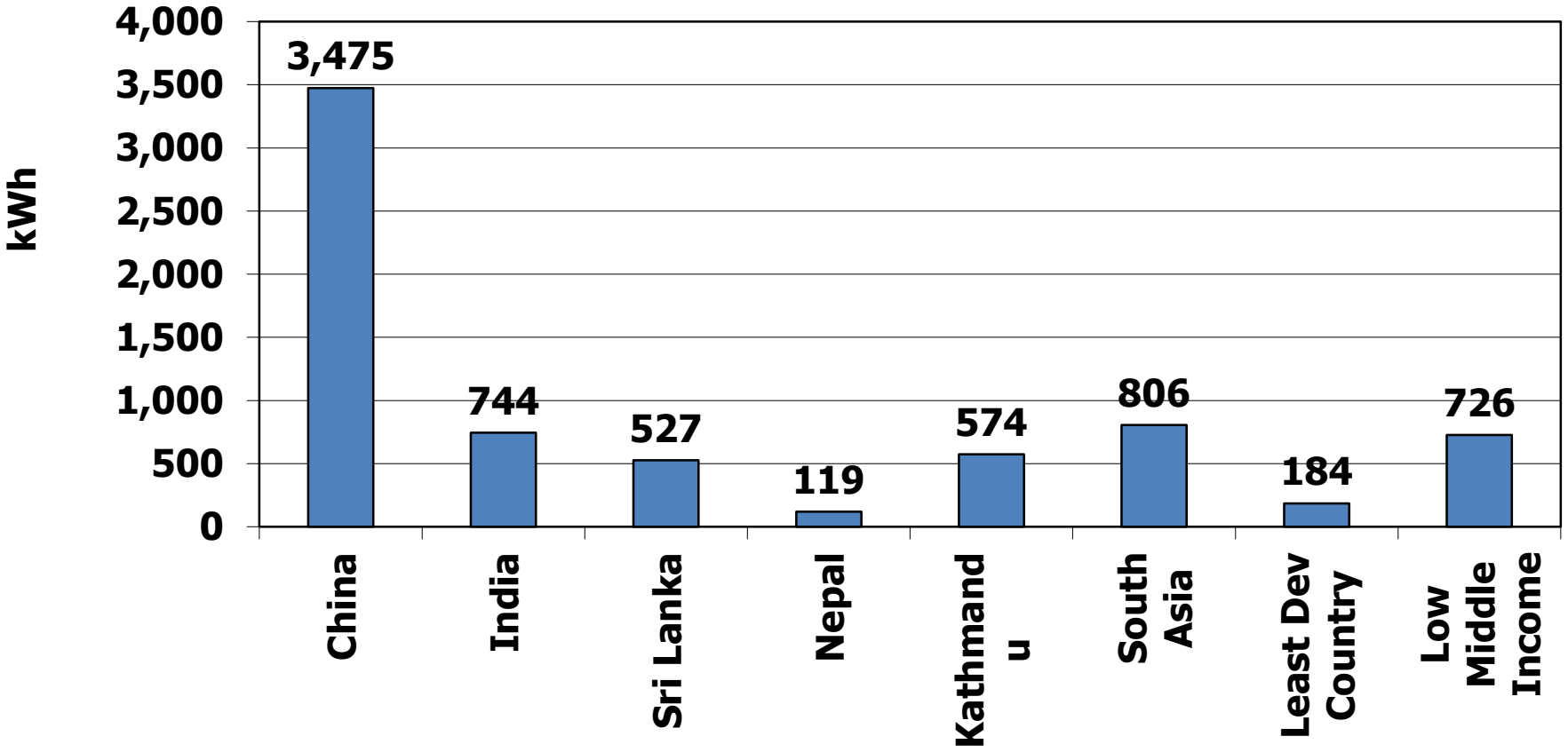
Per Capita Primary Energy Supply in 2010 (kgoe)



Source: World Development Indicator 2015 in The World Bank (2015)

