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सूक्ष्म , लघु और मध्यम उद्यम मंत्रालय
MINISTRY OF
MICRO,SMALL & MEDIUM ENTERPRISES

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MSME IDEA HACKATHON 4.0

Reference No. :- **INC24DWB050084**

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4. HI/BI State	WEST BENGAL
5. HI/BI Name	Haldia Institute of Technology
6. Problem Statements	Sustainable Development
7. Idea Sector	Power, Renewables, Electricals, Power Electronics, Energy Efficiency and any related sub-sector
8. Title of proposed idea/innovation	Performance of smokeless biomass chulha with water heating arrangements for rural and urban kitchens

9. Briefly explain newness/uniqueness of the innovation	A smokeless chulha is a kitchen appliance that uses renewable energy such as wood and other biomass to produce meals. Development and design of smokeless chulha is in prime focuses to make it useful in rural and urban uses. Uniqueness of present design includes many features such as completely smokeless cooking hot plate, smokeless hot oven, hot water outlet arrangement, SPM (suspended particulate matter) trap in chimney and ash tray can use as barbeque grill. This chulha was designed to supply constant hot water to the kitchen and for other uses and make it use for heating water too. The size of wood biomass needs to maintain depending upon the desire hot plate area. The hot water outlet from the chimney will be an additional heat recovery from flames as well. Hot oven is a unique feature of the smokeless chulha could have multiple uses during preparation of food. Another uniqueness of this proposed smokeless chulha is to control the flame by controlling induced draft. There are inline heat proof blowers with variable rpm to control the induced draft. The smoke will be drawn through a water trap to remove SPM and trap will work as fire arrester. Overall it will bring another revolution in kitchen experience with conventional renewable energy sources such as wood and other agricultural residue. It is also capable to use biomass pellets.
10. Concept & Objective	The rising cost of fossil fuels and the effects of climate change force us to develop new solutions for heating systems, both for food preparation and other purposes. Instead of burning agricultural wastes in the open, they might be used as fuel. Additionally, farmers may make money by selling their leftovers to companies that make biomass pellets. There are many of business opportunities with agricultural leftovers that might increase farmers income. Through the implementation of this sustainable business strategy, new start-ups may address the environmental pollution challenges linked with fossil fuels. Biomass chulha is basically a solution for kitchen to prepare food using renewable energy. Adding values to the agricultural biomass as fuel not only bring smile on the face of farmers but also provide a long waited substitution of LPG gas ovens for preparing food. Wood or any agricultural biomass are considered as renewable energy sources, thus our objective is to use it for preparing food in every house in rural and urban area. Moreover, this smokeless chulha can be used in the high rise residential complex without any risk. One more objective is to make biomass smokeless chulha as popular appliance in the modern kitchen too. In addition the proposed model was designed to use wide ranges of biomass including terrified or non-terrified biomass pellets.
11. Specify the potential areas of application in industry/market in brief	There are enormous scopes for application of said smokeless biomass chulha for domestic and commercial use. Proposed smokeless chulha will be a close system without causing any emission inside the kitchen, and the specially design hot surface and hot chambers could be use for cooking of variety of items. As the propose model is a close door system without any leakage of flame, so it could be use in every kitchens either in cities of villages. There are mandatory requirement for room heating in cold area during winter. This smokeless chulha will be a suitable cheaper alternative as well as would be an environment friendly solution. The proposed smokeless chulha not only supposed to use for preparing food but also provide hot water to kitchen as well as to the bathroom also. This will save electricity bill due to running of geysers. The proposed system will be very much popular in the commercial places like hotels, restaurants, bakeries, hospitals etc. There are considerable amount of fossil fuels require in industries for generating heat. Smokeless chulha could replace the conventional coal fired heating system entirely or it could be integrated as an auxiliary heating system. With little modification biomass pellets could use in modified chulha for generating low pressure to moderate pressure stem for use. The smokeless chulha could be useful for preheating systems in process industries.

12. Briefly provide the market potential of idea/innovation	Rural people still rely on biomass chulha compromising its smoke realated hazards. LPG can be additional arrangement for food preparation, but still a costly and limited alternative. Thus a smokeless biomass chulha is an essential arrangement for the kitchen of every household. As we propose its design for heating water, hot oven, hot plat and barbeque grill without indoor smoke and outdoor smoke, it could be used in high rise building and urban area also. Peoples have any reasons as mention above to purchase the proposed smokeless chulha. In particular cold area, it becomes an essential item for biomass based water heater, roti maker, heating of freeze food items etc. Thus we can start our manufacturing units of such chulha with little variation of MOC could open up enormous market, actually every household.
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