SYMBI
Interreg Europe

MUNICIPALITY OF KOZANI

European Union
European Regional
Development Fund

Report on policies that create attractive conditions for public-private partnerships based on the results of the policy development workshop

September 2017

1. Introduction

1.1. Project Framework

Interregional Operational Programme for European Territorial Cooperation "Interreg Europe" for the period 2014-2020 aims at improvement, through interregional cooperation, of the effectiveness of regional development policies in the fields of research and innovation, competitiveness of SMEs, growth with low carbon emissions and the efficiency of energy resources.

All EU-28 Member States, Norway and Switzerland are participating in the Project.

The Operational Programme was adopted by the European Commission on 11 June 2015 with the No. 11/06/2015 C(2015) 4053 decision, defining a strategic framework of four (4) priorities from the (11) thematic priorities set out in the first paragraph of Article 9 of Regulation (EC) 1303/2013 with the agreement of the participating countries, which are:

1.2. Project Objectives

This "SYMBI" project is part of the fourth priority of the Interreg Europe Operational Program, which concerns the efficiency of energy resources.

The "SYMBI" project aims to support and improve the regional policies of the represented European Regions as regards the diffusion of industrial symbiosis in order to add value, reduce production costs and lead to the alleviation of environmental impacts by increasing resource efficiency and reducing greenhouse gas emissions. Improving the policy tools of the involved regions aims at making both a positive contribution to regional sustainable development and job creation.

To achieve this, the "SYMBI" project, through its activities, will strengthen:

a) the exchange of experience between the regions involved and the interest bodies which are involved in the supply and value chain of resource use,

b) the integration of lessons learned into regional policies and action plans including indicatos for benchmarking, and

c) the development of broader synergies to support the transition to a cyclical economy

The main results / deliverables of the project "SYMBI" are presented in the following diagram.

Promoting the exchange of experience of partners and interest groups(stakeholders group)

Developing Action Plans for the participants to improve the policy tools plan by providing assistance to Managing Authorities and beneficiaries of these tools

Summarized policy newsletters for public services that will include the knowledge from the implementation of the project

Thematic studies and analyzes on the cyclical economy and industrial symbiosis

1.3. Project Partnership

The project "SYMBI" involves 9 organizations from different EU countries while the lead partner is the Fundecyt Institute.

- Foundation Fundecyt, Science and Technology Park of the Region of Extremadura
  - (Spain)
- -Environment and Territory Regional Ministry of Andalusia
  - (Spain)
- -Malopolska Region
  - (Poland)
- -Chamber of Commerce of Molise
  - (Italy)
- -Government Office for Development and European Cohesion Policy
  - (Slovenia)
- -Municipality of Kozani
  - (Greece)
- -Pannon Novum West-Transdanubian Regional Innovation Non-Profit Ltd
  - (Hyngary)
- -Regional Council of Hame
  - (Finland)
- -Häme University of Applied Sciences Ltd
  - (Finland)

1.4. Project Implementation

The project began after the signing of the lead partner contract with the Interreg-Europe Managing Authority. Specifically, the official launch of the project was 1 April 2016 and is expected to be completed (according to the current timetable) on 31 March 2021, with a total duration of 5 years. The project implementation includes the following activities:

EXCHANGE OF EXPERIENCE

It concerns the exchange of experiences and best practices on the competitiveness of rural SMEs. Expected results / Deliverables of the project:

- ✓Promoting the exchange of experience of partners and interest groups(stakeholders group)
- ✓Developing Action Plans for the participants to improve the policy tools plan by providing assistance to Managing Authorities and beneficiaries of these tools
- ✓Summarized policy newsletters for public services -except for the project participants- and will include the knowledge coming from the implementation of the project
- ✓Thematic studies and analyzes on the cyclical economy and industrial symbiosis

COMMUNICATION AND RESULTS DISSEMINATION

It concerns communication and project results dissemination. In the context of implementation, they are included:

MANAGEMENT AND COORDINATION

It concerns the coordination of the project, the smooth and orderly function of management and communication with the implementing body, the partnership and the Managing Authority of the Interreg-Europe programme.

It includes all the actions aimed at monitoring the natural and economic object with a duration of 60 months or until is considered necessary by the Managing Authority of the Interreg-Europe programme.

It includes all the actions required for internal communication processes between partners such as obligatory participation in workshops between partners in order to ensure the progress, the most effective communication and the proper implementation of the project.

In general, the project management includes all actions aimed at the proper management of the action plan and the achievement of a common implementation line between the partners, the specification of the timetables, the obligations of economic and technical coordination obligations, the progress reports (six-monthly in the first three years).

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2. Workshop brief description

The 2nd SYMBI Interregional Workshop entitled "Interregional workshop on how to plan and unlock public and private investments - How regional authorities can develop public-private partnerships to foster industrial symbiosis" took place in Kozani during the weekend of 20-21 June 2017 in the “Coventarios” Municipal Library of Kozani (address: Mouka 7, 50132, Municipality of Kozani)

2.1. Theme and objectives

The aim of the workshop was to explore how regional authorities can develop public-private partnerships (PPPs) to support industrial symbiosis.

The issues addressed included the ways of setting up, financing, monitoring and capitalizing such partnerships, as well as barriers that may hinder these processes.

Successful examples from European partner countries were presented to help participants identify potential barriers to all phases and aspects of the development and implementation of PPP initiatives and projects.

Overall, as there is evidence of the importance of PPPs as a tool for fostering industrial symbiosis networks, the seminar focused on identifying the factors of successful PPPs that can promote the emergence of industrial symbiosis and ensure their success. During the workshop, the views of the various stakeholders were presented in order to clarify the subject's costs and benefits.

2.2. Introduction to PPPs

Public-Private Partnerships (PPPs) are contracts - generally long-term ones- concluded between a public body and a private one for the purpose of executing works or providing services. In a PPP, the private partner assumes all or part of the cost of implementing the project and a significant part of the risks associated with its construction and operation. The public sector, for its part, focuses on defining the design, technical and operational requirements of the project and reimburses the private bodies either by partial payments from the State side linked to the availability of the project and the observance of its operating specifications or by direct payments by end-users.

With the budgetary constraints agreed by the Member States over recent years in the Eurozone, the unprecedented cuts in the public investment program in Greece, alongside the desire to limit the intervention of public authorities and the desire to benefit the public sector from experience and methods of operation of the private sector, the growing interest on PPPs is on the rise as the only financing tool for such investments.

As PPP approach begins to expand into the Public Sector, innovative solutions are constantly being

developed. The scale of opportunities is as big as the operations of the Public Sector itself.

More specifically, on the first day of the 2nd Interregional Workshop of the SYMBI project, the discussion focused on the basic principles of PPPs (definition and general description), the regulatory and financial aspects of these partnerships, the incentives of the private and public sectors for the establishment such partnerships and how these partnerships can be used as a tool for achieving environmental goals. In particular, case studies from Greece, the Kozani region, Slovenia and Finland, as SYMBI partner countries were discussed. The examples presented showed how PPPs can be a tool for achieving the goals of the private and public sectors.

Finally, on the second day of the workshop, based on the framework (regulatory, legal, financial) of the PPPs put forward and the examples presented, the work was revolved around the challenges and constraints that may affect or appear in the process of creation PPP. The second day debates investigated issues related to the relative economic, conventional and construction barriers and ways to bypass them.

3. Workshop Implementation

3.1. Workshop Agenda

The works were organized in three (3) thematic sections during the two (2) days of the workshop:

1: **EU policies and initiatives about Public-private Partnerships**

2: **PPPs in the context of circular economy and sustainable use of resources**

3: **Barriers and challenges related to PPPs**

In detail, the workshop agenda was as follows:

DAY 1: TUESDAY, 20th JUNE 2017

Time/ Duration	**Description**
09:30 – 10:00	*Arrivals and registration*
10:00 – 10:15	**Opening speech | Mayor of Kozani**
10:15 – 10:30	**Objectives of the workshop / Overview of the agenda**
10:30 – 13:00	**Topic 1: EU policies and initiatives about Public-private Partnerships** **Sergis Nikolaos**, Representative of the Special Secretariat of PPP, Ministry of Economy and Development
13:00 – 14:00	*Networking lunch*
14:00 – 16:00	**Topic 2: PPPs in the context of circular economy and sustainable use of resources** 1. District heating of Kozani, **Kyriptidis Eleftherios**, DEYA of Kozani 2. PPPs in Finnish Water Services **Harri Mattila**, Project Manager, Hame University Lecturer (HAMK) 3. Transition of the Urban Area into the Cyclical Economy **Igor Kos**, Municipality of Maribor, Mayor's Office and

Time/ Duration	Description
	WCYCLE Maribor Institute 4. The case of the municipality Sentrupert **Rupert Gole**, Mayor Sentrupert
15:30 – 16:00	*Coffee break*
16:00 – 17:30	**Continue Topic 2 discussion** **Wrap-up / conclusions from Day 1**

DAY 2: WEDNESDAY, 21st JUNE 2017

Time/ Duration	Description
09:00 – 11:00	**Topic 3: Barriers and challenges related to PPPs** 1. Implementation of infrastructure of the Integrated Waste Management System of Western Macedonia, **Cafasis Pericles**, DIADYMA
11:00 – 11:30	*Coffee Break*
11:30 – 12:00	**Continue Topic 3 discussion** **Wrap-up / conclusions from Day 2**
12:00 – 13:00	**Final remarks from the workshop | Evaluation**
13:00 – 14:30	*Networking lunch*

The structure of each thematic unit was organized on the basis of the following:

- Presentations
- Questions to the speaker
- Answers to questions from participants
- Interactive debate
- Presentation of the conclusions from the thematic discussion

3.2. Participants

In the workshop participated SYMBI partners, as well as local stakeholders (eg public and public bodies

already participating in a PPP) and external experts (academics, policy makers, researchers and representatives from case studies, among others).

