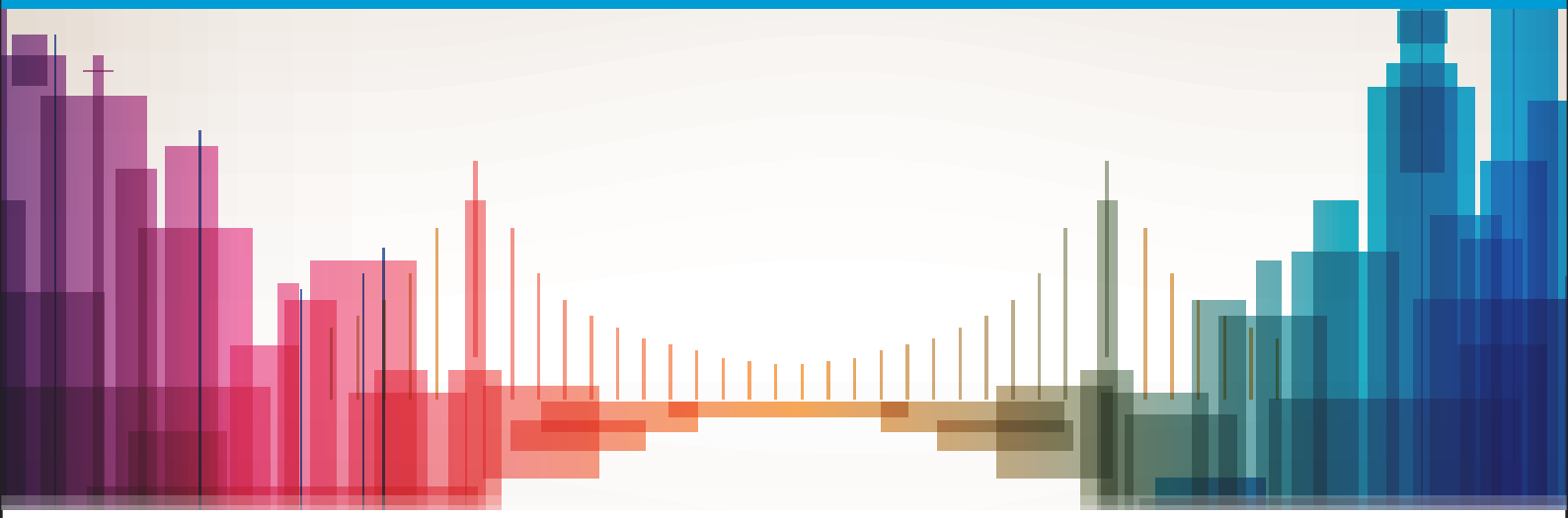
United 4 Smart Sustainable Cities

Compendium of practices on innovative financing for smart sustainable cities projects



Convention on Biological Diversity

United Nations ECLAC

Food and Agriculture Organization of the United Nations

ITU

UNDP Empowered lives. Resilient nations.

United Nations Economic Commission for Africa

UNECE

UNESCO United Nations Educational, Scientific and Cultural Organization

UN environment programme

UNEP FINANCE INITIATIVE

United Nations Framework Convention on Climate Change

UN-HABITAT FOR A BETTER URBAN FUTURE

UNWTO World Tourism Organization

UNIDO

UN OFFICE 4 PARTNERSHIPS

UNITED NATIONS UNIVERSITY
UNU-EGOV
Operating Unit on Policy-Driven Electronic Governance

UN WOMEN

WORLD METEOROLOGICAL ORGANIZATION


SALES BY CATEGORY
JAN FEB MAR APR MAY JUN
Steel 90 %
Copper 10 %
BID ASK PRO
241,00 € 558,00 € 104,00
955,00 € 348,00 € 374,00
116,00 € 415,00 € 930,00
262,00 € 146,00 € 107,00
839,00 € 890,00 € 801,00
706,00 € 579,00 € 691,00
622,00 € 870,00 € 933,00
557,00 € 775,00 € 934,00
50,00 € 300,00 € 437,00
817,00 € 518,00 € 269,00
173,00 € 331,00 € 223,00
608,00 € 599,00 € 339,00
QUA
339
223
269
437
934
933
691
801
107
930
374
104
DAT BID ASK PRO
JAN € 942,00 € 348,00
FEB € 685,00 € 920,00
MAR € 993,00 € 604,00
APR € 228,00 € 202,00
MAY € 468,00 € 685,00
JUN € 609,00 € 963,00
JUL € 617,00 € 240,00
AUG € 939,00
SEP € 654,00
OCT € 911,00
NOV € 829,00
DEC € 748,00
SALES BY CATEGORY
South € 1 236 345,0 Copper
North € 1 896 354,0 Steel
East € 2 569 345,0 Gold
Total € 1 893 543,0 Silver
€ 7 595 587,0 Platinum
10.02.09 634,77
11.02.09 215,37
12.02.09 830,88
13.02.09 846,63

United 4 Smart Sustainable Cities

Compendium of practices on innovative financing for smart sustainable cities projects

Acknowledgements

In 2016, the United Nations Economic Commission for Europe (UNECE), together with the International Telecommunication Union (ITU), launched the global initiative United for Smart Sustainable Cities (U4SSC). One of the aims of U4SSC is to develop guidance and training materials for city leaders to make their cities smarter and more sustainable and to support the achievement of international agreements such as the 2030 Agenda for Sustainable Development (2030 Agenda) and the New Urban Agenda.

In 2020-2021, the secretariat of the UNECE Committee on Urban Development, Housing and Land Management was leading the U4SSC thematic group on "Innovative Financing Instruments for Smart Sustainable Cities", which compiled the "Compendium of Practices on Innovative Financing Smart Sustainable Cities Projects".

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Disclaimer

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Executive summary

The objective of the Compendium of Practices on Innovative Financing is to provide a practical insight on the types of projects that can improve sustainability and smartness of a city, combined with ideas on how they can be financed. Given the focus on financing projects which support achieving the 2030 Agenda for Sustainable Development, innovative financing of urban development projects is critical to achieving the Sustainable Development Goals (SDGs) globally.

This Compendium builds on the "U4SSC Guidelines on tools and mechanisms to finance sustainable smart cities projects", which were also developed within the United for Smart Sustainable Cities Initiative (U4SSC) and published in 2021.

While the Guidelines provide recommendations for city governments on how to develop investment-grade projects in support of sustainable smart urban development, the Compendium, through its case studies from different geographical regions, demonstrates the use of different instruments to finance sustainable smart cities projects.

The presented case studies include examples of smart sustainable cities projects at different project stages - from planning and preparation to project implementation and evaluation; and from different sectors: education, energy, housing, transport, communication technology, urban development, water and waste management.

The case studies demonstrate the use of different financial mechanisms. For instance, the examples of the Ogal Shiwa Public Real Estate Programme in Japan and Parque das Nações in Portugal show the use of the public-private partnerships. The case of Elaziğ Fethi Sekin City Hospital is an example of a project financed using green and social bonds.

Other projects presented in the Compendium highlight the important role of international development institutions. For instance, the Cabeólica wind farm built across four islands of the Cape Verde archipelago, demonstrate the use of the funds from the European Investment Bank (EIB). Support from these and other multilateral organizations proved to be important not only in providing funds but also in promoting transparency in public procurement.

One more approach is involved in-kind grants and technical support by the private sector, which is followed by the transfer of the operation to a cooperative of beneficiaries. The case of First Solar Energy Cooperative in informal settlement in Rio de Janeiro, Brazil demonstrates the use of grants from the Open Society Foundation and the International Cooperatives Alliance.

This Compendium also highlights that enabling environments, including suitable laws and regulations and the improved capacity of local communities to absorb projects, and governments to implement them, are necessary for their successful deliveries. While the private sector took the necessary financial risk, it was also the commitment of the government to ensure that investments

were protected through laws and regulations, and in many cases, financial commitment, in order to share the burden of large-scale projects. The Compendium, through its case studies, highlights that people-first project deliveries necessitates the involvement of communities. The engagement of the local communities is very important, and it is also important to avoid the top-down approach.

The projects presented in this Compendium also reveal that through the use of appropriate financing instruments, the smart sustainable cities project can provide an important source of support to achieving the Sustainable Development Goals. Most of the projects presented in this publication were implemented following the 2030 Agenda principles. Many of the projects support the eradication of poverty (SDG 1), promote reducing equality through contribution to local employment and decent work (SDG 8), provide state-of-the-art yet affordable health care (SDG 3) and quality education (SDG 4) and support gender equality by providing opportunities to women in communities (SDG 5). In addition, it was not only projects under the energy sector that followed SDG 7 principles through the provision of affordable, reliable renewable and modern sources, but also transport, housing and urban development projects incorporated this SDG in the implementation. In all the presented cases, project implementation involved cooperation among different stakeholders (SDG 17).

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List of abbreviations

AFC	Africa Finance Corporation
AfDB	African Development Bank
AUMSA	Actuacions Urbanas de València
BIMS	building information management system
BOT	build-operate-transfer
BREEAM	Building Research Establishment's Environmental Assessment Method
CapEx	capital expenditures
CBD	Convention on Biological Diversity
CEO	chief executive officer
CO2	carbon dioxide
COVID-19	coronavirus disease of 2019
ECLAC	United Nations Economic Commission for Latin America and the Caribbean
EIB	European Investment Bank
EPC	engineering, procurement and construction
EPC-C	engineering, procurement and construction contractor
ESG	environmental, social and corporate governance
EUR	euro
FAO	Food and Agriculture Organization of the United Nations
FMCo	facility management company
GHG	greenhouse gas
GIFA	gross internal floor area
GIS	geographic information system
HIMS	hospital information management system
ICT	information and communication technology
IRR	internal rate of return
ITU	International Telecommunication Union
KDC	Kakonko District Council
LEED	Leadership in Energy and Environmental Design
NGO	non-governmental organization
NPV	net present value
O&M	operations and management
OPEX	operating expense
PECA	Special Plan for the Protection of the Old Town (*Plan Especial de Protección del Casco Antiguo*)
PFI	private finance initiative
PoS	point of sale
PPP	public-private partnership

PPCP	public-private community partnership
PPPP	people-first public-private partnership
RMB	Ren Min Bi – official currency of China
SDGs	Sustainable Development Goals
SOE	state-owned enterprise
SPV	special purpose vehicle
SROI	social return on investment
SSC	smart sustainable city
TPG	Geneva, Switzerland public transportation (*Transports Publics Genevois*)
UITP	International Association of Public Transport (*Union Internationale des Transports Publics*)
UNCDF	United Nations Capital Development Fund
UNDP	United Nations Development Programme
UNECA	United Nations Economic Commission for Africa
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
UNEP FI	United Nations Environment Programme Finance Initiative
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UN-Habitat	United Nations Human Settlement Programme
UNIDO	United Nations Industrial Development Organization
UNOP	United Nations Office for Partnerships
UNU-EGOV	United Nations University Operating Unit for Policy-Driven Electronic Governance
UN Women	United Nations Entity for Gender Equality and the Empowerment of Women
UNWTO	World Tourism Organization
USD	United States dollar
U4SSC	United for Smart Sustainable Cities
WACC	weighted average cost of capital
WMO	World Meteorological Organization

Units of measurement

km	kilometre
m^2	square metre
m/s	metre per second
MW	megawatt
Tbps	terabytes per second

Introduction

Achieving the SDGs requires an increase in investments. Given that in many countries there is a growing need to spend in social and economic infrastructures while facing budgetary constraints, developing innovative ways to finance SDG-related projects is becoming more crucial. This is particularly true for low- and middle-income countries. Innovative finance, including the use of public-private partnerships (PPP) can help to close the financial gap by providing additional sources to finance projects in municipalities and bringing the expertise of the private sector into project cycle. Innovative finance can supplement limited public sector capacities in providing infrastructure and services.

This was highlighted by the United Nations Secretary General Antonio Guterres during the High-Level Meeting on Financing the 2030 Agenda for Sustainable Development held on 24 September 2018, wherein he released a financing strategy that emphasized the critical role of the United Nations in supporting and accelerating the mobilization of project finance. It focused on three objectives to accelerate progress, from global to local levels: (a) align global financial and economic policies with the 2030 Agenda; (b) enhance sustainable financing strategies and investments, at country and regional levels; and (c) seize the potential of financial innovations, new technologies and digitalization, to provide equitable access to finance.

This Compendium of Practices on Innovative Financing was developed as a part of the **United for Smart Sustainable Cities Initiative** (U4SSC) by its thematic group on Innovative Financing Instruments for Smart Sustainable Cities, coordinated by the United Nations Economic Commission for Europe (UNECE). The publication builds on the previous U4SSC deliverable, Guidelines on tools and mechanisms for smart sustainable cities

U4SSC is a global United Nations initiative coordinated by ITU, UNECE and UN-Habitat and supported by CBD, ECLAC, FAO, UNDP, UNECA, UNESCO, UNEP, UNEP-FI, UNFCCC, UNIDO, UNOP, UNU-EGOV, UN-Women, UNWTO and WMO to achieve Sustainable Development Goal 11: "Make cities and human settlements inclusive, safe, resilient and sustainable". U4SSC serves as the global platform to advocate for public policy and to encourage the use of ICTs to facilitate and ease the transition to smart sustainable cities.[1]

Methodology

The compendium is based on principles and approach outlined in the "U4SSC Guidelines on tools and mechanisms to finance sustainable smart cities projects", published in August 2021. Both documents promote implementation of the 2030 Agenda for Sustainable Development and the Addis Ababa Action Agenda of the Third International Conference on Financing for Development.

