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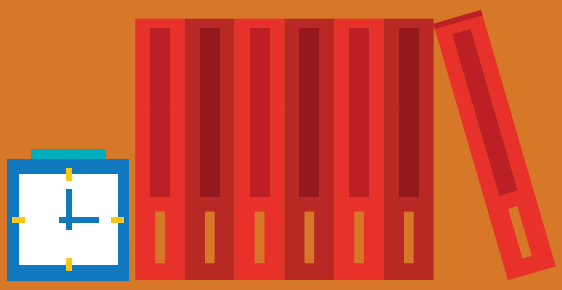

Chapter 9.
PPP project appraisal guidelines

Glossary

BBCR	Budget benefit-cost ratio
BIRR	Budget internal rate of return
BNPV	Budget net present value
CF	Cash flow
CFADS	Cash flow available for debt service
DPBP	Discounted payback period
DSCR	Debt service coverage ratio
DSRA	Debt service reserve account
EBCR	Economic benefit-cost ratio
EIRR	Economic internal rate of return
ENPV	Economic net present value
FCFE	Free cash flow to equity
FCFF	Free cash flow to firm
FPI	Financial performance indicator
IRR	Internal rate of return
KPI	Key performance indicator
LLCR	Loan life coverage ratio
NPV	Net present value
PBP	Payback period
PLCR	Project life coverage ratio
PPP	Public-private partnership
PV	Present value
SDR	Social discount rate
TV	Terminal value
WACC	Weighted average cost of capital

1. General provisions

Purpose, objectives and structure

This methodology for appraising a public-private partnership (PPP) project (hereinafter, the methodology) has been developed for public entities responsible for preparing and implementing projects designed to meet public needs through the development of public infrastructure (hereinafter, the competent authority) in CIS countries. The methodology aims to systematically facilitate the creation of common tools to analyse and select the most effective and cost-efficient projects and methods for their implementation, standardise selection procedures for implementing the most effective and cost-efficient projects and increase the transparency and objectivity of the project appraisal process.

The methodology deals only with financial and economic/social aspects. In a full feasibility study and a full appraisal, many other aspects should be examined and assessed in addition – for example, technical, legal, institutional and environmental aspects.

At the same time, for the purpose of implementing the procedures specified in the methodology, the competent authority may engage consulting companies and experts. Investors preparing to invest in a PPP project and other market participants and experts can also use the methodology.

This methodology can be used to assess the appropriateness and efficacy of implementing an infrastructure project via a PPP. This methodology is not suited to traditional public procurement (government contracts) or an assessment of whether a particular project would best be implemented as a PPP or a public-sector investment (a public-sector comparator).

This methodology covers the following aspects of comparative evaluation:

- the criteria used to assess the effectiveness and cost-efficiency of alternative projects and ways to implement them
- the procedure for evaluating and selecting the most effective and cost-efficient form of project implementation from the perspective of meeting the needs of society and optimising state costs
- the methodology for establishing performance evaluation criteria and calculating the value-for-money ratio of various project implementation methods.

In the absence of alternative projects, the methodology can be used to analyse one project and its implementation forms, once the competent authority has established the absolute values of criteria for passing the relevant stages of analysis. Public infrastructure refers to a set of buildings, structures, equipment and systems that are intended to provide socially significant (publicly consumed) services to the public, generally financed by the central government budget.

Within the framework of the methodology, public infrastructure mainly includes the following:

- transport infrastructure assets (roads, railways, river and sea ports, airports, aerodromes and public transport infrastructure)
- social infrastructure assets (items of public health, public welfare, culture, sports and education)
- utility infrastructure assets (water supply and sanitation facilities, facilities to use or dispose of solid domestic waste)
- energy infrastructure facilities (production facilities, transmission and distribution of electric power, heat and gas supply, outdoor lighting of communal areas)
- communication facilities.

Basic terms and definitions used in the methodology

Risk analysis – identification and assessment of all risks that might affect the attainment of the projects' investment objectives within the allotted budget and time.

Investments – cash, monetary funds, loans, shares, securities, other property (including property rights) and other rights that have a monetary or financial value, invested in commercial and/or other activities aimed at generating a profit and/or the receipt of other benefits.

Investment project – a set of actions (work, services, acquisitions, management operations and decisions) aimed at attaining investment objectives.

An investment project aimed at the development of public infrastructure (hereinafter referred to as a

project in the methodology) – a set of actions (work, services, acquisitions, management operations and decisions) designed to create/modernise/renovate public infrastructure facilities to meet the needs of society.

Project initiator – an entity that elaborated a proposal for the implementation of a project and that can be either a private partner or a specialist authority.

A PPP as defined by the Model PPP Law for CIS countries – a legal partnership between a public partner, on the one hand, and a private partner, on the other, based on the pooling of resources and the allocation of risks on the basis of a public-private partnership agreement or a concession agreement concluded for a certain period.

A PPP project as defined by the Model PPP Law for CIS countries – an investment project planned for joint implementation by the public and private partner according to the principles of public-private partnership.

Public procurement (public purchases) – the acquisition by the state, funded from the central government/ federal budget, of goods/work/services for the purposes of implementing an investment project.

Cost of capital – the cost of funds needed to finance an investment project, defined as the weighted average cost of the sources within the overall funding structure.

The competent authority – a public entity that has been authorised by the state to fulfil the obligations of the public partner in the PPP project and is also responsible for the analysis and preparation for the implementation of projects aimed at satisfying the public's needs through the development of public infrastructure.

2. Assessing the effectiveness and cost-efficiency of an investment project

As defined by the Model PPP Law for CIS countries, all PPP projects have to be assessed before the selection of the private partner starts. That said, it is widely accepted that some standards can be lowered for smaller-scale PPP projects, as there is less at stake for either party, yet there can still be significant potential benefits. In terms of project appraisal this means the use of simplified methods and procedures for smaller-scale (less costly) PPP projects. The methods used have to be proportional to the cost of the PPP project. For example, many countries have cost thresholds below which it is not necessary to carry out a full-blown cost benefit analysis; instead, a simpler multi-criteria appraisal would be used.

Best practice has established a set of criteria that make it possible to identify the most effective and cost-efficient infrastructure project from the various proposals available (subject to the satisfaction of certain societal needs) and also the preferred implementation mechanism. These performance criteria groupings are outlined below:

I. Criteria reflecting the financial efficacy of the project (including credit sustainability indicators). These are used to assess the attractiveness of the project for investors, where the values of these criteria demonstrate the extent to which the project is likely to be feasible for them; that is, whether the investors' costs will be covered and whether the return of and on the borrowings is sufficiently reliable.

