

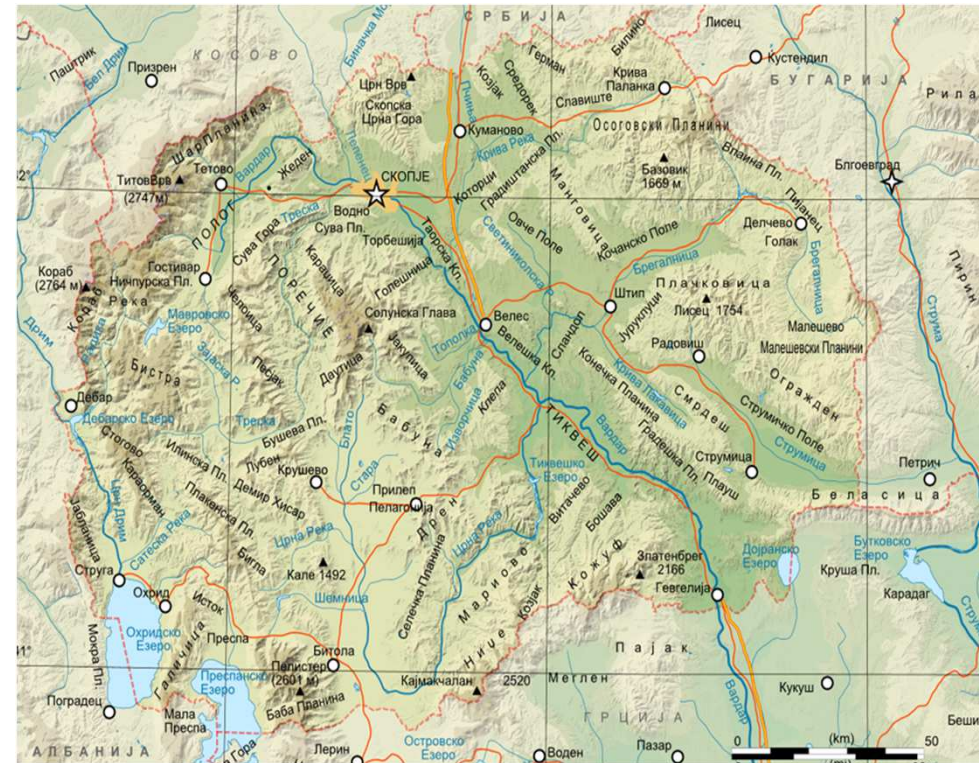


GAS DISTRIBUTION SYSTEM

(FEASIBILITY STUDY SUMMARY)

General information about the Republic of Macedonia

- The Republic of Macedonia is a country located in the Balkan Peninsula. It is bordered by the Serbia and Kosovo to the north, Bulgaria to the east, Greece to the south, and Albania to the west. It has a total area of 25.713 km², and a population of 2.022.547. (source: State Statistical Office of the Republic of Macedonia/2002 census).



General information about the Republic of Macedonia

▪ General economic parameters:

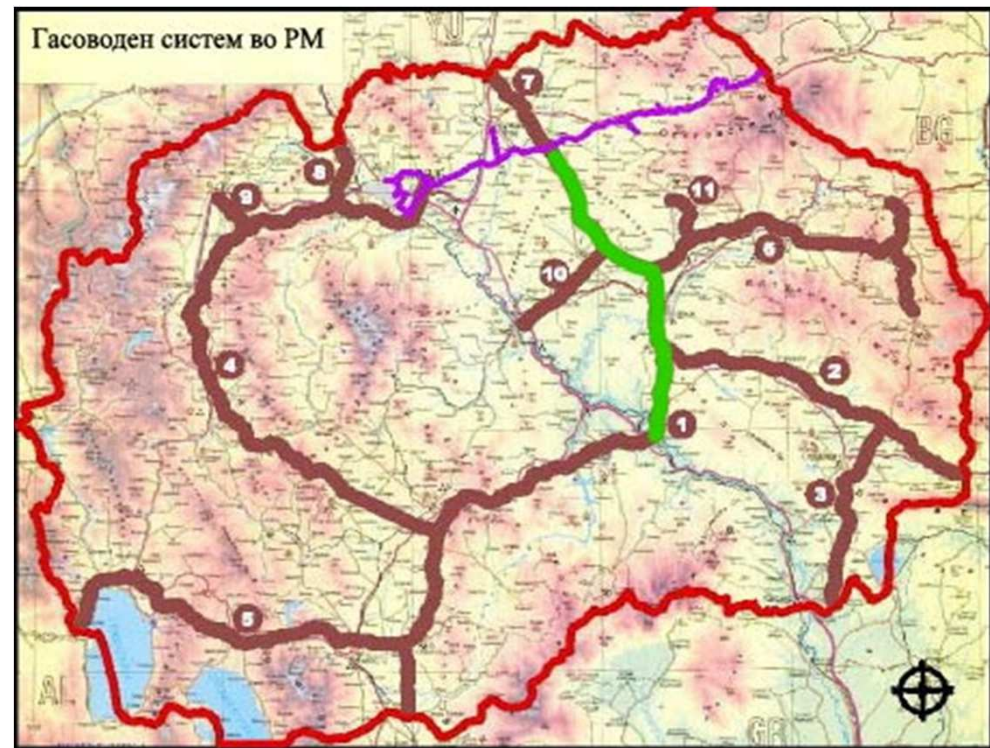
- National currency: Macedonian Denar (MKD)
- GDP in 2012: 458.621.000.000 MKD
- GDP per capita: 3.616 EUR
- Energy consumption per unit of GDP: 5.5 times higher than the developed European countries
- Largest final energy consumers in 2012:
 - Industry 31,4 %
 - Households 27,6 %
 - Transport 24,9 %

