

CHAPTER 7

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GREEN PUBLIC-PRIVATE PARTNERSHIPS: GLOBAL AND EUROPEAN CONTEXT AND BEST PRACTICES

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Abstract: *In recent decades the imperatives of international business have been related to enrichment of society and achievement of economic growth while protecting the environment and preserving natural resources for future generations. The “greening” of the economy calls for the implementation of Public-Private Partnerships (PPPs) that support green and resilient infrastructure and better living conditions. While requiring goods such as wood or furniture, for example, is a natural goal by itself, an efficient heating system provided from cogeneration of electricity for a whole village can help reduce carbon emissions and energy consumption and lead to lower total life cycle costs for the contractor. Green PPP projects can provide not only profitable investments through lower operating costs, but also health and social benefits. The purpose of this chapter is to explore the context and best practices of the green PPPs as innovative investment solutions. Through a review of their role in the global sustainable development agenda and a survey of several case studies, the authors identify them as an instrument for sustainable development with an accent to their new dimensions. Attention is also paid to their implementation in the EU.*

Keywords: *Green PPPs, Green funds, Green platforms, Sustainable development, Innovative solutions*

INTRODUCTION

Public-Private Partnership (PPP) has become a popular concept for green growth projects. It is recognized that the commitment to PPPs varies

from country to country, and that experience has shown that the transition to green economy tends to be rather slow from the usual adversarial relation between the public and private sectors, to the desired partnership in search of the common good and the best forms of attaining this (WBCSD, 2004). According to the OECD and WBCSD, the challenge for business is to move towards clear performance indicators for sustainable development, and to align them with the broader needs of society.

In its varieties, PPP is perceived as a long-term agreement between a government entity and a private party in the fulfillment of initiatives on a national and international level that solve socio-economic problems, provide public assets or services, and promote sustainable development of the economies and civil societies (WB, 2017, p. 5). In a broader sense, PPPs cover the full range of cooperation between the public and private sectors. Any relationship involving a combination of private and non-governmental or public sector activities is defined as a "partnership". American authors, such as Lindner (1999), define PPP as "a form of cooperation between the state and private business" (p.35). In the United States, for example, in addition to building transport facilities and toll roads, private prisons and detention facilities, PPPs also prioritize education policy, social work, health and medical services, as well as great number of other public activities (from education to urban renewal and environmental policy). This broader framework includes partnerships at "policy level" and at "project level", especially with regard to initiatives related to environmental protection and the achievement of economic growth through sustainable development to meet the goals of the green economy. The policy-level partnerships combine the efforts of the public and private sectors in project decision-making and policy formulation. In the field of energy, for example, policy-level partnerships assess the benefits of different types of energy sources, including renewables, basic operating rules, investment instruments and dispute resolution. In contrast, the partnerships at project level focus on specific sites, such as the construction of new electric power stations to attract private capital and ensure stable project management. In some countries, partnerships at policy, program and project level often go hand in hand, in others - this is not always the case (UN, 2016, pp. 3-8).

The range of organizational and managerial structures, methods of financing and technological innovations in PPPs is extremely rich. Given the diversity of public/private relations, it is interesting to know the unifying elements in this interaction. The most important of them are the following:

- **Participants.** A PPP involves two (or more) parties and at least one of them must be a state or municipal authority or a public body. Each of them

must be able to play the role of a principal or a grantor, i.e., be able to negotiate and conclude contracts on their own behalf. All parties must be organizationally committed to the partnership.

- Relationships. The partnership is usually long-lasting and binding. The project is awarded through a competitive tendering process. Governments and municipalities can buy goods and services, but also provide grant schemes, impose fines and taxes.

- Contribution. Each participant must contribute something valuable to the partnership. PPP requires good skills, knowledge and resources, whether provided by the public or the private sector, as well as good value for money in the provision of public services. To achieve such a goal, each partner must invest certain resources (money, property, power, reputation) in the project.

- Responsibility. PPP means sharing responsibility and risk for the consequences (financial, economic, environmental, or social) of working together. This mutual responsibility contrasts with the relationship between the public and private sectors, in which the public authority retains control over policy decisions after receiving information from private companies. It also contrasts with the relationship between the public and private sectors, which is contractual in nature and largely means a relationship of control. In these cases, private companies are not partners in the true sense. In PPPs there must be mutual interest and shared responsibility.

- Legal framework. The basis of the partnership is the framework agreement, which establishes the "rules of the game" and gives the partners some security. Its existence enables parties to make decisions without starting over each time, and to develop rules in accordance with the basic principles governing these interactions. Although the PPP contract builds the conceptual framework, it is inevitably "incomplete", does not specify all components and does not take into account all the consequences. The partnership agreement implies sharing values, a common understanding of policy priorities and objectives, as well as more trust.

- Risk allocation. The assumption of the risk of ownership and operation of the site by the state usually leads to significant, often neglected, costs. Transferring some of the risk to a private company that can manage it at a lower cost significantly reduces the overall cost to the government or municipality.

The range of organizational and managerial structures, methods of financing and technological innovations in PPPs is extremely rich. While PPPs differ in name, scope, and approach, they share the following core characteristics: a mandate focusing mainly on mobilizing private investment using interventions to mitigate risks and enable transactions,

innovative transaction structures and market expertise, independent authority, a focus on cost effectiveness and public–private win-win (Hongo, 2016). Green PPPs are a promising alternative that may offer both practical and conceptual solutions to ensure productive interaction of public and private organizations.

The purpose of this chapter is to analyze the implementation of green PPPs on the global arena and to discuss their role as a tool of sustainable development. To reach this objective several goals have been set: to reveal the conceptual framework of the green PPPs, to trace their rationale in the global and European context and to discuss their distinctive characteristics. Some best practices in the implementation of the green public-private initiatives have been used to illustrate the diversity of these innovative mechanisms.

The methodology of the paper is based on desk research and case studies. A literature review on the green PPPs and their role in the sustainable development agenda has been carried out. The data are taken from government documents, guidelines of UNIDO and the World Bank, documents of UN, UNECE, UNDP, EC, etc., research studies, scientific journals and other secondary sources to generate a comprehensive idea of these challenging type of cooperation.

