



Training #8

Infrastructure projects - Preparation of technical documentation with main emphasis on preparing feasibility studies - Experience by the implementation body from Croatia



Basic content of Feasibility Study

- Executive Summary
- Socio-economic context.
- Supply of and Demand for the Project's Outputs.
- Technological Alternatives and Production Plan.
- Human Resources
- Location
- Implementation schedule
- Financial Analysis
- Socio-economic Cost-Benefit Analysis
- Risk Analysis

The six steps for a good appraisal

1. A presentation and discussion of the socio-economic context and the objectives
2. The clear identification of the project
3. The study of the feasibility of the project and of alternative options
4. Financial Analysis
5. Economic Analysis
6. Risk Assessment

1. Presentation of the socio-economic, institutional and political context



2. Definition of objectives

- Needs assessment
- Project relevance



3. Project identification

- Project activities
- Body responsible for project implementation
- Who has standing?



4. Technical feasibility & Environmental sustainability

- Demand analysis
- Option analysis
- Environmental consideration, including EIA and climate change
- Technical design, cost estimates and implementation schedule

5. Financial analysis

- Cash-flow for project costs and revenues, including residual value
- Tariff and affordability analysis (where relevant)

FNPV > 0

The project **does not** require financial support

FNPV < 0

The project **does** require financial support

6. Economical analysis

- Fiscal corrections
- From market to shadow prices
- Evaluation of non-market impacts
- Economic profitability

ENPV < 0

The society is better **without** the project

ENPV > 0

The society is better off **with** the project

7. Risk assesment

- Sensitivity analysis
- Qualitative risk analysis
- Probabilistic risk analysis

Croatia experience

- Based on large amount of documentation prepared - more than 150 Feasibility studies
- Investment value more than 2 billion EUR
- More than 10 years of preparation

Definition of Objectives

- project must be assessed, in compliance with the sectorial strategy prepared by the MS and accepted by the European Commission
- checking that the project contributes to reaching the EU policy goals and national/regional long-term development plans in the specific sector of assistance.
- Reference to these strategic plans should demonstrate that the problems are recognised and that there is a plan in place to resolve them.
- Clear link with the OP indicators

Should projects be based on Directive driven approach only?

Prioritizations issues – how to dealt with?

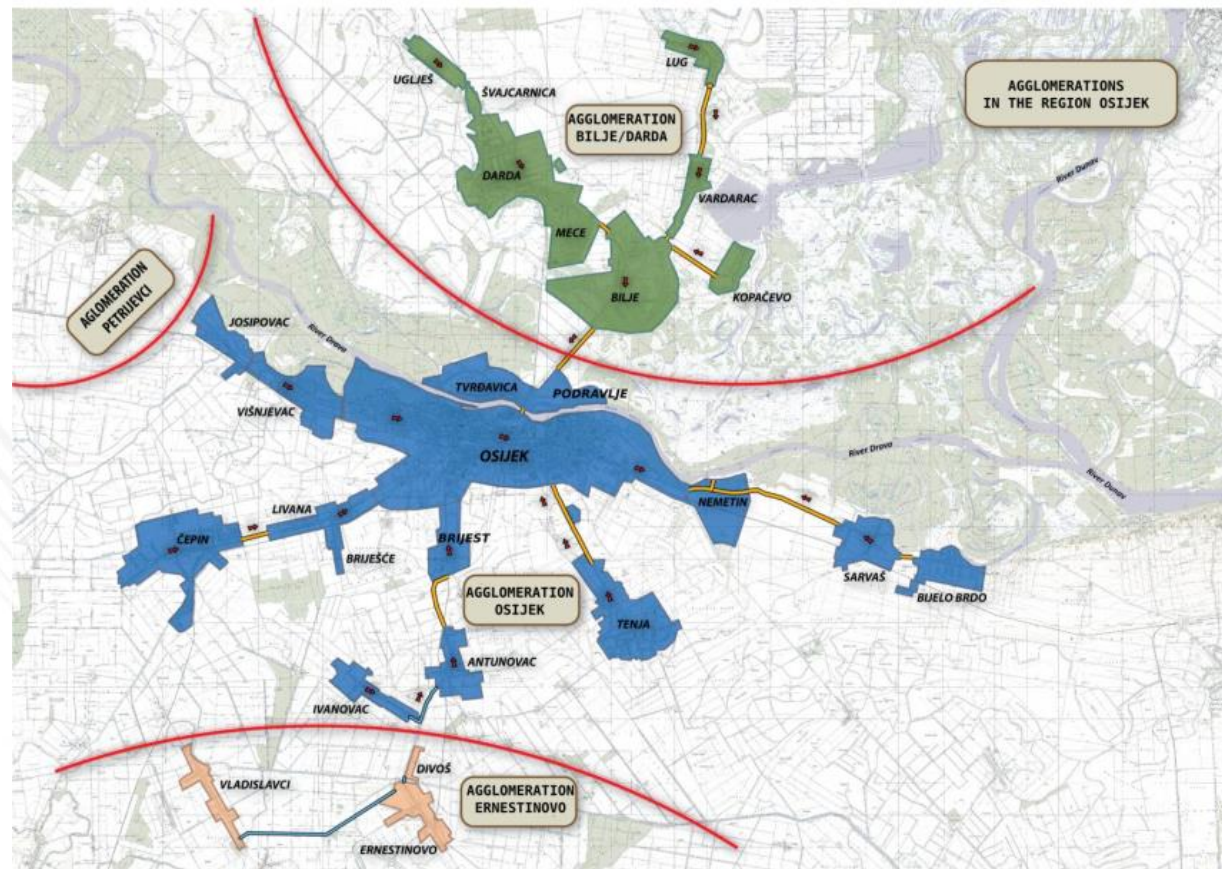
Definition of Agglomeration

- Size of Agglomeration Manipulated for Prioritization Reasons;
- PE Definition with Inclusion of Non Resident
- Coverage Levels within Agglomeration

Development of criteria for No of Treatment Plants

Development of criteria to Establish Coverage of Sewer Systems;

Flexibility of use of alternative treatment Solutions within the Agglomeration



Demand Analysis

current demand (based on statistics provided by service suppliers/ regulators/ ministries/ national and regional statistical offices for the various types of users);

future demand (based on **reliable** demand forecasting models that take into consideration macro- and socio-economic forecasts, alternative sources of supply, elasticity of demand to relevant prices and income, etc.) in both the scenarios with- and without-the-project