[1] United 4 Smart Sustainable Cities. Available at https://u4ssc.itu.int/.

Developed under the global initiative of U4SSC, the compendium contains cases from around the world.

The "U4SSC Guidelines on tools and mechanisms to finance sustainable smart cities projects" were developed as part of the U4SSC initiative and provide practical recommendations for city governments on how to develop investment-grade projects in support of sustainable smart urban development. The Guidelines explain what a sustainable smart city project is and provide an overview of traditional and innovative financing tools that are available and can be used to finance city projects. They also provide an overview of existing investors, and how to make a sustainable city development plan attractive to them. The Guidelines are based on the principles contained in the 2030 Agenda for Sustainable Development and the Addis Ababa Action Agenda of the Third International Conference on Financing for Development.

The compendium further develops on the Guidelines and presents the collection of cases selected by the members of the U4SSC Initiative thematic group. These cases demonstrate financing mechanisms that were used to implement sustainable and smart city projects to the extent it was possible to disclose publicly. The compendium development process started in September 2020, with the call for the submission of project case studies using innovative financing to the members of the U4SSC thematic group on Innovative Financing Instruments for Smart Sustainable Cities. Case studies were required to have a brief description of the essence of the project, its contribution to the sustainability and/or smartness of a city, the financing mechanism used to implement the project, and the impact that it had on people's lives in the city.

Between October 2020 and January 2021, the thematic group secretariat received 40 submissions from 23 countries around the world. The thematic group agreed on the criteria for case selection to the compendium at its meeting in March 2021. In April 2021, the 15 cases presented in this compendium were selected based on the following criteria:

- The submission is complete and contains sufficient information, particularly concerning the innovative financial mechanism of the project
- The submission contains clear, people-first elements; that is, the project creates value for people and for the planet, with a focus on the world's most vulnerable
- The submission has sectoral and geographical diversity

The objective of the compendium is to provide a practical insight on the types of projects that can improve sustainability and smartness of a city, combined with ideas on how they can be financed. Given the focus on financing in the 2030 Agenda for Sustainable Development, innovative financing of urban development projects is critical to achieving the Sustainable Development Goals (SDGs) globally.

1 Education - University Campus in a smart sustainable city Vilne (Ukraine)

Size of investment: USD 205 million

Start date: 2020

End date: 2050

Project stage: implementation

Project partners

- Public partners:
  - Ministry of Education and Science of Ukraine
  - V.I. Vernadsky Taurida National University
  - State Road Fund
- Private partner: Vilne LLC – initiator of the public-private partnership (PPP)

Project description

The innovative university campus will be constructed as part of the creation of a new sustainable city Vilne, located between Kyiv and the village of Bilogorodka. The aim of the new city and campus is to prevent excess dependence on the city of Kyiv by providing a maximum of activities on site, including education, work, sports and recreation. The new city and university campus will be created on a 26.3-hectare plot of land belonging to Vilne LLC, comprising 110 000 m² of non-residential buildings, 95 000 m² of student dormitories, and 95 000 m² of residential buildings for teachers.

The project was initiated by the Taurida National University, which was relocated to Kyiv in mid-2016. The new campus will allow the university to increase the number of students from 3 500 to 18 000. The university campus and new city Vilne will be built using new modern construction approaches and technologies, to ensure that it is green and energy efficient. The project is a people-first public private partnership (PPPP); it ensures that "people" are prioritized above all stakeholders. Its focus is on improving the quality of life of the community by creating local and sustainable jobs, promoting gender equality and access to education for all. All citizens of the new city Vilne will have access to adequate, safe and affordable housing and basic services, accessible and sustainable transport systems, and universal access to green and public spaces.

Sustainable Development Goal impacts

SDG 1: Reduced poverty through creation of decent works

SDG 4 and SDG 10: Inequality decline as citizens will have access to quality and inclusive education

SDG 17: Partnerships between government, academia and private sector

People-first elements

- Access to quality higher education: The construction of the university campus will significantly increase the number of young people and adults with access to an affordable education. A rise in Ukrainian graduates will improve their competitiveness in the labour market and boost economic activity in the country. Construction of the new city and campus will also take into account the needs of people with disabilities, enabling them to receive education and employment opportunities. All premises and transport facilities will have disability access.
- Use of smart technology: The city and campus will have smart water supply and its power supply will acquire 50 per cent of its energy through solar panels placed on the facades and roofs of buildings, as well as canopies over sidewalks.
- Commitment to sustainability: The University will offer courses focused on sustainable development and human rights, ensuring students acquire the knowledge and skills necessary to promote sustainable development and growth. All buildings in the city and on the campus will be energy-efficient, with requirements to meet BREEAM and LEED standards. The city will introduce a citywide system for separate collection of household waste.
- Improved access to jobs: The construction of the university campus and smart city Vilne will provide new employment opportunities and thus, will result in an increase in the number of jobs in the region. The number of teachers and other staff is expected to increase from 360 to 4 140 by the eighth year of the project.

Innovative finance instrument

The investment covers the construction of the new smart city and university campus, as well as a road to the newly built municipality. A total of USD 205 million was invested for the project:

- USD 193 million – private investment from the investor Vilne LLC
- USD 12 million – public investment from the State Road Fund.

Payback terms: Payback to the private partner is required. Vilne LLC will use 20 per cent of its own capital and external financing (loans) for its investment in the city and campus construction and

in its management during project implementation. There are three payback scenarios (payment terms) under consideration:

i 18 years – USD 19 million per year;

ii 24 years – USD 15.5 million per year;

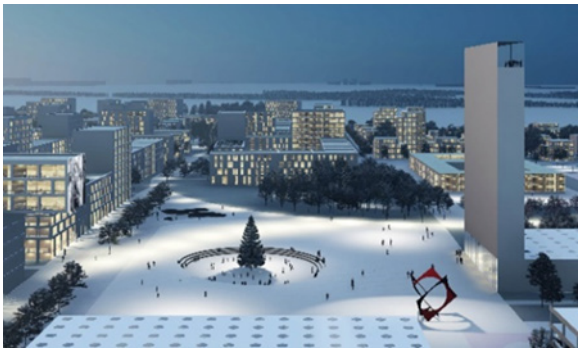
iii 35 years – USD 12.8 million per year.

The money for the payback will be generated through availability payments – payments by the government to the investor once the project is completed (around 80 per cent) – and through revenue that will be generated from the accommodation of students and teachers and utilization of other facilities on the campus (around 20 per cent).

Observations

- The project has the potential to be replicated in other regions; the combination of a university campus and new urban area prevents overcrowding in existing cities and creates new opportunities for jobs.
- Implementing the PPPP project faced some challenges due to the lack of preparation by local authorities for institutional and financial innovations. There is limited experience with PPPs in the country and changing existing regulations and work habits was difficult.
- A lack of experience with PPPs can be addressed through the international sharing of experiences on implementing institutional and financial innovation, training on PPPs and other financing mechanisms, and work discussions between private businesses and public authorities.

Figure 1: University Campus in a smart sustainable city Vilne (Ukraine)



Photos/Illustrations

More illustrations available at http://vilne.madein.ua/index2.html.

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2 Energy - Cabeólica wind farm project (Cape Verde)

Size of investment: USD 84 million (EUR 63 million)

Start date: 2009

End date: 2011

Project stage: maintenance

Project partners

- Public partner: Government of Cape Verde
- Private partners:
  - InfraCo Africa (publicly-financed privately-managed project development company)
  - Africa Finance Corporation (AFC)
  - African Development Bank (AfDB)
  - European Investment Bank (EIB)
  - FinnFund
  - Electra (government-owned utility company)

Project description

The Cabeólica wind farm, set across four islands of the Cape Verde archipelago, has led the way in wind power generation in Africa. The country suffered from power deficits and a high reliance on oil imports prior to implementation of the wind farm. This project involved the construction and operation of the wind farm with a total installed capacity of 25.5 MW, which became fully operational in September 2011. Prior to the installation of the Cabeólica Wind Farm, wind farms generated only two per cent of the country's power needs. Currently, Cabeólica supplies approximately 25 per cent of the energy needs of Cape Verde, enabling the country to diversify its energy grid and shift away from thermal energy diesel.

The archipelago of Cape Verde has consistent wind speeds of up to 10 m/s, making it one of the best locations in the world for wind power generation. The wind farms are capable of directly supplying energy to the individual power grids on each of the islands, substantially reducing fuel imports and leading to significant financial savings. The Cabeólica Wind Farm is set across four islands: Sao Vicente, Santiago, Sal and Boa Vista. It has created an abundant source of renewable energy that is cheaper and cleaner than previous sources relied on in Cape Verde.

Sustainable Development Goals impacts

SDG 1: Reduced poverty by contributing to local employment

SDG 7: Provision of affordable, reliable, renewable and modern energy source. The project will increase the share of renewable energy in the global energy mix

SDG 13: Take urgent action to combat climate change and its impacts

SDG 17: Partnerships between government, international financial institutions and private sector

People-first elements

- Environmental impacts: Cabeólica is the first commercial-scale PPP wind farm in sub-Saharan Africa. The project has consistently achieved a reduction in emissions of 55 000 tons of CO_2 annually, providing new and improved access to clean electricity to 360 000 people. Cabeólica has been recognized as a Clean Development Mechanism by UNFCCC and was awarded "Best Renewable Energy Project of the Year" by the 2011 Africa Energy Awards.
- Economic benefits: The project's energy production has reduced the country's consumption of heavy oil fuels and diesel, translating into significant savings. Prior to Cabeólica, Cape Verde has one of the highest energy generation costs in the world.
- Social benefits: The local population of Cape Verde now benefits from an upgraded and extended electricity grid. The project has freed up public funds for other uses and reduced the frequency of blackouts in the country.

Financial information

The project was financed 70 per cent through debt and 30 per cent through equity. Equity financing came from AFC (with 94 per cent stake), FinnFund, InfraCo Africa, Electra and the Government of Cape Verde. Debt financing was provided by EIB (USD 42 million) and the AfDB (USD 21 million). The total capital cost was USD 84 million. InfraCo Africa assumed the direct costs and risks of early-stage project development, enabling the project team to navigate and resolve technical, legal and regulatory issues and allowing the wind farms to be commercially viable and quickly constructed.

Observations

- As a pioneer in large-scale wind energy PPP in sub-Saharan Africa, the project plays an important role in encouraging other countries to implement similar projects.
- The key ingredients for the project's success were the participation of solid, transparent and high-profile partners; government support and stable regulatory framework; contractual instruments to ensure predictable and transparent cost planning and cash flow projections; and other instruments to de-risk the project, making it less likely to incur financial loss.

- Cabeólica is the main producer of renewable energy in Cape Verde and the largest off-setter of greenhouse gas emissions in the country, significantly contributing towards the global obligation to tackle climate change. Cabeólica has also been promoting environmental awareness, particularly on the importance of renewable energy and the need for conservation of local species through preventive and mitigation measures during project construction and maintenance.

Figure 2: Cabeólica wind farm project (Cape Verde)

Photos/Illustrations

Contact information

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3 Energy - The first solar energy cooperative in the Rio Favela informal settlements (Brazil)

Size of investment: USD 0.18 million

Start date: 2020

End date: 2021

Project stage: maintenance

Project partners

- Public partner: City Hall of Rio de Janeiro (technical cooperation to create studies and policies for replicating the model; no financial investment)
- Private partners:
    - LONGI Solar (25 per cent investment – solar modules donation)
    - Local Power (15 per cent investment – solar installation donation)
    - Goodwe (8 per cent investment – solar inverter donation)
    - Solarize & Canal Solar (4 per cent investment – professional training services donation)
- Other partners:
    - International Cooperatives Alliance (22 per cent investment – grants)
    - Open Society Foundations (26 per cent investment – grants)

Project description

Revolusolar is a community-shared solar energy cooperative. As a social organization, it promotes the sustainable development of low-income communities in Rio de Janeiro through distributed solar energy. Solar power can provide a renewable, decentralized source of energy to low-income communities with expensive and low-quality energy service. But to access solar energy in Brazil, initial capital or access to credit is required, leaving only the wealthiest to benefit. The role of Revolusolar is coordination, fundraising and contracting of the necessary services, followed by rental and maintenance of the photovoltaic generator, and administrative support during the cooperative's operation.

Revolusolar partners with two favelas (informal settlements) in Rio de Janeiro, Brazil to co-create a new, affordable, community-based and sustainable energy model, aligned with the traditions of collective action and self-management of these favelas. The project includes solar

installations, professional training to residents as electricians and solar installers, and workshops for children on sustainability. The professional training programme trains the local population to be solar installers and electricians, promoting the autonomy of the community and its residents, in addition to facilitating their entry into the labour market and generating new quality local jobs. So far, 48 residents have been trained as electricians and solar installers in this training programme. Additionally, the workshops of the environmental education programme cover different themes related to sustainability to raise awareness among the local population – particularly children and adolescents – on environmental issues. The workshops currently have 65 local children participating, with the goal of empowering a new generation of youth in sustainability.

