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Direct Tax Incentives and Plastic Waste-to-Fuel Businesses

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Abstract : About 9% of municipal solid waste in India consists of plastic waste and this waste is land filled, recycled or incinerated, thus releasing a large amount of pollution. The few measures to handle this waste include efforts by entrepreneurs to convert the plastic waste into more usable products such as fuels and road construction material.

Environmental economics has been largely focused on the Pigouvian concept of taxing the polluter and trying to reduce negative externalities. These taxes are essentially in the form of indirect taxes levied on the polluting good at the time of production or sale. To complement the Pigovian tax regimes, there is scope for improving the environmental quality by using other tools such as regulation, incentives for those engaged in reducing negative environmental externalities or in creating positive environmental externalities, using market forces to reduce pollution, etc., albeit in appropriate measures.

This study includes the interview of an entrepreneur engaged in converting plastic waste into fuels in India to see if there exists scope for introduction of a direct tax support policy through the Indian Income Tax Act. The key contribution of this paper is the suggestion of four possible direct tax incentives (DTI) in the Indian context to encourage such businesses.

Key Words: Environmental taxation, plastic waste management, direct tax, positive externalities, Waste-to-fuel.

Direct Tax Incentives and Plastic Waste-to-Fuel Businesses

1 Introduction

This study first tries to understand the importance and benefits of plastic waste management within the larger canvas of municipal waste management. It then looks at the various ways and means currently in practice to tackle environmental issues and focuses on the usage of direct tax incentives (DTI) to encourage businesses engaged in converting plastic waste into fuel. Thereafter, the various provisions in the Indian Income Tax Act are studied to find out if there are adequate measures existing to encourage this activity and attempts to suggest provisions that could help promote these businesses. The key contribution of this paper is the suggestion of four possible DTI in the Indian context to encourage businesses engaged in plastic waste to fuel conversion. It then raises a set of questions to be explored in the future.

This research is structured as follows: Part I of this study looks at the broad picture of waste management in India, and plastic waste management in specific. It identifies plastic waste to fuel conversion as the focus area of this study. Part II tries to explore the different facets of policy instruments to help the environmental cause and tries to make a case for the use of DTI as one of the policy measures to help businesses engaged in plastic waste to fuel conversion. Part III reviews the existing incentives offered by the Income Tax Act, 1961 for encouraging such environment friendly activities. The findings from an interview of an entrepreneur engaged in creating fuel out of plastic waste is presented in part IV along with suggestions as to possible DTI that could be introduced to encourage plastic waste to fuel converters. Part V consists of the concluding remarks.

2 Plastic Waste Management

Solid waste management in India has assumed a critical status not only for environmentalists and governments but also for the common man. This is mainly due to the explosion in the amounts of waste generated each day in urban and rural centres, which is also partly due to the population growth, migration of population from rural to urban areas, income levels and changes in lifestyle. It is estimated that municipal solid

waste (MSW) generated in India is about 43 million tons per annum or 120,000 tons per day (TPD). This figure is expected to reach 160.5 million tons per annum or 440,000 TPD by 2041. The growth in municipal solid waste is expected to go hand in hand with the increase in the GDP (CBCP, 2008). The composition of municipal solid waste in India is as shown in Table 1.

Table 1: Composition of Municipal Solid Waste

Waste category	**% of total waste**
Paper	8.13
Plastic	9.22
Metal	0.5
Glass	1.01
Rags	4.49
Inerts	25.16
Compostable material	47.43
Others	4.06

(Source: Zhu et al, 2008)

As can be seen from Table 1, about 9 % of the solid waste generated is plastic and when seen in the context of total waste of 120,000 tons per day, the amount of plastic waste generated amounts to 10,000 tons per day.

Almost 90% of the Municipal solid waste management (MSWM) budget is spent on waste collection and transport activities. Disposal of waste, a long standing problem for municipal corporations, is mainly done by dumping the waste in low lying areas outside the cities (landfills). This waste needs to be compacted and leveled and finally the site needs to be covered with earth, which rarely happens (Sharholy et al, 2007). As a result, the waste disposal activities are quite unscientific and potentially harmful to residents around the dumping area (Gupta et al, 1998). In fact, improper handling of the gases released during the bio degradation process in these sites can even contribute to the

increase in greenhouse gases, thus hastening the global warming process. If left to itself, the time taken for the waste to degrade is shown in Table 2.

