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ESCAP Connectivity Tools and the E-resilience Monitoring Dashboard for Digital Foresight Planning

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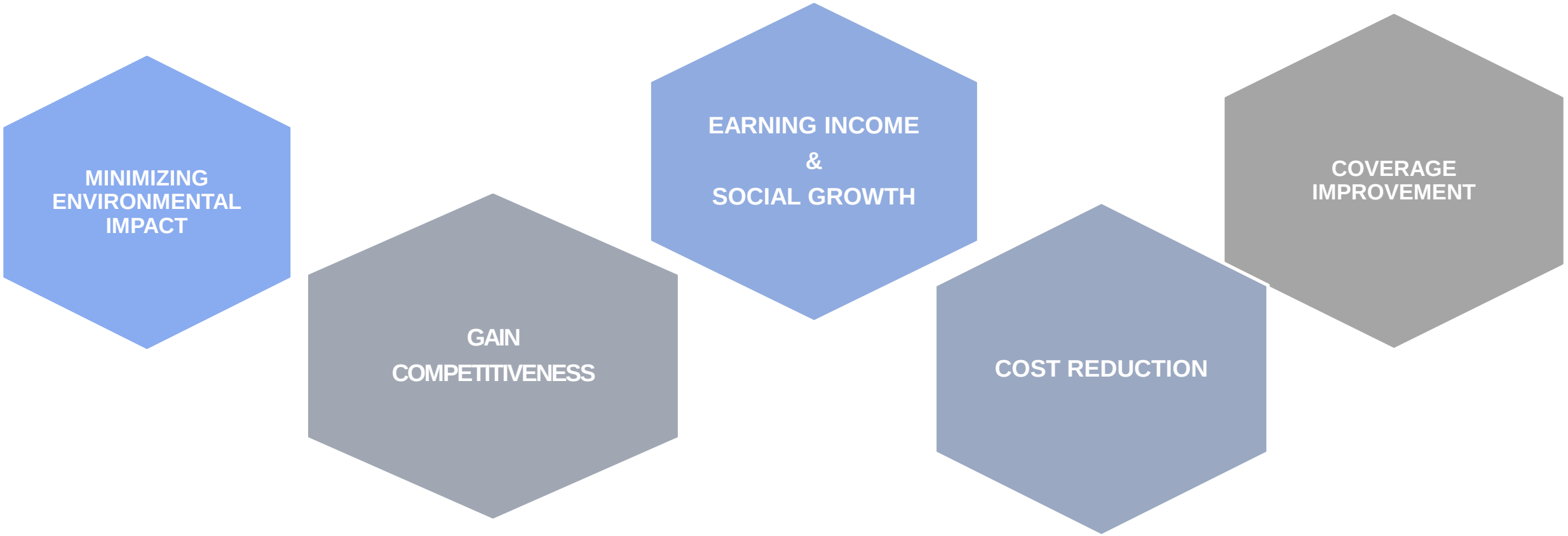
Benefits of co-deployment



Infrastructure Corridors Development Series: 2020-2021

In-depth analysis of the promising infrastructure corridors

Almaty (Kazakhstan) – Cholpon-Ata (Kyrgyzstan)

Semey (Kazakhstan) – Rubtsovsk (Russia)

Urzhar (Kazakhstan) – Chuguchak (China)

Toolkit for the development of the new infrastructure corridors

Determination of promising economic and technological flows on the territory of the infrastructure corridors

Estimation of economic efficiency of co-deployment of road transport, railway, energy and IT infrastructure

Determination of the optimal combination of potential partners for the implementation of a promising scenario