II. Criteria reflecting the social and economic feasibility of the project. These criteria are used to assess the social and economic efficacy and impact of the project in monetary terms (in the context of cost-benefit analysis).

III. Criteria characterising budgetary feasibility (including the adequacy of the public partner's resources and acceptability of budgetary commitments). This group of criteria is used to assess the efficacy of project implementation from the perspective of the use of central government/federal budget funds by comparing cash outflows/budget inflows.

It is advisable to evaluate an investment project from the perspective of the above criteria in a number of stages, which are associated with protracted calculations of certain criteria. These stages constitute strategic and complex analyses:

- Strategic analysis is carried out during the early stages: when determining the main characteristics/ indicators of the project, as well as the preliminary verification of the project's feasibility. At this appraisal stage, projects are selected that meet the requisite needs of society. The constraints that affect the project's feasibility are also analysed. In addition, possible project implementation forms are identified.

- A complex analysis consists of a more detailed assessment and is performed to select the preferred project/projects from a list of alternatives. A final choice on the form of project implementation is made, taking into account analysis of the value-for-money ratio.

At the same time, in the case of each investment project, irrespective of the preferred form of implementation, it is advisable to conduct a risk analysis at all preparation stages.

Note: The following indicators and procedures for conducting the strategic and complex review are recommended for all major projects. The proportionality principle is applicable to small-scale or simpler PPP projects from the perspective of depth of analysis. A high-level review is also applicable depending on the level of PPP development in the country.

Chart 2.1 illustrates when strategic and complex analyses should be performed as part of the investment project implementation process through a PPP.

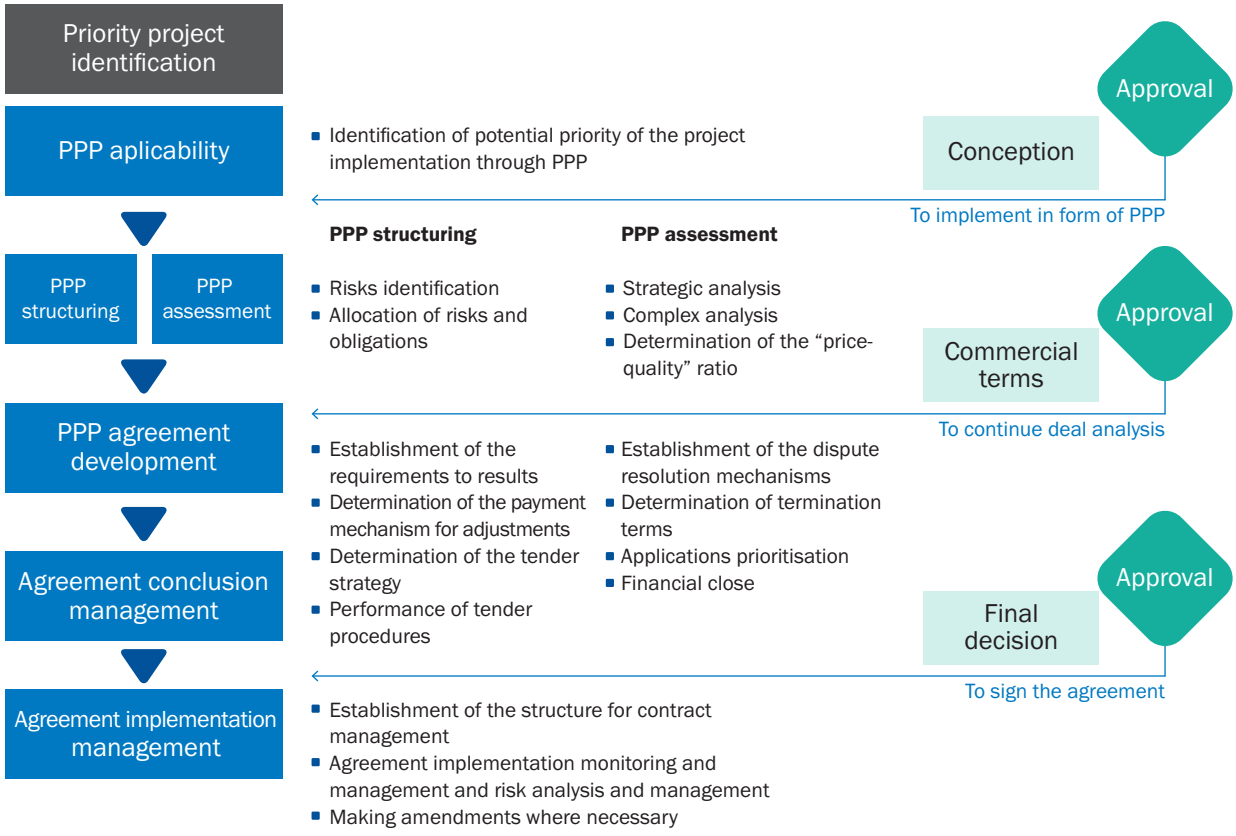

Chart 2.1 Investment project implementation process through a PPP

Chart 2.2 demonstrates the process for appraising investment projects by the public partner at the selection stage and subsequent selection of the form of project implementation that is expected to be financed, in whole or in part, from the central government/federal budget.

