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Name of the ENVIS Centre



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### Area of Activity

**Capacity Enhancement Programme  
on Management of Plastics, Polymer  
Waste and Bio-Polymers, Impact of  
Plastics on Eco-System**

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President - GC



### Other Office Bearers



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*Member - EC*



**Mr. P. P. Kharas**

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Discovery and invention of various types of plastics materials have changed the way of our lives across the world in many ways. From increasing the production of various types of agricultural products and storing the produce in safe packaging for a long time, saving of millions of human lives by delivering life saving medicines and devices, distributing electricity safely to the billions of people across the world, helping the people of the world in connecting to each other by providing an efficient communication network, manufacturing important parts of automobiles and avionics for making those lighter, still safer and saving in fuel consumption, safe packaging of foodstuffs, pharmaceuticals and drinking water as well as various types of electronics and products and manufacturing various types of household and industrial products – plastics add value to almost every activities of our lives.

While plastics provided all material supports for providing these benefits to the humankind, it also helped reducing the adverse impacts on the earth's environment by way of reducing the energy consumption, reducing the emissions of Volatile Organic Compounds (VOC's) and Hazardous Atmospheric Pollutions (HAP's) to air and water, reducing Green House Gas effects on the Earth by way of reduced CO<sub>2</sub>e emissions during its production, transportation and usage as verified by various Life Cycle Impact Analysis Studies (LCIA) by accredited Institutions across the world.

However, the very success of plastics has created its own enemies too, said Mr. K. G. Ramanathan, President – ICPE, during his invited speech during the 7th International Symposium on Feedstock Recycling held in New Delhi during 23rd – 26th October, 2013. Handling and disposal of plastics waste and litter have become a major problem for citizens and municipalities all over the world. The Largest user sector of plastics is – Packaging. Mostly flexible packaging materials, which are abandoned after single use, cause solid waste management issues if the disposal is not taken care appropriately. Some types of plastics packaging materials have such a material construction, such as multilayered, which are difficult for recycling. More often different types of plastics materials get mixed up together making normal mechanical recycling process difficult.

As a result, these types of flexible plastics waste mostly remain un-collected and cause municipal waste management issue. Feedstock Recycling addresses these issues and can resolve the disposal problem with the added benefit of producing useful products. Scientists and academics from across the world and from India gathered in during the 7th ISFR Event and shared their research work and inventions in the Forum. This Newsletter will publish the Abstracts of select publications in the next editions.

To set an example, ICPE has joined hands with an Organisation in Delhi to set up a Mini Plant for converting all types of mixed plastics waste in to fuel in a residential colony. The brief story has been carried in this edition. In case of any query, readers may contact the Editor for clarifications.

In this edition we have carried the Data on The Contribution of Plastic Products to Resource Efficiency - Estimation of the savings of energy and greenhouse gas emissions achieved by the total market of plastic products in Western Europe. The study was conducted by GUA Gesellschaft für umfassende Analysen GmbH on the initiative of Plastics Europe (formerly APME) - Association of Plastics Manufacturers (in Europe). The full report could be viewed in the website of GUA.

### Subscription Information:

ENVIS is sent free of cost to all those interested in the information on Plastics and Environment.

Readers are welcome to send their suggestions, contributions, articles, case studies, and new developments for publication in the Newsletter to the ICPE-ENVIS address.

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### Editor

Mr. T. K. Bandopadhyay

# “Zero Waste Management” Project at New Moti Baugh Colony, New Delhi

ICPE in cooperation with the Associations and NGOs, since inception, has been encouraging the society and cooperating with the local bodies in establishing system which helps in segregation of waste at the source of waste generation so that different types of waste – broadly DRY and WET waste, could be collected separately for appropriate disposal. Most of the DRY waste can be recycled while WET waste comprising mainly of food and other biodegradable waste can be treated for composting or other processes of biological recycling, thus creating wealth from the waste while keeping the environment safe and clean.

Some of the successful efforts of crating such systems have been reported in earlier editions of this Newsletter. In another such challenging efforts, ICPE has joined hands with an Organisation in Delhi (GPWM), which, with the support of the Government and the Local Municipality Corporation, has taken up a challenging task of making a moderate sized residential colony a Zero Waste Zone, by not disposing any waste under the Municipal Solid Waste category, generated within the colony, to Landfill.