GREEN PUBLIC-PRIVATE INITIATIVES: PURPOSE AND CONTEXT

The idea of investing of private capital in building infrastructure is not new. PPPs have long history with rich traditions. One of the first countries which implements the idea of greening government and green PPPs is the UK with the publishing in 2002 of a Guidance note on how to include environmental considerations within PPPs and PFI projects. The guidelines show that greening and private finance are not mutually exclusive. On the contrary they both look at the service to be provided and the whole life costs of doing so – being green is about eliminating wastefulness. The focus is put on value for money and not the lowest cost (Green PPPs, 2002, p.4). Greening does not just stop with the award of the contract – the organization needs to work with suppliers to ensure improved environmental performance throughout the whole life of the project.

In the last few years, UNIDO coined the concept “green industry” and promoted the green industry concept to place sustainable industrial development in the context of new global sustainable development challenges. Green industry means economies striving for a more sustainable pathway of growth, by undertaking green public investments

and implementing public policy initiatives that encourage environmentally responsible private investments (UNIDO, 2016). Green industry is a growing and diverse sector that covers all types of services and technologies aimed at contributing to reducing negative environmental impacts or addressing the consequences of various forms of pollution. This includes material recovery, recycling companies, waste management and treatment companies, as well as companies that transport waste. Further examples include engineering companies that specialize in wastewater treatment, air pollution control and waste treatment equipment. The sector also encompasses environmental and energy consultants, in addition to the providers of integrated solutions, for example, energy service companies (esCOs) that offer design, implementation of energy saving projects, energy conservation, energy infrastructure outsourcing, power generation, energy supply, and risk management. A central segment of the sector is monitoring, measuring and analysis providers. Green industries also include companies that manufacture and install renewable energy equipment and companies that develop and produce clean technologies (UNIDO, 2016, p.14).

The constant concern about the environment and the measures undertaken by the governments, create a new trend, namely the “green” economy, which changes more and more aspects of economic life and international business. (Boeva, Vassileva, Pavlova, Stoychev & Zhivkova, 2015, p.6). Green PPPs are inevitably connected with the concept of sustainable development, whose most widely recognized definition is given by the Norwegian Prime Minister Gro Harlem Brundtland in the Report of the World Commission on Environment and Development: Our Common Future released in 1987. That is, development that “meets the needs of the present without compromising the ability of future generations to meet their own needs” (UN, 1987). Basically, PPPs for sustainable development have been in operation for several decades. On one hand they are a result of the changing nature of public policy making. This is captured by the so-called shift from “government” to “governance”, signaling that governments are no longer the only providers of public policy but increasingly engage private actors (Marx, 2019, p.1-2).

The United Nations are actively encouraging governments to use PPPs in infrastructure for sustainable development and poverty alleviation, mindful of the limited resources available to governments to meet the huge development challenges of the era. The Monterrey Declaration, adopted at the International Conference on Financing for Development in 2002, recognizes PPPs as an important instrument in creating an environment favorable to the normal functioning of business and the attraction of

investment, an essential element in generating employment and creating wealth. Not least because of this advocacy, a great number of governments are taking on board this concept and are formulating legislation and policy to mobilize resources outside the public sector (Ryan, 2004, p.7-8).

It is difficult to distinguish green PPPs from PPPs for sustainable development. The following quote from the Brundtland Report (UN, 1987) is quite convincing. “The concept of sustainable development does imply limits - not absolute limits but limitations imposed by the present state of technology and social organization on environmental resources and by the ability of the biosphere to absorb the effects of human activities. Technology and social organization can be both managed and improved to make way for a new era of economic growth” (p. 160). It can be reasonably argued that green PPPs are PPPs for sustainable development in their essence because they also pursue economic growth, social benefits, and environmental protection. Some banks have established methodologies for evaluating green projects and thus approve green PPP financing (UN, 2016). They use tools and frameworks to prioritize projects while taking into consideration social and environmental factors (e.g. Social Cost Benefit Analysis versus Economic Internal Rate of Return). These tools could, however, be costly, time consuming and unfeasible for government authorities with limited capacity.

Here are some distinctive features that make a PPP for sustainable development different from the traditional PPP:

- Type of partnership. Although some partnerships are set up to shape policy, determine priorities and coordinate the efforts of organizations from different sectors (i. e. renewable energy strategies, healthcare issues, education goals), they have to integrate sustainability concerns. The green initiative promotes sustainable patterns of production and consumption i.e. patterns that are resource and energy efficient, low-carbon and low waste, non-polluting and safe, and which produce products that are responsibly managed throughout their lifecycle. “The Green Industry agenda covers the greening of industries, under which all industries continuously improve their resource productivity and environmental performance. It also aims to create green industries, that deliver environmental goods and services in an industrial manner, including, for example, waste management and recycling services, renewable energy technologies, and environmental analytical and advisory services” (UNIDO, 2011).

There are significant differences between partnerships, which are economic in nature and whose final goal is profit, and those related to social, education and other policies, basically due to the need to provide funding (Vassileva, 2022b, p.5). Government interventions include

adoption of standards, labelling systems, procurement policy, regulatory innovation, platforms, as well as technical and financial support to business. Partnerships among governments, private sector and civil society very often explore new regulatory models and co-ordinate different economic activities. Since the PPPs unite the efforts of different actors the key issue is how the partnership is managed and who takes the lead so that that potential conflicts of interests can be put up. Scholars argue if the state or the private company is more trustworthy in the role of the “rule taker”. Many examples exist in both directions. Obviously, the performance led by trust, constant exchange of information and flexibility as basic principles of collaboration leads to success in sustainability (Marx, 2019, pp.5-6).

- Type of services. Emphasis is placed on services traditionally provided by the government and transferred to the private sector in the field of economic or social infrastructure and protection of the environment. Promoting wider social and environmental benefits – by addressing health, safety and environmental concerns of those living and working in the area a project can have a significant impact on improving the morale and wellbeing of the community. Usually, the government or municipality pays for services provided by private businesses through infrastructure owned or leased by them as part of the service package. Keeping the norms and standards in relation to the sustainability the partners pursue, is of crucial importance.