Altogether, thirty-three (33) participants participated in the first day of the workshop and on the second day seventeen (17). Apart from the partners, the presence of representatives from the following bodies should be noted:

In detail, names, bodies and participant information are listed in the following table.

20 June 2017					
#	Full Name	Email address	Organisation/Affiliation	Country	signature
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5	Harri Mattila	harri.mattila@hamk.fi	HAMK	— " —	
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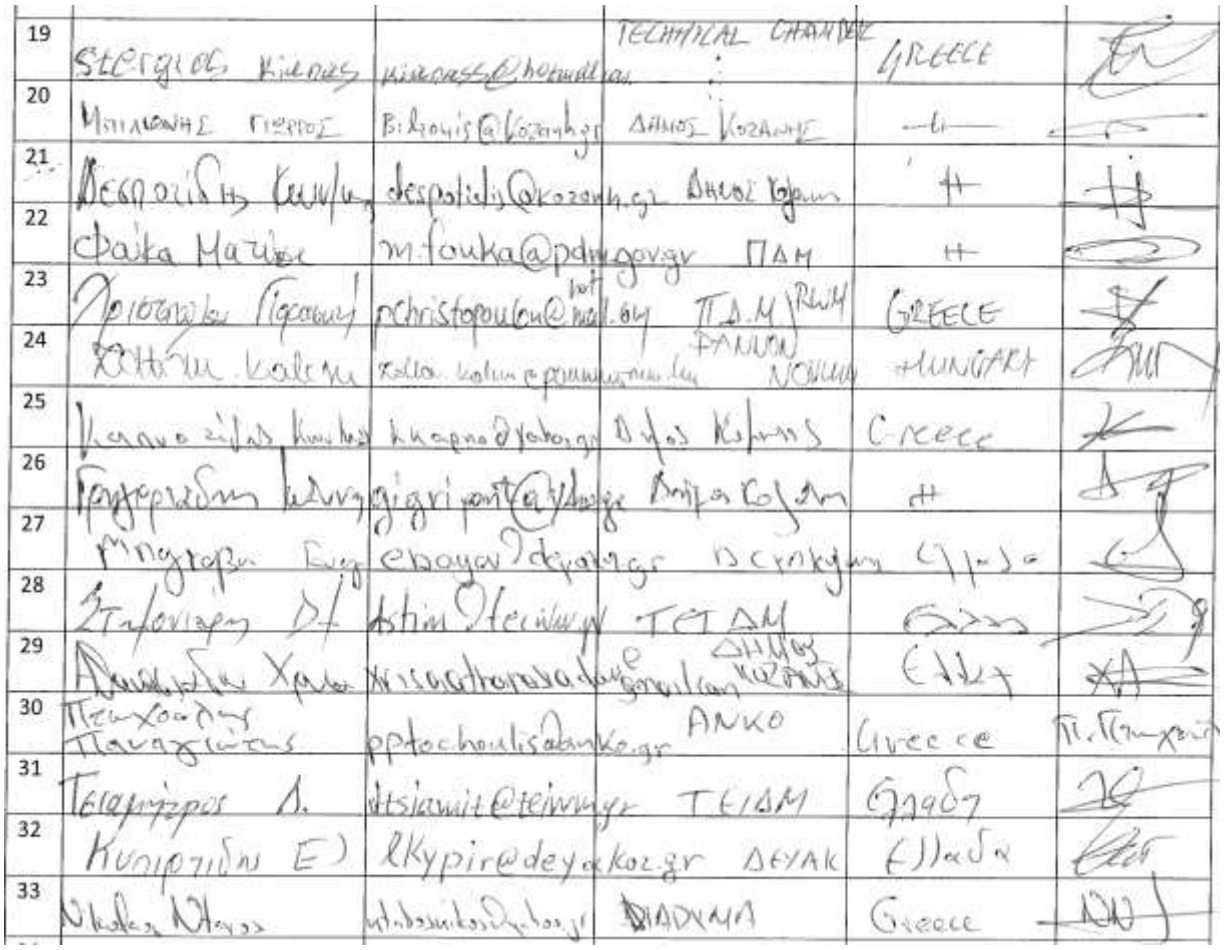
17	Konstantina Spyropoulou		ext. expert	GR	
18	PAPATHANASIOU VASILEIOS	vpapathanasiou@kozanh.gr	KOZANI	GR	



19			TECHNICAL CHAMBER	GREECE	
20					
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24				HUNGARY	
25				Greece	
26					
27					
28					
29					
30			ANKO		
31					
32					
33				Greece	

21 June 2017					
#	Full Name	Email address	Organisation/Affiliation	Country	signature
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5	Konstantina Spyropoula		Ppt expert	Greece	[illegible]
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10	Ms GRACIA BENITEZ	gracia.benitez@fundecyt-pctex...	FUNDECYT PCTEX	SPAIN	[illegible]
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13	[illegible]	[illegible]	- " -	- " -	[illegible]
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17	Konstantinos Despotidis	despotidis@kozanh.gr	Municipality of Kozani	GREECE	[illegible]

The speakers of the thematic units of the Interregional Laboratory were six (6) in total. By theme:

1: European Policies and Initiatives on PPPs

- **Sergis Nikolaos**, Representative of the PPP Special Secretariat, Ministry of Economy and Development

2: PPPs in the context of cyclical economy and the sustainable use of resources

- **Kyriptidis Eleftherios**, DEYA of Kozani (*Water Company*)
- **Harri Mattila**, Project Manager, Hame University Lecturer (HAMK)
- **Igor Kos**, Municipality of Maribor, Mayor's Office and WCYCLE Maribor Institute
- **Rupert Gole**, Mayor of Sentrupert

3: Barriers and challenges related to PPPs

- **Kafasis Pericles**, DIADYMA S.A.

3.3. Conclusions

The main points of the papers, discussions and conclusions for each of the thematic sections of the 2nd Interregional Workshop are presented below.

European Policies and Initiatives on PPPs

• Definitions

An instrument for the procurement and provision of infrastructure and public services through the implementation of long-term contractual agreements between a public body and a private group that promotes the transition from a manufacturing culture to a service and investment culture.

• Institutional framework

The ownership of the project remains in the public sector, which also has a strong supervisory and regulatory role.

Creating quality projects while delivering high quality services to citizens / end users

Exploiting the expertise and efficiency of the private sector.

An important tool for stimulating economic growth, utilizing private funds in development projects.

The public sector undertakes:

- Project specifications
- Bidding procedures
- Evaluation of the private sector proposal
- Monitoring the implementation of the project and the contract

The Private Sector undertakes:

- Carry out the necessary studies
- Construction
- Securing financial resources
- Installation manager
- Transfer of the project to the public sector at the end of the contract

• Theoretical economic approach to the necessity of PPPs

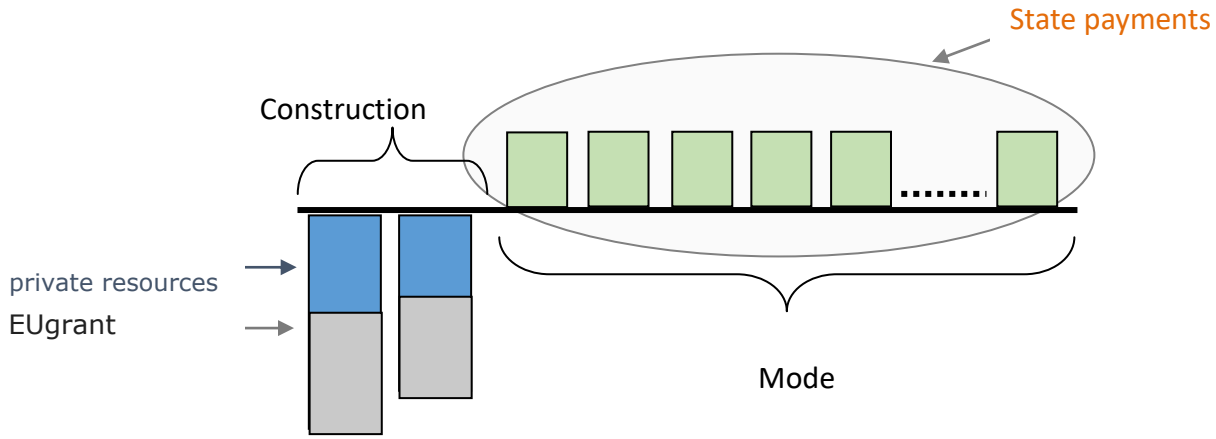
Concession Contracts	Availability Payment Projects
• Projects or services where there is a commercial action and private parties - foundations undertake financing, deigning, maintenance and operation / exploitation of the project. • Users pay fees to the private partner for the project use or the service provided.	• Projects or services where there is no commercial action for users. • Public Sector return bact to the private sector through annual long term payments (availabiliy payments), after project delivery, based on a payment mechanism connected to Qualitative Specifications.

• National and European PPP funding mechanisms

The main financial resources are national, private and European Union funds.