The solar installations follow a shared solar generation model wherein Revolusolar designs, builds and owns the solar equipment and the beneficiaries form a cooperative and rent the photovoltaic system. Residents will pay substantially less each month than they have been previously paying for energy from the utility company. The trained solar installers carry out the installations. This project will provide an affordable energy supply to the population as an alternative to current inadequate infrastructure and unaffordable energy.

Sustainable Development Goals impacts

SDG 1 and 8: Poverty alleviation in the informal settlement as the project created decent employment and provided cheaper electricity among residents.

SDG 7: Provision of affordable, reliable, renewable and modern energy source to marginal and vulnerable groups.

SDG11: Make cities and human settlements inclusive, safe, resilient and sustainable.

SDG 13: Take urgent action to combat climate change and its impacts

SDG 17: Cooperation among NGOs, local community and private sectors.

People-first elements

- Affordable, accessible and environmentally friendly energy supply: One quarter of the population of Rio live in favelas with social marginalization, inadequate infrastructure and unaffordable energy supply. They perceive energy services as expensive, unfair, unreliable, low quality and distant from their reality. In the last decade, the price of conventional energy in Rio increased by 106 per cent. On the other hand, the cost of solar photovoltaic equipment fell by almost 90 per cent, in line with the global trend of decreasing renewable energy costs. The adoption of solar energy will, therefore, reduce energy costs for the population.
- Increased opportunities for employment: Unemployment affects almost 14 million people in the country and millions more are underemployed. The solar photovoltaic industry is the leader among renewable sources in generating jobs, according to the International Renewable

Energy Agency.[2] Revolusolar currently employs five solar installers to install and maintain the systems, one administrative manager, two ambassadors focused on communications, one local accountant, four teachers and one educational coordinator.

- Increased awareness and empowerment of local populations: Revolusolar contributes to improving the awareness and empowerment of the population about sustainability and energy. The favelas can become poles for generating clean energy for the city, and the very term "favela" can take on new meanings and become a reference in innovation, sustainability and entrepreneurship.

Financial information

The investment of USD 180 000 covers all the capital expenditures (CapEx) and expenses for the initial six months of operation. It also covers payment to the local residents installing the solar panels, including all their training. Local residents were trained as electricians and solar installers, and then five were hired to install the cooperative's solar system.

The financing model includes institutional sponsors and a rental component. Solar energy beneficiaries pay a monthly fee, which is approximately 70 per cent lower compared with their regular electricity bill. The collected fees, in addition to covering fixed project costs and remunerating local workers who carry out maintenance, are accumulated to finance new facilities in the community. As photovoltaic panels are guaranteed for at least 25 years, operation costs remain low, allowing payments to be used to repay the investment.

At the first stage, the project is funded by non-refundable sources such as grants and scholarships, with discounts of 30 per cent for low-income beneficiaries. After initial validation of the monthly payments made by the cooperative members, the plan is to implement a blended finance structure consisting of an estimated 30 per cent grants, 30 per cent equity and 40 per cent CapEx funded with debt. The debt has an eight per cent interest rate and a payment term of 10 years, with constant amortization and a grace period of two years. There are an estimated eight years of payback, in which the internal rate of return (IRR) will be 7.63 per cent, slightly over the 6.98 per cent weighted average cost of capital (WACC) rate. Positive impact indicators such as social return on investment (SROI), will be measured and reported to have the other 30 per cent of the project funded by grant-makers interested in sustainable economic development.

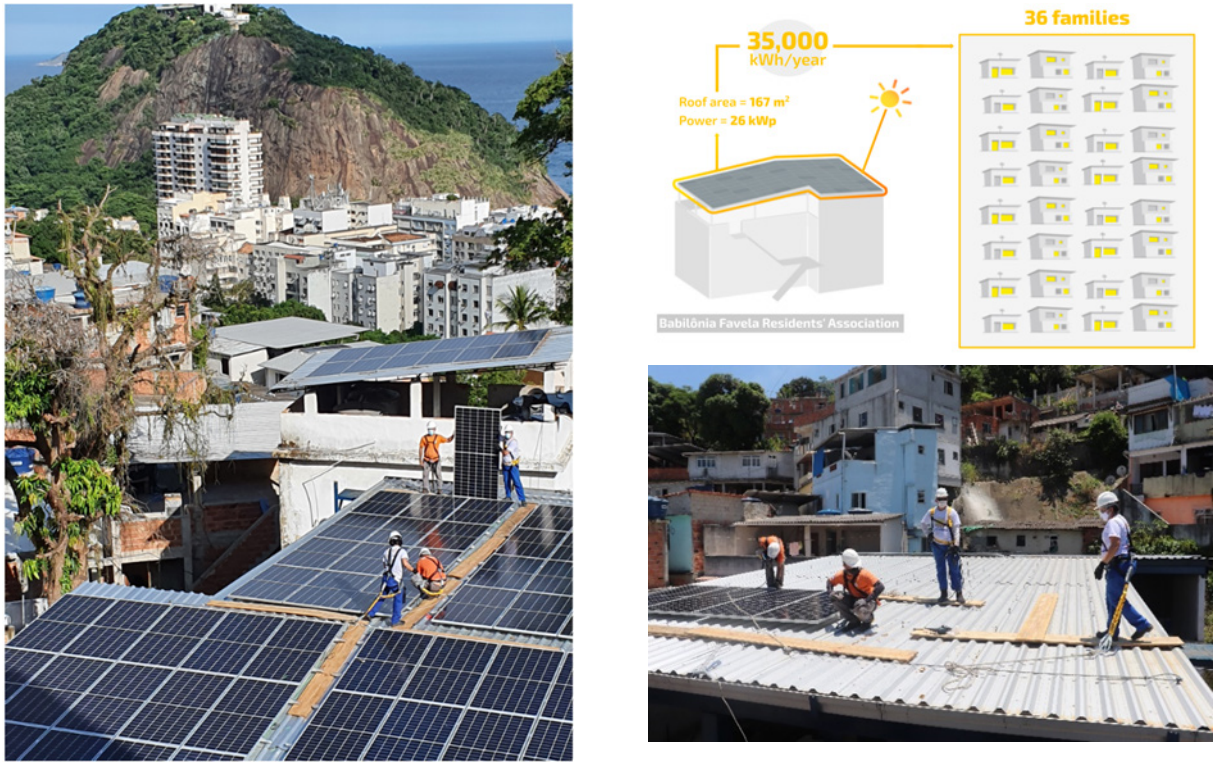
Observations

- Despite schedule delays, mainly due to the pandemic and non-compliance with regulatory deadlines by the local utility, the installation of the system and the professional training of community residents hired for installation were successful.

[2] International Renewable Energy Agency (IREA), *Renewable Energy and Jobs – Annual Review 2018*. Available at: https://www.irena.org/publications/2018/May/Renewable-Energy-and-Jobs-Annual-Review-2018.

- The receptivity of the community, and the society as a whole, to the project was positive. The relationship with sponsors and other institutional partners was also a success, which demonstrates that there are resources available in the market to finance the expansion of the model.
- Although funding from sponsors for the expansion of the model in the short term exists, it comes in a limited scale.
- A closer relationship with the local utility is fundamental for the success of projects of this type.

Figure 3: The first solar energy cooperative in the Rio Favela informal settlements (Brazil)



Photos/Illustrations

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4 Health - Elaziğ Fethi Sekin city hospital (Türkiye)

Size of investment: USD 400 million (2020 prices)

Start date: 2016

End date: 2018

Project stage: maintenance

Project partners

- Public partners:
  - Turkey Presidency of Strategy and Budget (Project Assessment for PPP Approval by the President - evaluated feasibility of the project)
  - Ministry of Health (developed the project, conducted the project tender and signed a contract with the assigned company as a result of the tender. During project execution, monitored project performance, negotiated with the Special Purpose Vehicle (SPV) as necessary, and made the rental payments to the SPV.)
  - Provincial Health Directorate (approved monitoring of hospital operation and payments)
  - Ministry of Treasury and Finance (involved in the assessment of the project and the loan financing process of the SPV and necessary financial support)
  - Ministry of Environment and Urbanization (evaluated environmental aspects)
  - Provincial Directorate of Environment and Urbanization (evaluated environmental aspects)
  - City Revenue Office Governorship Municipality (makes the payments to the SPV)
- Private partners: (contracts signed with the following companies for the execution of the investment and operation phases of the project)
  - SPV (ELZ Sağlık Yatırım A.Ş.)
  - Facility Management Company - Rönesans İşletme Hizmetleri A.Ş.
  - EPC-C (Engineering Procurement Construction - Contractor - Rönesans Medikal İnşaat A.Ş.)
  - Subcontractor of the FMCo and EPC – CRS Ticari Yatirim A.Ş.
- SPV received consultation from the following:
  - LTA (Mott Mac Donald)
  - Legal Advisor Company

- SPV Consultants

Project description

The project involved building a new health centre (city hospital) that offers world-standard health services and new job opportunities to the communities in Elaziğ and neighbouring provinces. Elaziğ Fethi Sekin City Hospital was built using the PPP model and was inaugurated by the Turkish Ministry of Health and Renaissance Healthcare Investment in August 2018. It has been operational since then. The health centre comprises two hospitals and one clinic with a total capacity of 1 038 beds and has 355 752 m^2 gross internal floor area (GIFA), making it the largest healthcare complex in the city of Elaziğ in Turkey.

The health campus includes an 888-bed main hospital, a 150-bed high-security forensic psychiatry hospital and a 60-unit oral and dental health centre. The main hospital facility comprises a general hospital, a maternity and children's hospital and a psychiatry hospital. All hospitals on the health campus are equipped with inpatient services, outpatient clinics, diagnostic treatment departments and support facilities.

The main hospital facility installed 872 world-class cutting-edge seismic isolators, ensuring that Elazığ Fethi Sekin City Hospital remains unaffected from earthquakes and continues all operations during and after an earthquake without interruption.

Sustainable Development Goals impacts

SDG 1 and 8: Reduced poverty by contributing to local employment and the providing affordable health care.

SDG 3: Improved quality of health services and promoted well-being of communities.

SDG 5: Gender equality is ensured as the project promised to allocate 35–40 per cent of workforce places to women.

SDG 9: Use of modern and smart technologies to provide services.

SDG 17: Partnerships between the government and private sector to build the hospital and provide health services.

People-first elements

- High standard of health services: The development of the city hospital improves the quality and inclusiveness of healthcare services in Turkey. It brings together a range of healthcare service discipline and high-technology specialty hospitals into a single campus (e.g., hospitals

specializing in cardiology, neurology, orthopedics, oncology, maternity, pediatrics, and physical medicine and rehabilitation).

- Improved access to health services: The city hospital serves Elaziğ and a wide regional area of neighbouring cities, with a total population of approximately 3.4 million people. Construction of the hospital has allowed for a five-fold increase in the number of qualified beds in the region, from 211 to 1 038.
- New job opportunities and a commitment to gender equality: The construction of Elaziğ Fethi Sekin City Hospital has created 5 000 new jobs during construction and 4 500 during operation, with 35–40 per cent of them for women. All the project documents include gender-equality and non-discrimination clauses for women.
- Use of smart technology: The hospital uses ICT systems such as medical services, e-Government, e-Bill, e-Procurement and electronic healthcare data with the Hospital Information Management System (HIMS). In addition, their help desk system uses information technology to monitor the effectiveness of hospital operation services, penalties and satisfaction surveys. Also, the hospital building uses smart systems in lighting and heating and cooling, and fire and life safety system managed by a Building Information Management System (BIMS).
- Strong commitment to sustainability and resilience: Commitments to sustainability and resilience are reflected clearly in contractual provisions among project stakeholders, with risks on affordability, accessibility and equitability assessed during the feasibility study. The city hospital services are easily accessible to all, including the most vulnerable and disadvantaged. The city hospital uses trigeneration units to reduce GHG emissions and the project has a zero-waste certificate from the Ministry of the Environment.

Financial information

The investment cost covered the construction and operation of the hospital. The project was financed with the first green and social bond for an infrastructure project in Turkey in the amount of USD 400 million. Green bonds are used to provide financing for environmental projects, while social bonds raise funds for projects that address or mitigate a specific social issue and seek to achieve positive social outcomes. The project's bond is a landmark transaction for Turkey and has been certified as "Green and Social" by ESG services specialist Vigeo-Eiris and the credit enhancement has resulted in a Moody rating of Baa2. The project's leverage is 80 per cent, which was raised through green and social project bonds privately placed with major financial institutions, meaning a debt-to-equity ratio of 80:20. Investor's shares are as follows: Meridiam - 68 per cent; Ronesans - 26 per cent; and SAM Yapı - 6 per cent.