▪ Natural gas consumption

- The Republic of Macedonia is connected only with one main gas pipeline
 - The main gas pipeline has an annual capacity of 800 million nm^3 , with a possibility of increase of 1.200 million nm^3
 - In the last 10 years through this pipeline approximately 100 million nm^3 natural gas per annum are transported.

Review of the current situation

- The existing level of constructed gas pipeline system in the Republic of Macedonia is unsatisfactory. So far, out of the entire planned gas pipeline network shown in the image right, the only completed section is the one with a starting point located at the Macedonian-Bulgarian border, in the vicinity of the border crossing point Deve Bair, and an endpoint located in the region of Skopje, which was built and put into use in 1997.



Consumers of the distribution system

The consumers that would be provided with natural gas are divided in three categories:

- Households in individual residential facilities (houses) (IRF)
- Households in collective residential facilities (buildings) (CRF)
- Commercial and Service sector facilities and industry facilities exempt from the huge metallurgy and hued metals (OF)

Heat energy sources for substitution

At this moment the existing facilities meet their requirements for heating through one of the available methods such as:

- ***Local sources of heat in the facilities***
- ***Electro energy system of the country***
- ***District heating systems in the country***

The local sources of heat in the facilities use the following fuels:

- *Woods and other biomass*
- *Electrical energy*
- *Extra light heating oil,*
- *Liquefied petroleum gas,*

Comparison of distribution system for natural gas with existing systems

PRICE ANALYSIS OF UTILIZED ENERGY														
SKOPJE REGION	District heating system		Natural gas		Wood	ELHO		LPG	Electricity					
	1		1		1	mkd/l	€/ton	1	1	Households	1 Others			
Fuel price	400	€/1000 m3	400	€/1000 m3	50	€/m3	50	938	1300	\$/ton	Average	3.2	mkd/kWh	6.22
System efficiency					1.6	MWh/m3		11.94	1000	€/ton	High	3.9	mkd/kWh	
Boiler	0.95		0.97		0.7			0.87	0.93		Low	2	mkd/kWh	
Network	0.88										The fixed part is calculated 33%			
Price of energy from fuel	51.45	€/MWh	44.34	€/MWh	44.64	€/MWh		90.22	€/MWh	84.15	€/MWh			
Total capacity	480	MW												
Total heat	524,160	MWh												
Total fixed costs	9,790,581		100	€/1000m3	0		0		0		The fixed part is calculated 33%			
Price of energy from fixed costs	18.68	€/MWh	11.09	€/MWh							of the energy			
			40.7											
Average price od heat	70.13	€/MWh	55.43	€/MWh	44.64	€/MWh		90.22	€/MWh	84.15	€/MWh	69.43	€/MWh	
Tariff	Households	Others	Households	Others							Households		Others	
Heat capacity €/MW	16,924	33,849									Average	3.2	mkd/kWh	6.22
Delivered heat €/MWh	39.32	78.65	41.57	76.21							High	3.9	mkd/kWh	
Natural gas €/1000 m3			375.00	673.32							Low	2	mkd/kWh	
Heat costs														
Daily heating	15	h	15	h	15	h	15	h	15	h	15	h		
Required energy - others 10kw	10,920	kWh	10,920	kWh	10,920	kWh	10,920	kWh	10,920	kWh	10,920	kWh		
Required energy - flat 80m2	10,483	kWh	10,483	kWh	10,483	kWh	10,483	kWh	10,483	kWh	10,483	kWh		
Tariff system/average price														
Flat 80m2	575	€/heat season	436	€/heat season	468	€/heat season	946	€/heat season	882	€/heat season	671	€/heat season		
Other facility 10KW capacity	1,197	€/heat season	832	€/heat season	488	€/heat season	985	€/heat season	919	€/heat season	1,474	€/heat season		
Percent reduction relative to the gas														
Flat 80m2	24		-		7		54		51		35			
Other facility 10KW capacity	30		-		-71		16		9		44			

