

CEESEU-DIGIT

Central and Eastern Europe Sustainable Energy Union's Design and Implementation of regional Government Initiatives for a just energy Transition

Municipalities and Climate Finance: An Overview of Innovative and Novel Financing Methods

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About the CEESEU-DIGIT project

The DIGIT project, formally known as the Central and Eastern Europe Sustainable Energy Union's Design and Implementation of regional Government Initiatives for a just energy Transition (CEESEU-DIGIT), was launched in December 2022. It is financed by the European Union's LIFE programme and aims to support local and regional authorities in the preparation of new regional Energy and Climate Plans (ECAP+). The project focuses on six Central and Eastern European carbon-intensive target areas, specifically in the regions of Croatia, Czechia, Estonia, Latvia, Poland, Slovenia, and cooperates with a Hungarian partner.

The primary objectives of CEESEU-DIGIT are to build the capacity of local and regional authorities in all aspects covered in ECAP+, ensure alignment with the national and European Union 2050 goals related to carbon neutrality, and create a methodology that equally values climate adaptation, social, and landscape use aspects in these documents in addition to mitigation measures. This approach emphasizes a just energy transition, which involves transforming the economy and economic system in a fair and inclusive manner, ensuring respectable employment prospects for all stakeholders, and aligning with the Sustainable Development Goals (SDGs).

CEESEU-DIGIT is coordinated by the University of Tartu and involves partner organizations like Climate Alliance, ENVIROS Czech Republic, Local Energy Agency Spodnje Podravje, Mazovia Energy Agency, Medjmurje Energy Agency, Society for Sustainable Development Design, Tartu Regional Energy Agency, Vidzeme Planning Region, and WWF Hungary. The project is set to run until November 2024.

About the CEESEN network

CEESEN, The Central and Eastern European Sustainable Energy Network, is a pivotal NGO that plays a crucial role in guiding sustainable energy and climate action in the Central and Eastern European (CEE) region. Its primary aim is to align the region's sustainable energy efforts with the European Union's 2050 climate neutrality goals. CEESEN operates by fostering cooperation and interaction among local public administrators, stakeholders, and policymakers. This ensures that policies and initiatives undertaken by the EU and other entities adequately address the interests of the CEE region, effectively planning, financing, implementing, and maintaining sustainable and just energy initiatives.

The organization is deeply committed to promoting sustainable energy practices across the CEE region. CEESEN acts as a hub for sustainable energy information, sharing knowledge and best practices, and encouraging regional cooperation. It works towards creating a low-emission, energy-efficient future, while also focusing on the social aspects of the energy transition, especially the implications for vulnerable and marginalized groups.

CEESEN's activities include supporting the development and implementation of local and regional sustainable energy and climate policies, promoting renewable energy sources and energy efficiency, and engaging in various projects and initiatives that contribute to the region's sustainable energy landscape. One of their significant roles is to ensure that the CEE region's voice is heard in wider European discussions about energy policy and climate action, thereby ensuring that the region's unique challenges and opportunities are considered in broader EU policies.

CEESEN partners devotedly work together to build up the CEESEN network, to enable increased communication and collaboration between CEE sustainable energy actors throughout the region.



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1. Foreword

In the quest for sustainable development and climate action, municipalities across Europe face a significant challenge: securing adequate funding. Traditional funding sources are often limited, competitive, and may not fully align with the unique needs and goals of local governments. This reality necessitates a shift towards exploring innovative and novel financing methods, which is the focus of this paper.

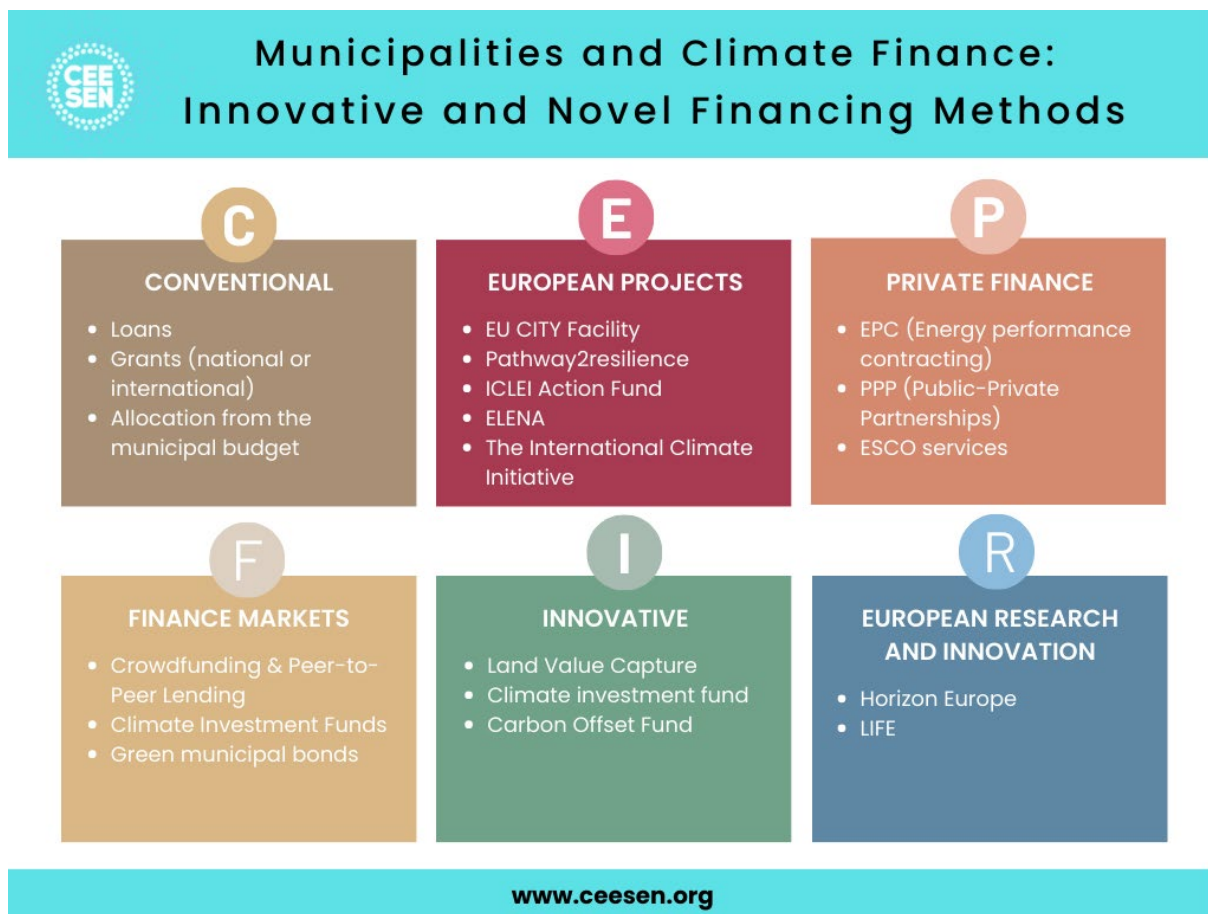
The primary issue with accessing regular funding lies in its constraints. These can include stringent eligibility criteria, limited scope for innovative projects, and often, a mismatch between the long-term nature of sustainability projects and the short-term financial perspectives of traditional funding mechanisms. Moreover, with the increasing demand for climate action and sustainable development, the competition for these funds has intensified, leaving many municipalities struggling to finance their initiatives.