Table 2: Time taken for waste material to degrade

Nature of waste	**Time taken to degrade**
Organic waste (kitchen waste)	1-2 weeks
Paper	10-30 days
Cotton cloth	2-5 months
Tin, aluminum and other such metals	100-500 years
Plastic	One million years

(Source: NSWAI website)

Plastic is among the components that needs the maximum time to degrade. Plastic waste needs more scientific disposal techniques as it is not capable of bio degrading naturally and hence would remain in its original form for a large number of years. Plastic waste disposal if not managed properly, can lead to the following forms of pollution, among others:

- This plastic waste, when burnt with other garbage, releases harmful and toxic gases.
- It clogs up drains, landfills and interferes with other waste processing facilities
- Recycling these plastics in a haphazard manner causes further pollution
- It leads to spoiling the aesthetics of the area (CPCB, 2008).

The problem with plastic is less of its creation and use and more of its disposal. This is evident from the uses and benefits of plastic which is strong, highly durable, economically viable and easier to process. To exemplify, a paper cup typically consumes about 12 times more steam, 36 times more electricity and twice the cooling water required for a plastic foam cup (Rebeiz and Craft, 1995). Replacing plastic with paper is also fraught with danger as it would put more pressure on the existing forest wealth, which is already depleting alarmingly.

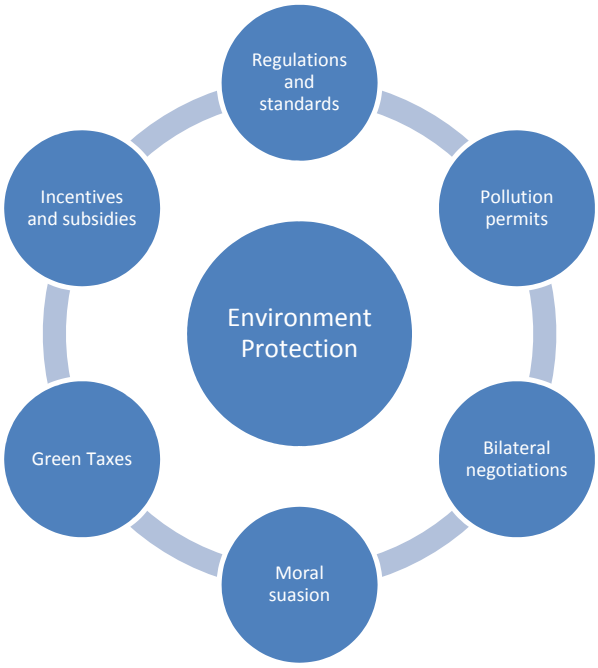
Plastic waste needs to be recycled in an environmentally sound manner, as opposed to the unscientific landfilling activities and open burning of plastic waste. Some of the environment friendly recycling measures suggested by the Central Pollution Control Board (CPCB) of India are quaternary level techniques where the plastic waste is burnt or incinerated in a scientific manner and its energy content is retrieved. It suggests two methods of disposal at this level- by using as an input in polymer coated bitumen roads and by depolymerizing the waste plastic into fuel. These methods are currently in the experimentation stage and are used in pilot projects in certain places in the country (CBCP, 2008).

Having identified plastic waste management as the problem in this study, we now look at the various policy measures in use to tackle such problems. The intention is to identify the best measure or combination of measures to take care of the plastic waste disposal by encouraging plastic waste to fuel conversion businesses.

3 Tax Incentives as Policy Instruments

We now see the application of various tools to the general environmental problems and try to identify the appropriate one for the selected area of plastic waste to fuel conversion. Traditionally, the approach to environmental protection through policy has been through market centric measures such as pollution permits or through command and control methods such as regulations and standards. Frequently governments also intervene by imposing green taxes on polluters and using these collections to provide a benefit to certain sections of society by reducing taxes on salaries (Kolstad, 2000; Ligthart, 1998). The different policy instruments that are used to protect the environment are shown in Figure 1.