Project bonds are repaid through availability payments, which come from quarterly instalments (within the first seven business days of the quarter) by the Ministry of Health. The bonds are paid back by direct repayment over 15 and 18 years.

- A1A bond - maturity: 2034

- A2 and A1B bonds - maturity: 2036

Observations

- The construction process was successfully completed ahead of schedule due to a proper construction management approach and tools.
- The SPV, EPC-C and FMCo worked in coordination, enabling a smooth transition from construction to operation with grantor/end-user satisfaction.
- Ensuring the mobilization on site of administration staff responsible for the operations allowed for the interaction between key stakeholders at the early stage, which proved beneficial for the project and provided an opportunity to improve end-user satisfaction more efficiently.

Figure 4: Elaziğ Fethi Sekin city hospital (Turkey)

Photos/Illustrations

More are available at: https://sygm.saglik.gov.tr/TR-33982/elazig-sehir-hastanesi.html

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5 Housing - Intervention in the Plaza Redonda in Valencia city centre (Spain)

Size of investment: Approximately USD 11.8 million (€10 million)

Start date: 2012

End date: 2015

Project stage: maintenance

Project partners

- Public partners:
  - City Hall of Valencia (local authority)
  - Valencia Regional Ministry of Housing, Civil Engineering and Territorial Consolidation
  - Ministry of Transport, Mobility and Urban Agenda of Spain
- Private partners: 71 home-owning households

Project description

The aim of the project was to rehabilitate the Plaza Redonda, a unique piece of Valencian architecture from the 17th and 18th centuries in the Valencian city centre. The Plaza Redonda, or "Round Square" is enclosed by shops at the street level, with apartments on the upper floors. The plaza structure was originally created in the mid-1800s and its historical value has earned it protected status in Valencia. It is known as one of Valencia's most unique tourist attractions due to its peculiar design. It was a popular area historically as a market for buying fish and meat. The renovation of the plaza included parts of the building that are privately owned by households, as well as the interior of the plaza which comprises spaces for small companies and business venues. Since its renovation, the plaza has become surrounded by traditional craft shops and tapas bars, along with small stalls that sell lace, embroidery, fabrics and Valencian souvenirs.

The historical value of the Plaza Redonda and justification for its renovation were established in a study on the comprehensive rehabilitation of the plaza and constituent buildings undertaken by the Valencia City Council in April 2000, through the Actuacions Urbanas de València (AUMSA). The aims of the intervention included the renovation of the interior and exterior facade of the complex, the standardization of roof volumes and redevelopment of the surrounding public space. The plan for the conservation and preservation of the Plaza Redonda included the involvement of businesses and homeowners.

The main objectives of this project included:

- Recovery of the coherence and composition of the facade
- Recovery of the residential character of the complex
- Establishment of a normative planning framework for private interventions
- Definition of the volumetric (3-dimensional) standards for architectural or private interventions (i.e., limitations on altering windows due to protection measures of historic or cultural heritage, etc.)
- Definition of the protection of the buildings

Sustainable Development Goals impacts

SDG 8: Renovated specialized shops employ dozens of people providing decent stable jobs to area residents and therefore it will contribute to long-term economic growth.

SDG 11: The renovation of the apartment building will ensure its resiliency and long-term viability. The project also protects architectural heritage.

SDG 17: Cooperation among apartment owners, residents, local businesses, government and construction companies.

People-first elements

- Improved living conditions: The Plaza Redonda has been an active centre for wholesale and retail businesses for several decades. Renovation of the plaza thus added tremendous value to the entire commercial life of the city, while simultaneously improving the living conditions of local homeowners.
- Greater access to essential services: The project is aimed at directly or indirectly improving essential services such as access to water, sanitation and electricity through upgrades to the plaza building and attached private apartments. Infrastructure was further adapted to meet the needs of disabled people.
- Local job growth: The project created new local jobs at all three project stages, that is, renovation of the building facade, renovation of the plaza and renovation of the 71 apartments forming the interior of the building.
- Growth in tourism and business: The Plaza Redonda was an intervention related to the whole city centre. Renovation of the inner city was a positive factor for business and tourism, thus creating additional wealth and value in the city. The upgraded plaza has led to a rise in tourism to the area and new businesses by the way of craft shops and tapas bar.

Financial information

The total size of the investment amounted to approximately USD 11.8 million (EUR 10 million) from public finance:

- EUR 2.5 million was allotted to the facade and the roof was covered in full by the City Hall via engagement of private businesses carrying out the renovation.
- Approximately EUR 4.8 million was allotted to renovation of the plaza covered in full by the local, regional and national governments. The estimation comes from taking into account all facilities and infrastructure (excluding the facade and roof).
- Approximately EU 4.5 million was devoted to the rehabilitation of the interior of the plaza, covered initially by private homeowners. The sum assumes average rehabilitation costs (including utilities infrastructure) of EUR 60 000 per apartment unit (71 in total). The tax reduction system allowed for a refund of 15 per cent of total costs for the period 2015–2017 and 25 per cent for the period 2018–2021.

Observations

- Renovation of the plaza guaranteed the safety of residents and visitors of the complex, while also contributing to the preservation of the cultural heritage of Valencia.
- The renovation project revitalized the property, raising property value to approximately EUR 250 000 per 90 m^2 apartment.
- The newly renovated plaza increases the attractiveness of the area for commercial activity (shopping) and tourism. It also preserved existing traditional shops and small businesses.
- The public initiative allowed for greater participation of public institutions in the renovation process.

Figure 5: Intervention in the Plaza Redonda in Valencia city centre (Spain)

Before:

After:




Photos/Illustrations

More illustrations available at: http://aumsa.es/plaza-redonda/?lang=es

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6 Housing - Integral rehabilitation plan – Old Town of Ponferrada (Spain)

Size of investment: USD 4.2 million

Start date: 2004

End date: 2009

Project stage: maintenance

Project partners

- Public partners:
  - Municipality of Ponferrada
  - Regional Government
  - Central Government
- Private partners: Private homeowners and developers
- Other partners: Neighbouring associations

Project description

The regional government approved the guidelines of the "Special Plan for the Protection of the Old Town" or "Plan Especial de Protección del Casco Antiguo" (PECA), which had a main objective of restoring the old town of Ponferrada and renewing the area's urbanization. The city experiences heavy rain and significant temperature changes between summer and winter, causing the centuries-old buildings to decay over time. Despite the historical location at the heart of the old city, the buildings and houses in the old town of Ponferrada were deserted by their owners and neglected for decades. Structural elements such as rooftops and facades were collapsing with the time and weather. Sewage and base isolation systems also required updating.

The old town was experiencing a population decline and ageing so steps had to be taken to reverse the trends because of its strategic location and potential as a historical heritage centre. The plan outlined steps for the city council to boost recovery of the traditional urban environment by renovating existing commercial premises and repairing dilapidated buildings. The project aimed to reconstruct existing buildings to keep the structures from collapsing, while also rebuilding buildings that had already fallen. The aim was to reconstruct and renovate the city centre in its original style and with as much original material as possible to maintain its historical character.

Today's old town of Ponferrada is a renewed city centre, yet historical. It showcases an upgraded look that combines old buildings with new technologies that allow for efficient living, working,

hospitality and tourism services. The project resulted in repopulation of the old town with the return of citizens to recover their private properties, thus revamping the economic potential of the real estate in and around the area.

Sustainable Development Goals impacts

SDG 9: Innovative solutions in order to reduce CO_2 emissions and noise pollution.

SDG 11: The renovation of the apartment building ensures its resiliency and long-term viability. The project also protects cultural heritage and promotes renewal of the old city.

SDG 17: Cooperation among apartment owners, residents, businesses, local and national governments, and construction companies.

People-first elements

- Improved access to essential services: The renovations opened up access to parts of the city not being used due to degradation and economic decline. Renovating and rebuilding these spaces allowed for a socio-economic revitalization of the city.
- Growth in local jobs: Restoring the old town led to a growth in tourism, hospitality and commercial services that employ local populations. The area was in decay, lacking economic activity and cultural attractions, but the rehabilitation plan led to the opening of new shops, bars, restaurants and boutique hotels. The municipality received 30 new licences for commercial activity related to food service and hospitality, creating around 120 jobs, in addition to the jobs created for maintenance and adaptation of the premises. An additional 30 to 50 jobs were created by the 10 to 15 new shops and professional service offices that opened in the area.
- Successful reduction of greenhouse gas emissions: The old town renovations reduced energy consumption through thermal insulation and the installation of energy-saving systems.
- Access to adequate housing: Rehabilitation of the local housing improved habitability by improving acoustic isolation to protect against noise. It also guaranteed functionality, accessibility and mobility through improvements to the housing facilities including: rehabilitation to make structures more stable; renovation of facades to respond to the deterioration of coating; installation of elevators; and improvements in energy efficiency through thermal insulation and alternative energy systems.

Financial information

This project was financed through grants to private owners and users, as well as loans to developers and sellers. Public funding was used for parks and infrastructure. The general terms of provision were covered 50 per cent by city funds, and 25 per cent by regional and national funds.

The project was incentivized through the promotion of qualified loans of 80 per cent the maximum prices of homes, garages and storerooms. These loans encouraged the renovation of private households and were offered with a 20-year amortization and 3-year grace period, with a variable annual interest rate of 3.96 per cent (for 2003). Homeowners were also offered subsidization – a reduction of the monthly loan payments – according to their income level. In addition, complementary aid was offered to young people, large families and single parents from the Junta de Castilla y León.

Observations

- Having city officials make the first move in the rehabilitation process using the public budget was necessary to encourage owners of private buildings to commit to further rehabilitation.
- By moving forward with the upgrading of facades and other external elements using small public budgets, private owners were willing to contribute more to the project.
- The support from private owners freed the public budget to finance further improvements of public infrastructure elements, thus resulting in the complete rehabilitation of the historic city centre.

Figure 6: Integral rehabilitation plan – Old Town of Ponferrada (Spain)

Before:



After:

Photos/Illustrations

Photo credit: Ponferrada City Council

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7 ICT - MainOne submarine cable project (West Africa)

Size of investment: USD 240 million

Start date: 2008

End date: 2010

Project stage: maintenance

Project partners

- Public partners:
  - Governments of Nigeria and Ghana (granted rights / licenses to operate the project in their jurisdiction)
- Private partners:
  - Africa Finance Corporation (AFC)
  - African Development Bank (AfDB)
  - Pan-African Infrastructure Development Fund
  - Nigerian Banks: FBN Capital and Skye Bank
  - KFW DEG (provides long-term financing and advice to private enterprises investing in developing and emerging market countries)
  - Main Street Technologies Nigeria (promoter)

Project description

The MainOne cable system is an underwater cable spanning approximately 14 000 km, with a 7 000 km cable linking Nigeria, Ghana and Portugal, and reserved branching units to Morocco, Senegal, Côte d'Ivoire and the Canary Islands. The undersea fibre-optic cable was conceptualized to be developed in two phases, with phase two deploying an additional 5 473 km of cable connectivity to Angola and South Africa.

The MainOne cable system is the first private subsea cable along the West African coastline, owned by the MainOne Cable Company based in Nigeria. MainOne began the construction project in February 2008, and launched it for commercial service in 2010. The MainOne cable system has been proven to provide capacity of at least 4.96 terabytes per second (Tbps). Today, MainOne serves as a conduit for approximately 60 per cent of broadband bandwidth into Nigeria, and its customers include Internet service providers, corporate clients, universities and government

offices. The project has received multiple international awards including the African Banker Deal of the Year in 2009 and the Private Equity Africa Development Impact Award in 2012. The MainOne project represents the first wholly privately African-funded licensed submarine cable along the West African coastline.

Sustainable Development Goals impacts

SDG 9: Investment in sustainable infrastructure and technology increases the potential for economic growth on the African continent.

SDG 10: Improving and modernising communication and technological infrastructure in Western Africa will reduce the inequality in services.

SDG 17: Partnership between governments, financial institutions and services providers.

People-first elements

- Improved communications access: Access to the only pre-existing cable system on the west coast of Africa, was restricted to national telecommunication operators with landing rights in their respective countries. This mode of operation led to monopolistic conditions and the artificial fixing of bandwidth prices for third-party users. The MainOne project was built on an open access basis made open to all operators in the countries of the project. By acting as a neutral platform, MainOne is attractive to many ICT/telecommunications operators.
- Greater affordability: MainOne was structured to add value and increase impact. The project changed the wholesale bandwidth pricing structure to provide more value to customers. Pricing is determined by market forces and driven by economies of scale to ensure inclusiveness and penetration. Regional connectivity and access, with significant technology/broadband cost reductions to local businesses and consumers, were achieved.
- Creation of new jobs: MainOne has created 100 000 direct or indirect jobs as a provider of innovative telecom services and network solutions for businesses in West Africa.

Financial information

The project total cost was USD 240 million with a debt-to-equity ratio of 1:1. The project was financed through a mix of debt (USD 120 million) and equity (USD 120 million). AFC contributed USD 37 million in equity and shareholder loans and was the lead arranger on the debt syndicated financing of USD 120 million. AfDB contributed USD 61 million in debt financing. Other investors included the Pan-African Infrastructure Development Fund, Nigerian Banks (FBN Capital and Skye Bank), KFW DEG, and Main Street Technologies Nigeria.