Recognizing these challenges, this paper aims to present a diverse array of innovative financing methods that have emerged across Europe. These methods not only offer alternative sources of funding but also promote greater financial sustainability and autonomy for municipalities. By exploring a variety of European examples, the paper seeks to demonstrate how different regions have adapted these novel approaches to suit their specific contexts and needs.

The exploration of these innovative financing methods is not just an academic exercise; it is a critical step towards empowering municipalities to become more proactive and self-sufficient in funding their sustainability projects. These new methods include, but are not limited to, green bonds, energy performance contracting, public-private partnerships, crowdfunding, and leveraging European Union funds in creative ways.

This paper will delve into case studies from various European municipalities, highlighting how they have successfully implemented these innovative financing mechanisms. Each example will provide insights into the practical aspects of these methods, including their benefits, challenges, and the conditions necessary for their successful application. By exploring and learning from the diverse experiences across Europe, this paper aims to equip municipalities with the knowledge and inspiration needed to finance their journey towards a more sustainable and resilient future.

The paper lists several innovative and novel financing methods, all of them are summarised in the following chart. Most of the relevant mechanisms and methods are accompanied by one case study illustrating real life applications of the concrete method. The list mentioned in this paper is not comprehensive and there have been several other methods listed in the reviewed literature.



2. Conventional Sources of Funding

Conventional sources, including bonds, loans, and grants, have proven their efficacy over time and continue to play a pivotal role in financing climate projects by municipalities. However, while they offer numerous advantages, their limitations and dependence on external factors, such as political decisions, cannot be overlooked. This chapter offers a brief overview of these traditional financing mechanisms, highlighting their widespread use, capabilities, and inherent challenges.

Loans: The Go-To for Immediate Funding

Loans, sourced from financial institutions or through governmental programs, are another cornerstone of traditional project financing. They provide immediate funds, which is essential for kick-starting projects. Their structured repayment schedules, often with interest, make them a predictable and manageable financial tool for both private and public entities. Yet, the dependency on creditworthiness and the potential for high-interest rates, especially in economically volatile times, can pose significant challenges.

Grants: The Non-Repayable Financial Aid

Grants are fundamentally different from loans and bonds as they do not require repayment, making them highly sought after. Typically provided by government bodies, foundations, or international organizations, grants are allocated to projects that align with specific goals, such as social welfare, environmental protection, or research and development. While grants are an excellent source of funding without the burden of repayment, they are highly competitive and often limited in scope. Their availability is heavily influenced by political priorities and budgetary constraints, making them an unpredictable source of funding.

Own Municipal Budget

Municipalities operate with distinct budgets, funded primarily through taxes and other revenue streams set by the national government. The degree of financial autonomy and flexibility varies significantly across countries. In some regions, municipalities enjoy considerable leeway and substantial funding, while in others, they face limited resources and stricter constraints. Even within the same country, disparities can exist, with certain municipalities more prosperous than others due to their historical financial decisions. However, allocating funds from their budget necessitates trade-offs, as diverting resources to one area may result in underfunding in other critical sectors, potentially affecting various aspects of public policy negatively.

Limitations and the Shift Towards Alternative Financing

While these traditional mechanisms have funded countless successful projects, their limitations are becoming increasingly apparent in the modern financial landscape. One significant limitation is their inability to effectively attract private capital. Private investors often seek innovative and financially viable projects, and traditional financing methods, with their rigid structures and potential political entanglements, may not always present the most attractive opportunities.

Moreover, the reliance on political decisions can lead to uncertainties. Changes in government policies, budget allocations, and economic priorities can drastically alter the availability and terms of these financing sources. This dependency on external factors places projects at risk of delays or cancellations, should the political climate shift unfavorably.

