

## Demonstration cum Technology Transfer Program for “Improved Domestic PNG Burner”

CSIR-Indian Institute of Petroleum (CSIR-IIP) is a highly reputed National Laboratory working in the area of Petroleum Refining, Petrochemicals, Efficient Utilization of Fuel & Lubricants in Automotive Vehicles, Industrial and Domestic Combustion and Tribology.

Piped Natural Gas (PNG), as kitchen fuel, is being used in many states of India. **However, no standard PNG domestic cooking stove/burner is available in the Indian market.** Due to the unavailability of dedicated PNG stove/burner, domestic consumers are using the retrofitted LPG burners to use PNG in the domestic cooking application. As per the lab scale evaluation is done at CSIR-IIP, Thermal Efficiency of the domestic LPG stove reduces by **25-30%** when fired with PNG with retrofitting. The reduction in thermal efficiency is mainly due to different fuel characteristics and unsuitable burner design. It is evident from various technical research that using the same appliance to burn fuels of different composition / characteristics compromises with the performance and safety of the user due to the possible occurrence of incomplete fuel combustion, flame lift off or flame flashback. There are more than **35 lakh domestic PNG users** in India that are currently using the retrofitted PNG stoves. In view of the energy conservation and user safety, CSIR-IIP has developed a dedicated PNG domestic cooking burner with the financial support of PCRA (Petroleum Conservation Research Association). The developed PNG burner is found to be **15%** more efficient than retrofitted PNG burner when tested in the laboratory conditions. Salient features of the developed PNG burner are given in Table.1

**Table.1:** Features of the developed PNG Burner

<b>Features</b>	<b>Retrofitted PNG Burner</b>	<b>Improved PNG Burner</b>	<b>Advantage</b>
Thermal Efficiency	40%	55%	Up to 15% Fuel saving
Design Pressure	30 mbar	21 mbar	As per the household supply pressure of PNG
Design	Self-aerated, designed for LPG	Self-aerated, designed for PNG	Reliability
Components	Nozzle, Mixing tube, Burner Manifold, Burner Cap	Nozzle, Mixing tube, Burner Manifold, Burner Cap	Manufacturing cost is similar to LPG burner
Compliance with BIS standard	No	Yes	User acceptance

The burner has been designed for power capacity (1.53 kW, 1.82 kW, 2.06 kW and 2.25 kW) to cover the entire range of domestic cooking burners prevailing in the Indian market. It comprises of parts similar to that of a conventional LPG burner. However, there are some design modifications and dimensional changes. The burner design is a conventional circular self-aerated type. It can be readily fitted with the conventional stove body. Energy conservation potential and safe operation of the developed burner has been confirmed through the field trials conducted at six different locations over a period of six months across the Delhi NCR region.

We hereby inform to all the stakeholders that technology of Improved PNG Burner has been successfully developed; tested and field trials have been conducted with the feedback confirming higher fuel saving than specified in the document. The energy saving potential and safety are the key highlights of the developed product that will enable its quick penetration in the market. Also, it is proposed to label the product with a CSIR-IIP-PCRA hologram which may enhance its customer acceptance. The product meets the requirement of BIS (Bureau of Indian Standards) standard which has been finalized. The manufacturer of the product may readily get ISI certificate and enhance customer acceptance. The manufacturer may provide reasonable warranty period to the customer as the product has been tested rigorously in the lab as well as during field trails.

Due to the urgent requirement of a major Gas Distribution Company, we want to straightaway license the technology on a **non-exclusive basis** to every interested party. If the NDA, MoU and Technology Transfer documents are signed on the same day (**i.e. Friday, 15 March 2019**), **CSIR-IIP will offer a highly attractive discount on the technology transfer fee. Therefore, it is advised that the representative of the company attending the meeting should come with the authorization letter of the company to sign the documents. The person should be senior enough to take on the spot decision to take advantage of the onsite discount.** However, the technology will be available on the same terms and conditions (without discount, as this is applicable only on 15 March 2019) even after the meeting, whenever required by any party. Besides this, CSIR-IIP will provide assistance in testing and evaluation of the product and on related technical issues as and when required by the interested party.

