

Final Report:

Energy City of Cuenca:

a participative municipal planning tool to bolster the energy transition in Ecuador



Author(s):

Mauricio Villasenor, EBP AG

Date of the Report: 15-09-2020	Contract Number: 2018.18
Institution: EBP Chile	Country: Ecuador

Prepared by:

EBP Schweiz AG

Zollikerstrasse 65

8702 Zollikon

Switzerland

Tel. +41 44 395 11 11

info@ebp.ch

Fundación Futuro Latinoamericano,

Av. República y Av. Amazonas

Edif. Las cámaras 2do Piso

Quito, Ecuador

info@ffla.net

EBP 



With the Support of:

REPIC Platform

c/o NET Nowak Energy & Technology AG

Waldweg 8, CH-1717 St. Ursen

Tel: +41(0)26 494 00 30, Fax: +41(0)26 494 00 34, info@repic.ch / www.repic.ch

The REPIC Platform is a mandate issued by the:

Swiss State Secretariat for Economic Affairs SECO

Swiss Agency for Development and Cooperation SDC

Federal Office for the Environment FOEN

Swiss Federal Office of Energy SFOE

The author(s) are solely responsible for the content and conclusions of this report.



Contents

1. Summary	4
2. Starting Point	4
3. Objectives	4
4. Project Review	5
4.1. Project Implementation	5
4.2. Achievements of Objectives and Results	5
4.3. Multiplication / Replication Preparation	6
4.4. Impact / Sustainability	7
5. Outlook / Further Actions	8
6.1 Multiplication / Replication	8
6.2 Impact / Sustainability	9
7. Lessons Learned / Conclusions	9
7.1 Final conclusions	11
8. Annex	12

1. Summary

The city of Cuenca has been experiencing an important demographic growth in recent years. Additionally, their commitment to sustainable development is challenged by problems such as vehicular congestion, air pollution and a lack of sustainable energy infrastructure for facing climate change challenges.

Dialogue spaces and concrete projects are necessities for boosting local action and promotion of energy efficiency and renewable energies across sectors. Thus, the project was implemented with the main goal to establish the institutional and technical bases for the promotion and development of the energy efficiency and renewable energy (EE/RE) in the city of Cuenca with the possibility of scaling up to other cities in Ecuador. In this sense, it seeks to integrate an energy dimension into citizen processes and create synergies between different public policies and stakeholders to implement measures and promote initiatives in favour of sustainable development.

The project was divided in three main components:

Component A: It was based on the elaboration of the Local Energy Strategy (energy diagnosis, evaluation of potential, multi-actors' workshops and concertation, the definition of an action plan and participative validation). Additionally, it was created a "Local Energy team", for leading action plan implementation and supporting the municipal team.

Component B: The early victory project in Cuenca considered the promotion of photovoltaic solar energy, oriented at public space. The proposed location was the "Parque de la Libertad" and a 12,42 [kW] system was installed.

Component C: Finally, it was elaborated a study for the establishment of a roadmap for the implementation of a national Energy City program. The study was based on an in-depth analysis of the current regulatory and institutional framework, as well as a broad consultation of relevant national stakeholders and the feedback of Swiss experts who has led the establishment of the European Energy Award.

Future actions include the presentation of the project to new municipalities, seeking their support in raising funds to carry out their strategies and implement demonstration projects. This is based on the creation of a consortium between the organizations that have led the project (EBP-FFLA) who have decided to invest in promoting Energy City in Ecuador.

2. Starting Point

The Ecuadorian context for the promotion of energy efficiency and renewable energies is promising, but there is no evidence of major progress at the political level or in terms of projects implemented. The energy industry is small, and a few companies control the market. This situation reduces the profitability of EE/RE projects, which is intensified because in Ecuador there are strong subsidies from the national government for fuels.

Particularly at the local government level, efforts are focused on environmental aspects (recycling, forestry) and on mobility issues, not seeing energy as a potential for climate change mitigation, let alone an opportunity for local economic development.

3. Objectives

- Improve public policy/management at the municipal level and increase local participation in energy-related processes to foster synergies between the public, private, civil and academic sectors.
- Attract private investment towards EE/RE projects and bolster local entrepreneurship related to clean energy.
- Enable the establishment of a long term regional/national program related to Energy City, activating south-south cooperation with other countries (Chile, Colombia).