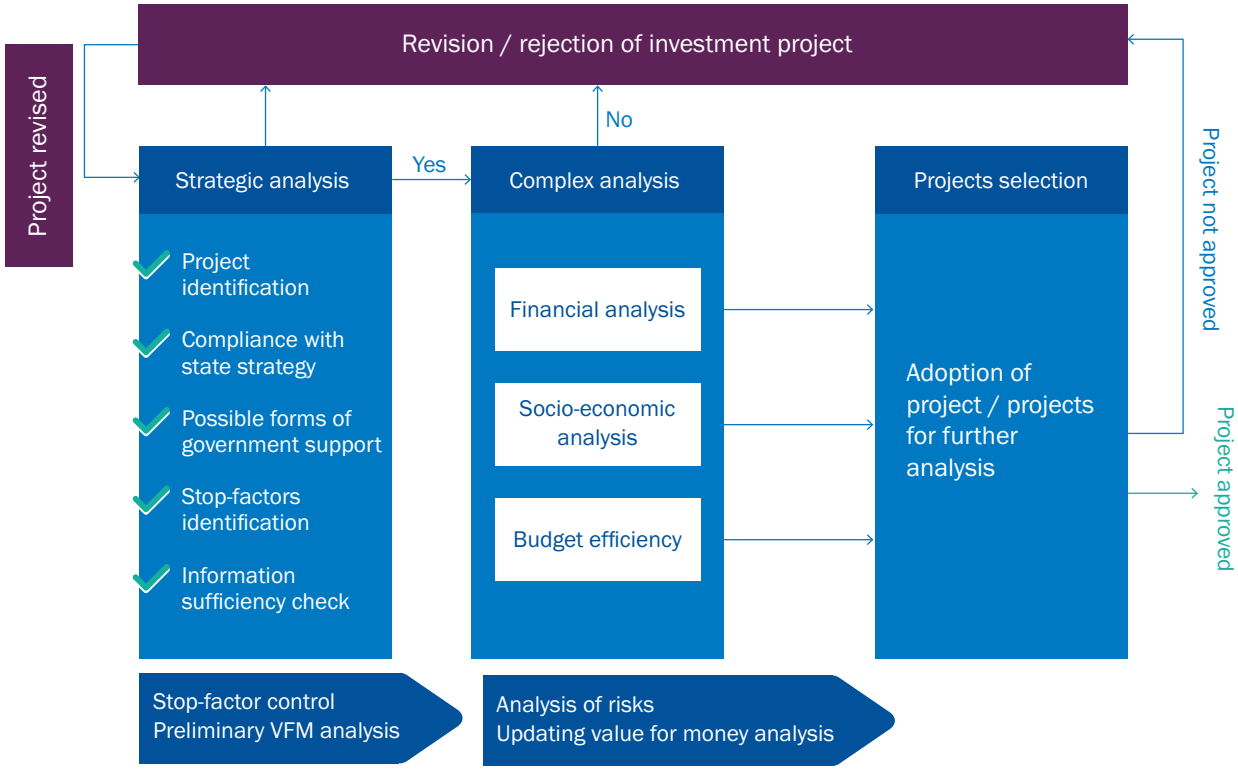

Chart 2.2 Project appraisal and selection

3. Strategic analysis

Strategic analysis looks at investment projects aimed at stopping any further appraisal of projects that will not yield commercial, social or economic benefits, or from which it is anticipated that the benefit will be comparatively lower than alternative projects. This approach means the public partner will not waste time and financial resources developing projects that will not yield any benefits to society. At the same time, a prerequisite to strategic analysis is determining the needs to be resolved by implementing a potential investment project. This is carried out by assessing the social and economic needs of the state, regions or society and by assessing the gaps in existing infrastructure. Needs may vary by sector (for examples, see Annex 1).

During a strategic analysis, the public sector assesses a set of reasonable options for addressing an infrastructure development task (identified by the analysis of needs) that meets the state's requirements for final outputs, then selects the optimal solutions for a more detailed study accordingly.

The strategic analysis includes the following steps:

Step 1. Identification of the project, assuming the following:

- The project is clearly defined as an independent item for analysis.

- The project objectives are clearly articulated and showcase the benefits of implementing the project, including the public, social and economic significance of the project for meeting the formulated needs of the state, regions or society. The establishment of the investment project's objectives should be based on the goal of substantiating the social and economic needs of the state, regions and society. The project's objectives should have the following characteristics: distinctiveness, specificity, measurability, attainability, relevance and a time frame for attainment of the goal.

- The project can form an integral part of a larger investment project (in this case, it should be reviewed as such).

• Alternative implementation options and projects aimed at achieving the same goals may be identified.

Step 2. Verification of compliance with the long- and medium-term planning documents of the state and/or an administrative-territorial division (depending on the project level/scope), assuming that the investment project:

• complies with the development areas and principles set out within the framework of planning documents (including development concepts, medium- and long-term strategies, social and economic development programmes, investment programmes and state and industry development plans)

• provides a comprehensive approach to the resolution of a specific problem and satisfaction of established needs in relation to corresponding programme activities

• is included in one or more relevant policy document(s) (optional) and is substantiated in terms of its expected social and economic impact, and structured according to the methodology.

Step 3. Analysis of the options/alternatives. In this stage, alternative ways of meeting the needs of government and society within the framework of the proposed project are analysed, together with possible options for the organisational and legal scheme for implementing the project through a preliminary evaluation of the value-for-money ratio.

Options are analysed, irrespective of the availability or lack of alternative projects. The number of options depends on the project's specifics. To determine the implementation options, the following are performed:

• identification of the criteria for selecting project implementation options

• study of the best-practice implementation of similar projects

• identification of the full list of possible project implementation methods (for example, assessment of various technological solutions, structures and types of financing, project implementation periods, site location)

• assessment of the payment mechanism options (for instance, to ensure a return on investment for private partners and to meet public and private partners' financial obligations as part of the project implementation options via a PPP, and also the possible allocation of key risks of the PPP project)

• determination of the minimum number of actions the public partner can perform to attract the minimum threshold amount of resources for feasible implementation of the project.

Based on the complete list of project implementation options, a shortlist of options is drawn up after the feasibility or reasonableness of each option is assessed, along with the adequacy of the resources to implement each option, including financial, labour, material and technical resources. The elaborated list of project implementation options is further analysed as separate projects during subsequent stages according to the methodology. The decision to choose an option for project implementation is based on the application of key performance indicators (KPIs), taking into account the appraisal of alternative projects.

Stage 4. Determination of the form of state support for the project, assuming identification of the required amount and form for financing the project, funded from the central government/federal budget. In this case, the final decision on the form of state support and, accordingly, the overall form of project implementation, is made based on analysis of the value-for-money ratio. As part of the strategic analysis, a preliminary value-for-money analysis can be performed on the basis of both qualitative and quantitative criteria. A detailed methodology for estimating the value-for-money ratio is set out in the Value-for-Money Matrix report.

Stage 5. Identification of the project's stop factors. This stage involves identification and analysis of the possible project stop factors, which are internal constraints (controlled by the project's participants) and external constraints (outside the control of participants) inherent in the project under consideration, which pose a significant threat to its successful implementation. Successful implementation of the project involves achieving project objectives while respecting the agreed implementation timeframe and investment volumes.

