BUSINESS PLAN of
Investment Project

"Creation of EcoTechnoPark – Center of Certification, Testing and Improvement of "Second Level" Transport System under SkyWay Technology in Maryina Gorka, Minsk Region"

Project developer:
Closed Joint Stock Company
SkyWay Technologies Co.
104, bldg B, office 703b
Dzerzhinskogo Ave., Minsk

Minsk 2016

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1. SUMMARY

This Business Plan has been elaborated to make assessment of financial and economic efficiency of implementing the investment project "Creation of EcoTechnoPark – Center of Certification, Testing and Improvement of "Second Level" Transport System under SkyWay Technology in Maryina Gorka, Minsk Region".

The enterprise was registered by Minsk City Executive Committee in the Unified State Register of Legal Entities and Individual Entrepreneurs under No. 192425076 dd. 12/02/2015 as Closed Joint Stock Company "SkyWay Technologies Co.".

The authorized capital was registered in the amount of 5.3 bln BYR (Belarusian rubles). On 18/03/2015, there were issued shares in the amount of 10,000 pcs, which were distributed among shareholders. The additionally announced authorized capital was 262.7 bln BYR as of 01/01/2016 and shall be formed in full before 31/12/2016. In fact, the authorized capital as of 01/01/2016 was formed in the amount of 19.7 bln BYR (equivalent to 1,060.9 thousand USD at the conversion rate equal to the rate of the National Bank of the Republic of Belarus as of 01/01/2016).

The founders of the enterprise are as follows:

1. Legal entity, resident of the British Virgin Islands, Joint Stock Company Ltd. "Global Transport Investments Inc.", registered on 12/06/2013 under No. 1778122; location: 19 Waterfront Drive, p/o 3540, Road Town, Tortola, VG1110, British Virgin Islands – 9,000 (nine thousand) ordinary (common) shares.

2. Citizen of the Republic of Belarus Anatoly Yunitskiy – 1,000 (one thousand) ordinary (common) shares.

Legal address: 1a Leninskaya st., agro-town Novosyolki, Pukhovichi district, Minsk region, 222838, Republic of Belarus.

Postal address: 104, bldg B, office 703b Dzerzhinskogo Ave., 220116, Minsk, Republic of Belarus.

General Director – General Designer of the enterprise is Anatoly Yunitskiy.

The main purpose of the project is creation of EcoTechnoPark – Center of certification, testing and improvement of "second level" transport system under SkyWay technology of the fourth generation.

The distinctive features of SkyWay string transport system (SkyWay technology) are attributed to the complex of its design, technological and operating peculiarities.

String transport technology was supported by 16 expert evaluations, including by the Solomenko Institute of Transport Problems of the Russian Academy of Sciences, the Siberian Branch of the Academy of Transport of the Russian Federation, State Committee for Construction, the Ministry of Economy and the Ministry of Transport of the Russian Federation, Russian Academy of Engineering, Petersburg State Transport University, the United Nations Organization (UN-HABITAT Program).

The technology for building the rail-string track structure and supports, as well as the main units and components of cargo string transport of the first generation in 2001–2009 successfully passed evaluation testing at the test site built in 2001 in the town of Ozyory, Moscow region.

Road or railway transport is usually used for overland passenger and cargo transportation. The main general design feature of these transport systems is earth embankment, which serves as a basis for solid road surface or a railway sleeper bed for railway transport.

The track structure designed under SkyWay technology has no solid roadbed. In terms of traffic management, it is similar to automobile transport, and in terms of track structure – to railway transport in overpass design.

The basis of the track structure is uncut string rails pre-stressed by tension and installed on supports (light transport system) and an uncut load-bearing trussed-string structure pre-stressed by tension (heavy and multifunctional transport system).

The track structure is always located above the ground surface due to anchor supports (every 3–5 km and more) and intermediate supports (every 40–60 m and more).

Location of the track structure above the ground surface has a fundamental value for keeping down construction costs, minimizing the environmental impact, creating optimal conditions for economic management along the whole territory of the track, as well as for ensuring the highest safety level on the transport.

The rolling stock is always rail transport on steel wheels:
– passenger – **unibus, unicar, unibike** (they differ in passenger capacity and design travel speeds);
– cargo – **unitruck,** which has simple and reliable algorithms of traffic organization and management in the logic of conventional rail transport.

The innovative nature of string technologies is mainly formed due to the additional synergetic effect, which is made up of simple and clear solutions. Each of them is well known separately and is widely used in machinery.

Tre project relevance is explained by unavailability of a similar object not only in the Republic of Belarus, but also anywhere in the world.

EcoTechnoPark will demonstrate all main transport and infrastructure solutions of SkyWay technology in its fourth generation:

- **high-speed double-rail track**
  (with mounted rolling stock, speed – up to 500 km/h),
  urban double-rail
  (with mounted rolling stock, speed – up to 120 km/h);
- **urban monorail track**
  (with mounted rolling stock, speed – up to 120 km/h),
- **cargo track**
  (in two design variants: as a product pipeline, and with suspended monorail unitrucks).

Moreover, there will be planted gardens, created squares, walkways and organized pedestrian zones, which will underline eco-friendliness of the innovative transport system SkyWay.

EcoTechnoPark will also be an exhibition center and sales showroom for SkyWay products. It will allow to pay off the invested funds due to designing and constructing transport and infrastructure complexes all over the world, as well as due to their further operation.

The project time horizon is assumed to be about 10 years.
When planning, two scenarios are taken into consideration – optimistic and pessimistic. In our case, an optimistic scenario is taken as a basis.
The main directions of investment expenses and sources of their funding are given in Table 1.1.

Table 1.1 – Investment plan, mln USD

Purpose of investments	Total	By years of project implementation, mln USD		
		2015	2016	2017
Pre-investment expenses	5.5	2.0	3.0	0.5
Design and construction works	19.0	4.0	7.0	8.0
Rolling stock	32.0	0	22.0	10.0
Transport overpass	70.0	0	12.0	58.0
Equipment	30.0	0	19.0	11.0
Buildings and structures	20.0	0.5	14.5	5.0
Site improvements	9.5	0.5	4.0	5.0
Marketing	9.0	0	4.0	5.0
Miscellaneous and unforeseen costs	5.0	0	2.0	3.0
VAT	40.0	1.4	17.5	21.1
Total of expenses	**240.0**	**8.4**	**105.0**	**126.6**
Sources of funding	**Total**	**By years of project implementation, mln USD**		
		2015	**2016**	**2017**
Investments, total	**240.0**	**8.4**	**105.0**	**126.6**
including own funds	240.0	8.4	105.0	126.6
for CAPEX	226.0	8.4	99.0	118.6
for OPEX	14.0	0	6.0	8.0
borrowed funds	0	0	0	0

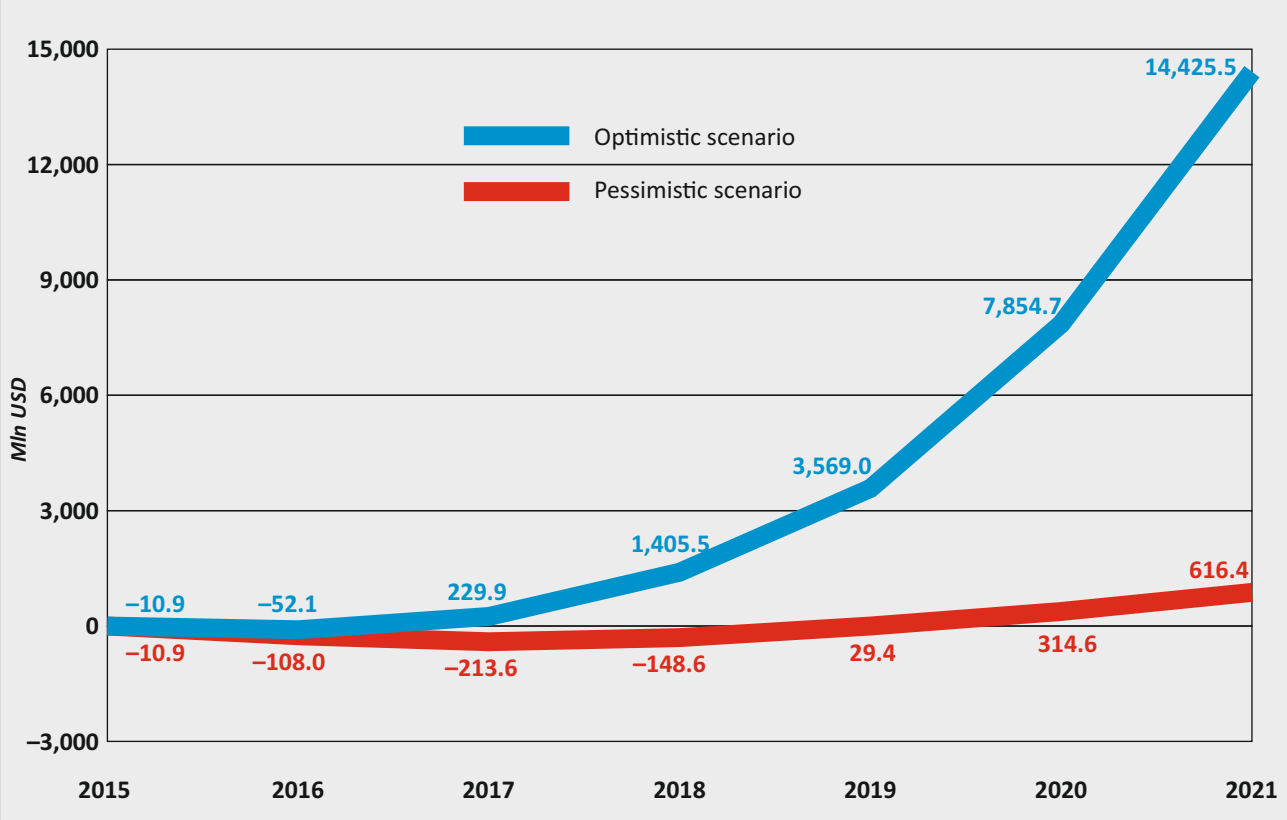
The source of investments in this project will be own funds of a foreign company – founder of SkyWay Technologies Co.

Net present value (NPV) characterizes an integrated effect from project implementation and is defined as a value obtained by discounting (with a constant interest rate separately for every year) the difference between all annual outflow and inflow of real cash accumulative during the project time horizon. **The project NPV makes 57,414.6 mln USD (in pessimistic scenario – 2,936.6 mln USD).**

Discounted payback period (DPP) is calculated according to the accumulative discounted net cash flow. It takes into account the cost of capital and shows the real payback period of the project. **The project DPP makes 22 months (in pessimistic scenario – 64 months).**

The schedule of the project payback period for discounted cash flows (in optimistic and pessimistic scenarios) is given in Figure 1.1. The discount rate is taken at the level of 10 % as it is possible to alternatively invest funds in currency in Belarus at this rate.

Figure 1.1 – Forecast of discounted cash flows for EcoTechnoPark (accrued total)



It should be noted that even in its pessimistic scenario, the project is highly attractive from the financial point of view and has an exceptionally short payback period compared to other infrastructure projects.

2. CHARACTERISTICS OF SECTOR AND ENTERPRISE

2.1. Brief Characteristics of Sector

It is rather difficult to determine the sector profile of the created object (considering its innovativeness and multi-functionality).
Taking into consideration the location of a production complex on the site designed for test assembly of the rolling stock (unibuses and unitrucks), the rail-string track structure, electric in-wheel motors, the automated control and safety system and other equipment, we suggest qualifying the created enterprise as a machine-building complex.

The machine-building complex of the Republic of Belarus includes 135 enterprises of machine-tool manufacture, automobile manufacturing, agricultural machinery industry, road-building and municipal machine engineering, machine-building for food and light industry, tool-making facilities and metallurgy.

The key directions include production of automobiles and agricultural machinery. Every year, about 60,000 tractors, over 20,000 heavy-duty trucks and approximately 2,000 buses and combine harvesters are produced in the country. "BELARUS" tractors, "MAZ" trucks, "BelAZ" mine trucks, "Gomselmash" agricultural machinery and other products of Belarusian machine-building sector are well known all over the world.

AUTOMOBILE MANUFACTURING

The main products of Belarusian automobile manufacturing are trucks of multipurpose use. The enterprises of this sector manufacture machines with cargo capacity of up to 320 tonnes. Production volumes are increased and the quality of products is improved. Minsk Automobile Plant alone produces over 300 truck models and modifications. It is the only enterprise in CIS, which manufactures line-haul trains complying with EURO-4 and EURO-5 requirements.

Automobile manufacturing includes 35 enterprises and organizations, which produce automobiles and road-trains for international transportation, dump trucks and log trucks, AWD vehicles of cross-country capacity, super-heavy mine trucks and dump motor-vehicle trailers, loaders, self-powered scrapers, truck trailers and semi-trailers, caravans for light motor vehicles, diesel engines, buses of multipurpose use, components and spare parts for automobile machinery.

Table 2.1 – Main automobile manufacturing enterprises in the Republic of Belarus

Enterprise	Manufactured products
OJSC "Minsk Automobile Plant"	Automobiles and road-trains, truck tractors for intercity and international transportation, dump trucks, log trucks, truck trailers and semi-trailers, urban and intercity buses, caravans for light motor vehicles
OJSC "Belarusian Automobile Plant", Zhodino	Heavy and super-heavy mine trucks, front loaders, bulldozers, aircraft tow tractors
Branch of OJSC "BelAZ" – Mogilev Autoworks named after S.M. Kirov"	Self-powered scrapers, road-trains for underground mining and tunnels, loaders, concrete mixer trucks, dump trucks
OJSC "Minsk Motor Plant"	Four and six cylinder diesel engines for tractor construction, including with turbocharger
OJSC "Belcard", Grodno	Cardan shafts for motor vehicles
OJSC "Borisov Plant "Avtogydrousilitel"	Hydraulic steering booster for automobiles, oil pumps
OJSC "Grodno Plant of Automobile Parts"	Shock absorbers, brake chambers
OJSC "Borisov Plant of Automotive and Tractor Electrical Equipment"	Hydraulic steering booster for automobiles, oil pumps
OJSC "Minsk Wheeled Tractor Plant"	Unique transport solutions for heavy cargo transportation on public roads and in conditions of hard accessibility. OJSC "MWTP" creates machinery at individual technical assignment of customers, from one to several hundred units using a maximally wide range of national and foreign components.

TRACTOR AND AGRICULTURAL MACHINE BUILDING

The sub-branch is focused on the agricultural economy sector. More than 350 models of machinery are produced for agro-industrial complex. Agricultural machine building includes about 80 enterprises, with over 55,000 people employed.

In the sub-branch, there are created corporate structures based on OJSC "Minsk Tractor Works", holding "Gomselmash" and RTUE "Belagromash", which produce tractors, combine harvesters, machines and equipment for production and processing of agricultural products.

The flagship of sub-branch – OJSC "Minsk Tractor Works" – set up the production of over 50 tractor models with capacity from 8 to 300 h.p. It produces modern ploughs, loaders, forestry and municipal machinery.

The enterprise is among the largest tractor exporters in the world.

Table 2.2 – Main enterprises of tractor and agricultural machine building in the Republic of Belarus

Enterprise	Manufactured products
OJSC "Minsk Tractor Works"	General-purpose tractors with capacity of 50–280 h.p. (23 models), small-size tractors of 20–35 h.p. (six models), walk-behind tractors and mini-tractors of 8–12 h.p. (eight models), municipal, loading, mining and forestry machines
OJSC "Minsk Gear Works"	Pinion shafts and wheels to tractor and other machinery, steel forging, ploughs to tractors of 1,4–3 classes
OJSC "Smorgon Aggregate Plant"	Ploughs to tractors of 4–5 classes, production of walk-behind tractors, mini-tractors, mounted and trailed implements to them
OJSC "Mozyr Machine-Building Plant"	Tractor-mounted loaders, lifting machines, manipulators, forestry and chipping machines
OJSC "Gomselmash"	Combine harvesters for grain, fodder, potato, beetroot, flax, general-purpose energetic units, reaping machines, crop collectors, mowing machines, cultivators
OJSC "Bobruyskagromash"	Transport and technological machines for injecting liquid and solid organic and mineral fertilizers into soil, machine complexes for haymaking, trailers, fodder distributors, machines for flax harvesting
OJSC "Lidselmash"	Potato planters, banking hoes, potato diggers, disc harrows, seeding machines, grain-cleaning and drying complexes, horticultural machines, forestry machinery
OJSC "Lidagroprommash"	Seeding machines, tillage sowing units, trailers, grain combine harvesters
OJSC "Mozyr Plant of Agricultural Machine-Building "	Equipment for heating, ventilation, hot water supply: heat generators, water heaters, household heating boilers

CONSTRUCTION, ROAD AND MUNICIPAL MACHINE BUILDING

The sub-branch includes over 10 enterprises, producing at present the majority of machines, equipment and instruments necessary for builders, as well as for employees of road services and public utilities.

New products have been mastered in recent years, which successfully compete with foreign analogues: automobile and hydraulic cranes, container carriers, pavement sweeping machines, assembly lifters, manipulators for work with wood products.

The enterprises also produce concrete mixers, painting units, paint shops, paint-spray guns, machines for applying bitumen mastic, diaphragm compressors, pumps and other equipment for construction and finishing works.

Table 2.3 – Main enterprises of construction, road and municipal machine building of the Republic of Belarus

Enterprise	Manufactured products
OJSC "Amkodor"	Loaders, airdrome cleaning machines, snow-cleaning machines, pavement sweeping machines, road rollers, machines of timber processing complex
Affiliate of OJSC "MAZ" – plant "Mogilevtransmash"	Automobile semi-trailer of open type, with a tent, pipe carriers, container carriers, concrete panel trailer, automobile crane with cargo capacity of 15 and 25 t, lifting machines
OJSC "Volkovysk Plant of Roofing, Construction and Finishing Materials"	Concrete mixers, painting units, paint shops, machines for applying bitumen mastic, paint-spray guns, compressors, pumps

2.2. Key Performance Indicators of Machine-Building Enterprises of the Republic of Belarus in 2011–2015[1]

According to the data of the Eurasian Development Bank (EADB), in 2011, the production of machine-building products in money terms was 58.7 trillion BYR (equivalent to 12.7 bln USD). Of it, the production of machinery and equipment (mainly, agricultural machinery) made 46.3 %; the production of vehicles and equipment – 32.4 %; electrical, electronic and optical equipment – 21.3 %. It must be noted that Belarusian machine-building industry is traditionally export-oriented: in 2011, 65 % of products of the total volume of industrial production was exported to external markets. As to practically all large goods items, at least half of them are exported from Belarus to Russia[2].