The colony is spread over 110 acres and has about 60% as green cover. It is a residential colony with more than total 1000 flats of Government officers and staff members. GPWM proposed to establish and operate an organic waste converter plant and a green waste pallet making plant. Although all Dry Waste would be collected from the households, only the waste of laminated plastics packaging materials like biscuit packaging, tea and coffee packaging, detergent packaging, wafer packaging and some other contaminated plastics film packaging materials which are difficult to recycle by Mechanical Recycling process, would be treated in the colony by a specially designed Feedstock Recycling pilot plant. All other types of Dry Waste like – paper, glass, metals etc would be forwarded to respective recyclers. There would be a special arrangement to collect the E-Waste materials for different treatment.

## **To summaries, the major activities of the project are:**

- conversion of Wet Waste (Organic Waste) generated within the colony to compost
- conversion of the Green Waste (Plant Leaves & Grass) into pallets for using as coal substitute
- recycling of all types of plastics waste, which are rejected by mechanical recyclers, by setting up a small feedstock recycling plant within the colony
- segregation of all other types of Dry Waste including mechanically recyclable plastics waste and forwarding the same to respective recyclers for recovery

At the end, there is practically no waste left for disposal in to landfill. The Urban Development Ministry, Government of India has given full cooperation in creating the infrastructure in the colony to facilitate the waste management programme. While GPWM is concentrating on the waste collection, segregation and treatment of the Organic and Green Waste, ICPE is providing

technical assistance in the selection and setting up of the pilot feedstock recycling plant for converting all types of mixed plastics waste in to hydrocarbon fuel (LDO - Light Diesel Oil). Although plastics are 100% recyclable, however some types or form of plastics waste require undergoing specific recycling process, other than the conventional Mechanical Recycling process. Moreover, when different types of plastics waste are mixed together, these cannot be mechanically recycled unless each group of plastics are separated and bunched together – A difficult task in reality.

This is the reason that these types of mixed plastics or laminated plastics waste are not picked up by the waste pickers and are dumped in the landfill or make their way to the drains causing waste management issue. Special care has been taken in the project so that these types of plastics waste could be recycled adopting the environmentally right techniques. Feedstock Recycling Technology is well known and practiced in the developed countries.

Plastics Waste to Fuel conversion is also known in the country since last few years. However, in this decentralization of MSW Management, the requirement of the plant is specific – small, totally safe and pollution controlled and efficient in converting the mixed plastics waste in to usable quality of Light Diesel oil. The plant cost should be within a moderate range. ICPE could locate such a plant which has been indigenously developed. Details of the plant would be covered in the future edition of the Newsletter. While the Organic Waste Converter and the Green Waste Converters are already operating at the site, the Feedstock Recycling Plant is ready for installation shortly, making the Project fully functional.

This concept of decentralization of Municipal Solid Waste Management system is adopted some of the European Union countries, as confirmed by a visiting delegation of the Belgian Government representative, who visited ICPE during 27th November, 2013. It is felt that with the available technology at moderate cost, such type of localized treatment of the MSW within the urban cities could greatly reduce the burden on the landfill, improving the environmental cleanliness of our surroundings.

## **Benefits to the New Moti Baugh Colony**

The Colony will be the first pioneering zone in Delhi NCR to implement an Environment – friendly Waste Management system which would send NO WASTE TO THE LANDFILL. Upon successful implementation, New Moti Baugh Colony would be able to lead the entire Delhi NCR zone to practice similar Waste Management system in the respective residential colony ultimately creating a ‘NO LANDFILL ZONE’ in Delhi NCR like developed countries Germany, Switzerland etc.

This Newsletter will bring further details of the functioning of the project in its future editions.



# New Moti Baugh Colony, New Delhi



*New Moti Baugh Colony, New Delhi*



*Sh. K. G. Ramanathan, Sh S. K. Ray and Sh. Gopal Jha in discussion with Sh. Ravi Agarwal and Sh. Rajesh Mittal at project site*



*Composting Plant*



*Waste Segregation area*



*Inside the Composting Plant*



*Clean roads inside the Colony*

# 7th International Symposium on Feedstock Recycling of Polymeric Materials from 23rd-26th October, 2013 New Delhi - India

International Symposium on Feedstock Recycling of Polymeric Materials (ISFR) is a biennial international symposium focusing on the various processes for the valorization of polymeric waste. It aims at bringing together scientists, engineers, and other industrial experts across the world to brainstorm on the development in the field of waste plastics, e-waste and biomass conversion processes. It was for the first time that India hosted the International Symposium during 23rd – 26th October 2013 at New Delhi.