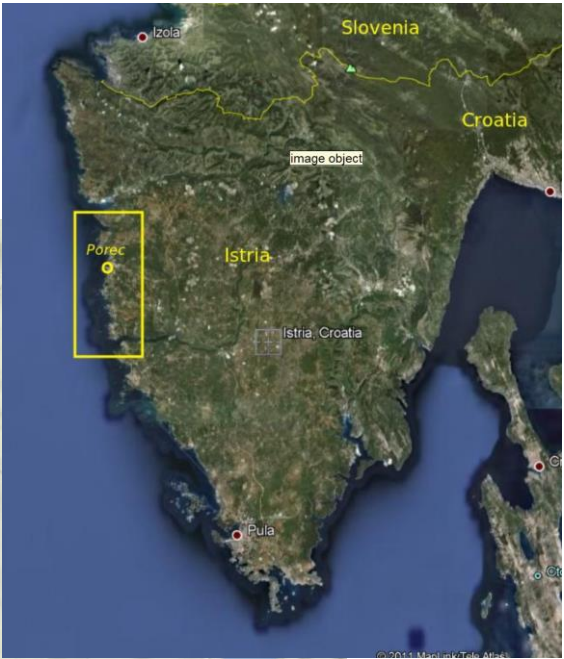
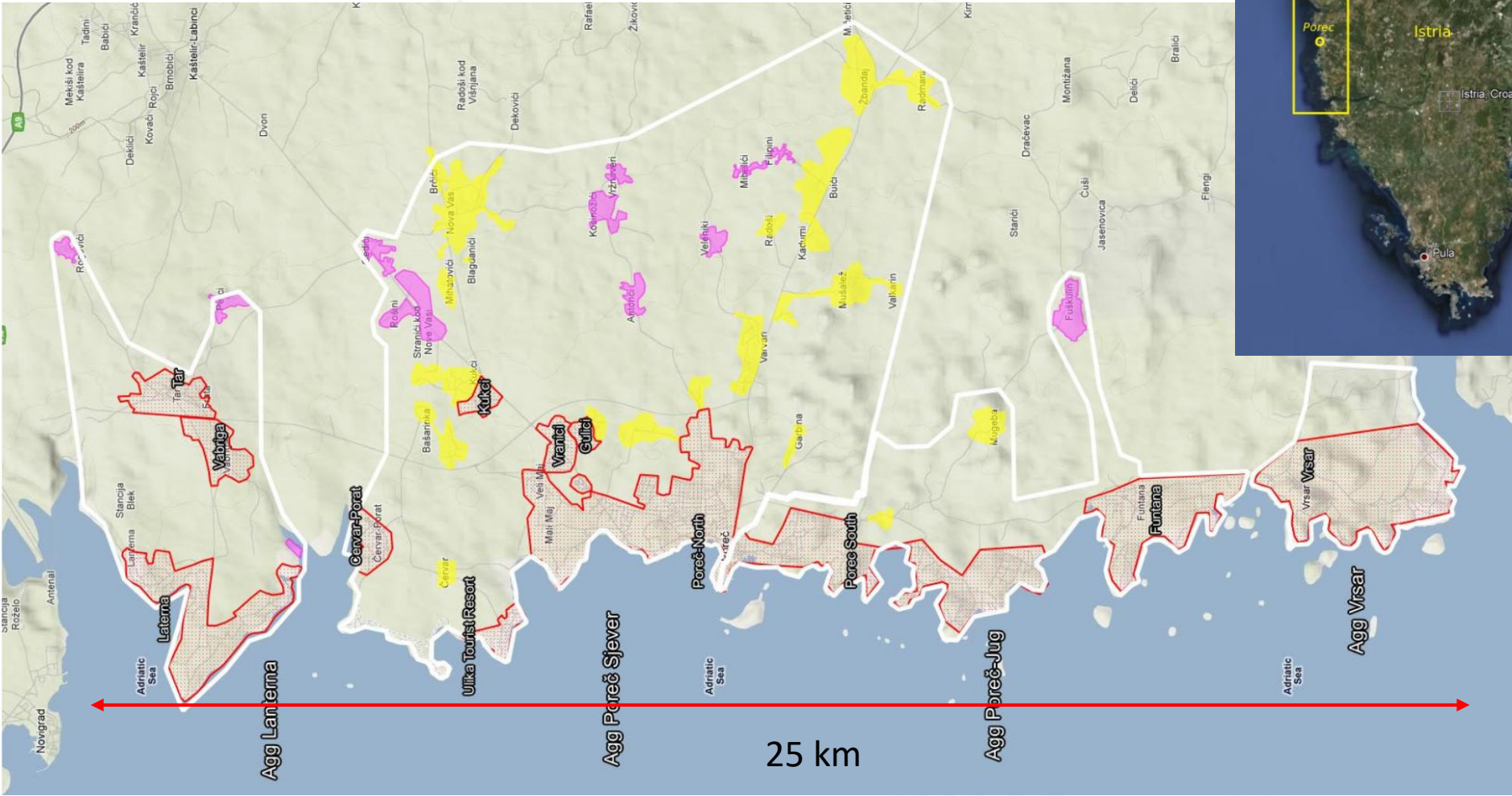
Demand Analysis

- Population forecasts - **should not be based on overestimated data from spatial plans**
- Domestic Consumption Levels – **overestimation of specific consumption average consumption 125 – 135 l/p/day**
- Domestic Load – **not be based only on theoretical data**
- Industrial Demand – **based on recent and plausible modeling**
- Industrial Load – **based on actual, and only with confident data for future load**

Option Analysis

- Multi Criteria Analysis – **investment and O & M cost not subjective approach**
- Scope of Network Extension – **establishing criteria based on least cost analysis against IAS**
- Wastewater Treatment Plants – **size, location, extension**
- Wastewater Treatment Technologies – **same input for option analysis different technology chosen**
- Rehabilitation Needs – **proper justification based on actual condition analysis**