Governments, particularly those in developing countries, face numerous challenges in strengthening their education systems. Inadequate infrastructure facilities, poor quality of staff, and outdated curriculum are major issues faced by public sector education systems. Governments face almost similar issues with technical and vocational education. While private schooling addresses most of these issues, it is costly and unaffordable to many. Some countries have responded to these challenges by promoting PPPs as a means to improve delivery and financing of education facilities and services. However, PPPs in this sector are quite different from the ones in economic infrastructure sectors. PPP projects in education include a focus on providing quality educational facilities and services without relying on user fees as the main source of revenue. For instance, governments can explore green infrastructure creation through PPP arrangements when they envisage adding capacities. Likewise, private management and capacity building initiatives may be used to increase accessibility of quality education in existing public schools at environment friendly surrounding. Other initiatives in education include voucher-based systems and charter schools although there are not considered as typical PPP projects as per the usual definition. Voucher systems aim to leverage

infrastructure and services of already existing private schools for the provision of high-quality education to government sponsored students. This system relieves the government of the responsibility associated with the creation of new school facilities. Charter schools is another way of tapping private sector resources to provide education services. These schools are privately operated but publicly financed (UN, 2016, p.24). Distant learning and education at home (not only in times of severe pandemics) complement the sustainable and the “green” elements of the partnership.

- Innovation. The PPP approach gives priority to the quality characteristics of the product and provides more opportunities and incentives for bidders to offer innovative solutions that meet the requirements for high quality, low costs and better living conditions. Innovation, where public-private collaboration can result in long-term certainty for private sector innovation investments, stimulate “green” entrepreneurship and help establish networks that support innovative outcomes. Many examples can be pointed out referring to the “greening” of the cities and buildings in the USA (Steedman et al., 2014, pp.1-42) and the countries in South-East Asia, creating clean environment through decarbonization of the cities like the Tokyo waste-to-power model (Hongo, 2016, p.20), adoption of digital technologies in waste management modernization in Egypt, Colombia and Mexico, expansion and development of IT networks in Spain and Germany, facilitating the access to touristic attractions by modernized cable cars in Peru, improving elderly people’s living standards by providing users with telematic care in Spain, etc. (IESE Case Studies, 2020).

Initiatives in Astana, Birmingham, Nokia, and Lyon demonstrated how city-level innovative partnerships can drive the transition towards sustainable production and consumption. Birmingham’s industrial symbiosis approach, part of its overall sustainable economic development strategy, promotes the use of waste materials and by-products as inputs in production in other parts of the economy. Lyon’s “Chemistry Valley” has emerged around a diversified and integrated multi-site activity in chemistry, energy and the environment (UNECE, 2018).

Green PPPs aim to provide public service delivery and, while they seek to benefit from mutually beneficial partnerships, they remain founded on public oversight. They therefore provide frameworks to ensure public leadership and accountability in tackling climate change, as well, while enabling the ownership of certain components of climate finance to be transferred to private hands. PPPs in climate finance can be understood as

interaction between public and private financial institutions for the delivery of climate finance (Gardiner et al., 2015).

The potential field of application of PPPs in climate finance is very broad. A recent report of Green Growth Best Practice (GGBP, 2014) points out the thematic areas that are identified for public-private collaboration. They include mostly the green infrastructure, where the PPPs hold the potential for enhancing the efficiency of large infrastructure investments, mobilizing the resources needed to support infrastructure projects of a smaller scale, and supporting innovation as well as the emergence of new growth areas. Another field is the natural resource management, where the importance of shared public and private ownership of natural resources to ensure shared valuation and awareness can help achieve effective compliance and enforcement.

PPPs are usually based on project finance using debt, equity and sometimes mezzanine capital (Vassileva, 2022b, p.7). Innovative solutions refer to developing new financial instruments and institutions such as green bonds, green funds and green banks, as well. According to the Climate Policy Initiative (2017), private sector investment has taken the largest share in climate finance over recent years and project developers have consistently been driving the largest volume of private finance (Dharish & Anbumozhi, 2018, p.6). While the share of more traditional lenders in the green climate financing mix signals a maturing technology market, more commercial finance institutions are taking a larger role, with institutional investment growing rapidly. The general trend suggests the need for dedicated green finance institutions to leverage private finance that can help close the funding gap for many low-carbon investments, especially in developing countries. With the private sector alone being unable to mitigate externalities and monetize, many green investments through PPPs often require the support of Green Investment Banks (GIBs). Hybrid financing schemes are increasingly common as projects become more complex and are not viable purely based on private financing structures. Green technologies must develop an equitable risk allocation framework that can provide a compelling argument for different stakeholders to support these investments through subsidized financing to the extent that this financing is justifiable from a public good perspective. GIBs and similar entities have been established at national level (Australia, Japan, Malaysia, Switzerland, the UK), state level (California, Connecticut, Hawaii, New Jersey, New York, and Rhode Island in the US), county level (Montgomery County and Maryland in the US), and city level (Masdar in the United Arab Emirates) (Dharish & Anbumozhi, 2018, p.5)

As many countries turn to debt to help their green recoveries from the coronavirus pandemic in 2020, an increasing number of governments and companies are looking at sustainability-focused financial instruments to fund major projects (Vassileva et al., 2020, p.594). Moreover, the development of financial instruments such as green bonds can be linked to PPP projects that can attract institutional investments. PPPs implementing innovative technologies with unproven environmental performance and uncertain financial returns, have been struggling to find debt financing. Some innovative initiatives have been fostering the development of a deep green bond market (Vassileva, 2022a, p.142). For instance, The Climate Bonds Initiative introduced international standards serving as a baseline to recognize and label green infrastructure projects. The methodology is built on clearly defined solar, wind, green building and transport thresholds. It also establishes methodologies for efficiently measuring the results achieved from their implementation. Once a project has been certified as green, the bonds can receive the “green” label. These types of bonds are no different from any other regular project bond, sharing the same financial features but lacking the liquidity and benchmarks other, more mainstream, fixed-income instruments enjoy in capital markets (Ordonez et al., 2015, p.2).