The process of identifying stop factors is carried out in the following sequence:

• **Step 1.** Identify potential constraints on the successful implementation of the project. The main project limitations can be divided into groups (technical, economic, commercial, political, organisational and financial).

• **Step 2.** Determine the extent of project limitations during its preparation. The elaboration of limitations implies a detailed description of the project, conducting (where necessary) special studies and assessing effective mechanisms to neutralise/minimise the negative impact. The limitation is deemed to be mitigated if it does not represent an obstacle to successful implementation of the project.

• **Step 3.** Identify "stop factors". A restriction is deemed to be a stop factor if it was not taken into account during the preparation of the project and poses a significant threat to the successful implementation of the contemplated project. A checklist of key questions can be used to identify stop factors. An example of such a checklist is provided in Appendix 2.

Stage 6. Confirmation that the relevant project documentation has been prepared at that stage. The following documentation (among other things) is required for the strategic analysis:

• a preliminary feasibility study of the project

• a preliminary financial model, taking into account the different financing options in accordance with standard requirements (the financial model requirements are provided in Appendix 3).

Drafting of an opinion. After all the stages of the strategic analysis have been completed, an opinion is formed on the strategic analysis of the proposed project and its results. On this basis, one of the following decisions is taken:

• accept the project for discussion at the next stage of the project appraisal – the complex analysis stage

• send the project for revision and completion to the initiator and subsequent re-examination at the strategic analysis stage

• reject the project.

Consequently, the strategic analysis results in a list of rejected projects, projects sent for revision and projects accepted for complex analysis. As part of the strategic analysis, a preliminary assessment of social and economic efficacy may be performed.

Note: The strategic analysis may partially overlap with the analysis of qualitative criteria in the context of the value-for-money ratio analysis. At the same time, the value-for-money ratio analysis does not entail an appraisal of the investment project from the perspective of the efficacy of the use of public funds. Accordingly, in the context of the value-for-money ratio analysis, it is assumed that the decision on the targeted use of public funds had already been made as part of the investment project appraisal, and the highest priority at this stage of project preparation is the choice of an effective and cost-efficient implementation method.

4. Complex analysis

4.1 Evaluation of financial efficacy

Analysis of initial data and assumptions. The initial data and assumptions are analysed to obtain sufficient confidence in their reasonableness and relevance. This includes verification of their compliance with the sources of information used in the preparation of the project and a comparison with data obtained from alternative sources. The key categories of input data and assumptions, as well as recommended ways to verify them, are described below.

Key categories of input data and assumptions to be analysed within this task:

• macroeconomic assumptions

• factors determining revenue

• demand for the services/infrastructure

• capital expenditures

• variable operating costs

• fixed operating costs

• working capital requirements

• tax assumptions

• assumptions on financing terms.

Based on the results of the analysis, it is necessary to confirm the reasonableness and validity of the initial data and assumptions. If there are any inaccuracies in the initial data or the assumptions underlying them, the project is sent for revision.

Calculation of financial performance indicators.
The calculation of the performance indicators of the project's financial efficacy (financial performance indicators) is based on cash-flow projections according to the submitted financial model and includes the following financial efficacy and credit sustainability indicators:[1]

I. Financial performance

• Net present value (NPV) is calculated by discounting free cash flows from the project using a discount rate equal to the projected weighted average cost of capital of the project:

$$NPV = \sum_{n=1}^{N} \frac{FCFF_n}{\prod_{i=1}^{n}(1+WACC_i)} + \frac{TV_N}{\prod_{i=1}^{N}(1+WACC_i)}$$, where

FCFF – free cash flow to firm

n – year number of the forecast period (for free cash flows)

i – year number of the forecast period (for the discount rate)

N – number of years in the forecast period

TV_N – terminal value (final cash flow)

WACC – weighted average cost of capital, calculated using the formula:

$$WACC = K_d * (1-t) * \frac{D}{V} + K_s * \frac{E}{V}$$, where:

K_s – required return on equity for the investor

K_d – required borrowing interest rate before taxes

t – corporate income tax rate

E – value of the equity capital

D – amount of borrowing

V – amount of the invested capital (internal funds and borrowing)

• The internal rate of return (IRR) is calculated as the discount rate at which the NPV of the project is zero.

• The payback period (PBP) is calculated using the following formula:

PBP= the lowest value of t at which

$\sum_{t=1}^{T} CF_t > CF_0$, where

T – number of periods

t – specific period

CF_t – cash flow for t period

CF_0 – amount of initial investment in the zero period

• The discounted payback period (DPBP) is calculated using the following formula:

DPBP= the lowest value of t at which

$\sum_{t=1}^{T} CF_t/(1+r)^t > CF_0$, where

t – number of periods

CF_t – cash flow for t period

CF_0 – amount of initial investment in the zero period

r – discount rate

We recommend calculating financial performance indicators for both the project as a whole and for the project's participants and/or shareholders.

The PPP project specifics should be taken into account when calculating financial performance indicators, in particular, the payment mechanism. For example, the financial performance of the project for investors can be ensured through an availability payment mechanism (if the public partner makes a certain payment that provides a return on the investments of a private partner).

In addition, the specifics of the PPP project will usually stipulate a certain period for the agreement; in this case, cash-flow projections to analyse the project's efficacy for the private partner/investors will be based on the period of the agreement.

Performance criteria: NPV ≥ 0, IRR ≥ discount rate, payback period – an acceptable number of years for each project.

II. Credit sustainability

• The debt service coverage ratio (DSCR)[2] for a specific period is calculated using the following formula:

$$DSCR = \frac{CFADS}{P+I}$$, where

[1] Two types of financial performance indicator can be calculated, depending on the type of cash flow used: using the cash flow of the project, which is placed at the disposal of the creditors and shareholders (FCFF), the financial performance indicators of the project as a whole are calculated; using the cash flow available to shareholders (free cash flow to equity, or FCFE), the relevant financial performance indicators are calculated only for shareholders. In this case, it is necessary to apply the discount rate sequentially, depending on the flows: for FCFF, WACC; for FCFE, the cost of equity.

[2] The DSCR, LLCR and PLCR indicators are calculated for projects and project implementation options that involve debt funding and constitute a subgroup of financial performance indicators.

