Project Profile Biomass Stove Distribution & Servicing Unit Uttarakhand

1. Introduction

The state of Uttarakhand, with its predominantly rural population and hilly terrain, relies heavily on traditional fuelwood-based cooking systems. This reliance has led to extensive deforestation, time-consuming fuelwood collection, and serious health concerns due to indoor smoke inhalation. Women and children, in particular, suffer from exposure to carbon monoxide and particulate matter, leading to respiratory illnesses, eye problems, and reduced productivity. Biomass stoves, designed to utilize compressed pellets, briquettes, and agricultural residues, offer a sustainable and efficient alternative to traditional chulhas.

A Biomass Stove Distribution and Servicing Unit aims to introduce these improved cookstoves to rural and semi-urban households, schools, hostels, and small eateries. By functioning both as a retail point for sales and a technical hub for maintenance and repair, the unit ensures not only the adoption of cleaner cooking technologies but also their sustained use. The presence of a servicing component distinguishes this unit from pure retail outlets, as it builds customer trust, provides long-term utility, and enhances satisfaction.

The initiative directly aligns with the state's sustainable energy goals, forest conservation objectives, and health improvement policies. Additionally, it creates entrepreneurship and employment opportunities for local youth, particularly in service, distribution, and awareness creation. Thus, the unit contributes simultaneously to environmental sustainability, livelihood generation, and social well-being.

2. Industry Overview

The clean cooking technology industry in India has received significant policy attention over the past decade. While the government has expanded LPG coverage under schemes like the Pradhan Mantri Ujjwala Yojana, LPG affordability and supply chain issues remain persistent in remote and hilly regions. Consequently, the market for biomass-based improved cookstoves

has expanded, offering affordable, efficient, and culturally adaptable alternatives for rural households.

At the national level, the Ministry of New and Renewable Energy (MNRE) has promoted biomass cookstoves through various programs, encouraging private manufacturers, NGOs, and distributors to expand their networks. In Uttarakhand, the biomass stove industry is still in its growth phase but holds significant promise due to the state's large forest-dependent population. Improved stoves not only address the health and energy needs of families but also contribute to environmental conservation by reducing fuelwood demand.

The industry structure typically consists of stove manufacturers, pellet suppliers, distribution agents, and servicing centers. Manufacturers provide standardized stoves, often tested for emission standards, while distributors ensure last-mile connectivity. Servicing units strengthen adoption by addressing repair needs. Over time, micro-entrepreneurs and SHGs can become part of the network, turning the industry into a decentralized, community-driven clean energy ecosystem.

3. Products and Application

The unit's core product is the biomass stove, available in household, institutional, and community variants. Household models are compact, portable, and designed for family use. Institutional stoves, suitable for schools, hostels, and small restaurants, are larger in capacity and built for heavy-duty cooking. Community models can be deployed in temples, Anganwadi centers, or disaster relief kitchens. These stoves are compatible with biomass pellets, briquettes, and crop residues, which are easily available in Uttarakhand and adjoining states.

Applications of biomass stoves go beyond basic household cooking. Institutions that rely on bulk cooking can significantly reduce costs and improve efficiency. Tourism establishments such as homestays and rural cafés can use biomass stoves both for cooking and as eco-friendly showcases for sustainable tourism. In addition, demonstration units can be used during community fairs and campaigns, providing live examples of the product's efficiency.

Complementary services, such as stove repair, spare parts replacement, and pellet distribution, add value to the offering. Training programs on stove usage, maintenance, and safety can

further improve customer satisfaction and ensure long-term adoption. In this way, the unit functions as a comprehensive provider of clean cooking solutions rather than a simple product outlet.

4. Desired Qualification

The venture can be successfully led by rural entrepreneurs, youth, or SHG members with basic entrepreneurial and technical training. A formal educational degree is not strictly necessary, but having a diploma in mechanical trades, renewable energy, or rural management provides an advantage. The entrepreneur should be familiar with sales, service management, and community engagement practices to effectively manage distribution and customer relations.