Koppenjan (2015) in his analysis of the public–private partnerships for green infrastructures identifies six challenges that might be perceived like tensions in realizing the green PPPs. One may dispute his point of view but some of his arguments are quite convincing, especially the contradiction of profitability and economic regulation versus sustainability and the government-business interface versus stakeholder involvement. „Since stakeholders are not necessarily committed to LCCR policies, stakeholder management should be aimed at aligning private, public and stakeholders interests with each other and with LCCR objectives. Private investments in LCCR infrastructure requires stakeholder participation, perhaps even to an extent that PPPs turn into Public Private Community Partnerships“(p.5). It proves once again that efforts of public and private entities are not sufficient, NGOs and society should participate actively in changing the new function of the governments, whose role like a mere partner needs to be reconsidered.

PPPs AS A KEY TO TRANSFORMING THE WORLD

Following the ratification of the Paris agreement, highly developed, less developed and emerging economies are taking actions that help accelerate investments in green infrastructure and better social conditions

(Vassileva, 2022b, p.8). The roots of PPPs go back centuries ago, but their incorporation into the global sustainable development agenda has become more visible since the beginning of the millennium, when the OECD organized an expert meeting in Paris in February 2012 to discuss the potentials of private investments in low-carbon, climate-resilient (LCCR) infrastructure. The investments they envisioned are aimed at new and existing public infrastructures in the field of transportation, energy, water management, public buildings, or urban development, in order to increase their contribution to sustainability, more specifically to the reduction of the emissions of greenhouse gasses and to the adaptation to climate change (OECD, 2012). Investments in infrastructures were considered as a smart way to create a long-term and large-scale lock-in in LCCR-friendly technologies, thus realizing a substantive improvement in the sustainable performance of urban and societal systems. One of the options explored were the potentials of public-private partnership (Koppenjan, 2015, pp.1-3).

On September 25, 2015, more than 150 world leaders gathered at the United Nations headquarters in New York to formally endorse a new global agenda for the next 15 years. The 2030 Agenda for Sustainable Development, which includes the Sustainable Development Goals (SDGs), which is the result of an exhaustive consultation process lays out a vision of the future, in which poverty and hunger are eliminated, gender equity and quality education are achieved, and the effects of climate change are contained. The SDGs are a set of 17 goals, including 169 targets which represent an ambition, a target, and a measure for countries with regard to sustainable development and a sustainable future. The SDGs build on the Millennium Development goals (MDGs) and aim to complete what these MDGs did not achieve. Both are a natural evolution of the same idea, but the SDGs go much further. They expand the scope of the development agenda to include goals on economic growth, climate change, sustainable consumption, innovation, and the importance of peace and justice for all (UNDP, 2015). At their core, however, both the MDGs and the SDGs are the same: a belief that humanity - with sufficient determination and investment - has the ability to achieve sustainable development. A crucial difference between the MDGs and the SDGs is that the former were mainly targeted to governments while the latter target many different stakeholders including the private sector. Indeed, a shift in approach between the MDGs and the SDGs is the recognition that policy objectives are best achieved by involving and integrating private actors in the policy process (Marx, 2019, pp.1-2).

Since the 17 Sustainable Development Goals chart a transformative course toward a more prosperous, equitable and environmentally and economically sound world, aligning operations with the SDGs can position businesses ahead of market trends. The Business and Sustainable Development Commission reports in *Better Business, Better World* that the SDGs hold USD 12 trillion worth of business opportunity, ranging from affordable urban housing to agricultural technology advances (NASEM, 2017).

The latest research from the New Climate Economy finds that climate action and green growth could deliver at least USD 26 trillion in economic benefit through 2030 compared with business-as-usual, including the creation of over 65 million new low-carbon jobs, the avoidance of over 700,000 premature deaths from air pollution and the generation of an estimated USD 2.8 trillion in government revenues through subsidy reform and carbon pricing (NASEM, 2017).

A UN survey (UN, 2016) shows that half of the business community believes achieving the Global Goals is a government responsibility. While governments have a role to play, neither they nor businesses can go it alone if the SDGs' ambitious targets are to be met.

Delivery of public infrastructure and services is an important way through which countries all over the world can work toward achieving their SDGs. Most of countries in the different regions, in line with similar global trends, are striving to involve the private sector in the provision of needed infrastructure and services. In this context, public-private partnerships have become a dominant model. SDG 17 states it explicitly: "These inclusive partnerships built upon principles and values, a shared vision and shared goals that place people and the planet at the center, are needed at the global, regional, national and local level" (NASEM, 2017).

While businesses across the world have invested extensively in this direction, the United Nations Economic Commission for Europe (UNECE) is advocating for "People First" Public-Private Partnerships, exploring new ideas and arrangements to increase access to essential services, lessen social inequalities and preserve the environment while transforming the economy. UNECE supports economies in transition in their efforts to design and implement such policies through policy analysis, recommendations, regional policy dialogue and capacity building. Furthermore, UNECE undertakes fundraising efforts for the launch of a capacity building initiative on PPPs to support UNECE member States participating in the Belt and Road initiative in 2018–2019 (UNECE, 2018).

Active participants in the transition from a linear, resource-intensive system to a fully circular economy are the countries in Asia and the Pacific,

as well (UN, 2016). Cities and regions provide venues for experimenting with different partnerships and solutions and have the flexibility and scope for policy experimentation. Their high business and consumer density, their universities and research institutes and connectivity, make them ideal locations for innovation hubs, incubator spaces and urban farming.