Cash flow available for debt service (CFADS) – cash flow available to service senior debt in this period

P + I – amount of senior debt service payments in this period (P – payment of principal, I – payment of interest)

• The loan life coverage ratio (LLCR) is calculated using the following formula:

$$LLCR = \frac{CFADS(NPV_I) + DSRA}{D}$$, where

CFADS (NPV_I) – net present value of future cash flows available to service debt for the period until the debt is fully repaid, discounted at the cost of debt

DSRA – debt service reserve account at the end of this period

D – loan balance at the date relating to the NPV

• The project life coverage ratio (PLCR) is calculated using the following formula:

$$PLCR = \frac{CFADS(NPV_P) + DSRA}{D}$$

CFADS (NPV_p) – net present value of future cash flows available to service debt throughout the project period,[3] discounted at the cost of debt

DSRA – debt service reserve account at the end of the period

D – loan balance at the date relating to the NPV

Efficacy criteria: indicators are specific for each project and depend on the financing structure, the project's risk level, and the requirements of funding organisations.

Note: When calculating key indicators, the financial inefficiency of the project can be identified (NPV <0, IRR is lower than the level of the required profitability, lack of return on investment, etc.) At the same time, according to the results of the analysis, a decision to reject the project should not be made on this basis only, taking into account the specifics of the projects contemplated as part of the methodology (the focus of projects on meeting social and economic needs). These indicators are taken into account accordingly in further analysis aimed at selecting the most effective and cost-efficient project (with the highest positive NPV or the lowest negative NPV) within the framework of the proposed alternatives and implementation options.

4.2 Social and economic appraisal

The social and economic analysis (cost-benefit analysis) assesses the contribution of the project to the welfare of the region, country or society as a whole. As a rule, this assessment involves determining the net economic/social benefit of project implementation and is conducted based on various qualitative and quantitative-qualitative criteria. An indicative list of potential social and economic benefits (in accordance with the needs of society) for the implementation of infrastructure projects in various sectors of the economy is provided in Appendix 1.

The social and economic analysis concept complements the financial analysis and facilitates a more complete and broad evaluation of the project's benefits for the state and society: both direct and indirect cash flows related to the implementation of the project are taken into account.

The social and economic analyses consist of the following stages:

- monetisation of non-market effects
- discounting of costs and benefits
- calculation of additional indirect effects
- calculation of economic efficacy indicators.

The **monetisation of non-market effects** is applied to project implementation outputs that cannot be measured directly. However, their monetary value can be identified. Regarding the monetary value of the overall social and economic benefits of the project, consumers' "willingness to pay" can be applied. One way willingness to pay is calculated is by multiplying the average value of willingness to pay by the total number of potential users. Alternatively, a disaggregated analysis can be done looking at the willingness to pay of different types of consumer and then adding them up; willingness to pay can differ markedly for different groups. This indicator is added to the cash flows of the project as a socioeconomic component used to calculate the efficacy of expenditure.

Discounting of costs and benefits. Within the framework of the social and economic analysis, a social discount rate (SDR) is applied as the discount rate, which shows how the future benefits and costs associated with the project can be discounted to the current date, taking into account social effects. The SDR may differ from the financial discount rate.

[3] In the relevant project/financing agreement, the deadline for CFADS accounting may be set before the end of the project to calculate this indicator.

In the case of SDR[4], there are several different methodologies, involving the following[5]:

- the cost of borrowing for the state
- the social time preference rate (society's preference for immediate use over future use)
- the opportunity cost of capital (the forgone benefit of investing resources in the project rather than the market)
- variable rates during the project implementation period (reduction in the rate during the forecast period to significantly increase the impact of the project on future generations).

The methodology to calculate the rate may differ, but the rate should be applied consistently to all projects and implementation options. The state authorities can set a single rate for the analysis of projects.

Calculation of additional indirect effects. To assess social and economic effects that cannot be monetised, a technique of ranking and weighting may be used: each alternative project and selected implementation option is assigned a rank based on the expected deviation of the social and economic impacts of the project from the basic scenario (the current situation) on a common scale (for example, from -4, which corresponds to the effect of a value that is much worse than the value for the basic scenario, up to 4, which corresponds to the effect of a value that is much better than the value for the basic scenario). To integrate estimates of additional indirect effects into the final results of the analysis, each effect is assigned a weighting based on its significance (the value of the impact).

Calculation of economic efficacy indicators. The following key indicators are used for the social and economic appraisal of a project:

- Economic net present value (ENPV) – the amount of the discounted value of future benefits and costs, taking into account monetised social and economic effects and the application of SDR as a discount rate.

$$\mathrm{ENPV} = \sum_{t=0}^{n} a_t S_t = \frac{S_0}{(1+i)^0} + \frac{S_1}{(1+i)^1} + \ldots + \frac{S_n}{(1+i)^n}$$, where

S_t – net economic flow of the project during the period of time t

a_t – discount factor at the time period t

i – discount rate (SDR)

- Economic internal rate of return (EIRR) – discount rate where the ENPV equals 0 (zero).

$$0 = \sum_{t=0}^{n} \frac{S_t}{(1+\mathrm{EIRR})^t}$$

- Economic benefit-cost ratio (EBCR) – ratio of the present value (PV) of future social benefits to the PV of costs, taking into account monetised social and economic effects.

$$\frac{B}{C} = \frac{PV(B)}{PV(C)}$$, where

PV(B) – present value of benefits

PV(C) – present value of costs

Efficacy criteria: ENPV ≥ 0, EIRR ≥ SDR, B/C ≥ 1.

The relationship between the analysis of financial and social and economic efficacy as part of the complex analysis is presented below.

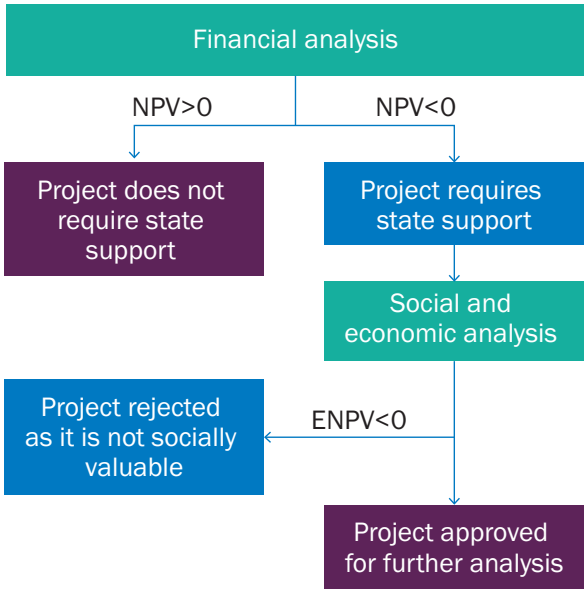

Chart 4.1 Financial and social and economic appraisal

Note: When using this structure, it is important to take into account the specifics of PPP projects. For example, a project structured with the use of availability payments will have a positive level of financial efficacy for private partners. At the same time, the availability payment itself can be considered a form of state support.