Since the project was wholly private sector-oriented, there was no concessional funding involved. The project benefitted from competitive resources from development financial institutions. Since

this transaction was carried out mainly through a syndicated financing structure, AFC may be legally restricted to share the terms and conditions negotiated with other lenders. However, the AFC contribution is fully through direct equity participation and shareholder loans, with favourable terms and conditions.

Observations

- Leasing bandwidth to leading local telecom operators has generated activity and revenue for these companies, further promoting sector growth.
- In 2009, approximately 80 per cent of the voice and data traffic of Africa was carried by satellite, which was not suited for new broadband applications that required large bandwidth. The project solved this challenge by adopting a sophisticated technology to meet broadband capacity needs, increasing network capacity and efficiency. The Dense Wave Division Multiplex (DWDM) fiber optic system technology provided a design capacity of 1.28 Tbps, which is approximately 10 times the speed capacity of other existing technologies.
- Early-stage equity contribution from AFC provided a de-risking opportunity resulting in a diverse group of international financiers and accelerated time-to-market. Unexpected incurred costs, or cost overruns, were mitigated by putting in place a standby funding contribution from investors.
- The project required development funding from major international institutions to reach bankability. Investors were hesitant to commit to a startup company that was planning to develop and implement a technologically advanced and complex project with multi-jurisdiction implications. Overcoming this challenge required a well-structured and well-developed project with a strong sponsor group, and credible international financial and technical partners.
- Differing regulatory regimes in countries of the project led to some delays in obtaining requisite operational licences and authorization. Approvals for licences, landing permits, environmental/waterways permits, and construction permits vary substantially per country. The cross-country nature of the project requires knowledge of differing regulatory and market requirements for its operation.
- At inception, the role that fibre-optic broadband systems can play in the social, economic and commercial activities and development in the countries was relatively less acknowledged and known. Consequently, the positive impact was generally underestimated by most countries but has significantly improved over time.
- The project has a potential impact on the marine and terrestrial environments. Overcoming this challenge required a detailed impact study that ensured operation with minimal impact to the environment and avoided any marine-protected areas. Close consultation with communities of the project, as well as provision of employment opportunities at the construction and operational phases ensured maximum buy-in of all the communities.
- At inception, attracting and retaining skilled personnel to a start-up enterprise was a major challenge for the project. Specialized training programmes were conducted to enhance capacity and ensure the successful operation of the project.

Figure 7: MainOne submarine cable project (West Africa)

Photos/Illustrations

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8 Transport - Toll road bypass of Togliatti with bridge over Volga river (Russian Federation)

Size of investment: USD 1 675 million

Start date: 2018

End date: 2024

Project stage: construction

Project partners

- Government of Samara region (public)
- SPV Concession of Togliatti bypass (PPP)
- Road construction and investment company Avtoban investment (private)

Project description

The toll road covers around 100 km, which allows the road to bypass the city of Togliatti, in the Samara region, and cross Volga River over a new bridge. The Togliatti bypass and bridge over the Volga River are of high strategic importance as part of a transport corridor between Europe and China. The 4 km bridge will significantly contribute to economic growth and progress in the central Russia region of Samara by creating favourable conditions for the development of an economic area and attracting federal and foreign investment.

The express toll road being constructed will accommodate two lanes of traffic in each direction. The entire route will span from the M-5 Ural Highway towards Ulyanovsk, cross the Volga River and bypass the city of Togliatti to connect again to the M-5 Ural Highway. The project is expected to be completed and open for traffic by 2024. Overall, the bridge and highway will serve to link Moscow and Kazan; it is projected to cut travel time from 16 hours to 8 hours.

Sustainable Development Goals impacts

SDG 1: Improvement of transportation and market-access will contribute to the reduction of poverty.

SDG 11: The new highway will reduce city congestion and improve air quality.

SDG 17: Partnerships between regional government and private sector.

People-first elements

- Improved access to national transportation network: The travel time from the Samara region or Togliatti city to Moscow will be reduced by five hours.
- Regional connectivity and new jobs: The toll road and bridge will remove major bottlenecks in international transport routes from China to Europe. More job opportunities in machine-building, chemical, petrochemical and agricultural industries in the region are expected as a result of the new transit route.
- Access to new markets: Small- and medium-size businesses will gain access to new markets by utilizing an efficient mode of transportation for their goods.
- Reduced traffic and congestion: The toll road removes transiting traffic from the city.

Financing model:

The project was funded through an unsolicited proposal. The initiative for this project was developed by a private entity then proposed to the government. If the project idea is accepted, the government announces a tender for a concession on a website for a period required by Russian legislation. If no better offer comes along, the initiator gets the concession deal. If there is a better offer, then the better offer gets the concession deal, and the initiator receives between 0.5 and 1 per cent from the capital investment amount as a remuneration for the initiative. In this project, the initiator was also chosen for the concession.

Half of the project cost will be covered by the government of the Samara region – close to the border of Russia with Kazakhstan – and the remaining cost will be covered by a special-purpose company called Bypassing Togliatti.

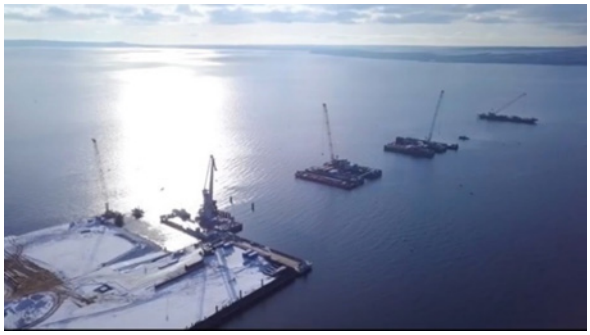
- The unsolicited concession proposal resulted in a minimal revenue-guaranteed concession co-financed with a federal capital grant (approximately 50 per cent) and project finance through private equity and commercial debt (amounting to about 50 per cent of the total CapEx).
- All project finance (about 50 per cent of the total CapEx) will be paid back approximately 14 years after project completion.
- All debt is in local currency from local sources. The senior debt interest rate is fixed through utilization of the special facility run by the national development bank. Caps on the cost of equity/subordinated debt and the cost of senior debt used in the concession agreement comply with requirements set by the Federal Ministry of Transportation for provision of the capital grant.

Payback model: Tolls are collected by the concessionaire to recoup the investment. Payments will range from USD 3 for cars to USD 18.20 for lorries. In the event of insufficient revenue, the revenue deficit is paid by the conceding partner. Any excess revenue from the tolls is shared 50/50 between the private and public partner.

Observations

- An unsolicited project proposal was allowed to reduce public costs and accelerate competitive procedures for contracting.
- The developer's completion of certain design work, prior to the delivery of the proposal and contracting allowed for an accurate cost estimation and quicker mobilization.
- The involvement of the company sponsors in the process of project proposal development, public appraisal and financial closing allowed the developer to recover its venture investments more easily.
- Giving control of the project company to equity investors affiliated with the Engineering, Procurement and Construction (EPC) contractor could cause a conflict of interest with sponsors, and therefore, should be avoided.

Figure 8: Toll road bypass of Togliatti with bridge over Volga river (Russian Federation)



Photos/Illustrations

Photo Credit: JSC Concession company of Togliatti bypass

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9 Transport - Longhua tram (China)

Size of investment: approximately USD 390 million (RMB 2.54 billion)

Start date: 2015

End date: 2017

Project stage: maintenance

Project partners

- Public partner: Bureau of Public Affairs of Longhua District, Shenzhen Municipality

  (involved in project investment, public tender, construction and project management, and franchise operation)

- Private partner: Shenzhen Modern Tram Co. Ltd, a joint venture of two partners
  - Shenzhen Metro Group (49 per cent share in the joint venture)
  - China Railway Group (51 per cent share in the joint venture)

Project description

The Longhua Modern Tram Project is a light rail system that integrates the north side of Longhua into the city's rail network in Shenzhen, significantly easing commuting difficulties and relieving traffic congestion in the city. A feasibility study for the project was completed in 2014, with construction of the line being completed from 2015 to 2017. It is approximately 11.7 km long, with 20 stations in total. The project includes the development of one tram car maintenance shop and 15 tram cars powered by energy storage supercapacitors. The modern tram system has lower energy consumption, greater flexibility and quieter operations than metro and light rail.

Sustainable Development Goals impacts

SDG 9: Increased in resource-use efficiency and adoption of climate-neutral technology. The use of smart technology enhanced railway safety.

SDG 10: The tram project ensures transportation to previously unserved part of the city.

SDG 11: Reduced reliance on private cars and the promotion of public transport will improve the sustainability of the city.

SDG 13: Climate action with the use of carbon-neutral mode of transportation.

SDG 17: Partnership between local government and private railway companies.

People-first elements

- Access and equity: The tram system integrates the north side of Longhua district into the city's metro network and significantly eases commuting difficulties to promote equity for local inhabitants in terms of metro service. This project provides the citizens with convenient, safe, economic and environmentally friendly railway transit services.
- Use of smart technology: The train operation is controlled by an intelligent (cloud platform) control system, which allows the dispatching centre to control the two signals (traffic and tram signals) across the junction, thus ensuring safety for passengers. The system supervises the operation of the track area and stations in real time, ensuring traffic priority to the tram at crossings.
- Environmental sustainability: The tram is powered by a supercapacitor, which can be recycled after eight to 10 years of service. It saves approximately 30–40 per cent electricity consumption in comparison with a conventional electricity-driven train. The line track is covered by green grass, and trees are planted alongside to build an ecology landscape, effectively reducing carbon emissions and urban noise.

Financial information

The project construction used a concession model, managed and franchised for 20 years and open to public tender, with a settlement price of RMB 2.54 billion (approximately USD 390 million) for the winning contract document. The project total investment included RMB 1.31 billion (USD 200 million) for construction, RMB 860 million (USD 130 million) for device procurement and renewal, and RMB 390 million (USD 60 million) as subsidy for the passengers/revenue gap. The government approved an initial fare of RMB 2 (0.30 USD) for the line trip, while advertising and commercial operations along the line have accounted for 4 per cent of total operational income.

The public tender for the project investment covers the construction cost and the cost of the 20 year-concession operations (including taxes), which will be shared by the successful bidder according to the winning contract price and contract terms. The investment is split by the partners according to their shareholdings. The project has outstanding socially beneficial properties; the financial internal rate of return is limited to 2-2.5 per cent of the winning contract price for the concessionaire.

Payback terms: The project is paid for through ticketing and operating revenues (advertising etc.). The concessionaire is responsible for marketing and promotion to attract passengers. Any increase or decrease in passenger flow, which may bring about change of the fare cost during the operating period, will be in accordance with the winning contract document and the operating supervision agreement document.

Observations

- The completion and operation of the tram line in Longhua District has successfully integrated the north-central part of Longhua into the transportation system, achieving the expected passenger flow and traffic efficiency.
- The tram line operator has effectively delivered safety and operation targets, with the short interval between trains greatly facilitating the daily travel of residents in the northern part of Longhua District through reduced travel costs and increased travel efficiency.
- In the past three years, 28.17 million passengers have been transported, with an average daily passenger volume of 24 300 and a maximum daily passenger volume of 41 400.
- The cumulative operating chart fulfilment rate is 99.7 per cent, the punctuality rate is 99.4 per cent, and 11.64 million km have been safely run.
- Developing the customer service team improved timely and efficient response to passenger complaints and enquiries.
- Offering different payment methods such as Shenzhen Pass, WeChat, Alipay, UnionPay and digital RMB is useful to meet the public's payment habits and facilitate their travel.

Figure 9: Longhua tram (China)

Photos/Illustrations

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10 Transport - TOSA electric bus fleet (Switzerland)

Size of investment: USD 38 million

(USD 33 million – cost of the project + USD 5 million – cost of the prototype)

Start date: 2016

End date: 2018

Project stage: maintenance

Project partners

- Public partners:
  - TPG (public transport company of Geneva)
  - Canton of Geneva
  - Office of Industrial Promotion
  - SIG (local electric company)
  - Government of Switzerland
- Private partner: ABB (an international infrastructure company)

Project description

The project involves the creation of a fleet of 12 electric buses which use flash-charging technology via an overhead charging arm every three or four stops. The new bus fleet reduces three types of pollution: air pollution (no particle emissions), noise pollution (50 per cent quieter than a diesel bus) and visual pollution (no overhead lines). The trolleybus system optimization power supply or "Trolleybus Optimisation Système Alimentation" (TOSA) protoype was launched in 2013 at the Geneva UITP Summit, and the first commercial line was launched five years later. After a year in operation, the electric buses covered more than 500 000 km, connecting the Leman express Bachet de Pesay station to the Geneva international airport.

Sustainable Development Goals impacts

SDG 9: Increased in resource-use efficiency and adoption of climate-neutral technology.

SDG 11: The growth in the use of public transport and connectivity within Geneva will improve the sustainability of the city as it reduces air and noise pollution.

SDG 13: Climate action with the use of carbon-neutral mode of transportation.

SDG 17: Partnership between local and national governments, public transport company and public utility service.

