

# 27 LIME FROM LIMESTONE



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## 1. INTRODUCTION

The project, "Lime from Limestone," is a micro and small investment venture designed for entrepreneurs interested in the mineral processing industry in the Uttarakhand region of India. Lime, a versatile chemical compound derived from limestone, plays a crucial role in various sectors, making it a promising business opportunity.

## 2. PRODUCT & ITS APPLICATION

The primary product of this project, high-quality lime, is derived from the calcination of limestone and is pivotal in a myriad of industrial applications. In the construction industry, lime's inclusion in mortar and plaster enhances their workability, durability, and setting time, making it an indispensable material. The agricultural sector benefits from lime's soil quality improvement capabilities, pH balance adjustment, and its use as a fertilizer, demonstrating its versatility beyond construction. Lime's role in water treatment is crucial for both municipal and industrial processes, where it purifies water and controls pH levels. In the steel industry, lime facilitates desulfurization during production, underscoring its importance in heavy industrial operations.

The chemical industry relies on lime as a fundamental raw material for producing various chemicals, including calcium carbide, highlighting its chemical utility. In mining, lime is instrumental in controlling mine drainage acidity and reducing environmental impacts, showcasing its environmental significance. The sugar industry utilizes lime in the sugar extraction clarification process, indicating its role in food processing. Furthermore, lime's contribution to environmental control extends to air and water pollution mitigation, emphasizing its ecological benefits. Additionally, the paper and pulp industry employs lime in its production processes, and the food industry makes use of lime in pickling and preservation, illustrating its widespread applicability across diverse sectors.

## 3. DESIRED QUALIFICATION FOR PROMOTER

To successfully establish and operate a lime production venture in Uttarakhand, the promoter should possess a diverse set of qualifications and attributes. Firstly, technical knowledge is paramount, necessitating a background in chemistry, mineral processing, or a related field to comprehend the intricacies of the lime production process and ensure stringent quality control measures are in place. Additionally, proficiency in business management is crucial, encompassing financial planning, marketing strategies, and adept supply chain management to streamline operations and maximize profitability. Moreover, a comprehensive understanding of legal compliance is imperative, as the industry is subject to various regulations, licenses, and permits governing mineral processing operations. Lastly, effective resource management skills are essential for overseeing the efficient utilization of resources, including raw materials, machinery, and labor, to optimize production processes and enhance operational efficiency.

## 4. INDUSTRY OUTLOOK AND TRENDS

The lime production industry in Uttarakhand, as well as on a global scale, is poised for significant growth, buoyed by a confluence of favorable trends and expanding opportunities. The industry's outlook is particularly bright, with increasing demand from the construction and agriculture sectors acting as key drivers, especially in emerging markets where these sectors are rapidly expanding. This surge in demand is complemented by a growing emphasis on sustainability and

eco-friendly practices, which is promoting the use of lime in water treatment and environmental control efforts, aligning with global efforts to mitigate environmental impact.

Furthermore, the continuous development of infrastructure projects provides a steady demand for lime-based products, essential for construction activities. Technological advancements in kiln technology and automation are set to enhance production efficiency and reduce costs, thereby increasing the competitiveness of lime production ventures. The potential for exporting lime-based products to neighboring regions and countries presents lucrative opportunities for expanding market reach and tapping into new revenue streams.

## 5. MARKET POTENTIAL AND MARKETING ISSUES; IF ANY

The market potential for lime production in Uttarakhand is significant, driven by its diverse applications in construction, agriculture, water treatment, and various industries. In the construction sector, lime is essential for mortar, plaster, and soil stabilization, amidst rapid infrastructure development. Agriculture utilizes lime to enhance soil fertility and crop yields, reflecting a growing market. Similarly, the demand for lime in water treatment and industrial applications remains steady. Export opportunities further augment the market. However, entrepreneurs must navigate challenges like competition, ensuring consistent quality, regulatory compliance, and establishing efficient distribution networks to capitalize on this promising market potential.