Example - number of WWTP



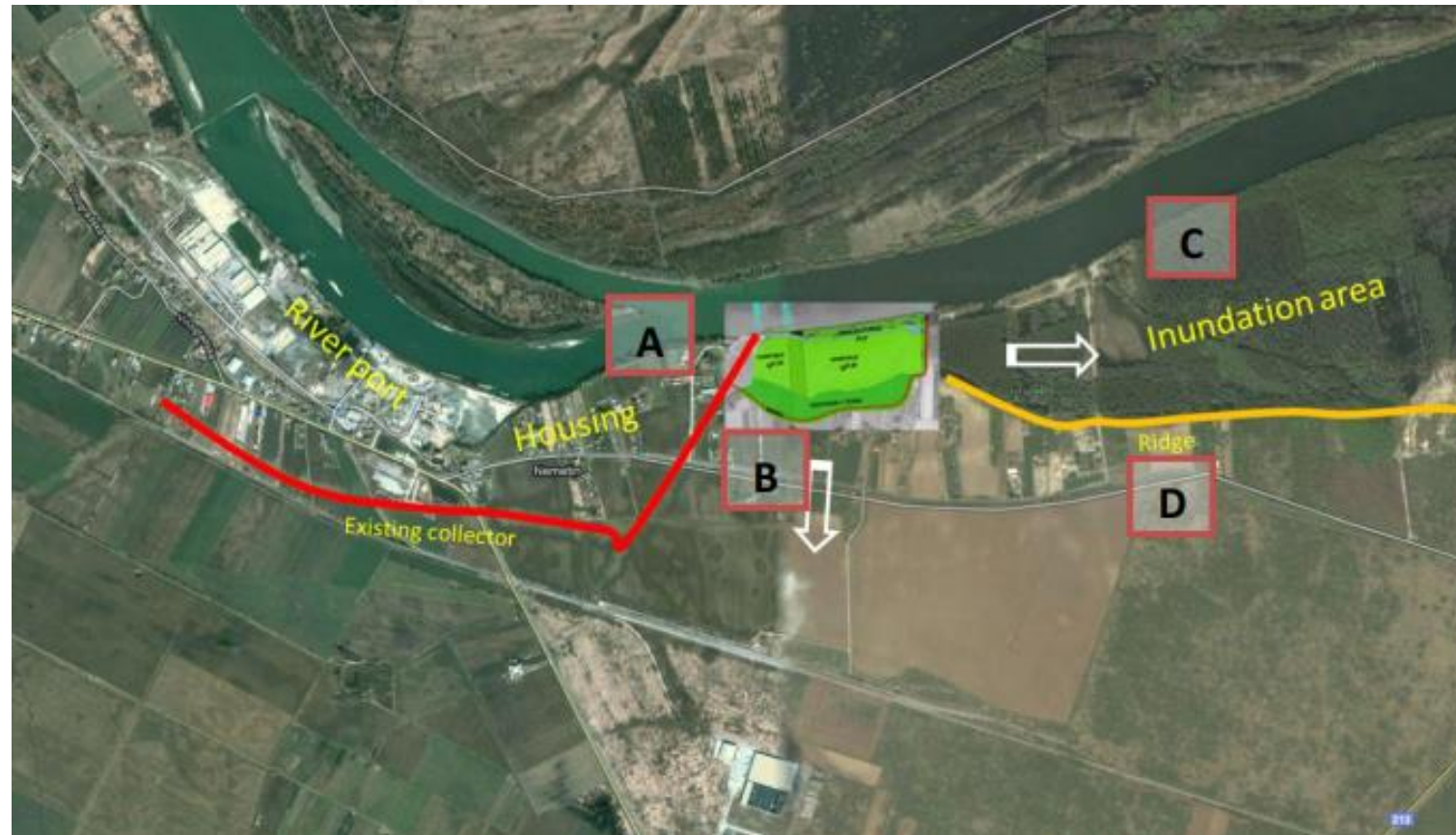
Example – cont.

Variant 1	Variant 2	Variant 3	Sub Variant 3a
WWTP Laterna (30.000 PE)	WWTP Poreč Sjever (67.000 PE)	WWTP Poreč (137.500 PE)	WWTP Poreč Jug (115.000 PE)
WWTP Poreč Sjever (37.000 PE)			
WWTP Poreč Jug (48.000 PE)	WWTP Poreč Jug (70.500 PE)		WWTP Vrsar (22.500 PE)
WWTP Vrsar (22.500 PE)			

Example – cont.

Recapitulation (Values * 1000 Euro)	Variant 1		Variant 2		Variant 3		Variant 3a	
	Invest ments	O&M	Invest ments	O&M	Invest ments	O&M	Invest ments	O&M
Investments network and pumping stations	7,715		13,522		16,244		13,770	
Investment WWTP	35,840		30,250		26,813		30,219	
TOTAL Investment Costs	43,555		43,772		43,056		43,989	
NPV network maintenance		1,173		2,133		2,625		2,233
NPV Pumping costs		685		1,676		3,525		3,137
NPV WWTP Operation&Maintenance		24,775		23,287		21,799		22,568
Total NPV of O&M costs		26,633		27,096		27,950		27,938
Total Life Time Cost	70,188		70,868		71,006		71,927	

Option analysis – example 2







Engineering approaches

- Basic criteria for dimensioning of water and / or wastewater systems
- Establishing the same return period for dimensioning of network
- Establishing the average pressures levels
- Appropriate design recommendations
- **Design based on approved concept after conducting option analysis**

Project costs

- Cost estimation – **based on established unit prices database**
- Affordability treshold – **establihsing affordability treshold for the water prices 2.5 – 3 % off average household income**
- Procurement plan – **based on real expected implementation period**
- Type of contract – **based on option analysis or predefined strategic approach**
- Consideration for other future projects and extensions
- Synergy for joined investment water and wastewater in the same street
- Operation costs – based on realistic costs which will cover all required maintenance
- Tarif levels – include significant proportion of depreciation