People-first elements

- Access and equity: In 2019, the bus line frequentation was 3 153 434 clients for 572 452 km on the line 23 (connects the Leman express Bachet de Pesay station to the Geneva international airport in less than 40 minutes). The new fleet offers a more comfortable experience for passengers and drivers.
- Economic effectiveness: The TOSA bus has a service life of 20 years instead of the normal 15 years for a diesel bus. The battery life is expected to last up to 10 years.
- Environmental sustainability and resilience: The fully electric bus fleet allows for a reduction of 1 000 tons of CO_2 per year. The electric bus produces 50 per cent less noise than the diesel bus.
- Employment opportunities: The current operational line of 12 electric buses is expected to grow to more than 200 by 2030 and employ more than 1 000 drivers, 12 per cent of which today are women. The shift of employment skills from diesel to electric buses will generate new employment opportunities.

Financial information

The project is paid by the State through investment; ABB through the development of the infrastructure and technology; and TPG, which is responsible for the maintenance. A feasibility study was conducted from 2011 to 2013, which involved a USD 5 million investment financed by ABB. This study allowed for the start of a prototype and demonstrated the feasibility of the project. The commercial line of electric buses came into operation at the end of 2017 to June 2018. The commercial line cost USD 33 million, of which USD 16.5 million was paid for by the State and covered general infrastructure such as charging polls. Another USD 16.5 million was covered by TPG to buy the vehicles. ABB did not make any financial investment in the final project itself but did invest in the prototype. A Swiss company, Hess AG, purchased all electrical equipment necessary from ABB. In addition to State and TPG financing, a subsidiary from the Federal Office of the Environment covered approximately 10 per cent of costs (USD 3.3 million of the USD 33 million project cost).

Payback terms: The repayment plan is over 20 years for the vehicles and infrastructure (this is the normal depreciation of vehicles in Switzerland). The project is paid 50 per cent by the State budget and 50 per cent by TPG through earnings from ticket sales. TPG finances the buses via a bank loan with an interest rate plus amortization of 1.5 per cent.

Based on the successful experience of the TOSA line, the shift to a full network of electric buses in the future has been adopted by the Canton of Geneva on December 2020, with an ambitious action plan from 2024 to 2030.

Observations

- The ultrafast charging solution is reliable and adapted to the heavy urban large-capacity mobility solution.
- The environmental benefits, particularly energy efficiency and noise reduction in the city, are very high.
- The improvement of battery technology would allow for a decrease in the charging infrastructure requirements along the line.
- Providing a solution from a single manufacturer would simplify the implementation and deployment of the fast-charging electric bus solution.

Figure 10: TOSA electric bus fleet (Switzerland)

Prototype design of bus and feeding station

Current design of bus and feeding station

Photos/Illustrations

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11 Urban development - Parque das Nações, Lisbon (Portugal)

Size of investment: USD 232 million

Start date: 1992

End date: 2005

Project stage: implementation

Project partners

- Public partners:
  - Government of Portugal
  - City of Lisbon
  - Parque das Nações PPP Unit (State-owned enterprise)
- Private partner: Multiple development, investment and lending partners, developers and contractors, investors including private equity and mezzanine providers, and debt providers from commercial banks.

Project description

The Parque das Nações or "Park of the Nations" project envisaged the transformation of an area in Lisbon suffering from environmental degradation into a landmark destination. East Lisbon, although in a unique geographic location, was an industrial area for a slaughterhouse, waste depot, unorganized container storage, refineries and other illicit activities, which eventually contaminated the land and water. Urban planning and management were developed on a small scale with a low quality of redevelopment.

In the late 1990s, the government designated the area as the site of the 1998 Lisbon World Exposition, or Expo 98. Expo 98 hosted 130 countries and international organisations and had the theme of "The Oceans: A Heritage for the Future". The entire area of East Lisbon at the waterfront was rebuilt for the event. This led to the transformation of the area into a modern commercial and residential district - Parque das Nações. The Parque das Nações is now a popular destination for those visiting or living in Lisbon. It boasts a large shopping centre, a state-of-the-art oceanarium, a modern casino, water gardens, a viewing tower and large numbers of restaurants and bars.

Urban development models were designed to attain a unique public urban service, from the design phase to building and operation, making Parque das Nações one of the largest urban redevelopment projects in Europe. The Parque das Nações project comprised a variety of investments, including public, PPP and private. The PPP investment project was designed by the Parque das Nações

PPP Unit and has created multiple SPVs that were opened for the participation of private sector developers and investors.

Sustainable Development Goals impacts

SDG 8: The project created productive and decent employment.

SDG 11: Integrated urban planning and transformation from a polluted to modern estate increased city liveability and sustainability.

SDG 17: Partnership between local and national governments, financial institutions and real estate developers.

People-first elements

- Maximizing economic potential: The urban development project transformed an industrial and polluted area into a sustainable city district with a new central business district and multiple urban products: housing retail, services and public social infrastructure. The PPP project demonstrated the ability to leverage public urban design, public land and public permit management, while attracting private equity and debt.
- Increased opportunities for employment: 25 000 new residents relocated to the city and created 18 000 new permanent jobs. On top of attracting people back to the city of Lisbon, the project focused on improving the quality of life of communities, by adding education, health, cultural, sports infrastructure and services, and creating new decent jobs, retail and service facilities.
- Social benefits: The project has created impressive leisure facilities along the rivers of Lisbon where residents and visitors can jog, bike or rollerblade. The construction of a modern marina permits additional recreational activities like water sports and creates space for nautical sport events.
- Use of ICTs to make the district more pedestrian friendly: Traffic lights were installed to slow down traffic, encouraging cars to choose routes away from the district. This speed control created a safe environment for pedestrians that contributed to quality of life.

Financial information

The total PPP project cost was USD 232 million, comprising USD 186 million debt and USD 46 million equity (USD 23 million from the public partners and USD 23 million from the private partners). An SPV was created, and equity shares were sold to private developers. Business plans were developed by the SPV partners, and debt was raised jointly. To raise debt, the partners used the mortgage of the land, business plans with the estimated project cost and shareholders' IRR to guarantee debt and optimize interest rates.

Payback terms:

The payback was generated from rent of the real estate, and was distributed as follows:

- USD 90 million to the SPV shareholders (equally divided between public and private entities)
- USD 65 million to the public development company
- USD 34 million to the central administration
- USD 15 million to the local administration

To recuperate investment, rental contracts were established with the final users, initially with letters of intent and then with 5- to- 10-year rental contracts. The contracts guaranteed at least 60 per cent building occupancy so the money from rents will secure future payments to the debt.

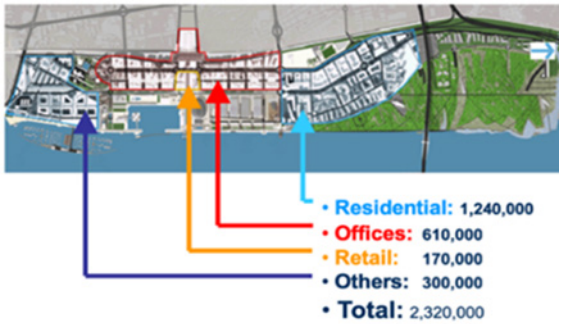
The output of the project generated residential, retail and service retail real assets. The assets were sold to institutional investors, most of which were pension funds.

Observations

- The project has achieved significant social, environmental and economic impacts, but could have provided greater outcomes in the transformation of the surrounding territories.
- For future projects, it is recommended that the positive externalities of improving a territory should be integrated during design, construction and exploitation phases, so that surrounding communities benefit from the development of a new district.

Figure 11: Parque das Nações, Lisbon (Portugal)

Before:



After:

Photos/Illustrations

Photo credit: Parque Expo at www.portaldasnacoes.pt

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12 Urban development - Ogal Shiwa – Public real estate programme (Japan)

Size of investment: approximately USD 60 million

Start date: 2011

End date: 2017

Project stage: maintenance

Project partners

- Public partners:
  - Shiwa town (Iwate Prefecture)
  - Toyo University
- Private partner: Various local companies

Project description

The town of Shiwa, a small municipality with a population of about 34 000 in the Iwate Prefecture (Japan), developed a 10.7-hectare plot of land in front of their train station. After ten years of economic downturn and harsh financial conditions in the town, it was determined that the site could be used to create economic activity and generate new revenue. To accomplish this, the public real estate programme, Ogal Shiwa, was developed and it included the development of approximately 60 housing units and additional sub-projects such as the redevelopment of the old town hall, a new public library complex, football centre and a hotel complex. These new public facilities attracted visitors to the area and made the town more attractive for small and medium businesses such as cafes, restaurants, a farmers' market and other small retail.

To successfully execute the projects, the town concluded a memorandum of understanding with Toyo University to conduct a feasibility study for PPP. The study focused on determining the potential strengths of the town and the site. With the envisioned businesses, the study found that the town's location between several large cities and easy accessibility by train could potentially attract customers from other cities. Moreover, the town produces good quality agricultural products, which could be marketed to the potential visitors from larger cities where these products are not widely available.

Toyo University suggested that the project should create a local economic ecosystem that is based on local production and would involve local labour and culture, rather than creating a generic project like a large shopping mall. With the positive results of the study, the town developed a

"Shiwa town PPP basic plan", which was disseminated to the local population through more than 100 community meetings. Once the plan received sufficient support from the population, the public real estate programme started the development of the football centre, followed by the Ogal Plaza, which included the public library and the commercial centres. Following this, Ogal Base (consisting of a volleyball court and hotel complex) and the town hall, as well as the other infrastructure projects, were completed.

Sustainable Development Goals impacts

SDG 9: Use of modern and smart technologies throughout the project, from the design and procurement to post-construction and market access for local products.

SDG 11: The project involved the building of safe and affordable housing with safe and inclusive green and public spaces while improving waste management.

SDG 12 Sustainable management and efficient use of locally-sourced materials.

People-first elements

- Increased activities for the local population: Ogal Shiwa opened new after-school activities for local children such as football, volleyball and other sports, as well as library programmes. These activities also benefit children from neighboring cities.
- Use of local products and waste reduction: The town's energy station utilizes local wood resources for district heating, cooling and hot water.[3] Leftovers from the farmers market are used in hotel restaurants to reduce food waste.
- Rise in economic growth: In addition to encouraging new visitors, Ogal Shiwa has attracted new residents to the town, successfully reversing its population decline in 2020 as a result. The local farmers and the local construction industry have experienced a diversification of revenue as a result of the project. Approximately 250 new jobs were created from the project as a result of the development of the library, hotel complex and other facilities. The Ogal programme attracts almost one million visitors annually, with the farmers' market generating more than USD 5 million in annual sales.
- Use of smart technology: E-procurement is used in the city and all procurement documents and other information can be obtained through a website. The farmers market uses a Point of Sales (PoS) system, which can track the sales of each farmer on their cellphones.

[3] The logging industry in Japan is difficult to sustain due to a large importation of cheaper wood from abroad. This leads to a vast amount of poorly managed planted forests, which can harm biodiversity and cause disasters such as landslides/sediment. Therefore, encouraging the use of local woods is essential to sustain the regional ecology.

Financial information

Since the Ogal programme consists of a series of sub-projects, the financing mechanisms vary:

Sub projects	Iwate Prefecture Football Centre	Ogal Plaza	Ogal Base	Shiwa Town Hall	Energy Station	Ogal Centre	Ogal Hoikuen (Childcare)
Project Owner	Iwate Prefecture Football Association	Ogal Plaza Co., Ltd. (SPV-Public and Private jv)	Ogal Co., Ltd. (SPV)	Shiwa Town	Shiwa Green Energy Co., Ltd.	Ogal Centre Co. Ltd (SPV-Public and Private jv)	Kyojokai Social Welfare Corp.
Project Partner	Shiwa Town (with Ogal Shiwa Co. Ltd.)	Ogal Shiwa Co. Ltd.	-	Shiwa City Hall Co. Ltd (SPV)	-	-	-
Methods	PPP-Agent	PPP-Agent	Public land utilization (private business)	PFI (BTO) 15 years	Sole source	Public land utilization (private business)	Public land utilization (non-profit business)
Facility	Soccer ground (artificial turf)	Library, cultural centre, childcare, farmer's market, restaurants, shops, clinic, office	Hotel, volleyball court, restaurant, convenience store	Public administration office	District heating (town hall, Ogal Plaza and houses)	Paediatrics, nursery, offices, retail, restaurant, gym, children's centre, lodging	Childcare (Capacity: 150)
Cost <Public financial burden/ subsidy>	$175M <subsidy $0.6M>	S10.7M <S8.1M incl. $0.7M equity investment>	$7.2M	$33.8M <$33.8M>	$5M	$3.1M ($0.4M as equity investment to Ogal Centre Co.)	$3.3M <subsidy $2.2M mostly by central government>
Financing	Financed by Iwate Football Association	Project finance (10 years)	Private project finance	Private project finance (15 years)	N/A	Private project finance	Corporate finance
Completed	April 2011	June 2012	July 2014	May 2015	July 2014	December 2016	April 2017
Land usage	Lease	Fixed-term lease		-	Fixed-term lease		
Landowner	Shiwa Town						