GREEN PPPs IN THE EU SUSTAINABLE DEVELOPMENT STRATEGY

According to Simić et al. (2021a) apart from the further process of globalization, an important characteristic of modern economic relations is the increase in integration activities, which, among other things, establish new economic and trade blocs of universal type (WTO) or regional level (EU, EAEU). PPPs are at the heart of economic development and competitive initiatives in the EU as well, as they are expected to foster innovation, reconcile different interests and enable public authorities to come together around common goals. The European Union has a key role in bringing about sustainable development, within Europe and also on the wider global stage, where widespread international action is required. The European Union represents strong economic integration with great importance for the Republic of Serbia, not only in terms of foreign trade exchange, but also in terms of economic and social development (Simić et al., 2021b). The European Council set a strategic goal for the EU in Lisbon: “to become the most competitive and dynamic knowledge-based economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion” (EC, 2001, p.2). The Stockholm European Council decided that the EU sustainable development strategy should complete and build on this political commitment by including an environmental dimension. This recognizes that in the long term, economic growth, social cohesion and environmental protection must go hand in hand. Sustainable development offers the European Union a positive long-term vision of a society that is more prosperous and more just, and which promises a cleaner, safer, healthier environment – a society which delivers a better quality of life for us, for our children, and for our grandchildren (EC, 2001, p.2). Achieving this in practice requires that economic growth supports social progress and respects the environment, that social policy underpins economic performance, and that environmental policy is cost-effective.

The EU Sustainable Development Strategy makes no reference to PPPs but does draw attention to the issue of green public procurement (EC, 2016). “In relation to public procurement, the legislative framework should

facilitate the taking into account of environmental concerns alongside its primary economic purpose” (EC, 2001). It suggests that Member States should “consider how to make better use of public procurement to favor environmentally friendly products and services” (Ryan, 2004, p.9).

In many cases, the EU gives priority to projects that include PPPs, for example in the construction of industrial zones, photovoltaic parks, high-tech centers and others. With the major steps the EU is making on climate action there is much interest on how other financial instruments can push achievement of the Paris Agreement on Climate Change objectives. It is no wonder that the experts from the World Bank consider that “decades of global PPP thinking can be an excellent starting point” (Loschacoff, 2020).

In 2015, the European Commission adopted an action plan to accelerate Europe's transition to a circular economy, strengthen global competitiveness, promote sustainable economic growth and create new jobs. The action plan contains 54 measures to "close the cycle" of the product life cycle - from production and consumption to waste management and the market for secondary raw materials. The plan also identifies five priority sectors to accelerate the transition along the value chain (plastics, food waste, critical raw materials, construction and demolition, biomass and bio-based materials). It emphasizes building a solid foundation for investment and innovation to thrive. The action plan encourages close cooperation with Member States, regions and municipalities, businesses, research organizations, citizens and other stakeholders involved in the circular economy. Finland, for example, is one of the pioneers of innovative partnerships for a circular economy and has adopted an ambitious national roadmap.

A circular economy is one that designs most pollution and waste out of the system, extracts maximum value from resources and allows natural capital to regenerate. Innovation and partnerships, including Public-Private Partnerships (PPPs), are instrumental in making consumption and production more sustainable. There are numerous examples of new technologies, processes, services and business models that are re-shaping product life cycles from design through production and usage to disposal and recycling.

The European Green Deal, announced by the European Commission in December 2019, commits the EU to becoming climate-neutral by 2050 whilst promising to help companies to become world leaders in clean products and green technologies. The ambitious and wide-ranging measures set out in the plan are aimed at achieving significant reductions in carbon emissions and a net zero target will be given legislative force in a new Climate Law. The measures are expected to require investment of

around €1trillion, to be funded under a new Sustainable Europe Investment Plan which will draw in part from the EU Budget, from the InvestEU Fund and from the European Investment Bank as well as private investment (Smith, 2020).

CASE STUDIES

Numerous case studies (CCES, 2015; GGGI, 2016; IESE, 2020) have been analyzed to identify appropriate pairing of different capabilities that public and private stakeholders can bring for the best outcome. Thorough investigation of these best practices resulted in a number of possible areas where PPPs can better support sustainable development, three of which have been described in the chapter.

Case study 1. European Center for Independent Energy Supply Based on Local Renewables and Sustainable Regional Development: The Güssing Model, Austria.

In 2007 the New York Times reported Güssing was the first community in the European Union to cut carbon emissions by more than 90 percent, helping it attract a steady stream of scientists, politicians, and eco-tourists (Guevara-Stone, 2013). Güssing is a regional center in Austria with about 27,000 inhabitants. In 1988, this area was one of the poorest in the country. Due to its geographically unfavorable location near the border, at that time there was no lively trade and no large industrial sites, the area lacked transport infrastructure (railway or highway). This has led to unemployment, 70% of its residents travelled to their jobs in neighboring villages, and a high percentage migrated to other regions. In addition, there was a problem of significant capital outflows from the region caused by the purchase of energy from abroad (oil, electricity, fuels), while the available resources (45% forest land) remained almost unused.

In 1990, experts developed a model that provided for the complete abandonment of fossil fuels. The aim is, at an early stage, to supply Güssing, and the region as a whole, with local renewable energy sources, thus providing it with new forms of added value. The model covers the production of heating energy, fuels and electricity (CCES, 2015).

The first steps towards the implementation of the model targeted energy saving measures in Güssing. As a result of improving the energy efficiency of all buildings in the city center, energy costs have been reduced by almost 50%. Subsequently, the construction of several pilot power plants in the city and the region helped to accelerate the phased implementation of the model. Examples are the successful construction of a biodiesel plant that uses rapeseed oil, the implementation of two regional

heating systems running on biomass for some areas of Güssing, and, finally, a regional heating system based on wood fuel, which supplies the city of Güssing. Energy independence was finally achieved in 2001 with the construction of a biomass plant in Güssing, it uses modern biomass gasification technology. Güssing currently produces more energy (heating, fuel and electricity) from renewable sources than is consumed in the city per year.

The application of the innovative energy concept marks the beginning of the process of sustainable regional development, which within 15 years turns a "fading region" into a region with a high standard of living and excellent quality of life. In recent years, Güssing has become known as "the city with the most favorable environmental conditions" and "the most innovative municipality" in Austria. One of the first infrastructure improvements, the installation of a regional heating system in Güssing (1996), made the border town an attractive place for business. A special scheme to attract business in the area leads to the creation of 50 new companies with more than a thousand jobs in the renewable energy sector in the region. Since then, Güssing has been known as an important center for the production of parquet, hardwood flooring and environmental technologies.

