

**Economic development in Indian States & Rural People's transition to Modern fuels: A virtuous relationship****Amit K Mishra, Asst Professor****National Power Training Institute, Faridabad****ABSTRACT**

*The Indian economy is growing at a fast pace. However, the growth in Rural economy has not commensurate the growth of overall economy. In many of the Indian States, Rural People are still dependent on traditional fuels like – Fire Wood, Charcoal, Cow dung for meeting of their basic purposes of heating & cooking. The relatively less developed rural belts in several states are still waiting for electrification. In the present Research paper the Author attempts to find out that is it the development polices of high income club states that have paid-off to better electrification levels or better electrification levels have boosted the pace of development. The Research Paper attempts to establish a correlation between the virtuous cycle of economic development & electrification % in different states and vice versa. The Paper concludes that contrary to the general perception that Rural People are not in a position to pay for the cost of service associated with migration to better fuel sources, they are infact more than willing to switch to better sources of energy supplies which improves their quality of life. Thus, there does exist a close correlation between the economic development of rural areas and the transition of Rural People to modern fuel sources.*

**Keywords – Economic development, Rural electrification, Transition, Modern fuel sources, Virtuous relationship**

**I. INTRODUCTION**

The economy of India, a developing country is on a strong growth path. However, significant variations are observed in the regional developments across states. The polarization of States is highly visible on the basis of rich & low income club states. States like Gujarat, Tamilnadu, Maharashtra & Haryana form part of high per-Capita Income club whereas, States like Bihar, Odisha, Madhya Pradesh and Uttar Pradesh are part of the low per-Capita Income club.

Rural economy holds an important aspect to the development of overall economy of any developing country. Almost one-third of our Country's population is living below the poverty line and of which a major chunk are living in rural areas. The usual problems associated with Rural poverty gets further aggravated by the lack of adequate infrastructure facilities like Electricity and transport in the rural areas. As per the Report of Central Electricity Authority, a total of 19766 villages are yet to be electrified in India as on 31.03.2015. There are some States which have made a good progress in Rural electrification while others are still on the way to achieve 100% Rural electrification. An important aspect of prompt achievement of targets for Rural electrification is the overall development of the State. This is based on the premise that enabling conditions for development in a State would boost the purchasing power of rural people and in turn they abandon using traditional fuels and switch to better alternative forms of energy. This eventually gives rise to a virtuous cycle wherein the rise in per capita

income as a consequence of State development would support the electrification and further rise in electrification of villages would augment the development initiatives in the State.

The Research Paper aims to establish a correlation between Per-Capita Income & Village Electrification % in various Indian States. States with high Per-Capita Income like of Maharashtra & Haryana have almost achieved 100% Village electrification whereas on the other hand States with relatively less Per-Capita Income like of Bihar, Uttar Pradesh & Madhya Pradesh are yet to achieve full Electrification. This would also help us in establishing that Rural People are willing to switch to better forms of energy that improves their quality of life provided they are offered a choice.

Rural People in remote villages of Uttar Pradesh, Madhya Pradesh, Odisha and Bihar are still dependent on traditional fuels like wood, charcoal, dung and agricultural residues for their basic purposes like cooking & heating. This is absolutely not by choice. Instead, Studies have shown that in Bangladesh when electricity supplies are available, People are willing to spend a significant portion towards it and are opting for electrification of their villages. In remote belts of Kenya, where electrification chances through Grid are feeble, Rural People are opting for efficient Solar systems.

Thus, contrary to the general belief, Rural People are willing to spend a significant portion of their income towards getting access to electrification provided it enhances their quality of life.

## II. Literature Survey

Prem K. Kalra et al. 2007 in their Paper on “Electrification and Bio-Energy options in Rural India” highlights the role of electricity in Rural development. The Paper emphasizes that Rural electrification holds prominence in India’s economic growth. The Paper focus upon the importance of reliable electricity services that result in overall improvement in the rural infrastructure.

Sandip Deshmukh et al. 2014 in the Paper “Determinants of Household Fuel Choice Behavior in Rural Maharashtra, India” highlights that insufficient income levels of poor people restricts them in switching to better energy sources of supply. It lays stress on raising awareness levels of rural people to promote them to switch to better fuel sources.

Debabrata Das et al. 2012 in the Paper “Income Levels and Transition of Cooking Fuel among Rural Poor in India” observe that economic development in a developing country and switching of rural people to better sources of energy supply go hand-in-hand. They argue that the type of fuels used by rural consumers is mainly governed by socio-economic conditions.

José Goldemberg (Brazil), Amulya K.N. Reddy (India), Kirk R. Smith (United States), and Robert H. Williams in their Paper “Rural energy in developing countries” highlights that the facilitating the introduction of better energy sources is the primary criterion for promoting sustainable development in rural areas.

