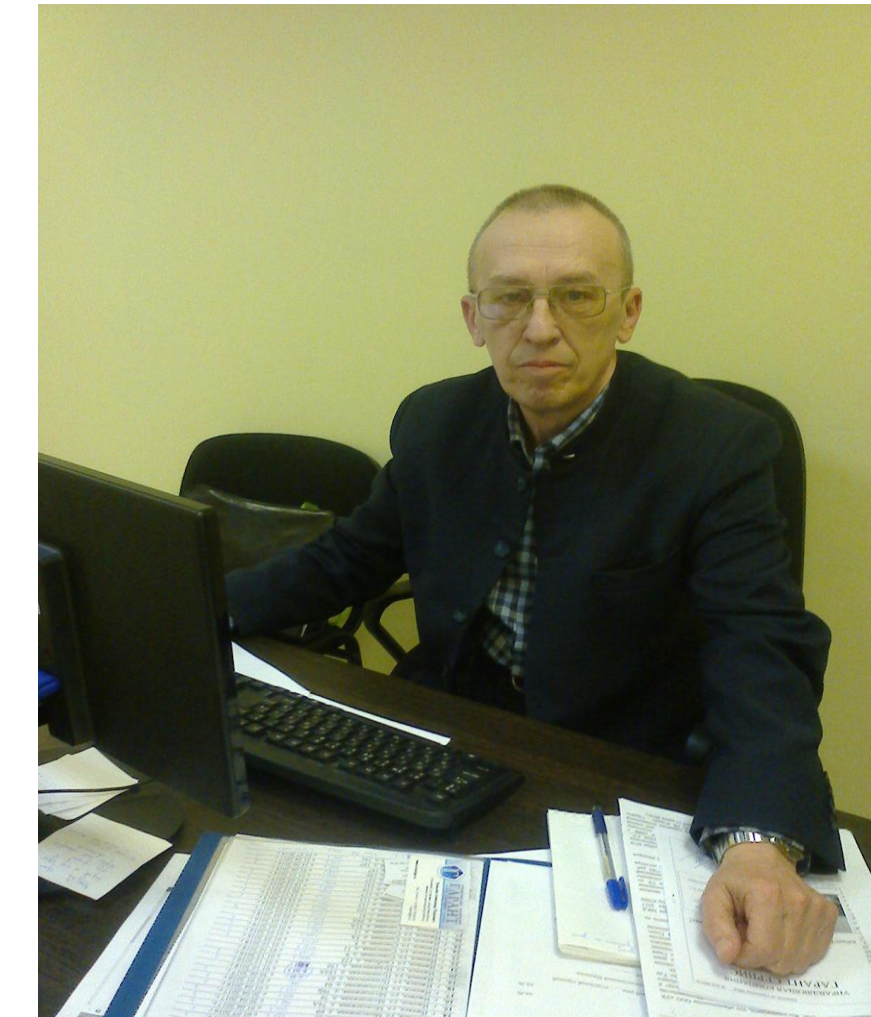


Industrial engineering of thermal panels for insulation and facade cladding of low-rise and high-rise buildings and structures



Vladimir Shabalin

1. PROBLEM

High costs of house heating due to poor insulation.

The most effective way to save money on house heating is a simple insulation of the walls.

Thermal panels with brick tiles currently represent 90% of the thermal panels market. These panels have significant drawbacks - high price (**2,000 rubles/sq.m.**), high installation costs and heavy weight, do not fully comply with the standards of Flammability.



When using thermal panels we do not need to perform two operations with separate installation of insulation and decoration, which is typical of systems with ventilated facades.

2. SOLUTION

Our thermal panel is a molded PVC sheet with a thickness of 2.0 mm, with a filler thickness of 10 mm and thermal insulation of non-combustible mineral wool of any thickness to provide heat transfer resistance (R) of the building walls which is more than $3\text{M}^2 \cdot \text{K/W}$. The estimated maximum size of a thermal panel sheet will be 3 square meters (2500x1200mm).

Thanks to a number of innovations applied in our panels, we receive characteristics which are superior to those of manufacturers in Russia and abroad.

LOYALTY PROGRAM

In order to make our potential consumers more interested and loyal, it is intended to:

- for bulk consumers (developers, dealers, distributors): to apply the conclusion of long-term contracts, discount systems, granting supplier loan, complex motivation, product delivery by the manufacture's transport;
- for the consumers of small wholesale (individuals, small construction and repair companies): some of the above methods are applicable, as well as offering services involving design, modeling and installation of the facade systems of the manufacturer, prepared by specialists on a turnkey basis.