Pre-feasibility study of the promising infrastructure corridors

Scenarios for the development of a transport corridor

Most efficient from the economical point of view technological solution

Economic efficiency of the implementation of scenarios

Infrastructure Corridors Simulator: Main Components

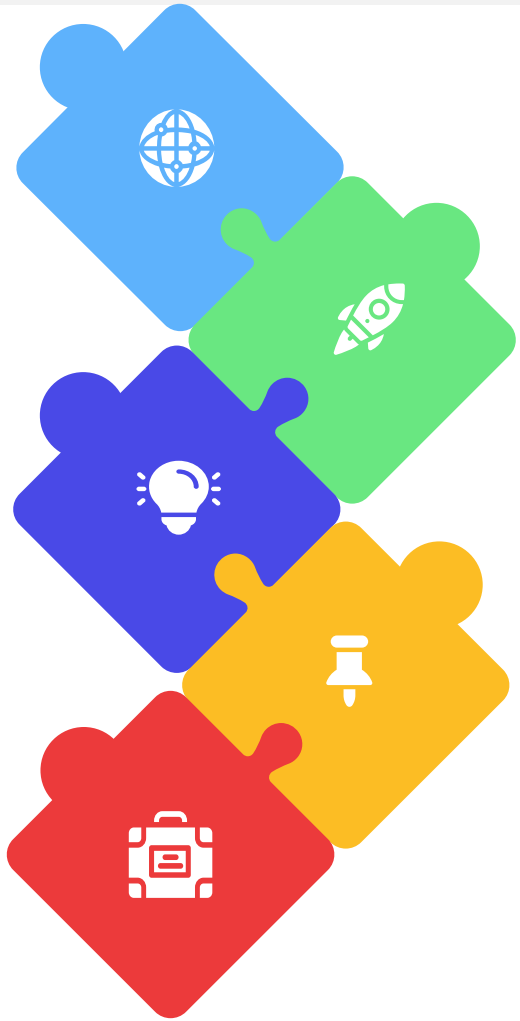
A parametric model of the infrastructure corridor

Determination of promising economic and technological flows

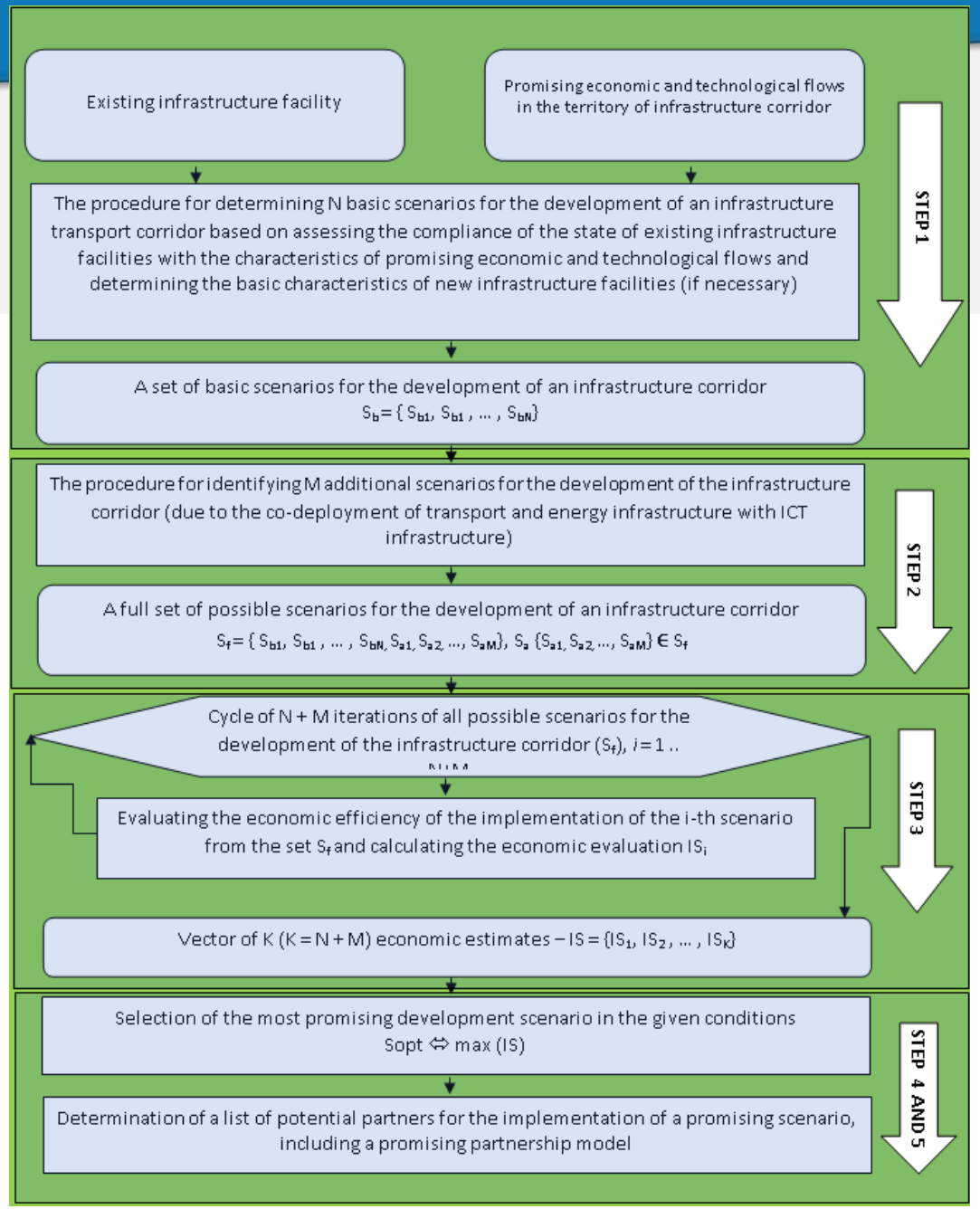
Determination of scenarios for the development of infrastructure corridor