In India, the lime and limestone industry is witnessing its own set of trends, with lime production on the rise to meet the increasing demand for lime-based foods and the health benefits they offer. India's limestone production, which stood at nearly 350 million metric tons in 2021, is estimated to have increased to around 393 million metric tons in 2022. The chemical lime segment, in particular, is expected to see significant growth, driven by its application in producing other chemicals like quick lime, slaked lime, and precipitated calcium carbonate. Looking ahead, India's cumulative demand for limestone is projected to reach around 4,664 million tonnes by 2030, highlighting the substantial growth potential of the lime production industry in the country.

## 6. RAW MATERIAL REQUIREMENTS

The cornerstone of lime production hinges on the procurement of high-quality limestone, which serves as the primary raw material for the manufacturing process. Essential for the production of lime, the limestone must boast a high calcium carbonate ( $\text{CaCO}_3$ ) content to ensure the efficiency and quality of the lime produced. To this end, the limestone deposits located in Uttarakhand or the surrounding regions are identified as the optimal sources for this crucial raw material. The selection of these deposits is strategic, aiming to leverage the local geological bounty to meet the raw material requirements for lime production, thereby ensuring a steady supply of high-quality limestone essential for the process.

Some of existing suppliers in similar business:

- **Uthaya Chemicals:** 183-B, 7th Street, Kamakotti Nagar, Pallikarani, Pallikaranai, Chennai - 600100, Tamil Nadu, India
- **Deepali Minerals:** C - 2/29 C, Lawrence Road, New Delhi - 110035, Delhi, India
- **SVN Bharat Minchem Private Limited:** 263/05, Sanganer, Pratap Nagar, Jaipur - 302029, Rajasthan, India

- **Ashirwad Enterprise:** Block No 711 Plot No 3 Shop No 2 Jitali Silver Avenue Jitali Bharuch, GIDC, Ankleshwar - 393001, Gujarat, India
- **A.H.LIME SUPPLIERS:** Address: F-2/3, BILAL PARK, BALUBHAI MOTORS ROAD, OPP JANPATH HOTEL, NR. SARKHEJ RAILWAY- CROSSING, Sarkhej Makarba Rd, Ahmedabad, Gujarat 382210. Phone: 091937 61625
- **Chalode Lime Industries:** Address: Mundaparamba P.O Edayannur, Chalode, Kerala 670595. Phone: 095262 46666

## 7. MANUFACTURING PROCESS

The manufacturing process of lime commences with the quarrying of limestone, sourced from deposits that are rich in purity and quality. Once extracted, this limestone is subjected to crushing, breaking it down into smaller pieces, and then screened to achieve the desired size suitable for the next stage of processing. Following this preparation, the crushed limestone undergoes calcination, a process where it is heated at high temperatures in a kiln or rotary furnace. This intense heating prompts the limestone to release carbon dioxide (CO<sub>2</sub>), transforming it into quicklime (calcium oxide, CaO).

Subsequently, this quicklime is mixed with water in a process known as hydration, resulting in the formation of hydrated lime (calcium hydroxide, Ca(OH)<sub>2</sub>), a reaction that releases a substantial amount of heat. To cater to specific customer needs, the hydrated lime might be further processed through grinding and sizing. The final step involves packaging the finished product, making it ready for distribution to various industries where it serves numerous purposes.

The Bureau of Indian Standards (BIS) standard for hydrated lime is IS 1540-2. This standard is for quicklime and hydrated lime for chemical industries. The BIS standard for lime is IS: 712 - 1984. This standard classifies lime into six categories: Class A, Class B, Class C, Class D, Class E, and Class F. Class A lime is used for structural purposes because it is hydraulic lime and can set without air. The BIS standard for hydrated lime was first published in 1959 and revised in 1970 and 1978. The 1978 revision included a clause on hydrated lime grades for different industries.