4. Project Review

4.1. Project Implementation

The project was implemented in close collaboration between EBP and FFLA as main partners. For the specific work in the city of Cuenca, the University of Cuenca had a role of technical expert and local coordinator. In addition, the municipality of Cuenca actively supported the participatory process for the elaboration of the local energy strategy (component A).

The main steps during component A were the gathering of information for the elaboration of the energy diagnosis, the participatory workshops for the establishment of the vision and goals, and the technical assessment, design and validation with the local stakeholders of the project portfolio, that is summarized in the action plan.

With respect to component B, the Ecuadorian Association of Renewable Energies and Energy Efficiency (AEEREE in Spanish) was assigned as the main contractor in consortium with the local partner Intienergias, for implementing a 12.42 kW pilot solar system in the "Parque la Libertad". This project has become the first in the city of Cuenca to be connected to the electricity grid under the ARCONEL¹ 003/18 regulation, which allows both self-consumption of energy and injection (i.e. sale) into the grid when there is a surplus.

Finally, component C included a general analysis of the energy context in Ecuador, which was complemented with a series of meetings with relevant authorities and companies in the sector. With this background and the consultant's experience in establishing the Energy City program in Latin America and Europe (with support from experts from ENCO AG), a strategy was developed for scaling up the results of this project with the goal to establish a national program.

4.2. Achievements of Objectives and Results

It is estimated that the objectives initially set were successfully met. In particular, the results of the project are the following:

- The municipality of Cuenca has a roadmap to lead the Energy City process. A multi-stakeholder committee has been set up to follow up project implementation and dissemination. In addition, the municipality's professionals are now better trained in energy efficiency and renewable energy, and they are integrating these variables into their work programs and personal/collective goals. The EBP-FFLA consortium in collaboration with University of Cuenca is addressing new business opportunities and funding for implementing some of the projects defined in the Action Plan.
- A solar system has been installed in a public park with high visibility; this pilot project is visible to all citizens because of its strategic location. The solar system will be one of the first in Ecuador to be able to inject surplus energy into the national grid under the distributed generation law. During the implementation process and permit procedures, a lot of information has been generated for the municipality, companies, and the energy authority (electricity distributor). The main impact of the project has been the understanding of the national regulation in the local context, particularly for public institutions, who can now generate their own electricity in a sustainable way. The large bureaucracy faced during this project has leveraged the necessity to adapt some concept in the requirements/rules of the distributed energy law, for being more flexible in the acceptance criteria (for example, when a building space have more than 1 electric meter and the solar system is capable to supply more energy than the electric meter where is connected, a common situation in public infrastructure). In terms of environmental integrity and co-benefit, the consortium is also pursuing that this kind of local sustainable solutions can also formally contribute to the climate change reduction goals for Ecuadorian government, through its NDC.
- It has been identified that there is potential for the establishment of a national Energy City programme in Ecuador, but initial leadership must come from the municipalities, since the

¹ <https://www.regulacionelectrica.gob.ec/>

central government does not have the current capacities to address such a program, as in the case of Chile or Colombia. The consulting team has defined a strategy that seeks to add new municipalities with interest and capacity to lead local processes that allow the implementation of successful projects, exchange experiences and generate support from international cooperation, so this program becomes part of the national strategy linked to climate change goals in the future. The Swiss experts were actively involved in the analysis and proposal for the scalability of the Energy City program in Ecuador. Unlike the cases in Latin America, the governance of CE incorporates in Switzerland a strong support of private sector experts (as advisors or auditors). This idea is interesting in the context of Ecuador and possibly the most agile way to promote the implementation of projects and plans at the municipal level.

Another relevant point is the regional integration of the initiative, right now when Ecuador is looking to join the Pacific Alliance (<https://alianzapacifico.net/>), the experience of the European Energy Award (EEA) in Switzerland and Europe becomes very relevant. An Energy City program in Ecuador should be built considering its possible exchange with the programs in Chile and Colombia. In a first phase at the level of definitions and technical criteria, but in a second phase thinking about the active exchange of experiences, and aggregation of demand for larger projects that can be applied in the 3 countries. Furthermore, the Swiss government is supporting programs in the region with a focus on energy efficiency in buildings, as the case of CEELA "Strengthening Capacities for Energy Efficiency in Buildings in Latin America", where Ecuador is one of the beneficiary countries, along with Colombia, Mexico and Peru.