While traditional financing mechanisms like bonds, loans, and grants have been instrumental in driving forward a multitude of projects, their limitations, particularly in attracting private capital and dependence on political decisions, necessitate a closer look at alternative financing solutions. As the financial landscape evolves, the need for more flexible, innovative, and private-sector-friendly financing options becomes increasingly vital.

3. European sources of funding

3.1. EU CITY Facility

The European City Facility (EUCF) is a European initiative designed to support municipalities, local authorities, their groupings, and local public entities across Europe. Its main aim is to develop investment concepts that accelerate investments in sustainable energy. The EUCF provides a grant of EUR 60,000 to finance services and activities that support the development of these investment concepts, such as feasibility studies, market and stakeholder analyses, and legal, economic, and financial analyses.

This initiative addresses the challenges that municipalities and local authorities face in implementing climate and energy action plans due to financial constraints and a lack of capacity to access appropriate financing. The EUCF helps transform these plans into real investments by developing credible and mature investment concepts, which are essential for accessing various funding sources.

The EUCF plays a crucial role in bridging two fundamental gaps for sustainable energy investments at the local level: the lack of financial and legal capacity to transform local long-term energy and climate strategies into appropriate investment concepts, and the lack of aggregation of smaller, fragmented projects, thereby increasing their attractiveness for the financial sector.

Beneficiaries of the EUCF can access the grant to develop their investment concept, which is a preliminary step towards creating a comprehensive business and financial plan. This plan facilitates the mobilization of local investment in energy efficiency and renewable energy. Funding sources for these projects can include private sector investments, EU-funded instruments, and various national investment platforms.

The objectives of the EUCF are to build a substantial pipeline of sustainable energy investment projects across Europe, provide technical and financial expertise, build the capacity of municipal staff, facilitate access to private finance and EU funding streams, and use successful investment concepts to encourage further action across European cities.

The vision of the EUCF is to empower European cities to influence how the initiative's financial and technical support is used, thereby helping them overcome barriers in financing and implementing their energy and climate strategies. The EUCF aims to encourage cities to boldly address the fundamental changes needed to accelerate the energy transition.

Link: <https://www.eucityfacility.eu/home.html>

Case study – EU CITY Facility

Riga applied to EU CF with a plan, to set up a renewable and energy efficiency fund –(REEF). The investment project aims to accelerate the energy renovation of multi-apartment residential buildings in Riga. The project will provide funding for deep retrofits to improve the energy efficiency of these buildings, with a target of 150-200 buildings per year by 2030 and 200-300 buildings per year by 2050. The REEF project is expected to have several positive benefits, including increased use of renewable energy resources in the housing sector, reduced energy poverty, improved urban environment and quality of life.

The project is technically, economically, and legally justified, and will provide a tailor-made financing instrument for the large-scale, standardized, and sustainable renovation of multi-apartment buildings in Riga. The city has developed a programme to reinvest the budget recovered thanks to energy savings into long-term measures to become climate neutral by 2030. The city reduced its energy consumption by 15% last winter, mainly by switching to LED lights, dimming public lighting, and regulating temperatures in buildings. The city saved around 4 million euros, which were allocated to support the implementation of its Sustainable Energy and Climate Action Plan.

Source: <https://eu-mayors.ec.europa.eu/en/how-riga-reinvests-its-energy-savings-into-long-term-sustainable-energy-and-climate-action>

Country: Latvia

Date: 2022-2023

Amount: 2 025 000 EU CF contribution, total investment expected 600 mil euro.

3.2. Pathway to resilience

Pathways2Resilience is a European project that aims to enhance the resilience of regions and communities to the effects of climate change. The project offers financial and technical assistance to selected regions/communities that have low adaptive capacity and high vulnerability to climate hazards, such as floods, droughts, heat waves, and wildfires. The project also fosters learning and exchange among regions/communities on best practices and innovative solutions for climate adaptation.

The project has launched its first call for proposals, inviting public authorities and bodies governed by public law in EU Member States or Associated Countries to apply for subgrants of up to 210,000€. The subgrants will support the implementation of concrete adaptation actions in the selected regions/communities, as well as the development of adaptation strategies and plans. The subgrants will last up to 18 months and will be complemented by supporting services and capacity building activities provided by the project consortium.

The selection of the regions/communities will be based on a set of criteria that include the level of exposure, sensitivity, and adaptive capacity to climate change impacts, the potential for co-benefits and synergies with other policy objectives, the involvement of relevant stakeholders and target groups, and the feasibility and sustainability of the proposed actions. The project aims to achieve a balanced and diverse portfolio of regions/communities, covering different geographical, socio-economic, and environmental contexts.

The deadline for submitting proposals is 31 January 2024. The application form and the guidelines for applicants are available on the project website.

Link: <https://www.pathways2resilience.eu/>

3.3. ELENA - An Innovative Financing Mechanism

The European Local Energy Assistance (ELENA) facility is a forward-thinking initiative by the European Investment Bank (EIB) and the European Commission, designed under the Horizon Europe program. Established in 2009, ELENA has played a pivotal role in promoting energy efficiency and renewable energy investments across Europe. By providing technical assistance for project preparation, ELENA has catalysed significant investments in sustainable energy sectors, with a substantial impact on reducing emissions and enhancing energy efficiency.

ELENA primarily targets the public sector, including EU Member States, government organizations, regional, local, and municipal authorities, public corporations, and financial institutions. The range of activities eligible for ELENA grants encompasses technical studies, energy audits, business plans, financial advisory, legal advice, preparation of tendering procedures, project bundling, and effective project management. This comprehensive support system underscores ELENA's commitment to ensuring the feasibility and success of sustainable energy projects.