Dale T. Manning and J. Edward Taylor in their Paper “Migration and fuel use in rural Mexico” have attempted to develop a model that has the potential to explain the impacts of economic development on rural fuel choices and energy use.

Aditya Ramji, et al. 2012 in their Paper titled "Rural energy access and inequalities: An analysis of NSS data from 1999-00 to 2009-10" highlight that Rural people are largely dependent upon traditional fuel sources like fuel-wood, crop residues, and cattle dung for meeting the basic energy needs for cooking and heating purposes. With increasing in rural Population, pressure on traditional natural sources is increasing day-by-day.

### III. Economic development & measurement criterion

Per Capita Income signifies the mean income of the people residing in geography, Country or State and is often used to measure standard of living in a State. Thus, a State with higher Per-Capita Income is assumed to be more developed and economically better placed with that of a State with less Per-Capita Income. The State with high Per-Capita Income signifies its prosperity and the average standard of living of its residents.

**Table 1: Per-Capita Income of Indian States\***

Indian States	Per-Capita Income (FY 2013-14)
Bihar	31229
Assam	46354
Uttar Pradesh	37630
Madhya Pradesh	54030
West Bengal	69413
Rajasthan	65098
Tamilnadu	112664
Maharashtra	114392
Haryana	132089

*\*Economic Survey 2014-15, Government of India*

In the Research Paper, I have captured the Per-Capita Income of Indian States – Bihar, Assam, Uttar Pradesh, Madhya Pradesh, West Bengal, Rajasthan, Tamilnadu, Maharashtra and Haryana. The States have been chosen so as to have a fair mix of Per-Capita Income. States with low Per-Capita Income include Bihar, Uttar Pradesh & Assam. Tamilnadu, Maharashtra & Haryana have high Per-Capita Incomes while Madhya Pradesh, West Bengal & Rajasthan are among the middle ones.

The economic development in Bihar, Assam and Uttar Pradesh is relatively less compared to Maharashtra & Haryana which is also reflected from their Per-Capita Incomes.

#### IV. Transition to Modern fuels

Rural People in remote villages of the less developed States continue to be dependent on traditional fuels like Wood, Charcoal, Cow dung etc for their basic purpose like cooking & heating. The Rural people in most of the relatively less developed States suffer from Energy Poverty, wherein the desired form of energy service is unavailable to the rural people which affects women & children the most. Women spent most of their quality time exploring new and farther places in search of wood and gathering fuel. Burning of cow dung, Charcoal, firewood, Plastic waste which turns to be highly injurious to their health develops respiratory infections due to persistent exposure to smoke. Children either continue to stay home alone or suffer with the mother in the search for fuel.

Transition to modern forms of energy provides the opportunity to women to utilize their time in more productive works and reduce unnecessary toiling from collecting firewood. Mothers are in a better position to offer their time to Children dependent on them for care. Thus, transition to modern fuel sources of energy turns out to be a fundamental towards achieving sustainable development.

**Table 2: Percentage Electrification achieved in Indian States\***

Indian States	% Electrification (As on 31.03.2014)
Bihar	94.8%
Assam	96.1%
Uttar Pradesh	98.9%
Madhya Pradesh	97.8%
West Bengal	100.0%
Rajasthan	98.2%
Tamilnadu	100.0%
Maharashtra	99.9%
Haryana	100.0%