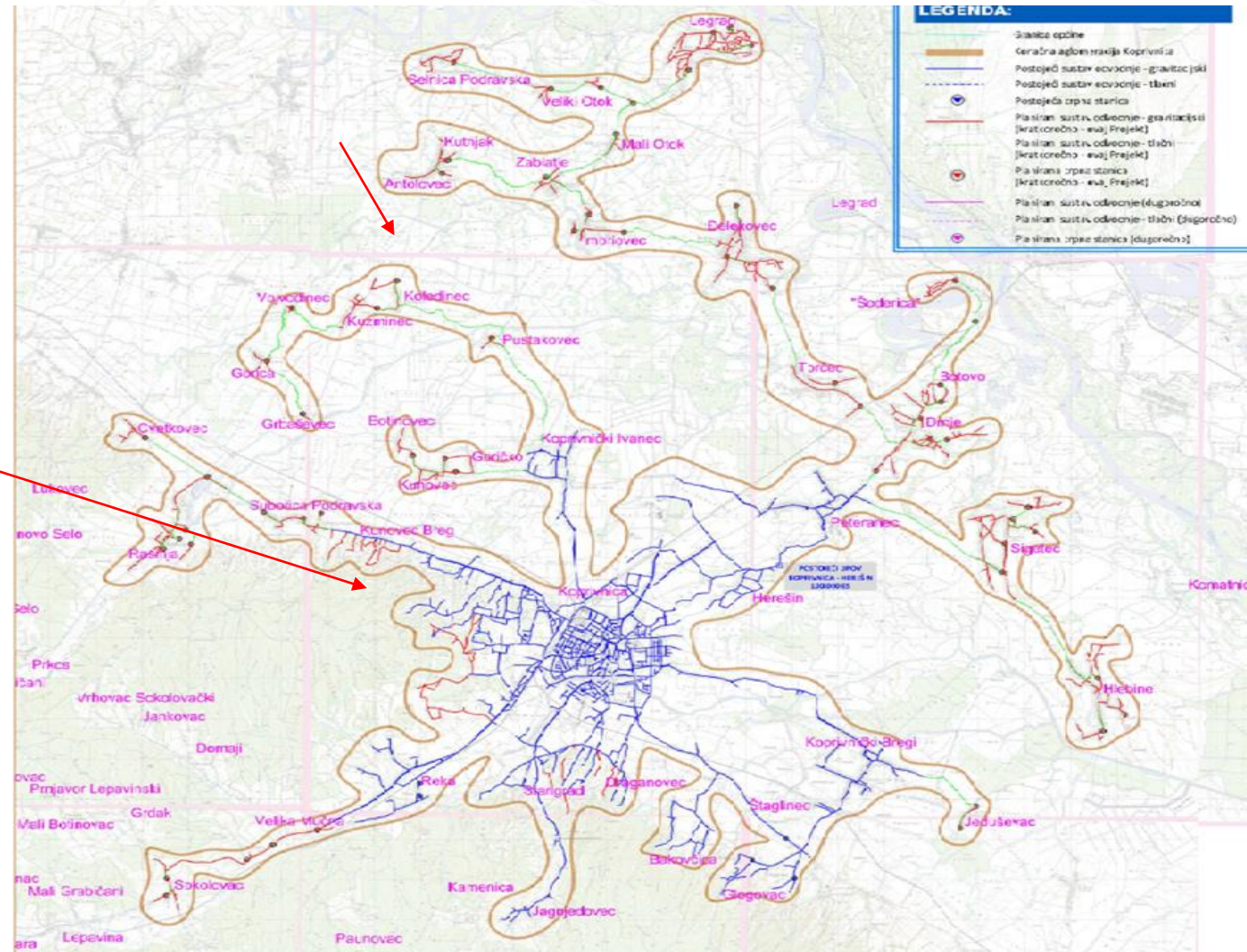
Size of WWTP - example

Name of agglomeration	Implementation Plan	Feasibility study	Differences
OSIJEK	250.000 ES	170.000 ES	68% / 47%
ČAKOVEC	116.000 ES	75.000 ES	65% / 55%
DRNIŠ	10.000 ES	5.000 ES	50% / 100%
ZADAR	200.000 ES	100.000 ES	50% / 100%