ELENA's support spans across three crucial sectors: energy efficiency, sustainable residential projects, and urban transport and mobility. In the energy efficiency sector, ELENA backs projects aimed at enhancing energy efficiency and renewable energy use in both residential and non-residential buildings. This includes support for public lighting, district heating, and smart grids. For sustainable residential projects, ELENA aids private individuals and homeowner associations in energy efficiency renovations and renewable energy projects. The urban transport and mobility sector benefits from ELENA's backing in promoting innovative and energy-saving transport solutions in urban areas, focusing on alternative fuels and efficient urban logistics.

ELENA supports large-scale investment programs, typically those exceeding €30 million, with a three to four-year implementation period depending on the project type. This approach encourages the aggregation of multiple projects, enhancing their appeal to contractors and financiers. By the end of 2019, ELENA had awarded over €180 million in EU support, mobilizing an estimated €6.6 billion in investments. This impressive figure highlights ELENA's effectiveness in leveraging European Union funds to catalyze substantial investments in sustainable energy and transport projects.

Link: <https://www.eib.org/en/products/advisory-services/elena/index.htm>

3.4. Horizon Europe

The European Union's primary instrument for funding research and innovation, is the successor to Horizon 2020. This programme not only addresses climate change but also other significant global challenges. Within its structure, Horizon Europe emphasizes climate, energy, and mobilisation. It calls upon EU legal entities to contribute to Europe's industrial competitiveness, especially in climate change adaptation and societal transformation. The program announces project proposals, categorized by topic and deadline. From 2021 to 2027, Horizon Europe boasts a budget of EUR 95.5 billion, dedicating 35% of it specifically to climate-related actions. Discover more about Horizon Europe through its introductory presentation.

Link: https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe_en

3.5. LIFE

The LIFE Programme, the European Union's financial tool dedicated to environmental and climate action, allocates finance and annual operating grants to European non-profit entities. Eligibility requires NGOs to have a presence in at least three EU Member States, contributing to EU's environmental and climate policies or acting as intermediaries between citizens and EU institutions. For the 2021-2027 period, a budget of EUR 5.4 billion is earmarked. Regular calls for proposals are announced on the European Commission's website, with the upcoming call for the 2025-2027 period scheduled for 2024.

Link: https://cinea.ec.europa.eu/programmes/life_en

3.6. The International Climate Initiative

The International Climate Initiative (IKI) complements EUKI's focus on intra-European climate collaboration by funding climate and biodiversity projects across approximately 150 partner countries globally. With a significant budget of EUR 5 billion, IKI forms a key component of the German Government's commitment to international climate finance. About eight percent of IKI's funds are allocated to European countries listed as Official Development Assistance (ODA) recipients. Eligible regional, national, and local organizations in ODA countries can apply for small grants ranging from EUR 60,000 to EUR 200,000, dedicated to local or regional climate and biodiversity initiatives.

Link: <https://www.international-climate-initiative.com/en/>

3.7. ICLEI Action Fund

The ICLEI Action Fund is a collaborative initiative by ICLEI and Google.org to support data-driven environmental and climate projects at the local level in Europe. Here's a general summary:

- **Funding for Local Projects:** It provides significant funding to civil society organizations and academic institutions for implementing data-driven actions.
- **Focus on Climate Action:** The fund aims to improve environmental quality, reduce emissions, and enhance climate resilience.
- **European Scope:** Projects are based in selected European cities, leveraging various data sources for inclusive climate actions.
- **Ongoing Impact:** The initiative has had multiple phases, with the current one starting in spring 2023, continuing the momentum of data-driven environmental efforts.

Link: <https://iclei-europe.org/funding-opportunities/action-fund/>

4. Private and Unconventional Sources of Funding

4.1. EPC (Energy performance contracting)

Energy Performance Contracting (EPC) is a financing mechanism that enables municipalities to implement energy-saving measures without the need for upfront capital. It's a solution that combines both financial and technical aspects, providing a comprehensive approach to improving energy efficiency in public buildings and infrastructure.

EPC projects can be a crucial measure for cities to effectively reduce energy intensity. The EPC method involves a comprehensive service where an Energy Service Company (ESCO) designs and implements contractually guaranteed energy-saving measures. The contractual guarantee of savings is a fundamental and unique advantage of the EPC method, distinguishing it from other contractual relationships or public procurement organization methods. Additionally, throughout the contract duration, the ESCO performs continuous energy management for all buildings and typically also secures financing for the entire investment in energy-saving measures at the beginning of the collaboration. The total project costs are repaid by the city in predetermined instalments – unless otherwise agreed, these instalments are equal to or less than the guaranteed savings on fuel and energy costs. Due to these commitments and obligations of the provider, higher savings are achieved compared to standard projects, often by tens of percent. Moreover, these savings are realized over the long term, not just in the initial years after implementation.

At its core, EPC involves a contractual agreement between a municipality and an energy service company (ESCO). The ESCO conducts a thorough energy audit of municipal facilities and implements various energy-saving measures. The cost of these

measures is financed through the energy savings achieved over time. Essentially, the energy cost reductions resulting from improved efficiency are used to pay back the investment made for the energy-saving measures.

This arrangement offers a risk-reduced method for municipalities to upgrade their energy systems, as the ESCO typically guarantees the energy savings. If the savings are not as high as projected, the ESCO is responsible for covering the difference, providing a financial safety net for the municipality.