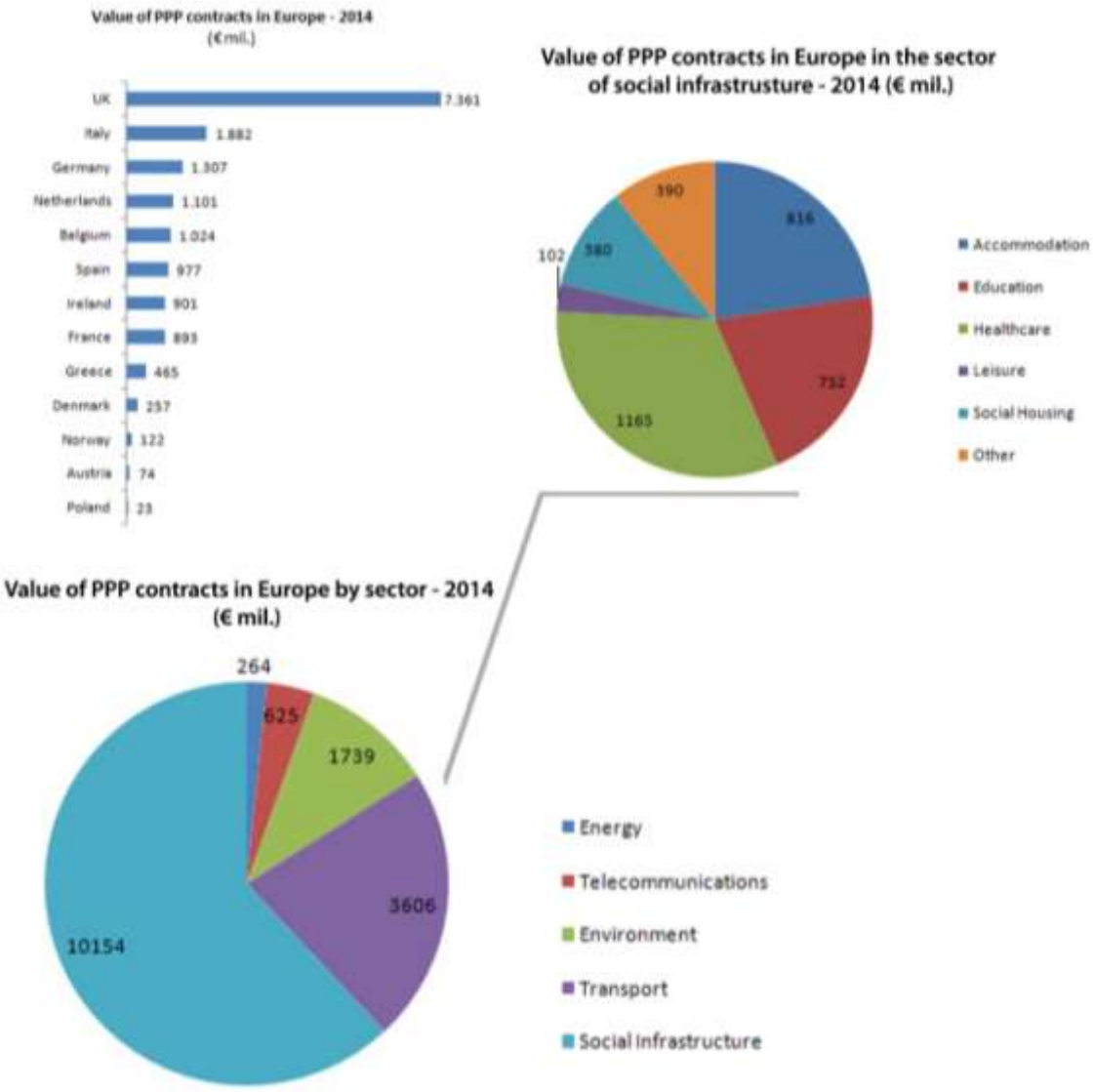
Approximately 70% -80% of the financing needs of a PPP project come from financial institutions and the remaining 30% -20% from private funds.

The integration of European grants can contribute to optimizing resources.



EU funding sources that can be used, include the European Investment Bank and financial instruments such as JESSICA.

For 2014, the total value of PPP contracts in Europe amounted to € 16.4 billion. 85% are social infrastructure projects using the availability payment method.



• Incentives for private and public participation to participate in PPPs

Utilization of private resources for the implementation and delivery of public services and infrastructure projects.

- Private capital complements public resources and is used to provide and implement public infrastructure and services.
- Ensure a pre-determined time and cost for the implementation of the projects
- The contractor's payment for the work is done only after the delivery of a project, which is a strong incentive to meet the specified timetable.

A single contract for design, construction and operation under the responsibility of a single contractor

- The public sector does not just provide an infrastructure but rather produces integrated

services. Synergies are achieved by integrating the design, construction, operation and maintenance of the project into a (single) long-term contract with a private contractor who is fully accountable to the public sector. In these projects, the ultimate goal is for projects and services to operate efficiently under a contractor, who has the sole responsibility, thus avoiding the fragmentation of responsibilities.

Linking the contractor's payment to the quality of the service provided

- The contractor is paid, based on a detailed payment mechanism, which evaluates the quality of work and services provided throughout the life of the project. The low quality of services leads to a reduction in payments, thus ensuring a strong incentive for long-term maintenance of sound technical work and high quality services.

Long-term payback of the project

- There is no requirement for immediate disbursement of public funds to repay the project after completion and receipt of the finished product. Repayment takes place gradually overtime

• Examples from Greece

Design, construction, financing, maintenance and management of 14 school units in the Region of Attica for 25 years.

- Participation / Commercial banks: EUR 19.8 million
- EIB: EUR 19,1 million
- JESSICA: EUR 19.1 million
- Total project cost: EUR 58 million
- Type of project: Payment method of availability

Design, financing, construction, maintenance, technical management and operation of an integrated telematic system that will serve the entire fleet of buses and trolleys in Athens for 12 years.

- Participation / Commercial banks: EUR 10,1 m.
- EU subsidy: EUR 5.3 million
- JESSICA: EUR 4 million
- Total project cost: EUR 19.4 million
- Type of project: Payment method of availability

PPPs in the context of cyclical economy and the sustainable use of resources

- **District heating of Kozani**

  Objective: Supply to the city of Kozani with heat for space heating and domestic hot water production and improvement of air quality.

Inputs: III, IV and V units of the Agios Dimitrios Steam Power Plant (they generate 70% of the maximum thermal load with a 97% share of annual heat output)

Characteristics:

- 22nd operation period
- 5,350 buildings have been connected
- 2.459.000 m2 of total area
- Total thermal power 215 MWth
- 415 km of network

Financing:

EU funds		National Funds	Sum
Valoren	3.550.990,00	36.882.514,04	73.425.005,88
CSF I	7.160.674,00		
CSF II	586.945,00		
CSF III	11.601.510,46		
NSRF	8.051.764,38		
PIP	5.590.608,00		
Sum	**36.542.491,84**	**36.882.514,04**	**73.425.005,88**
	49,77%	**50,23%**	

Benefits:

- Savings on currency due to the fact that 520,000 TOE (tons of oil equivalent) of heating oil is not consumed.
- Less expenses for the heating of homes (146,000,000 euros) resulting in an increase in the income of residents. In the future, this amount will amount to approximately EUR 30,000,000 each year.
- Creating new jobs to boost commercial and industrial activities in the city.
- Employment since 1994 for 30 people
- It is estimated that during the construction of the project from 1993 to date, 100 people are employed annually on a full-time basis.
- Contributing to a better quality of life through a cleaner urban environment.

- It contributes substantially to the mitigation of air pollution.
- Provides opportunities for further development in the region with parallel heating activities in the economy.
- Has demonstrated that Local Authorities need and can effectively implement large-scale projects.

- **PPPs in Finnish Water Services**

  Water services belong to the Municipalities

  - They have staff required for day-to-day operation only
  - The staff is concentrated on key technical tasks (water acquisition, treatment and distribution, collection, treatment and disposal of liquid waste
  - Purchase construction and maintenance work from the private sector, such as:
    - Sludge treatment - production of compost or biogas
    - Equipment maintenance - in cooperation with other SGIs
    - Automation - product development
    - Water analyzes - process development

  PPP Benefits / Outcomes:

  - World first in water quality
  - Job opportunities in the services are highly sought after / highly qualified personnel
  - Financial transparency
  - Money savings

- **Transition of the Urban Area into the Cyclical Economy (Wcycle project)**

  The Wcycle project is the strategic development model of the city of Maribor as an urban center in the field of integrated management of all generated waste, energy surplus and wastewater based on cyclical economy policy as a material, energy and water strategic use of treated waste, energy and processed water as new sources of resources.

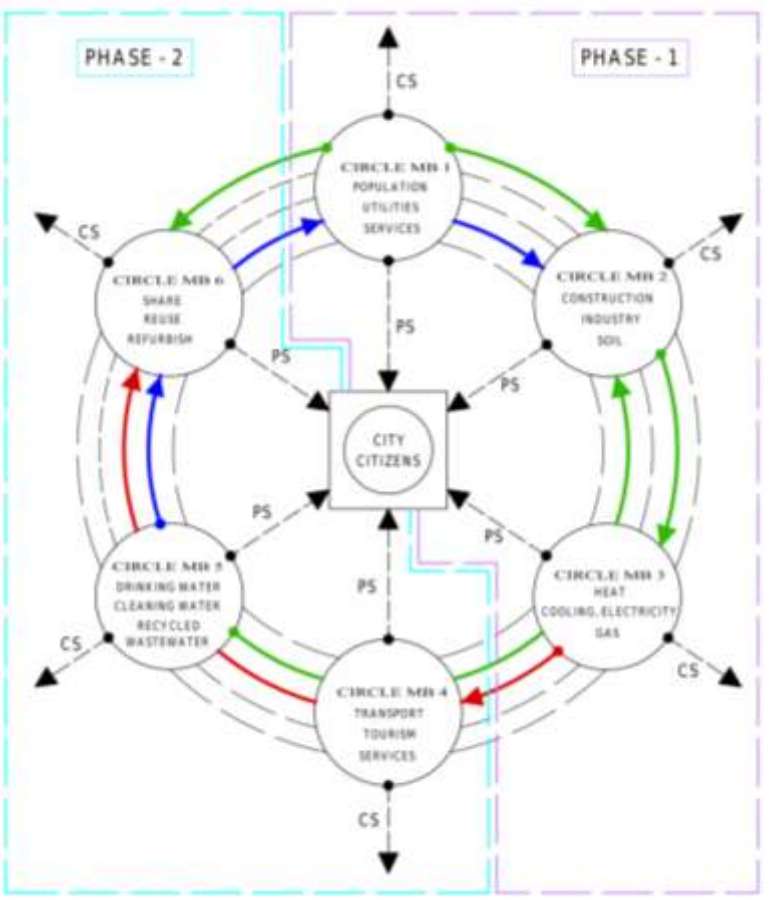
  Recovery bodies for specific pillars of the project - project cycles are companies mainly owned by the municipality, which are already performing public services for citizens. The municipality is responsible for more "soft" actions (sharing, repair, reuse, self-supply)

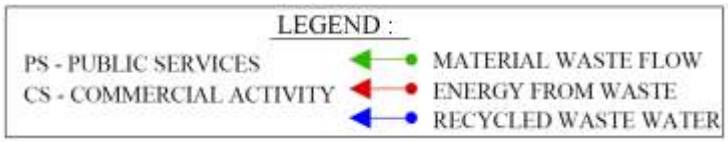
Main priority on the cooperation of enterprises that are mainly in the municipality within its cycle, with the aim of achieving the project objectives.