Determination of the economic efficiency of the implementation of scenarios for the development of the infrastructure corridor

Determination of the optimal combination of potential partners for the implementation of a promising scenario



GENERALIZED ALGORITHM FOR DETERMINING THE MOST SUITABLE MODEL FOR THE DEVELOPMENT OF NEW INFRASTRUCTURE CORRIDORS



ESCAP

Development scenario of infrustructure facility S_t^f

Highways

- $t = rd$
- S_{rd}^n - new highway construction
- S_{rd}^r - highway reconstruction
- S_{rd}^0 - does not require any additional actions

Railroad

- $t = rw$
- S_{rw}^n - new railroad construction
- S_{rw}^r - railroad reconstruction
- S_{rw}^0 - does not require any additional actions

Power lines

- $t = eg$
- S_{eg}^n - new power line construction
- S_{eg}^r - power line reconstruction
- S_{eg}^0 - does not require any additional actions

FOCL

- $t = it$
- S_{it}^n - new FOCL laying
- S_{it}^r - FOCL reconstruction
- S_{it}^0 - does not require any additional actions

$\{S_{rd}^r, S_{rw}^0, S_{eg}^0, S_{it}^n\}$ Development scenario of infrastructure corridor with the reconstruction of highway and construction of FOCL

EXAMPLE OF A SET OF SCENARIOS FOR THE DEVELOPMENT OF A INFRASTRUCTURE CORRIDOR

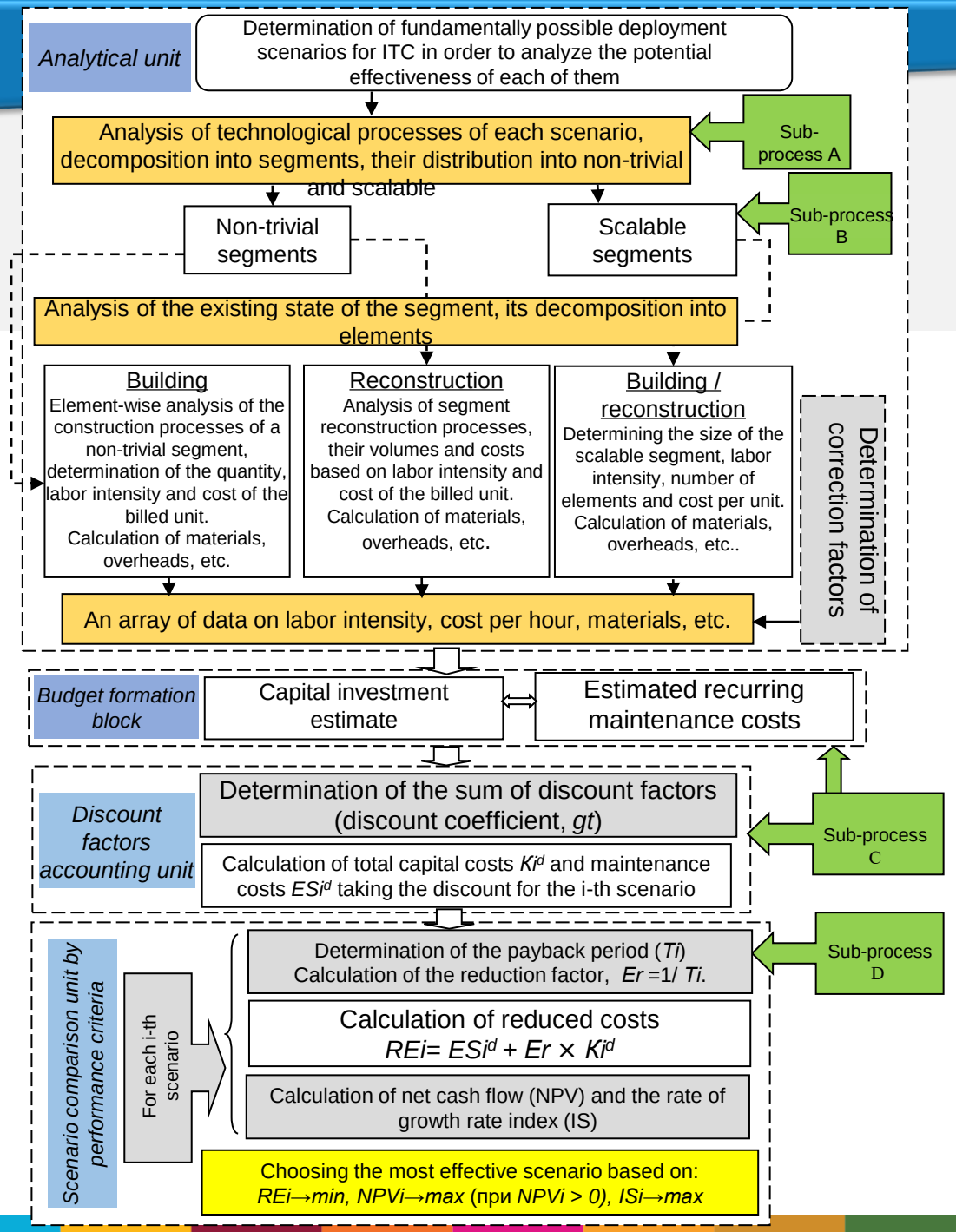
Scenario number	Scenario legend		
	Example I	Example II	Example III
1	$\{ S^{r}_{rd} , S^{0}_{rw} , S^{0}_{eg} , S^{0}_{it} \}$	$\{ S^{0}_{rd} , S^{n}_{rw} , S^{r}_{eg} , S^{n}_{it} \}$	$\{ S^{0}_{rd} , S^{n}_{rw} , S^{0}_{eg} , S^{n}_{it} \}$
2	$\{ S^{0}_{rd} , S^{r}_{rw} , S^{0}_{eg} , S^{0}_{it} \}$	$\{ S^{r}_{rd} , S^{0}_{rw} , S^{r}_{eg} , S^{n}_{it} \}$	$\{ S^{n}_{rd} , S^{0}_{rw} , S^{0}_{eg} , S^{n}_{it} \}$
3	$\{ S^{r}_{rd} , S^{r}_{rw} , S^{0}_{eg} , S^{0}_{it} \}$	$\{ S^{r}_{rd} , S^{n}_{rw} , S^{r}_{eg} , S^{n}_{it} \}$	$\{ S^{n}_{rd} , S^{n}_{rw} , S^{0}_{eg} , S^{n}_{it} \}$
4	$\{ S^{0}_{rd} , S^{0}_{rw} , S^{0}_{eg} , S^{0}_{it} \}$	–	–

A set of basic scenarios for the development of three infrastructure corridors (example)

