MANUFACTURING · STATIONERY · ETHIOPIA

Pencil Manufacturing Plant

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Feasibility Study for a Wood-Cased Pencil Factory in Ethiopia

Market, technical, human resource and financial assessment of a 28.8-million-pencil plant producing graphite, eraser-tipped and colour pencils.

9 chapters
Market to economic benefits

10-year financial model
NPV, IRR, payback, sensitivity

School market
Enrolment-based demand to 2035

Process & machinery
Automatic line, inputs, staffing



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1. Executive Summary

1.1 The Project

This feasibility study assesses the establishment of a wood-cased pencil manufacturing plant in or near Addis Ababa, Ethiopia. The plant will produce ordinary graphite pencils (grades 9H to 6B), eraser-tipped HB pencils and colour pencils, with an installed capacity of 200,000 gross a year (28.8 million pencils) on a fully automatic line operated in two shifts.

Pencils are an essential item for every pre-primary, primary and secondary school pupil, as well as for offices, technical drawing and the arts. Ethiopia's general education system enrolled about 27 million learners in 2022/23, and demand is supplied by a single domestic producer and by imports, mainly from China. Most raw materials (pencil slats, leads, lacquer, glue, ferrules and erasers) are imported; packaging materials are sourced locally.

1.2 Market

Customs data show that Ethiopia imported 189 tonnes of pencils and crayons in 2025 (about 31.5 million pencils), 94% of it from China, at a landed cost of about Birr 537 per kg including duties and taxes. With domestic production, recorded apparent consumption is about 55 million pencils a year. Based on Ministry of Education enrolment data, demand is estimated at about 121 million pencils in 2026 in the base scenario (four pencils a year per pre-primary and primary pupil), with a range of 57–177 million. The plant's full-capacity output represents about 24% of base-case demand. Pencils retail in Addis Ababa at about Birr 100–120 a pack, from which the study derives factory-gate prices of Birr 6.00 for ordinary, Birr 6.80 for eraser-tipped and Birr 7.50 for colour pencils, excluding VAT. These prices are well above the import-parity price of about Birr 3.9–4.2 a pencil for mass-market Chinese pencils.

1.3 Investment and Finance

Table 1.1 Summary of the Project

Item	Value
Product	Wood-cased graphite, eraser-tipped and colour pencils
Installed capacity	200,000 gross a year (28.8 million pencils), two shifts
Land and building	3,000 m² leased land; 1,800 m² built-up area
Machinery	Automatic pencil line, about US$400,000 (FOB)
Total investment cost	**Birr 213.7 million**
Financing	Equity Birr 85.2 million (40%); bank loan Birr 128.5 million (60%)
Employment	102 permanent staff
Annual sales at full capacity	Birr 182.7 million

Source: Study analysis.

The total investment cost is Birr 213.7 million, of which fixed investment accounts for Birr 160.7 million, pre-operating costs and interest during construction Birr 18.6 million and initial working capital Birr 34.4 million. About Birr 63.9 million (US$400,000) of the machinery cost is required in foreign currency.

1.4 Financial Results

Table 1.2 Key Financial Indicators

Indicator	Result
Sales revenue at full capacity (Year 3)	Birr 182.7 million
Net profit, Year 1 to Year 10	**Birr 9.1 million to Birr 46.2 million**
Project internal rate of return (after tax)	23.4%
Equity internal rate of return	31.1%
Net present value at 17%	Birr 57.0 million
Payback period	4.0 years
Break-even sales (Year 3)	53% of full-capacity sales
Income tax paid, Years 1–10	Birr 149.2 million

Source: Financial analysis, Chapter 8.

The project is financially viable on its base-case prices, but its viability depends critically on the selling price. The NPV at 17% falls to zero at a factory price of about Birr 5.34 for ordinary pencils, 11% below the base case. At import-parity prices of about Birr 4.00, the IRR falls to about zero and the NPV to −Birr 126 million. A slower ramp-up reaching only 80% utilization also brings the NPV close to zero, and a single-shift operation is not viable.