According to the data of Belstat, in 2012, machines and equipment in the Republic of Belarus were produced for the amount of 106.7 trillion BYR (equivalent to 12.8 bln USD). It makes 17.3 % of the total industrial production. There were exported machines and equipment to foreign markets for the amount of 3.9 bln USD (6.1 % more than in 2011); vehicles and equipment – for 1.9 bln USD (21.7 % more); electrical, electronic and optical equipment – 1.2 bln USD (12.7 % more). The export volume on this branch on the whole exceeded 7 bln USD – about 60 % of the production volume.

The dynamics of machine-building indicators in the Republic of Belarus in 2011–2015 is presented in Table 2.4.

Table 2.4 – Dynamics of machine-building indicators in the Republic of Belarus

Indicator name	2011	2012	2013	2014	2015
Production of machines and equipment, trn BYR	58.7	106.7	109.6	98.4	94.3
Production of machines and equipment, bln USD	10.5	12.8	12.7	9.6	5.9
Rate of increase in production of machines and equipment in USD in relation to last year, %	8.2	21.9	–0.8	–24.4	–38.5
Share in total volume of industrial production, %	16.9	17.3	19.0	14.6	12.9
Export of machines and equipment abroad, bln USD	6.3	7.0	6.0	4.8	3.7
Rate of increase in export of machines and equipment in relation to last year, %	40.0	11.1	–14.3	–20.0	–22.9

[1] Sources: http://allby.tv/article/3122/mashinostroenie-v-belarusi, http://www.belstat.gov.by/ofitsialnaya-tatistika/publications/izdania/public_compilation/index_4920/.

[2] Source: http://www.interfax.by/news/belarus/1122641.

The export mainly accounts for the CIS (with the share of the Russian Federation of over 50%) – these markets are traditional for Belarusian machine-building products. In 2014–2015, there was observed a tendency for the reduction of machine-building production output in the Republic of Belarus. It was attributed to the contraction of demand for the manufactured products at sales markets (primarily, in the Russian Federation).

The dynamics of production output for the main commodity groups in the machine-building sphere in 1995–2015 is shown in Table 2.5.

Table 2.5 – Dynamics of machine-building indicators in the Republic of Belarus

	Name of product		
	cargo vehicles (including dump trucks), thousand pcs.	buses, pcs.	trolley-buses, pcs.
1995	12.9	62	83
2000	14.7	914	109
2001	16.5	460	62
2002	16.5	467	56
2003	18.1	499	127
2004	21.5	610	118
2005	22.3	1,263	147
2006	23.2	2,104	176
2007	25.5	2,160	311
2008	26.3	2,196	446
2009	11.5	1,520	388
2010	13.5	2,089	283
2011	23.3	2,162	206
2012	26.2	2,277	174
2013	19.3	2,342	118
2014	12.7	1,691	106
2015	6.0	795	86

It should be noted that the drop in production output in the machine-building sphere of the Republic of Belarus in 2014–2015 is largely caused by the insufficient competitive ability of machines and equipment, produced at present, in the world market. In this connection, securing the production output growth in the machine-building sphere of the Republic of Belarus is deemed possible due to the development of innovative production with a potential demand not only in Russia, but also all over the world.

This project envisages the organization of designing and production of a brand new kind of transport complexes both for the Republic of Belarus and for the whole world with the following complete equipment: a rolling stock on steel wheels, transport rail-string overpass, infrastructure, including the automated system of control, safety, energy supply and communications, as well as units for them.

2.3 Company Profile

Closed Joint Stock Company "SkyWay Technologies Co." is duly registered by Minsk City Executive Committee as a legal entity under registration number 192425076 dd 12/02/2015 in the Unified State Register of Legal Entities and Individual Entrepreneurs.

The paid-up authorized capital is 19.7 bln BYR (equivalent to 1,060.9 thousand USD at conversion rate equal to the exchange rate of the National Bank of the Republic of Belarus as of 01/01/2016).

Company founders are:

Legal entity, resident of the British Virgin Islands, Limited liability company "Global Transport Investments Inc.", duly registered on 12/06/2013 under number 1778122; location: 19 Waterfront Drive, P.O. 3540, Road Town, Tortola, VG1110, British Virgin Islands – 9,000 (nine thousand) common (ordinary) shares.

Citizen of the Republic of Belarus – Mr. Anatoly E. Yunitskiy – 1,000 (one thousand) common (ordinary) shares.

Legal address: 1a, Leninskaya street, agrotown Novosyolki, Pukhovichi district, Minsk region, 222838, Republic of Belarus.

General Director – General Designer of the enterprise is Mr. Anatoly E. Yunitskiy.

The main business activity of the enterprise is rendering services of general design engineer, general contractor and general supplier of equipment for transport complexes located on the "second level" under SkyWay technology all over the world. In addition, the enterprise possesses a unique competence in the sphere of designing transport complexes under SkyWay technology, including an innovative transport overpass, innovative rolling stock and innovative infrastructure, in particular an automated system of safety, control, energy supply and communications. Apart from that, the enterprise will carry out test assembly of the rolling stock, different transport and technological equipment and accessories, as well as metal structures for SkyWay transport overpass.

CJSC SkyWay Technologies Co. is a privately owned legal entity.

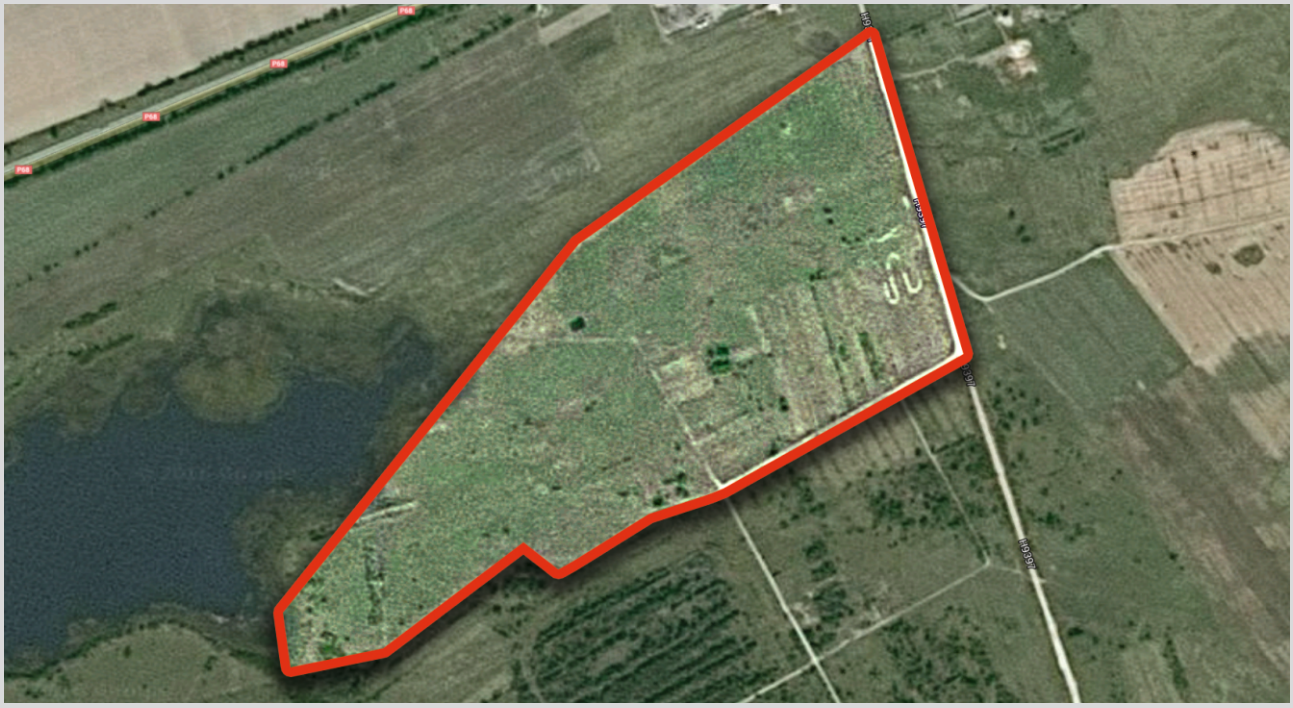
2.3.1. Demonstration Site

With the purpose of implementing the EcoTechnoPark project, SkyWay Technologies Co. obtained a land plot with an area of 35.9 ha in Maryina Gorka of Minsk region (for a 25-year lease).

The project envisages creation of a unique object – EcoTechnoPark, the structure of which includes the following:

- **demonstration complex** comprising three overpass transport complexes, including track and station infrastructure, passenger high-speed, passenger urban and cargo elevated transport;
- **production premises** with an area of about 2,000 sq. m.;
- **intellectual string fencing** around the perimeter of the plot over 2.5 thousand meters long;
- **gardens and green planting** with an area of about 30 ha on the whole territory.

Figure 2.1 – Enterprise location



EcoTechnoPark construction will be carried out in two stages:

- **first** – construction of three test sites (urban, double-rail, urban monorail and cargo, as well as all the required infrastructure), production building, intellectual string fencing, establishing gardens and green planting. Completion – IV quarter of 2016;
- **second** – construction of a 15-km high-speed test complex outside the EcoTechnoPark site. Completion – IV quarter of 2017.

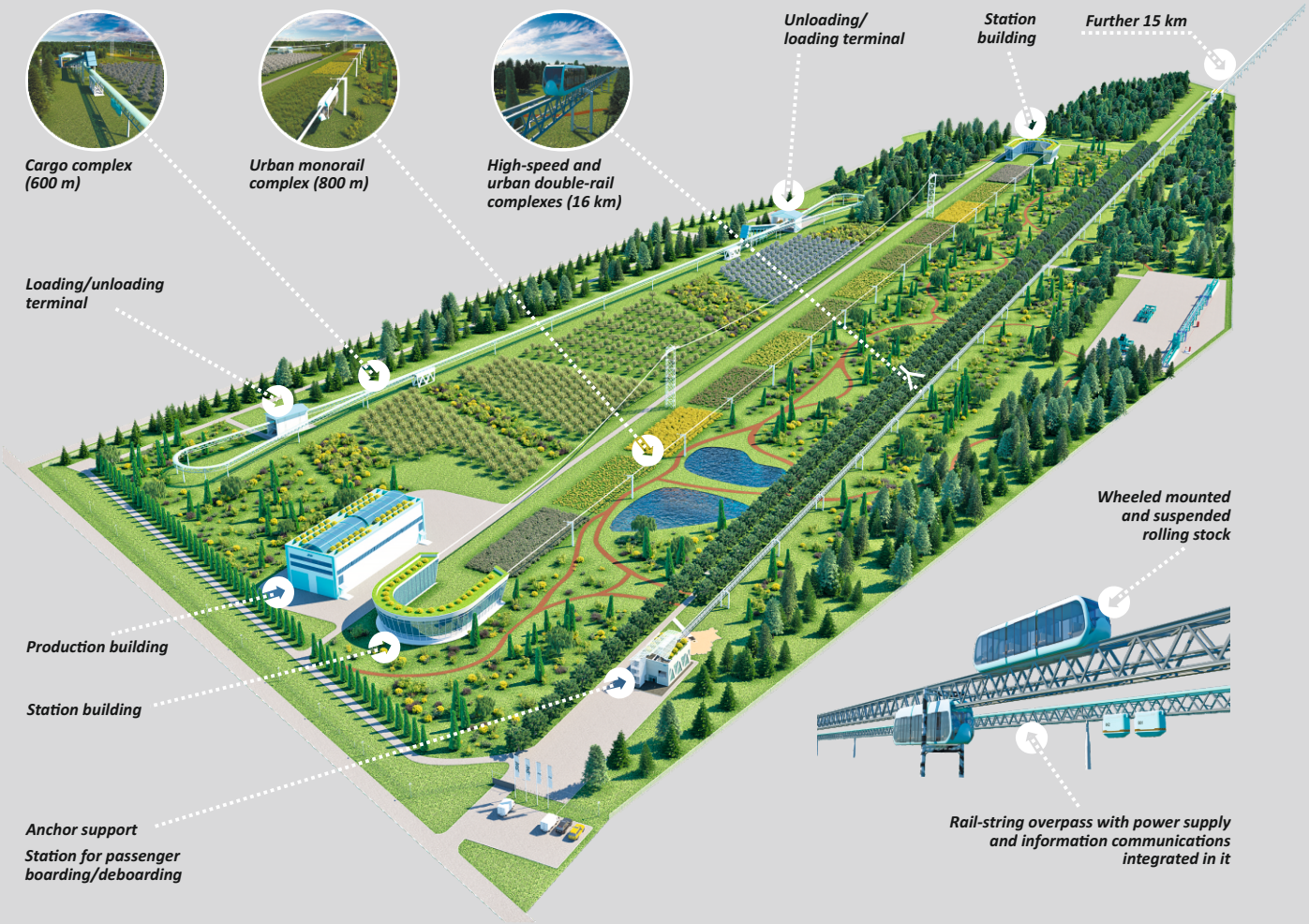
The calendar plan for project design and construction is given in Table 2.6.

Table 2.6 – Plan of activities on EcoTechnoPark construction

Project stage	Start time	Duration, months
Planning work	January, 2015	28
Obtaining Act on land plot allocation and leasehold	June, 2015	1
Obtaining approval documents	July, 2015	1
Stage 1. Construction of urban double-rail complex	August, 2015	15
Stage 2. Construction of urban monorail complex	April, 2016	6
Stage 3. Construction of cargo complex	May, 2016	6
Testing and certification of urban and cargo complexes	October, 2016	2
Acceptance and commissioning of stages 1–3	November, 2016	1
Solving a question on point land acquisition for stage 4	February, 2016	5
Stage 4. Construction of high-speed double-rail complex	June, 2016	16
Testing and certification of high-speed complex	October, 2017	2
Acceptance and commissioning of high-speed complex	November, 2017	1

A more detailed calendar scheduled plan on project implementation is given in Annex 3.

Figure 2.2 – Scheme of objects location on EcoTechnoPark territory



2.3.2. Equipment

Successful creation and operation of EcoTechnoPark requires technological, auxiliary and testing equipment (Table 2.7).

Table 2.7 – Technological and auxiliary equipment

Name of equipment	Country	Delivery terms	Cost for stages 1–3 (2016), mln USD	Cost for stage 4 (2017), mln USD
1. Equipment for urban double-rail track	EU	CIP	5.0	
2. Equipment for urban monorail track	EU	CIP	3.5	
3. Complex of equipment for production facility	EU	CIP	0.5	
4. Equipment for cargo track	EU	CIP	8.0	
5. Equipment for high-speed double-rail track	EU	CIP	2.0	11.0
Total			**19.0**	**11.0**

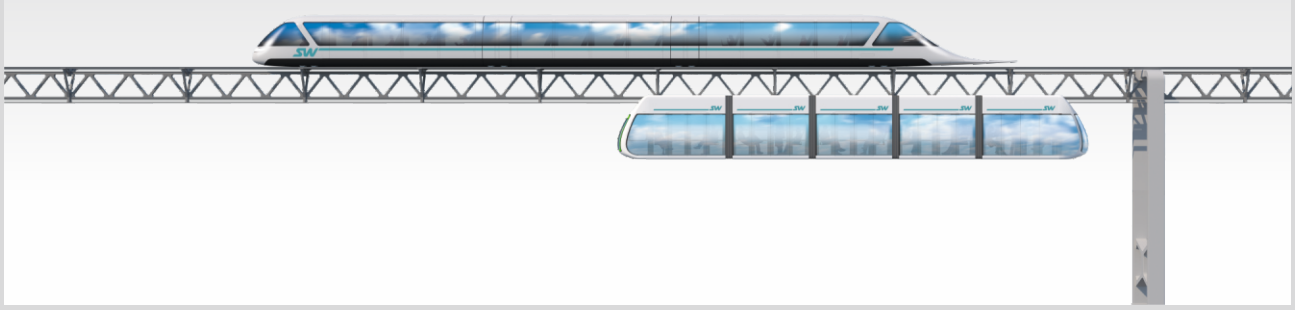
The selection of equipment was carried out in accordance with the requirements for technological processes and the production program.

The following technological and production processes will be carried out in the enterprise:

- test assembly of a rolling stock (unibuses);
- assembly and programming of elements for the automated system of safety, control, energy supply and communications;
- expert review of documents, testing and certification of the track structure, rolling stock and infrastructure.

It is planned that Belarusian enterprises will supply 70 % of raw materials and components.

The project envisages that in 2016–2017, the products to equip EcoTechnoPark will be manufactured in Maryina Gorka, Minsk region (high-speed passenger, urban passenger and cargo tracks). Starting from 2017, there will be launched the customized production of a rolling stock in single quantities and in small-scale production for end users.



2.3.3. Project Cost

The cost of planning, construction and assembly works, equipment and other investment expenses for EcoTechnoPark creation will make 240 mln USD (with VAT). A more detailed structure of investment expenses is shown in Table 2.8.

Table 2.8 – Breakdown of costs for EcoTechnoPark design and construction

Description of costs	Cost, mln USD
1. Preparation, planning and survey works	24.5
2. Construction of transport overpasses	70.0
3. Rolling stock manufacturing	32.0
4. Purchasing equipment	30.0
5. Construction of buildings and facilities	20.0
6. Miscellaneous expenses	23.5
7. VAT	40.0
Total	**240.0**

2.4. Environmental Impact Assessment of Project

According to the Law of the Republic of Belarus "About Waste Handling", waste products include waste produced in the course of manufacturing products or energy, carrying out works or rendering services intended for sale. Waste products also include residues, side and by-products of extraction and processing of mineral resources. In the structure of solid waste formation, waste products make 92 %. The state policy regarding waste handling is aimed at the prevention of harmful waste impact on the environment and human health.

At the stage of enterprise planning, all the requirements of the environmental legislation of the Republic of Belarus will be taken into consideration.

When organizing the SkyWay Technologies Co. production, a generally established approval procedure of this production for compliance with the norms, regulations and standards for fire safety, sanitary and hygienic indices, etc. required by the applicable legislation, will be undergone.

From the ecological standpoint, SkyWay Technologies Co. is a low-waste enterprise in terms of its technical characteristics.

When carrying out the production processes, atmospheric emissions of pollutants do not exceed the maximum permissible concentration.