According to the European Energy Efficiency Platform there are several ways of how EPC could be applied:

- **Standard EPC Model:** The most common form of EPC, where the ESCO guarantees a certain level of energy savings and assumes the performance risk. The contract typically covers comprehensive energy audits, project design and implementation, maintenance, and monitoring of energy savings.
- **Shared Savings Model:** In this model, the ESCO and the municipality share the financial savings resulting from the energy efficiency improvements. This approach reduces the municipality's financial burden but also shares the benefits between the two parties.
- **Guaranteed Savings Model:** Here, the ESCO guarantees a specific amount of energy savings, reducing the municipality's operational costs. Any savings beyond the guarantee are retained by the municipality, offering potential for additional financial benefits.
- **Chauffage Contract:** A specific type of EPC focusing on heating and cooling systems. The ESCO takes over the complete management of these systems, including investment, operation, maintenance, and fuel supply, in exchange for a fixed payment from the municipality.
- **Lighting-as-a-Service (LaaS):** This is a newer application of the EPC model, specifically focusing on lighting. The ESCO upgrades the municipality's lighting systems to more energy-efficient solutions, like LED, and the cost is covered by the energy savings achieved.

Case study – EPC project

Bohnice psychiatric hospital in Prague, Czech Republic, is a large, complex facility with a long history. In 2022, the hospital embarked on a major renovation of its entire campus, including its energy infrastructure.

The hospital decided to finance the project using the Energy Performance Contracting (EPC) method. Under EPC, a third-party energy service company (ESCO) designs, implements, and finances energy efficiency measures. The ESCO then recovers its investment through guaranteed energy savings over a specified period of time.

The project includes a variety of measures, including replacement of 102 circulation and 47 circulating pumps with new, variable-speed pumps, modernization of the central heating plant and distribution system and insulation of building envelopes. The hospital expects to achieve guaranteed energy savings of 30% over the life of the contract.

The replacement of the pumps is expected to provide the greatest energy savings, with a predicted reduction in electricity consumption of 76.5%. The new pumps will use a variable-speed control system to adjust their output to match the actual needs of the heating system. The EPC project at Psychiatrická nemocnice Bohnice is an example of how this financing method can be used to achieve significant energy savings. The project is also a major investment in the hospital's infrastructure and will help to improve its sustainability.

Source: <https://bohnice.cz/psychiatricka-nemocnice-bohnice-snizi-spotrebu-energie-o-vice-nez-30/>

Country: Czech Republic

Date: 2022-2023

Amount: 20 mil euro investment

4.2. PPP (Public-Private Partnerships)

In the evolving landscape of project financing, Public-Private Partnerships (PPPs) emerge as a novel and effective mechanism, bridging the gap between public needs and private efficiency. These collaborative ventures involve a municipality or government entity and a private sector partner joining forces to finance and execute projects. Typically, these projects are infrastructure-oriented, ranging from energy and transportation to healthcare and education. The defining feature of PPPs is the significant sharing of risks and responsibilities, with private entities often shouldering substantial project risks.

Municipal PPPs represent a specific subset of PPPs where the partnership is between a municipal body and a private entity. The essence of this partnership is to deliver municipal assets or services more efficiently and innovatively than traditional public sector approaches. Municipal PPPs are characterized by the long-term nature of agreements and the private partner's involvement in various phases of the project, including planning, financing, implementation, and sometimes maintenance. These partnerships are not merely financial agreements but are collaborative efforts where expertise, technology, and resources are pooled to achieve mutual goals.

PPPs offer several advantages over traditional financing mechanisms. They provide access to private sector capital, reduce the burden on municipal budgets, and bring in private sector expertise and efficiency. Additionally, PPPs can expedite project timelines and often result in higher-quality outcomes due to the vested interests of the private partners.

However, the success of PPPs hinges on meticulous planning, clear contractual agreements, and strong collaborative relationships. Challenges include ensuring alignment of public and private sector goals, managing complex contractual arrangements, and ensuring transparency and accountability. Furthermore, the long-term nature of PPPs requires sustained commitment from all parties, which can be challenging in changing political and economic environments.

Public-Private Partnerships represent a significant shift in traditional project financing, offering a more collaborative and innovative approach. Municipal PPPs, in particular, harness the strengths of both the public and private sectors to deliver essential services and infrastructure. As exemplified by the Johannesburg BioGas Project, PPPs can be powerful tools for municipalities to achieve their objectives, especially in the realms of infrastructure development and sustainability. While they come with their own set of challenges, their potential in facilitating large-scale, impactful projects is undeniable, making them a crucial element in the repertoire of novel financing mechanisms.

Case study - PPP project

The European Investment Bank (EIB) supported a project of urban transport sector in Krakow, Poland, through a pioneering public-private partnership in the size of 45 mil euro. The tram line, integral to Krakow's sustainable development strategy, will connect the city centre to the Mistrzejowice terminus. It reflects a strategic move towards environmentally friendly public transport, a crucial element in Krakow's ambition to reduce car traffic and promote alternative transport modes.

The PPP agreement, signed between the City of Krakow and a consortium of PPP Solutions Polska covers the financing, design, construction, and 20-year maintenance of the tram line. Spanning 4.45 km with nine new stops, the line will improve connectivity between northern residential districts and the city centre. The PPP model is allowing for cost-optimized infrastructure development and reinforcing Krakow's commitment to innovative solutions in public transport.

Source: [Poland: EIB supports the sustainable development of public transport in Krakow](#)

Country: Poland

Date: 2022

Amount: 45 mil euro investment

4.3. Green Municipal Bonds

Green municipal bonds represent a significant stride forward in aligning financing mechanisms with environmental sustainability goals. These bonds function as debt instruments where an investor loans money to an entity, typically a corporation or governmental body, which then uses these funds for specific projects. Unlike traditional bonds, green bonds are exclusively utilized to finance green investments, encompassing projects like renewable energy, energy efficiency, and other sustainable initiatives. A notable feature of green bonds is their potential tax-exempt status, making them particularly attractive to investors. This chapter explores green bonds, with a case study on the City of Paris, and introduces the concept of revolving funds as an adjunct to green financing.