3. CONSUMERS

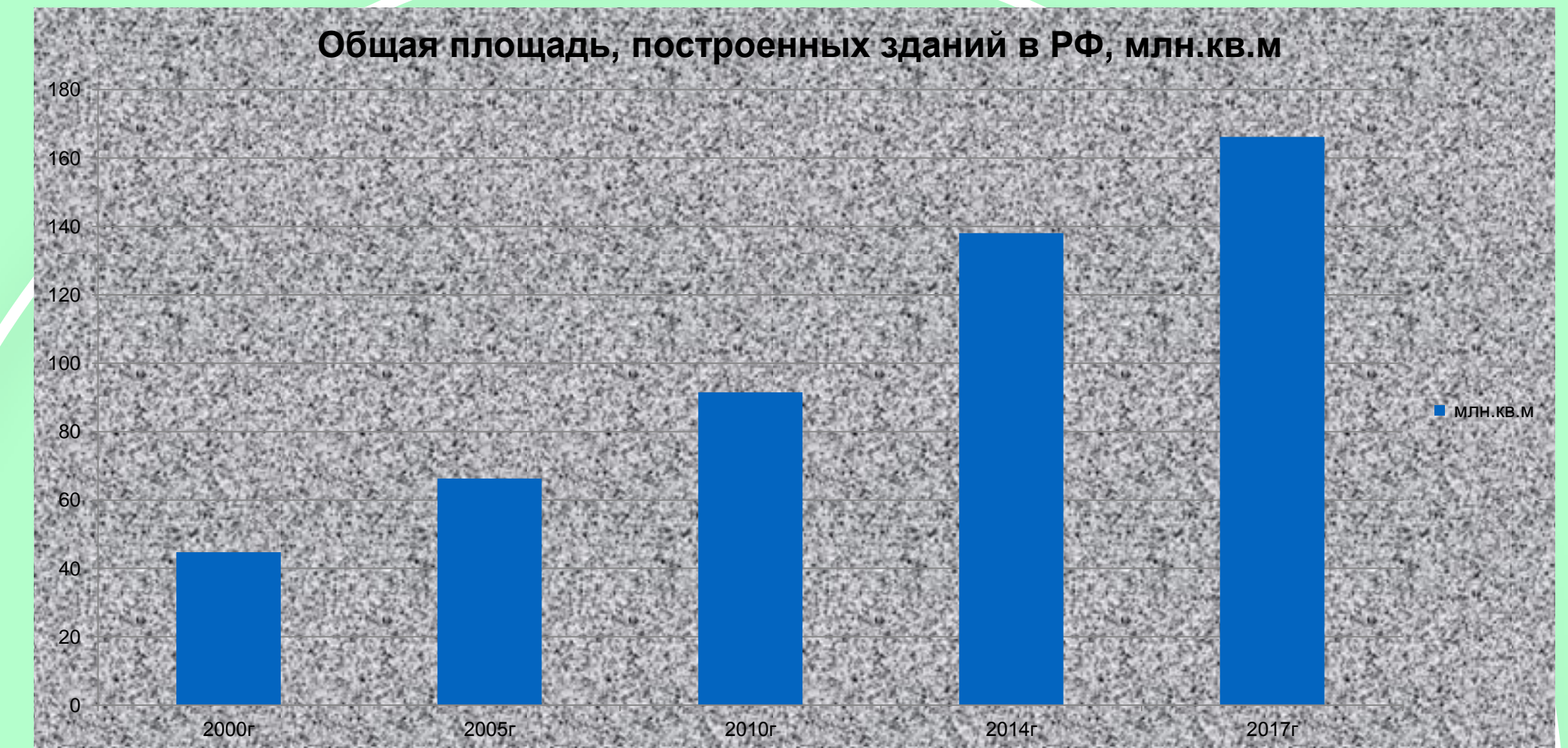
Organizations engaged in construction and repair work;

Building materials dealers and distributors, shops and construction industries;

Private individuals.