Waste collection and disposal will be carried out in accordance with the legislation of the Republic of Belarus.

3. PRODUCT DESCRIPTION

As a result of project implementation, SkyWay Technologies Co. will fulfill design and construction of the following transport and infrastructure complexes:

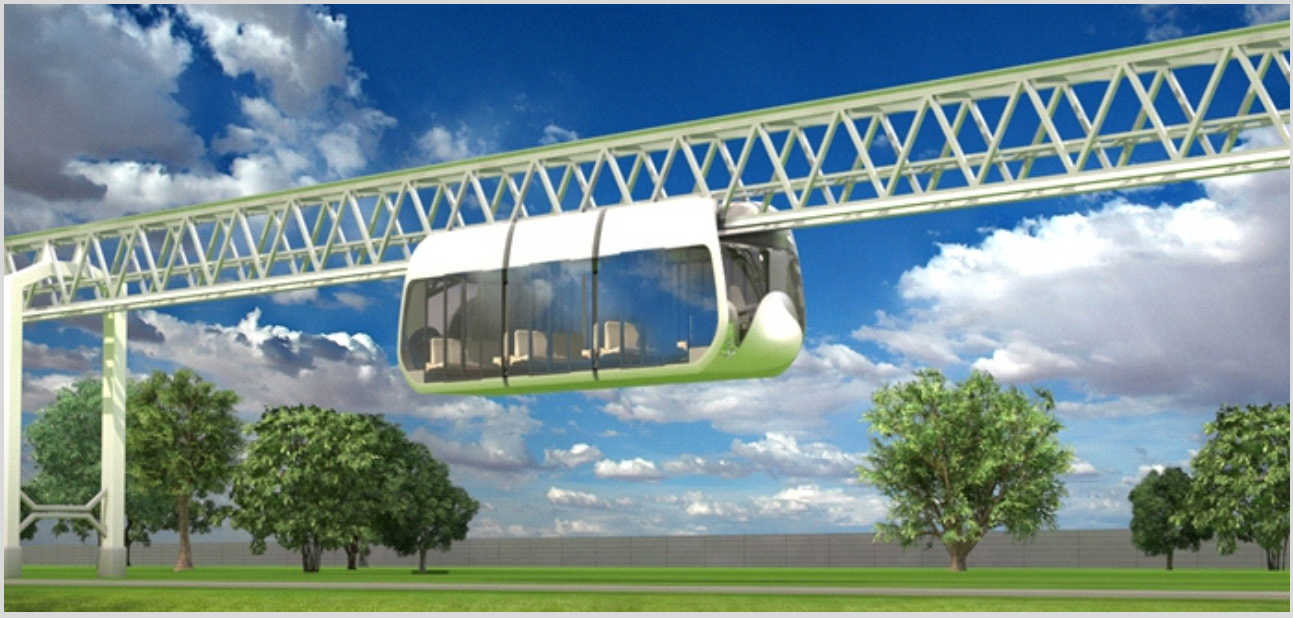
- urban mounted double-rail transport complex;
- urban suspended monorail and double-rail transport complexes;
- cargo transport complex (product pipeline + suspended monorail transport complex);
- high-speed mounted double-rail transport complex.

3.1. Urban Transport Complex

The urban transport complex is a transport system designed for passenger transportation for small distances (up to 200 km), which fits nicely into the urban development and provides motion speed of up to 150 km/h.

Depending on the track structure design and the use of alternative transport standards, the urban transport complex is realized in EcoTechnoPark in two variants – suspended double-rail (Figure 3.1) and suspended monorail (Figure 3.2).

Figure 3.1 – Urban suspended double-rail transport complex



As a rule, the track structure in multifunctional complexes looks like a pre-stressed rail-string trussed structure. The urban transport complex can be made both in suspended and mounted variants. Also, it is possible to realize a multifunctional system based on a rail-string truss – for example, with a high-speed track above (speed up to 500 km/h) and an urban track below (speed up to 150 km/h).

Figure 3.2 – Urban suspended monorail transport complex

The track structure is a special construction on string rails. It can be carried out between anchor supports with intermediate supports (as a rule, located with a 50 meter span, see Figure 3.2), and with a sagging structure between tower supports (Figure 3.3). Both variants will be demonstrated in EcoTechnoPark.

The urban rolling stock is made in a suspended variant.

Figure 3.3 – Section of urban monorail track on a sagging structure

3.2. Cargo Transport Complex

A cargo transport complex is a transport system designed for cargo transportation. It can be represented in two variants – in the form of a product pipeline (special conveyor, Figure 3.4) or cargo and passenger modules (unicars and unitrucks, Figure 3.5).

Figure 3.4 – Cargo belt and rail product pipeline

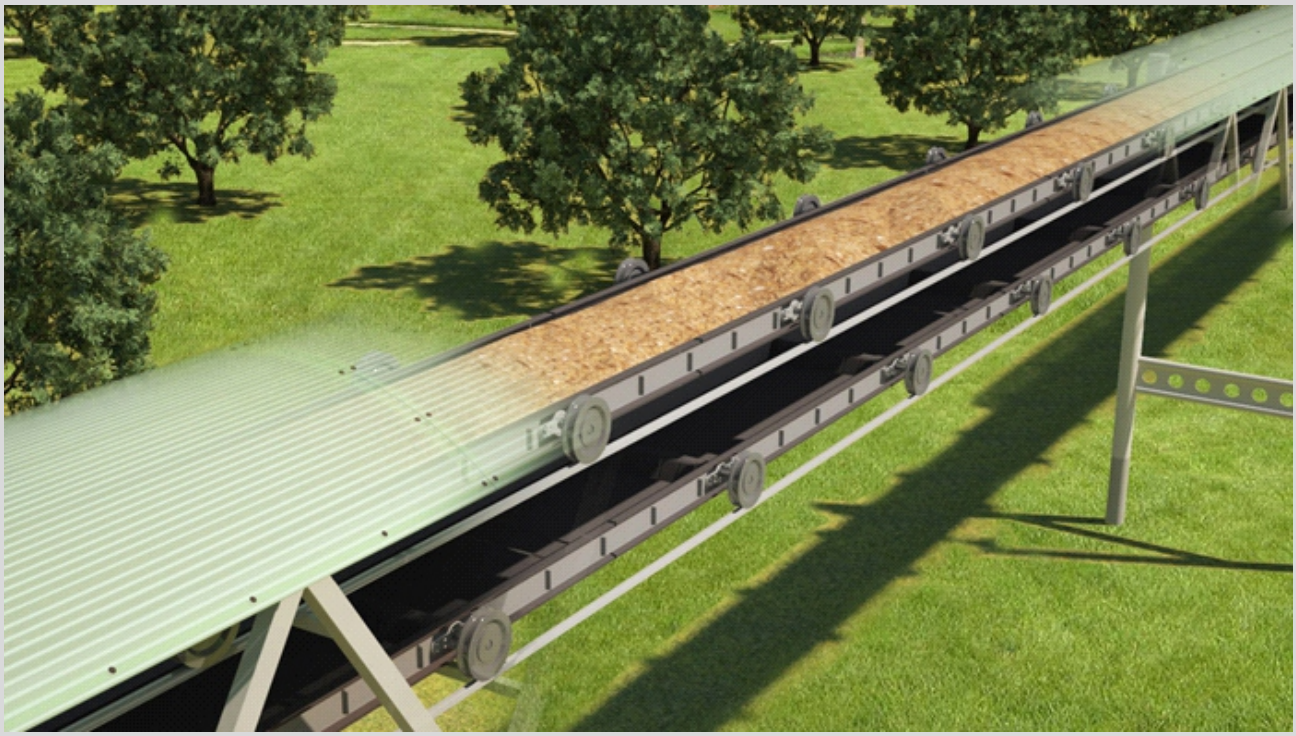
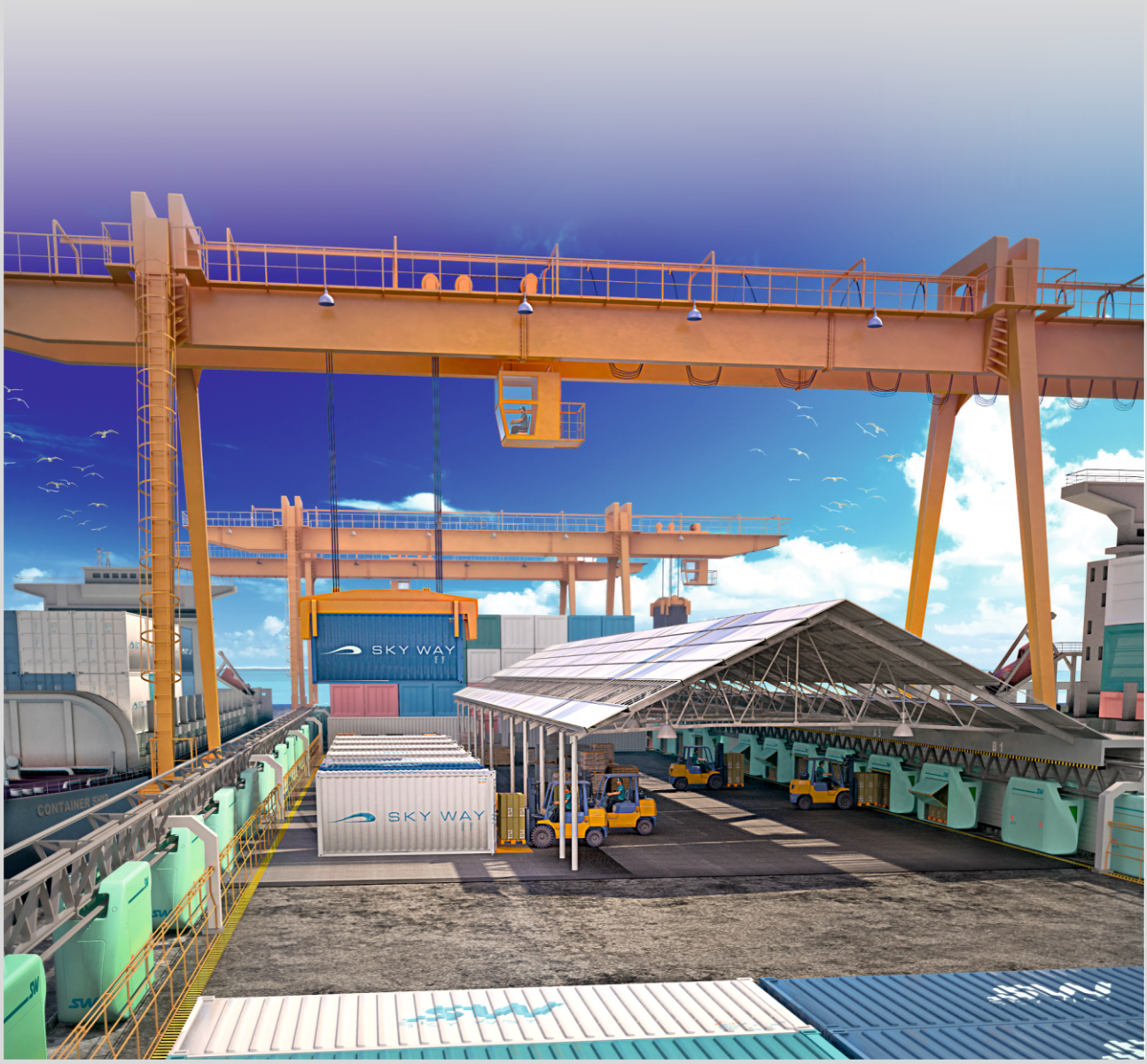


Figure 3.5 – Cargo complex for cargo transportation using unitrucks

A product pipeline can be used for bulk and break-bulk cargo transportation for distances up to 500 km and more. The transportation speed is up to 36 km/hour. Efficiency is ensured due to 24/7 year-round continued operation, which allows to transport significant amounts of cargo (up to 100 mln tonnes per year).

In addition, a product pipeline includes loading and unloading terminals of special design – with continuous cargo loading and unloading (in motion, i.e. non-stop and without slowing down the speed). It allows to provide fast and inexpensive transportation of bulk and break-bulk cargo. It is especially efficient in remote and hard-to-reach places, particularly, when developing hard-to-reach mineral deposits.

The complex with special suspended cargo modules (unitrucks) and cargo and passenger modules (unicars) can transport bulk, break-bulk and liquid cargo, as well as Europallets and containers (including of an automobile and railway type) for distances up to 10,000 km. In this case, carrying capacity of the track makes up to 500 mln tonnes of cargo per year. Such a system ensures cargo transportation speed up to 150 km/hour.



3.3. High-Speed Transport Complex

A high-speed transport complex is a transport system designed for intercity passenger and cargo transportation for long distances (up to 10,000 km) at a speed of up to 500 km/hour. In order to demonstrate high-speed capabilities of the track, an additional track section 15 km long will be built in EcoTechnoPark outside the territory of the allocated land plot.

Figure 3.6 – Intercity high-speed mounted transport complex combined with suspended urban complex (two-in-one in EcoTechnoPark)

3.4. SkyWay Technology Description

Distinctive features of string transport system SkyWay (SkyWay technology) are attributed to the complex of its design, engineering and operating peculiarities.

The string transport technology has been supported by 16 expert evaluations, including by Solomenko Institute of Transport Problems of the Russian Academy of Sciences, the Siberian Branch of the Russian Transport Academy, the State Committee for Construction of the Russian Federation, the Ministry of Economy and the Ministry of Transport of the Russian Federation, the Russian Academy of Engineering, St. Petersburg State University of Communication, the United Nations Organization. It is worth emphasizing that in February, 2016, the Expert Council under the Ministry of Transport of the Russian Federation acknowledged SkyWay string technology as innovative.

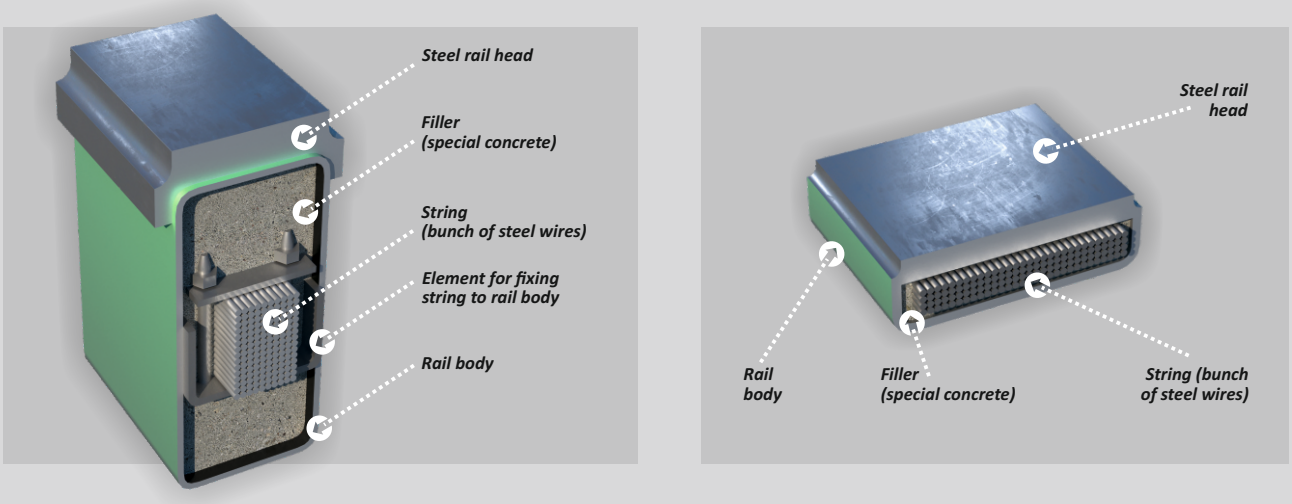
The construction technology for the first generation of the rail-string track structure and supports, as well as of the main string transport units and components was successfully tested in 2001–2009 at the test site built in 2001 in the town of Ozyory, Moscow region.

The transport conventionally used for passenger and cargo land transportation is an automobile or railway. The main general design feature of these transport systems is earth embankment, which performs the function of a foundation for hard road cover or railway sleepers for railway transport.

The track structure made under SkyWay technology in its overpass design has no solid road bed. Therefore, in terms of traffic management, it is similar to automobile transport, and in terms of track structure arrangement – to rail transport.

The basis of the track structure is uncut string rails pre-stressed by tension (semi-rigid rail, Figure 3.7, on the left; flexible rail, Figure 3.7, on the right) or an uncut bearing string-trussed structure pre-stressed by tension (heavy and multifunctional transport system, Figure 3.6).

Figure 3.7 – Rail-string design for mounted (on the left) and suspended (on the right) SkyWay (on each of the variants)



A rail-string track structure is characterized by ideal straightness and smooth curves. It has crucial significance for achieving considerable operating characteristics of the transport system – high motion speeds, minimal impact loads, low energy consumption for passenger and cargo transportation.

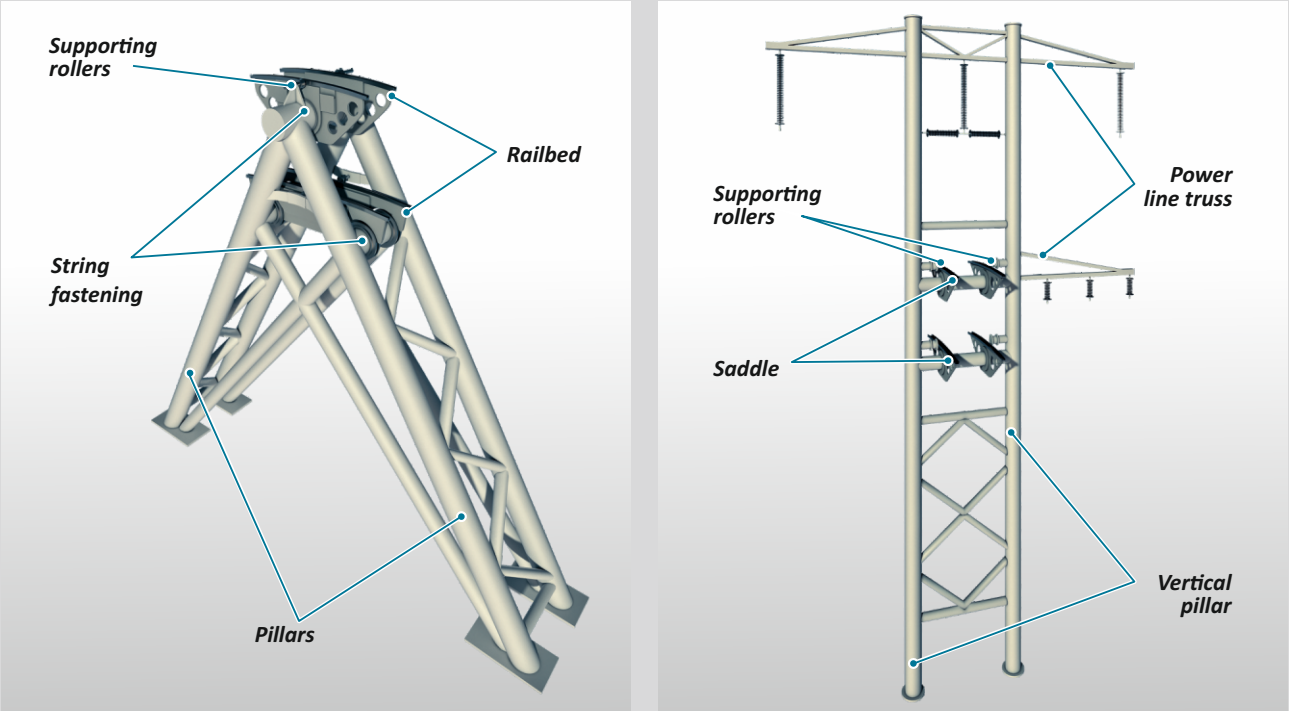
Due to anchor supports (every 2–3 km and more) and intermediate supports (every 40–60 m and more), the track structure is always located above the ground surface.