The 7th ISFR Event was Organized by CSIR – Indian Institute of Petroleum (IIP), Dehradun; Research Association for Feedstock Recycling of Plastics, Japan (FSRJ); Council of Scientific and Industrial Research (CSIR), New Delhi and Co-organized by ICPE at India Habitat Centre, New Delhi.

This Conference was very important for a country like India where un-recycled plastics waste in urban as well as rural areas is creating plastics waste management problem to the civic authorities and which has attracted the critical attention of the highest Judiciary in the country as well as the policy makers in the Government. Feedstock Recycling of all types of plastics waste – mixed and un-cleaned, into usable products, could in a great way resolve this issue of plastics waste management in the country. The Symposium mainly dealt on three subjects – Plastics Conversion, E-Waste Conversion and Biomass Conversion. A galaxy of speakers from overseas countries like Japan, Germany, Netherlands, Spain, Finland & distinguished

scientists and academics from India shared their insight at this Forum. Hon. Union Minister of Science and Technology – Mr. Jaipal Reddy, addressed the Symposium and expressed his confidence that scientists would be able to find out solution for polymer waste problem. Dr M. O. Garg, Chairman, 7th ISFR 2013 & Director, CSIR-Indian Institute of Petroleum, India and Dr H. Tagaya, President, FSRJ, Japan & Professor, Yamagata University, Japan welcomed the delegates and briefed about the whole programme.

The IIP team shared the information on their unique technology established to convert Waste Plastics to Transportation Fuel and Petrochemicals. Feedstock Recycling Situation in Japan and its Future View, Plastic Waste Management in Japan, Review of Post-Consumer Plastic Preparation in Austria and New Approaches for Feedstock Recycling – were among the long list of topics on which scientists of respective countries covered in their speech. Prof. S. K. Brahmachari, DG-CSIR & Secretary, DSIR addressed the Symposium and chaired a Brain-storming Session in which distinguished scientists and academics participated to focus on their recommendations.

They were - Prof. A. Buekens, Vrije University, Belgium; Dr. M. O. Garg, CSIR-Indian Institute of Petroleum, India; Prof. A. K. Ghosh, Indian Institute of Technology-Delhi, India; Prof. A. Oku, Kyoto Institute of Technology, Japan; Prof. Y. Sakata, Okayama University, Japan; Prof. D. P. Serrano, IMDEA, Spain; Prof. M. Stöcker, SINTEF, Norway.

Mr. K. G. Ramanathan, President – ICPE, addressed the gathering. He said that the very success of plastics has created its own enemies. Handling and disposal of plastics waste and litter have become a major problem for citizens and municipalities all over the world. He expressed his confidence that the scientists in the Symposium would focus on the ground reality and work on to achieve sustainable solutions to plastics waste management. ICPE had displayed its Theme Work on Plastics Waste Management by way of displaying panels and samples of recycled plastics products in a stall in the exhibition area.



# Plastivision Exhibition at NSE Ground Mumbai From 12th to 16th December, 2013

ICPE participated in the PLASTIVISION 2013 Exhibition held during 12th to 16th December, 2014 at Bombay Exhibition Ground, Goregaon, Mumbai. ICPE and AIPMA organized the Recycling Pavilion where various activities of Plastics Recycling and related matters were exhibited.

The exhibition pavilion space was provided free of cost by the Organisers. ICPE had taken initiative in arranging the display of the Plastics Waste to Fuel making plant at the recycling pavilion which attracted the attention of large numbers of visitors. Feedstock Recycling is the desired mode of recycling of mixed plastics waste, including waste of multilayered laminated plastics, expanded polystyrene (thermocole) etc, which causes waste management problem. A Dual Reactor Fuel

making plant was displayed and the functions were explained to all visitors. ICPE had placed order for a similar plant for the proposed Waste Management Project at New Moti Baugh Colony in New Delhi. Apart from this, Awareness Films on Plastics and the Environment were screened in the Pavilion.