Figure 1: Policy instruments used for environment protection



(Source: Ligthart, 1998)

While these instruments need to be used in tandem, this study looks at the role of taxation which normally includes levying a charge on incomes and activities (green taxes), but can also be used to provide DTI to encourage certain behavior. The different policy measures as shown in Figure 1 are outlined as under:

- Regulations and Standards: These command and control measures include bans and restrictions. These could be counterproductive due to their compulsory and restrictive nature. With direct regulation, a polluting company has no incentive to pollute lesser than the permissible limit. Informational cost being high can make the command and control system more expensive and the polluter also has an incentive to misreport information. These also significantly reduce the incentive to innovate and find other ways of reducing pollution (Kolstad, 2000).
- Pollution permits: These are part of a set of economic instruments to help control pollution and allow the polluter to buy and sell the right to pollute.

However, the challenge with pollution permits is to achieve environmental transformation without being too complex and impractical. This instrument also encounters political roadblocks as the level of the fee needs to be changed over time, which is usually resisted by industry. (Kolstad, 2000)

- Moral Suasion and Bilateral Negotiations: Moral pressure by governments or society on industry has increased of late leading to some change in the polluting patterns. However, this method is largely voluntary and depends to a great extent on the individual polluter. The Coase theorem states that the initial distribution of polluting rights does not matter and market mechanism would ultimately lead to a pareto optimal condition. It is seen that bilateral negotiations are motivated by this principle. However, the theorem assumes that among other things, there is perfect information, the legal system for enforcing agreements is costless and there are no transaction costs (Kolstad, 2000). Owing to these, the negotiations are difficult to conclude or implement
- Green Taxes: The primary role of any taxation system is to raise revenue to fund the general functions of government. However, an important policy objective is also to enhance overall economic well being, while promoting fairness, and continuing to raise sufficient revenue at the same time. Taxes can be raised directly as well as indirectly. Indirect taxes are taxes such as VAT, Central Excise, etc. which are levied on production or production related activity.

Pigou (1920) stated that negative externalities caused by pollution would be internalized by the market if polluters paid a tax equal to the marginal social cost of polluting emissions. The focus was entirely on the principle 'the polluter pays'. Worldwide, "green taxes" as they are known, are mainly taxes of the indirect kind, occurring at the production and/or sales stage. Examples would be taxes on production and sale of petroleum products, and plastic products. One of the advantages of the green tax theory is the 'double dividend' hypothesis, which implies that the tax policies can be revenue neutral in form by taxing polluting activities and using the increased revenues to offset a reduction in taxes on salaries. This would pay double dividends in the form of raising more revenue for the government (green dividend) and increase environmental quality (efficiency dividend) (Goulder, 1995).

While governments can collect taxes from the polluting producers, these taxes still need to be ploughed back into the economy in a beneficial way. If the collected taxes are channelized back by way of reduced salary or wage taxes, there would be a compensation of sorts for the consumer, for having paid a higher green tax (Schob, 1996; Sandmo, 1975). This move of reducing salary taxes would put more money into the hands of the consumer, thus encouraging the search for better and more environmental friendly alternatives. However, green taxes have their shortcomings.

In a developing country like India, less than 3% of the population pay income tax and a portion of these taxpayers are salaried tax payers, who are not necessarily the poorest level of the population. Hence, it is possible that the redistribution of income could reach a different set of people than that which suffer the brunt of the green taxes. Further, like all indirect taxes, Pigouvian taxes, as these green taxes are also known, can also encourage smuggling and black market activities, especially if there are large differences in product prices with those in nearby areas (Okoye and Akenbor, 2010). Thirdly, these taxes would be ultimately borne by the consumer, irrespective of the level of income. As a result, the poor tend to pay more taxes as a percentage of their total income. If lower income groups spend a greater portion of their income on products with external social costs, such as electricity, tax is regressive. Hence the green tax approach needs to be balanced with the positive effect of DTI.