Anchor supports are designed to accept longitudinal forces (temperature, brake, acceleration, etc.) arising in an uncut track structure and in the pre-stressed reinforcement – in strings.

Intermediate supports are designed to carry the track structure and take up vertical and transverse horizontal operating loads (structure and rolling stock weight, side wind, etc.).

The general diagram of anchor and intermediate supports is shown in Figure 3.8.

Figure 3.8 – Anchor support (on the left) and intermediate support (on the right) for suspended cargo system combined with high-voltage and low-voltage power lines



Track structure location above the ground is crucial for cutting construction costs, careful attitude to the environment and commercial opportunities along the whole territory of the track, as well as for provision of the highest level of transport safety.

The rolling stock is always rail transport on steel wheels (rail automobiles) with simple and reliable algorithms for traffic management and control in terms of conventional rail transport.

Minimal steel wheel rolling resistance on a steel rail under any natural and climatic conditions is the only feature that makes SkyWay technology similar to the conventional railway transport.

As for the rest and, primarily, as for the questions of arranging and controlling the rolling stock movement, SkyWay technology fundamentally differs from railway transport, demonstrating manifold higher efficiency with much higher transport performance.

A string rail is a steel, reinforced concrete or steel reinforced concrete continuous beam (along the whole track length), equipped with a rail head and additionally reinforced with pre-stressed (by tension) strings (Figures 3.7 and 3.9). Such a structure combines the properties of a flexible thread at a big span between supports, and a rigid beam at a small span (under a rail automobile wheel and above the support).

The track structure for string transport systems of high capacity and/or high travel speed envisages a continuous string-trussed superstructure, pre-stressed by tension, as a bearing basis, which is very rigid in vertical and horizontal directions (Figure 3.9). In this case, rail heads can be located at the truss top chords (for mounted system implementation) and at the low chords (for suspended system implementation) of each string truss.

Figure 3.9 – Example of string-trussed track structure

A rail-string track structure is an ideally even track for wheel movement, as it has no construction and temperature joints along its entire length (the rail head is welded into a single string).

A rail-string track structure for one track in its suspended design has one string rail (monorail suspended system) or two string rails (double-rail suspended system), and in its mounted design – two rails (double-rail mounted system).

String rails are rigidly fixed in anchor supports, installed every 2–3 km and more, and placed onto intermediate supports-pillars forming spans 40–60 m long and more. The optimal height of supports is 4–6 metres. If required, the height of supports can be reduced up to 1 m and less or, vice versa, increased up to 10–20 m and more for specific track sections.

Supports can be made of reinforced concrete (precast or monolithic), steel welded structures, composite materials or high-strength aluminum alloys. Depending on the type of soil on the track, their foundations can be piled (driven, screwed, bored and cast-in-place or augercast) or slabby (monolithic or precast).

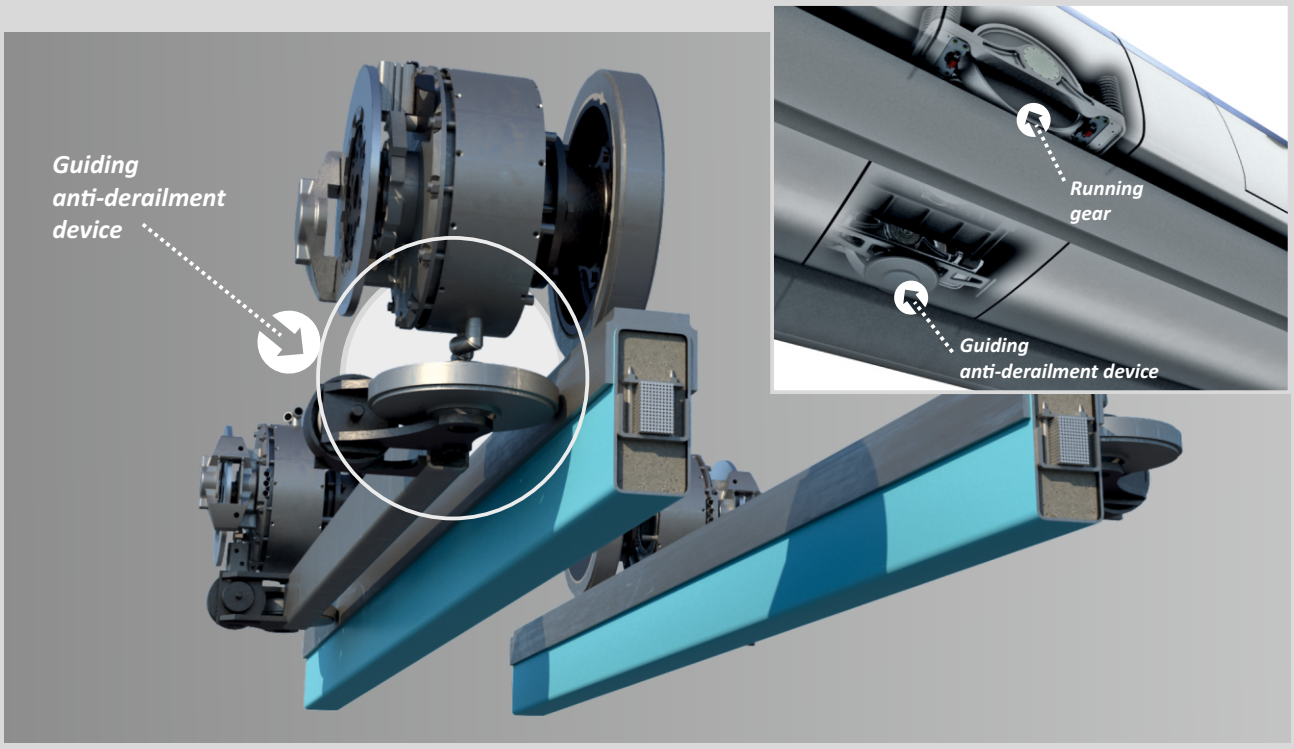
Supports and a continuous rail-string track form a rigid frame structure. Therefore, the bearing capacity of supports is increased compared to, for example, a conventional monorail by 8 times (consequently, the cost of supports will be lower).

The rolling stock wheels are made of high-strength steel or high-strength light alloys and are fixed to the vehicle body through an independent "automobile" suspension. Two ribs and/or an anti-derailment side roller on each wheel, which replaces flanges, excludes rolling stock derailment from the rail-string track structure (Figure 3.10).

Figure 3.10 – Design variant for anti-derailment side rollers

For suspended double-rail system,
with a rail automobile located under the track structure

For mounted double-rail system,
with a rail automobile located above the track structure



The coefficient of steel wheel rolling resistance on a steel rail is 0.001–0.0015, which is 1.5–2 times lower compared to a railway wheel, which has a conical support surface. The distance run (resource) – up to 1 mln km and more. A steel wheel is cheaper and lighter than an automobile pneumatic tyre and by 10–20 times more durable compared to it.

A vehicle (passenger: unibus, unicar, unibike; cargo: unitruck) is a variety of an automobile on steel wheels (Figures 3.11, 3.12). Similar to a traditional automobile, a rolling stock in SkyWay transport system can have various types of drive – internal combustion engines, including turboprop, electric traction, hybrid drive systems.

In order to ensure the safe operation of all infrastructure, unibuses and unitrucks will be equipped with the automated control system.

Moving on the track section controlled by a dispatcher, a unibus/unitruck will automatically transfer full information on the operability of all systems, including backup systems, to the dispatcher console. Every control communication is duplicated and provides a dispatcher with a possibility of switching a faulty function to the properly operating control loop using its control console at the assigned track section. The main function of a dispatcher is not to control, but to monitor the operation of SkyWay transport and infrastructure complex.

Figure 3.11 – Passenger rail automobiles under SkyWay technology – unibuses.
On the left – high-speed intercity, speed – up to 500 km/h
On the right – urban, speed – up to 150 km/h

Figure 3.12 – Design variants for cargo rail automobiles under SkyWay technology.
On the left – mounted system with movement of trailer trains with locomotive traction on a string truss
On the right – suspended system with movement of non-self-propelled carts with external drive by means of cable traction

The SkyWay technology infrastructure located on the "second level" includes passenger stations, terminals, loading/unloading cargo terminals, maintenance workshops (depots), filling stations located on the "second level", as well as turnout switches and the control, energy supply and communications system (Figure 3.13).

Figure 3.13 – Interchange passenger station under SkyWay technology in city, used for interchange from intercity high-speed system to rapid urban system (above) and loading/unloading cargo sea terminal (below)

Depending on the design travel speed, turnout switches are divided into low-speed, rapid and high-speed ones; in terms of traffic management – with unibus (unitruck) stop or non-stop on the move). Turnout switches are located at the stations, terminals, in cargo terminals, depots and, if necessary, on the track on anchor supports.

Track structure location on the second level in SkyWay technology expands opportunities for stations and terminals construction. Due to more favourable rail automobile operating modes, the need for garages and filling stations is decreased compared to the conventional automobile transport. A small size of a unibus allows to decrease the dimensions and, consequently, the cost of passenger stations, terminals and platform length by 5–10 times compared to conventional railway infrastructure objects.

3.5. Compliance with International and National Quality Standards

One of the most important priorities in the industrial activity is provision of quality and safety indices for the manufactured products.

When designing transport and infrastructure complexes SkyWay, all requirements acting in the corresponding countries and international organizations (UN, EU, USA, Russia, Republic of Belarus, etc.) are taken into consideration.

SkyWay Technologies Co. is based on the toughest requirements for all constituents of the complexes:
– rolling stock (cargo, urban, high-speed – both double-rail and monorail);
– transport overpass (both double-rail and monorail);
– infrastructure (stations, terminals, turnout switches, automated control system, etc.).

Overpasses are not certified. They are designed and constructed in accordance with the construction regulations acting in the countries, where specific target projects will be implemented. In addition, the requirements applicable to transport structures: bridges, viaducts and overpasses for railway and automobile transport are taken as a basis. Further, the project shall undergo expert evaluation in the authorized bodies of the corresponding countries.

Product release will be carried out in compliance with the regulatory technical and technological documentation, as approved according to the Standards of the Republic of Belarus, Russian National Standards, European and world standards.

Quality control for raw materials, consumables, finished products, operating conditions will be carried out according to the internal regulations and requirements of international standards.

3.6. Possession of Licences, Patents, Certificates

The intellectual property of string transport technologies SkyWay is protected by dozens of patents from Russia, the CIS and other countries of the world. The list of the main patents is given in Annex 2.

According to the assessment of the certified intellectual property evaluator Hold Invest Audit Consul No.0-905/2 dd 20/05/2013, in compliance with International Valuation Standards, the market value of the exclusive rights for intellectual property and know-how of "Rail-string transport system of engineer Yunitskiy" makes 400,867,433,000 (four hundred billion eight hundred and sixty-seven million four hundred and thirty-three thousand) USD.


РОССИЙСКАЯ ФЕДЕРАЦИЯ

ПАТЕНТ

НА ИЗОБРЕТЕНИЕ

№ 2224064

ТРАНСПОРТНАЯ СИСТЕМА ЮНИЦКОГО (ВАРИАНТЫ) И СПОСОБ ПОСТРОЕНИЯ ТРАНСПОРТНОЙ СИСТЕМЫ


ҚАЗАҚСТАН РЕСПУБЛИКАСЫ

ҰЛТТЫҚ ПАТЕНТ ВЕДОМСТВОСЫ

№ 114

ӨНЕРКӘСІП ҮЛГІСІНЕ БЕРІЛГЕН

АЛДЫН АЛА ПАТЕНТ


РОССИЙСКАЯ ФЕДЕРАЦИЯ

ПАТЕНТ

НА ИЗОБРЕТЕНИЕ

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ЕВРАЗИЙСКАЯ ПАТЕНТНАЯ ОРГАНИЗАЦИЯ
ЕВРАЗИЙСКОЕ ПАТЕНТНОЕ ВЕДОМСТВО

ЕВРАЗИЙСКИЙ ПАТЕНТ

№ 004391

Название изобретения:
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ГРИГОРЬЕВ Александр Николаевич
Президент Евразийского патентного ведомства


ЕВРАЗИЙСКАЯ ПАТЕНТНАЯ ОРГАНИЗАЦИЯ
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ЕВРАЗИЙСКИЙ ПАТЕНТ

№ 006359

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РОССИЙСКАЯ ФЕДЕРАЦИЯ

ПАТЕНТ

НА ИЗОБРЕТЕНИЕ

№ 2324612

СТРУННАЯ ТРАНСПОРТНАЯ СИСТЕМА ЮНИЦКОГО

4. SALES MARKET ANALYSIS

4.1. General Market Overview

The number of built automobile roads and railways on the planet as of 2014 is shown in Tables 4.1 and 4.2 (the data is taken from open sources).

Table 4.1 – Information on countries with the longest automobile road network

Country	Place as to auto-roads length in the world	Auto-roads length, thousand km	Area of the country, thousand km^2	Auto-roads density, km/thousand km^2
All the world		**37,329.4**		
USA	1	6,586.6	9,519.4	691.9
India	2	4,865.0	3,287.6	1,479.8
China	3	4,460.0	9,599.0	464.6
Brazil	4	1,751.9	8,514.9	205.7
Russia	5	1,396.0	17,125.4	81.5
Japan	6	1,217.1	377.8	3,221.6
Canada	7	1,042.3	9,984.7	104.4
France	8	1,028.4	547.0	1,880.2
Australia	9	823.2	7,686.9	107.1
RSA	10	747.0	1,219.9	612.4
Spain	11	683.2	504.8	1,353.4
Germany	12	644.5	357	1,805.3
Sweden	13	579.6	450	1,87.9
Indonesia	14	496.6	1,904.6	260.7
Italy	15	487.7	301.3	1,618.7

Table 4.2 – Information on countries with the longest railway network

Country	Place as to railway length in the world	Railway length, thousand km	Area of the country, thousand km^2	Railway density, km/thousand km^2
All the world		**1,218.4**		
USA	1	224.8	9,519.4	23.6
China	2	112.0	9,599.0	11.7
Russia	3	86.0	17,125.4	5.0
India	4	65.6	3,287.6	20.0
Canada	5	46.6	9,984.7	4.7
Germany	6	43.5	357	121.8
Australia	7	38.4	7,686.9	5.0
Argentina	8	39.7	2,780.4	14.3
RSA	9	31.0	1,219.9	25.4
France	10	29.6	547.0	54.1
Brazil	11	29.3	8,514.9	3.4
Japan	12	27.2	377.8	72.0
Italy	13	24.2	301.3	80.3
Ukraine	14	22.3	603.5	37.0
Romania	15	22.3	237.5	93.9

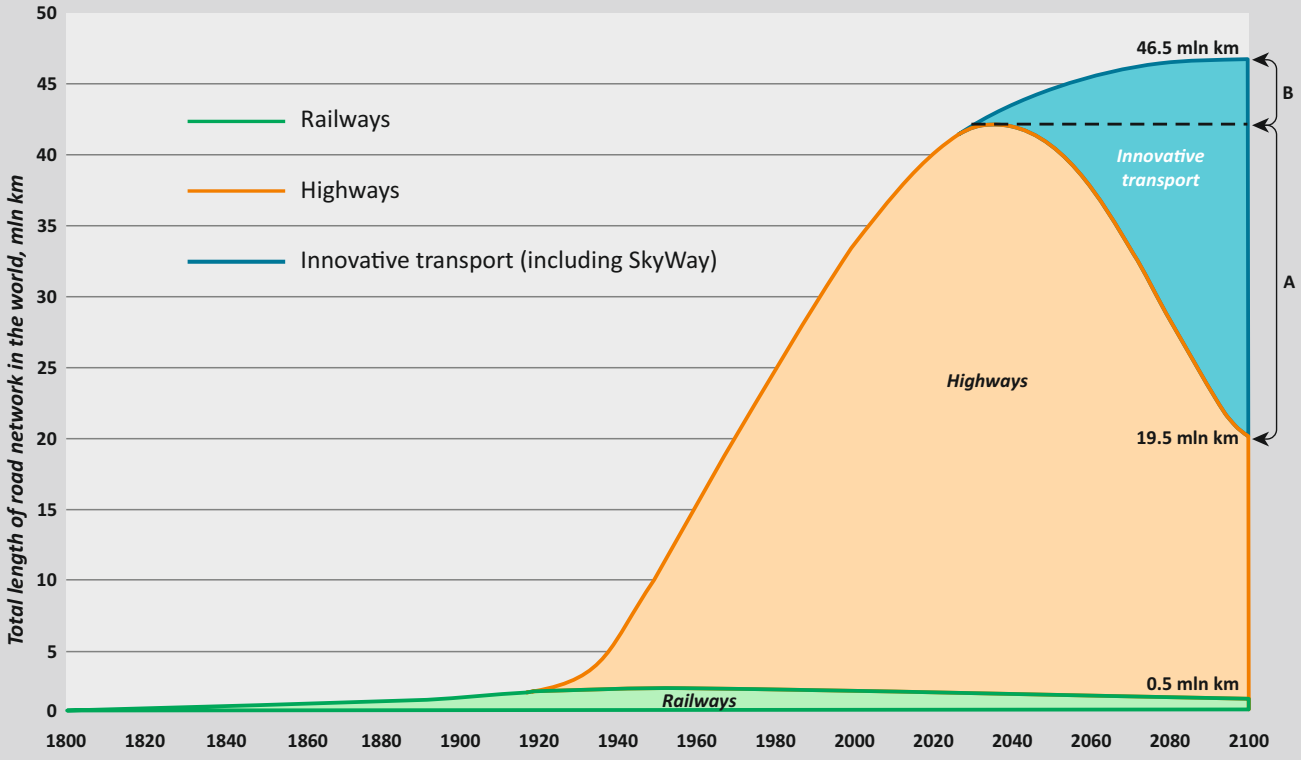
It should be noted that Russia, which takes the first place in the world in terms of the area of its territory, is significantly inferior to most countries-leaders from the point of view of auto-road density as to the length of automobile roads and railways. Only countries with a vast territory and low population density, such as Canada and Australia, have comparable values. In addition, in terms of the automobile network length Russia is behind:

USA (6.6 mln km), India (4.9 mln km), China (4.5 mln km) and Brazil (1.8 mln km). The outdated network of land roads, very expensive and resource-intensive both for construction, maintenance and operation, continued its extension to move into the 21st century.