In the above, two of the sub-projects are highlighted:

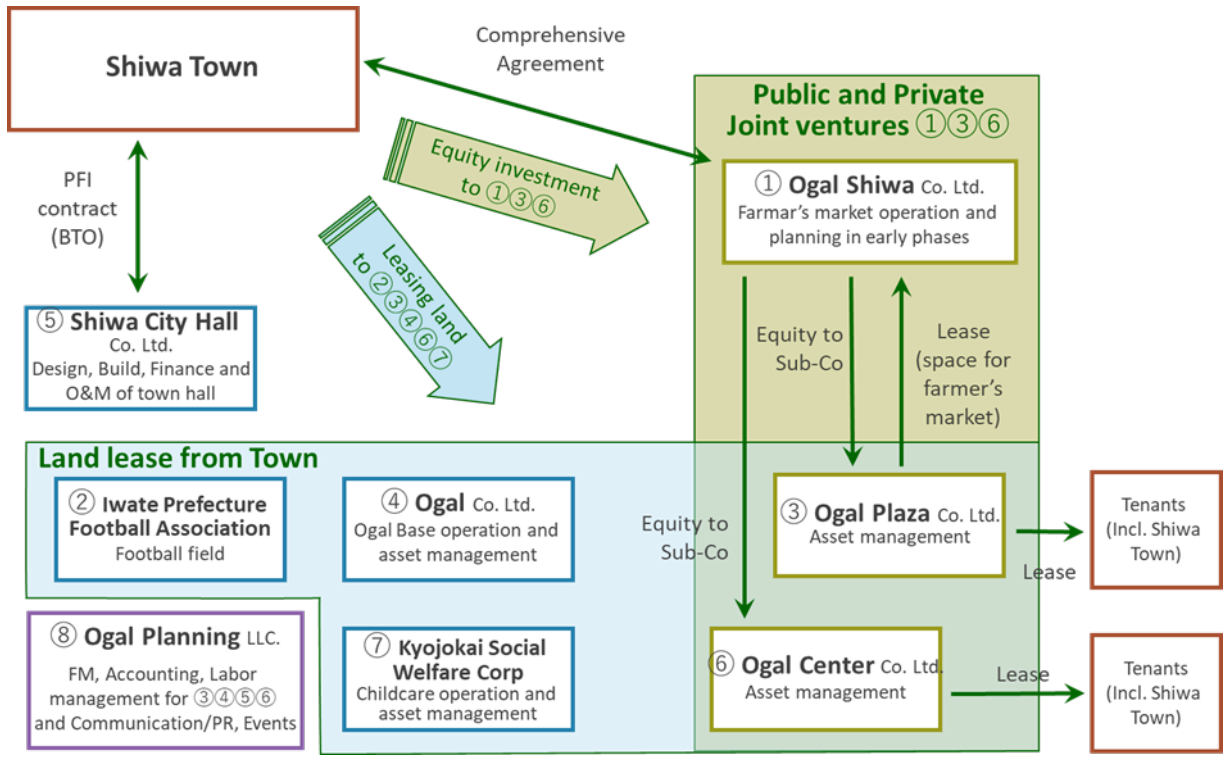
- Ogal Plaza - consists of a public library, cultural centre and farmers market. It was developed by a sub-company (Ogal Plaza Co.) set up to serve the project by Ogal Shiwa Co. (public-private joint venture). Its financing came from Ogal Shiwa Co., Urban Redevelopment Promotion Organization and commercial banks through equity investment, public funds and a loan (term of 10 years at a 2.125 per cent interest rate). The shareholder ratio of Ogal Plaza is: 46.67 per cent by the town; 40 per cent by the Urban Redevelopment Promotion Organization; and 13.33 per cent by Ogal Shiwa Co. (the town together with 9 companies). The library and adjunct public facility were financed by the town (USD 8.1 million or about 73 per cent of the CapEx). It was a one-off payment upon completion of the construction. The town operates the library, while hard facility management is taken care of by the sub-company (Ogal Plaza Co.). The interior and equipment of the farmers market was partially financed by the membership fees (around USD 500) of the farmers who established it.
- The town hall (municipal administrative office) reconstruction was financed through a government-pay PPP or the private finance initiative (PFI) model. In this case, it was initially financed solely by the private SPV - Shiwa City Hall Co. About 60 per cent of the money came as a syndicated loan from banks and the rest was equity investment from sponsors – PFI consortium

members (9 companies). Upon completion of the construction and transfer of facility ownership to the town, the town pays to the SPV using its budget over the contract term (15 years). Since this is a town hall, it does not generate any revenue; thus, it is repaid for with taxpayer money. That is, it was initially financed 100 per cent by the private party and the town will repay 100 per cent of that amount over 15 years (unitary payments over the contract term).

Ogal Shiwa Co. is a development corporation originally set up by the town of Shiwa to execute the "Shiwa town PPP plan" through design, procurement, finance, finding tenants and operations. It started as a 100 per cent publicly financed project management company and concluded a comprehensive agreement with Shiwa town. For the first year of operation, Ogal Shiwa Co. conducted market research and interviews to find potential tenants and investors. After one year, the company gained capital from the private sector and became a project implementation company. All the capital investors were local companies within Shiwa or nearby cities.

Since the town of Shiwa remains the landowner, the town receives land lease fees for 32 years (design and construction for two years and operations and maintenance for 30 years). Today the land generates enough tax revenue to cover operation and maintenance costs of the public facilities built within the project area as well as investment in other parts of the town.

Figure 12: The scheme of relationships between the Shiwa town and project companies for sub-projects



Observations

- The private management of Ogal Shiwa Co. made it possible to construct a public facility at a reduced cost, enabling the SPV to pay back loans quicker than initially planned.
- Tax revenue generated within the Ogal area can cover the operation and maintenance cost of the public facilities (library, cultural centre, after-school childcare, etc.) and allows the town to invest in additional facilities and projects, like the renovation of old school buildings and improvements in community transportation.
- People embraced the project's success and regained confidence to act proactively in their communities.

Figure 13: Ogal Shiwa – Public real estate programme (Japan)

Before

After

Library in Ogal Plaza

Town Hall

Photos/Illustrations

Photo credit: Shiwa Town

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13 Urban development - Muhange cross-border market (Tanzania)

Size of investment: USD 0.53 million

Start date: 2018

End date: 2020

Project stage: implementation

Project partners

- Public Partners:
  - Kakonko District Council (KDC)
  - United Nations Capital Development Fund (UNCDF)
- Private partners:
  - Two village communities (contributed land as equity in line with the public, private, community partnership (PPCP) ownership model used for the project)
  - Local Traders Association (acted as private entities due to civil society organizations lacking strong establishment in Tanzania and lacking a mandate to carry out profitable business activities)
  - Women Association/Cooperatives (also acted as private entities)

Project description

The Muhange cross-border market is expected to serve approximately 3 000 traders, farmers and livestock keepers and service providers, and to bring a number of positive impacts into the Kakonko District Council (Tanzania), Cancunzo Province (Burundi) and beyond.

Over the years, the markets in Muhange have been attracting traders from neighbouring wards, divisions and districts, including from the hinterland catchment about 200 km from both countries. The products and services traded include livestock, poultry, cereals, horticulture, construction materials, textiles, foods, beverages, and informal local currency exchange.

The market has been growing due to improvements in road infrastructure from Kakonko town to the market site. The road on the Burundi side is accessible all year long and the East African Community was encouraging its Member States to strengthen their cross-border markets in order to enhance border security.

Prior to project implementation, and despite the market's business volume, products and services were exchanged in an open place without any sheds, storage facilities, toilets, water supply or other key facilities prior to the implementation of this project. Women were significantly affected due to regular trading with their infants in unhygienic areas that were prone to diseases. Due to the lack of permanent market facilities, the district councils and villages were unable to collect a sizeable amount of fees and levies, resulting in a significant loss in economic and trade opportunities. The project was designed to address these challenges and transform the village into a genuine regional centre for cross-border trade.

Sustainable Development Goals impacts

SDG 1 and 8: Poverty reduction and sustained growth through the creation of productive and decent employment.

SDG 5: Women empowerment by providing greater economic opportunities to women in the community.

SDG 9: Use of modern financial technologies to improve financial transactions.

SDG 17: Partnership between the UN, local authorities and private enterprises to build the market.

People-first elements

- Localization of the SDGs: The project addresses SDGs – especially economic growth and women economic empowerment – because of the increased participation of women in the economic activities. Seventy-one per cent of funded stalls were allocated to women entrepreneurs (supporting 150 youth and women), contributing to increased security and a rise in household income. Furthermore, the Womens' Association was allocated shares to take up ownership of the market SPV.
- Support to the border communities: Surrounding communities benefit significantly and enjoy locational comparative advantages, especially in the case of women who cannot travel long distances because of other family care work and have insufficient capital to engage in formal business.
- Maximized economic potential: The market has a transformative effect on the Muhange villages, emerging as a vibrant cross-border economic town within the rural Kakonko district. The village has transformed from having one government building to more than 24 buildings, offering market users and residents a wide range of products, including agricultural products and fast-moving consumer goods.
- Structural transformation of the local economy: The market has created additional demand and boosted the supply of production and services in an area characterized by subsistence farming. Construction of facilities such as warehouses for storage has improved operational efficiency through reduced transportation, handling and storage costs. KDC own-source revenues from

the area are expected to increase fourfold at the end of the first full year of operations of the cross-border market.

- Use of smart technology: Facilities for mobile money transfers increased access to financial services and reduced frequent travel to the commercial banks, which are situated more than 40 km from Muhange market/villages.

Financial information

In the first phase of the project, KDC contributed USD 26 256 of its own funds toward the project. Muhange villages contributed land and labour, for a total value of USD 19 877. UNCDF provided seed capital of USD 120 000 toward complementing the project equity in the first phase. The private sector (represented by the Local Traders Association) constructed structures worth USD 367 117 through PPP (Build Operate Transfer - BOT).

No payback is required. The grant contributions from UNCDF were capitalized and constitute the equity of the two village administrations and the women's cooperative. Money from the KDC and the central government will be recuperated through tax collection and not through capital repayments. It constitutes the local council equity with which to leverage funding from the private sector.

The revenue streams generated by the project are utilized for recapitalization to improve other supportive infrastructure (i.e., water supplies) and investment in social amenities in the two villages such as school facilities and health services. The revenue collection is in the form of fees and levies to KDC and is re-invested in other needy villages and social services (i.e., road repairs, bridges).

Observations

- The PPP was enhanced to become a PPCP by virtue of the Village Land Act of 1999 and the Local Government Act, which recognize villages as a corporate body. This allowed community efforts and labour to be converted into equity ownership and participation in the dividends and governance structure.
- The project used step-by-step community engagement to empower the local community to take ownership of the market. Community participation and ownership under the PPP structure (to be PPCP) was a huge success, even when the community/village ownership is as small as 5 per cent.
- Poor communities which own land, forestry, water sources or minerals, find it difficult to participate in capital contribution and, therefore, equity ownership. All or a portion of the grant money from development partners should be converted into equity for women cooperatives and villages.

Figure 14: Muhange cross-border market (Tanzania)

Before (Old Market)

After (New Market)

Photos/Illustrations

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14 Waste management - Municipal solid waste management of the city of Mamou (Guinea)

Size of investment: USD 0.264 million

Start date: 2020

End date: 2022

Project stage: implementation

Project partners

- Public partners:
  - City of Mamou
  - United Nations Capital Development Fund (UNCDF)
- Private partner: Molthanas Company

Project description

Urbanization is increasing rapidly in Guinea, particularly in the city of Mamou, which is considered as the "crossroads city" of Guinea because it connects the country's main regions. By 2023, its population will produce an average of 14 168 tons of waste per year. The waste management service provided by the municipality collects waste only from a few waste production units in the city centre and disposes it at an uncontrolled landfill, leaving most areas of waste production neglected. The capacity of waste collection services in Mamou covers less than five per cent of the city's waste collection needs, leaving behind the needs of more than 95 per cent of households and businesses in town. Considering the circumstances, it has become a habit of residents in Mamou to abandon waste a few metres outside their homes and business premises. This practice not only harms the environment but also negatively affects the quality of life and living standards.

If no change is introduced, the municipal council will only be able to collect and transport 145 tons of waste out of the 14 168 tons produced each year. Therefore, the City Council requested the technical and financial assistance of UNCDF under the INTEGRA programme for the structuring and financing of the "City of Mamou Solid Waste Management Project", one of the first PPPs to utilize blended finance instruments in Guinea.

The project deliverables include collection, transport and sorting of waste (2–3 times a week); waste recovery for transformation into paving stones or compost; and regular cleaning of public roads in the city centre district. This effective integrated management system (collection, transportation,

recycling, landfill) will cover at least 2 500 households and businesses in the first year and 8 500 by the tenth year.

Sustainable Development Goals impacts

SDG 1 and 8: Poverty reduction and sustained growth through the creation of productive and decent employment, particularly among the youth in the community.

SDG 9: Innovative technologies to transform plastic waste into paving materials that can be used for road construction.