Green bonds stand out in the financial landscape as tools dedicated to funding projects that have positive environmental and climate benefits. These bonds are issued by companies, municipalities, states, and sovereign governments, reflecting a growing recognition of the importance of sustainable investment. The earmarking of funds for green projects ensures transparency and accountability, reassuring investors that their capital contributes to tangible environmental improvements.

In addition to green bonds, revolving funds represent another innovative financing mechanism. A revolving fund is a self-supporting fund that provides services or sells goods to state agencies, other governmental jurisdictions, or the public. These funds are continually replenished by the revenue generated from their services or sales, making them a sustainable financing source. One best practice example is the revolving fund for energy and water efficiency in Águeda, Portugal. This fund illustrates how revolving funds can support ongoing sustainability projects, often complemented by private investment, thereby enhancing their reach and impact.

Green municipal bonds and revolving funds represent powerful tools for financing sustainable development. By specifically targeting environmental projects, green bonds offer municipalities a way to align their financial strategies with their sustainability goals. Furthermore, the introduction of revolving funds as a complementary mechanism broadens the scope for sustainable financing, providing a continuous funding source for ongoing green initiatives. Together, these financial instruments offer a robust model for cities and regions committed to a sustainable future, combining public commitment with private investment and innovative financing strategies.

Case study - Green Bonds

Östersund, a city with a vision to become climate neutral by 2030, has been pioneering sustainable investments through a green bond scheme initiated in 2017. The city's commitment to renewable energy, mobility, and energy-efficient housing has led to significant achievements, including an annual reduction of 892 MWh in energy usage due to housing improvements in 2021.

The city's strategy involves a comprehensive approach, with the goal to reduce energy consumption by 30% and transition to renewable energy sources⁴. Notable projects financed by the green bonds include photovoltaic, wind, and hydropower plants, as well as an innovative direct-current network and energy hub with battery storage⁵. These efforts are part of Östersund's broader plan to make all its operations climate neutral by 2025 and align local regulations with its ambitious climate program⁶. The success of Östersund's green bond scheme serves as an inspiring case study for cities worldwide aiming to achieve a sustainable energy transition.

Source: <https://eu-mayors.ec.europa.eu/en/node/447>

Country: Sweden

Date: 2022

4.4. ESCO services

Energy Service Companies (ESCOs) have emerged as a vital partner for municipalities aiming to enhance energy efficiency and implement sustainable energy projects. ESCOs provide an integrated approach, covering project design, implementation, financing, and maintenance, specifically tailored to the unique needs of municipal environments. This chapter will explore the various services offered by ESCOs and their role in assisting municipalities with sustainable energy transitions.

Energy Audits and Analysis: ESCOs initiate their engagement with municipalities by conducting comprehensive energy audits. These audits assess the current energy consumption and identify potential areas for improvement, laying the groundwork for future energy-saving measures.

Customized Project Design: Utilizing the insights from energy audits, ESCOs develop bespoke energy efficiency projects. These designs are tailored to the specific needs of municipal buildings, public lighting, water treatment facilities, and other municipal assets.

Project Financing and Implementation: A distinctive feature of ESCOs is their ability to provide financing for energy efficiency projects. This often involves performance-based contracts where the repayment is contingent on the energy savings achieved. ESCOs manage the entire project implementation process, ensuring minimal disruption to municipal services.

Maintenance and Performance Monitoring: Post-implementation, ESCOs continue to offer maintenance and monitoring services. They ensure that energy systems operate optimally and that the projected energy savings are realized, providing municipalities with ongoing support and expertise.

Capacity Building and Training: ESCOs often provide training and capacity-building programs to municipal staff. This helps in creating an informed workforce that can sustain and build upon the energy efficiency initiatives.

ESCOs offer a comprehensive solution for municipalities looking to navigate the complexities of energy efficiency projects. From initial audits to long-term maintenance, ESCOs provide expertise, financing, and support, helping municipalities achieve their sustainability goals while also ensuring financial viability. Their role is increasingly crucial in aiding municipalities to transition to more energy-efficient and sustainable operations.

Case study - ESCO services

The Photovoltaics for one crown program in the Czech Republic by the Czech ESCO company ČEZ ESCO is a financial initiative that enables individuals and entities to install photovoltaic systems with virtually no upfront costs, as the ownership of the systems is transferred to the participant after 15 years for a symbolic one Czech koruna. The program covers the exchange of the inverter and all service fees within the cost of electricity, which is ideal for properties with an annual electricity consumption of at least 150 MWh. For larger projects, the terms are customizable, ranging from 15 to 25 years of operation, with conditions tailored to the participant's needs, thereby promoting the adoption of renewable energy sources and making green energy more accessible. The programme is done together with the Czech branch of Societe Generale bank.

In 2023 in the frame of the programme s 83 kW photovoltaics was being built at a public swimming pool at the city of Havířov, Czech Republic.

Source: <https://equipmentfinance.societegenerale.cz/cz/produkty-sluzby/specializovane-financovani/fotovoltaika-korunu/>

Country: Czech Republic

Date: ongoing in 2023

4.5. Crowdfunding & Peer-to-Peer Lending

In recent years, crowdfunding and peer-to-peer (P2P) lending have emerged as revolutionary methods of financing, harnessing the power of collective support from a broad audience. Typically facilitated through online platforms, these methods involve raising small amounts of money from a large number of people. This approach has democratized access to funding, especially for projects and ventures that may not fit traditional financing criteria.