[4] The indicative level of SDR, in constant price terms, for developing countries is 8-15 per cent and for developed countries 3-7 per cent.

[5] A single rate can also be set for the analysis of all projects that pass the respective approval procedure.

4.3 Assessment of budget efficacy

This appraisal stage involves analysis of the appropriateness of state participation in the project, based on an increase in the burden on the central government/federal budget. In analysing budget efficacy, both the direct and indirect budgetary impact should be considered.

Direct effects are associated with direct cash flows from the project to the central government/ federal budget. Direct effects include an increase in budget revenue attributable to tax revenues from the project during the investment and operating stages. Direct tax revenues to budgets of various levels directly relate to the implementation of the investment project. An estimate of public receipts is made on the basis of cash flows under the investment project in the investment and operating stages, based on legislation in effect and on current rates and the procedure for calculating tax deductions to the budgets at various levels.

During analysis of the direct effects, the specifics of the PPP project (in particular, the payment mechanism) should be taken into account. For example, if the project includes an availability payment mechanism (if the public partner makes a certain payment ensuring a return on investment), such payments to the private partner should be considered direct costs/outflows of budget funds. It is also important to consider if the implementation of the PPP project could generate revenue, or a portion of it, that could be allocated to budgets at various levels.

Indirect effects are associated with changes in the incomes/expenditures of budget funds caused by the impact of the project on external organisations and the public:

• the direct financing of enterprises participating in the implementation of the project

• a change in tax revenues from enterprises whose activities depend on the project being implemented

• payments to individuals made redundant as a result of implementation of the project

• the allocation of funds from the budget for the relocation and employment of citizens due to implementation of the project

• budget savings on the payment of benefits in the event of the implementation of projects that create jobs in regions with low economic activity and high unemployment.

The cash flows analysed within the framework of estimating budget efficacy include the following:

• Inflow of budget funds

- the revenue or a proportion of the project proceeds (if such a mechanism is stipulated by the project)
- direct and indirect inflows from taxes, excises, duties, levies and deductions to extrabudgetary funds established by legislation in effect (currently valid and enforceable)
- income from licensing, competitions and tenders for the construction and operation of facilities stipulated by the project
- payments to repay credits and loans issued from the budget to project participants
- payments for repaying tax credits (with tax holidays)
- dividends on state-owned shares and other securities issued in connection with implementation of the project
- the residual value of state-owned assets at the end of the project period.

• Outflow of budget funds

- costs related to building infrastructure
- costs related to the preparation of land plots used for the project
- equity injections from the budget
- the provision of budgetary funds in the form of investment loans
- granting of budget funds on a cost-free basis (subsidy), the disbursement of capital grants for PPP projects
- payment for access to the infrastructure facility (if such a mechanism is envisaged by the project)
- budget subsidies related to the implementation of a certain pricing policy and compliance with certain social priorities
- tax privileges in the form of reduced taxes and fees.

KPIs used as part of the analysis of the budget efficacy of a project include:

• budget net present value (BNPV) – calculated using a similar formula to that for calculating NPV to estimate financial efficacy, using budget cash flows and a corresponding discount rate

• budget internal rate of return (BIIR) – calculated using the same formula for calculating IRR for the estimate of financial efficacy and using the NPV of the budget

• budget-benefit cost ratio (BBCR) – the ratio of income received to incurred cost

$BBCR = \frac{\sum_{n=0}^{N} DCF_{pos,n} + DTV_{pos,N}}{\sum_{n=0}^{N} DCF_{neg,n} + DTV_{neg,N}}$, where

n – number of the forecast period (for free cash flows)

N – number of periods

$DCF_{pos,n}$ – discounted positive cash flow of the budget per period n

$DCF_{neg,n}$ – discounted negative cash flow of the budget per period n

$DTV_{pos,N}$ – discounted terminal value of the positive cash flow of the budget per year N

$DTV_{neg,N}$ – discounted terminal value of the negative cash flow of the budget per year N

- the particular efficacy of a project is calculated as the ratio of BNPV to the initial budget investments in the project
- the discounted payback period is calculated using the same DPBP calculation formula to estimate financial efficacy, using budget cash flows and the corresponding discount rate.

Due to the specifics of a PPP project related to a specific project agreement term, it is advisable to calculate budget efficacy both with and without the terminal value (in other words, to take into account the present value of all cash flows beyond the explicit forecast period). When calculating the terminal value, the specifics of the PPP project should be taken into account. For example, if the PPP asset is transferred to the public partner, the forecast cash flows should be adjusted.

Regarding the discount rate, it is advisable to use the rate of return on long-term government borrowings (bonds). If the bonds are not marketable or if there is no active bond market, other sources can be used to determine the discount rate that will reflect the cost of debt for the government (for example, calculation based on Eurobonds, Damodaran data and others).[6]

4.4 Risk analysis

It should be noted that there are at least five different reasons to conduct a PPP-related risk analysis, which can require some differences in the methods used and the type and application of results obtained.

Reasons to conduct a risk analysis include:

- understanding how to allocate risks to the different parties in the PPP arrangement
- incorporating certain risks into the base-case cash flows of the PPP financial model
- carrying out a public sector comparator analysis
- understanding the impacts of various risks on the financial cash flows (stress tests, determination of needed debt service cover ratio, gearing level and so on)
- understanding (in likelihood and impact) the risks that have been allocated to public-sector entities by the agreements and devising mitigation measures ahead of time.

Irrespective of the form of project implementation, the project preparation procedures consist of elements of risk analysis at each stage. This involves the preparation of a risk register and elaboration of respective risk management strategies. When considering the implementation of a project through a PPP, a more detailed risk analysis is envisaged and a more detailed register and risk matrix is prepared. This analysis involves determining the risk value and sharing the responsibilities for specific risks between the private and public partners.

The main result of the risk identification and registration process is the creation of a risk register. The main objective is to identify aspects of the potential project that are most likely to affect overall costs and the quality of project implementation and to identify the partner (public or private) that can most efficiently manage a particular risk.