However, with the appearance of a fundamentally new communication system of the "second level" on the transport service market in the 21st century, which is cheaper, safer, more cost-efficient, durable and eco-friendly, the existing imperfect automobile roads and railways will be gradually replaced with more advanced communications – the innovative transport (including SkyWay transport system).

As a result of successful implementation of the EcoTechnoPark construction project, the first track sections of passenger and cargo string transport will have been demonstrated by the year 2017, high-speed transport – by 2018. By 2035, construction of new automobile roads and railways will have been stopped almost completely, and their length will start decreasing in a natural way with the approximately equal intensity as their construction back in the 20th century, – about 400,000 km every year (Figure 4.1). They will be replaced with more effective tracks located on the "second level" at the same rate. It means that in the future, string tracks shall be built at least in the same amount (400,000 km per year). In total, it is expected to replace about 21 mln km of land automobile roads and railways in the 21st century.

Figure 4.1 – Forecast of world transport sphere development up to 2100.
A – replacement of outdated and cost-intensive railway and motor roads built in 20th century with the innovative transport (including SkyWay) – 21 mln km.
B – innovative transport construction in previously undeveloped regions and directions – 6 mln km.



Apart from the replacement of roads on the "first level", it will also be required to lay new tracks on the "second level" in the regions undeveloped earlier and in new directions. It is expected that in total, at least 6 mln km of new tracks will be built, or 90–100 thousand km per year, on average, in the 21st century (Figure 4.1).

Thus, the capacity of the future market for different kinds of innovative transport is estimated, on average, at the level of 400–500 thousand km per year (due to the construction of new tracks and replacement of the existing land road and communications infrastructure).

The world market is waiting for the appearance of fundamentally new innovative transport technologies, which will be able to provide:

- economic, resource and fuel efficiency;
- safety in all its aspects, including ecological safety;
- cargo and passenger profile;
- a wide range of distances;
- a wide range of speeds, up to 500 km/h;
- operability under the extreme natural and climatic conditions;
- operability under the extreme topological and geographical conditions.

According to our evaluation, the SkyWay share in the innovative transport segment can be at least 50 % (in the optimistic scenario).

4.2. Competitive Advantages of SkyWay String Transport

The unique competitive advantages of string transport systems have been taken as a basis for the strategy of project implementation. SkyWay advantages are practically inaccessible for the conventional transport systems – railway and automobile, which have reached their greatest development by now and are planned for their extensive use in the future despite having substantial and obvious disadvantages.

The string transport technology is distinguished by the unique indices of technical and economic efficiency at all stages of practical implementation – design, construction and operation, as well as by a high degree of reliability and, consequently, a high safety level – both technogenic and ecological.

However, in case of capital-intensive sectors, the innovative component of investment risks, as a rule, significantly outweighs the high efficiency of innovative technologies. It is the innovativeness of string transport technology that at present prevents it from effective competition with widely used transport systems – railway and automobile – on the same level.

The advantages of the last-mentioned include absence of innovative risks, which is confirmed by over a hundred-year history of successful operation and practical visibility of millions of kilometers of operating routes all over the world. Moreover, traditional transport technologies are characterized by the availability of clearly functioning infrastructure in the broad sense of the word – scientific and teaching, design and engineering, production and operating, as well as a vast market of consumers of standard transport services.

Therefore, the basis of the strategy for promoting the innovative string technology shall be formed, primarily, by the unique competitive advantages, which allow the innovative technology to be implemented in places inaccessible for conventional transport technologies.

Considering the above, it is possible to single out the following main competitive advantages of SkyWay transport system.

1. Low cost of construction and transport service.
SkyWay transport complex construction is cheaper by:
– 2–3 times than railway (tram) complex;
– 3–5 times than automobile complex;
– 10–15 times than monorail;
– 15–20 times than magnetic levitation train (with transportation cost reduced by 3–5 times and more).

2. Low power consumption.
Due to the high unibus aerodynamics and improved support of steel wheels onto ideally even rails, SkyWay power consumption is lower by:
– 3–5 times compared to the existing transport systems, which use steel wheels or a magnetic cushion;
– 15–20 times compared to transport on pneumatic tires (automobile transport) or transport, which uses an air cushion (aviation, WIG vehicles, helicopters).

3. Minimal land acquisition.
The land plot required for the construction of transport and infrastructure complex is about 100 times smaller compared to road and railway (tram) complexes. And when using the suspension system for connecting urban high-rise buildings, there is no need for expensive land acquisition for transport at all.

4. Full automation.
Automation of the transport complex and optimal transport logistics is ensured by the automated system of control, safety, energy supply and communications.

5. Highest safety level.
A high level of transport, environmental and anti-terrorist safety is ensured as there are no intersections, pedestrian crossings, oncoming traffic with the risk of head-on and side collisions of the rolling stock. In addition, the high-rise string-rail track structure has a tenfold safety factor and is not accessible for vandals, while the rolling stock is equipped with an anti-derailment system. The SkyWay transport complex is more resistant to natural disasters, such as earthquakes, landslides, torrential rains, floods, flood flows compared to any other transport system. It is explained by transport location on the second level, as well as by the fact that SkyWay system has no embankments prone to destruction.

6. High speed indices.
Design speed rates:
– urban transport SkyWay – up to 120–150 km/h;
– cargo transport SkyWay – up to 120–150 km/h;
– high-speed intercity transport SkyWay – up to 450–500 km/h.

7. Minimal operating costs.
The operating costs are reduced by 5–7 times compared to automobile (trolley-bus) and by 2–3 times compared to railway (tram) transport.

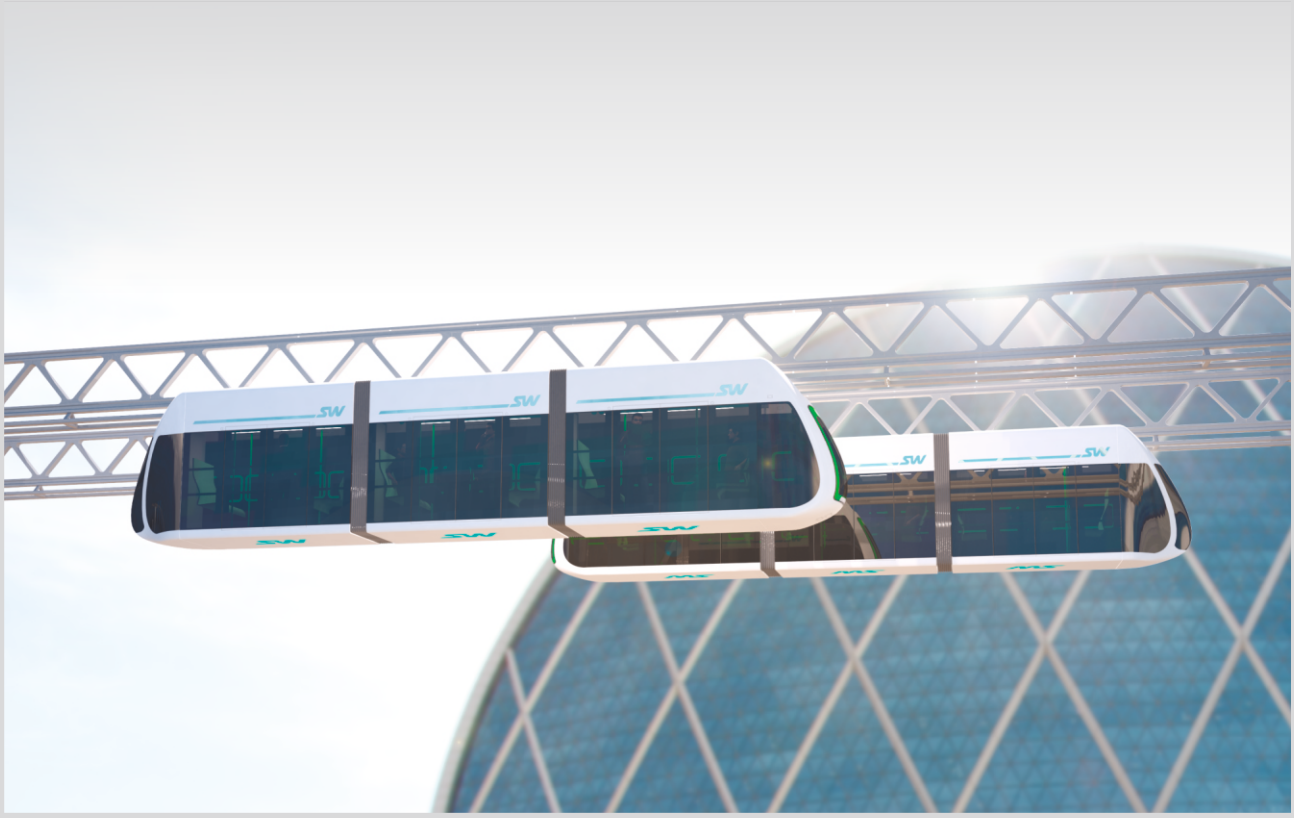
8. Use of renewable energy sources.
The SkyWay transport complex uses electric motors for efficient and low-cost movement on the scheme "steel wheel – steel rail" (including the use of a unique in-wheel motor of in-house development) and can cover a significant part (in some cases – up to 100 %) of its energy needs with renewable energy sources – solar and wind.

9. Restoring live fertile soil.
It is possible to restore live fertile soil and natural ecosystems – fauna and flora (using SkyWay-Agro technology) – in any natural habitat, including in a city.

10. No harmful impact on people and the environment.
The harmful impact (exhaust gases, noise, vibration, electromagnetic and other radiation) is reduced by:
– 15–20 times compared to automobile transport;
– 2–3 times compared to railway (tram) and monorail tracks.

11. Cost and time efficiency.
There is ensured significant cost and time saving for passengers and shippers for transportation in a city, between cities, as well as on the route of cargo delivery. In case of intercity transportation, the saving can be significantly higher considering the hauling distance.

12. Short payback period.
The SkyWay transport and infrastructure complex has an unprecedented payback period – from 3 to 5 years from the moment of its commissioning.



5. SALES PLAN AND MARKETING STRATEGY

5.1. Sales Plan

In the framework of project implementation, the sales are understood as sale of services of the general design engineer, general contractor and general supplier of the equipment for transport complexes all over the world. These services will be provided by efforts of SkyWay Technologies Co. with possible involvement of other organizations on subcontract conditions.

The revenue from design, construction and equipment supply will be an income base for the EcoTechnoPark construction project in the town of Maryina Gorka, Minsk region. In its turn, the revenue from design, construction and equipment sale will be calculated based on the amount of the implemented typical projects on transport complexes of the corresponding types, considering the potential of demand growth for string transport by years.

When planning sales, two scenarios are considered – optimistic and pessimistic. The optimistic scenario is taken as a basis.

The earnings will be presented in the form of the revenue from design, construction and equipment sale for SkyWay transport and infrastructure complexes all over the world, as well as from their further operation.

Planning is carried out based on the typical variants of target tracks of the following implementation format (look like average requirements of customers on each track type):

- urban double-rail track 50 km long;
- urban monorail track 50 km long;
- cargo track 100 km long;
- high-speed double-rail track 1,000 km long.

It should be understood that design and construction of a 2,000 km SkyWay high-speed track is equivalent to two typical projects, a 300 km cargo track – to three typical projects, etc. A separate financial model is prepared for each of the typical tracks concerning its further operation. Further, they are consolidated depending on the commissioning time of the corresponding tracks.

The number of tracks planned for orders in optimistic and pessimistic scenarios is given in Tables 5.1 and 5.2.

Table 5.1 – Volume of orders in work, by years of project implementation (optimistic scenario)

Product name	Unit of measurement	By periods (years) of project implementation								
		2016	2017	2018	2019	2020	2021	2022	2023	2024
Urban double-rail track	pcs	1	1	4	7	12	15	20	25	30
Urban monorail track	pcs	1	1	4	7	12	15	20	25	30
Cargo track	pcs	1	3	8	13	25	30	40	50	60
High-speed track	pcs	–	2	5	10	20	30	50	70	90
Total of tracks	**pcs**	**3**	**7**	**21**	**37**	**69**	**90**	**130**	**170**	**210**

Table 5.2 – Volume of orders in work, by years of project implementation (pessimistic scenario)

Product name	Unit of measurement	By periods (years) of project implementation								
		2016	2017	2018	2019	2020	2021	2022	2023	2024
Urban double-rail track	pcs	–	–	1	1	1	1	2	2	2
Urban monorail track	pcs	–	–	1	1	1	1	2	2	2
Cargo track	pcs	–	–	1	1	1	1	2	3	3
High-speed track	pcs	–	–	–	1	1	1	3	3	5
Total of tracks	**pcs**	**–**	**–**	**3**	**4**	**4**	**4**	**9**	**10**	**12**

5.2. Marketing Strategy

5.2.1. Purposes of Marketing Strategy

Corporate Development Plan

The main task of the prospective strategic development of SkyWay Technologies Co. is the creation of EcoTechnoPark in Maryina Gorka, Minsk region.

EcoTechnoPark is expected to become:

- **center for certification, testing and improvement of SkyWay technology and the creation of new generations of transport and infrastructure complexes;**
- **exhibition and business center;**
- **center for developing the related nature-like technologies: bio and agrotechnologies, the creation of fertile soil and humus production.**

The marketing and sales strategy of SkyWay Technologies Co. is, first and foremost, associated with the purpose of winning and expanding the market niche in the innovative segment of transport technologies.

The string transport technology is distinguished by the unique indices of technical and economic efficiency at all stages of practical implementation – design, construction and operation, as well as by a high degree of reliability and, consequently, a high safety level – both technogenic and ecological.

The basis of the strategy for promoting the innovative string technology shall be formed, primarily, by the unique competitive advantages, which allow the innovative technology to be implemented in places inaccessible for conventional transport technologies.

One of such competitive advantages is the ability of the string transport technology to maintain high economic efficiency and other properties even under the extreme natural and climatic conditions, where conventional transport systems – railway and automobile – are either economically inefficient or technically unfeasible.

This includes conditions with very low and very high temperatures (annual temperature differences within 120 °C), very high and very low humidity, permafrost, snow drifts, glaciation, impenetrable forests and swamps, deserts, overflows, mountainous landscape, sea shelf, etc.

It is important to point out that such resistance of the string transport technology to the environmental conditions is displayed at all stages – both at the investment and construction stage and the operation stage.

Another competitive advantage, which is of no less significance, is the fact that the string transport technology is unrivaled in terms of energy saving, ecological and technogenic safety, anti-terrorism security, which is becoming one of the crucial factors when carrying out expert evaluation of infrastructure and industrial projects, considering the present reality.

It is the combination of high efficiency and the unique competitive advantages that makes the string transport technology unprecedentedly desirable for projects, which aim at:

- **development of hard-to-reach territories,** rich in mineral and other natural resources, but underinvestigated up to now for the reason of their inefficient development using conventional railway and automobile transport technologies;

- **solving problems of megalopolis overpopulation,** including:

– transport congestion, when in city conditions there are no more territories available for further expansion of conventional transport communications or increase in their carrying capacity;
– overpopulation in its conventional meaning, when it is required to expand the boundaries of an urban district in order to provide equal transport accessibility to suburbs, which often turn to be cut off from the previous urban territory by dense development;
– implementation of all-weather and year-round transport connection of any remote regions on any continent of the planet within several hours (not days, as it is at present), available to all social groups.

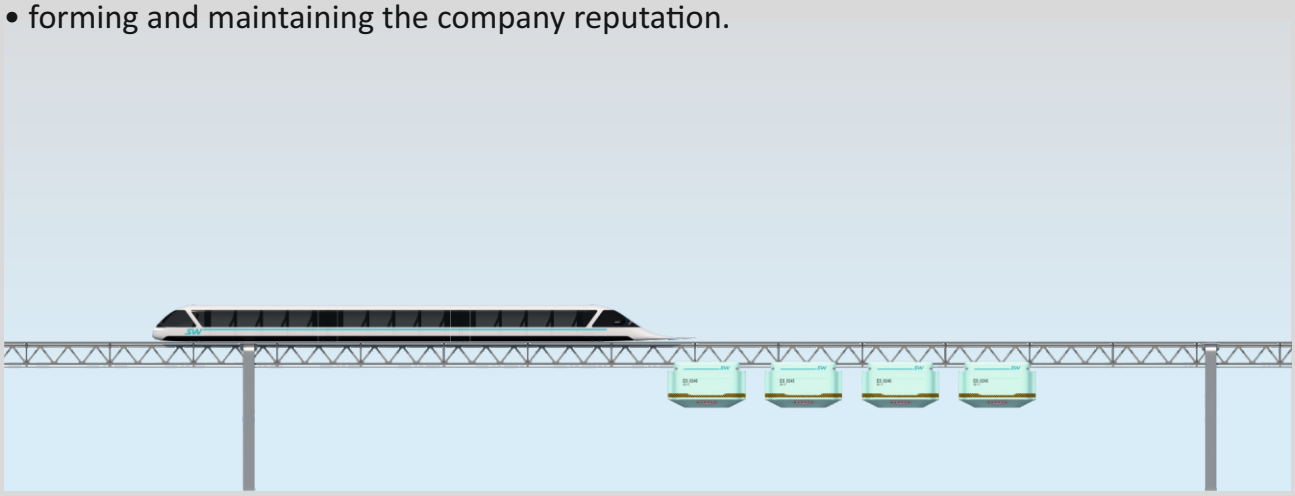
Activities aimed at promotion of string technologies in the next three years:

- research of world markets for transport services in the sphere of fast and high-speed overground passenger and cargo transportation;
- client base determination – at least 100 potential customers in different countries of the world, including Russia, for target projects of intercity tracks SkyWay ("city – airport", "city – city", "capital – regional town", "capital – capital", etc.);
- signing preliminary agreements (contracts) of intent with a range of potential customers (at least 20) on the implementation of target projects on fast and high-speed tracks SkyWay for passenger and cargo transportation;
- search for new potential consumers of products and services;
- advertisement of company services in specialized mass media and global Internet;
- provision of high-quality products and services due to using and implementing new technologies.