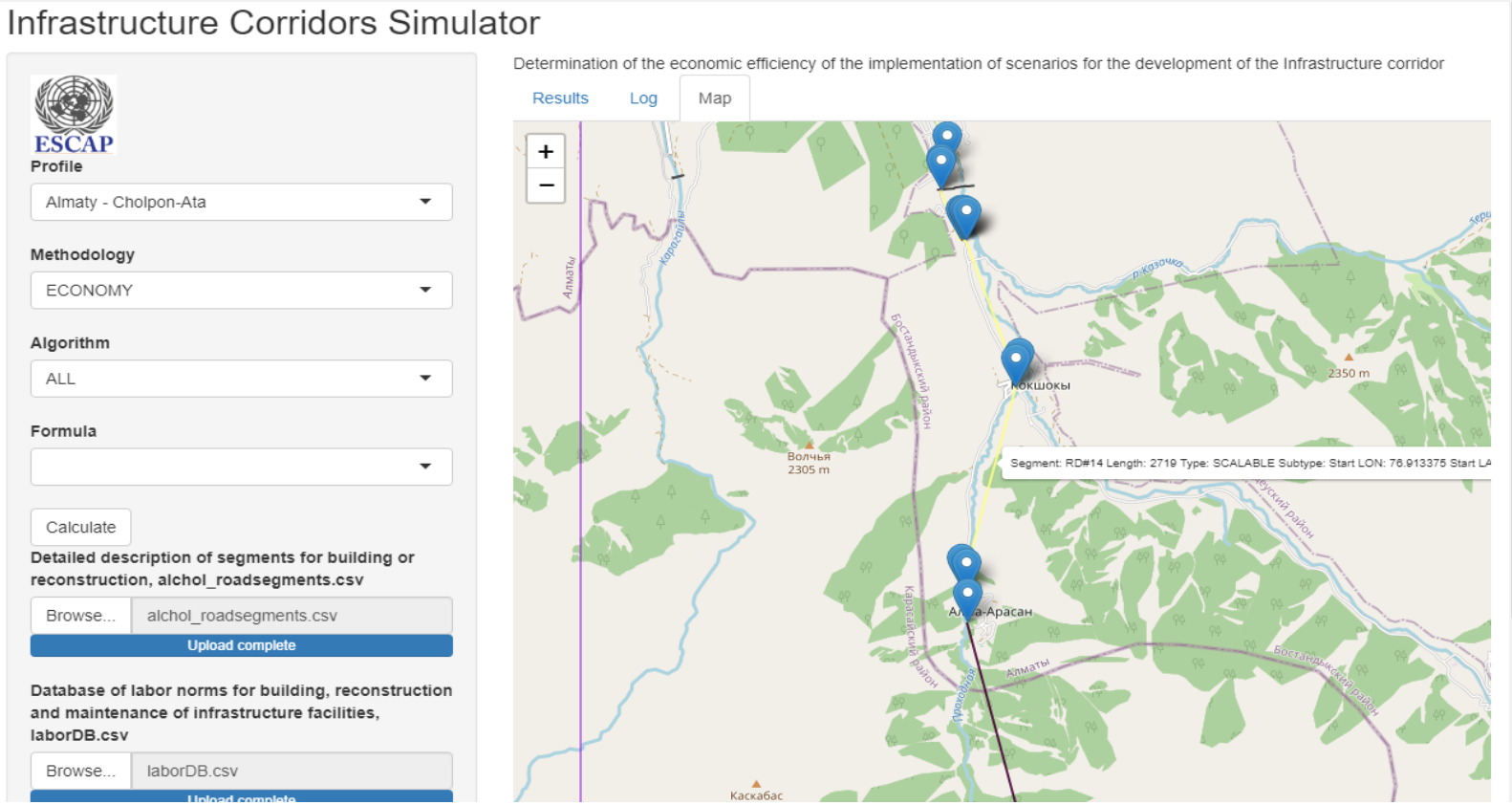
A set of additional scenarios for the development of three infrastructure corridors (example)

Scenario number	Scenario legend		
	Example I	Example II	Example III
1	-	$\{S^{0}_{rd} , S^{n}_{rw+it} , S^{r}_{eg}\}$	$\{S^{0}_{rd} , S^{n}_{rw+it} , S^{0}_{eg} \}$
2	-	$\{S^{r}_{rd} , S^{n}_{rw+it} , S^{r}_{eg}\}$	$\{S^{n}_{rd+it} , S^{0}_{rw} , S^{0}_{eg}\}$
3	-	-	$\{S^{n}_{rd+it} , S^{n}_{rw} , S^{0}_{eg}\}$
4	-	–	$\{S^{n}_{rd}, S^{n}_{rw+it} , S^{0}_{eg}\}$

DETERMINATION OF THE ECONOMIC EFFICIENCY OF THE IMPLEMENTATION OF SCENARIOS FOR THE DEVELOPMENT OF THE INFRASTRUCTURE CORRIDOR



Infrastructure Corridors Simulator



The Infrastructure Corridors Simulator is built on in-depth research and methodology of infrastructure co-deployment simulation to promising infrastructure corridors.