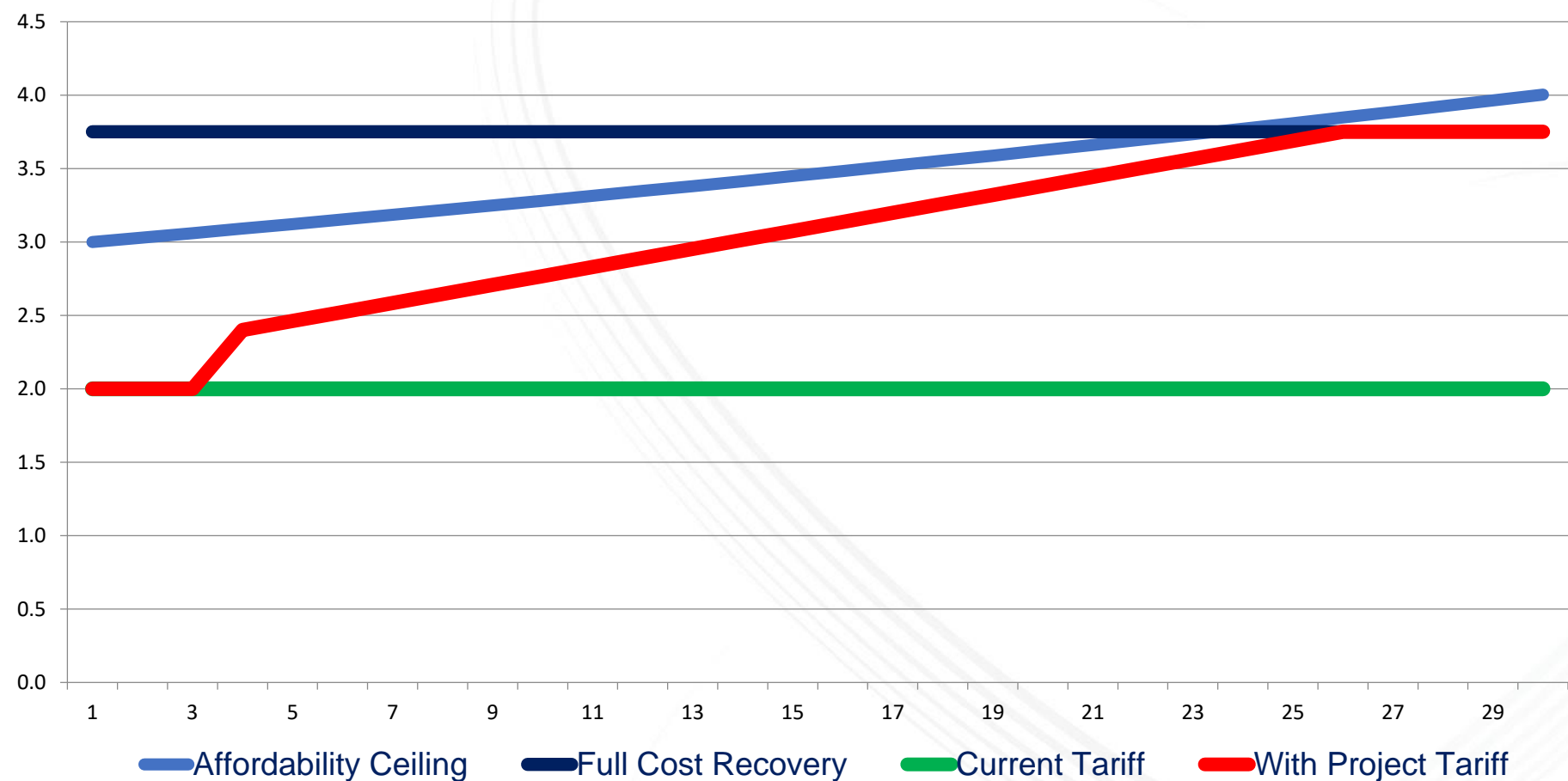
Scope of agglomeration

Agglomeration
according to the FS

Agglomeration according to
the Implementation plan



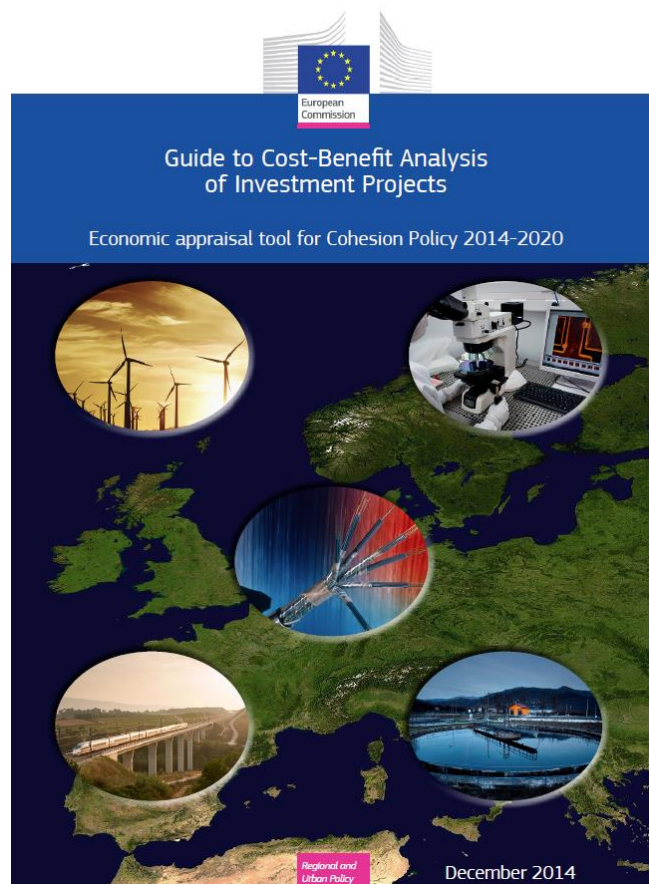
Tariff policy development



Institutional difficulties

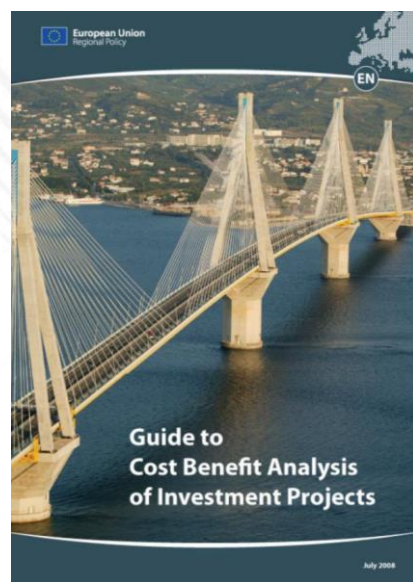
- Majority of projects are on agglomeration or water supply system less than 30,000 Consumers
- Implementation and Project Management Difficulties
- Deficits in Operation Abilities for new Installations/Technologies
- Capacity to secure support Finance;
- Future Tariff Levels and Affordability Constraints

CBA



Guide to Cost-Benefit Analysis of Investment Projects (2014)

http://ec.europa.eu/regional_policy/en/newsroom/news/2014/12/guide-to-cost-benefit-analysis-of-investment-projects-for-cohesion-policy-2014-2020



Guide to Cost-Benefit Analysis of Investment Projects (2008)

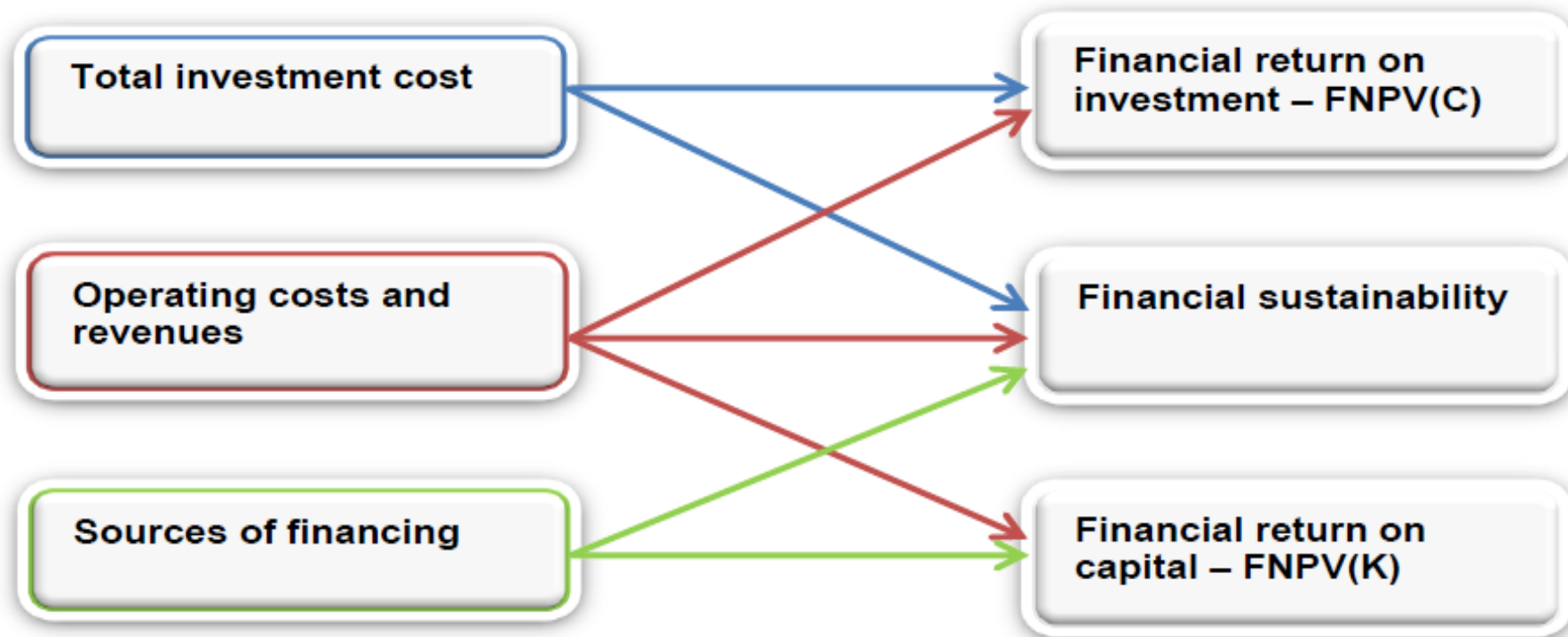
CBA

- Establish national practice
- Tariff policy
- Financial sustainability
- Affordability threshold (2,5 – 3,0 % average household income)
- Economic analysis parameters
- Sensitivity and risk analysis
- Establish reference period
- Link between affordability and full cost recovery

CBA Concepts

- **Long-term perspective.**
- A long-term outlook is adopted, from 10 to a 30 years or more, depending on the sector – **water sector 30 years**
 - set a proper time horizon;
 - forecast future costs and benefits (looking forward);
 - adopt appropriate discount rates;
 - take into account uncertainty by assessing the project's risks.
 - Incremental approach
 - Using Discounted Cash Flow method

Figure 2.2 *Structure of financial analysis*



Source: EC CBA Guide 2008

Investment and replacement costs

- Initial investment: it includes the capital costs of all the fixed assets (e.g. land, constructions buildings, plant and machinery, equipment, etc.) and non-fixed assets (e.g. start up and technical costs such as design/planning, project management and technical assistance, construction supervision, publicity, etc.)
- Replacement costs: includes costs occurring during the reference period to replace short-life machinery and/or equipment, e.g. engineering plants, filters and instruments, vehicles, furniture, office and IT equipment, etc.

