National Biomass Cookstoves Programme

Ministry of New and Renewable Energy
National Biomass Cookstoves Programme (NBCP)

1. Background

In the context of concerns over health, climate change and energy security, the Ministry of New and Renewable Energy through a Special Project on Cookstove(SPC) during 2009-10 initiated the process of consultations under its Core Group on cookstoves to ascertain the status of various types of biomass improved cookstoves being developed and promoted by various organizations, NGOs, entrepreneurs and industries in the country, and to identify ways and means for the development and expansion of the deployment of improved biomass cookstoves. The consultations indicated that biomass cookstoves do have the potential to directly address health and welfare concerns of the weakest and most vulnerable sections of society. The cleaner combustion in these devices will also greatly reduce greenhouse pollutants.

2. National Biomass Cookstoves Initiatives (NBCI)

2.1 As a result of the above consultations, a National Biomass Cookstoves Initiative (NBCI) was launched by MNRE on 2ndDecember 2009 at New Delhi with the primary aim to enhance the use of improved biomass cookstoves. The initiative stressed the setting up of state-of-the-art testing, certification and monitoring facilities and strengthening R&D programmes. The aim was to design and develop the most efficient, cost effective, durable and easy to use device.

2.2 The NBCI of MNRE was structured differently from the earlier National Programme on Improved Chulhas (NPIC), although building on the several successes of that programme as also drawing lessons from the experience gained from its implementation. Under this initiative, a series of pilot scale projects were envisaged using several existing commercially – available and better cookstoves and different grades of process biomass fuel. A project entitled “A New Initiative for Improved Cookstoves: Preparatory Activities for Launch” was taken up by MNRE at Indian Institute of Technology, New Delhi during the year 2009-10 to assess the present status of various types of improved chulhas, their suitability and delivery mechanisms. The IIT was to prepare an action plan for development and deployment of cookstoves. The project had been completed and its recommendations have been acted on.

3. Technology & Models of Biomass Cookstoves

3.1 Biomass cookstove is basically a combustion device which burns biomass fuel more efficiently with reduced emissions and offers cleaner cooking energy solutions. Biomass Cookstoves are of two types; fixed type and portable type. The portable cookstoves are also of two types; natural draft and forced draft. Advanced cookstoves utilizing fans are more efficient cookstoves compared to natural draft ones. Each type of cookstove can be used for domestic as well as community cooking applications. The improved cook-stoves may be made with metal, ceramic and terracotta/ pottery (durable type) and combination thereof. With this, the stoves will be categorized as metallic (MS, SS, cast iron and combination thereof), metal clad ceramic/ pottery and ceramic types.

4. Revised Standards and Test Protocols

4.1 As follow up to the NBCI, the Ministry in consultation with the Principal Investigators of the Test Centers including experts from the CGPL, IISc Bangalore perused the BIS on solid biomass cookstoves – portable that was brought out by BIS in 1991 to examine the applicability of the standard and test protocols, in view of the newer designs of cookstoves that came to market in recent years. After extensive discussions and examinations, a revised standard and test protocols has been developed for the portable natural draft and forced draft types improved domestic and community biomass cookstoves and the same has been published by BIS in August, 2013.

4.2 Accordingly, the test facilities have been strengthened with advanced equipments and testing methodologies for carrying out performance testing of cookstoves. All relevant R&D/academic institutions in the country and a few leading organizations in the subject in US were contacted to know the methods being followed for emissions and particulate measurements from combustion of biomass. These include National Environmental Engineering Research Institute (CSIR), Nagpur, Shri Ram Institute of Industrial Research, New Delhi, Indian Institute of Petroleum(IIP-CSIR), Dehradun, Central Building Research Institute(CBRI-CSIR), Roorkee, Central Pollution Control Board(CPCB), New Delhi, US Environmental Protection Agency Labs, USA and LBNL, University of California, Berkeley, USA.

4.3 US EPA(5G) method for “wood heaters” have been followed for designing and developing a hood and duct system for collecting emissions from biomass cookstoves for test facilities at three Test Centres supported by MNRE in R&D Project mode. Considerable efforts have been made to set up test facilities with uniform equipment and instrumentation, and to evolve suitable operating parameters for operating test facilities for carrying out performance testing of cookstoves with accuracy. Extensive tests were conducted at MNRE supported test centres at IIT Delhi, IMMT-CSIR, Bhubaneswar and MPUAT, Udaipur to streamline the process of performance testing particularly testing methodologies for emissions and particulate measurements. Keeping in view the international practice for measuring the emissions and particulates emanating from the combustion of biomass and responsible for health hazards, the revised standard has replaced the performance parameters CO/CO_2 ratio and TSP by CO (g/MJd) and TPM(mg/MJd), respectively. The emissions are determined in terms of Mega Jules energy delivered to pot. The limit of moisture content has been considered within 5(±1)%. Further, the standard performance parameters of thermal efficiency, CO and TPM have been evolved on the basis of performance testing results obtained on the various cookstove models developed by Indian industry and traditional chulha tested at Test Centres.