## 8. MANPOWER REQUIREMENT

Sr. No	Particulars	No. of Person	Months	Monthly Wages Amount/Person (Rs in Lakhs)	Monthly Wages - Total (Rs in Lakhs)	Annual Expenses (Rs in Lakhs)
1	Skilled	3	12	0.22	0.66	7.92
2	Semi-skilled	3	12	0.15	0.45	5.40
3	Unskilled	5	12	0.10	0.50	6.00
	<b>Total</b>					<b>19.32</b>

## 9. IMPLEMENTATION SCHEDULE

Sr. No.	Activity	Time Required (in months)
1	Acquisition of premises	1.5
2	Construction (if applicable)	2.5
3	Procurement & installation of Plant & Machinery	2
4	Arrangement of Finance	2
5	Recruitment of required manpower	1
<b>Total time required (some activities shall run concurrently)</b>		<b>7</b>

## 10. COST OF PROJECT

Sr. No.	Particulars	Amount (Rs in Lakhs)
1	Pre-operative Expenses	1.60
2	Land and Building	20.00
3	Machinery	88.18
4	Equipment and Furniture	3.85
5	Working Capital	1.30
<b>Total Project Cost</b>		<b>114.93</b>

Assumed capacity to produce lime is 8-10 tonnes per day.

## 11. MEANS OF FINANCE

Bank-term loans are assumed @ 75% of fixed assets.

Sr. No.	Particulars	Percentage Share	Amount (Rs in Lakhs)
1	Promoter's Contribution	25%	28.73
2	Bank Finance	75%	86.20
<b>Total</b>			<b>114.93</b>

## 12. LIST OF MACHINERY REQUIRED

### A. Machinery

Sr. No.	Particulars	Unit	Unit Cost (Rs in Lakhs)	Total Amount (Rs in Lakhs)
1	Quarrying Equipment	1	6.00	6.00
2	Crushing and Screening Plant	1	15.00	15.00
3	Kiln or Rotary Furnace	1	30.00	30.00

4	Hydration Equipment	1	7.00	7.00
5	Grinding Mill	1	5.00	5.00
6	Conveyors and Belt Systems	1	0.02	0.02
7	Weighing Scales	1	0.20	0.20
8	Dust Control Systems	1	1.00	1.00
9	Laboratory Equipment	1	1.50	1.50
10	Material Handling Equipment	1	0.50	0.50
11	Water Treatment Systems	1	1.50	1.50
12	Safety and Protective Gear	1	0.10	0.10
<b>Total Amount in Rs.</b>				<b>67.82</b>
Tax, Transportation, Insurance, etc.				13.57
Electrification Expenses (Wiring) in Rs.				6.79
<b>Grand Total Amount in Rs.</b>				<b>88.18</b>

## B. Furniture & Equipment

Sr. No	Particulars	Unit	Unit Cost (Rs in Lakhs)	Total Amount (Rs in Lakhs)
1	Office Furniture	Set	0.65	0.65
2	Laboratory Equipment	Set	1.00	1.00
3	Safety Gear	10	0.18	1.80
4	Computer and Printer	1	0.40	0.40
<b>Total Amount</b>				<b>3.85</b>

### Some of machinery/equipment suppliers are:

- Shiv Shakti Mechanicals  
H- 459-460, H1-463-464, 2nd Phase,  
Sarna Dungar Industrial Area,  
Jhotwara Extension, Jaipur - 302012, Rajasthan, India
- Gajanand Engineering Works  
Next To Sangari Dharmkanta, Main Salawas Road,  
Sangaria, Jodhpur-342001, Rajasthan, India
- Arsh Techno Engineers  
Pusaram Sharma S/o Hariram Sharma,  
Brahmpuri, Khinwsar, Nagaur, Jodhpur-341025,  
Rajasthan, India

### 13. SALES REALIZATION CALCULATION

Sr. No	Product	Quantity (in tons)	Sales in Percentage	Total Sales (Rs in Lakhs)
1	Quick Lime	6085.7	66%	213.00
2	Hydreted Lime	2815.7	34%	107.00
	<b>Total</b>		100%	320.00