Adopted business concept for development of distribution systems

- The feasibility of the distribution system depends on the connection to the DSNG of the existing facilities.
- The connection of the existing facilities to the DSNG depends on the consumers' capability for investing in gas equipment.
- In order to avoid the uncertainty about connection of the existing facilities to the DSNG, there is a proposed business concept in the study for the companies that would implement the distributive system for natural gas.

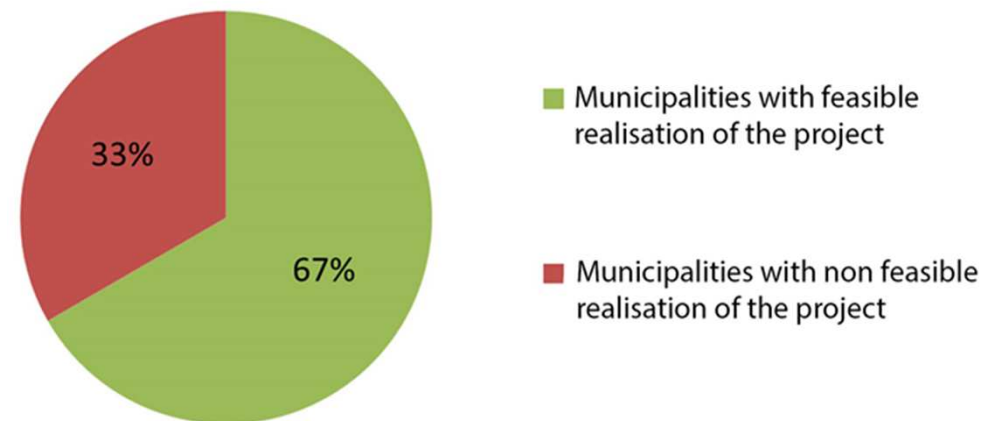
Adopted business concept for development of distribution systems

- The companies that will get the license to construct and operate the gas distribution system, apart from the construction of the main and local distribution network, would invest additional assets in order to facilitate the connection of the existing facilities to the distribution system of natural gas.
- The amount of this investment should be on level that would ensure reimbursement of the invested assets of the consumers for connecting to the DSNG through annual savings from that connection, for 3 years in individual residential facilities i.e. 2 years in the collective residential facilities.
- The proposed concept of construction of the main distribution network will enable the connecting of the consumers right from the **beginning of the second year of the construction of the distribution system.**
- Thereby, the pipelines pathways of the main distribution network is positioned to enable rapid connection to the available load from the OF and CRF. In short term, that would provide connection of a larger load with the most convenient quality from the aspect of revenues per unit of delivered natural gas.

Feasibility of distribution system of natural gas

The basic questions that need to be answered by this Study are the following:

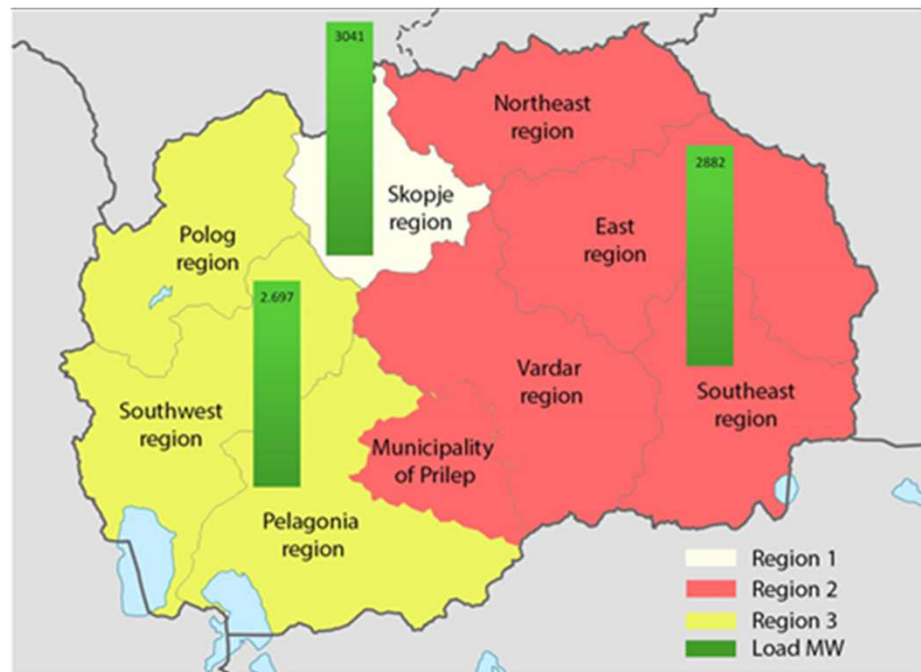
- In which municipalities in the Republic of Macedonia is the construction of a gas distribution network justified?
- Which model of distribution systems development is most suitable for the Republic of Macedonia?.



Result: **48 municipalities feasible**
32 municipalities unfeasible

Feasibility of distribution system of natural gas

- According to the analysis of the possible scenarios for establishing the regions for implementation of the distribution systems of natural gas, explained in the executive summary page 72-85), it is proposed on the territory of the Republic of Macedonia to have **three regions with almost equal estimated load.**



Realization of the distribution system for natural gas for region 1

- **The dynamics of realization** provides that the procedure for concession granting of distribution system, for the Skopje region, in all 17 municipalities from this region to start immediately. Upon completion of the procedure for this region to start the procedure for the second region, and upon completion of the procedure for the second region to start the procedure for the third region.
- **The chosen model for the project implementation is concession / PPP**, where the concessionaire / private partner overtakes all the phases of the project implementation: Design, Financing, Construction, Operation, Maintenance and Development. The grantor / public partner reserves the right of concession fee and the right to control the implementation of the concession / PPP agreement.
- **Estimated minimal concession fee 1% of the total annual income.**
- **The proposed procedure for granting concession agreement is a competitive dialogue**, which is implemented in three phases, as follows: phase of candidates prequalification, phase of dialogue with the selected candidates for identifying solution adequate to the needs of the contracting authority, based on which, the candidates submit their offers and phase of offers submission. The tender documentation fee: EUR 5000.



REGION 1 – SKOPJE REGION

Steps in preparation of the study

- 1. Research of the potential and the need for construction of a distribution system of natural gas on the territory of the municipalities in Skopje region**
- 2. Preliminary design of the construction of a distribution system of natural gas**
- 3. Evaluation study for the impact of the distribution system for natural gas on the environment.**
- 4. Study on the feasibility of establishing a PPP contract for development of distribution system for natural gas.**

Study on the feasibility of establishing a PPP contract for development of distribution system for natural gas

- Technical analysis**
- Economic financial analysis**
- Legal analysis**

Current situation in the Skopje region

- In the Republic of Macedonia in this moment operate only two smaller distribution systems in Kumanovo and Strumica. In this moment there isn't distribution system of natural gas in the Skopje region. The natural gas is available for use in the Skopje Region from year 1997. The nonexistence of the distribution system of natural gas prevented this fuel availability to end users.
- The first and maybe the biggest effect from the implementation of this project in the Skopje region will be the significant increase of the number of consumers from all types, for which this energy resource will be available.
- **The expected total heat load for connection to the distribution systems for natural gas in the Skopje Region in a period of 20 years amounts to 1720 GWh or around 51% of the total available heat load on the level of the Skopje Region.**
- **Around 190 millions m³ of natural gas per year will be delivered, through the distribution systems for natural gas in the Skopje Region, for production of heating energy, required to meet the needs of the connected consumers.**

Anticipated development plan of distribution system

- In the first ten years of the development of the system, the most part of the connected load comes from the existing facilities. This means that with the development of the distribution system for natural gas there will be a substitute in the energy sources which were used for meeting the requirements for heating energy.
- The construction of the main network is expected to be realized in all municipalities from the Skopje region and in accordance with the plan the same should be finalized in the first two years.
- The first group of consumers that will be connected to the distribution system are the consumers from the CRF or OF that are close to the main distribution network constructed in the first and second year of the project. This will enable the connection of the most quality load anticipated for connection in the second and third year of the construction of