4.4 The revised standard and test protocols are being followed for carrying out performance testing of cookstove at test centres. The cookstoves satisfying the stipulated performance parameters are considered for approval by MNRE. The standard performance parameters are given below:-

Sl. No.	Type of Biomass Cookstove	Standard Performance Parameters		
		Thermal Efficiency (%)	CO(g/MJd)	PM(mg/MJd)
1	Natural Draft Type	Not less than 25	≤ 5	≤ 350
2.	Forced Draft Type	Not less than 35	≤ 5	≤ 150

5. Process of Cookstove Testing

5.1 The industries/manufacturers who may want to get their products tested may send the complete technical details of the cookstoves including the kind of biomass the cookstove can burn and the procedure for feeding the fuel to cookstove to MNRE. The Ministry in turn will direct the industry to send their product with details including testing charges to the respective test centres for performance testing. The cookstove models should have the industry’s logo fixed on the outer surface of the cookstove with serial no. marked thereon. The

cookstoves are being tested for three performance parameters as stipulated in the revised standard, namely, thermal efficiency, CO and Total Particulate Matter (TPM) as given above, apart from other basic design parameters. The cookstoves qualifying the stipulated tests as per the revised standard are granted Excise Duty Exemption. The test centre will complete the performance testing within two week time and will send the performance testing report to MNRE for consideration. The test reports of cookstoves qualifying the stipulated performance Tests are placed before the Technical Evaluation Committee of MNRE for examination of test results for consideration of approval. The industries whose cookstoves do not qualify are informed of the results with a suggestion to make appropriate improvement in cookstove designs.

6. Pilot Scale Demonstration Projects

6.1 As a part of National Biomass Cookstoves Initiative pilot scale projects were taken up for demonstration of community size cook-stoves and domestic biomass cook-stoves for cooking applications. As per the final report of IIT Delhi, the field performance evaluation of 400 nos. of community size cook-stoves for cooking in Mid-day Meal schemes in government schools in the States of Andhra Pradesh, Chhattisgarh, Uttar Pradesh, Maharashtra, Madhya Pradesh & Haryana indicated reduction in fuel consumption in the range 40-60%, emission reduction in the rage 60-70% and saving cooking time in the range 10-30% compared to traditional chulha. In another pilot scale project for demonstration of 12000 nos. of biomass cook-stoves for domestic cooking applications 3000 nos. of cookstoves have been distributed in two districts of Khistwar & Doda in J&K while in other States like Karnataka, Bihar , U.P& Jharkhand the distribution of the stoves is in progress.

6.2 During 2013-14 a Model Pilot Project for promotion of improved cookstoves in the State of Goa in the Talukas of Phonda & Sattari was sanctioned so as to saturate all the 8000 households and subsequently extended to other areas in Goa. Another Pilot Project for deployment of Family size Improved Chulhas in State of Andhra Pradesh was sanctioned to Society for Elimination of Rural Poverty Department of Rural Development, Government of Andhra Pradesh and State Rural Livelihood Mission for National Rural Livelihoods Mission, a flagship program of Ministry of Rural Development so as to promote improved cookstoves through the Self Help Groups.

7. Carbon Finance on Biomass Cookstoves

7.1 The cookstoves market is still at the nascent stage and manufacturers have had limited ability to realize economies of scale to lower prices to consumers. While subsidies could be an option to increase affordability for the most disadvantaged, offering similar pricing structures to the market at large may be unrealistic. Against this background, it was recognized that carbon finance may offer an additional alternative for reducing the price and increasing the affordability of improved biomass cookstoves for low-income households. Switching to biomass cookstoves can displace greenhouse gas emissions related to fuel use. To the extent that accepted protocols have been put in place and verify avoided emissions, these can be sold as carbon offsets on the voluntary and CDM markets. The hope is that revenues from the sale of such offsets will allow cookstoves suppliers to market these devices at a lower price, thereby expanding sales. Encouragingly, offsets generated from cook stove projects are reportedly among the most sought after among voluntary offset purchasers. With these considerations, the Ministry in collaboration with GIZ, German has developed a Programme of Activities (PoA) for CDM in biomass cookstoves and was submitted to UNFCCC for registration on 31st of December, 2012. The CDM Programme of Activities (PoA) has been registered with a registration date of December, 2012. The credits generated from the PoA are eligible under EU-ETS.