The transfer of a particular risk to the private partner is associated with two main types of cost: additional compensation to the private sector (the risk premium included in the price of the private party's bid) and a loss of flexibility with respect to a change in the service specification during the effective term of the contract. An efficient risk allocation process is established to manage any excess benefits from the transfer of risk, expressed in reduced costs and improvements in the quality of the services provided based on declared costs.

Identifying risks and risk mitigation methods

Identifying risks is a preliminary stage in the compilation of a register and risk matrix. The risk identification procedure consists of the following:

- determination of the type of input data used to identify risks
- description of the tools and methods used to identify risks
- determination of the type of output data when identifying risks.

[6] Damodaran data are data and analyses provided on the website of Professor Aswath Damodaran of the Stern School of Business at New York University. See: https://pages.stern.nyu.edu/~adamodar/New_Home_Page/home.htm.

The following can be used as input data for risk identification:

- existing PPP project documentation
- legislative acts and other regulatory frameworks applicable to the project
- macroeconomic information (exchange rate and interest rate dynamics)
- information on the project-specific indicators of the estimated volume of provided services (traffic density for roads, the number of hospital visits, appointments at polyclinics for healthcare projects)
- information about the risks identified during the implementation of similar projects.

The key tool for identifying risk is an expert assessment, which can be obtained through group meetings, as part of an interview with appraisers and/or from a detailed study.

Risk mitigation methods are identified as part of four main risk management strategies:

- avoidance (establishment of requirements for a private partner, review of project tasks)
- mitigation (for example, implementation of risk management activities to identify and establish provisions reducing the likelihood and impact of risks)
- assumption of risks (control of the level of the assumed risk)
- transfer (insurance, hedging).

Evaluating risk mitigation methods is not mandatory for the compilation of the risk matrix, but is recommended to improve the efficacy of a project's risk management process.[7] In the case of output data, as part of the risk identification process, it is advisable to use a risk register that includes a set of risks and also a brief description of those risks.

Risk assessment

This stage makes it possible to rank risks (to determine the likelihood of the occurrence of a risk and the degree of its impact on the PPP project). Risk analysis and assessment is performed via two main methods: qualitative and quantitative.

- Qualitative methods include expert assessments in which risk events and the degree of risk exposure are divided into a number of groups, depending on the likelihood of their occurrence and the degree of impact (from low to very high).
- Quantitative methods involve measurement of the risk value in monetary terms and comprise a sensitivity analysis and scenario analysis, sometimes using the Monte Carlo simulation method. At the same time, please note that at the current PPP market development stage in CIS countries, there is no extensive base of historical data on the likelihood of the occurrence/degree of the impact of risks on projects being implemented.

In a qualitative analysis, the biggest risks are identified. These are characterised by the greatest likelihood of occurrence and the greatest deviation caused to certain cost items/revenues/financial indicators for the project as a whole. In a qualitative analysis of risk importance, it is advisable to use a risk impact matrix (see Chart 5.1). This will increase the visibility of risks and assist risk management decisions by helping to prioritise risks, develop mitigation strategies, allocate resources and monitor progress.

Risk event	**Risk impact**				
	Immaterial	Minor	Moderate	Significant	Critical
Almost impossible					
Unlikely					
Even odds (50:50)					
Likely					
Almost certain					

Chart. 5.1 Risk impact matrix

[7] An example of a typical risk matrix, including recommendations on risk management, is provided in the report Risk Allocation Matrix.

To determine the quantitative risk assessment, a risk analysis is performed in terms of the impact on cost items and project revenues, as well as on the financial indicators of the project as a whole. The impact of risks on costs and revenue items is determined in the form of expected deviations in actual values (as a result of a risk event) from planned values. Determination of the deviation in cost items and project revenues as a result of the risk event is a quantitative assessment and is performed for the most significant project risks as a whole.

In quantitative risk assessment, the following methods are used:

- sensitivity analysis
- scenario analysis
- Monte Carlo simulation.

The method should be chosen based on the type of risk and its main characteristics. The primary goal of quantitative assessment of PPP project risks is to determine the level of sustainability of the financial forecasts on the main PPP project risks.

Under the sensitivity analysis method, some inputs and assumptions (sensitivity factors) of the financial model are subject to change within the given range. The impact of these changes on financial indicators (for example, financial ratios) is then evaluated. At the same time, the sensitivity factor is changed with a certain step (for example, 5 per cent or 20 per cent) while the other parameters remain fixed.

Examples of sensitivity factors for a PPP project include:

- CAPEX
- operating costs
- inflation rate
- cost of financing
- project milestones.

The importance of risk is determined by how much it affects the resulting indicators (for instance, the amount of payments from the public partner, IRR, DSCR, budget efficacy indicators) when the parameter that characterises the risk changes.

The range of sensitivity factors is selected using expert opinion based on expected or possible deviations in the actual values of sensitivity factors from respective inputs in the financial model.

The Monte Carlo simulation is based on the stochastic nature of the sensitivity factors (each possible value of the sensitivity factors has its own probability), on the one hand, and on the calculation of a significant number of results of the financial model, on the other. Based on the results, the probability distribution of the cost/duration of the PPP project is built. This method makes it possible to analyse the impact of simultaneous changes of several parameters on the resulting investment indicators of the PPP project.

Risk-sharing (allocation) approach

Project risk allocation can be divided into three categories:

- risk transferred to a private investor
- risk retained by a public partner
- shared risk.

The basic principle of risk allocation is that the risk is assumed by the partner that is most able to manage it. The sharing of a risk between the partners is an option when it is difficult to determine which partner would manage it most efficiently.

Risk sharing and the construction of a risk matrix are described in detail in the Risk allocation matrix report.

Risk analysis results. Based on the results of the risk analysis, a risk allocation matrix should be prepared and, in response, appropriate risk management actions should be decided, including how risks should be allocated in the PPP agreement. It should be noted that it is possible to prepare a risk allocation matrix without any quantitative analysis.

Assessing the value-for-money ratio within the framework of the complex analysis

As part of the complex analysis, it is advisable to perform a complex value-for-money analysis on the basis of both qualitative and quantitative criteria. A brief description of this analysis is given below, and the detailed methodology for assessing the value-for-money ratio is set out in the Value-for-money matrix report.