- **Low per capita primary energy supply**

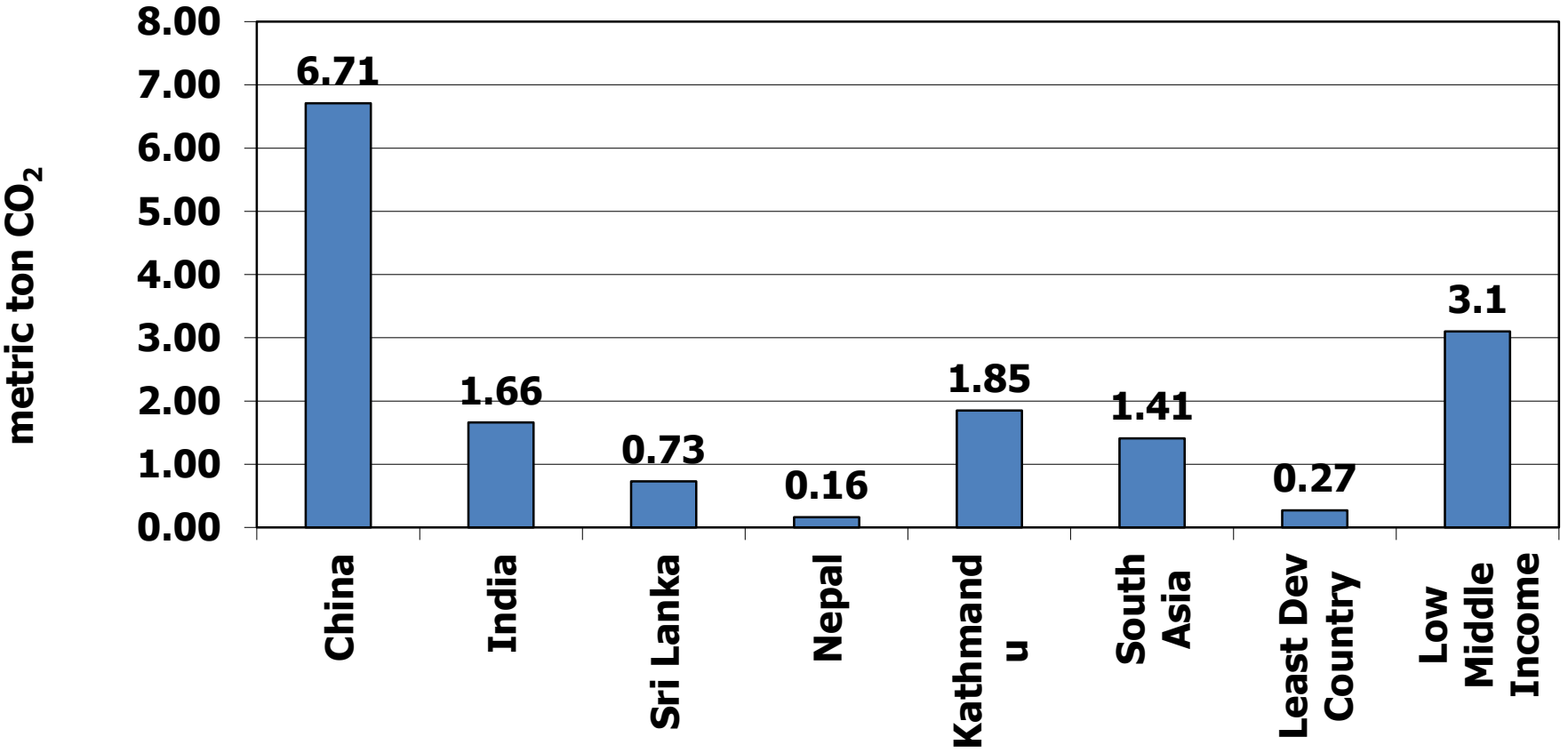
Per Capita Electricity Consumption in 2014



Source: World Development Indicator 2015 in The World Bank (2015)