- Incentives and Subsidies: While the approach to green taxes has mostly been the 'stick' one, the 'carrot' part should not be ignored. Incentives such as subsidy schemes for reducing emissions, soft loans to buy capital equipment, etc. could prove equally effective (Ligthart, 1998). These benefits could also be in the form of specific deductions, which directly relate to conservationist activities, as opposed to general deductions, which could be taken advantage of by all industries (Douglas, 2002). Traditionally, tax incentives have mostly been to encourage supply, as mentioned above. They could do well to encourage demand for environment friendly machines, products, energy, etc. (Mann and Hymel, 2006). For example, a household investing in solar water heaters could well be given rebates in their regular electricity bills, as is being done in some parts of India. A large number of government schemes in India are driven by way of incentivizing the populace to invest in them and get a

tax rebate or benefit. For example, businesses are encouraged to buy new machinery instead of old ones and drive the indigenous machine production industry. They are offered additional depreciation under section 32 of the Income Tax Act to compensate them for their decision to buy new machinery (I.T. Act, 1961).

Thus, incentives in general can play an important role in reducing environmental pollution along with other measures (Ligthart, 1998; Wilson 1996). We discuss the role of incentives in the form of DTI here. Combining a green tax policy with DTI would mean that the taxes collected could be used to help provide an alternative to the polluting product, or at least reducing the polluting effect of the polluting product by helping recycling it or converting it into another usable product (Gago and Labandiera, 2000).

The revenues collected through green taxes on plastic products could be channelized to provide benefits to manufacturers engaged in the area of converting this plastic into reusable products. For example, there is a technology that is being worked out to convert plastic waste into fuel, gas and ash, without polluting the environment as much as regular incineration would. This action, which would help develop positive externalities, could be supported through DTI.

Next, we examine the provisions in the Indian Income Tax Act pertaining to DTI for environmental protection in general.

4 The Indian Income Tax Scenario

We have discussed in the preceding sections that DTI can play a role in helping reduce pollution. The Income tax provisions in India aimed at creating positive externalities are as follows:

- If specified air pollution, water pollution control equipment, solid waste control equipment or recycling & resource recovery systems are purchased, 100% depreciation under section 32 of the Income Tax Act, 1961, is allowed to the taxpayer. This enhanced depreciation helps the entrepreneur to reduce taxable profits in the first year and if this depreciation is more than the profits, it can be carried forward to the coming years to be set off against profits till the entire depreciation is exhausted.

- Renewable energy devices including solar power/ wind power based equipment and other related equipment are allowed 80% deduction under section 32 of the Income Tax Act, 1961. A similar benefit as in the above case is available to the entrepreneur in respect of the set off against profits.
- It a business is engaged in collecting and processing or treatment of biodegradable waste and converting into power, bio fertilizers, bio pesticides, etc., 100% of the profits from such activities are deductible from tax under section 80JJA of the Income tax Act 1961, for a period of five years from the year in which the activity commences.

However, there are no DTI for businesses specifically engaged in plastic or non biodegradable waste management. Nor is there any deduction for research and development in this area. Section 35 of the I.T. Act allows for a weighted average deduction of revenue as well as capital expenses on scientific research ranging from 100% to 200% of the expenses incurred (Bakker, 2009; Income Tax Act, 1961). A specific deduction for research and development in the area of plastic waste to fuel technology could also help alleviate concerns regarding the reliability of the technology. Hence, there appears to be scope for introduction of such provisions. This study tries to suggest possible DTI to help businesses engaged in plastic waste to fuel conversion. Towards this, we conducted a depth interview with an entrepreneur engaged in converting plastic waste to fuel. We also gathered pertinent data from multiple internet sites such as the entrepreneur's website and moneycontrol.com. In the next section, we describe the details of this interview.

5 Depth Interview with Entrepreneur

The entrepreneur is engaged in receiving plastic waste from the City Municipal Corporation and converting it into fuel which has multiple uses, including as a generator fuel. We asked the entrepreneur about:

- the reasons for starting the unit
- the operations and processes in the unit,
- problems being faced in the operations,
- the various benefits he receives from the state government and central government in running the business and

- his expansion plans and roadblocks to the expansion plans.

The interview lasted about 85 minutes and the transcript ran into close to 7500 words/ 12 pages. The analysis of the data has been done by classifying the information at different stages into key areas of importance.