In light of the above, the technology of Improved PNG Burner is offered for licensing to all the interested parties. We invite all the interested parties to witness this success story on **Friday, 15 March 2019** at CSIR-IIP, Dehradun as per the program agenda given below.

## Program Agenda

### Demonstration cum Technology Transfer Program for “Improved Domestic PNG Burner”

**Date:** 15 March 2019

**Time:** 10 a.m. to 5:30 p.m.

**Venue:** CSIR-Indian Institute of Petroleum, Mohkampur, Haridwar Road, Dehradun.

<b>Minute to Minute Program</b>	
<b>15 March 2019</b>	
10:30 a.m.-10:40 a.m.	Welcome and Felicitation of Executive Director Petroleum Conservation Research Association by Director, Indian Institute of Petroleum (DIIP)
10:40 a.m.-11:00 a.m.	Welcome of the participants by DIIP and Introduction
11:00 a.m.-12:00 noon	Presentation on the technology/demonstration of Improved PNG Burner: By Sh. Pankaj Arya
12:00 noon-1:00 p.m.	Discussion & interaction with the stakeholders about technology transfer terms & conditions
<b>Lunch : 1:00 p.m. – 2:00 p.m.</b>	
2:00 p.m.-2:30 p.m.	Lab visit and demonstration of burner operation
2:30 p.m.-5:30 p.m.	Signing of agreement with interested parties

In case of any further clarification, kindly contact the undersigned:

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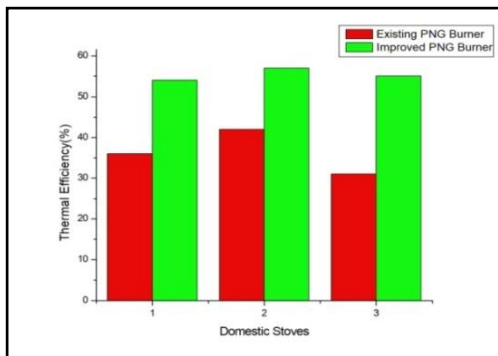
### Improved PNG Burner:



CSIR-IIP Improved PNG Burner  
*Patent Application: 201711046975*

An energy efficient domestic cooking burner has been designed for Piped Natural Gas by CSIR-IIP, Dehradun with the financial support of PCRA, New Delhi. The designed burner has following salient features;

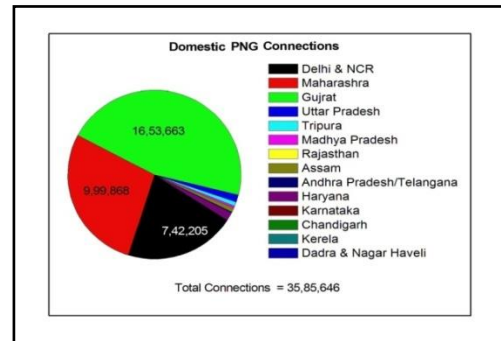
- **Upto15% improved thermal efficiency**
- **Available in four power capacity**
- **Simple design and easy to fabricate**
- **Ready for commercialization**



Thermal Efficiency of improved PNG burner (Green bars) compared with existing PNG burners (Red bars)

### Market:

There are more than **35 lakh** registered domestic PNG users in India. Out of which highest number of domestic PNG users are in Gujrat followed by Maharashtra and Delhi-NCR region. With the increased network of gas distribution companies, the number of domestic PNG users is increasing at a steady rate.



State-wise domestic PNG connections in India

### Field Trials:

*The developed burner has been tested at six different locations in Delhi-NCR region over a period of six months. The field trials were conducted to assess the burner performance with respect to change in seasonal temperature and cooking behavior. The field trials have confirmed the fuel saving potential and safe operation of the developed burner*

### Energy Saving Potential:



Improved PNG burner with stove body

***Energy equivalent of estimated PNG saving = 3526 million BTU /month = 881 million kcal/month, for a city like New Delhi.***

The improved energy efficient PNG burner will lead to significant reductions in energy consumption per household enabling lower PNG supply per household

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