Training in stove repair, pellet handling, and safe usage is highly desirable for technical staff. Institutions such as Krishi Vigyan Kendras (KVKs), Renewable Energy Training Centers, or NGO-led programs can provide short-term courses. Knowledge of digital record keeping, inventory management, and government subsidy schemes also helps in smooth operations.

A strong community presence and ability to build trust with rural households are equally important. As stove adoption requires behavior change, the entrepreneur must be patient, persuasive, and service-oriented. Involving women SHG members in distribution can be highly effective, as women are the primary users of cooking stoves and trusted voices in their communities.

5. Business Outlook and Trend

The outlook for biomass stove enterprises in Uttarakhand is highly positive due to a convergence of health, environmental, and policy factors. Growing awareness about indoor air pollution and its harmful effects has created a demand for healthier cooking solutions. Simultaneously, rising fuelwood scarcity has increased household costs and labor burdens, making efficient stoves more attractive.

One emerging trend is the integration of stove distribution with pellet supply chains. Units that not only sell stoves but also ensure regular pellet availability see higher adoption rates. Another

trend is institutional adoption, with government schools, mid-day meal kitchens, and Anganwadi centers exploring biomass solutions to cut cooking costs.

In the medium term, increased climate change awareness and eco-tourism initiatives are likely to enhance demand for biomass stoves as sustainable lifestyle products. Over the long term, clean energy enterprises combining solar, biomass, and biogas solutions are expected to dominate the rural energy market, offering significant scope for diversification.

6. Market Potential and Market Issues

The market potential for biomass stoves in Uttarakhand is extensive. More than 65 percent of rural households continue to depend on firewood for cooking. With nearly 12,000 schools running mid-day meal programs, institutional adoption can add further demand. Additionally, the state's booming homestay sector provides another opportunity for biomass stove adoption as part of sustainable tourism practices.

Despite this potential, market issues persist. High upfront cost is one barrier, as rural households often hesitate to make large investments even if long-term savings are evident. Awareness is another challenge, with many families reluctant to switch from traditional methods due to cultural familiarity. Demonstrations and EMI-based payment models are crucial in overcoming these barriers.

Another key issue is servicing. If stoves malfunction and repair services are not easily available, households quickly revert to traditional chulhas. Hence, a robust servicing network, spare part availability, and pellet supply are vital for sustained adoption. Tackling these issues with a mix of awareness, financing, and service support is critical to unlocking the full market potential.

7. Raw Material and Infrastructure

The primary raw materials for this unit are finished stoves procured from certified manufacturers, spare parts such as burners, chimneys, and handles, and biomass pellets or briquettes for demonstration purposes. Reliable vendor tie-ups are essential to ensure continuous supply and maintain product quality.

The infrastructure required includes a small warehouse for storage, a demonstration showroom for customer engagement, and a servicing area equipped with repair tools. Additional infrastructure includes pellet storage bins to prevent moisture damage, a small office for documentation, and logistics arrangements such as a transport vehicle.

A space of 500–700 sq. ft. is sufficient for showroom, storage, and service center functions combined. Locating the unit near block headquarters or local markets ensures better visibility, accessibility, and customer footfall. Ensuring basic amenities such as electricity, ventilation, and water supply is also necessary for smooth operations.

8. Operational Flow and Flow Chart

The operational flow of the unit involves several interconnected activities. It starts with procurement of stoves, spare parts, and pellets from manufacturers and suppliers. These are stored systematically and displayed in the showroom for demonstrations. The sales process involves awareness campaigns, village-level demonstrations, and direct retail sales to households, schools, and institutions.

After-sales service is a critical part of the flow. The unit maintains a customer database and schedules follow-ups for servicing, spare replacement, and pellet refills. This ensures that customers remain engaged and satisfied, reducing the likelihood of reverting to traditional stoves.

The unit also organizes outreach programs in partnership with SHGs, NGOs, and Panchayati Raj Institutions to expand market coverage. Over time, village-level distribution points can be developed to increase accessibility.

Operational Flow Chart:

Procurement of Stoves & Parts → Storage & Display → Awareness & Demonstrations → Sales & Distribution → Customer Database Entry → After-Sales Service & Repairs → Pellet & Spare Supply → Continuous Customer Support

9. Target Beneficiaries

The primary target beneficiaries of this project are rural households in Uttarakhand, where the majority of families still rely on traditional chulhas. Women and children, who spend the most time near cooking fires, will benefit directly from reduced smoke exposure, leading to improved health outcomes such as fewer respiratory diseases, eye problems, and reduced drudgery from firewood collection.