The person responsible for each project cycle also performs free market services, all aimed at improving public services for the public.

The organizational model of the project is as follows:

- Service pillars carry out waste, energy and water recovery services with selected pillars of their formation and selected recovery operations.
- The combination of waste treatment, excess energy and recycled water is particularly emphasized in order to achieve maximum technical, technological and economic benefits.
- Wcycle Institute is an extremely professional core of the project for R & D, the introduction of selected technologies and the use of an integrated IT tool for information and supervision.
- OPTcycle performs professional service and maintenance services for the needs of the project, the operation of its subsystems and improved efficiency.





- **The case of the Sentrupert Municipality**

  The municipality of Šentrupert consumes about 1,156,000 liters of heating oil per year. Of these, only the central Dob prison consumes from 700,000 to 900,000 liters of heating oil per year. This costs over € 1.1 million per year. In ten years: € 11 million.

  Strategic natural raw material is wood. They therefore designed the "Wood Processing Center", which will produce wood waste that will be the city's energy source.

  They created the Public Company Energetika Šentrupert, which built a boiler system with the production of wood waste. The company will thus take over the heating of prisons, the production of cogeneration electricity will be sold to the grid, additional heat will also be sold to investors who will build greenhouses for tomato cultivation (4 hectares).

Barriers and challenges related to PPPs

- **Integrated Solid Waste Management System of Western Macedonia**

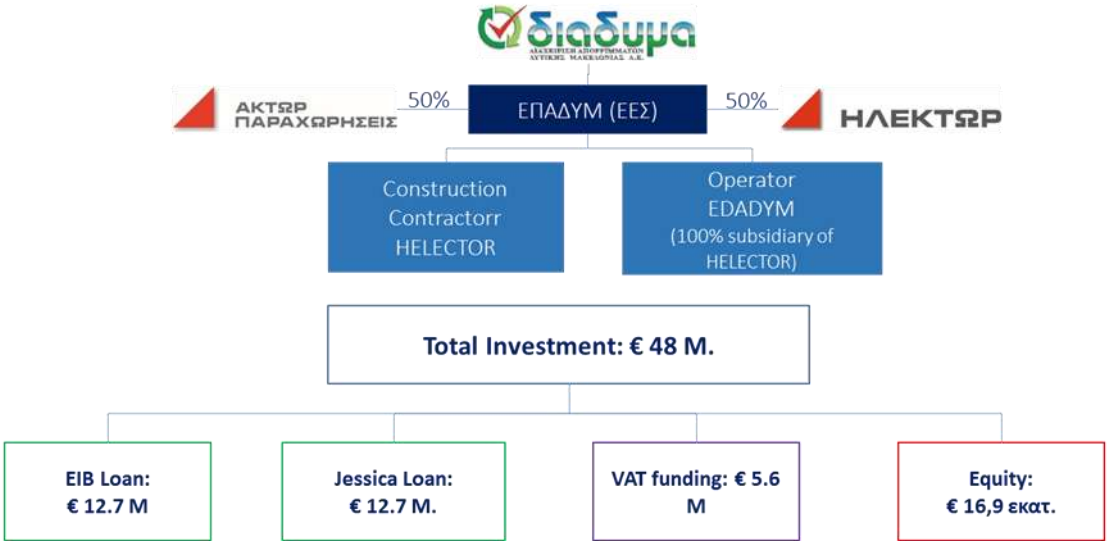
  Basic features:

  - It includes the construction and operation of 5 Central Installations (Solid Waste Treatment Plant, Sanitary Waste Factory, Wastewater Treatment Factory, Infrastructure Supervisor, Waste Transfer Station and the operation of 10 local MSAs.
  - Mixed waste and recyclable materials are shipped.
  - It serves the needs of 12 Municipalities and 300,000 inhabitants.
  - Each year receives 100,000 tonnes of household waste.

  The PPP experience:

  - The start of the PPP implementation investigation process started in 2006. The tender procedure for the public contract lasted from 2011 to 2013 in two phases.
  - The PPP contract was signed in 2014.

- The funding is € 250 million, of which € 116 million from the State and € 134 million € from the beneficiaries
- The exploitation time horizon is 25 years.
- The cost of the investment amounted to 48 million €



The results of the PPP:

- Reduction of the quantities of waste resulting in landfills
- Minimizing environmental impacts by processing the biodegradable fraction of waste
- Production of materials and energy that bring economic benefits
- The project has been a model for waste management across the country

4. Policy learning survey

In the context of this deliverable, participants in the 2nd Interregional Workshop were asked to complete a questionnaire on the perceptions and views they formulated as regards policy on the use of PPPs in the cyclical economy. The nine (9) questions posed were:

1. Please rate the following phases related to the establishment of a PPP in term of implementation difficulty.

Analysis of the current status	Identification of partners	Design of PPP	Initiation of PPP	Operation

2. Are there any other phases of a PPP project that you think are essential?

3. In your opinion, which are the most important benefits of industrial symbiosis?

4. To what extend do you believe that barriers against the establishment of PPPs are country specific?

Strongly disagree	Disagree	Neutral	Agree	Strongly agree

5. Do you think that PPP would better be initiated by the public sector, or both?		
public sector	private sector	both

6. Which of the following sentences matches your opinion regarding who is abler to manage a PPP?		
public sector	private sector	depends on the general environment of the country

7. Considering that barriers and constraints exist, how would ypu rate the severity of each in your country? (1-5 scale, with 1 being the most severe and 5 not important at all)			
Legal, regulatory	Economic	Institutional	Capacity (of the economy)

8. Do you think that governments have been reinforcing the stimulation of PPPs during the last decade?		
Yes	No	Not sure

9. Do you think that PPPs will be a tool that will attract the interest of the private and public sector in the future?

Altogether, fourteen (14) responses were collected for the above survey, the processing of which yielded the results analyzed below per question.

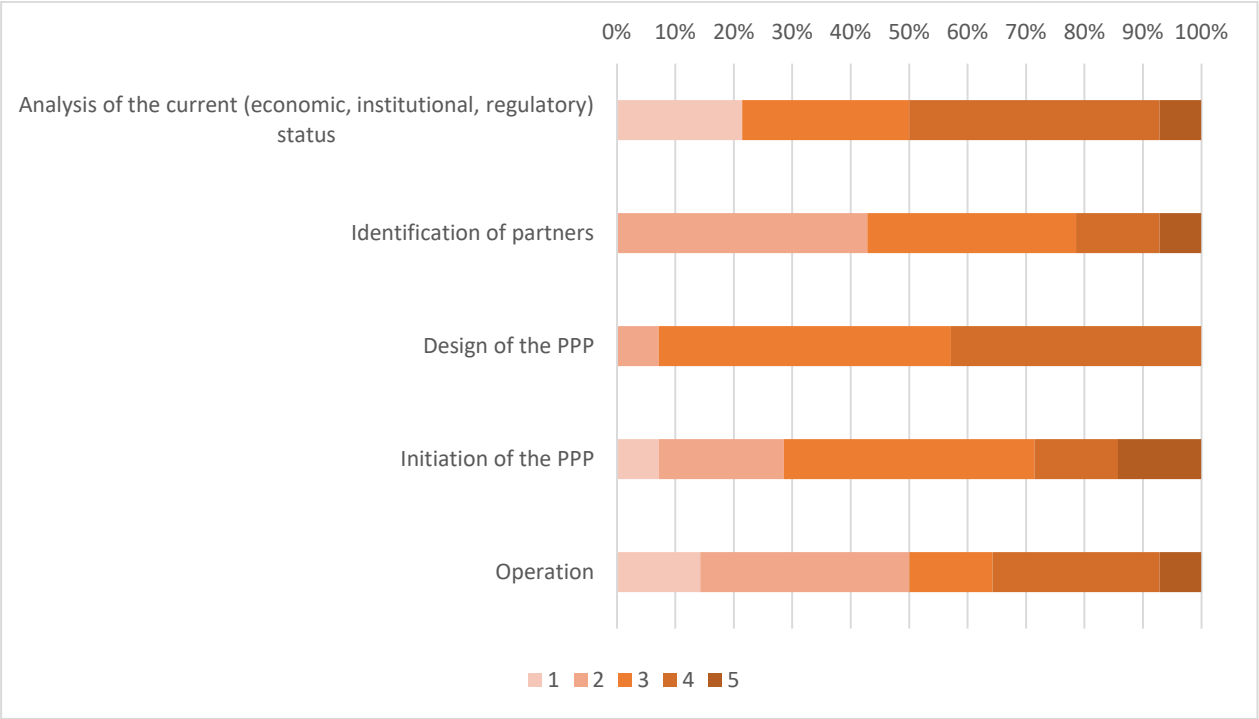
1. Please rate the following phases related to the establishment of a PPP in term of implementation difficulty. (1-5 scale, with 1 being the easiest and 5 the most difficult)

The analysis of the current situation (economic, institutional, regulatory) is considered by the respondents as the most difficult stage, bringing together 50% of the answers to the difficulty.