The entrepreneur mentioned that while he was a businessman, it was his concern for the environment and especially that of pollution through plastic that made him think on these lines. According to him, almost every large city in India generates about 400-450 tons of solid waste per day of which, 8-10% is plastic waste. From every litre of crude oil extracted, about 8-10% becomes plastic material. There is nothing to replace plastics as a packaging material today as it is considered the most versatile among packaging material. Banning plastic in the form of carry bags may not be the solution to the problem since plastic is used in many other ways, for example- in mobile phones, computers, pens, bread covers, shampoo sachets, and so on. With the changing lifestyle of the people and with nuclear families, packaging material is becoming smaller and smaller.

The company manufactures aromatic chemicals and uses a large volume of petroleum products in the process. The technology of converting plastic waste to fuel has been researched and provided by Harita NTI Ltd., a TVS group company. So far, no plant in India is running on a commercial basis though there are small pilot plants taking 10-15kg of plastic and converting into oil. This entrepreneur's plant is a 24x7, continuously operating plant where post consumer waste plastic is processed. He has been engaged in fractionation of petroleum products for a long time. The company is in existence since a decade now, but has recently picked up activity due to the change in technology. It is listed on the Mumbai Stock Exchange as well as National Stock Exchange of India. The company is experiencing losses since the last three years.

This entrepreneur uses a technology called plasma pyrolysis which converts the waste plastic into a different form of hydrocarbon under very high temperature and in the presence of a catalyst, leading to very little pollution and converting the waste into fuel and carbon, which also has multiple uses. It uses plastic waste which doesn't have any further recyclable value and saves the cost of putting it into a landfill site. The input does not need any sorting or cleaning and it could be a mixture of any plastic-HDPE, LDPE, PPE, multilayered, etc. Once that plastic waste goes into the reactor, it is turned into a

molten state and in the presence of a catalyst; it cracks into vapor state and a hydrocarbon mixture right from C1 to C34. Some of these gases are C1 to C4 gases (propane, butane, methane, etc.) which are difficult and expensive to condense. These gases are piped back to the burner of the plant by which it becomes energy efficient and self sufficient to some extent. Since the plastic waste has very little Sulphur, the oil that comes out also is Sulphur free to a great extent and that makes the oil environment friendly when used. The conversion rate of plastic waste to fuel is almost 0.8, i.e. 1 kg of plastic waste generates about 1 litre of fuel. Currently, the oil is being sold to MNCs for use in their furnaces. It also has the potential of being sold to small paint and ink manufacturers, among other consumers. The future plan is to fractionate the hydrocarbon mixture to obtain the variants of petroleum such as petrol, diesel, kerosene, etc. thus adding more value to the chain. He also plans to spread out to a larger number of cities where plastic waste is available in abundance.

The chain of operations as described by the entrepreneur is as follows. First, waste is generated in multiple ways- for example when consumer purchases are made waste is created in the household. From the household, it goes into the dustbin and from there, into the corporation dustbin. Then the municipal corporation collects this garbage on a day to day basis and transfers it to a transfer station at a cost. Every city has got small pockets of garbage collection centres known as transfer stations, which are run by the municipal corporations. From these transfer stations, it goes into the landfill site.

The corporation engages private parties who charge a tipping fee per ton, to pick up the garbage from the household dustbins and bring it to the transfer stations. From the transfer station, the garbage is dumped in the landfill sites for which action there is another tipping fee that is paid. Further, these landfill sites are government demarcated land, some of which were, earlier, natural water bodies, ponds and lakes. Nowadays, the corporations are setting up separate landfill sites. These landfill sites are dumped with a mixture of bio degradable and non degradable waste. In some cases, waste management companies treat this garbage and what they get in the process is compost, some glass, metal, and the like. But the major component of the non bio degradable portion of this solid municipal waste is plastic because glass and metal waste already has a market created for itself in the sense that much of these types of waste are segregated and recycled and hence do not enter the landfill. What comes to the landfill sites in the non degradable category is mainly plastic which is about 8-10% of the total waste. Examples

of this plastic waste are shampoo sachets, laminates, consumer product packaging, multi layered packaging material, etc. These are found more in abundance since they are cheap and also serve the purpose of storing the goods efficiently and hence commonly used.