The system of market promotion is direct marketing as the most effective form of promoting this type of services.

Based on this, the following tasks for the marketing service have been formed:

- analysis and forecast of the main factors, which influence the environment of potential markets for transport technologies;
- analysis of the economic situation and the financial position of potential customers and the effective consumer demand;
- analysis of the competitive ability of technologies and products, comparison of consumer indices, prices and expenses with the analogic figures of competing companies;
- creation of the information and statistical database on the requests for products;
- organization of customer feedback and customer opinion poll with the purpose of improving the product quality;
- forming and maintaining the company reputation.



5.2.2. Pricing Policy

The pricing strategy at the enterprise shall meet the following requirements:

- **comply with the stated strategic aims;**
- **take into consideration the demand fluctuations;**
- **take into consideration the prices of competing transport systems and transport and infrastructure complexes;**
- **correspond to the product novelty and uniqueness.**

Considering that practically all target transport and transport-infrastructure complexes are individual and depend on the climate, terrain, underlying soils, passenger and cargo flow, design speed and other factors, the price formation for the services of the general design engineer, general contractor and general equipment supplier in this Business Plan is calculated for typical urban, cargo and high-speed passenger tracks for countries with an average cost of materials, components, electric energy and labour force.

In this case, the revenue of the general design engineer is estimated at the level of 8–10 % of the project cost; the revenue of the general contractor – at the level of 5 % of the transport overpass cost; the revenue of the general equipment supplier – 30 % of the rolling stock and equipment cost (automated control system, external drive, loading and unloading terminals, etc.).

The planned price for design and construction services for all typical tracks is given in Table 5.3.

Table 5.3 – Planned price for design and construction services for typical tracks, mln USD

List of typical tracks	Services of general design engineer	Services of general contractor	Services of general supplier
1. Urban double-track complex SkyWay (50 km)	30.0	6.3	39.9
2. Urban mono-rail complex SkyWay (50 km)	30.0	6.3	39.9
3. Cargo complex SkyWay (100 km)	25.5	7.5	22.8
4. High-speed double-track complex SkyWay (1,000 km)	450.0	200.0	165.0

6. PRODUCTION PLAN

6.1. Production and Sales Program

The production program of SkyWay Technologies Co. and the expected total revenue gained from design and construction of transport and infrastructure complexes are based on the production capacities of the enterprise and the demand for the manufactured products.

The initial data for the production plan development are:

- the anticipated sales market capacity for finished products;
- capacity of the equipment planned for installation.

The production program was based on the following prerequisites:

1) revenue from design, construction and equipment supply was planned proportionally to the determined period (for example, if for design of one cargo complex there were provided two years, in the first and second years it was planned to design by 0.5 of cargo complex);

2) number of projects in work (in terms of design, construction and equipment supply) was summed for each year with regard to their implementation schedule;

3) resources and expenses were planned with regard to the work load by years.

The planned period for the main project stages of typical tracks is given in Table 6.1.

Table 6.1 – Planned period for main project stages of typical tracks

List of typical tracks	Design	Construction	Equipment supply
1. Urban double-track complex SkyWay (50 km)	1st–2nd years	3rd–4th years	4th year
2. Urban mono-rail complex SkyWay (50 km)	1st–2nd years	3rd–4th years	4th year
3. Cargo complex SkyWay (100 km)	1st year	2nd–4th years	3rd year
4. High-speed double-track complex SkyWay (1,000 km)	1st–2nd years	3rd–5th years	5th year

When planning, two scenarios are taken into consideration – optimistic and pessimistic. The optimistic scenario is taken as a basis.

The production volume will be represented in the form of the scope of services for design, construction and equipment sale for transport and infrastructure complexes SkyWay all over the world.

Planning is based on the typical track variants of the following format:

- urban double-rail track 50 km long;
- urban mono-rail track 50 km long;
- cargo track 100 km long;
- high-speed double-rail track 1,000 km long.

The production program in its optimistic and pessimistic variants is given in Tables 6.2 and 6.3.

Table 6.2 – Program for services production and sales (optimistic scenario)

Name of product	Unit of measurement	By periods (years) of project implementation								
		2016	2017	2018	2019	2020	2021	2022	2023	2024
Urban double-rail track										
Design	pcs	0.5	1.0	2.5	5.5	9.5	13.5	17.5	22.5	27.5
Construction	pcs	–	–	0.5	1.0	2.5	5.5	9.5	13.5	17.5
Equipment supply	pcs	–	–	–	1.0	1.0	4.0	7.0	12.0	15.0
Urban mono-rail track										
Design	pcs	0.5	1.0	2.5	5.5	9.5	13.5	17.5	22.5	27.5
Construction	pcs	–	–	0.5	1.0	2.5	5.5	9.5	13.5	17.5
Equipment supply	pcs	–	–	–	1.0	1.0	4.0	7.0	12.0	15.0
Cargo track										
Design	pcs	1.0	3.0	8.0	13.0	25.0	30.0	40.0	50.0	60.0
Construction	pcs	–	0.5	2.0	5.5	10.5	19.0	27.5	35.0	45.0
Equipment supply	pcs	–	–	1.0	3.0	8.0	13.0	25.0	30.0	40.0
High-speed track										
Design	pcs	–	1.0	3.5	7.5	15.0	25.0	40.0	60.0	80.0
Construction	pcs	–	–	–	0.7	2.3	5.7	11.7	20.0	33.3
Equipment supply	pcs	–	–	–	–	–	2.0	5.0	10.0	20.0
Total on all tracks										
Design	**pcs**	**2.0**	**6.0**	**16.5**	**31.5**	**59.0**	**82.0**	**115.0**	**155.0**	**195.0**
Construction	**pcs**	**–**	**0.5**	**3.0**	**8.2**	**17.8**	**35.7**	**58.2**	**82.0**	**113.3**
Equipment supply	**pcs**	**–**	**–**	**1.0**	**5.0**	**10.0**	**23.0**	**44.0**	**64.0**	**90.0**

Table 6.3 – Program for services production and sales (pessimistic scenario)

Name of product	Unit of measurement	By periods (years) of project implementation								
		2016	2017	2018	2019	2020	2021	2022	2023	2024
Urban double-rail track										
Design	pcs	–	–	0.5	1.0	1.0	1.0	1.5	2.0	2.0
Construction	pcs	–	–	–	–	0.5	1.0	1.0	1.0	1.5
Equipment supply	pcs	–	–	–	–	–	1.0	1.0	1.0	1.0
Urban mono-rail track										
Design	pcs	–	–	0.5	1.0	1.0	1.0	1.5	2.0	2.0
Construction	pcs	–	–	–	–	0.5	1.0	1.0	1.0	1.5
Equipment supply	pcs	–	–	–	–	–	1.0	1.0	1.0	1.0
Cargo track										
Design	pcs	–	–	1.0	1.0	1.0	1.0	2.0	3.0	3.0
Construction	pcs	–	–	–	0.5	1.0	1.0	1.0	1.5	2.5
Equipment supply	pcs	–	–	–	–	1.0	1.0	1.0	1.0	2.0
High-speed track										
Design	pcs	–	–	–	0.5	1.0	1.0	2.0	3.0	4.0
Construction	pcs	–	–	–	–	–	0.3	0.7	1.0	1.7
Equipment supply	pcs	–	–	–	–	–	–	–	1.0	1.0
Total on all tracks										
Design	**pcs**	**–**	**–**	**2.0**	**3.5**	**4.0**	**4.0**	**7.0**	**10.0**	**11.0**
Construction	**pcs**	**–**	**–**	**–**	**0.5**	**2.0**	**3.3**	**3.7**	**4.5**	**7.2**
Equipment supply	**pcs**	**–**	**–**	**–**	**–**	**1.0**	**3.0**	**3.0**	**4.0**	**5.0**

The calculation of the production program and the economic and financial indicators was carried out for the period of 2015–2024, or for 10 years from the beginning of project implementation.

6.2. Costs of Production and Product Sales

The breakdown of costs of production and product sales (in its optimistic and pessimistic scenarios) is given in Tables 6.4 and 6.5.

Table 6.4 – Breakdown of costs of production and product sales (optimistic scenario), %

Cost elements	By periods (years) of project implementation, %									
	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
1. Costs for raw materials and consumables	0	5	3	41	73	45	62	67	69	72
2. Depreciation costs	0	5	11	5	1	1	1	0	0	0
3. Miscellaneous costs related to intellectual property protection and ownership	0	11	3	2	1	1	1	1	1	0
4. Labour payment expenses with taxes and deductions	86	53	20	5	1	2	1	0	0	0
5. General administrative expenses	14	6	2	1	0	0	0	0	0	0
6. Marketing expenses	0	20	60	46	24	51	36	32	30	27
Total costs of production and product sales	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Table 6.5 – Breakdown of costs of production and product sales (pessimistic scenario), %

Cost elements	By periods (years) of project implementation, %									
	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
1. Costs for raw materials and consumables	0	7	8	7	8	50	82	81	89	89
2. Depreciation costs	0	6	28	38	34	17	5	5	3	3
3. Miscellaneous costs related to intellectual property protection and ownership	0	14	8	11	15	10	4	5	3	3
4. Labour payment expenses with taxes and deductions	86	66	50	39	39	21	7	8	5	5
5. General administrative expenses	14	7	6	5	5	3	1	1	1	1
6. Marketing expenses	0	0	0	0	0	0	0	0	0	0
Total costs of production and product sales	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

The information on the amount of costs of production and product sales by years (in its optimistic and pessimistic scenarios) is given in Annex 4.

7. ORGANIZATION PLAN

The organization plan reflects the order and consistency of implementing the main activities of an organizational character aimed at achievement of the strategic purposes set before the enterprise and the solution of the specific tasks on delivering a high-quality project as soon as is practicable with the lowest possible costs.

The project is expected to be implemented in accordance with the approved graphic schedule. The consolidated graphic schedule on project implementation is given in Table 7.1.

Table 7.1 – Consolidated graphic schedule on EcoTechnoPark project implementation

Stage No.	Name of the corresponding stage	Period of stage implementation
1	Construction of a single-track urban double-rail complex on a truss structure (950 m long, two anchor supports, passenger station with a connection hub, 18 intermediate supports, one urban unibus)	September 2015 – October 2016
2	Construction of a double-track urban mono-rail complex (1,600 m long in a single-track valuation, two anchor supports, 19 low-height supports and two high-rise intermediate supports, passenger station, turnout switch, one unibike and one urban unibus)	April 2016 – October 2016
3	Construction of a double-track cargo complex on a truss structure (1,080 m long in a single-track valuation, two anchor supports, 28 intermediate supports, automated loading/unloading terminals, two external drives, product pipeline 1,080 m long, turnout switch, one cargo unitruck)	May 2016 – November 2016
4	Construction of a high-speed double-rail complex on a truss structure (16,000 m long, seven anchor supports, 387 intermediate supports, two passenger stations, turnout switch, two high-speed unibuses of different models)	September 2015 – October 2017

A more detailed plan on the staged project implementation of EcoTechnoPark design and construction is given in Annex 3.

The process of EcoTechnoPark construction will be supervised by the enterprise founders. Construction and assembly works will be carried out by contracting organizations. Staff recruitment to SkyWay Technologies Co. started in 2014. The start of services implementation on design, construction and equipment supply is planned for the years 2016–2017 within the scope of available pre-orders and upon the receipt of new orders from customers, which envisages a gradual staff increase at SkyWay Technologies Co. With the growth in the volume of scopes provided, the staff number will be growing, respectively. The existing organization structure of the enterprise is given in Annex 5.

The staff structure and the period of employee engagement are presented in Table 7.2. A one-shift work schedule is planned for the enterprise.

Table 7.2 – Structure and average staff number by categories

Category name	Unit of measurement	Total									
		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Personnel engaged in the main activity	persons	103	204	264	306	348	390	432	474	516	558
Specialists	persons	80	175	233	275	317	359	401	443	485	527
Executive staff	persons	23	29	31	31	31	31	31	31	31	31
Personnel engaged in auxiliary activity	persons	–	–	–	–	–	–	–	–	–	–
Total	**persons**	**103**	**204**	**264**	**306**	**348**	**390**	**432**	**474**	**516**	**558**

8. INVESTMENT PLAN

The financial and economic calculations have been carried out in millions USD (as mentioned in the text of the Business Plan – mln USD). The project time horizon is assumed equal to 10 years.

The general investment costs on the project make 200 mln USD (without VAT). The investment in fixed capital is resources required for design, construction, equipment purchase and assembly and implementation of other pre-production activities.

The amount of capital expenses on the project, without regard to VAT, determines the investment project cost, which is 200.0 mln USD. The amount of VAT to be paid when carrying out capital expenses is 40.0 mln USD (refunded upon the construction completion and object commissioning).

The summarized data on the investment expenses and their funding sources on the project

The total investment requirement with regard to funding of project expenses will make 240.0 mln USD. Within the work on the EcoTechnoPark project, the activities are carried out regarding SkyWay technology improvement and future target projects. In order to simplify the calculations, a part of SkyWay Technologies Co. expenses (particularly, employee salary with accruals, as well as general administrative expenses) is taken as operating expenses on the project.

Table 8.1 – Investment plan, mln USD

Purpose of investment	Total	By years of project implementation, mln USD		
		2015	2016	2017
Pre-investment expenses	5.5	2.0	3.0	0.5
Design and construction work	19.0	4.0	7.0	8.0
Rolling stock	32.0	0	22.0	10.0
Transport overpasses	70.0	0	12.0	58.0
Equipment	30.0	0	19.0	11.0
Buildings and structures	20.0	0.5	14.5	5.0
Site improvement	9.5	0.5	4.0	5.0
Marketing	9.0	0	4.0	5.0
Miscellaneous and unforeseen expenses	5.0	0	2.0	3.0
VAT	40.0	1.4	17.5	21.1
Total expenses	**240.0**	**8.4**	**105.0**	**126.6**
Funding sources	**Total**	**By years of project implementation, mln U SD**		
		2015	**2016**	**2017**
Investment, total	**240.0**	**8.4**	**105.0**	**126.6**
including				
own funds, total	240.0	8.4	105.0	126.6
– for CAPEX	226.0	8.4	99.0	118.6
– for OPEX	14.0	0	6.0	8.0
borrowed funds	0	0	0	0

9. FINANCIAL PLAN

The main prerequisites for financial planning are the following:

- **income and expenditure planning is carried out for a 10-year period, from 2015 to 2024;**
- **taxation planning was carried out with regard to the following prerequisites (complies with the current taxation conditions in the Republic of Belarus):**
  – value added tax – 20 %;
  – profit tax – 18 %;
  – deductions from payroll budget – 34.6 %;
- **planning of depreciation of fixed assets was made with regard to the average depreciation period for all objects for 30 years.**
  As EcoTechnoPark is planned to be a centre for SkyWay technology testing and improvement, an object cost renewal is envisaged from 2021 due to depreciation. As a result, the amount of fixed assets will remain unchanged from that moment, although depreciation will be charged. A constant renewal of fixed assets is envisaged for the amount of depreciation.
- **planning of balance, profit and loss statement, and a cash flow statement is carried out based on the planned income and expenditures considering the scope of services implementation, their cost, as well as the current operating expenses of the enterprise;**
- **the main project revenue is the services of the general design engineer, general contractor and general supplier of equipment for transport and infrastructure complexes SkyWay all over the world, as well as the revenue from their operation (the model envisages a share of SkyWay Group in the revenue from operation at the level of 25 %);**
- **investment financing was planned in full at the expense of own funds of the foreign company-founder.** Raising borrowed funds for project implementation was not planned;
- **planning of financial indicators was carried out for the optimistic scenario only, since it was accepted as a basic variant.**

The estimated financial statement for the optimistic scenario is given in Tables 9.1, 9.2 and 9.3.