4. MARKET

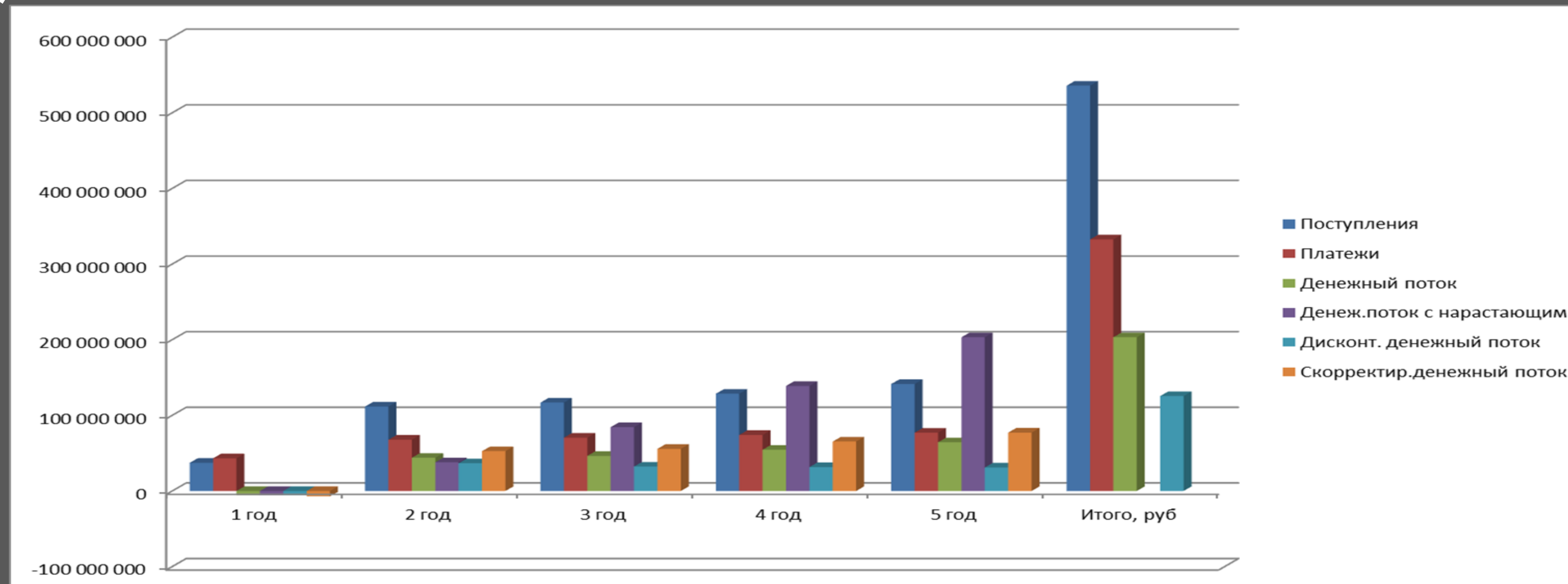
The global facade market industry size in 2016 was estimated at **179.70 billion US dollars**.



The market volume of facade systems in the Russian Federation in 2017 amounted to **46 990 thousand sq. m**. The growth rate in 2017 was 6.5%. In value terms, the market volume of ventilated facades in 2017 amounted to **65 billion rubles** (from the report of the Marketing research agency DISCOVERY Research Group).

According to the Ministry of Construction of UR in Udmurtia in 2018 659.7 thousand square meters of housing were put into operation. The potential volume of thermal insulation of facades with thermopanel T2 (60 m) is 584 thousand sq. m. in individual housing construction only. At the price of **1300 rubles per a square meter** of a thermal panel, the sales volume of this market will be **758,9 million rubles**.

5. Indicators of the investment project



The payback period is 24 months.

NPV (net present value) at a discount rate of 20% for 4 years will be 126 963 000 rubles.

IRR (internal rate of return) also calculated for 4 years will be 748%.