8.Unnat Chulha Abhiyan Programme

8.1 As follow up to the National Biomass Cook-stove Initiative (NBCI), the Ministry initiated a new proposal for promoting the development and deployment of Unnat Chulhas (Biomass Cookstoves) in the country during the 12th Plan Period for a budgetary cost of Rs. 294/- crores appraised and recommended by the Expenditure Finance Committee. Accordingly the Administrative Approval with detailed Guidelines for the Unnat Chulha

Abhiyan were formulated and issued on 27th June 2014. Guidelines are available on the MNRE website (http://mnre.gov.in/file-manager/dec-biomass-cookstoves/programme-biomass... (http://mnre.gov.in/file-manager/dec-biomass-cookstoves/programme-biomass-cookstoves_unnat_) [1] chulha_abhiyan-2013-2014.pdf)

8.2 Objectives

i. To develop and deploy improved biomass cook-stoves for providing cleaner cooking Energy solutions in rural, semi-urban and urban areas using biomass as fuel for cooking.
ii. To mitigate drudgery of women and children using traditional chulha for cooking.
iii. To mitigate climate change by reducing the black carbon and other emissions resulting from burning biomass for cooking.

8.3 Activities

i. To support R&D activities on development of efficient and cost effective designs of biomass cook-stoves with reduced emissions.
ii. To provide support for Test Centres for carrying out performance testing of biomass cook-stoves as per BIS.
iii. Development of revised test protocols and standards.
iv. To take up a series of pilot scale projects using existing commercially available and better chulhas and different grades of process biomass fuel with ultimate aim exploring a range of technologies deployment biomass processing and delivery models leveraging public-private partnerships.
v. To support awareness and marketing campaigns and creating enabling environment
vi. for mass production of processed biomass fuel, network of dealers, entrepreneurs training and supply chain mechanism.
vii. Supporting training to manpower facilitating operation and maintenance networks at local level thus generating opportunities for employment.
viii. Taking up dissemination programme on family type and large size Unnat Chulhas / cook-stoves for cooking applications.
ix. Awareness for use of biomass cookstove in target groups.
x. The field and market experience of the above pilot project will be analysed for developing a business model for commercialization including availing CDM benefit for biomass cookstove. The possibility of establishing a Section 25 company will be explored for carrying out the business of promotion of Unnat Chulhas in the country in future.

8.4 Target Users

I. Kitchens of Mid-day Meal (MDM) scheme, Anganwadis, Forest Rest Houses, Tribal Hostels and small business establishments (road side dhabas, small hotels and restaurants and a variety of cottage industries like textile dyeing, drying of spices etc.) to be supplied with improved biomass cookstoves complying with improved standards.

II. Individual households in rural areas who use biomass for cooking purposes.

8.5 Physical Target

A target of 2.75 million improved cookstoves/chulhas will be disseminated/installed in the remaining period of the 12th Plan Period as given below :-

Physical Target for the Unnat Chulha Abhiyan (UCA) Programme for 12th Five Year Plan Period

	Physical Targets

Sl.No.	Year	Family Type or Household cook-stoves#	Community Size Cook-stove Dhabas/Canteen, Industry	Anganwadis/ ICDS/ MDM/Tribal Hostels/Forest Rest Houses, etc
1	2012-13	Nil	Nil	Nil
2	2013-14	100,000	5,000	5,000
3	2014-15	750,000	25,000	75,000
4	2015-16	750,000	40,000	75,000
5	2016-17	8,00,000	50,000	75,000
Total		**24,00,000**	**1,20,000**	**2,30,000**

The total numbers include earthen cook-stoves also. The breakup of target between earthen and family type portable cook-stove will be done by MNRE on the basis of demand for each type and the availability.

8.6 Financial Provisions

Central Financial Assistance for Unnat Chulha Abhiyan (UCA) Programme for 12th Five Year Plan

Sl. No.	Item	Funds require-ment (in crore)
1.	**Test centres (3 old + 2 new) (Test Centres will also get testing fees for revenue generation**)	7.0
2.	**R&D on cook-stoves and technology development for processed biomass fuel,**- Professional Services including consultancy charges for personnel of a proposed Cell in MNRE for activities such as training/capacity building of nodal agency personnel, users, after sales service personnel orientation camps, workshops in a centralised manner	5.0
3.	**Deployment of family sized /domestic cook-stoves/earthen cookstoves (24,00,000 nos.)Central Financial Assistance: <u>For Natural Draft Cookstoves (including earthen chulhas with metal combustion chambers)</u>** (i) upto 50% of cost of cook-stoves with maximum ceiling of Rs.400 for natural draft (including earthen chulhas with metal combustion chambers) and Rs.800 for forced draft - average support taken at Rs.600/- per cookstove for the years 2013-14 and 2014-15, (ii) upto 40% of cost of cookstoves with maximum ceiling of Rs.300 for natural draft cookstoves(including earthen chulhas with metal combustion chambers) and Rs.600 for forced draft cookstoves, average support taken Rs.450for the years 2015-16 and 2016-17.	120.75