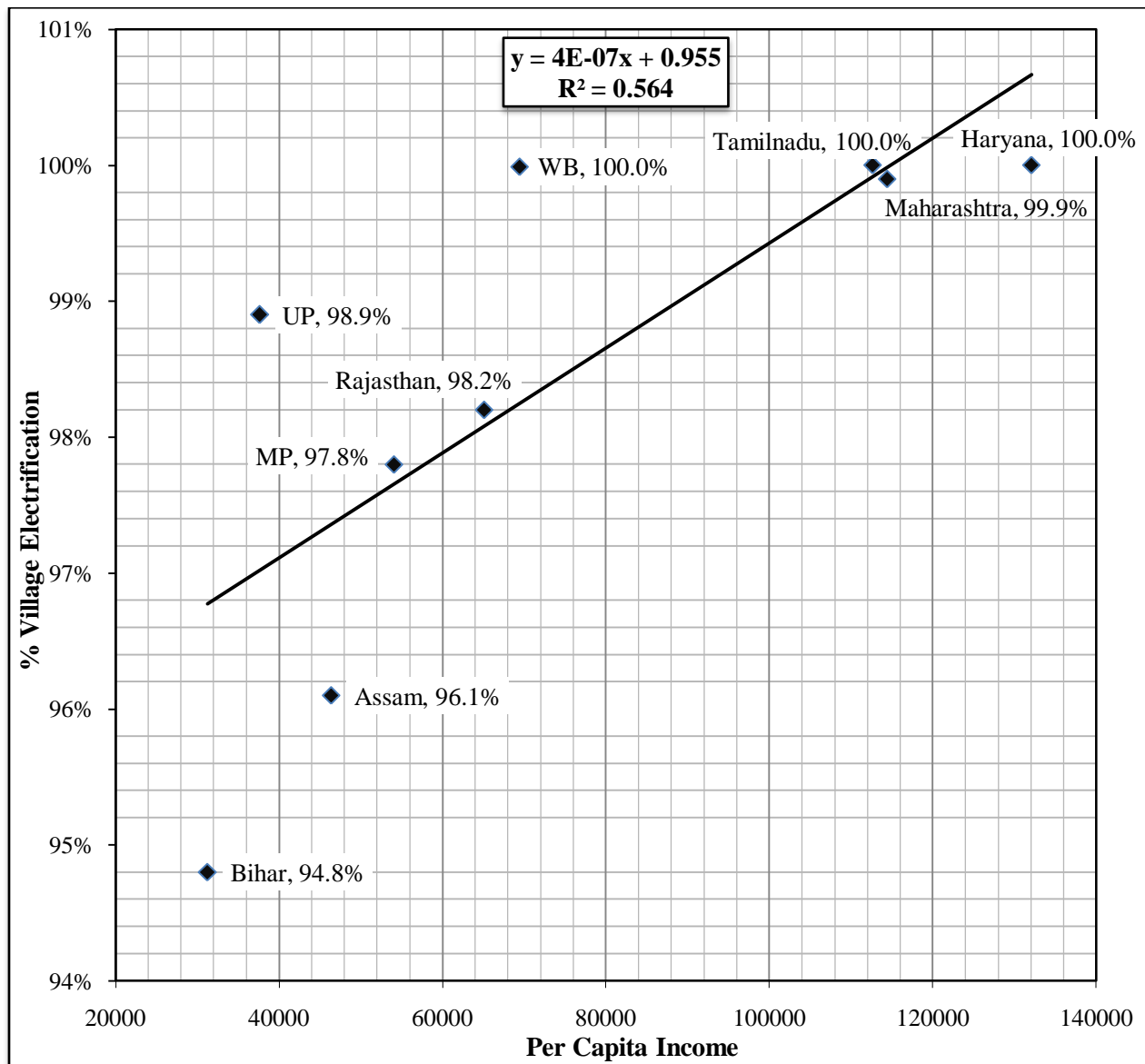
*\*Central Electricity Authority, Government of India*

In this context, I have considered the Village electrification % to measure the transition towards better energy supplies. A Village which has low level of electrification is more likely to be dependent upon traditional fuel sources for basic energy usage.

### V. The Virtuous Correlation – Economic development & Better Fuel sources

From the above, we have seen that States with high Per-Capita Income levels tend to have better economic development. This in turn boosts the purchasing power of people residing in that area. As the income level rises, the awareness about the ill effects of using traditional fuels increases and people tend to shift to better fuel sources. The paying capacity of rural people also helps the institutions & agencies involved in rural electrification programme to invest for electrification in that particular area. Thus, the migration of poor people which initially are dependent on traditional sources to modern fuel sources depends on the enabling conditions of development.

**Graph 1: Per Capita Income & Village Electrification levels of Indian States**



The Graph above shows the relationship between Per-Capita Income & Percentage Village electrification in few of the States referred above. The Linear equation depicting the relationship of Per Capita Income & % village electrification levels is governed by

$$y = 4E-07x + 0.955$$

As the electrification levels in a particular area improves, small commercial & industrial establishments start setting-up, leading to a rise in employment levels of the residents. This also leads to an increase in disposable income of the rural people which tends to invest more for leading a quality life.

## VI. Conclusion

The above relationship as obtained from the graph shows that there exists a correlation between the Per Capita Income of States & Percentage Electrification levels achieved. The analysis proves that a virtuous relationship exists between the States Economic development & switching of Rural people towards better fuel sources.

Thus, States with high per Capita Income levels have better economic development and the rural residents have higher awareness and better purchasing power to pay for better fuel sources. The shifting of Rural people towards better sources of energy supplies and eventually towards electrification leads to an improvement in the quality of life. The Rural Women are in a position to utilize time with their children rather than spending their day in collecting firewood. Man also tends to acquire better skill sets and improve their productivity. This further leads to an improvement in the overall economic development of the concerned village and increase the disposable incomes of rural people. It is a general belief that Rural people usually are not in a position to pay for the cost of service and thus the investors are reluctant to introduce products which offers them a choice to shift to better source of energy supplies. Thus, contrary to the general belief, the Research Paper has concluded that Rural People in more developed States are enjoying the benefits of virtuous cycle associated with economic development and thus have higher village electrification levels. Rural People are more than willing to pay for the cost of service associated with electrification provided it improves upon their quality of life and enables them to be more productive.

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