The construction of the biomass plant and the creation of RENET (Renewable Energy Network Austria) marked the beginning of numerous national and international research projects in the field of "renewable energy" in Güssing. The European Center for Renewable Energy coordinates all pilot plants, projects, research and training programs in this field. Multilateral research activities also contribute to the attractiveness of the region and to the creation of additional places for highly skilled workers.

The Güssing Model project and related complementary activities facilitate the dissemination of experience in the field of renewable energy sources, a network has been set up involving regional, national and international partners. A large number of joint projects are used to develop regional concepts for the use of renewable energy sources and for the implementation of specific projects. The biomass energy network is based on five pillars:

- Experimental plants. Within a radius of 10 km around Güssing there are more than 30 installations using different technologies; can be visited at any time.
- Research and development. The research network is an important driving force and ensures that - in addition to conventional energy

technologies - Güssing will remain a place where innovative technologies are tested and presented to the public.

- Training and advanced training. The program for events and seminars offers information about new technologies and projects. In addition, there are special projects and training programs designed for schools. The various programs aim to raise awareness of renewable energy and ensure the continuous development and quality of biomass installations.

- Services. Based on its experience in developing energy concepts, the Center offers consultations and acts as an intermediary for potential customers and manufacturers of equipment for installations.

- Ecological Energy Tourist Program. Currently, many tourists visit Güssing every week to view the numerous experimental installations (for biomass, biogas, solar and photovoltaic). This type of tourism is becoming an additional economic factor of great importance for the region. EEE offers special training for certified guides so that they can professionally acquaint guests with the various installations. In addition, working with cultural and sports organizations helps to carry out various common activities (for example, an eco-energy marathon). The project makes the region an attractive tourist destination. Even Austria's favorite celebrity, former California governor, and renewable energy advocate Arnold Schwarzenegger visited Güssing in 2012. "Güssing has become a green island," he said when he spoke at the Güssing renewable energy demonstration plant. "You have built your own district heating system. You are generating your own electricity. You are operating a biomass power plant, produce synthetic natural gas from wood and develop new fuels at the research lab. I have seen all of this with my own eyes. Everyone should follow your example. The whole world should become Güssing."

The green PPP model in the Austrian town of Güssing proves how the combined efforts of the municipality, business and science can lead to success in providing energy from natural renewable sources with many direct and indirect benefits - high economic efficiency, sustainable development and growth of all related industries.

Case study 2: Japan's Green Funds: A Practical Example of How Japan Supports Green Public-Private Initiatives.

Japan has great experience in promoting and supporting green PPPs (Hongo, 2016, pp.17-29). One of the mechanisms used in Japan which show the enhanced role of the state in stimulating the circular economy and the green PPPs are the green funds.

Japan's Green Fund commenced operations in July 2013 after the Minister of the Environment announced the Finance Initiative to build a Low-Carbon Society, which highlighted the need to use private capital to

tackle global warming (Mabey, 2013). The Green Finance Organization (GFO), the body selected by the Ministry of the Environment to govern the Green Fund, is comprised of an Executive Board and operations team that regularly receive external counsel from an advisory committee of legal, technological and other experts. The Green Fund is capitalized by a portion of the revenue of Tax for Climate Change Mitigation, a carbon tax established in 2012 on fossil fuel consumption.

The Green Fund was established in response to the challenges associated with building out a clean energy projects, including high up-front capital costs for development and construction as well as long operation and income phases that increase project risk for project owners/developers. The Green Fund's objective is to solidify the business case of small to large-scale clean energy projects by making equity and mezzanine investments that attract further capital from private sources. Equity investments are limited to less than 50% of the total equity amount and in some cases, a sub-fund will be created that aggregates equity investments from GFO and other sponsors prior to funding the project vehicle. This investment strategy aims to decrease the "debt to equity" ratio to facilitate loan financing as well as support deployment of new clean technologies in the green economy. Successes are publicized and used to encourage expanding green investment to regional private sectors across the country. Investments are made in projects that not only reduce greenhouse gas emissions, but also stimulate local economies. This is achieved by working with locally based companies and, for some cases, focusing particularly on the project development phase during which there is no revenue generation. The GFO invests specifically in projects with new business models that can be replicated in regional communities.

The GFO aims to engage with local communities, and this engagement goes beyond clean energy project deployment. Often, profits from projects are invested in regional low-carbon efforts. For example, a portion of a 7MW solar project's profits is donated to the community's fund for local environmental initiatives, and that project site is used as an education facility on clean energy. Another example is a small-scale hydropower project that includes the creation of a scholarship fund for children.

In addition to investing in projects, the Green Fund shares information associated with projects with other project owners and private actors to aid their clear understanding on the technical and financial feasibility and sustainability of low-carbon energy projects, including wind, solar, small-scale hydro, biomass, and geothermal.

Since inception in 2013 and through March 2018, GFO has, through the Green Fund, made USD 123 million in investment commitments into

projects with a total value of over USD 1000 million, achieving a private source leverage ratio of over 11:1 (the ratio is calculated taking account of additional but undisclosed public and private investment). Projects in which GFO has invested are expected to avoid around 1 million tons of CO₂ every year (GBN, 2020).

Another good example showing the international dimensions of Japan's efforts to promote green economy is the Japan Special Fund (JSF), established in 1993, as a mechanism through which the Government of Japan supports the Regional Environmental Center to provide assistance in addressing environmental issues in Central and Eastern Europe (CEE) and beyond. The JSF is a flexible mechanism, a needs-driven process through which any type of project may be implemented in any region, as long as it genuinely contributes to the safeguarding of the environment. The JSF has achieved impressive results to date. Since its establishment, the contribution from the Government of Japan through the JSF has exceeded USD 12 million. All projects are implemented in collaboration with the REC and the respective REC country office (REC, 2020).