Institutional beneficiaries include government schools under the mid-day meal scheme, hostels, temples, small eateries, and homestays. Adoption in these settings will reduce operating costs, ensure consistent fuel availability, and demonstrate sustainable practices to surrounding communities. This institutional market is vital as it ensures bulk demand and creates visibility for the technology.

Secondary beneficiaries include youth and women's self-help groups engaged as distribution partners, technicians, and pellet suppliers. By creating employment and entrepreneurship opportunities, the unit contributes to rural income generation while addressing pressing energy and health challenges.

10. Suitable Locations

The unit is best suited to semi-urban towns and block headquarters in Uttarakhand where both rural outreach and market linkages are strong. Districts such as Chamoli, Pauri, Almora, Rudraprayag, Bageshwar, Champawat, and Tehri are particularly suitable due to their dependence on firewood and proximity to forest areas. These regions also have significant institutional demand from schools and hostels.

Proximity to pellet suppliers or briquette manufacturers, such as those located in Rudrapur and Haldwani industrial areas, is an added advantage. Easy logistics ensures cost-effective pellet supply to households. Additionally, locations near tourist hubs like Nainital, Mussoorie, and Ranikhet provide opportunities for sales to homestays and eco-tourism enterprises.

A hub-and-spoke model can be adopted, where one major unit is located in a district town, supported by smaller distribution kiosks in nearby villages operated by SHGs. This

decentralized approach ensures last-mile connectivity and continuous servicing for rural customers.

11. Manpower Requirement

Manpower Category	Number Required	Roles and Responsibilities
Unit Manager	1	Operations, procurement, liaison with suppliers and government
Sales Executives	2	Outreach, demonstrations, household and institutional sales
Service Technicians	2	Stove installation, repair, maintenance, pellet distribution
Storekeeper	1	Inventory management, warehouse handling
Office Assistant	1	Accounts, billing, record keeping
Logistics/Support Staff	1	Transportation, loading/unloading

The manpower plan ensures both sales and service activities are managed effectively, with a total of 8 people for smooth functioning. In addition, village-level SHG members can be engaged as part-time promoters and micro-distributors.

12. Implementation Schedule

Activity	Timeline (in Months)
Business Planning & Registrations	1–2
Procurement of Stoves & Equipment	2–3
Infrastructure Setup (Showroom/Store)	3–4
Recruitment & Training of Staff	4–5

Activity	Timeline (in Months)
Awareness Campaigns & Demonstrations	5–6
Launch of Sales & Service Operations	6 onwards

The entire project can be implemented within 6 months, provided that approvals, finance, and supply linkages are managed in parallel.

13. Estimated Project Cost

Cost Head	Amount (INR Lakhs)
Infrastructure & Setup	4.00
Tools & Servicing Equipment	1.50
Initial Stove Inventory	6.00
Spare Parts & Pellet Stock	2.00
Awareness & Promotion	1.50
Working Capital	3.00
Miscellaneous/Contingency	2.00
Total Project Cost	**20.00 Lakhs**

14. Means of Finance

Source of Finance	Contribution (INR Lakhs)
Promoter's Contribution	5.00
Bank Loan/Term Loan	12.00
Government Subsidy/Support	3.00
Total	**20.00 Lakhs**

The project can avail capital subsidy support under Devbhoomi Udyamita Yojana (DUY) or renewable energy promotion schemes, reducing the financial burden on the entrepreneur.

15. Revenue Streams

1. Sale of household, institutional, and community biomass stoves.
2. Annual maintenance contracts and repair services.
3. Sale of spare parts such as chimneys, burners, and accessories.
4. Continuous pellet and briquette supply to users.
5. Training and awareness workshops for SHGs, schools, and institutions.

This diversified revenue structure ensures both one-time and recurring income, balancing profitability and sustainability.