Crowdfunding allows individuals or organizations to present their ideas or projects to a wide audience, soliciting small contributions from many backers. This method is highly versatile, supporting a range of initiatives from artistic endeavours to technological innovations. Crowdfunding platforms serve as a bridge between project creators and potential funders, providing a space for showcasing ideas and securing financial support.

Peer-to-peer lending takes the concept of borrowing outside the traditional financial institutions. Here, individuals can lend money directly to others, bypassing banks or lending agencies. This method often results in more favourable terms for both lenders and borrowers, with competitive interest rates and flexible repayment options.

Crowdfunding and peer-to-peer lending represent a paradigm shift in the world of finance, offering alternative avenues for funding outside conventional channels. These methods empower individuals and communities, enabling them to directly influence and contribute to the success of diverse projects and ventures.

Case study - Crowdfunding

The Križevci solar roofs project in Croatia is a pioneering example of crowd investing in renewable energy. The project was financed by 93 citizens who invested in two 30 kW solar power plants on a Development Centre and public library owned by the municipality. The project's main aim was to demonstrate the feasibility of using local resources to finance public energy initiatives and to show that citizens, not only corporate investors, can invest in such projects. The project's success led to the establishment of a local energy cooperative (KLIK) that is now advising on renewable energy projects and leading the energy transition in partnership with the town.

Source: <https://energy-cities.eu/biggest-crowdfunded-solar-power-plant-in-croatia-is-ready-to-take-off/>

Country: Croatia

Date: 2018-2019

4.6. Climate Investment Funds

The Climate Investment Funds (CIF) stands as a beacon of hope and action in the face of the escalating climate crisis. Established as a collaborative, coordinated, and

multilateral response to climate change, CIF plays a crucial role in fostering a transition to a sustainable, equitable global economy. It focuses on providing climate-smart planning and climate action support, particularly in low and middle-income economies, which are often the most vulnerable to climate change impacts. The CIF's mission is rooted in the belief that facilitating a shift to clean and green practices enhances community resilience against climate risks, stabilizes economies, and underpins sustainable development inclusive of all societal segments.

As a global leader in flexible, secure, concessional climate finance, CIF is pivotal in piloting and scaling innovative climate solutions. Since its inception in 2008, it has been instrumental in channelling funds from government donors and the private sector, supporting over 370 projects in 72 countries. Recognizing the interconnection between climate change and development, CIF's efforts align with the UN's Sustainable Development Goals (SDGs). Through partnerships with governments, the private sector, civil society, local communities, and major multilateral development banks, CIF reduces investment risks and mobilizes private capital for climate action. Its ability to attract significant co-financing, at an average rate of 1:8.3, underscores its effectiveness in stimulating local economies and opening new sustainable markets. CIF's governance and operational approach are marked by transparency and inclusivity. Overseen by a governing board that balances the authority of donor and recipient countries, CIF fosters trust and collaboration among a diverse range of stakeholders. This transparent, country-led process is committed to gender equality, empowering women in climate leadership roles. Recognizing the need for social and economic transformation in the transition to sustainable economies, CIF's initiatives are guided by the Just Transition Initiative. This approach ensures equitable distribution of climate finance benefits and opportunities, aiming for a future that is cleaner, greener, and fairer for all. Independent evaluations have

The Climate Investment Funds exemplify a dynamic, impactful approach to addressing the global climate crisis. By enabling large-scale financial solutions and fostering collaborative partnerships.

Case study- Energy Efficiency Investment Fund

Albertville in France implemented an Intracting fund to enhance municipal energy efficiency. This self-sustaining fund, starting with €100 000 in 2019, reinvests savings from energy-efficient measures into new projects. Managed by the city's financial services, it supports projects that are quick to implement and have measurable energy savings

Key projects and their impacts include: replacing 87 public lighting lamps with LED, resulting in a 76% energy saving (73,195 KWh/year), saving €7,412 in petrol annually, and reducing CO₂ emissions by 8 tons per year, upgrading to energy-efficient vehicles and electric bikes for municipal services, saving €4,735 annually and installing solar equipment in public lighting, saving 3,994 KWh and 439 kg of CO₂ annually. The size of the investment has grown to € 704 000 in 2023.

This approach not only supports Albertville's energy transition but also maintains financial autonomy. It aligns with PROSPECT+'s objectives of empowering local authorities in sustainable energy planning and implementation.

Source: <https://netzerocities.app/resource-3150>

Country: France

Date: 2019, ongoing

Amount: 704 000 euro in 2023

4.7. Land Value Capture (LVC)

Land Value Capture (LVC) is a financial mechanism that harnesses the increase in land value resulting from public infrastructure investments. It operates on the principle that public works, such as transportation systems, parks, and other infrastructure developments, often enhance the value of nearby land. LVC allows municipalities and governments to recapture a portion of this increased value, often through taxes or levies, and reinvest it back into public projects. This method aligns the cost of public infrastructure more closely with those who benefit from it, ensuring a more equitable distribution of public investment costs.

LVC works by identifying and quantifying the added value to land as a direct result of public infrastructure developments. This increase in land value can be captured through various means, such as property taxes, development charges, or special assessments. The revenue generated is then channelled back into funding further public projects or maintaining existing ones. LVC is particularly effective in urban areas where public infrastructure significantly influences land values.

The primary benefit of LVC is its ability to generate funding for public projects without placing an excessive burden on general taxpayers. It ensures that those who benefit most from public investments contribute fairly to their costs. Additionally, LVC can incentivize smart urban planning and sustainable development.