The project is therefore conditionally feasible: it should proceed only if a trade and school survey confirms that wood-cased pencils of the planned quality can be sold at factory prices of at least about Birr 5.30–5.50, and that the plant can capture about a quarter of the market. Otherwise, the design should be reconsidered, for example as a smaller finishing and packing operation using imported semi-finished pencils, or with a product mix weighted towards higher-value colour and eraser-tipped pencils.

1.5 Economic and Social Benefits

The project will employ 102 people, substitute imported pencils and save foreign exchange, support local packaging suppliers and generate about Birr 149 million in income tax over its first ten years, in addition to payroll taxes, VAT and other levies.

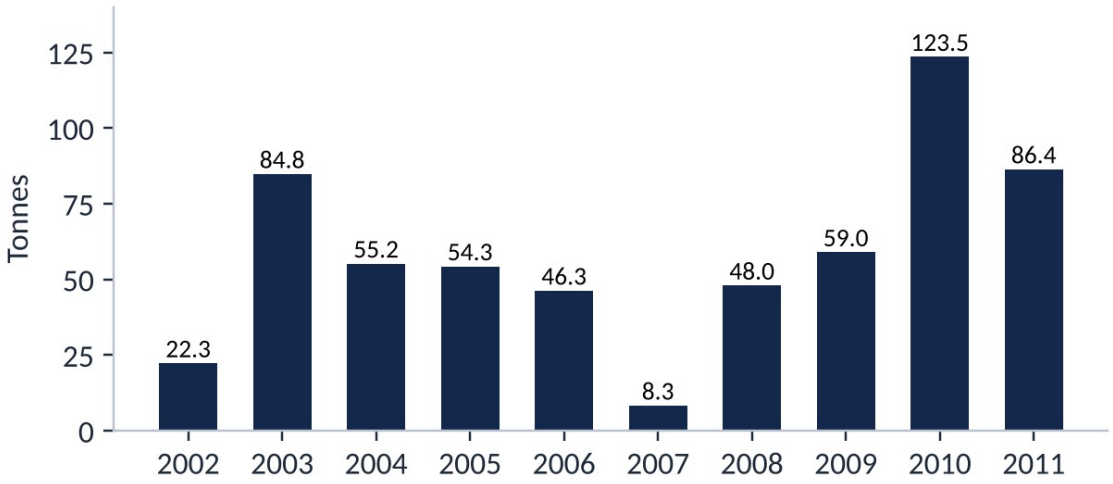


Figure 3.1 Imports of Pencils and Crayons, 2002–2011

Source: Table 3.2.

At an average weight of about 6 grams for an eraser-tipped HB pencil (about 167 pencils a kilogram), the average imports of 2008–2011 (about 79,000 kg) correspond to about 13.2 million pencils a year.

3.2.2 Recent Imports, 2021–2025

Customs import declarations for tariff line 9609.10.00 (pencils and crayons with leads encased in a sheath) show that Ethiopia imported about 1,000 tonnes of pencils and crayons worth Birr 196.2 million (CIF) during 2021–2025, almost all of it from China.

Table 3.3 Imports of Pencils and Crayons (HS 9609.10), 2021–2025

Year	Value (Birr million)	Value (US$ thousand)	Net weight (tonnes)	Birr/kg	US$/kg	Duties and taxes (Birr million)	Taxes/value	Supplier countries
2021	12.24	–	88.5	138	–	5.31	43%	13
2022	35.57	602.1	227.3	157	2.65	11.67	33%	13
2023	44.91	735.7	340.2	132	2.16	16.08	36%	13
2024	30.39	345.3	154.9	196	2.23	11.37	37%	13
2025	73.13	458.8	188.9	387	2.43	28.23	39%	11
Total	**196.24**	**2,141.9 (2022–2025)**	**999.7**	**196**		**72.66**	**37%**	**29**

Source: Ethiopian customs import declarations, 2021–2025, compiled by MultiLink Market Intelligence and Data Platform (November 2026). Values are CIF; 2021 declarations carry no US dollar values.