It contains the spatial simulation module, as well as calculus and variable modules, which identify:

- The most prospective economic and technological flows.
- Scenarios and economic efficiency for infrastructure corridor development.
- The most appropriate combination of partnerships.

Currently the Simulator contains qualitative and quantitative parametric data for three pilot corridors:
(i) Almaty (Kazakhstan) – Cholpon-Ata (Kyrgyzstan);
(ii) Urzhar (Kazakhstan) – Chugunchak (China);
(iii) Semei (Kazakhstan) – Rubtsovsk (Russian Federation).

Infrastructure Corridors Simulator

More than 70 different types of infrastructure facilities, including roads, railways, tunnels, bridges and overpasses can be designed using this tool.

Using the simulation can save labour costs during the pre-feasibility phase and estimate co-deployment efficiency – for example possible savings of capital and operational cost.

To simulate new transboundary corridors the following initial data are needed:

(i) Economic and technical flows around the territory of infrastructure corridor;

(ii) Traces of existing or planned facilities with granularity up to separate segments;

(iii) Site-specific data set for scenario simulation, partnerships model and other needs.

Infrastructure co-deployment portal - https://co-deployment.online

UNITED NATIONS ESCAP
Economic and Social Commission for Asia and the Pacific

CO-DEPLOYMENT

Knowledge base | Search facilities | Login | Registration | EN

Information portal

Making co-deployment wider

Improving infrastructure co-deployment today

CO-DEPLOYMENT

Infrastructure co-deployment portal - https://co-deployment.online

Knowledge base in the sphere of co-deployment of ICT infrastructure with road-transport and energy infrastructure

Estimates of infrastructure facilities compatibility and economic efficiency from co-deployment

Enabled policy conditions for creation partnerships in the field of infrastructure facilities co-deployment

The Infrastructure Co-deployment Partnership Portal is a collaborative online workspace supporting ICT infrastructure co-deployment with road transport and the energy infrastructure. The portal enables services to:

- ✓ Register new infrastructure facilities and find other compatible infrastructure development projects (either planned or at early development stage);
- ✓ Learn from other infrastructure co-deployment projects;
- ✓ Assess technical compatibility, cost-effectiveness and economic efficiency of the co-deployed infrastructure development;
- ✓ Initiate and generate the interest of potential partners for infrastructure co-deployment, from initial correspondence to formulation of joint infrastructure co-deployment projects.

Infrastructure Co-deployment Portal:
Estimates of Infrastructure Facilities Compatibility and Economic Efficiency

Edit facility **Type** Road

Facility | Compatibility params

Technical parameters

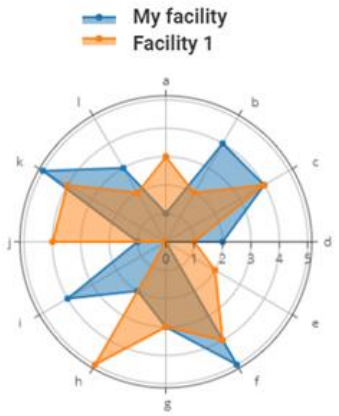
Level of dependency of the infrastructure object from the availability of electricity

If the infrastructure is more electrified, then the score for this parameter is higher. For example, the maximum score will be on an electrified railway or on a highway along which a power line will be built, or a power line already exists along its route

The score for this parameter is inversely proportional to the difference between the life (maximum duration of operation) of the transport or energy infrastructure and ICT infrastructure

Organizational factors

If the building rules for the co-deployment and sharing of an object of this infrastructure with ICT infrastructure are more detailed, then the



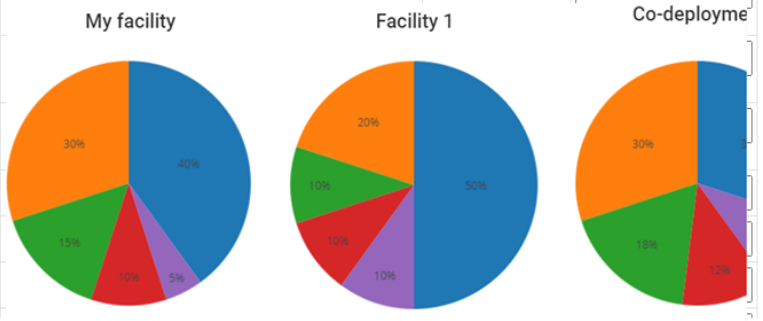
Determining the compatibility potential of ICT infrastructure co-deployment with road transport and energy infrastructure