Table 9.1 – Estimated cashflow statement on the project, mln USD

Line item	By periods (years) of project implementation									
	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Net profit	–1	42	465	1,518	3,161	6,895	11,634	19,439	30,552	44,214
Depreciation	–	1	3	7	7	7	7	7	7	7
Change in net working capital	–2	–18	–21	40	–	–	–	–	–	–
Cash flow from operating activity	–3	25	447	1,565	3,168	6,902	11,641	19,446	30,559	44,221
Investment in fixed assets	–7	–70	–106	–	–	–	–	–	–	–
Cash flow from investment activity	–7	–70	–106	–	–	–	–	–	–	–
Loans and credits	–	–	–	–	–	–	–	–	–	–
Purchase/sale of shares	10	178	139					–	–	–
Dividend payment	–	–	–	–469	–1,237	–3,451	–5,821	–9,723	–15,279	–22,111
Cash flow from financial activity	–	178	139	–469	2,371	–3,451	–5,821	–9,723	–15,279	–22,111
Change in cash flow for the period	**–**	**133**	**480**	**1,095**	**1,901**	**3,451**	**5,820**	**9,723**	**15,280**	**22,110**
Cumulative monetary funds	**–**	**133**	**613**	**1,708**	**3,609**	**7,060**	**12,880**	**22,603**	**37,883**	**59,993**

Table 9.2 – Estimated income and expenditure statement on the project, mln USD

Line item	By periods (years) of project implementation									
	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Revenue	**2**	**60**	**596**	**1,980**	**4,381**	**8,805**	**15,125**	**24,690**	**37,354**	**51,816**
Project "Urban double-rail track"	–	15	30	78	211	341	599	864	1,238	1,533
Project "Urban mono-rail track"	–	15	30	78	211	341	599	864	1,238	1,533
Project "Cargo track"	–	25	79	238	435	886	1,189	1,776	2,197	2,749
Project "High-speed double-rail track"	–	–	450	1,575	3,508	7,217	12,713	21,158	32,650	45,967
Miscellaneous design and engineering works	2	5	8	11	16	20	25	28	31	34
Net cost	**–**	**–1**	**–3**	**–7**	**–7**	**–7**	**–7**	**–7**	**–7**	**–7**
Gross revenue	**2**	**56**	**593**	**1,973**	**4,374**	**8,798**	**15,118**	**24,683**	**37,347**	**51,809**
Project "Urban double-rail track"	–	15	29	77	210	340	598	863	1,237	1,532
Project "Urban mono-rail track"	–	15	29	77	210	340	598	863	1,238	1,532
Project "Cargo track"	–	24	78	237	434	885	1,188	1,175	2,196	2,748
Project "High-speed double-rail track"	–	–	450	1,571	3,504	7,213	12,709	21,154	32,646	45,963
Miscellaneous design and engineering works	2	5	8	11	16	20	25	28	31	34
Indirect expenses	**–3**	**–9**	**–27**	**–122**	**–541**	**–510**	**–1,295**	**–2,337**	**–3,759**	**–5,683**
General running and administrative expenses	–3	–7	–9	–63	–409	–246	–805	–1,596	–2,639	–4,129
Marketing expenses	–	–2	–18	–59	–132	–264	–454	–741	–1,120	–1,554
Operating revenue	**–1**	**51**	**566**	**1,851**	**3,834**	**8,288**	**13,859**	**22,346**	**33,588**	**46,126**
EBITDA	**–1**	**52**	**569**	**1,858**	**3,841**	**8,295**	**13,866**	**22,353**	**33,595**	**46,133**
Depreciation	–	–1	–3	–7	–7	–7	–7	–7	–7	–7
Interest on credits and loans	–	–	–	–	–	–	–	–	–	–
Revenue from operation	**–**	**–**	**–**	**–**	**21**	**121**	**328**	**1,360**	**3,671**	**7,794**
Profit for taxation	**–1**	**51**	**566**	**1,851**	**3,855**	**8,409**	**14,188**	**23,706**	**37,259**	**53,920**
Profit tax	–	–9	–101	–334	–694	–1,514	–2,554	–4,267	–6,707	–9,706
Net profit loss	**–1**	**42**	**465**	**1,518**	**3,161**	**6,895**	**11,634**	**19,439**	**30,552**	**44,214**

Table 9.3 – Estimated project balance, mln USD

Line item	By periods (years) of project implementation									
	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Assets										
Monetary funds	–	133	613	1,708	3,609	7,060	12,880	22,603	37,883	59,993
Settlements with debtors	–	–	–	–	–	–	–	–	–	–
Budget settlements	1	19	40	–	–	–	–	–	–	–
Fixed assets and intangible assets	7	111	409	1,121	3,447	9,111	20,892	42,629	77,654	132,002
Total assets	**8**	**263**	**1,062**	**2,829**	**7,056**	**16,171**	**33,772**	**65,232**	**115,558**	**191,995**
Liabilities										
Settlements with creditors	–	–	–	–	–	–	–	–	–	–
Loans payable	–	–	–	–	–	–	–	–	–	–
Own funds										
Authorized capital	9	222	557	1,575	3,609	9,280	21,066	42,810	77,863	132,196
Profit	–1	41	505	1,554	3,448	6,892	12,706	22,422	37,695	59,799
Total liabilities and equity	**8**	**263**	**1,062**	**2,829**	**7,056**	**16,171**	**33,772**	**65,232**	**115,558**	**191,995**

Note – The budget forecast is given as of the end of the corresponding periods.

On the whole, the project shows a significant cash flow growth every year starting from 2017. With that, in its basic scenario, the project reaches the break-even point on the second year from the moment of construction start. All this allows to start dividend payment from 2018.

10. FINANCIAL AND ECONOMIC PERFORMANCE DATA

The main performance indicators of financial and business activity of the enterprise (in the optimistic scenario, with regard to the operation) are given in Figures 10.1 and 10.2.

Figure 10.1 – ROA dynamics by years, %

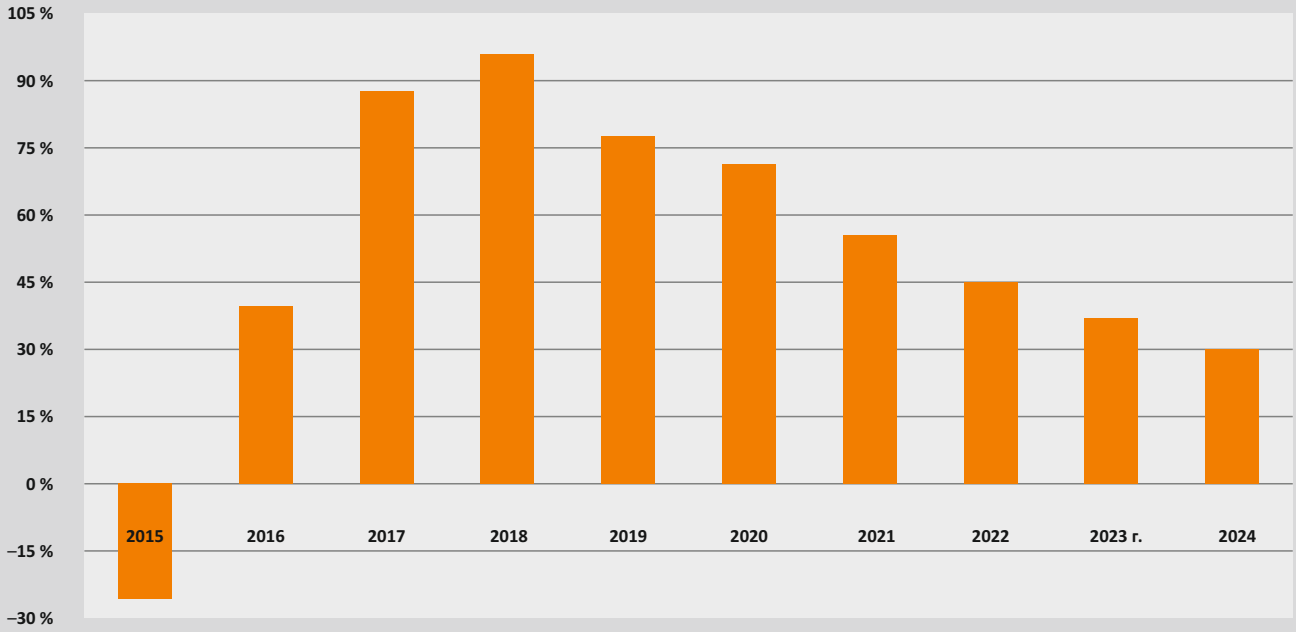
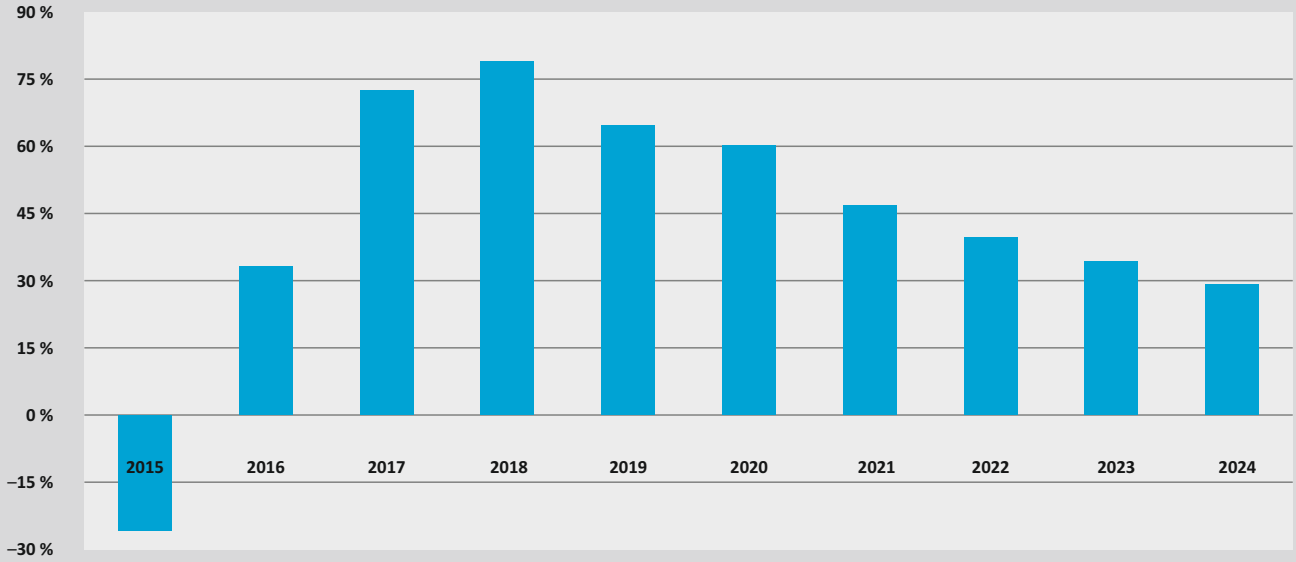


Figure 10.2 – ROE dynamics by years, %



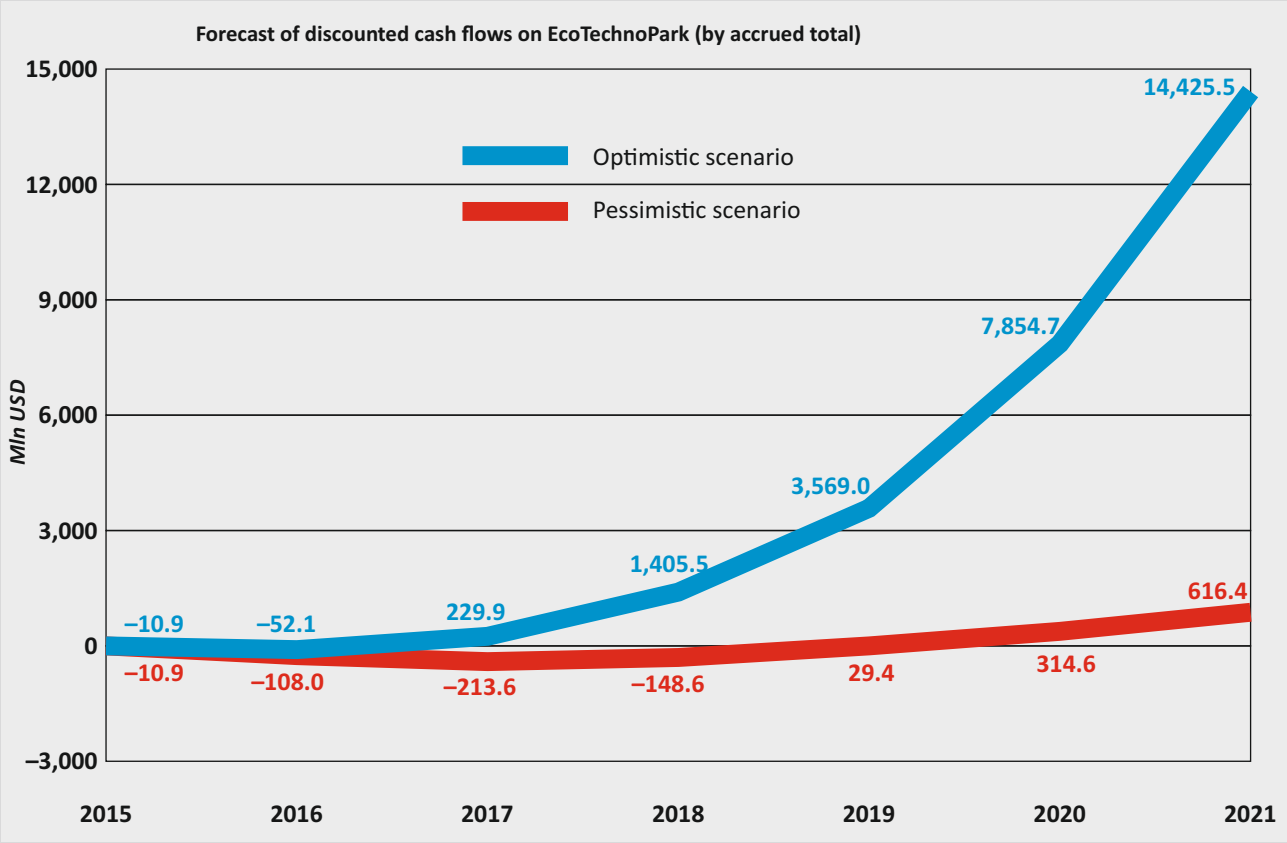
As is seen from the diagrams, the enterprise retains high indicators of return on assets (ROA) and return on equity (ROE) even in the long-term period (2021–2024), when the value of assets and equity capital will be already significantly high.

11. PROJECT SUCCESS CRITERIA

The assessment of return on investment (ROI) is based on the comparison of the expected net revenue from project implementation with the capital invested in the project. The basis of this method is calculation of the net cash flow, determined as a difference between the net revenue from product implementation (hereinafter – net revenue) on the project and the amount of total investment expenses and loan charges (credits) related to carrying out capital expenses on the project.

The main indicators of ROI assessment, such as net present value (NPV), profitability index (PI), internal rate of return (IRR) and dynamic payback period are calculated based on the net cash flow. In order to calculate these indicators, a discount coefficient is applied. It is used to bring the future cash flow and outflow at step ***t*** to the initial time period.
In this case, cash flow discounting is carried out from the moment of launching investment financing. The discount rate has been calculated by method of the weighted average capital cost and makes 10 %.

Figure 11.1. – Calculation of discounted payback period of the project, mln USD



Net present value (NPV) characterizes an integrated effect from project implementation. It is determined as a value obtained by discounting (with a constant interest rate separately for each year) the difference between all annual real cash inflow and outflow accumulated during the project time horizon. **The project NPV makes 57,414.6 mln USD (in its pessimistic scenario – 2,936.6 mln USD).**

Internal rate of return (IRR) is an integrated index calculated by finding the discount rate, where the cost of future receipts is equal to the investment cost (NPV = 0). **The project IRR makes 526 % (in its pessimistic scenario – 85 %).**

A simple payback period is a period of time, upon the completion of which the net volume of receipts (revenue) exceeds the amount of investment (expenses) in the project. A simple payback period corresponds to the period, when the cumulative value of the net cash flow is changed from negative to positive. **A simple payback period on the project makes 22 months (in its pessimistic scenario – 58 months).**

A discounted payback period is calculated based on the cumulative discounted net cashflow. It takes into consideration the cost of capital and shows the real payback period on the project. **The discounted payback period on the project makes 22 months (in its pessimistic scenario – 64 months).**

The implementation of this investment project will contribute to the increase in the export share of trade balance of the Republic of Belarus, currency inflow in the country's economy, creation of new working places, as well as to the quick growth in prosperity of SkyWay shareholders in all countries of the world.

12. ENTERPRISE RISK ASSESSMENT

It is possible to single out the following range of risks on this project.

1. Construction lag.
A construction lag can lead to overexpenditure, loss of potential revenue, extra expenses for storage of equipment already purchased, and violation of sale and purchase contracts. This risk can be reduced by means of control for the process of carrying out construction and assembly works, application of possible punitive sanctions in case of violating the project schedule times by the builder/contractor. The estimated risk is average.

2. Overexpenditure.
Overexpenditure can lead to the over-run of the total capital expenses compared to those envisaged in the budget, and require additional funding to the one provided for in the initial cost estimate. A careful choice of reliable contractors on a competitive basis, constant designer supervision for the construction progress, as well as signing general contracts will allow to minimize such risks. This risk is estimated as average.

3. Production risk.
This risk is related to the absence of the appropriate production control. The consequences can be expressed in the form of unreasonable and inefficient labour management, increase in labour costs and staff turnover. The ways to decrease this risk include staff training, using an effective system of staff recruitment and implementation of incentive mechanisms for the managerial staff. This risk is estimated as average. Further decrease in the production risk will depend on the effective work of the managerial staff of the enterprise.

4. Inflation risk.
This risk is estimated as average. The inflation risk falls into the group of the so-called system risks, i.e. the enterprise cannot affect it directly with the purpose of minimizing any negative impact. This risk can become a reason for the reduction of profit and failure to comply with the estimated figures. In order to eliminate this risk, it is required to conclude design-build contracts in different regions of the world pegged to the freely convertible currency (for example, USD), as well as to sign customer contracts, which envisage hedging prices based on the change in the currency exchange rate using financial instruments.

5. Organizational risk.
It is estimated as below the average, as project implementation is carried out by the qualified staff possessing an extensive experience in production engineering.

6. Marketing risk.
This risk is related to a probability of the enterprise failure to reach the planned volume of product sale. As the enterprise will work based on forward contracts for the production and product sale, the estimated risk is average.

7. Typical technological risks.
These are problems with technical maintenance of standard equipment, purchase of low-quality materials and components, availability of qualified labour force for operating the purchased technological equipment, failure to reach the planned capacity. These risks are estimated as average and can be minimized by the following ways:

- supply contracts for materials, components and purchased parts in terms of "price/quality" will be concluded only with the leading world enterprises, which specialize in the production of the required items and have an image of reliable international commercial partners;

- contract terms will envisage supervised installation and supervised equipment commissioning;

- purchased equipment shall be provided with warranty obligations;

- realization of an opportunity to conclude post-warranty service contracts.

Based on the above, the typical technological risks are estimated as average.

8. Innovative technological risks.
They are the main risks in any business related to innovative technologies, especially if these technologies are breakthrough and branch-forming. SkyWay transport and infrastructure technology falls specifically into the category of such technologies. In order to eliminate the specified risks, the main requirement is absolute compliance with the declared advantages of the technology over other competing technologies – automobile and railway transport, mono-rail and cable ways, air transport and magnetic levitation trains. These risks have two main constituents:

1) **scientific and design engineering risks**, when a developer overestimates the advantages of the technology, and sometimes deliberately embellishes them. These risks are eliminated by independent expert evaluations. Being a scientific, research and experimental development, SkyWay technology has undergone dozens of expert evaluations for the last 20 years – from the Academy of Sciences and the Ministry of Transport of the Russian Federation to the Administration of the President of the Republic of Belarus, Australian consulting companies and the United Nations Organization (there have been obtained two UN grants for the technology development).

According to the independent expert opinions, the string technologies are by times, and by some indices – by ten times, more efficient compared to all the above listed known transport technologies – in terms of its efficiency, energy saving, eco-friendliness, safety, transportation cost, capital expenses for construction.