PPP design is the second most difficult phase according to the answers of 43%.

The operation of PPP is also seen by many respondents as a difficult phase at 36%.

On the other hand, the identification of the partners (43%) and the operation with 50% are considered as easier steps.



2. Are there any other phases of a PPP project that you think are essential?

There were six answers addressing the need to break-down PPs in more phases. Indicatively, the following phases have been reported as helpful:

- Identification of innovation subjects, especially at the local government level and of higher risk projects
- Financial managmenet
- Monitoring
- End of long-term contracts
- Long term phase, regarding the future direction of the PPPs for circular economy

3. In your opinion, which are the most important benefits of industrial symbiosis?

The most important benefits identified by the participants are (according to their frequency in the answers):

- Reduction of waste and their volume / management and recycling of waste
- Environmental benefits / resource savings
- Economic benefits / industry competitiveness / cost cuts
- Cooperation among companies and increase of awareness
- Higher energy efficiency
- Less volatility in raw material prices
- New jobs
- Clean technologies

4. To what extend do you believe that barriers against the establishment of PPPs are country specific?

All respondents believe that PPP barriers are country-specific rather than shared. In fact, 36% strongly agree with the above finding.

5. Do you think that PPP would better be initiated by the public sector, or both?

None of the respondents considers that a PPP can be initiated at the initiative of the private sector. Two out of three respondents consider it best to start with both, while one in three thinks it is best to launch a PPP initiative from the public sector.

6. Which of the following sentences matches your opinion regarding who is abler to manage a PPP?

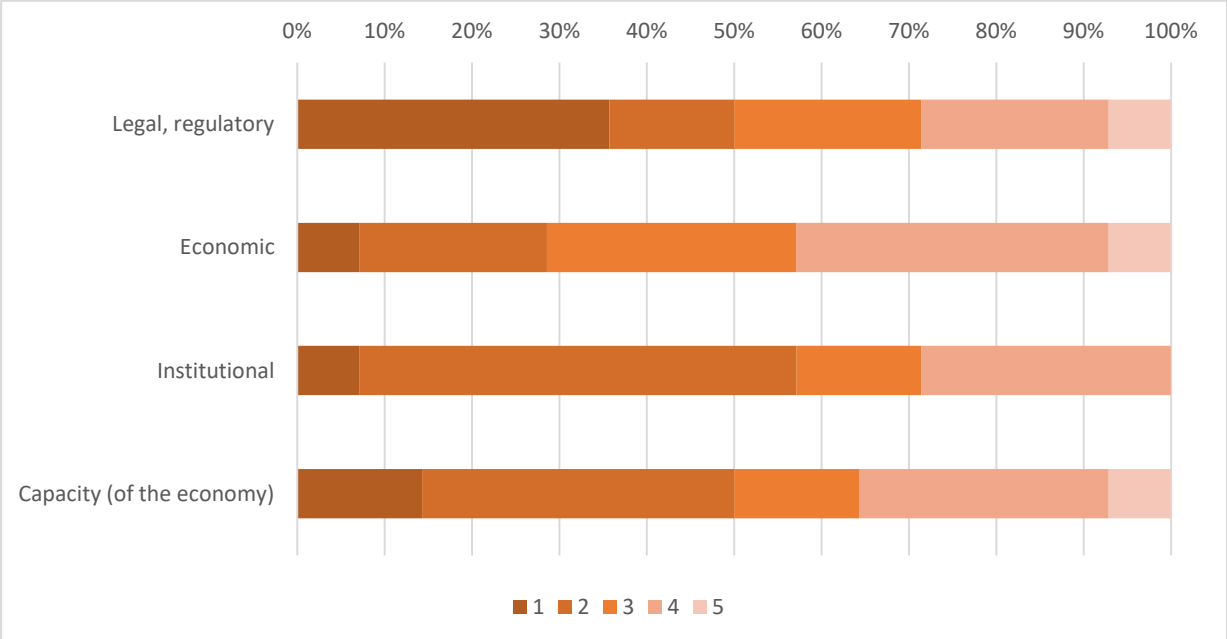
As far as the management of a PPP is concerned, 2/3 of the respondents consider that it depends on the environment of a country for who is best able to do so. Only 14% think the private sector is better, while 21% consider the public sector.

7. Considering that barriers and constraints exist, how would ypu rate the severity of each in your country?

Institutional barriers are rated by the respondents as the most serious, at 57%.

Accordingly, both the legal / regulatory and the economic capacity of the economy are seen as serious obstacles by 50% of the respondents.

Economic barriers appear to be of little importance, at least for 43% of respondents, and the ability of the economy is not a major barrier to 36%.



8. Do you think that governments have been reinforcing the stimulation of PPPs during the last decade?

The majority of respondents (71%) believe that governments have contributed to stimulating PPPs. In contrast, only 1 in 5 thinks this is not the case.

9. Do you think that PPPs will be a tool that will attract the interest of the private and public sector in the future?

All respondents look to the future increase in interest in the PPP tool both from the public and private sectors. The justification for this view can be found in the following axes:

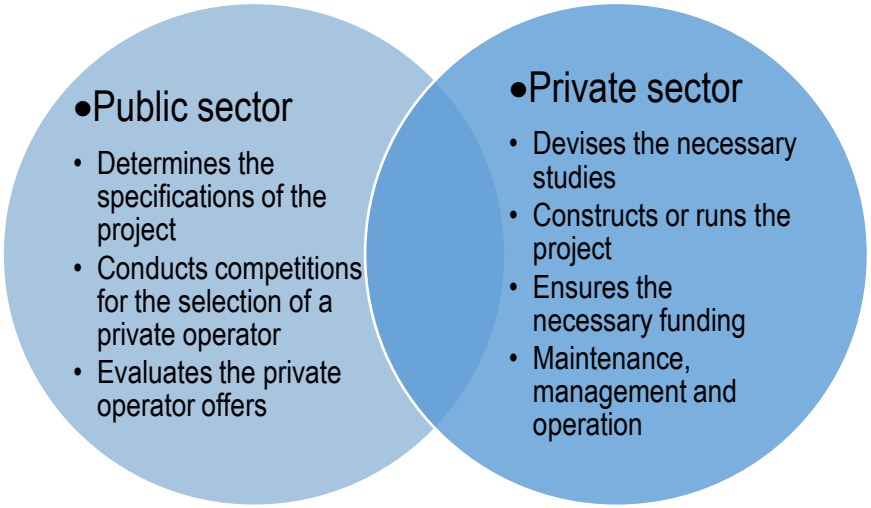
- As a tool for local communities
- Only for low-risk investments for private sector
- With the introduction of new forms of PPP investment projects
- Because the public sector will have less and less money and the private sector faces regulatory obstacles
- If the partnerships are balanced and promote the public interest
- By raising public awareness and reducing financial risks
- Due to co-operation and risk sharing
- Due to changes in EU funding mechanisms beyond 2020
- In response to the crisis and the movement of the economies.

5. PPP Policies and circular economy

Public-Private Partnerships (PPPs) are long-term contracts concluded between a public and a private actor for the purpose of performing or providing services. The benefits offered by PPPs in both areas are enlisted below:

- The know-how and the efficiency of the private sector are exploited while public sector maintains a strong supervisory role.
- Quality projects produces and at the same time high quality services which are provided to the citizens/users of these projects.
- It is an important tool to stimulate economic growth by leveraging private resources into development projects with a multiplier effect.
- The public actor retains ownership of its fixed assets and its strong regulatory and supervisory role, giving the opportunity to implement public works even in difficult economic circumstances.

The public and privates sector's roles are clearly defined:



5.1. Types of PPP contracts

Public-Private Partnerships cover a wide variety of legal, economic and operational relationships and co-relations between partners and given the size and the specifity of the projects they perform, they cannot have a single form and aspect.

In line with international practice, PPPs are distinguished into purely contractual partnerships and institutional type partnerships. The choice of the type of partnership to be followed depends to a large extent on the subject of the project, its peculiarities but also the economic potential as well as the relative experience of both the private and the public sector.

PPP of contractual type

This category of contract between the Public and the Private sector is based solely on conventional ties. This type of PPP covers various arrangements that delegate functions to the Private Body, such as the design, financing, the implementation and exploitation of the project or service. The private operator provides services to the public, always under the control of the public sector. The private body assumes all responsibility for the construction, operation and maintenance of the infrastructure by charging the user for the service.

PPP of institutionalized type

In this case there is co-operation between the public and the private sector in the context of creating another operator or the entry of the private sector in an existing body. This body is jointly controlled by the public partner to carry out a project or provide a service for the benefit of the public. The public uses this tactic to manage public services at local level (e.g. for water services, garbage collection, parking, etc.). It is understandable that in such forms of partnership public sector involvement in the business scheme is imperative for reasons of social acceptance and to maintain a relatively high level of work control.

The creation of a PPP of this type is done in two ways:

- By setting up a jointly controlled operator from the public and private sectors.
- By gaining control of an existing public business from the private sector.

Also, PPPs depending on the type and magnitude of the involvement of the private operator in this and the risks undertaken by the two parties, are divided into two main categories, fee-charging PPP's projects and non-fee charging making PPP's projects.