One of the last initiatives of Japan is a new fund amounting to 2 trillion yen (USD 19.2 billion) announced in December 2020 by the Japanese Prime Minister Yoshihide Suga to assist ambitious green projects over the next decade as part of additional stimulus measures in response to COVID-19. As quoted by Nikkey Asia on December 4, 2020: "Our country needs a source of growth post-coronavirus," he said. "The core of that will be green and digital." Suga vowed to boost the economy through green investment and digital innovation. The fund is supposed to continue to support companies engaged in ambitious innovation in environmental areas for the next 10 years.

Case study 3. Expanding of the PPP Model in Education Sector as Community-based Public-private Collaboration

Green education buildings and services in Brazil: Belo Horizonte School

Overview

Belo Horizonte, the third largest city in Brazil, has made education its top priority due to the strong need for better education for the more than 11,000 children on the school enrollment waiting list. However, technical and financial limitations hindered the municipality's efforts (GGGI, 2016). It only had resources to meet approximately 35% of the demand for new school buildings. For this reason, Belo Horizonte made decided to attract private-sector cooperation and investment to expand and reinforce its existing education infrastructure. Education PPPs in the municipality of

Belo Horizonte were Brazil's first public-private partnerships. These were led by The Educac Consortium, a leading Brazilian construction company. The PPP scope not only included five primary schools and 32 preschool facilities, but also, the operation of non-pedagogical (non-core) services such as maintenance and security. The contract was signed on July 25, 2012, and the concession is to run for 20 years, with a total private-sector investment of USD 95 million.

Governance

Belo Horizonte received support for this process from the IFC, as it had no previous experience with School PPPs. It appointed IFC, a member of the World Bank Group for private-sector financing, as lead advisor to investigate how private-sector participation could help improve its existing education system and what mechanisms could be used for this purpose. After conducting an exact feasibility study, the IFC recommended that the municipality execute PPPs with a private sector participant to relieve the shortage of preschools and primary schools. Considering that Brazil had never implemented an Education PPP, the IFC referred to examples from other countries to create a detailed model and to demonstrate how well-designed PPPs could be useful in accomplishing its education objectives. Furthermore, IFC organized stakeholder consultations giving them a forum for sharing their diverse concerns.

Under the terms of the concession, Belo Horizonte was required to offer sites for the facilities while the private sector took responsibility for both the construction and operation of non-pedagogical services, such as cleaning, surveillance, laundry, maintenance, and utility management. This approach developed overall administrative efficiency for managing early educational facilities by incorporating these services under the management of a single provider. In addition, this enabled school directors to concentrate on teaching rather than managing multiple vendors. The private-sector operator was evaluated according to a set of performance and availability indicators.

Issues in Project Preparation and Implementation

Expert consultants managed by the IFC designed solutions to financial, technical, and legal issues. These solutions were reflected in a transaction structure and made available for public comment and inputs from potential investors. The IFC helped draft tender documents, organize public hearings, and manage the bidding process. Through a competitive bidding process, Belo Horizonte received two qualified bids from Andrade Gutierrez and Odebrecht, respectively. Bids were evaluated on a cost basis once they met minimum technical requirements in order to provide education services with a lower budget. The Educac Consortium operated

by Odebrecht won the concession bid. The IFC proposed a 20-year concession to finance, build, equip, and operate the non-pedagogical services of 37 schools (32 new kindergartens and 5 elementary schools). Compared to the former procurement process, private-sector involvement was to significantly reduce the time needed to establish and launch these new schools. The new units were delivered within two years, which was a record in government construction procurement. The primary schools became operational within about a year.

Impact in a Later Period

Through these Education PPPs, about 18,000 additional children from low-income areas of Belo Horizonte will be able to attend kindergartens and elementary schools. This success has tremendous potential as model for replication in other states and municipalities of Brazil. As of 2014, the contract for the Education PPP in Belo Horizonte, Brazil's first PPP, has been amended. In order to considerably increase the number of school openings and to ensure quality infrastructure for students, the first PPP, which initially provided for the construction and operation of 37 schools, has been increased to 51. In addition, the number of students has risen from 18,000 to 25,000.

Overall, 46 Children's Education Municipal Units (UMEIs) and five Municipal Elementary Schools (EMEFs) had to be built. The new schools are being built by Odebrecht Infrastructure using the same architectural model used for the project's other 37 UMEIs. These constitute 1,100m² of built area, with classrooms, a kitchen, cafeteria, library, multi-use room, nursery area, and diaper changing. The operation of all the PPP schools remains the responsibility of Odebrecht Properties, which offers administrative services such as reception personnel, cleaning, gardening, laundry services, and maintenance. Teaching staff, educational monitoring, and school cafeterias continue to fall under the responsibility of the Belo Horizonte City Government and the Municipal Department of Education. Furthermore, the National Education Plan, aims to open classes for 4th and 5th grade students by 2016. The PPP was developed by the Municipal Department of Development and Education, and INOVA BH11, which is a partnership between the City of Belo Horizonte and Odebrecht Properties will be responsible for services such as building maintenance, security, cleaning, environmental, and real estate sustainability. INOVA BH will be compensated and evaluated for the quality of the services based on criteria established by the Belo Horizonte city government, with the support of the IFC and with monitoring by an independent evaluator. The units will also respect the regulations of the Brazilian Ministry of Education, the Brazilian

Association of Technical Standards, and the Belo Horizonte Municipal Department of Education.

UK: Barnhill Community High School (PFI for School Facilities)

Overview

Barnhill Community High School (Barnhill) was the first PFI school constructed on an existing school site in the London Borough of Hillingdon (GGGI, 2016). With a floor area of 12,000 square meters and a capacity of 1,450 pupils, it was built under the PFI through an agreement between Hillingdon Borough Council and a consortium led by Jarvis Construction (UK) Ltd. and had been in operation for about two years. Its contract is worth approximately GBP 15 million. The design concept consists of five linked faculty buildings forming a series of enclosed private and semi-private courtyard spaces. Important functional relationships between departments were established from the outset, leading to the links and interconnections, which are vital for the delivery of the school curriculum.