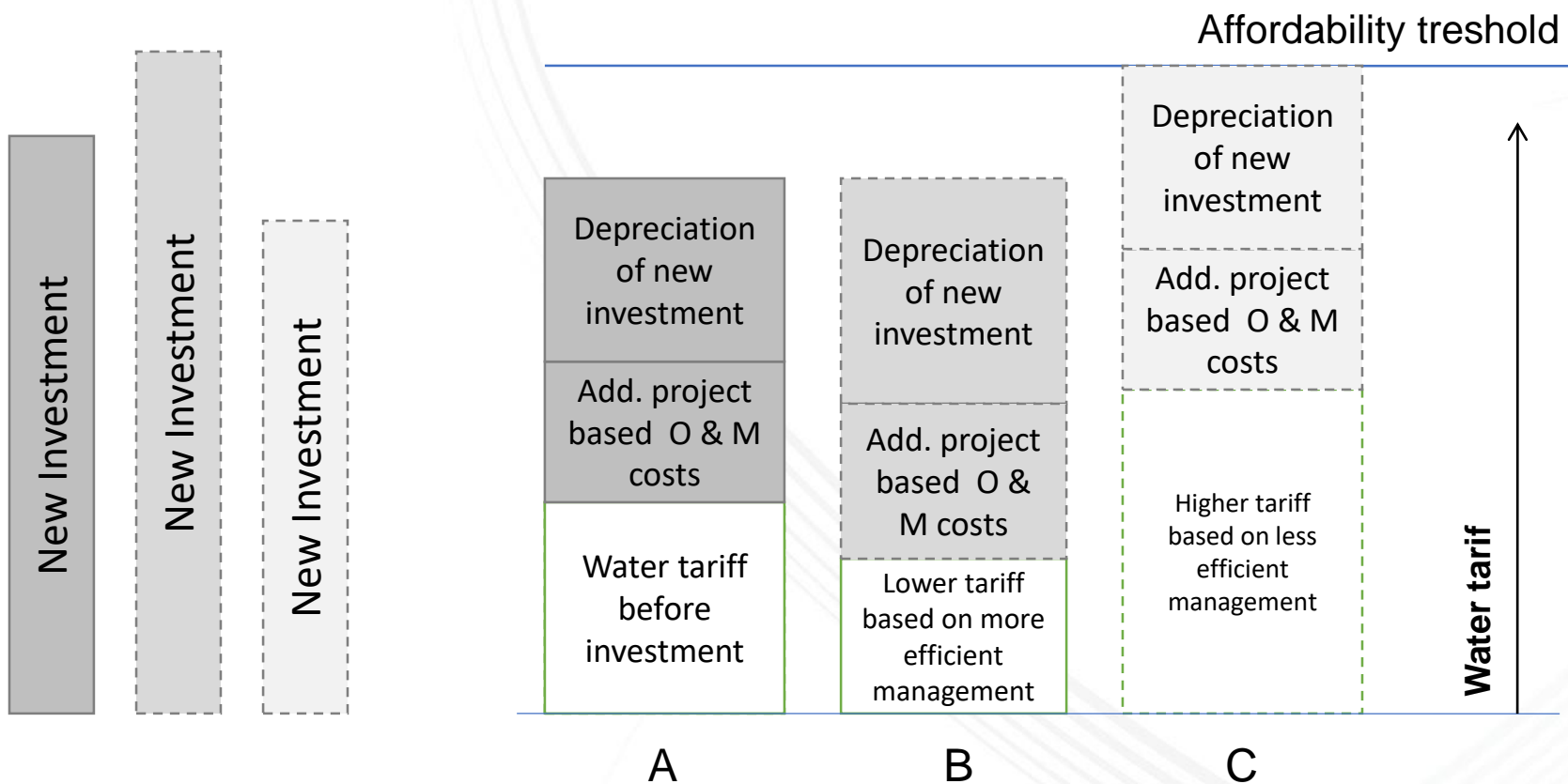
Operating costs

- Operating costs include all the costs to operate and maintain (O&M) the new or upgraded service; labour costs; materials needed for maintenance and repair of assets; consumables; services purchased from third parties; general management and administration; insurance cost; quality control; waste disposal costs; and emission charges.
- These costs are usually distinguished between fixed (for a given capacity, they do not vary with the volume of good/service provided) and variable (they depend on the volume).
- Cost of financing (i.e. interest payments) follow a different course and must not be included within the O&M costs.

Revenues

- cash in-flows directly paid by users for the goods or services provided by the operation, such as charges borne directly by users for the use of infrastructure, sale or rent of land or buildings, or payments for services'
- For compliance with the regulatory requirements, where relevant tariffs shall be fixed in compliance with the polluter-pays and the full-cost recovery principles.
- However, when relevant, e.g. for a project supplying a public service in the environmental sector,
- affordability considerations should be taken into account in the application of the polluter-pays and the full-cost recovery principles.

Relationship between investment volume and tariff



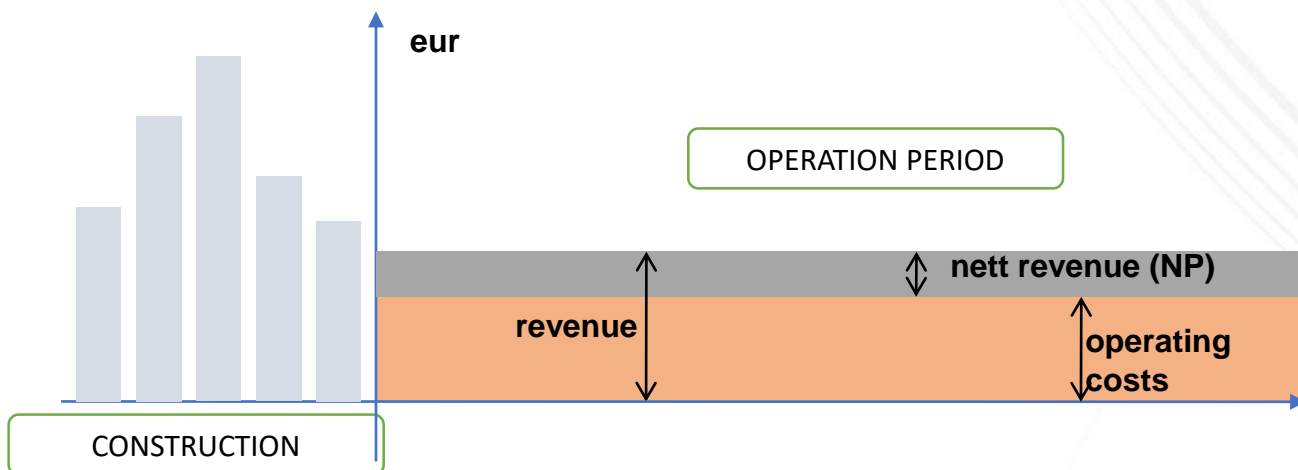
EU financed vs. Bankable project

EU FINANCED PROJECT

$$\text{FNPV} < 0$$

complinance driven projects

Not be possible to implement without EU supprt



BANKABLE PROJECT

$$\text{FNPV} > 0$$

$$\text{DSCR} > 1$$

Ratio of free cash (i.e. cash left to the project after payment of operating and essential capital costs) available to meet annual interest and principal payments on the debt.