Among various dignitaries, Union Secretary, Department of Chemicals and Petrochemicals had visited the ICPE Pavilion. Senior Executives of large scale plastics raw materials manufacturers as well as packers of various products who use plastics for packaging their products, showed interest in using some of the technologies displayed. The Awareness Campaign also reminds them about their responsibility towards facilitating creation of appropriate plastics waste management system in the country.



# Awareness Programmes at Bedeker Vidymandir School & D.J.Joshi School, Mumbai on 14th & 20th December, 2013

21 Sessions of Awareness Programmes were conducted in 11 Schools & Colleges of Mumbai, Navi Mumbai and Thane jointly by ICPE and NGO – Stree Mukti Sanghathana during September to December 2013. More than 2000 Students from 6th Standard to 3rd Year Graduate Course attended including their teachers. Exclusive Sessions were also conducted for the B. Ed. Course Teachers. The experience is similar to all other similar earlier programmes –

All understand that “Plastics are essential for our daily life; however we do not handle the plastics waste appropriately causing the larger problem of municipal solid waste management.” In fact the most common experience is that the municipality waste collection vans, while collecting

the waste from different waste generation centres, mix up all the waste together. It is realized that to achieve the desired goal of segregation of waste at source, all of us in the community have to cooperate in this act. On the other part, the municipality authority also has to carry such segregated waste separately for appropriate disposal. In most of the occasions, school / college principals requested for repeat programmes for their students, which was assured.

Smt Kalpana Andhare of Stree Mukti Sanghathana anchored the Sessions. Shri T. K. Bandopadhyay, Sr. Technical Manager of ICPE clarified critical queries of students. ICPE officials Shri T. V. Srinivasan, Shri Sudheer Khurana and Shri P. Radhakrishnan attended as observers.



# Awareness Programmes at English High School & N.G. Acharya College, Mumbai on 12th & 13th December, 2013



## Interaction with Belgian Delegation on Solid Waste Management Practices

Consulate General of Belgium had organized for a visit of a Belgian Economic Mission to Mumbai from November 26 - 28, 2013. In the framework of this Economic Mission, Belgian Consulate led a large group of delegates from Belgian companies for interaction with Indian Government Agencies as well with other organizations for possible sourcing opportunities from Belgium for mutual benefit.

The organisation ISWA - the International Solid Waste Association (website: [www.iswa2015.org](http://www.iswa2015.org)), which is the one of the world's most important congresses in the field of waste management was a part of the delegation. Members of the organisation were here to understand latest trends, developments and perspectives for the waste sector.

On 27th November, 2013 Mr. Tom DE BRUYCKERE – Coordinator of the organisation had a discussion with ICPE Team led by Mr. Vijay Merchant. Mr. P. P. Kharas and Mr. Tushar K Bandopadhyay on various aspects of Municipal Solid Waste Management practiced in India in general and on Plastics Waste Management in particular. It was revealed by Mr. Tom that decentralized processing / treatment of Municipal Solid

Waste is popular in Belgium. Mr. Tom informed that Belgium Municipal Authorities give more emphasis on producing energy from MSW. Belgian delegate assured to share further details of waste management practices in their country with ICPE and invited ICPE as a partner in organizing the World Congress on Solid Waste Management to be held during September, 2015 in Antwerp.