### 14. PROFITABILITY CALCULATIONS

Sr. No	Particulars - Amount (Rs.)	Year-I (Rs in Lakhs)
A.	Sales Realization	
	Sales (Assuming 15% growth per year)	320.00
	Other Income (Assuming constant)	
	Total Sales Realization	320.00
B.	Cost of Production	
	i) Raw Materials	230.40
	ii) Utilities (Assuming constant)	3.5
	iii) Manpower (Salaries/wages)	19.32
	iv) Administrative Expenses (Assuming constant)	2.20
	v) Selling & Distribution Expenses (Assuming constant)	2.50
	viii) Interest (Assuming constant)	11.5
	Total Cost of Production	269.42
	No of Units Produced	2,245
	Cost of Goods Sold	0.12
	Gross Profit/Loss (A – B)	50.59
	Less: Depreciation	9.20
C.	PBIT (Profit Before Interest and Tax)	41.40
D.	Income-tax (Assuming 28% tax rate)	11.59
E.	Net Profit/Loss (C - D)	29.81
F.	Repayment	11.5
	Retained Surplus (E - F)	18.31

## 15. BREAKEVEN ANALYSIS

<b>Fixed cost</b>	<b>Year-I (Rs in Lakhs)</b>
Depreciation	9.2
Interest	11.5
Manpower	5.80
<b>Total Fixed cost</b>	<b>26.50</b>
<b>Variable cost</b>	
Raw materials	230.4
Utilities	3.5
ManPower	13.52
Administrative expenses	2.2
Selling & distribution expenses	2.5
<b>Total Variable cost</b>	<b>252.12</b>
<b>Contribution margin</b>	<b>20%</b>
Break-Even Point in Value	132.50

## 16. STATUTORY/GOVERNMENT APPROVALS

Starting a lime production project in Uttarakhand involves obtaining various statutory and government approvals to ensure compliance with legal requirements. Here are some key approvals and licenses that may be necessary:

- **Environmental Clearance:** Lime production can have environmental implications, so obtaining environmental clearance from the State Pollution Control Board or relevant authority is essential. This clearance ensures that your project complies with environmental regulations.
- **Factory License:** You'll need a factory license under the Factories Act, 1948, to operate the lime production facility legally. This license ensures compliance with safety and labor regulations.
- **GST Registration:** Register for Goods and Services Tax (GST) to comply with tax regulations.

## 17. BACKWARD AND FORWARD INTEGRATIONS

### A. Backward Integration:

Backward integration involves activities related to the supply chain that occur before the primary production process. In the context of lime production, backward integration may include:

- **Raw Material Sourcing:** Secure reliable sources of high-quality limestone, which is the primary raw material for lime production. This may involve agreements with local mines or quarries.
- **Transportation:** Establish efficient transportation arrangements to bring limestone from the source to your production facility.

### B. Forward Integration:

Forward integration refers to activities beyond the primary production process, such as marketing and distribution. In the lime production context, forward integration may involve:

- **Product Marketing:** Develop a marketing strategy to promote your lime products to potential customers, including construction companies, agricultural businesses, and other industries that use lime.
- **Distribution Network:** Establish a distribution network to supply lime products to various markets in Uttarakhand and neighboring regions.
- **Product Diversification:** Explore opportunities to diversify lime products and expand your product range based on market demand.

## 18. TRAINING CENTERS AND COURSES

For entrepreneurs and workers in the lime production industry in Uttarakhand, there are several training centers and courses available to enhance their skills and knowledge. These centers and courses provide valuable insights into various aspects of lime production, safety protocols, and best practices. Here are some key training resources:

- **National Council for Cement and Building Materials (NCCBM):** NCCBM, based in Ballabgarh, Haryana, is a premier research and training institution in the field of cement and building materials. They offer training programs and workshops on lime production, quality control, and sustainable practices. NCCBM's courses are recognized for their industry relevance.
- **State Technical Education Institutions:** Uttarakhand has technical education institutions that may offer relevant courses in mining, materials processing, and industrial safety. These institutions can be valuable resources for acquiring technical skills.

It's advisable for entrepreneurs and employees in the lime production industry to regularly update their knowledge and skills through relevant training programs.

### Disclaimer

Only few machine manufacturers/institutes are mentioned in the profile, although many machine manufacturers/institutes are available in the market. The addresses given for machinery manufacturers/institutes 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 carry any recommendation.