	(ii) the masons doing the construction of earthen chulhas will be provided construction fee @10% per chulha which will added the overall cost of the earthen chulha. The NGO/CSO doing the construction will pass on this charge to the mason and keep accounts.	
4.	**Deployment of Community Cook-stoves for MDM Kitchens, Anganwadis, Tribal/SC/Backward hostels, government and forest rest-houses etc., (2,30,000nos).Central Financial Assistance:** (i) upto 50% of cost of cook-stoves with maximum ceiling of Rs.2500 for natural draft and Rs.5000 for forced draft type cook-stoves - average support taken at Rs.3750 per cook-stove for the years 2013-14 and 2014-15.	75.07
	(ii) upto 40% of cost of cookstoves with maximum ceiling on support Rs.2000 for natural draft cookstove and Rs.4000 for forced draft cookstove, the average support taken is Rs.3000per cookstove for the years 2015-16 and 2016-17.	
5.	**Deployment of community cookstoves(1,20,000 nos.) for commercial outlets and industry.(The entire cost will be borne by the users**).-the implementing agency/manufacturer/nodal agency doing extension work including dissemination will be paid success fee @15%, 10% and 5% for the years 2013-15, 2015-16 and 2016-17 respectively.	3.64
6.	**Technical Assistance for Implementing Agencies @10% of support of MNRE on each cookstove, including for commercial outlets.**	23.41
6.	**Administrative/overhead charges for implementing organizations @10% of support of MNRE on each cookstove, including for commercial outlets.**	23.41
7.	**Monitoring and Evaluation**	20.00
8.	**Publicity and Awareness generation**	16.0
Total		**294.28say 294**

8.7 Implementation Arrangements

The programme will be implemented through R&D/academic institutions, State Nodal/Implementing Agencies, State Departments of Education through District Coordinators of Mid-Day Meal Scheme, District Level Officer of Anganwadis, District Coordinators/Officers of Tribal/SC/Backward Class Hostels and similar departmental agencies where cook-stoves could be employed, NGOs/CSOs, manufacturers, business development organizations, etc. engaged in implementation of renewable energy projects at grassroot level.

8.8 Monitoring and Evaluation

Field monitoring of cookstoves will be carried through “Third Party Monitoring System”’ which could be a R&D institution or a consortia of R&D/ academic institutions, professionals and monitors to be identified by MNRE.. Eventually web-based monitoring system will be developed where mobile camera based photos of chulhas in use will be uploaded. The overall progress will be reviewed by the Core Group on Biomass Cookstove of MNRE

8.9 Biomass Cookstove Test Centres

Three Biomass Cookstove Test centres earlier funded by MNRE for performance testing and certification of biomass cookstoves industry from different zones of the country continued during the year 2013-14. The Test centres have test facilities with advanced equipment at par with international level. These Test centre have been set up in Indian Institute of Technology, Delhi, Institute of Mineral and Mineral Technology

(IMMT) ,CSIR-Bhubaneswar, Orissa and college of technology and engineering ,Maharana Pratap University of Agricultural and Technology ,Udaipur. Fourth test centre has been sanctioned at Sardar Swaran Singh National Institute of Renewable Energy (SSS-NIRE), Kapurthala during the year 2013-14. Addresses are as follow:

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8.10 Approved Models of Cook-stoves

At present, there are a total of 41 nos. of cookstoves approved by MNRE on the basis of their performance testing conducted by Improved Cook-stove Test Centres and satisfying stipulated performance parameters, which include 20 nos. natural draft domestic cookstoves, 12 nos. forced draft domestic cookstoves, 2 nos. of natural draft community cookstoves and 7 nos. of forced draft community cookstove with total 26 nos. of manufacturers. The list of approved cookstove models supplied by respective of manufacturers are given on the MNRE website (http://164.100.94.214/approved-models-cook-stoves (http://164.100.94.214/approved-models-cook-stoves) [2])

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Links
[1] http://mnre.gov.in/file-manager/dec-biomass-cookstoves/programme-biomass-cookstoves_unnat_
[2] http://164.100.94.214/approved-models-cook-stoves