Fee-charging projects

As PPP fee-charging projects are considered those projects or services in which, apart from financing, planning, construction and maintenance, private operators also exploit them. From this exploitation, through the collection of user fees for the use of the project service, private operators pay off the initial funding and expect to make a reasonable profit. The amount of the fees, the conditions and the manner of their collection are precisely defined in the partnership agreement which is concluded between the Private operator and the Contracting Authority. In this case of PPP projects, private operators, in addition to the risks of financing and construction, undertake the risk of demand-whether people will make the intended use of the project or service- so as to be able to recover the revenues expected form the partnership. After the end of the contractual period, the project is transferred to the State. If the project is not fully contributory, the viability of the investment can also be supported by the public contribution either by a lump sum during the construction period or by partial payments during the function period.

Common fee-charging projects are transport, environmental, energy and tourism projects.

Non-fee charging projects

As non-fee charging PPPs projects are considered those projects or services in which there is no

operating element for private operators. They are social infrastructures or services which are being operated by the state and they are free for the public use. In these projects, the private actors undertaking the implementation and they are paid directly by the state, while they take on the risks associated with financing and construction, but not the risk of demand. Instead, they take the risk of availability - that is, the management and maintenance of the infrastructure or service - in order to make it available, thus maintaining its functionality at well-defined public quality levels for as long as the contract partnership. State payments in parts are called availability payments, since in order to be paid in full to the private actor, it must ensure the proper operation and maintenance of the infrastructure or the services he offers. Otherwise, if the level of service quality or infrastructure functionality is lower than that set out in the original agreement, these payments are reduced accordingly or even suspended until the private operator has complied with its obligations (and manages to achieve the minimum level of quality required by the cartel agreement). After the end of the contractual period, the project is transferred to the State.

Non-fee charging PPPs are usually social projects, such as schools, hospitals, public buildings, etc.

Methods of PPP implementation

Various methods of PPs contracts appear between public and individuals, the main ones are:

1. Design-Build /DB	This form takes place when the private body is responsible for both the design and construction of the project, which provides to the public.
2. Design-Build-Operate / DBO	They concern the design and construction of their infrastructures, their construction and their operation, the private body undertakes the design and construction of the asset with specifications laid down by the public authorities.
3. Design- Build- Guarantee- Operate /DBGO	The design and construction are done by the private sector, which is also responsible for the operation and maintenance of the fixed asset for a predetermined period of time, then returns it to the public.
4. Build- Own- Lease- Transfer / BOLT	The individual finances and manufactures the project and then leases it to the public.
5. Build- Transfer- Operate / BTO	The private sector plans, finances and constructs the project, after the completion of the project, it is transferred to the public and then rented by the private

	body.
6. Build-Operate-Transfer/ BOT or Build-Operate-Ownership-Transfer /BOOT	The individual constructs and operates the project for a predetermined time and then transfers to the public.
7. Build-Lease-Operate-Transfer /BLOT	The special purpose company undertakes the construction, hiring, management and transfer of facilities to the public operator.
8. Lease-Build-Operate /LBO	The private body undertakes by leasing a large state-owned company or facility and has the obligation to invest his own capital to develop it and improve its operation.
9. Operate-Maintain-Manage /OMM	The public entrusts a private body with the operation of the facilities, their maintenance and preservation, but ownership belongs to the public sector.
10. Modernize-Own-Operate /MOO	The special purpose company undertakes the modernization and renovation of the facilities, manages them and owns them.
11. Modernize-Operate /MO	The special purpose company undertakes the modernization and renovation of the facilities, managed and owned by the public.
12. Private Finance Initiative /PFI	A programme implemented by the Government aiming at attracting private funds to public infrastructure and services. This program mainly focuses on the DBFO model.
13. Design- Build- Finance-Operate / DBFO	The private operator undertakes the study, construction of facilities, financing and the operation of new public infrastructures or investment plans. The state buys from the individual the services that flow from the project.
14. Design- Build- Finance- Operate-Maintain / DBFOM	The special purpose company undertakes the study and design, construction of facilities, financing, operation and maintenance of the facilities.
15. Privatization	The transfer of property or services from the State to the

	private sector.
16. Disinvestment	In this case, the public transfers to the private sector the full responsibility for the operation, maintenance and investment, the ownership of the asset, which it then leases to cover its needs.
17. Buy- Build- Operate / BBO	In the context of attracting venture capital, the public sells existing utilities to private individuals in order to make additional investments in them.

5.2. PPPs and local government

For the execution of projects and the provision of services, the Municipalities and Communities may conclude contracts with private sector legal entities. IN Greece this happens in accordance with the terms and procedure of Law 3389/2005 (Government Gazette 232 A) for:

- Securing funding
- Construction, refurbishment, management, maintenance of infrastructure
- Providing a service bases of a long-term contract

Municipality's investment plans implemented through PPPs are divided into specific categories, these being:

1. development projects
1. enviromental projects
1. projects related to the quality of life and the smooth running of cities
1. employment projects
1. social protection and solidarity projects
1. education, culture and sports projects
1. civil protection projects

Municipalities are constantly trying to improve their infrastructure and their development profile by promoting and carrying out various projects. However, the constraints on public finances, especially in times of economic crisis, call for the need to find alternative ways of financing these projects. Alternative ways refer to the different types of partnerships where the contribution of the private sector is assessed as important as it provides the necessary funds to ensure the progress of the public investment programme.

Some of the advantages offered by PPPs in Local Government and the problems in their implementation are the following:

Advantages	Barriers
□ Improving risk sharing (between the Public and Private sectors) □ Reduction of construction and operation costs (selecting a beneficial offer) □ Improved service levels or preservation of existing ones □ Improving cost / value □ Keeping schedules and accelerating at the time of completion of the investment □ Using new technologies □ Improving the quality of projects □ Increase in government funds and hence the possibility of financing new investment programs	□ A complex legislative framework □ High cost of creating a partnership □ Constitutional issues, particularly with regard to concession limits □ Execution by government and local authorities, State guarantees, Dispute Settlement Scheme □ Clarification of the competences of the public sector bodies involved □ Time and security of maturing processes □ Financial, tax and accounting issues

5.3. PPPs risk management

At any stage of the partnership contract there may be a legal, technical or economic risk to overturn the expected results of the agreement. A more adequate presentation of risks is made by listing them in line with the different stages of the partnership process.

All projects participating in a PPP need to carry out a risk analysis. Typically, there are three groups involved in the above process: the Public Sector, the Private Sector selected and its financiers. While the methodology used to identify and assess risks may be common, each sector has rather different objectives.

- **The private operator**: need to judge whether he will be able to manage the risks that the Public Sector decides to pass on.
- **The public body**: need to comply with some risk transfer directives, which are formally drawn up as a PPP policy maker.
- **Banks and other donors**: seek to repay the principal and pay their interest in a shorter timeframe.

In order to determine the optimal risk distribution, it is imperative to measure the ability and willingness to manage any risk from the public sector as compared to that of the private operator. The risks that the private operator undertakes are more manageable are transferred to it, and the risks managed by the public entity more efficiently remain in the public sector. Where possible, the operator responsible for each risk will seek to eliminate or mitigate it. If the risk is difficult to assess or manage, then it is advisable to share it between the two operators.

In particular, the table below presents the risks that each body is faced with.

Private operator	Public operator
The timetable The status of the land The permissions Exceeding costs The fit of the construction / study for the prescribed result Regular maintenance of the project Equipment replacement program Employee / Retirement Costs Changes in legislation Health and safety	Payment of construction costs in case of termination by the contractor at the expense of the State Payment of the contractor's surplus cost in case of change of legislation There is a cash facility available, which will be specifically used by the contractor Tolerance of contractor's time delays in the event of a justified delay

Finally, the stages of risk management in PPPs are:

1.Identifying the risks, assessing them and identifying the candidates who can take them

1.Understanding the factors that impact on the distribution of risks and defining the legal framework by which the allocation can be made

1.Analyzing the operators that can accept the risks and comparing this practice with other projects in Greece or abroad

5.4. Forms of PPPs funding

There are three key PPP financing models, they are:

Public funding

- In this case, the state finances the construction of the infrastructure needed by the country for the development of the national economy. Grants come from the Public Investment Programme and funds from various European Union funds such as the ERDF and the Cohesion Fund. Negative in this type of funding is that many countries, due to their political and economic situation, can not secure European funding. So the financing of large projects from the state budget raises the public debt, generating deficits.

Corporate funding

- With this method the company takes on itself the risk of total investment as it raises capital with share capital increase or borrowed by the banks. For this reason, corporate funding is used for relatively small projects with better controlled risks. Finally, companies generally avoid this way of financing because they have a great risk.

Project funding

- This is the most widespread and widely accepted method of PPP financing, this method is based on a combination of private and public funds to finance large scale projects. This method creates a Special Purpose Company, in which the shareholders participate and which has a certain lifetime. Repayment of the funding is made with the revenues from the activity to be developed.

Below are the sources of funding that may be available from the Public sector.