Anticipated development plan of distribution system

- The second very important element which enables the planned connection dynamic is the fact that the overall load anticipated for the connection in the second and third year is a load that has interior installation for central heating.
- Therefore for this load either a change of the part of the equipment in the local boiler room or installation of predefined type of equipment for production of heating energy is required. The necessary equipment for these facilities for production of heating energy would be acquired in the first year of the construction, and in the second and third year the installation and the connection to the system would be realized.
- **All analysis regarding the feasibility of the distribution system for natural gas in the Skopje Region are developed on a municipal level.**

Anticipated development plan of distribution system

Municipalities where the analysis showed feasibility for development of distribution system of natural gas:

- Municipality of Karposh
- Municipality of Centar
- Municipality of Aerodrom
- Municipality of Kisela Voda
- Municipality of Gjorche Petrov
- Municipality of Butel
- Municipality of Chair
- Municipality of Gazi Baba
- Municipality of Ilinden
- Municipality of Petrovec

Municipalities where the analysis did not show feasibility for development of distribution system of natural gas:

:

- Municipality of Saraj
- Municipality of Shuto Orizari
- Municipality of Arachinovo
- Municipality of Chucher Sandevo
- Municipality of Zelenikovo
- Municipality of Studenichani
- Municipality of Sopsishte

Financial and Economic Analysis

- **The projected investment for the project implementation is EUR 98.399.894.**
 - The amount covered by the system operator in the part to be invested by the consumers is in amount of EUR 39,9 million of the operator's total investment.
 - EUR 3,2 million for metering and regulating stations
 - EUR 3,1 million for connections
 - EUR 33,6 million for thermal energy production equipment i.e. equipment which transforms the gas into heat.
- **The financial net present value of the project for 20 years system operation is EUR 110.144.451, and the IRR of the project is 21,4%.**
 - The concession period is 20 years, and the estimated period of construction of the natural gas distribution system is four years.
 - The discount factor of the financial NPV of the project is 5% at annual level which is recommended in the reference instructions for preparation of this type of analyses of the European Commission.