Governance

The PFI was used as the procurement option in line with the government policy direction for public procurement to achieve better VFM over the life of the project and to ensure environmental, economic, and social sustainability. The Department for Education and Employment (DfEE), (now the Department for Education and Skills) performed the full client role, meaning that the DfEE was able to take an entirely independent approach to the requirements of its output specifications. The DfEE guidelines were applied for the design and construction of new schools. The consortium, led by Jarvis Construction, was responsible for finance, design, construction, and facilities management over the 25-year contract period. The output specifications of the construction were to be enhanced at an increase in construction cost but at lower facilities management costs. During construction, strong management ensured a high level of building quality, minimizing potential defects or repairs during the facilities management phase. Under the PFI contract, the project company was required to provide the following facilities: · an assembly hall, a dining hall, catering facilities, a library, a special needs unit, an information technology suite, a large sports hall, teaching areas for humanities, math, science, English, modern languages, art, and technology, facilities suitable for breakfast club and after school clubs for pupils, starting at 7am and ending in the evening, an indoor environment that was stimulating and exciting, rather than “institutional-looking, circulation areas to provide

ease of movement, and an outdoor environment to create stimulating external spaces for pupils to learn, play, and relax in safely, while also enabling supervision.

Issues in Project Preparation and Implementation

Since time was the most significant constraint for procurement, the bidding process was processed swiftly. During the procurement process, bidders were required to respond within twelve weeks and short-list of 4 bidders were selected out of twenty bidders on the list. It was announced in June 2000, with the financial close due in October 2000. The consortium went on site on 21st of October 2000. The key features of Barnhill in construction and operation for preserving the environment and health of users are described below. As a unique feature, the project company was allowed to earn revenues by running evening sports activities and conferences.

CONCLUSION

The greening of industries and green PPPs have been proclaimed as a global imperative and have become a core determinant of economic competitiveness and sustainable growth. Since resource inputs represent an important production cost for industries, improving efficiency gives industries a competitive advantage. The greening of industries also plays a role in poverty alleviation, through promoting energy security, health and safety, jobs, and reducing costs through increased productivity. The decisions have been made, now it is time to solve the problem with the inconsistent delivery of sustainability.

On a European level the situation is a little bit different. The biggest driving force in including sustainability criteria in PPPs is public procurement or PPP rules, laws or interpretive communications as well as the new EU SEA Directive. Even though the will is there to promote sustainability through procurement (EU, 2016), EC guidance on incorporating green and social considerations have insignificant effect, and in most cases, are unknown by procuring authorities. The UK and some Scandinavian countries are an exception taking into consideration the fact that generally speaking the UK has huge experience in all types of PPP/PFI projects. In the UK example, guidance exists on incorporating green issues in PPPs since 2002. Incorporating green principles into PPPs on a European level is not very efficient regardless of its sustainability strategy. This issue also refers to the national level.

As it has already been pointed out, green PPPs change their dimensions as good practices show that they exceed the conventional cooperation between public and private partners adopting new forms like green funds, green platforms, innovative funding tools and partners like green bonds, green banks, etc. Achieving sustainable development requires not only attracting private finance to develop infrastructure, to create clean environment, to build green urban areas, to provide quality education and healthcare, but also ensuring better access to services that put people and planet first. Thus, the private sector role should not only be to provide financial resources but also to contribute towards improving the quality of life and to reach better living standards. In this respect some key ideas of the WB experts have to be taken into consideration:

- First and foremost, governments must follow good investment planning processes that prioritize projects based on development needs, socio-economic return, and targeted to ensure inclusivity. There must be thorough understanding of associated commercial, technical, environmental, social and financial risks and their implications. A clear, practical guidance for decision-makers focused on real, lifelong affordability and value for money are needed. All these conditions fit the PPP model well since lifecycle costing, risk-sharing, and value for money are intrinsic to it.

- Integrating the potential impact of climate change in infrastructure project design and structure in a manner that enhances long-term affordability and value for money is also critical. The main challenge to climate change adaptation and mitigation of its potential impact on infrastructure is its integration into the project design and structure in a manner that enhances long-term affordability and value for money. This means looking at the long-term benefits of sustainability given the inherent uncertainties that could affect these assets over time. Here too, the very nature of PPPs makes them a strong tool to meet these challenges. A PPP is intrinsically a performance-based instrument, accustomed to the concept of long-term value for money and focusing on continued quality service rather than simply the underlying assets. With clear, contractually bound key performance indicators, PPPs are well-placed to incentivize adaptation and mitigation to climate change and resilience in project design and service delivery based on private sector skills, technology, and innovation.

PPPs could respond even better to current trends and challenges by introducing more flexibility in terms of models and contractual provisions, while including fiscally sustainable government support mechanisms to address resilience and affordability issues:

- Even with innovative private-sector approaches, climate change resilience and other future shocks will still require backing from the public

sector to manage all the risks and uncertainties associated with long-term infrastructure projects. Government support mechanisms will facilitate reaching the most adequate risk allocation among parties that maximizes value for money, ensuring both resilience and affordability. Instead of a principal-agent relationship, PPPs should create a framework and process for the joint discovery of innovative solutions for infrastructure delivery.

- Proper understanding of the fiscal implications of PPPs and their adequate integration in the overall public investment strategy prevent misconceptions that perceive PPPs as “free” infrastructure. This will help the above-mentioned government support mechanisms to be seen, not as an additional cost, but rather as tools to create the optimal structure to deliver quality infrastructure services.

- In the context of long-term PPP contracts, adjustments that add a certain degree of flexibility are necessary. Governments and practitioners need to embrace a more diverse pool of PPP models, including the better understood contractual PPPs, but also additional forms of institutional PPPs. The challenge is to be aware of different options and wisely apply the best fit for the purpose. Since fully complete contracts that predict all potentialities are unattainable, contracts should instead put in place processes that foster satisfactory resolution of unforeseeable circumstances while increasing flexibility.

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