16. Profitability Streams

Profitability arises from three major components: one-time revenue from stove sales, recurring income from pellet supply, and regular servicing charges. Pellet sales in particular create a recurring income stream as households require continuous fuel.

Seasonal sales during festivals, government programs, and tourism seasons increase demand, allowing the unit to achieve higher turnover in peak periods. Institutional sales also provide consistent income, as schools and hostels purchase in bulk and require regular servicing.

Margins on stoves range from 20–30 percent, while pellet sales and servicing can yield margins of 25–40 percent. Over time, brand trust and customer loyalty reduce marketing costs, further improving net profitability.

17. Break-even Analysis

Particulars	Value (Year 2)
Fixed Costs (Lakhs)	6.00
Variable Cost per Stove	2,500
Average Selling Price	4,000

Particulars	Value (Year 2)
Contribution Margin/Stove	1,500
Break-even Volume (Stoves)	4,000 units

The project achieves break-even within the second year by combining stove sales with pellet and servicing revenues.

18. Marketing Strategies

Effective marketing will combine community engagement, institutional tie-ups, and awareness generation. Village demonstrations, SHG workshops, and school-based awareness programs will be key to reaching rural families. Word-of-mouth promotion through satisfied women users will be one of the most powerful tools.

Institutional partnerships with schools, hostels, and homestays will help in bulk sales and visibility. Collaborating with NGOs, forest departments, and Panchayati Raj Institutions ensures credibility and wider acceptance. Flexible payment models such as installment sales or subsidy-linked discounts will overcome affordability barriers.

For urban and semi-urban institutions, branding the product as eco-friendly and sustainable will attract tourism operators and restaurants. Posters, community radio jingles, mobile van campaigns, and social media storytelling can be used to complement ground-level outreach.

19. Machinery Required and Vendors in Uttarakhand

Equipment/Machinery	Purpose	Possible Vendors in Uttarakhand
Tool Kits (Welding, Cutting)	Repairs and servicing	Dehradun Tool Suppliers, Haridwar Market
Pellet Storage Bins	Moisture-free pellet storage	Rudrapur Industrial Suppliers

Equipment/Machinery	Purpose	Possible Vendors in Uttarakhand
Demonstration Stoves	Field-level demonstrations	Haldwani Stove Dealers, Haridwar SIDCUL
Transport Vehicle	Stove distribution & servicing	Tata/Force Motors Dealers, Dehradun
Spare Part Kits	Chimneys, burners, accessories	Local suppliers in Haridwar and Kashipur

This machinery list ensures both distribution and servicing operations can run smoothly with local vendor support.

20. Environmental Benefits

Biomass stove adoption significantly reduces fuelwood consumption, lowering pressure on Uttarakhand's forests. By promoting the use of pellets and briquettes made from agricultural residues, the project also addresses agri-waste management issues, reducing open burning and environmental pollution.

Improved combustion efficiency reduces emissions of carbon monoxide, black carbon, and particulate matter, contributing to better indoor and outdoor air quality. Women and children benefit from healthier living conditions, leading to long-term social and economic gains.

At a macro level, this project contributes to climate change mitigation goals and aligns with India's commitments to sustainable energy and carbon reduction. The unit thus serves as a green enterprise model for rural development.

21. Future Opportunities

In the future, the unit can scale up to multiple districts with a hub-and-spoke model, ensuring wider outreach. Partnerships with local pellet producers can enable backward integration, and even small pellet plants can be established in Uttarakhand to create rural employment.

There is scope to diversify into clean energy solutions, such as hybrid solar-biomass cooking systems, improved biogas plants, and solar dryers. These complementary technologies can expand the customer base and strengthen the unit's role as a rural energy hub.

Export potential also exists for institutional stoves and pellet supply to eco-tourism resorts and neighboring states. With strong branding and government support, the unit can evolve into a state-level distribution and servicing network, promoting both entrepreneurship and sustainability.

Disclaimer

Only a few machine manufacturers are mentioned in the profile, although many machine manufacturers are available in the market. The addresses given for machinery manufacturers have been taken from reliable sources, to the best of knowledge and contacts. However, no responsibility is admitted, in case any inadvertent error or incorrectness is noticed therein. Further the same have been given by way of information only and do not imply any recommendation.