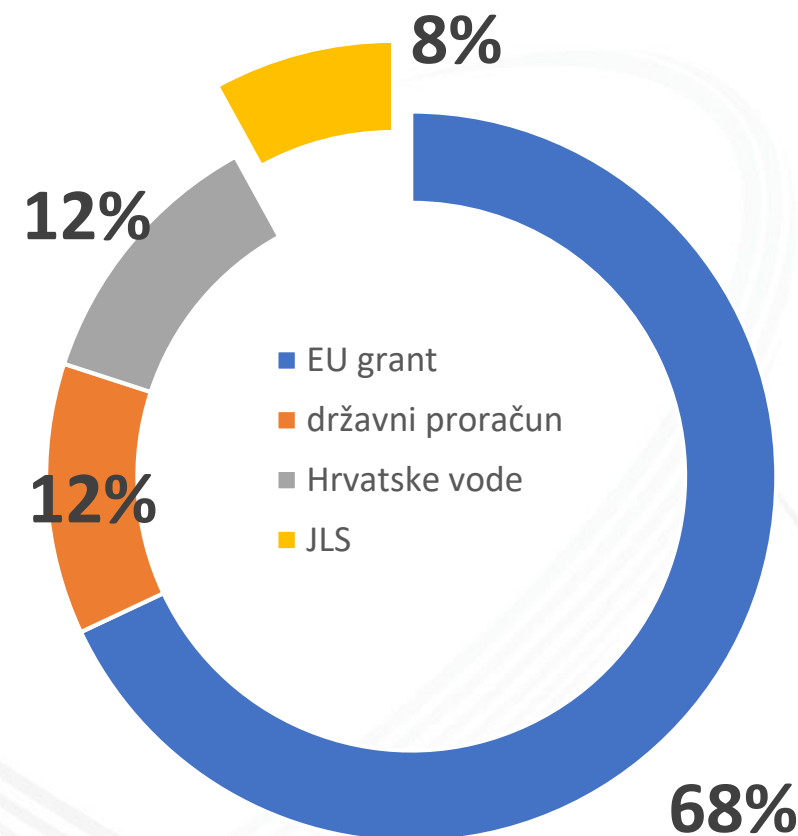
Affordability issue

repayment of interest and principal

Overestimate connection rate and consumption
- more revenue – better DSCR

Sources of financing

- the EU grant – **approx. 68%**;
- national public contribution (including capital subsidies at central, regional or local government level, if any);
- project promoter's contribution (loans or equity), if any;
- private contribution under a PPP, (equity and loans) if any.



Financial sustainability

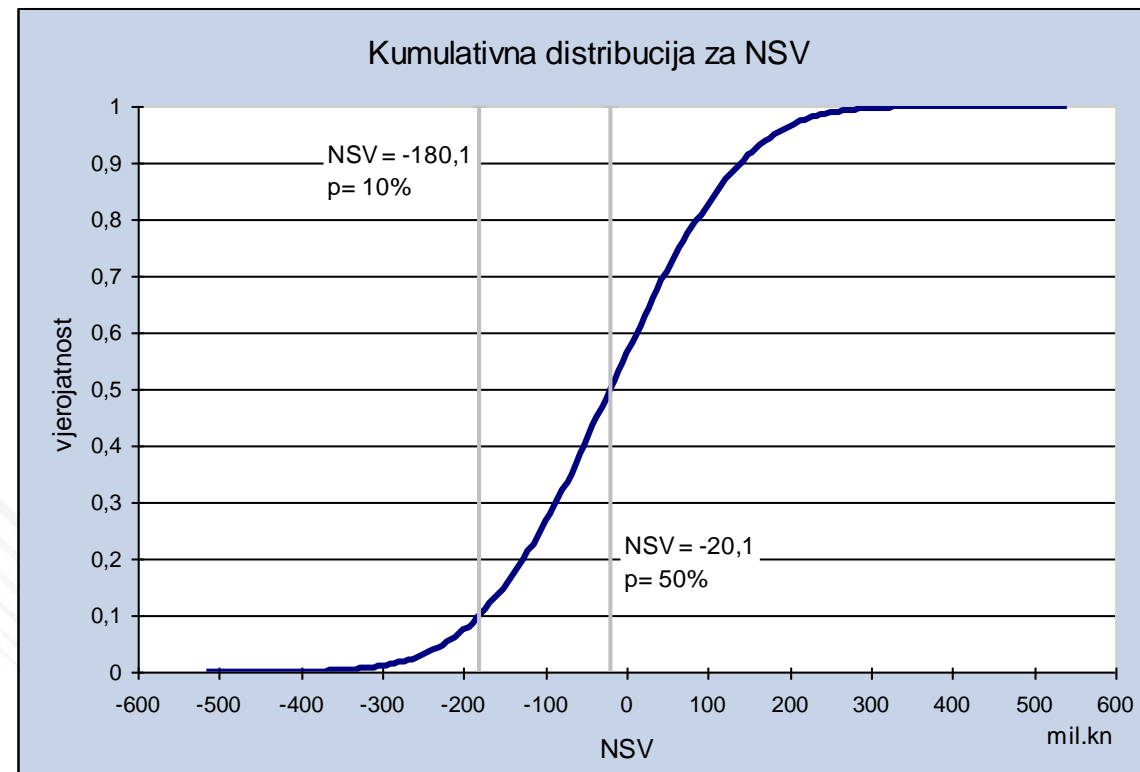
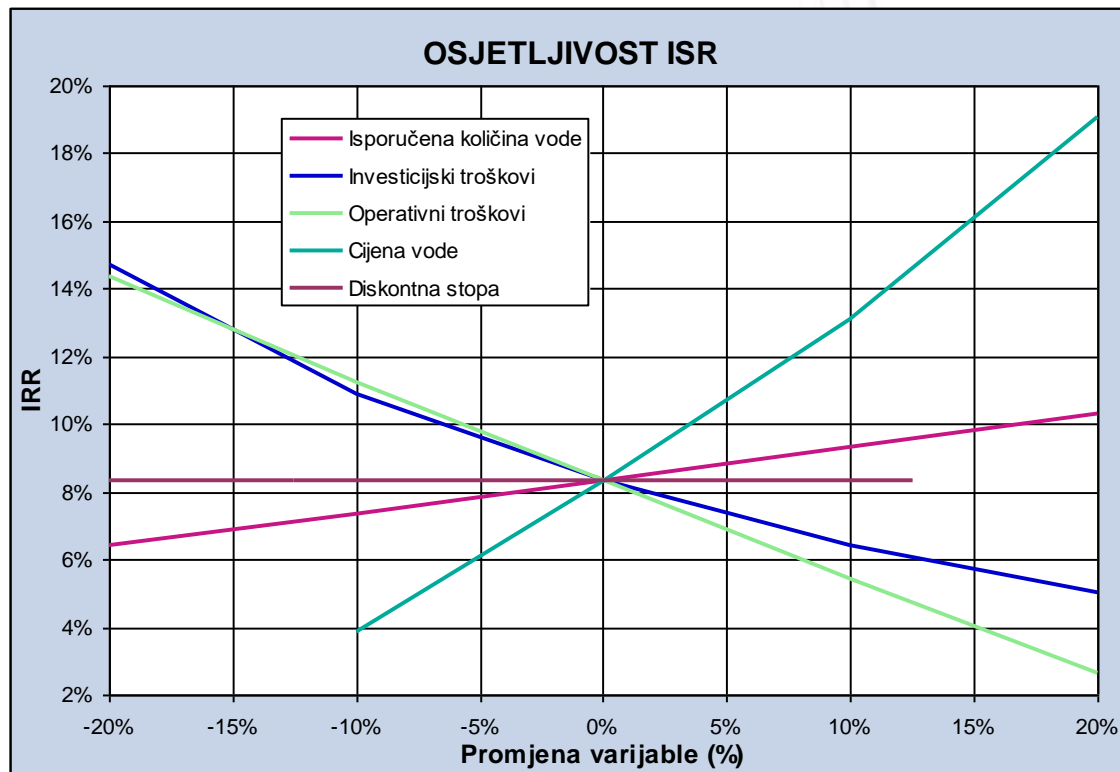
- The project is financially sustainable when the risk of running out of cash in the future, both during the investment and the operational stages. It is important to ensure that the project, even if assisted by EU co-financing, does not risk suffering from a shortage of capital.