*ICPE Team in discussion with Belgian Delegate  
at ICPE Mumbai Office*

# DATA SHEET

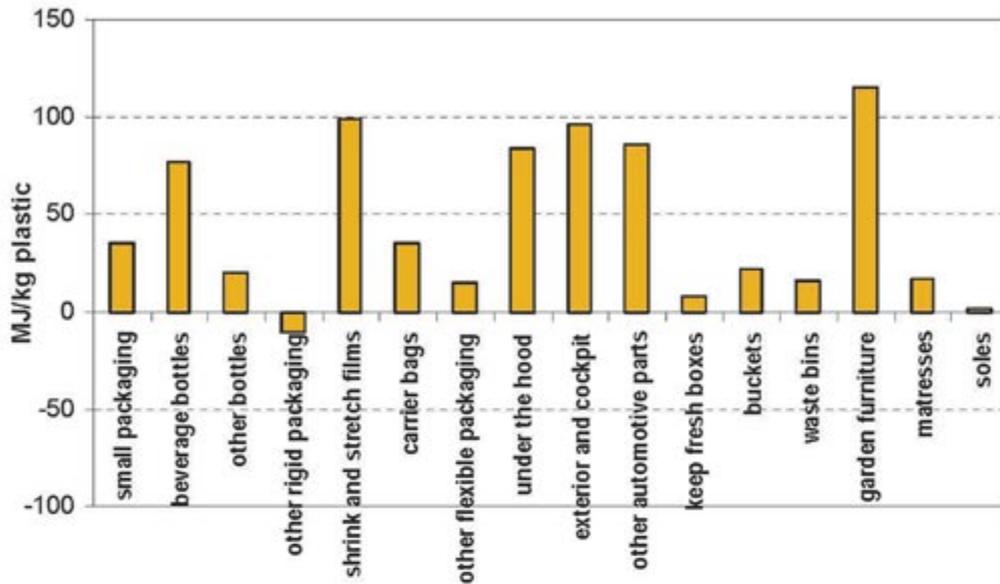


Figure 4: Energy savings of plastic products compared to alternative materials, given in MJ per kg plastic product. Figure shows first part of case studies.

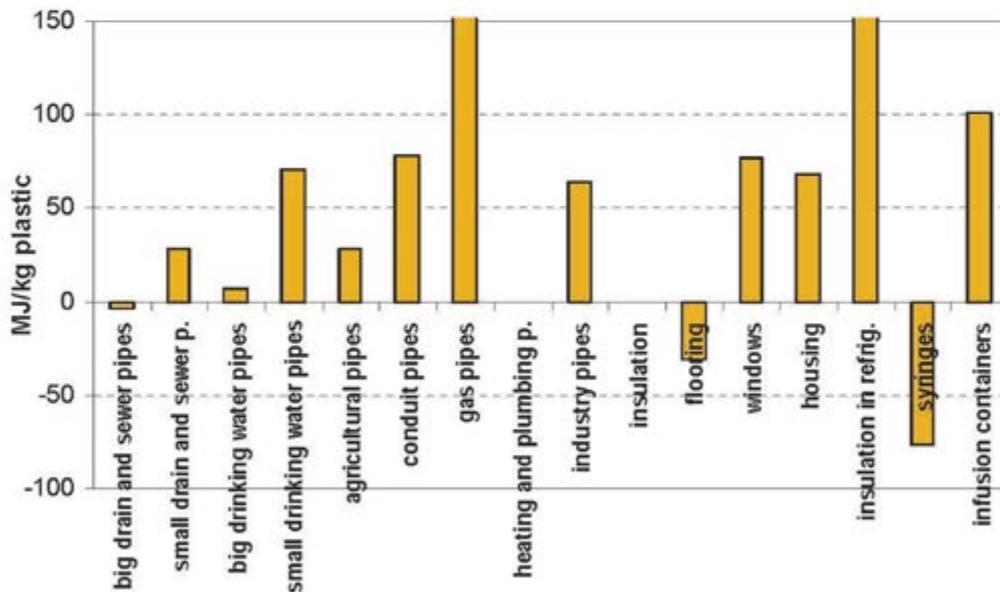


Figure 5: Energy savings of plastic products compared to alternative materials, given in MJ per kg plastic product. Figure shows second part of case studies. The value for "gas pipes" is 154 MJ/kg PE, the value for "insulation in refrigerators" is approx. 1.800 MJ/kg PUR.