Thus, there are no any scientific and design engineering risks at all;

2) **production risks,** related to the quality of research and development, design engineering, construction and assembly and machine-building works for EcoTechnoPark. These risks are divided into the following:

- **author's risks.** The SkyWay program is distinguished by a strongly marked author character. It is specifically the author – engineer Mr. Anatoly Yunitskiy – on his own initiative, having encountered serious opposition, has been promoting the project for almost 40 years. For these years, he has grown from the author of the idea to the General designer (as a developer) and General director (as an executive), combining these positions for over 20 years in different companies created by him for project development, funding and implementation in different countries – Germany, Russia, Ukraine, Australia, Lithuania, Belarus. Mr. Anatoly Yunitskiy is an academician of a range of international academies. He defended his doctorate thesis, created over 100 inventions, prepared and published 19 scientific monographs and over 200 scientific works. Having gained the corresponding experience and competence, the author uses them to the maximum extent possible to implement his life goal – enter the world market with the breakthrough transport and infrastructure technology and win a significant share on that market.

  Thus, the author's risks in this project are minimal;

- **design and engineering risks,** related to the quality of research and development and design engineering works.

  These risks are also minimal due to the following reasons:

  – design engineering enterprise SkyWay Technologies Co. was created in the Republic of Belarus; it has the highest level of development of an automobile construction school among all the CIS. The SkyWay General designer formed the basis of the enterprise primarily out of the specialists in this area to make 12 divisions and services and 22 design bureaus and structural subdivisions (Annex 5).

  – similar to General designer Sergey Korolyov, who back in his time selected the most skilled specialists for his team of cosmonauts – military pilots, General designer Anatoly Yunitskiy in our days has formed the "brain" of the program selecting the best skilled specialists from the automobile construction sphere for SkyWay project implementation, as he has experience of creating six design bureaus in the past. In addition, SkyWay Technologies Co. was not created from scratch, but on the basis of the scientific, design and engineering schools, created by engineer Yunitskiy in the previous, almost 40-year, period in six countries.

ANNEXES

Annex 1. Enterprise Passport

Branch:
Transport machine building and technologies.

Full company name:
Closed Joint Stock Company "SkyWay Technologies Co."

Abbreviated company name:
CJSC SkyWay Technologies Co.

Main business activities:
Rendering services of general design engineer, general contractor and general supplier of equipment for transport systems of the "second level" under SkyWay technology all over the world.

Legal address:
1a, Leninskaya street, agro-town Novosyolki, Minsk region, Pukhovichi district, 222838, Republic of Belarus.

Postal address:
Office 703b, bldg B, 104, Dzerzhinskogo Ave., Minsk, Republic of Belarus.

Form of ownership:
Private.

Date of incorporation:
12/02/2015

Amount of paid-in authorized capital as of 01/01/2016:
19.7 bln BYR (equivalent to 1,060.9 thousand USD at the rate of conversion equal to the rate of the National Bank of the Republic of Belarus as of 01/01/2016.)

Enterprise founders:

Legal entity: resident of the British Virgin Islands,
Limited liability company "Global Transport Investments Inc.", registered on 12/06/2013 under No. 1778122; location: 19 Waterfront Drive, PO 3540, Road Town, Tortola, VG1110, British Virgin Islands – 9,000 (nine thousand) common (ordinary) shares.

Citizen of the Republic of Belarus Mr. Anatoly E. Yunitskiy – 1,000 (one thousand) common (ordinary) shares.

Companies, where the enterprise is a founder / shareholder:
none.

Value of short-term assets:
5,129 mln BYR[3].

Value of long-term assets:
39,109 mln BYR.

Staff listing (as of the beginning of 2016):
121 people.

General Director – General Designer of the enterprise:
Mr. Anatoly E. Yunitskiy.

[3] Data on the short-term and long-term asset value of CJSC SkyWay Technologies Co. are given as of 01/01/2016; the staff listing – as of 01/01/2016.

Annex 2. List of Main Patents

The development of SkyWay string transport technology is protected by the following patents for inventions (author and patent owner is Mr. Anatoly E. Yunitskiy):

1) Anatoly Yunitskiy. Linear Transport System.
Patent of the Russian Federation No. 2080268, 1994;

2) Yunitsky Anatoly. Linear Transport System.
Patent of Republic of South Africa № 95/2888, 1994;

3) Anatoly Yunitskiy. Linear Transport System.
Patent of Ukraine No. 28057, 1994;

4) Anatoly Yunitskiy. Rail of Yunitskiy Transport System (variants) (two inventions).
Eurasian patent No. 003484, 2001;

5) Anatoly Yunitskiy. Rail of Yunitskiy Transport System.
Eurasian patent No. 003485, 2001;

6) Anatoly Yunitskiy. High-Speed Transport Module.
Eurasian patent No. 003490, 2001;

7) Anatoly Yunitskiy. High-Speed Transport Module.
Eurasian patent No. 003533, 2001;

8) Anatoly Yunitskiy. High-Speed Transport Module.
Eurasian patent No. 003534, 2001;

9) Anatoly Yunitskiy. High-Speed Transport Module.
Eurasian patent No. 003535, 2001;

10) Anatoly Yunitskiy. High-Speed Transport Module of Yunitskiy Transport System.
Patent of the Russian Federation No. 2201368, 2001;

11) Anatoly Yunitskiy. High-Speed Transport Module of Yunitskiy Transport System.
Patent of the Russian Federation No. 2201369, 2001;

12) Anatoly Yunitskiy. Rail of Yunitskiy Transport System (variants) (two inventions).
Patent of the Russian Federation No. 2201482, 2001;

13) Anatoly Yunitskiy. High-Speed Transport Module of Yunitskiy Transport System.
Patent of the Russian Federation No. 2203194, 2001;

14) Anatoly Yunitskiy. High-Speed Transport Module of Yunitskiy Transport System.
Patent of the Russian Federation No. 2203195, 2001;

15) Anatoly Yunitskiy. Rail of Yunitskiy Transport System.
Patent of the Russian Federation No. 2204636, 2001;

16) Anatoly Yunitskiy. Rail of Yunitskiy Transport System and Technique for its Manufacture and Assembly (two inventions).
Patent of the Russian Federation No. 2204637, 2001;

17) Anatoly Yunitskiy. Rail of Yunitskiy Transport System.
Patent of the Russian Federation No. 2204638, 2001;

18) Anatoly Yunitskiy. Rail of Yunitskiy Transport System and Technique for its Manufacture (two inventions).
Patent of the Russian Federation No. 2204639, 2001;

19) Anatoly Yunitskiy. Rail of Yunitskiy Transport System.
Patent of the Russian Federation No. 2204640, 2001;

20) Anatoly Yunitskiy. Rail of Yunitskiy Transport System.
Patent of the Russian Federation No. 2208675, 2001;

21) Anatoly Yunitskiy. High-Speed Transport Module of Yunitskiy Transport System.
Patent of the Russian Federation No. 2211781, 2001;

22) Anatoly Yunitskiy. Transport System.
Patent of the Russian Federation No. 2211890, 2001;

23) Anatoly Yunitskiy. High-Speed Transport Module of Yunitskiy Transport System.
Patent of the Russian Federation No. 2217339, 2001;

24) Anatoly Yunitskiy. Yunitskiy Transport System (variants) and Technique for Constructing Transport System (four inventions).
Patent of the Russian Federation No. 2220249, 2002;

25) Anatoly Yunitskiy. Yunitskiy Transport System (variants) and Technique for Constructing Transport System (three inventions).
Patent of the Russian Federation No. 2223357, 2002;

26) Anatoly Yunitskiy. Yunitskiy Transport System (variants) and Technique for Constructing Transport System (three inventions).
Patent of the Russian Federation No. 2224064, 2002;

27) Anatoly Yunitskiy. Yunitskiy Transport System and Technique for Constructing Transport System (two inventions).
Eurasian patent No. 004917, 2002;

28) Anatoly Yunitskiy. Construction Method for High-Rise Buildings and Structures by Lowering Slab Formwork, and High-Rise Building of Barrel-Wall System (two inventions).
Eurasian patent No. 004188, 2002;

29) Anatoly Yunitskiy. Rail Track Structure of Yunitskiy Transport System (variants) (three inventions).
Eurasian patent No. 004391, 2003;

30) Anatoly Yunitskiy. SkyWay String Transport System (variants), Manufacture and Assembly Technique for Span Section of String Rail Thread (three inventions).
Eurasian patent No. 005017, 2003;

31) Anatoly Yunitskiy. Transport System.
Eurasian patent No.005534, 2004;

32) Anatoly Yunitskiy. Yunitskiy Transport System (variants) and Technique for Constructing Transport System (four inventions).
Eurasian patent No. 006359, 2004;

33) Anatoly Yunitskiy. Yunitskiy Transport System (variants) and Technique for Constructing Transport System (three inventions).
Eurasian patent No. 006111, 2004;

34) Anatoly Yunitskiy. Yunitskiy Transport System (variants) and Technique for Constructing Transport System (three inventions).
Eurasian patent No. 006112, 2004;

35) Anatoly Yunitskiy. Yunitskiy String Transport System.
Patent of the Russian Federation No. 2324612, 2006;

36) Anatoly Yunitskiy. Yunitskiy String Transport System and Technique for Constructing SkyWay String Transport System (two inventions). Patent of the Russian Federation No. 2325293, 2006;

37) Anatoly Yunitskiy. Yunitskiy Transport System and Technique for Constructing SkyWay String Transport System (two inventions). Patent of the Russian Federation No. 2475386, 2013;

38) Anatoly Yunitskiy. Yunitskiy Transport System and Technique for Constructing SkyWay String Transport System (two inventions). Patent of the Russian Federation No. 2475387, 2013;

39) Anatoly Yunitskiy. Yunitskiy Transport System. Patent of the Russian Federation No. 2520983, 2014.

Annex 3. Project Time Schedule

A detailed time schedule for EcoTechnoPark project in Maryina Gorka, Minsk region.

Project Stages	2015				2016				2017			
	I qtr	II qtr	III qtr	IV qtr	I qtr	II qtr	III qtr	IV qtr	I qtr	II qtr	III qtr	IV qtr
Stage 0. Pre-project works												
Object design												
Decision on allocation of a land plot and registration of rights for it												
Obtaining the required approvals with state authorities to launch the construction												
Stage 1. Urban double-rail complex												
Preparatory work, pouring the foundation for the first anchor support												
Design and construction of the intellectual fencing												
Placing orders for manufacture of unibus units (suspended and mounted urban) and its assembly												
Construction of supports (intermediate and anchor)												
Station roof planting (+ laying the required communications) and starting gardens												
Manufacture of truss track structure												
Infrastructure construction (power supply, water pipeline, stations, system of control, safety and communications)												
Site improvement/landscaping												
Pre-commissioning work and start of testing												
Complex commissioning												
Complex certification												
Stage 2. Urban mono-rail complex												
Pre-project works												
Placing orders for manufacture of unibus units (suspended and mounted urban) and its assembly												
Construction of supports (intermediate, anchor and high-rise)												
Infrastructure construction (power supply, stations, system of control, safety and communications)												
Site improvement/landscaping												
Pre-commissioning work and start of testing												
Complex commissioning												
Complex certification												

Project Stages	2015				2016				2017			
	I qtr	II qtr	III qtr	IV qtr	I qtr	II qtr	III qtr	IV qtr	I qtr	II qtr	III qtr	IV qtr
Stage 3. Cargo complex												
Pre-project works												
Placing orders for manufacture of cargo rolling stock units (belt-rail product pipeline and suspended unicar), its assembly and erection												
Construction of supports (intermediate, anchor and high-rise)												
Track structure manufacture and assembly												
Infrastructure construction (power supply, stations, system of control, safety and communications)												
Site improvement/landscaping												
Pre-commissioning works and start of testing												
Complex commissioning												
Complex certification												
Stage 4. High-speed mounted double-rail complex												
Pre-project works												
Placing orders for manufacture of mounted high-speed unibus units, its assembly and erection												
Solving a question of point land acquisition for anchor and intermediate supports for 15 km outside the allocated plot for high-speed track												
Start of preliminary tests of a high-speed unibus on a truss structure built within Stage 1												
Construction of supports (intermediate, anchor)												
Track structure manufacture and assembly												
Infrastructure construction (power supply, stations, system of control, safety and communications)												
Continuation of preliminary testing of a high-speed unibus as track construction outside the land plot proceeds												
Site improvement/landscaping												
Pre-commissioning works and start of testing on the whole section length												
Complex commissioning												
Complex certification												

Annex 4. Total Cost of Production and Product Sales by Years

Table 4a – Optimistic scenario, mln USD

Line item	By periods (years) of project implementation									
	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
1. Expenses for raw materials and consumables	0	0.5	1.0	53.3	397.5	231.2	784.4	1,570.0	2,606.2	4,090.4
2. Depreciation deductions	0	0.5	3.4	6.7	6.7	6.7	6.7	6.7	6.7	6.7
3. Miscellaneous costs related to intellectual property protection and ownership	0	1.0	1.0	2.0	3.0	5.0	10.0	15.0	20.0	25.0
4. Labour payment expenses with taxes and deductions	2.7	4.8	6.0	6.8	7.6	8.5	9.3	10.1	10.9	11.7
5. General administrative expenses	0.4	0.5	0.7	0.8	1.0	1.1	1.2	1.4	1.5	1.7
6. Marketing expenses	0	1.8	17.9	59.4	131.4	264.1	453.8	740.7	1,120.6	1,554.5
Total expenses	**3.1**	**9.1**	**30.0**	**129.0**	**547.2**	**516.6**	**1,265.4**	**2,343.9**	**3,765.9**	**5,690.0**

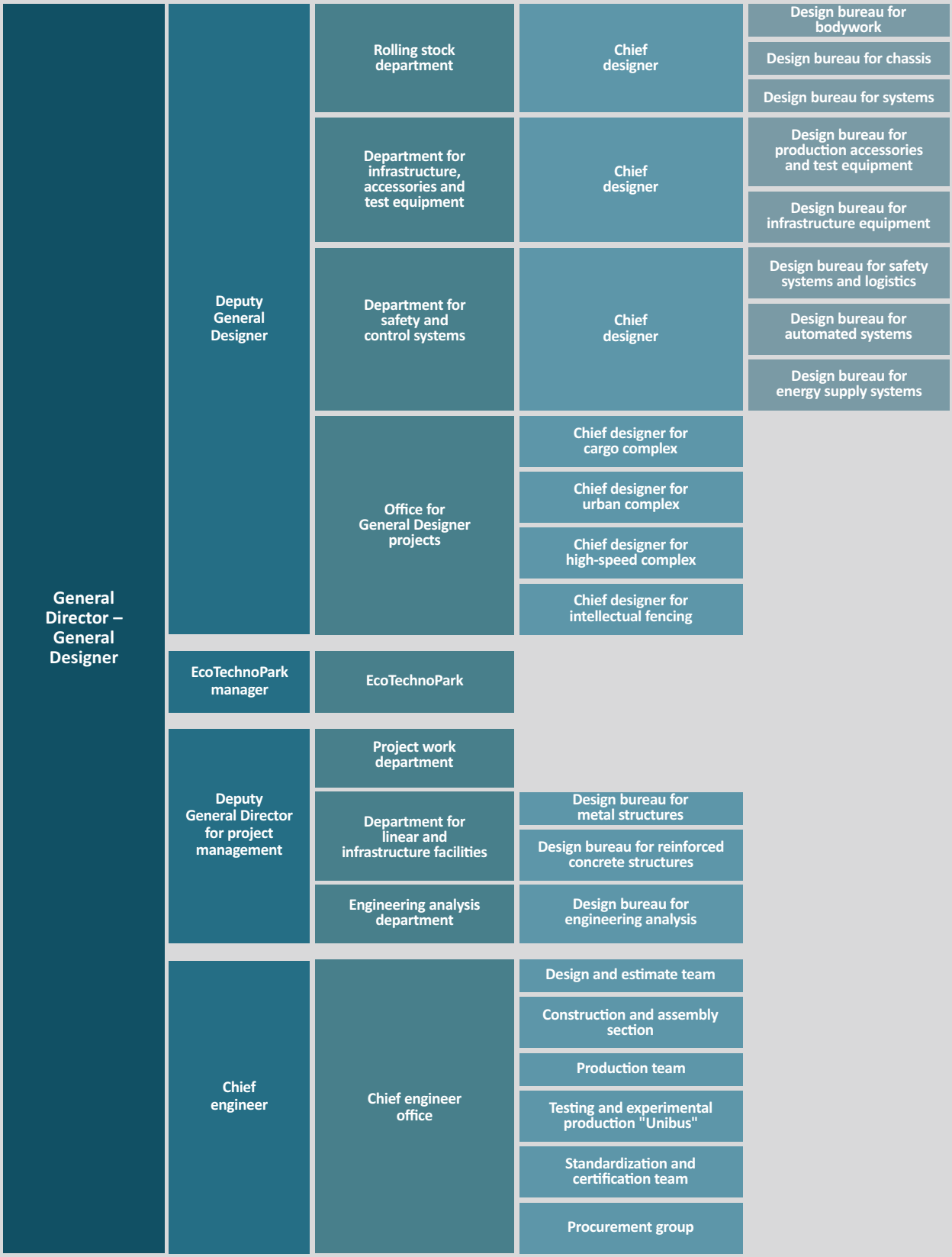
Table 4b – Pessimistic scenario, mln USD

Line item	By periods (years) of project implementation									
	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
1. Expenses for raw materials and consumables	0	0.5	1.0	1.3	1.5	19.8	104.0	104.2	209.4	227.8
2. Depreciation deductions	0	0.5	3.4	6.7	6.7	6.7	6.7	6.7	6.7	6.7
3. Miscellaneous costs related to intellectual property protection and ownership	0	1.0	1,0	2,0	3,0	4,0	5,0	6,0	7,0	8,0
4. Labour payment expenses with taxes and deductions	2.7	4.8	6.0	6.8	7.6	8.5	9.3	10.1	10.9	11.7
5. General administrative expenses	0.4	0.5	0.7	0.8	1.0	1.1	1.2	1.4	1.5	1.7
6. Marketing expenses	0	0	0	0	0	0	0	0	0	0
Total expenses	**3.1**	**7.3**	**12.1**	**17.6**	**19.8**	**40.1**	**126.2**	**128.4**	**235.5**	**255.9**

Annex 5. Enterprise Organization Structure

Organization structure of SkyWay Technologies Co.

Design Engineering Division



Administrative Department