This industry works on small volumes as of now. The plants are of 10 tons and 20 tons capacity and can put up in different locations within a radius of 100 kms. If there are two plants of 10 tons each running within a radius of 100 kms it is easier to source the raw material rather than transporting it to a common facility. This is because transporting plastic is difficult due the fact that it occupies more space but does not weigh so much and hence the transportation cost increases. So there is a demand across all locations in the city for this waste.

6 Findings and Suggestions

In the opinion of the entrepreneur, there are some roadblocks he encounters while operating the unit or planning an expansion. While he has mentioned them in the context of his work and environment, some of these problems can be potentially tackled with DTI, which are mentioned below:

- Problem: Most municipal corporations are yet to approve of this method of waste management since some authorities still have reservations due to the non reliability of the technology. There are fears of a small amount of gas leakage.

  Suggestion: While this technology is still in the process of becoming completely safe, there is need for increased research and development activity before it can be made universally acceptable. More research activities can happen if corporate spend more on their R&D activities in this area. To encourage this type of spending, the Indian Income Tax Act could have sections that allow weighted deductions for R&D spending specifically for the area of plastic waste to fuel technology development. Similar general provisions do exist in the Act (eg. Section 35) for certain sectors such as Education and Scientific Research and Development. However, a separate and specific provision is required to make the provision effective and encourage innovation in the area of plastic waste to fuel conversion.

- Problem: The final product is sold in the open market as a petroleum product which attracts the usual levies and taxes(excise, sales tax, VAT, etc.) at a high rate. There is

no separate tax treatment for this product to exempt it from duties and levies, which could help make the business more profitable and attractive for other entrepreneurs.

Suggestion: While DTI may not be able to help in reducing the impact of indirect taxes, income tax exemption to the extent of 100% of profits for a period of 5 years could be introduced on the lines of section 80JJA currently in operation for units engaged in processing bio degradable waste.

- Problem: There is inadequate participation from large businesses that are mainly responsible for waste generation. If their CSR activities and funds could be diverted to this business and used to help the condition of rag pickers and the like, it could benefit entrepreneurship aimed at waste reduction.

  Suggestion: DTI could be given for related factors to players other than the entrepreneur himself. For example, corporate granting their CSR funds towards this activity could also get a weighted average deduction. This corresponds to the current section 35AC of the Income Tax Act which allows for deduction of contributions to eligible schemes for poverty reduction and social upliftment. These funds could be utilized for payments to rag pickers which would not only improve their condition but also reduce the cost to the entrepreneur.

- Problem: Scaling is hampered by high cost of machinery.

  Suggestion: Cost of machines of is a huge investment for which the DTI could be aimed at the capital investment, on the lines of section 35AD which gives a deduction for capital investment in certain specified businesses. In fact, in businesses such as operating a cold chain facility or warehouse facility for agricultural produce, the deduction is allowed at 150% of the investment. This could be replicated for capital investment in the plastic waste to fuel business. The financial cost could further be alleviated by having weighted average deductions for interest paid on loans taken for buying the machinery for this industry.

To summarize, we recommend DTI for businesses engaged in plastic waste to fuel conversion in terms of these four specific aspects:

1. Weighted average deduction of expenses incurred for research and development in the area of plastic waste to fuel conversion. The deduction needs to be at least 150% of the expenses incurred.
2. 100% deduction of profits for a period of at least 5 years for businesses engaged in plastic waste to fuel conversion.
3. Deductions for businesses not in this area but who use their funds (CSR or otherwise) to finance certain activities of these plastic waste to fuel businesses such as payments to rag pickers who supply raw material, upliftment of workers in this area, etc.
4. Weighted average deduction for investment in machinery by these businesses and for interest on loans taken by these businesses for incurring capital expenses.

These DTI related suggestions would form part of an overall policy aimed at encouraging businesses engaged in using plastic waste in more productive ways without damaging the environment. These steps can lead to reduced dependence on imported fuel which in turn could have strategic implications.