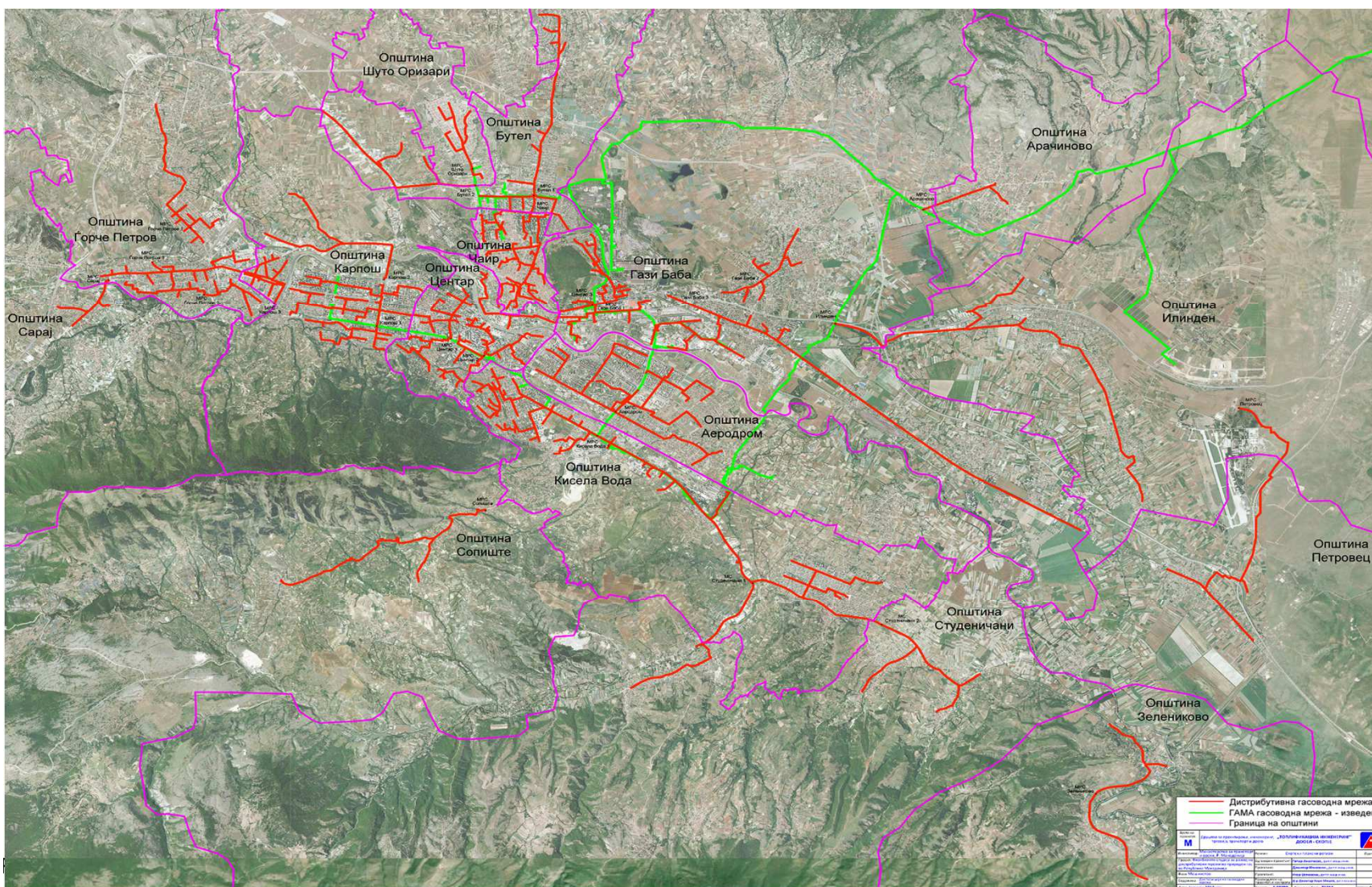
Financial and Economic Analysis

- **The economic NPV of the project is EUR 389.577.168**

- economic rate of return 40%
- ratio of discounted revenues and discounted costs- ratio V/S is 3.06.
- During the preparation of the economic NPV of the project discount rate of 5.5% at annual level was used which is recommended in the reference instructions for preparation of this type of analyses of the European Commission.

Financial NPV of the project	110.144.451€
Financial internal rate of return of the project	21.4%
Financial indicator V/S ratio	1.03
Economic NPV of the project	389.577.168€
Economic rate of return of the project	40%
Economic indicator V/S ratio	3.06

The distribution system for natural gas in the Skopje region



Conditions for development of the distribution system in region 1

▪ Dynamic for realization

- Preparatory activities 1 year
- Concession period 20 years, with two periods of construction:
 - first construction period 4 years
 - second operating period 16 years
- Length of the main distribution network – 244,934 km. The connection of the facilities and the delivery of the natural gas is projected to begin in the second year of construction of the system.

▪ Proprietary right

- Concession period:
 - property: public partner
 - right to use and right to perform public activity: concessioner/private partner
- After the period of concession:
 - property: public partner
 - the whole built system should be transmitted in possession of the concession grantor/public partner
- The procedure and the expropriation costs shall be covered by the concessioner/private partner.

Conditions for development of the distribution system in region 1

▪ Guarantees

- For the realization of the project, the following types of guarantee are proposed:
 1. **A guarantee for the tender** - bank guarantee for participating in the published public procurement call in amount of 1% of the value of the offer, VAT excluded.
 2. **A guarantee for the timely and high-quality execution of the contract:**
 - a) Period for preparatory activities and first construction period :
 - In amount of EUR 7 million
 - Timely and high-quality execution of the contract is: at the end of the first construction period, the concessioner/private partner shall have constructed at least 70% of the natural gas distribution network planned with this feasibility study, whereas in each municipality, the concessioner/private partner shall have constructed at least 20% of the natural gas distribution network planned for that municipality.
 - b) Second construction period:
 - In amount of EUR 500,000,
 - For guarantee that a natural gas distribution network will be constructed in each populated area in which at least 20-25% of population has shown interest in the distribution network.
 3. **Guarantee for improvement and maintaining of the distribution network** – with deposited money in amount of EUR 250,000 for the second construction period

Conditions for development of the distribution system in region 1

▪ Criteria for selection of concessionaire

• **Fundamentals conditions**

- Bidding criteria is the concession fee with initial value of 1 %.
- Connection fee of 100 € for apartments of 80 m² or 1,25 €/m² useful area.
- Each municipality in the Skopje region has to have a realized gas distribution system. In the municipalities with more settlements, obligation of the concessioner / private partner is to construct distribution system for natural gas in the settlement with biggest population.
- For each settlement where there are 20-25 % of the population interested in development of distribution system for natural gas, the concessionaire/private partner should provide realization of one .



THANK YOU FOR YOUR ATTENTION