4.5 Results of the complex analysis

After completing all the stages of the complex analysis, an opinion is drawn up on the project under consideration and one of the following decisions is taken, based on the results of the analysis:

• If positive results are obtained for each of the three criteria (financial, social and economic and budget efficacy) and the project is deemed bankable, technically feasible and compliant from a legal and regulatory perspective, the project is approved for implementation.

• When assessing the results of the analysis, the purpose and intended outcome of projects should be considered. For example, in the case of certain social projects, negative results are acceptable for one or two criteria, provided the result of the social and economic efficacy criterion is positive in terms of the benefits provided to society.

• If negative results are obtained for each of the three criteria, the project is rejected or sent back for modifications/revisions.

• During the assessment of a project, due consideration should be paid to the results of the risk analysis, their significance, the allocation of risks between project participants and the extent of the development of the risk management plan.

• When choosing a project/projects and the form of implementation, the resources available to the public partner should be taken into account, along with the capabilities/resources of the private partner.

• As part of a complex analysis, it is advisable to rely on the results of the value-for-money assessment, taking into account the forecasts of the financial model under consideration.

5. Assessment of the value-for-money ratio

A value-for-money analysis is carried out as part of the following stages:

• the assessment of qualitative criteria (preliminary stage) to determine the applicability of PPP as a method of project implementation

• a quantitative assessment, including cost projections for different project implementation methods

• the evaluation of qualitative criteria (final stage) to analyse bids received.

Qualitative assessment of the value-for-money ratio

Depending on the implementation stage, there are two areas within the qualitative criteria assessment:

I. determination of the applicability of PPP as a project implementation method

This analysis serves as the basis for the adoption of a decision to conduct a more detailed quantitative assessment. The project implementation methods that will be deemed unsuitable for this project according to the preliminary testing results can be excluded from further analysis at an early stage, thereby saving considerable resources. The project selection process is divided into two stages: exclusion and selection.

II. analysis and comparison of qualitative criteria of received bids

The qualitative characteristics of the bids of a private partner are taken into account when determining the value-for-money ratio of a PPP. The benefits to the state are not always the same from project to project and can include the following: completion of the project in a shorter period; innovations in the design, construction and materials used; improved quality of service delivery; higher return on investments; increased project revenues; and the level of experience/resources of the private partner required for compliance with the conditions for providing services throughout the life of a facility. This qualitative assessment stage is usually carried out after a quantitative analysis.

Quantitative assessment of the value-for-money ratio

The following indicators are determined for various project implementation structures to quantify the value-for-money ratio:

I. costs related to the establishment and operation of the asset

II. other project implementation costs

III. adjustment for competitive neutrality

IV. assessment of risks and their allocation as part of the value-for-money ratio analysis

V. financing costs

VI. approach to determining the discount rate.

The detailed methodology for assessing the value-for-money ratio is set out in the Value-for-money ratio matrix report.

Appendices

Appendix 1. Indicative list of public needs, based on the example of several sectors (expected social and economic effects of the project)

Transport

- savings on travel time
- savings of the owner of infrastructure and vehicles
- increase in passenger traffic
- reduction in the accident rate
- reduction in environmental pollution
- cargo turnover growth
- resource savings (passengers, shippers)

Power

- increased supply of electricity to meet growing demand or to supply consumers that previously had no access to electricity
- reduced energy costs, increased energy efficiency
- increased reliability of the electricity supply
- reduced power losses
- reduced harmful emissions

Healthcare

- increased life expectancy
- reduced length of hospital stays
- reduced disability payments
- improved quality of life for the public

Appendix 2. Example of a checklist of key questions to identify stop factors

1. What is the technical complexity and level of innovation of the project under consideration?

2. What is the planned location of the asset?

3. What specific requirements have been established for land plots?

4. What is the experience of the project team (both of the public and private partners) in implementing similar projects?

5. Are there market restrictions affecting the product?

6. What are the resource base restrictions?

7. What is the scope for efficient risk management and risk minimisation?

8. What are the project preparation and implementation time frames?

9. What is the level of market competition?

10. What type of technology is expected to be used: new or tested?

11. Can technical requirements on direct outputs/ services be established?

Appendix 3. Basic requirements of the financial model

The financial model of the project is developed in accordance with the following requirements:

- The financial model should be built in Microsoft Excel.
- It should contain a minimum number of macros.
- The information should be presented in a particular sequence: first input data (on a separate sheet), then calculations (the calculation sheets must not contain values without formulae or within formulae) and finally the output data.
- The financial model should use the simplest formulae; complex formulae should be broken down into components in different cells.
- No part of the financial model should be concealed, protected, blocked or otherwise inaccessible for viewing. All formula codes must be visible.
- Cash flows for the years of project implementation should be calculated based on the prices of respective years, taking into account the projected macroeconomic indicators.
- The financial model should contain a sufficient degree of detail. In other words, it should contain breakdowns by main types of work/service, periods, income and cost items, and so on (as applicable).
- The financial model should comply with the principles of uniformity and consistency regarding calculations/formatting.
- The financial model should allow for changes in the initial assumptions and automatically adjust financial projections should such changes arise.
- The financial model should facilitate a sensitivity analysis of the results of the financial forecast in the event of changes to the key assumptions (initial data) of the model throughout the forecast period.

Approximate structure of the financial model:

I. Input data

- planning time frame
- macroeconomic and industry assumptions
- prerequisites for the volume of capital investments
- operating requirements
- financing requirements

• tax assumptions

• other assumptions

II. Calculations

• revenue

- forecast of the sales volumes of products

- price forecasts for sales/tariffs

• cost of production

- forecast of variable expenses

- forecast of fixed expenses

• administrative and management expenses

- administrative expenses

- marketing expenses

- selling expenses

- other operating expenses

• working capital

- forecast of working capital demand

• property, plant and equipment and capital investments

- calculation of the book value of property, plant and equipment, as well as depreciation and capital investments

• calculation of the payment mechanism (where applicable)

• financing

• forecast of financial needs, taking into account different sources of financing

• discount rate

III. Results

• financial statements:

- income statement

- balance sheet

- cash flow statemen

• KPIs

- profitability ratios

- debt burden ratios

- other ratios

• cash flows, financial, budget and socioeconomic efficacy indicators

- calculation of the NPV of cash flows

- calculation of the internal rate of return

- calculation of the payback period

• sensitivity and scenarios

- sensitivity analysis of the project (NPV and IRR totals) to changes in the main requirements

- scenario analysis