7 Concluding Remarks

The need for plastic waste management in India is quite evident from the data available from government sites responsible for monitoring the same (CPCB, 2012). A glance at the measures to tackle this problem shows that they are either short term and costly in nature, like dumping this waste in landfill sites, or reactionary in nature such as banning the use of plastic itself, with less consideration to the availability of suitable material to replace it. As discussed earlier, the problem area may not be the use but simply the disposal of plastic. Among other measures to reach to a viable solution till such time that adequate replacement is found, DTI can play a vital role in encouraging new businesses to use this abundant plastic waste from municipal corporation dumpsites and convert it into fuel.

An advantage of DTI in this area is the reduced expenditure for municipal corporations in terms of lesser landfill sites. These savings can be used for more socially productive purposes such as creation of amusement areas, gardens, playgrounds, etc. The municipal corporations also benefit from the reduced cost of transporting the waste from

dumpsites to landfills if it allows the plastic converter to operate from the dumpsite and receive the waste thereat. From a social viewpoint, since there is a created demand for the plastic waste, households might even be tempted to not throw the waste into garbage bins but instead collect it and take it to the nearest collection centre as is the case in India with certain categories of waste such as newspapers, metal and glass waste. This would go a long way in creating awareness in the minds of the consumers. At a macro level, encouraging this business would go some way in reducing dependence on imported fuel since the volumes being discussed are 10,000 tons of plastic waste per day, which could potentially yield about 10 million liters of fuel per day, and that too, at a much reduced cost.

The DTI aspects suggested above need to be the part of a larger policy that encompass issues such as soft loans for this purpose, allowing businesses to set up factories on the dumping sites and encouraging research in this area. There is little literature available on the topic DTI for plastic waste to fuel converters. Hence this is an exploratory study made with the help of a depth interview with one such entrepreneur in India to help arrive at a workable set of provisions that could be considered given the current framework of DTI in India. A detailed content analysis of the interview has not been done and will be taken up in the future. This study attempts to contribute to the debate on the broader issue by bringing in the lesser discussed angle of the role of DTI to help solve the problem of plastic waste management. It aims at encouraging further studies to firm up the role of DTI as part of the broad policy package for this purpose.

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Experience	• Joined TAPMI as an Associate Professor in October 2007 • Worked with the Income Tax Department, Ahmedabad from May 1993 to Sep 2007- resigned as Income Tax Officer/Additional Assistant Director. • Experience in training and as visiting faculty in various Institutions prior to joining TAPMI.
Research interests	Taxation and environmental issues
Publication	• Shah, R. (2010), "Green Taxes", *ICWAI Research Bulletin, Vol. XXXIV, 2010, pp32-34.*
Paper Presentations	• "Income tax incentives and Plastic waste-to-energy converters", *Yale-Great Lakes 7th International Research Conference, 2012* • "Examining the role of Direct Taxes in Non Bio-degradable Waste Management in India", *11th Global Conference on Environmental Taxation, Bangkok* • "Direct Taxes and Environmental Issues", *International Conference on Environmental Issues in Emerging and Advanced Economies: Canada, India, Ahmedabad, 2009*
TAPMI Executive Education Programmes (EEP) / Training Programmes	• Resource person for 'Workshop on Finance' for Heads of Institutions of Manipal University. • Coordinated EEP on Effectiveness through Accounting • Coordinated EEP on Costing and Pricing strategies • Coordinated EEP on Direct Taxes and Profit Planning • Resource person for the orientation programme for C.A. students conducted by the ICAI, Udupi Chapter. • Resource person for 2 day training for Oracle employees in basics of Finance and Marketing.
Seminars/conferences/ trainings	• Attended the Participant-Centered Learning Seminar organized by HBS and CSRI at IIM (B) in January, 2013 • Co-chair of the International Conference on Accounting and Finance (ICAF 2011) held at TAPMI, Manipal from March 10 to 12, 2011. • Attended the seminar on "GST and Beyond" organized by CII-IL at Chennai in February 2010 • Attended the case writing and teaching workshop conducted by ECCH at Vishakhapatnam in February 2009. • Coordinated 'Kshamta', the colloquium on Microfinance and livelihoods, held at TAPMI on the 19th of January 2008. • Attended the Vth Advanced Reflective Training on Microfinance and Micro Insurance at the Tata-Dhan Academy, Madurai from 6-14 December 2007.