Assessing the economic efficiency of ICT infrastructure co-deployment with road transport and energy infrastructure

Economic variables **Selected group:** Road

- Railway
- Electricity
- Other
- ICT
- Road - ICT
- ICT - Railway
- ICT - Electricity
- ICT - Other

#	Variable	Unit	Value
1	Allowance rate for related specialists	hour./km	9000
2	Cost of an hour of work for computer modeling personnel	USD per hour	5
3	Cost of an hour of work of staff involved in legal support for obtaining permits	USD per hour	5
4	Cost of an hour of work of staff involved in preparing a package of documents for obtaining permits	USD per hour	5
5	Cost of an hour of work of staff involved in the	USD per hour	5
6			
7			
8			
9			
10			



Infrastructure Corridors Simulator: Proposals of the Future

Infrastructure Corridors Ranking

- There are 62 land borders between UN ESCAP Member-States in Asia and the Pacific with the total length more than 75,000 km where exist or can be developed more than 100 Integrated Infrastructure Corridors
- The project will be utilizing the Tool developed for in-depth analysis of all existing and potential Integrated Infrastructure Corridors in Asia and the Pacific Region from the technical, economic, political and other points of view to create ranking of these Integrated Infrastructure Corridors
- The project would be enabling infrastructure developing, including co-deployment of ICT with energy and transport infrastructure, as well as enabling completion environment in such sphere as transport, energy and ICT
- All UN ESCAP Member-States as well as neighboring countries would benefit and further contribute to the regional development with participation of international financial organizations

Potential Partners

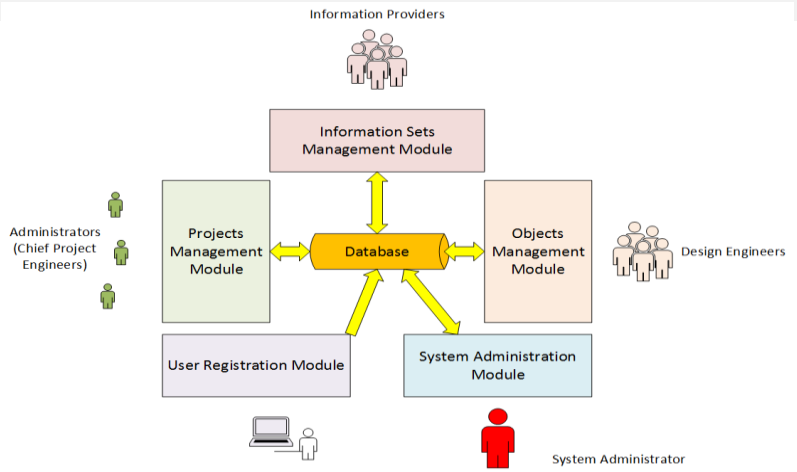
- Governments of UN ESCAP Member-States in Asia and the Pacific
- World & Regional banks
- Science institutions

Infrastructure Corridors Simulator: Proposals of the Future

Geo Infrastructure Simulator – GInSi

The main functionality of the proposed GInSi system will be:

- to add new infrastructure facilities through a convenient user interface (by drawing on the map), specifying them both in enlarged and detailed (by segments) form;
- to simulate the building, reconstruction and maintenance of an infrastructure facility in order to assess capital and operating costs;
- to compare (including the visualization of results on a map) of various technical solutions, for example, alternative routes for building a road or power transmission line, alternative technologies for constructing fiber-optic communication lines (in the ground or on pillars), etc.;
- to assess the effectiveness of the co-deployment of infrastructures of various types with visual presentation of the results;
- to make it possible for the user to change the data used for calculations, connect external data sources, exchange data (for example, databases of labor costs and materials) between users of the system.



Potential Partners

- World & Regional banks
- Industrial Leaders
- Science institutions

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