# DATA SHEET

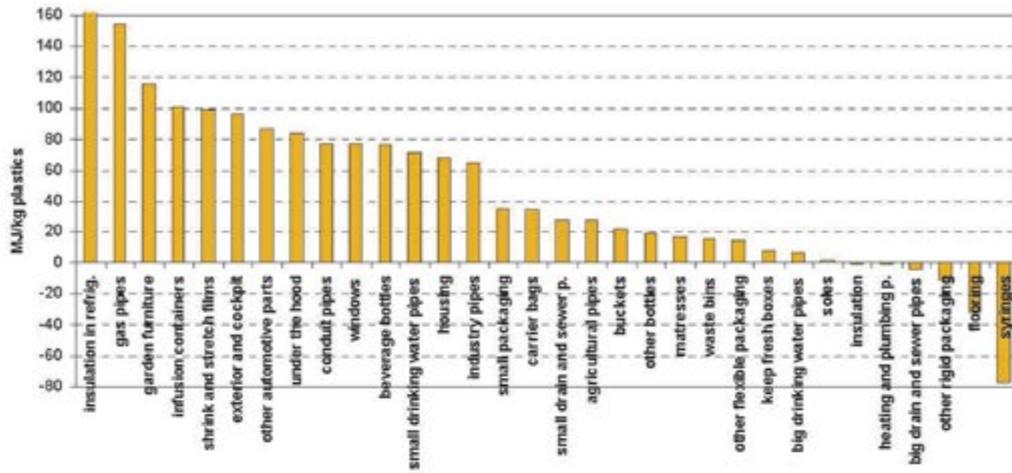


Figure 6: Energy savings of plastic products compared to alternative materials. Results in descending sorting. The value for "insulation in refrigerators" is approx. 1.800 MJ/kg PUR.

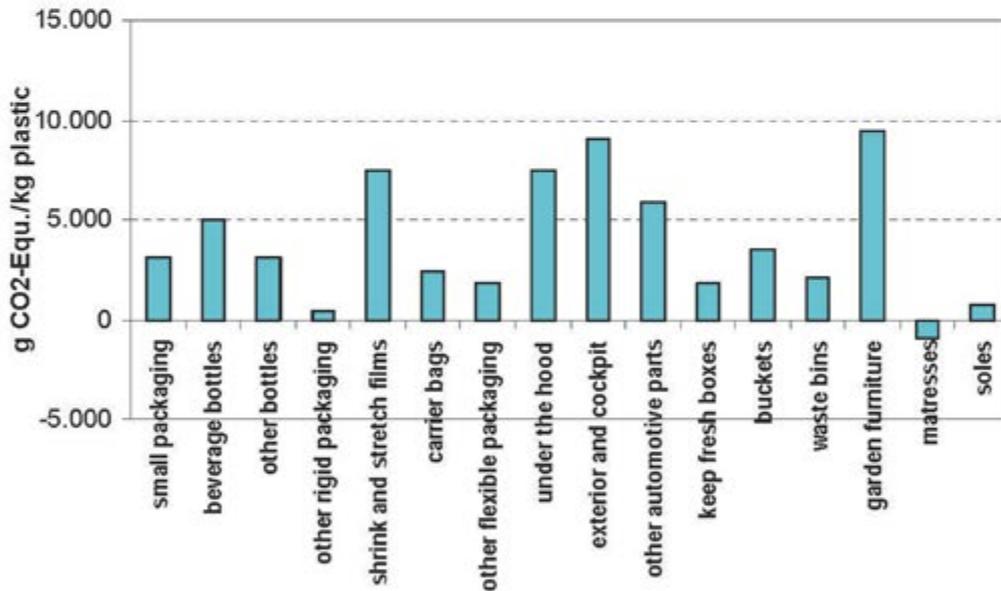


Figure 7: GHG emission savings of plastic products compared to alternative materials, given in gram (g) CO<sub>2</sub>-equivalent per kg plastic product. Figure shows first part of case studies.