Public Investments Program

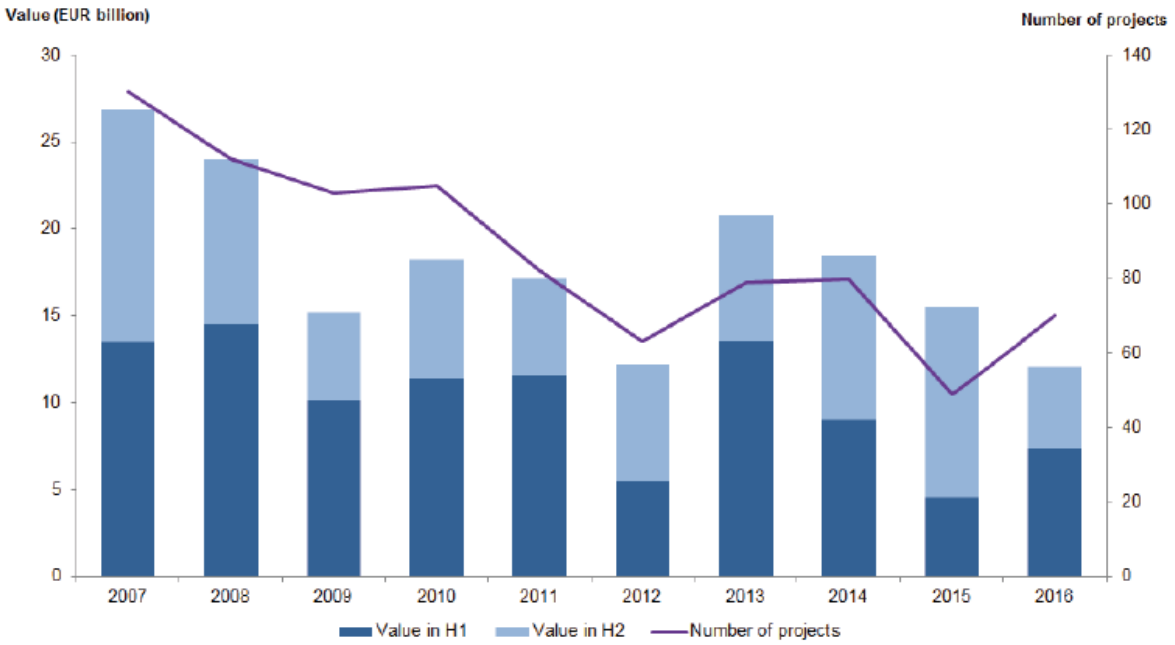
- Especially in public infrastrusture cases

Public Investments Program

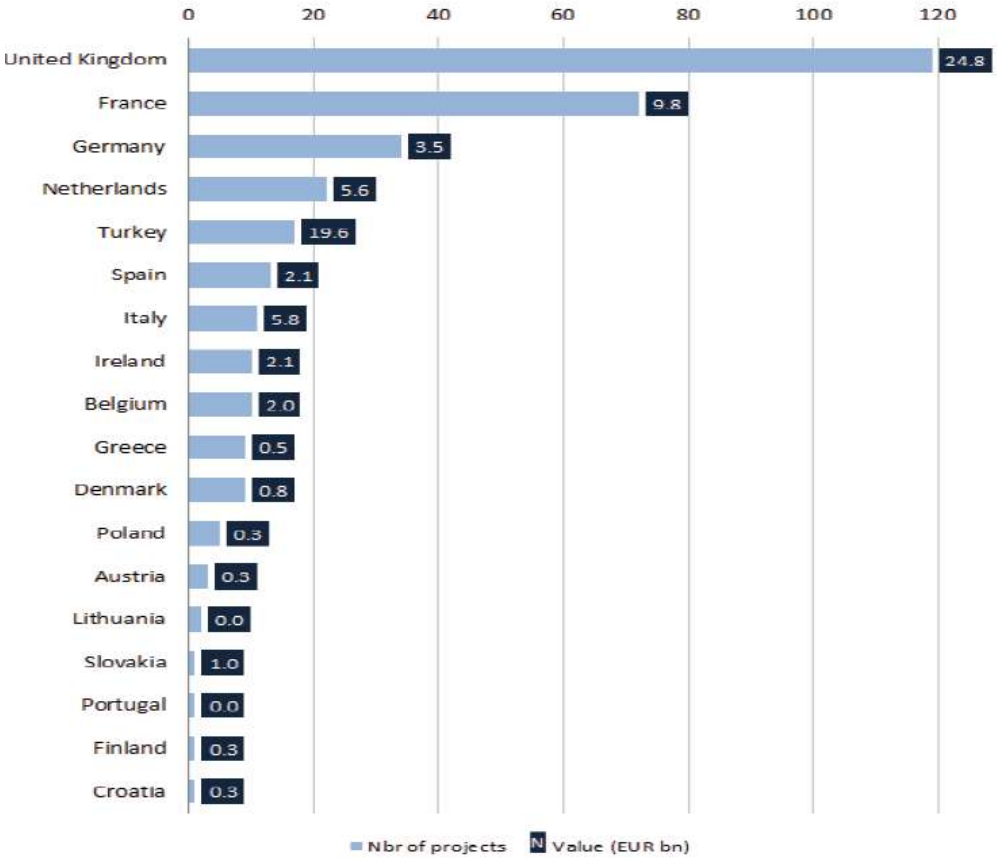
- Especially in public infrastrusture cases

5.5. PPP market in Europe

According to the annual market survey for 2016 by the European Investment Bank, 69 PPPs were signed for projects worth a total of € 12 billion. This represents a market growth of 45% compared to 2015 in terms of contracts and 22% in terms of value. Transport projects have had the highest participation in value, while in the number of projects in the field of education. The following diagram shows the PPP market in the EU from 2007 to 2016.

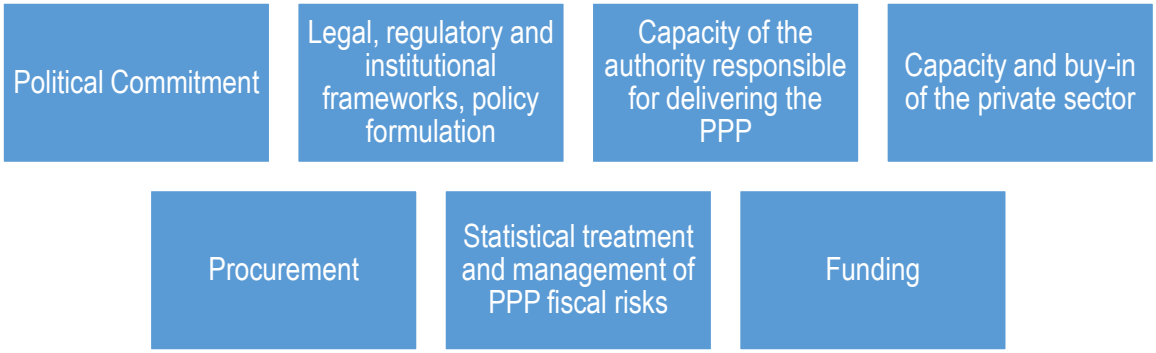


England remains the largest PPP market in both contract and project value. Greece is ranked 10th despite its small size. The following chart shows the PPP market by country for 2012-2016.



5.6. Barriers for PPP investments in Europe

The European Investment Bank, through the European PPP Expertise Center, has identified the main barriers to PPP investment presented at European level as well as proposals to overcome them. Briefly, obstacles are classified into seven (7) fields as follows:



The most important conclusions per barrier are:

1. Political Commitment
   - Governments tend to underestimate the political commitments and resources required to put in place and implement successful PPP programmes and projects.
   - This political commitment needs to be strong and stable if both the public and private sector partners are to be expected to devote significant resources to preparing, investing in and implementing projects.
   - As long-term contractual commitments, they often do not sit comfortably within the existing administrative framework of government.
   - Often require new and separate structures for their management and implementation.
2. Legal, regulatory and institutional frameworks, policy formulation
   - Require an effective legal framework, in particular to regulate the ability to use PPP schemes, the procurement process and key contractual provisions. Although a PPP law is sometimes considered a necessary prerequisite, especially in countries with civil code systems, PPP laws are sometimes insufficiently informed by experience from existing PPP markets and can inadvertently put inappropriate/excessive restrictions on PPP activity.
   - Clearly defined powers and processes in the public sector are a prerequisite for the appropriate selection and subsequent effective management of the various phases of PPP project development. There are many cases of immature/inadequate projects progressing to the tender phase or contract signature without an effective oversight of the team responsible for delivering the PPP, including appropriate public spending control (e.g. no involvement of the Ministry of Finance at key stages of the project development).
   - PPPs are sometimes seen as a proxy for the privatization or outsourcing of public services. As a result, PPPs can be associated with a wider debate around issues such as the private sector generating unreasonable profits from the provision of public services. Although most PPPs are successful in delivering high quality facilities on time and within budget and in providing improved services, the successes achieved are often weakly demonstrated (usually because of the absence of collected evidence) such that even in mature PPP markets, an understanding and acceptance of PPPs can be lacking.
3. Capacity of the authority responsible for delivering the PPP
   - Public authorities are often not equipped or unaware of the required skills and resources needed to meet the challenges of preparatory analysis ahead of procurement launch (e.g. Value for Money analysis, risk analysis, bankability analysis).
   - In the absence of a programme of investment, many will procure one or two PPP projects only, which makes the sunk costs of building internal capacity significant.

- Some reluctance to use advisers, with budgetary constraints preventing the recourse to appropriate advisers or a poor ability to manage advisers where these are mandated (e.g. over-reliance on advice).
- There are many cases of project proposals for which the "PPP business case" prepared by the authority in charge fails to address key issues satisfactorily:
  - poor analysis of affordability for the public sector over the long term;
  - the PPP option being selected too early on a weak analytical basis; using a PPP scheme where it is not suitable, for example on projects with high technological content, significant obsolescence risks or uncertain service requirements through time.
  - shortcomings in the risk analysis, which overestimates the ability of the private sector to take on risks in an efficient manner (e.g. latent defects of an existing infrastructure to be refurbished by the private partner);
  - no sounding of the market during project preparation to assess the feasibility and the terms upon which unusual risks may be allocated to the private sector;

4. Capacity and buy-in of the private sector
   - The size of the project can be a challenge for PPPs. PPP projects usually need to be of a certain minimum size to justify the transaction costs that are involved and attract the interest of bidders and associated financing. On the other hand, projects that are too large can also face constraints in the contracting (or financing) pool available.
   - Domestic market where the technical or financial capacity of contractors, service providers, investors, lenders and advisers to deliver PPPs is not well developed.
   - Poor availability of domestic financiers or contractors to support PPP projects with long-term project finance or equity.
5. Procurement
   - PPP procurement sometimes has not been effective in capturing the benefits of competition and private sector innovation. This is particularly the case where overly prescriptive tender process requirements have been set and inappropriate procurement procedures have been used.
   - Competitive dialogue and the "competitive procedure with negotiations" have both shown their potential to deliver value when properly designed and managed.
6. Statistical treatment and management of PPP fiscal risks
   - PPPs create an "affordability illusion" (due to the deferral and spreading of public sector payments through time), which is exacerbated when a project is found to be off-balance sheet. When a project is off-balance sheet, there is a risk that the fiscal liabilities that arise from it are

not managed properly.