A positive NPV and a very high IRR indicate profitability of this project

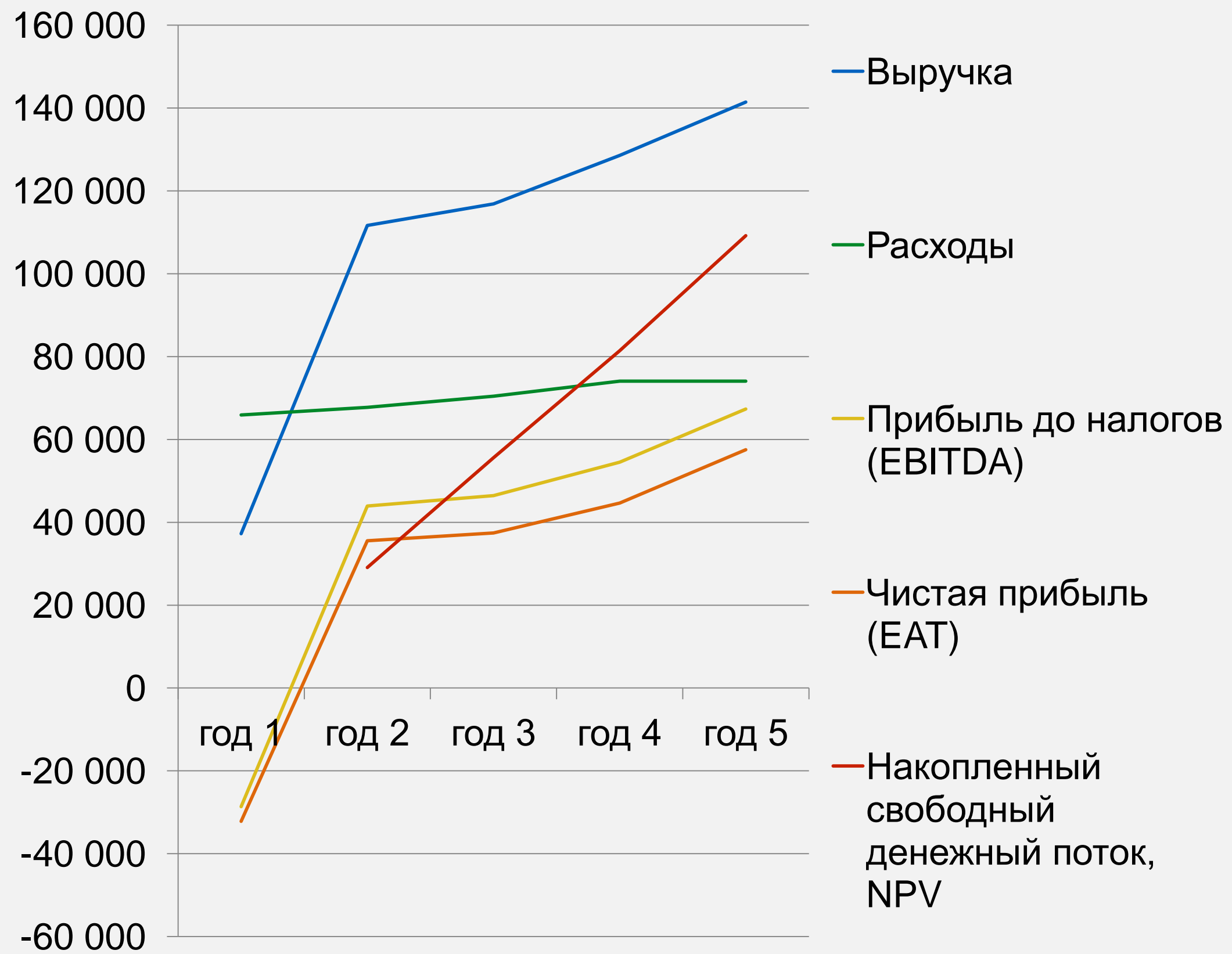
Receipts, payments, cash flow, cash flow on accrual basis, discounted cash flow, adjusted cash flow

325 000 ₺

**Average receipt
amount for individual
housing construction**

6. . FINANCE PLAN

Profit and loss forecast, thousand rubles



The business value in the 7th year of activity is **196 396 thousand rubles**, with an investment of **60 million rubles**

7. COMPETITORS

Heat panel (eco panel): ceramic tiles with fine-grained chippings + EPS foam (expandable polystyrene). Considerable weight and cost. **Combustibility.**

Clinker thermal panels: ceramic tiles + OSB (oriented standard board) + PUF (polyurethane foam)* or EPS foam** (many manufacturers***). Considerable weight and cost. Rigid construction requires installation on perfectly flat walls or on the battens, and with seasonal fluctuations of the foundation, cracks appear. **Combustibility.**

Our thermal panels: have attractive and unique external appearance. Light weight. Thickness from 10mm, flexible, this allows to be used on any curved surfaces inside and outside buildings. Eco-friendly. Good strength and thermal protection properties. Flammability class G1.

Thermopanel "Stenolit": galvanization + PUF (polyurethane foam). Not attractive external appearance. Heavy weight. Corrosion. Needs anti-lightning protection. **Combustibility.**

As a rule, tiles of European, Chinese, less often Russian manufacturers are used in the facing layer of clinker thermopanel. The technology is relatively simple — clinker tiles supplied from Germany or China are glued to the insulation by local manufacturers. The fall of the ruble exchange rate leads to manufacturers setting even higher prices for clinker thermopanel.