6. Technology and Engineering

6.1 Production Process

Wood-cased pencils are made in three stages: making the raw pencil, lacquering, and final treatment and packing.

Woodworking. Pencil slats are planed to a fixed thickness and semicircular grooves are cut into one face on the grooving machine. Glue is applied, the leads are laid in the grooves and a second grooved slat is placed on top to form a "sandwich". The sandwiches are clamped in frames under a hydraulic press and dried. The dried blocks pass through a shaping machine that cuts them into individual raw pencils, round or hexagonal.

Lacquering. The raw pencils are coated in automatic painting machines, which apply three to ten coats of lacquer depending on the quality of finish required.

Final treatment. End-cutting machines sand off excess wood and lacquer and trim the pencils to their exact length. For eraser-tipped pencils, the ends are rounded, and a ferrule and eraser are fitted and fixed by the tipping machine. The brand name, hardness grade and other information are hot-foil stamped on each pencil. The finished pencils are inspected, graded and packed in dozens, sets and cartons.

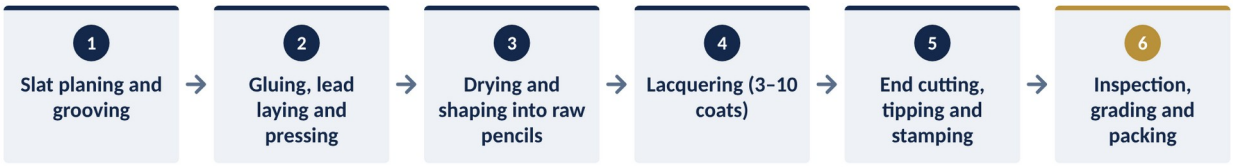


Figure 6.1 Pencil Manufacturing Process

Source: Study analysis.

6.2 Machinery and Equipment

The plant requires one complete automatic line. The cost of the line is estimated at about US$400,000 (Birr 63.9 million) FOB, with a further 25% (Birr 16.0 million) for sea and inland freight, insurance, clearing, duties on spare parts, installation and commissioning.

Table 6.1 Machinery and Equipment Requirement

No.	Description	Quantity
	Woodworking line	
1	Automatic slat grooving machine with feeder	1
2	Automatic gluing and lead-laying machine with connector	1
3	Oleo-hydraulic press	1
4	Clamping frames and plates	800 sets
5	Drying chamber	1
6	Automatic shaping (moulding) machine with connector	1
7	Cutter grinder	1
8	Glue stirrer	1
	Painting line	
9	Automatic painting machine with conveyor system	4
10	Lacquer stirrer	1
	Final treatment	

8.5 Projected Income Statement

Table 8.5 Projected Income Statement, Years 1–10 (Birr million)

Item (Birr million)	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Capacity utilization	70%	85%	100%	100%	100%	100%	100%	100%	100%	100%
Sales revenue	127.92	155.33	182.74	182.74	182.74	182.74	182.74	182.74	182.74	182.74
Variable costs	59.77	72.58	85.39	85.39	85.39	85.39	85.39	85.39	85.39	85.39
Fixed costs	19.61	19.61	19.61	19.61	19.61	19.92	19.92	19.92	19.92	19.92
Depreciation	13.70	13.70	13.70	13.70	13.70	11.40	11.40	11.40	11.40	11.40
Operating profit	34.84	49.44	64.04	64.04	64.04	66.02	66.02	66.02	66.02	66.02
Interest	21.85	21.85	18.73	15.61	12.49	9.36	6.24	3.12	-0.00	-0.00
Profit before tax	12.99	27.59	45.31	48.43	51.56	56.66	59.78	62.90	66.02	66.02
Income tax	3.90	8.28	13.59	14.53	15.47	17.00	17.93	18.87	19.81	19.81
Net profit	**9.09**	**19.31**	**31.72**	**33.90**	**36.09**	**39.66**	**41.85**	**44.03**	**46.22**	**46.22**

Source: Financial model.