7. Funding and financing

- All PPP projects have to be paid for at some point, regardless of how they are financed.
- "Funding", means the sources of cash that ultimately bear the cost of projects. These sources broadly form two groups: tax-payers (whose taxes enable governments, for example, to make capital contributions or availability payments to PPP projects) or users (who may for example pay a toll to use a highway).
- "Financing", is money that must be paid back (e.g. loans or equity). Finance is used to bridge the gap between project inception, when funding may not be sufficient, and later when resources are eventually available to pay for the project.
- A financing instrument, however sophisticated, will not address a funding issue.

Particular mention should also be made of the European Commission's recommendations on tackling investment barriers in Member States. The Communication of 18 May 2016 on the European Semester provides an overview of the main objectives of the recommendations for each Member State:

- If available, Member States should use their fiscal space to increase public investment in growth-friendly areas such as infrastructure, health, education and research.
- At the same time, further steps are needed to promote private investment and encourage Member States to accelerate the adoption of structural reforms and tackle investment barriers such as regulatory and administrative barriers as well as time-consuming approval procedures. In some Member States, remaining shortcomings in the areas of public procurement, tax systems, judicial systems and insolvency frameworks have been identified.
- Progress in dealing with trade also means identifying a consistent set of projects and ensuring coordination and planning at all levels of government.

5.7. European Strategic Investments Fund

The European Commission and the European Investment Bank proposed the Investment Plan for Europe in November 2014, as an initiative to fight economic weakness lingering from the 2008 financial crisis. The aim: to relaunch investment and restore EU competitiveness, thus increasing growth and creating jobs.

With EFSI support, the EIB Group provides financing for economically and technically viable projects, includingprojects with a higher risk profile than ordinary EIB activities. Emphasis is put on the following key sectors: (i) transport, energy and the digital economy; (ii) environment and resource efficiency; (iii)

human capital, culture and health; (iv) research, development and innovation; (v) support to SMEs and Mid-Caps.

The EFSI may finance Investment Platforms, to channel a financial contribution to a number of investment projects with a thematic or geographic focus, as well as operations with National Promotional Banks (NPBs).

The EFSI pillar finances a greater number of operations with a higher risk than the EIB previously did, attracting private investment and targeting market failures. The investments are intended to trigger EUR 315 billion in investment in three years, in strategic projects throughout Europe in order to secure that the funds will reach the real economy.

The European Commission and the EIB Group officially kicked off this part of the Investment Plan for Europe in summer 2015. After one year, the combination of a EUR 16 billion guarantee from the EU budget and EUR 5 billion of EIB resources has sparked investment with the potential to trigger the first EUR 100 billion of its target.

The EFSI consists of two sectors supporting a wide range of eligible projects:

- The infrastructure and innovation window, developed through EIB and
- The SMEs window, implemented by the EIF. The financial instruments used for the SMES window objectives are mostly guarantees and equities.

Already there are 289 approved transactions under this pillar of the Investment Plan in 26 EU countries.. So far these transactions have hit every one of the target sectors:

- 23% of the investment mobilised in the energy sector
- 25% in RDI
- 12% in digital.
- 26% account for Smaller businesses as a result of EFSI support

5.8. Investment plan for Europe and circular economy

Promoting a circular economy is high on the EU agenda because of its potential to boost competiveneness, generate jobs and foster sustainable economic growth. The circular economy will create business opportunities that will attract private funding.

The European Commission has adopted an ambitious new Circular Economy Package to help European businesses and consumers to make the transition to a stronger and more circular economy where resources are used in a more sustainable way. The proposed actions will contribute to "closing the loop" of product lifecycles through greater recycling and re-use, and bring benefits for both the environment and the economy. This transition will be supported financially by:

- the European Structural & Investment Funds (ESIF),

- €5.5 billion for waste management
- €650 million under Horizon 2020 (the EU funding programme for research and innovation)
- investments in the circular economy at national level.

The Investment Plan for Europe could also play an important role in this framework.The European Investment Bank (EIB) and the Commission have worked with stakeholders to explore the possibilities of the European Fund for Strategic Investments (EFSI) to finance related investments.

EFSI and other tools such as the European Investment Advisory Hub and the European Investment Project Portal can in particular help small-scale circular economy projects and support innovative projects that lack funding. The Commission is currently assessing the possibility of launching a Platform together with the EIB and National Promotional Banks to further support the financing of the circular economy. The EIB is a major partner for circular economy investments in the EU, and has during the last 10 years co-financed projects worth EUR 15 billion.

The Commission, together with the EIB, is currently reviewing how best to promote innovative projects in the water sector in the context of EFSI. The Commission is also examining how to use the Investment Plan to tackle the financing gap for innovative projects emerging from LIFE funding (the EU's financial instrument supporting environmental, nature conservation and climate action projects throughout the EU).

On Europe's maritime economy, and in particular the blue economy, low levels of investment currently constrain the development of its full potential, particularly in the sector of marine renewables, where high risks and longer-term paybacks often limit investors' appetite. The Commission is currently working with stakeholders to explore the possibility of setting up Investment Platforms with National Promotional Banks in this field.

Until now, the 9% of the EIB's approvals for the ESIF contains elements of environment and resource efficiency. Specifically, the funding reached 1,26 EUR bil. which is expected to trigger additional funds for total investments of 3,78 EUR bil.

5.9. Energy Savings Performance Contracts as a tool for industrial symbiosis

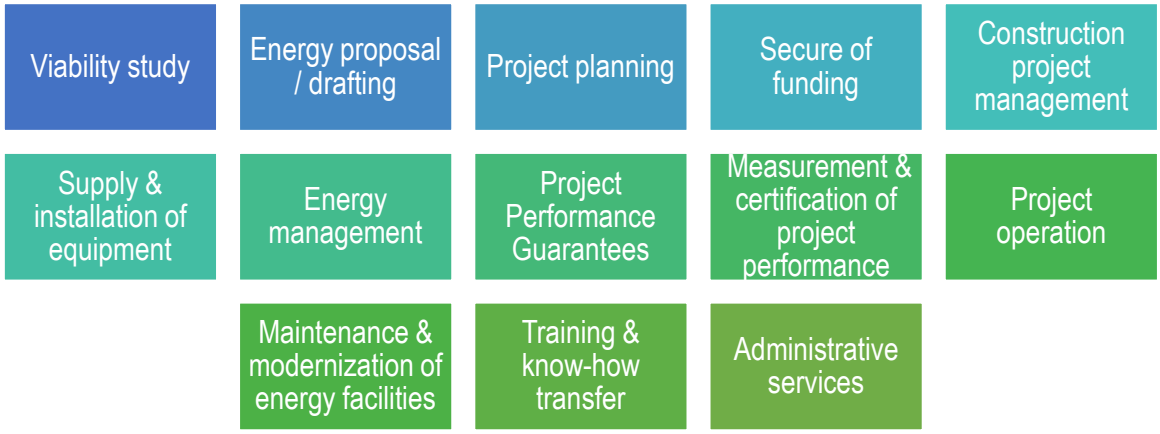
Energy Savings Performance Contracts (ESPCs) could, from a certain point of view, be part of industrial symbiosis. ESPCs are increasingly being used internationally as an effective market mechanism for implementing policies and energy saving and environmental protection actions.

With this mechanism, it is possible to provide integrated services. A company, the Energy Services Company (ESCO), assumes certain performance risks (depending on the type of ESPC) and is remunerated by the customer's financial benefit from the energy savings project he plans, finances, implements and monitors for account. Typically, projects implemented within a ESPC include:

- Installation, replacement, adjustment of energy equipment operating conditions.
- Installation of energy-efficient power systems and RES systems.

- Partial or total energy upgrade of building shell
- Installation of energy-efficient lighting systems, outdoor and indoor.
- Installation and operation of an integrated energy management system.

In its full form, EVS provides a wide range of services to the contracting entity / client covering the following:



Essentially the ESPCs utilizes the institution of Third-Party Financing for the needs of the energy saving project and / or the improvement of energy efficiency. The advantages of this form of funding are:

- No capital is required on the part of the contracting entity / client, since the investment is funded by the contractor.
- The contracting entity / client may make use of its available funds in other activities or to extend its turnover.
- Improving the financial profile of the entity / client.
- The risk of investing is shifted and undertaken by the contractor, who has specific know-how and experience across the range of services he offers.
- Technological upgrades of existing installations and modern energy equipment are ensured.
- Improving the competitiveness of the entity / client.
- At the end of the contract, the equipment is assigned to the contracting entity / customer.
- Guarantee of the energy saving rate as well as the availability of the cogeneration or electric / thermal power plant.

ESCOs' main focus is on the private sector and especially on industry and commercial buildings due to their flexibility and adaptability. In the public sector and local government, due to barriers to the legal and regulatory framework of public accounts and public procurement procedures, the spread of ESCOs is limited.

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