- **Low per capita electricity consumption**

Per Capita CO_2 Emissions in 2014

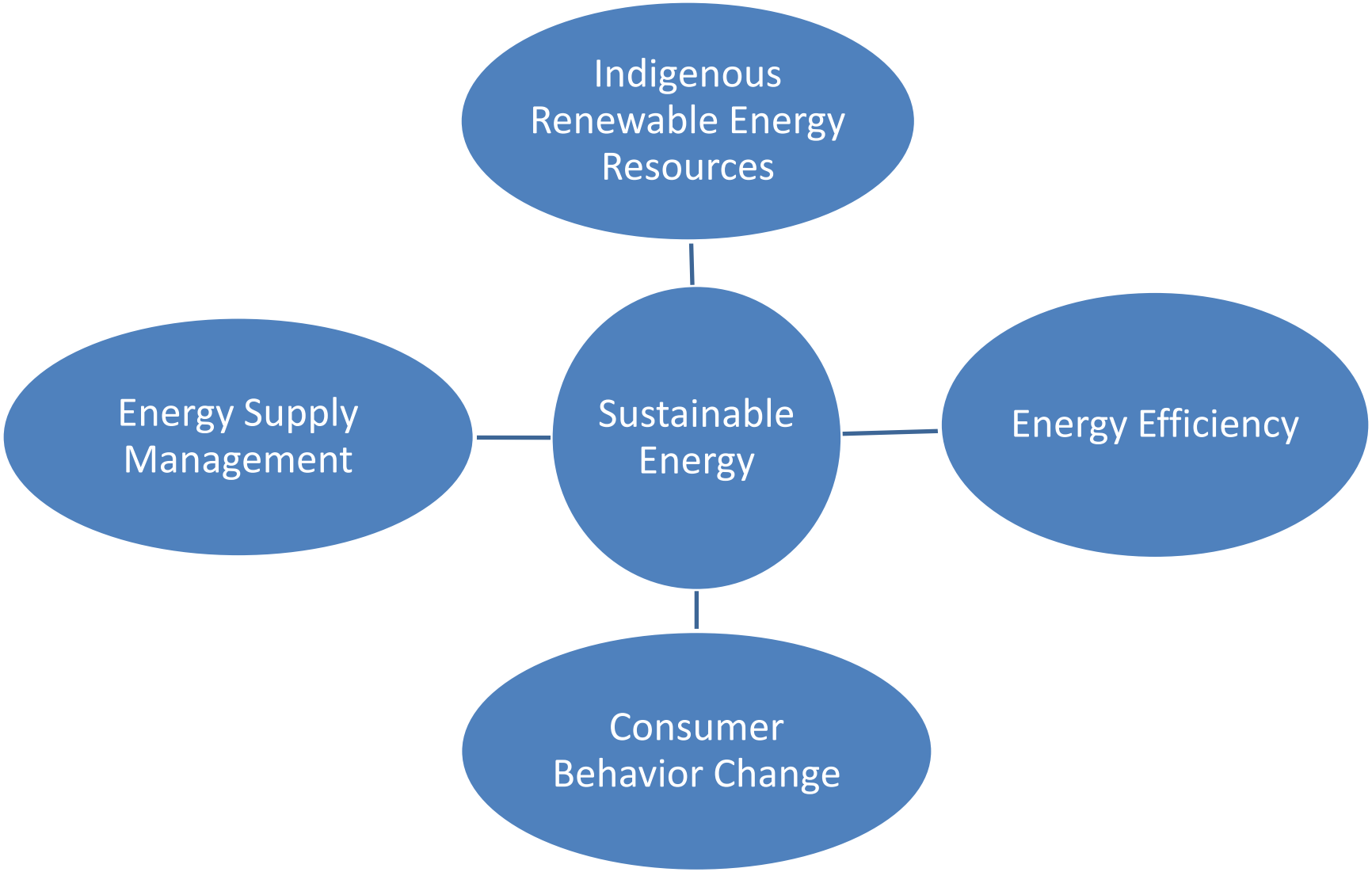


Source: World Development Indicator 2015 in The World Bank (2015)

- **Moderate per capita CO_2 Emissions**

Options for Sustainable Energy Development

Options for Sustainable Energy Development



Implementation of Sustainable Energy Development

Monitoring, Evaluation and Reviewing Mechanism

Capital Investment

Planning

Human Resource

Planning

Material Resource

Planning

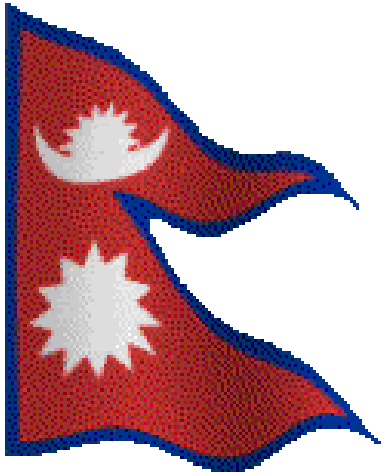
Construction Energy

Integrated Energy Action Plans and Targets

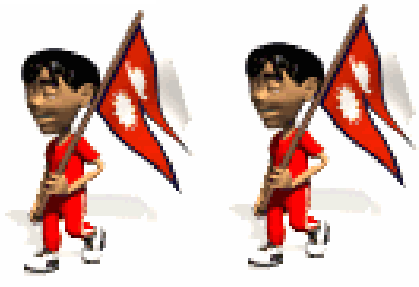
Energy Crisis Management Authority

Legal and Regulatory Mechanisms

Integrated Energy Vision, Strategy and Policy



Thank you



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