SDG 13: Climate action by sustainable waste management and re-use of existing materials.

SDG 17: Partnership among local government, project sector and United Nations Capital Development Fund.

People-first elements

- Improved waste management practices: In line with national legislation and the United Nations SDGs, the project generated increased awareness among the population of Mamou on the socio-economic and environmental issues of solid waste management. The project allows for a reduction in the production of waste by at least 15 per cent per year, and greater recovery of plastic and ferrous materials contained in the waste. Additionally, there is a reduction of negative impacts on human health and risks of environmental pollution in accordance with national targets on solid waste management in urban areas.
- Marketable products from recycled waste: Paving stones are produced from recycled plastic that will partially replace paving stones produced from cement. At least 229 499 m² of paving stones will be produced in 10 years. Compost is produced from biodegradable waste, producing at least 1 375 tons of compost in 10 years.
- Employment opportunities for youth: An additional 321 full-time jobs per year were created in the city. Youth were hired to assist in the cleaning of the city.

Financial information

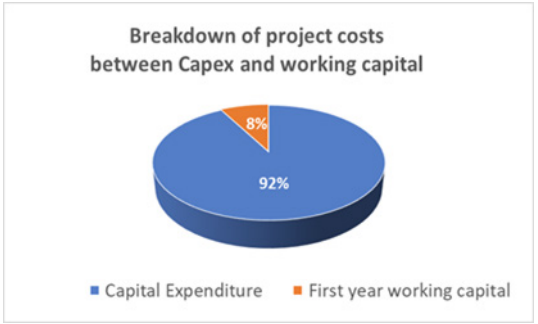
Budget item	Total (USD)
A. FRONT-END COST (Development cost)	*11 765*
B. FACILITIES' INSTALLATION AND IMPROVEMENT	
Land	*10 695*
Landfill	*6 952*
Treatment / processing plant	*8 556*

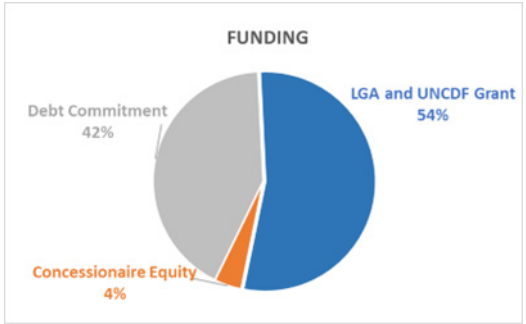
Other (Office, management information system, or laboratory)	*2 139*
C. VEHICLES AND EQUIPMENT	
Loader/material handling equipment, etc.	*1 604*
Dumper placement / tippers / trucks, etc.	*32 086*
Push carts	*7 872*
Light commercial vehicles: four-wheelers/three-wheelers	*39 358*
Bins of different sizes	*122 995*
D. Other safety equipment (for firefighting, etc.)	***257***
TOTAL CAPEX (A+B+C+D)	**244 278**
Working Capital (WC)	**20 199**
TOTAL PROJECT COST (CAPEX + WC)	**264 477**

The municipality of Mamou requested a UNCDF grant of approximately USD 100 000 to complement the equity contribution of the municipality and its private sector partner, Molthanas, equivalent to USD 54 545 either in land, transport equipment, front-end cost or in cash. This grant will be used as leverage to raise a debt of about USD 109 906 from a local bank.

The investment covers the purchase of garbage cans (around 60 per cent of the CapEx cost), at the rate of two garbage cans per household to allow the sorting at source. This is an incentive subsidy for 2 500 low-income households. A partnership will be established with a local industrial unit to manufacture low-cost garbage cans for the extension phase of the project to all neighbourhoods in the city of Mamou. The purchase of transport equipment – specifically light vehicles or tricycles and push carts – and the refurbishment of two trucks provided by the City Council, are the second largest investment and account for about 33 per cent of the CapEx. The use of light vehicles for the collection of waste is more adapted to the configuration of the city – with many hills and narrow roads. The trucks will provide the link between the light vehicles and the landfill. The operation of light vehicles is also an opportunity to tap into the city's labour force potential, containing many young women and men with no job prospects.

Figure 15: Breakdown of project costs and funding





This project is a municipal PPP: the management of municipal solid waste is a municipal competence and the municipality of Mamou decided to delegate it to a private actor. In Guinean law, and in accordance with the 2017 PPP law, this is a delegation of public service, in the form of a concession. The direct contribution of the municipality is around 16 per cent of the cost of the project (through transfer to the SPV of two dump trucks and provision of land). The municipality is the ultimate beneficiary of the UNCDF grant. In other words, it is as if the municipality is subsidizing the SPV a total of USD 100 000. Thus, the municipality's contribution amounts to USD 142 781 (54 per cent of the total project cost).

A six-month pilot phase was launched in January 2021 to test model assumptions and the effectiveness of the approach (communicate, educate, raise awareness, involve and give responsibilities to the citizens) and obtain reliable data. More than 600 households subscribed to the waste-collection and transportation service, confirming the willingness of citizens to pay USD 2 to 2.5 per month for an improved service. The possibility of covering more households than expected is being considered as it seems possible.

Observations

- Structuring of this transaction provided a close-up view of the daily functioning of a municipality in Guinea and the constraints it faces across its cities. This project can serve as the basis for a national programme to strengthen the capacities of local authorities and to put in place mechanisms for local development financing.
- Social innovation (changing the way things are communicated; involving beneficiaries from the beginning of the process) allows considerable results to be achieved with few means. The launch of the pilot phase of the project that uses this approach is producing good results:
    - More than 600 households subscribed to the service of collection and transportation of waste, knowing that the objective of the first year was to cover at least 2 500 households.
    - More than 1 000 subscription requests were received (the pilot project team can host up to 600 households).

Figure 16: Municipal solid waste management of the city of Mamou (Guinea)

Photos of the actual uncontrolled landfill of the city[4]

Photos/Illustrations

[4] It is planned that the new landfill will be built on a new 20 hectare site outside the city.

Figure 17: Photos of youth cleaning the city as part of the pilot phase of the project (January 2021)

Contact information

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15 Water and sanitation – Rostov-on-Don wastewater system (Russian Federation)

Size of investment: USD 700 million

Start date: 2005

End date: 2012

Project stage: maintenance

Project partners

- Public Partner: Municipality of Rostov-on-Don
- Private Partner: JSC Rostov water utility

Project description

The poor condition of the wastewater infrastructure in the city of Rostov-on-Don became a hindrance to future development of the new residential zones. A strategy was developed to improve the infrastructure with support from the public sector for construction and rehabilitation of the municipal infrastructure, and support from the private sector for new technologies in sludge treatment for energy generation. The public and private sectors cooperated to replace sewers and pumping stations.

The project is aimed at the modernization and development of the water and wastewater systems of the city of Rostov-on-Don and its agglomeration. It included:

- Construction of the second stage of new water intake facilities and extension of the existing water treatment facilities
- Construction of the sewage conduit
- Construction and reconstruction of wastewater treatment facilities in Rostov-on-Don, Taganrog, Azov, Novocherkassk and other centres of population of the Rostov region
- Construction and reconstruction of water mains of the distribution network
- Construction of trunk mains and networks in Rostov-on-Don
- Reconstruction and construction of local water treatment facilities
- Performance improvements (hydraulic modelling, tools and control equipment)
- Construction and reconstruction of pumping stations

- Reconstruction of backwash water re-use and sludge dewatering facilities on the water treatment facilities
- Construction of a hypochlorite production facility at the water treatment facilities

As a result of the project, more than 25 000 new customers were connected to the new centralized sewage system. The construction of new sewers led to the connection of new residential districts and commercial properties.

Sustainable Development Goals impacts

SDG 3: Improvement of health and well-being of residents resulting from the cleaner water supply.

SDG 6: Guaranteed clean water source and improved sanitation through treatment, distribution and management facilities.

SDG 9: Innovative technologies to improve water sanitation and hygiene while reducing electricity consumption.

People-first elements

- Improved living conditions: The project resulted in a reduction of water-related diseases. It also involved local manufacturers and used the best available technologies. Residents now have greater access to the water supply from 20 to 24 hours; water quality was also improved, with 98 per cent meeting sanitary norms.
- Reduced environmental impact: Electricity consumption was reduced by more than 25 per cent per cubic meters of wastewater. The full treatment of sludge was dedicated to recultivation of soils and for use in agriculture. Implementing UV-disinfection for wastewater means that no chlorine is entering the River Don.
- Greater access for vulnerable populations: The project improved access to modern sanitation infrastructure for low-income populations. Elimination of the infrastructure gap through connection to a centralized wastewater network has led to the development of new restaurants, cafes, business centres and residential houses.

Financial information

The project was financed with a mix of equity, debt and capital grant finance of CapEx in the local currency. It also consisted of four financing blocks:

1. Expenses related to reconstruction and modernization of the water supply systems in Rostov-on-Don
2. Expenses related to repairs and development of sanitation systems

3 Expenses related to launch of the new water intake system

4 Expenses related to capital repairs and maintenance

Project financing elements

- Long-term, 13-year loan of approximately USD 160 million equivalent in Russian ruble from the national development bank, secured by collateral of utility company shares and its assets and to be used for financing the first two blocks. Repaid from tariff revenue.
- Co-financing the first two and the fourth blocks in the amount of approximately USD 240 million by the utility company from dedicated part of tariff revenues and own sources during a period of long-term lease.
- Capital grant of approximately USD 300 million in Russian ruble from the federal government to finance the third block.

The ownership for new infrastructure is mixed – depending on the source of financing with private assets to be transferred to the municipality upon expiration of the lease if ongoing financial liabilities are absent.

Payback terms: The interest rate of the 13-year Russian ruble loan was the inflation rate plus two per cent. Its repayment installments were included into the regulated cost of the water and wastewater tariffs, with the loan being repaid from the operational income of utility services.

Observations

- The new wastewater networks resulted in the increase of property and land value, and the increased presence of retail and other businesses in the area. Local authorities were able to improve the quality of life for residents, while the private operators succeeded in expanding their service area and increasing their number of customers.
- The approach and financing mechanisms used can be implemented, not only in Russia, but worldwide. Combining public and private financing allowed for lower capital cost.
- Private sector participation changed the operational efficiency of the utility company, achieving a quick and significant reduction of unaccounted-for water and customer debts. An increased quality of the service (uninterrupted water supply) provided for increased customer satisfaction.
- Outsourcing the management of technically complex issues (e.g., hydraulic modelling and management, leakage management, laboratory services and control of industrial customer discharge) to companies with the necessary expertise and equipment allowed for a further increase in operational efficiency and a reduction of necessary CapEx.
- The project stimulated changes in Russian legislation (i.e., the law governing concession), which made the concessions model a working option for future projects.

- Implementation of the CapEx programme by different blocks, with different financing facilities and property rights, complicated the project. The changes in the Russian legislation provide opportunities to structure similar projects under a concession framework in the future.

Figure 18: Rostov-on-Don wastewater system (Russian Federation)

Photos/Illustrations

Photo Credit: JSC Evraziyski

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Conclusions

At the High-Level Meeting on Financing the 2030 Agenda for Sustainable Development on 24 September 2018, the United Nations Secretary General Antonio Guterres underlined the need to step up efforts in developing innovative financing and in mobilizing private investment. He further stressed the need to build stronger partnerships with the private sector and the business community in order to achieve the 2030 Agenda SDGs.

The cases provided in this compendium highlight best practices in involving the private sector and the business community in project finance. The compendium demonstrates the need for a suitable enabling environment and increase capacity among different stakeholders. It should be used to drive forward the 2030 Agenda and inspire cities to take steps to become smarter and more sustainable, while enabling investors to make profits in a sustainable way.

The fifteen cases of this "Compendium of Practices on Innovative Financing" demonstrate examples of innovative financing mechanisms that were used successfully to implement sustainable and smart city projects. In addition to understanding the essence of the project, it is possible to comprehend how these projects positively impacted the lives of citizens in the cities and contributed to the smartness and/or sustainability of the city. As shown in different cases, several SDGs can be achieved in each project and all of them contributed to make cities more livable. From this compendium, it is possible to develop an insight into the types of projects that can serve to improve city sustainability and smartness while acquiring new and innovative ways for which they can be financed, from PPP to blended financing.

Innovative finance and enhanced public-private partnerships (PPP) can close the financial gap by providing additional sources to finance projects in municipalities and bringing the expertise of the private sector into the project cycle. However, a suitable regulatory environment is needed to entice the private sector to finance public projects. Laws and regulations often prevent investors from investing in urban development projects. Existing laws and regulations – direct and indirect legislative barriers – may prevent investors from investing in these types of urban development projects. Together with the U4SSC Guidelines on tools and mechanisms to finance sustainable smart cities projects, this compendium provides a useful tool that suggests reviewing and revising existing institutional and legal frameworks to enable private sector investors to engage in urban development projects. Effective and transparent legal and institutional frameworks, including risk and profit sharing, are critical for attracting reliable investment partners. These innovative financial tools for city projects will ensure the support for priority actions for achieving SDGs and to ensure that "no one is left behind".

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