IZOsiding: Acrylic spackling + EPS foam. Unvaried external appearance options. **Combustibility.**

8. COMPETITIVE ADVANTAGES

Can be used for **high-rise building** facades insulation and cladding.



Cheaper than competitors' panels



Lower installation costs compared to existing facade systems



Panel size is bigger, up to 3 sq. m, fewer joints, easier installation

Can be used on complex geometry surfaces.

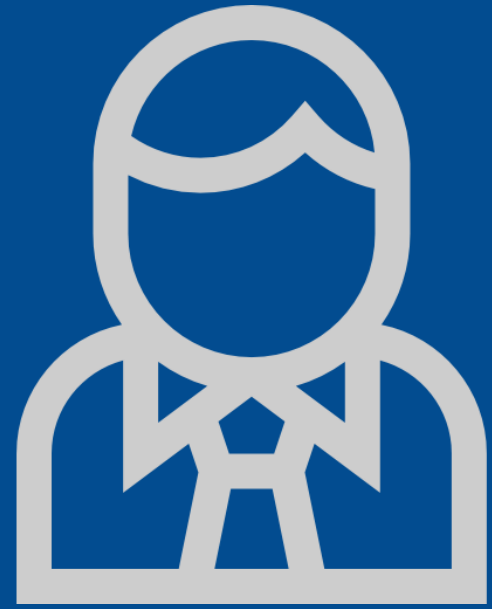


9. Current state of the project

The prototype model is manufactured. It is necessary:

- to manufacture a machine connector (our own development),
- purchase PVC sheet production line,
- purchase necessary materials,
- to produce a mold for the molding of the proposed version of the product,
- rent a room according to the requirements,
- to produce a batch of product,
- apply for certification and proceed to the next stage of the project.

10. TEAM



VLADIMIR - chief industrial engineer

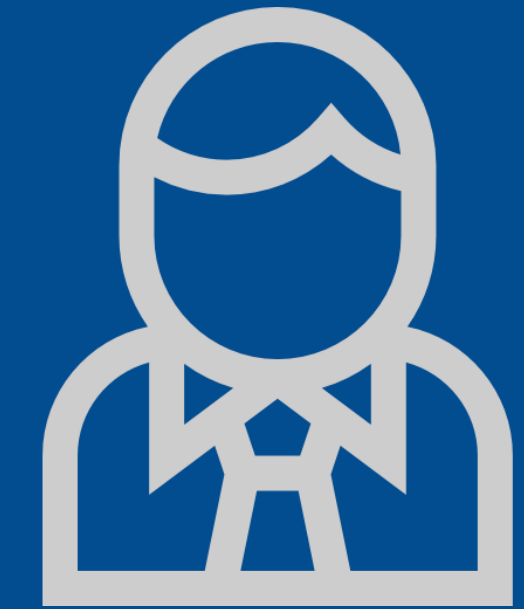
Ph.D. in Technical Sciences, development of composite materials, parts of Kalashnikov assault rifle, tank armor with polyurethane elastomer, etc. Experience: chief industrial engineer, product design and manufacture, including PVC. Chief engineer, Chief executive of industrial enterprises.



VLADIMIR – project supervisor.

Business experience since 1988:

- Deputy Chairman of the cooperative. The market share in the production and sales of furniture in Izhevsk is up to 10%.
- Managing Director of the dealership. TOP 10 car sales in the region.
- Deputy Director of the branch office of the insurance company. The branch office entered the TOP 10 in the insurance market of Udmurtia.
- Development Director of a construction company. The result of his work is an increase in the company's monthly turnover from 300 thousand rubles to 1.8 million rubles.



VLADIMIR – chief engineer

Head of the technical office of the "Bummash" plant, development and implementation of new technologies and technological processes. Head of the resource saving department in Gosstab (State suppliers) in the Udmurt Republic. Chief executive of the trading and processing company VTORRESURSY (Recyclable materials) in Izhevsk.

11. TO INVESTORS

60 million rubles is required for a share in the project up to 50%.

To implement the project, it is planned to use the vacuum-forming machine ANSA, worth 6.5 million rubles, available from the initiators of the project.

Transactions:

15 million + 7 million + 38 million ₺

Fixed assets, raw materials, tracks, certificates, patents, licenses, marketing, staff salaries, fixed costs

60 million ₺

Investor's share for the 1st 15 million rubles tranche is 25%

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Vladimir Shabalin - project supervisor

8 912 756 75 26, shvg18@mail.ru