However, implementing LVC requires careful planning and assessment to accurately capture the land value increments and to establish fair and efficient collection methods. There is also the challenge of ensuring that LVC policies do not disproportionately impact certain groups, such as low-income residents.

Land Value Capture represents a strategic approach to financing public infrastructure, turning the indirect benefits of public investments into a tangible financial resource. The Sao Paulo case study demonstrates LVC's potential in creating sustainable, self-funding models for urban development projects. When implemented effectively, LVC can be a powerful tool for equitable and efficient urban planning and development.

Case study - Land Value Capture

The Grand Paris Express, a major railway project in Paris, demonstrates the strategic use of expropriation in large infrastructure developments. This project, managed by the Société du Grand Paris, involves constructing 200km of new lines and 68 stations, with a budget that has grown from EUR 25.5 billion to EUR 38.5 billion. It aims to improve connectivity in the Paris metropolitan area, redistribute economic development, and enhance suburban accessibility.

In France, expropriation allows the government to acquire land for public interest projects, a process integral to the Grand Paris Express. The project's legal framework ensures that land value increments due to the project itself are captured by the

government, preventing overpayment. For the Grand Paris Express, special clauses were inserted to effectively capture these value increments, with the Société du Grand Paris spending an estimated €1.43 billion on land acquisition.

Source: <https://www.oecd.org/publications/financing-transportation-infrastructure-through-land-value-capture-8015065d-en.htm>

Country: France

Date: 2019

4.8. Carbon Offset Fund

A Carbon Offset Fund (COF) is a financial mechanism designed to support environmental sustainability initiatives, particularly those aimed at reducing carbon emissions. The concept revolves around the principle that developers or companies, unable to meet certain carbon neutrality or emission reduction targets, can contribute to these funds as a form of compensating for their carbon footprint.

These funds are typically managed by local councils or government bodies. The contributions are usually determined based on the amount of carbon emissions that the development or company is unable to offset on its own. For instance, if a developer cannot achieve carbon neutrality in a new project, they would be required to pay a set fee per tonne of carbon emission. This fee is then allocated to the COF. The funds collected are used to finance various carbon-saving initiatives within the local area. These projects can vary widely, from installing photovoltaic (PV) panels on buildings and upgrading heating systems to providing energy-efficient lightbulbs to households and supporting energy refurbishments in social housing. The ultimate goal of these funds is to ensure that the carbon emissions from new developments are balanced by equivalent carbon savings elsewhere in the community.

Moreover, COFs often aim to involve local communities more actively in sustainability efforts. This involves making the process of utilizing these funds more accessible and encouraging community participation in decision-making related to the funded projects.

The COF model provides a practical approach to managing environmental impacts of new developments and is a step towards achieving broader sustainability goals, such as carbon neutrality and reduction of greenhouse gas emissions.

Case Study - Milton Keynes Carbon Offset Fund

The City Council of Milton Keynes, United Kingdom, has implemented an innovative Carbon Offset Fund (COF) as part of its strategy to achieve carbon neutrality. Launched on 1st March 2022, this initiative represents a unique approach by a local government to transform energy transition and address climate change. The COF is funded through a CO2 tax, as per Milton Keynes Council Planning Policy D4, which mandates all new developments to be carbon neutral in operation. Developers who cannot achieve carbon neutrality in their projects must pay a fee of 200 euros per tonne of carbon emission. This payment is then channelled into the COF, managed by the council. The fund is dedicated to financing a variety of carbon-saving initiatives

within the city, ensuring that emissions from new developments are offset by equivalent carbon savings elsewhere.

The COF finances a wide range of projects, such as the installation of photovoltaic (PV) panels on refurbished buildings, upgrading heating boilers, providing energy-efficient lightbulbs, and supporting energy refurbishments in social housing. One notable project is the installation of PV panels in Stony Stratford, a town near Milton Keynes.

The council is also focused on making the COF more accessible and encouraging greater community involvement. Eligibility for the fund extends to community groups, public organizations, schools, charities, and not-for-profit organizations within the Milton Keynes borough. Projects eligible for funding include solar PV panels, low-energy lighting, window and door upgrades, insulation, and replacement of traditional heating systems with heat pumps.

Source: <https://www.milton-keynes.gov.uk/sustainable-milton-keynes/carbon-offset-fund>

Country: UK

Date: 2020

5. Conclusions

Innovative and novel financing methods provide municipalities with effective tools to address climate and sustainable development challenges. These methods, including public-private partnerships, green bonds, energy performance contracting, and crowdfunding, offer flexibility and adaptability, enabling tailored approaches to local sustainability goals. They empower municipalities with financial autonomy, essential for implementing localized strategies and solutions.

A diverse range of financing options opens up new possibilities for municipalities to pursue ambitious climate actions. However, the complexity of these innovative financing landscapes presents significant challenges. Municipalities often require enhanced capacity building and knowledge sharing to navigate and fully leverage these new opportunities effectively.

Building and sustaining partnerships is critical in this evolving financial environment. Collaborative efforts between municipalities, private entities, financial institutions, and other stakeholders are vital for accessing a wide array of funding sources and expertise. These partnerships facilitate resource pooling and best practice sharing, essential for driving innovation in municipal finance.

The potential for the growth and application of these innovative financing methods is evident. Municipalities are poised to explore and adapt these methods to their unique contexts and development goals. This adaptability is crucial in addressing the dynamic challenges of climate change and sustainability at the local level.

Ultimately, innovative and novel financing methods are paving the way for municipalities to achieve their climate and sustainability objectives. Embracing these methods, addressing their challenges, and fostering partnerships are key steps toward a more sustainable and resilient future for municipalities.

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