Risk assessment

The recommended steps for assessing the project risks are as follows:

- sensitivity analysis;
- qualitative risk analysis;
- probabilistic risk analysis;
- risk prevention and mitigation.

Risk and sensibility analysis



Lesson learned

- Objectives exceeding EU requirements
- Spatial plans not realistic
- Multiple „re-design”, overloaded experts and administration
- Oversized capacities
- Conservation of the current situation instead of option analysis
- No real option analysis
- The asset value of existing utilities does not reflect the reality
- Vague planning and tendering strategy
- Controversial, poor previous Studies
- Lack of coherent approach

Lesson learned – cont.

- Lack of coherent approach
- Poor quality, old available plans, out-dated technologies
- Unqualified Project Management
- The mid-term sustainability of the existing and long-term sustainability of the new assets is not provided
- The lack of Whole Life cycle planning knowledge and approach
- The lack of standardized guidance and Directives

FS and CBA Checklist – tool for reviewer

Step	Question
General	<ul style="list-style-type: none">• Has an incremental approach been adopted?• Is the counterfactual scenario credible?• Has an appropriate time horizon been selected?• Have project effects been identified and monetised?• Have appropriate financial and social discount rates been adopted?• Is the methodology adopted consistent with the Commission's or Member States' own guidance?

FS and CBA Checklist – cont.

Step	Question
Presentation of the context	<ul style="list-style-type: none">• Is the social, institutional and economic context clearly described?• Have all the most important socio-economic effects of the project been considered in the context of the region, sector or country concerned?• Are there any major potential constraints to project implementation?

FS and CBA Checklist – cont.

Step	Question
Definition of objectives	<ul style="list-style-type: none">• Does the project have clearly defined objectives stemming from a clear assessment of the needs?• Is the project relevant in light of the needs?• Are the project objectives quantitatively identified by means of indicators and target values?• Is the project coherent with the objectives of the Funds and the EU operational programmes?• Is the project coherent with the national and regional strategies and priorities, as defined in their development plans?• Are the means of measuring the attainment of objectives and their relationship, if any, with the targets of the operational programmes indicated?

FS and CBA Checklist – cont.

Step	Question
Identification of the project	<ul style="list-style-type: none">• Does the project constitute a clearly identified self-sufficient unit of analysis?• Has the technical, financial and institutional capacity of the promoter been analysed?• Has the impact area been identified?• Whose costs and benefits are going to be considered in the economic welfare calculation?• Are all the potentially affected parties considered?

FS and CBA Checklist – cont.

Step	Question
Technical feasibility and environmental sustainability	<ul style="list-style-type: none">• Has current demand for services been analysed?• Has future demand for services been forecasted?• Are the demand forecasting method and assumptions appropriate?• Does the application dossier contain sufficient evidence of the project's feasibility (from a technical point of view)?• Has the applicant demonstrated that other alternative feasible options have been adequately considered?• Is the technical design appropriate to the achievement of the objectives?• Is capacity utilisation rate in line with demand expectations?• Are the project cost estimates (investment and O&M) adequately explained and sufficiently disaggregated to allow for their assessment?

FS and CBA Checklist – cont.

Step	Question
Financial analysis	<ul style="list-style-type: none">• Have depreciation, reserves, and other accounting items which do not correspond to actual cash flows been excluded from the analysis?• Has the residual value of the investment been properly calculated and included in the analysis?• Has VAT, if recoverable by the beneficiary, been excluded from the analysis?• If tariffs are levied from users, how has the polluter-pays-principle been applied, what is their cost recovery level in the short, medium and long-term?• If an affordability cap is applied to tariffs, has an affordability analysis been carried out?

FS and CBA Checklist – cont.

Step	Question
Financial analysis	<ul style="list-style-type: none">• Is the financial sustainability analysed at project and, where appropriate, operator level?• If the project is not financially sustainable by itself (produces negative cash-flows at some point), is it explained how the required funds will be ensured?• Have the main financial performance indicators been calculated (FNPV(C), FRR(C), FNPV(K), FRR(K)) considering the right cash-flow categories?

Step	Question
Economic analysis	<ul style="list-style-type: none"> • Are the unit values for quantification of economic benefits and externalities and their real growth over time adequately presented/explained? • Have the main economic performance indicators been calculated (ENPV, ERR and B/C ratio) considering the right categories of cost and benefits? Is there any risk of benefit double counting? • Is the economic net present value positive? If not, are there important non-monetised benefits to be considered?

Step	Question
Risk assessment	<ul style="list-style-type: none"> • Is the sensitivity analysis carried out variable by variable and possibly using switching values? • Has the scenario analysis been carried out? • What is the proposed risk prevention and mitigation strategy? • Has a full risk prevention matrix been built? • Have risk mitigation or prevention measures been identified? • If the project appears to be still exposed to risk, has a probabilistic risk analysis been carried out? • What is the overall assessment about the project risk?

Questions and Answers

EU PROJECT PREPARATION FACILITY PROJECT

All documents, information, materials and pictures from this EU PPF training are available for download in the download section of our site www.ppf.rs

Questions and assistance

Robert Kartelo

Trainer, EU PPF | PPF6/EuropeAid/135637/IH/SER/RSr

+381 11 4040721

info@ppf.rs

www.ppf.rs

Thank you for your attention!