# DATA SHEET

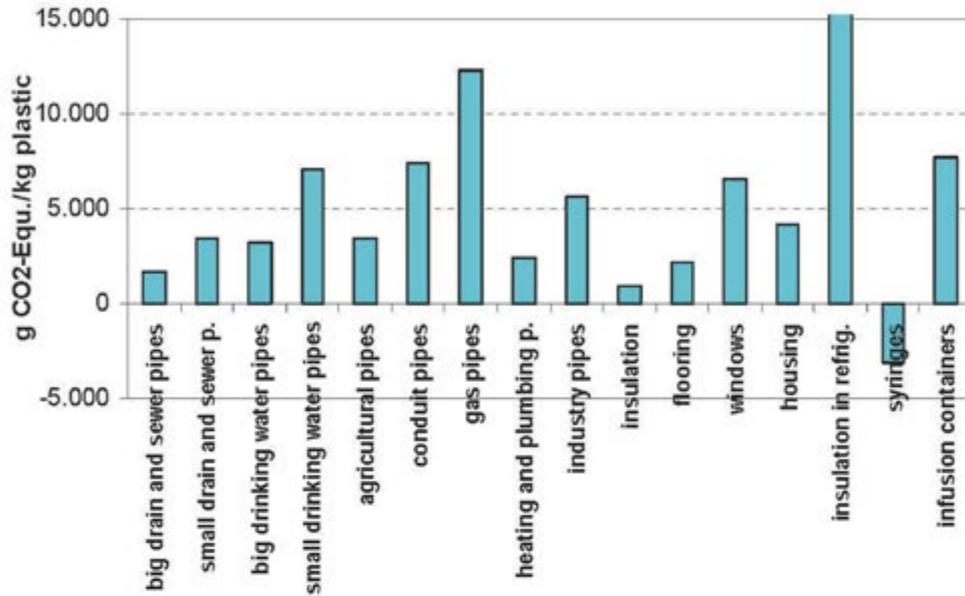


Figure 8: GHG emission savings of plastic products compared to alternative materials, given in gram (g) CO<sub>2</sub>-equivalent per kg plastic product. Figure shows second part of case studies. The value for "insulation in refrigerators" is approx. 79.000 g/kg PUR.

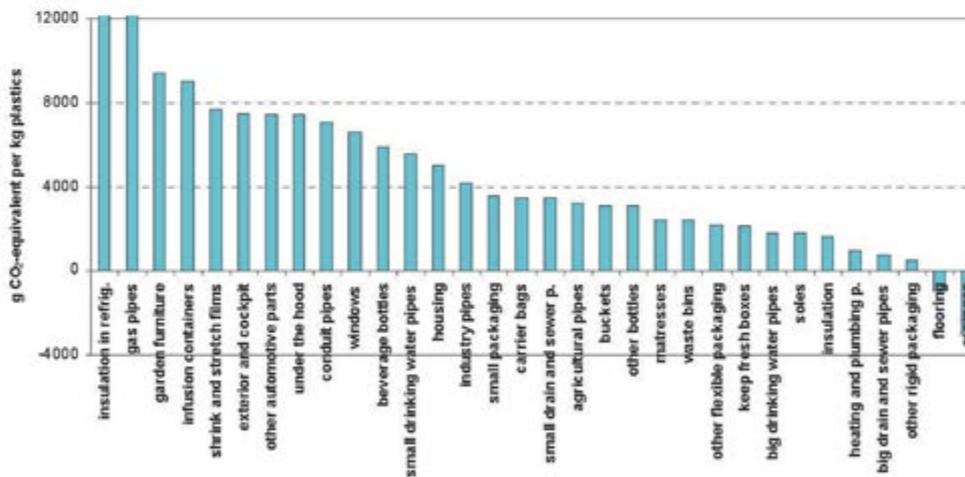


Figure 9: GHG emission savings of plastic products compared to alternative materials. Results in descending sorting. The value for "gas pipes" is 12.300 g/kg PE, the value for "insulation in refrigerators" is approx. 79.000 g/kg PUR.

Source : GUA - Gesellschaft für umfassende Analysen Corporation for Comprehensive Analyses

The Contribution of Plastic Products to Resource Efficiency Estimation of the savings of energy and greenhouse gas emissions achieved by the total market of plastic products in Western Europe by means of a projection based on a sufficient number of Examples.

**WORLD'S ICE DEPOSITORY IS MELTING  
DUE TO  
GLOBAL WARMING  
VANISHING GLACIERS GIVE AN ALARM  
NOTE FOR  
MOTHER EARTH.**



Melting of Himalayan Glaciers

**PLASTICS ARE AMONG THE HIGHEST  
GREEN HOUSE GAS SAVERS  
&  
DECREASE THE IMPACT OF  
GLOBAL WARMING**

**DON'T LITTER, USE PLASTICS RESPONSIBLY, KEEP  
THE MOUNTAINS CLEAN**



Plastics, Metals, Paper ...  
Can be recycled into useful products.

**PLASTICS ARE 100% RECYCLABLE**

