

इंडियन इंस्टीट्यूट ऑफ टेक्नोलॉजी दिल्ली

हौज खास, नई दिल्ली -110016

(औद्योगिक अनुसंधान एवं विकास इकाई)

INDIAN INSTITUTE OF TECHNOLOGY DELHI

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(Industrial Research & Development Unit)

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Applications from Indian nationals are invited for Project Appointment under the following project. Appointment shall be on contractual basis with consolidated pay, renewable yearly or upto the duration of the project, whichever is earlier. निम्नलिखित परियोजना के तहत भारतीय नागरिकों से आवेदन आमंत्रित किए जाते हैं। अपॉइंटमेंट, अनुबंधित आधार पर समेकित वेतन, नवीकरणीय वार्षिक या परियोजना की अवधि तक, जो भी पहले हो, के साथ होगा।

Introduction: Solid biomass fuel is used by about 40% of the global population and 50% of the Indian population to meet their daily energy needs [1-2]. In poor nations like India, traditional cookstoves are still commonly used. The by-products of their incomplete combustion, however, are damaging to the environment and must be vented [3]. Millions of lives are lost every year as a result of these poisonous pollutants. Women and children are disproportionately impacted by exposure to the harmful effects of cooking smoke from biomass inside, which can cause a variety of health problems, including acute respiratory ailments and cancer. They breathe in fine particulate matter from indoor cooking at concentrations up to 20 times greater than those advised by the World Health Organization [4]. An estimated 60% of the residential energy in India comes from biomass, much of it burnt in the traditional combustion devices called cookstoves (chulhas) which creates air pollution and hence, the adverse health and socio-economic implications. Every year, smoke from open fires and traditional stoves cause death of around 4.8 million people according to estimations from the World Health Organization (WHO, 2012). Also, the growing gap between availability and demand for firewood, coupled with the scarcity of fossil fuels, and the poor thermal performance and pollution caused by traditional stoves, has forced the technologists to focus their attention on improving the thermal efficiencies of these stoves and also to develop more efficient, smokeless stoves.

Job Profile: Release of airborne particulate matter (PM) is a major environmental issue associated with biomass combustion. The World Health Organization (WHO) has issued recommendations for improving air quality, including setting an annual average limit of 20 micrograms per cubic metre of particulate matter (PM10). In India, 68% of the population lives in rural areas, and 0.2 billion people use fuel for cooking: 49% use firewood, 28.6% LPG, 8.9% cow dung cake, 2.9% kerosene, 1.5% coal, lignite, or charcoal, 0.4% biogas, 0.1% electricity, and 0.5% any other means. According to the Global Burden of Disease 2013 study, air pollution causes the deaths of approximately 5.5 million people every year. There are approximately 2.6 million persons who are exposed to indoor air pollutants. The leading causes of death among these people are ischemic heart disease (27%), chronic obstructive pulmonary disease (28%), lower respiratory infections (16%), and lung cancer (4%), in that order [1]. Burning crops in an open field is a major reason for changing the atmospheric chemistry in the nearby locations. Many hazardous pollutants are emitted from this uncontrolled and low-efficiency combustion. Around 13% of global emissions from agro-residue burning are particularly from India, affecting many people's lives yearly. More than 130 MT of agro-residue is subjected to in-situ burning annually in India. Also, the traditional cooking practice followed among rural communities across the globe with woody and unprocessed biomass in traditional cookstoves results in inefficient cooking, fuel wastage, and severe health hazards to the user by inhaling the smoke emitted from the cookstove. Thus, there is an urgent need to investigate these issues to utilise the waste biomass efficiently and protect the environment and people from the emissions of crop residue burning.

Title of the Project	Demonstration of Biomass Pellet based Clean Burners and Evaluation of Carbon Saving Potentials (RP04388N)	
Funding Agency	Swami Samarth Electronics Pvt.Limited, Nashik (Maharashtra) India	
Name of the Project Investigator	Prof. S.K. Tyagi [email id:sudhirtyagi@yahoo.com; tyagisk@iitd.ac.in]	
Deptt./Centre	Department of Energy Science and Engineering	
Duration of the Project	Upto:07/11/2024	
Post (s)	Consolidated fellowship / Pay-slab	Qualifications
Research Associate (01)	Rs.47,000/-p.m. plus HRA @ 24%	EQ & Desired Skill: M. Tech. with 3-5 yrs Research Experience (Thermal/Mechanical Engineering/Energy) preferably having good experience in Design and Simulation through CFD (for Mech./Energy/Thermal Engg. background). Ph. D. in any discipline of thermal/ mechanical/chemical having publications in referred Journals, will be preferred. Project Requirements: The selected candidate should be able to carry out detailed studies of heat and mass transfer for the biomass combustion devices for cooking and heating applications. This includes the testing using standard (BIS, ISO protocols), modelling & simulation, data collection & analysis, field visit, writing research articles. The study also includes possible interventions as per the user's inputs such as, automation for primary and secondary air flow rates into the biomass combustion devices, simulation using suitable software and other technical work related to the project.

The post may be downgraded as per discretion of the Selection Committee if none of the candidate is found suitable for the post.
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