4.3. Multiplication / Replication Preparation

With respect to the work carried out in the city of Cuenca (Local Energy Strategy), the municipality has the ambition to implement at least 3 of the prioritized projects by 2021, which includes an energy efficiency program for educational institutions, a tool for monitoring energy variables in public buildings, and the formalization of the "energy committee" as a body regulated by the local government.

In addition, due to the success of the solar project of the La Libertad Park, the municipality has set a goal to expand the solar energy coverage in their facilities, starting with the markets, whose spaces are rented to local merchants, who demand high energy consumption for their food processing and refrigeration equipment.

Regarding the replication opportunities for the project carried out in Cuenca (which involved the elaboration of a Local Energy Strategy and implementation of a pilot project), and the development of a national Energy City program in Ecuador, it was prepared a full strategy document (Component C)². The main conclusion is that to structure such a program, it is necessary to start a roadshow at municipal level, introducing the program to the mayors, getting their interest and preparing a proposal to national authorities or potential donors (such a BID, CAF, WorldBank), in order to get technical assistance funds.

It was considered during Q1 2020 to hold several interviews with mayors from other relevant cities in Ecuador (as mentioned in the report). However, due to the global coronavirus pandemic, the replication strategy in other municipalities has kept frozen. We hope that once the situation in Latin America become more stable, we will be able to restart these conversations in order to fulfil the goals of the strategy.

² The whole Component C report is part of the annexes of this final report (just available in Spanish)

4.4. Impact / Sustainability

The following table summarizes the main indicators of the solar project implemented in the city of Cuenca:

Ecological	Unit	At the REPIC Project's Completion
Installed renewable energy capacity	[kW]	12,42
Renewable energy produced	[kWh]/year	17363
Amount of fossil fuel energy saved	[kWh]/year	17363
Greenhouse gas reduction	[t CO ₂ -eq]/year	22,6
Newly collected and separated waste	[t]	NA
Newly recycled waste	[t]	NA
Economic		
Energy costs (LCOE)	[Rp/kWh]	NA
Triggered third-party funding/investments	[CHF]	25,000
Local private income generated	[CHF]	NA
Social		
Number of beneficiaries	[Number]	direct (municipality), indirect (all the city)
Number of new jobs	[Number]	1 (municipal Operator)
Number of trained personnel	[Number]	10 (municipal local team)

Other Indicators	Unit	At the REPIC Project's Completion
Dissemination: Solar plant visitors	[Number]	1.500
Project pipeline for Cuenca	[Number]	25



Figure 1: Solar system installation in Cuenca.

5. Outlook / Further Actions

6.1 Multiplication / Replication

As indicated in the previous point, the report of component C incorporates a plan of future actions for the establishment of the national CE program in Ecuador, based on an initial proposal for being executed during 2020, which is presented below.

- Generate a first approach with potential GADs (municipalities) interested in replicating EC in their locations (March 2020)
- Create and communicate an institutional image of CE Ecuador (March 2020)
- Sign a collaboration agreement between FFLA and EBP (April 2020)
- Sign an MoU with at least three of the identified GADs (July 2020)
- Formation of the panel of experts (November 2020)
- Obtain funding to implement the CE methodology and pilot projects in partner GADs (December 2020)

Due to the coronavirus pandemic, this plan could not be carried out since March, and it is proposed to restart the activities committed by the EBP-FFLA consortium when the situation improves in the country. This action plan responds to the analysis of the country at the date of implementation of the REPIC project, which concluded that the government of Ecuador is not currently prepared to lead a program of energy cities at the central level. For this reason, the proposal of the consultant team was to continue working with other municipalities, to generate the necessary momentum and interest of the central government.

In terms of the long-term strategy, it is considered reasonable that the national program of Energy City Ecuador could be institutionalized in the government by 2022. This is summarized in the following table (which is detailed in the annexed report of component C)

Línea de Tiempo					
Año	2019	2020		2021	2022
Período	Enero - Dic.	Ene. - Julio	Ago. - Dic.	Enero - Dic.	Enero - Dic.
Fase	Fase 0	Fase I	Fase II	Fase III	Fase IV
	Piloto Cuenca	Prospección	Provisión	Replicación	Escalamiento
	Se implementa una EEL y un proyecto de victoria temprana como piloto para la evaluación de un desarrollo de Ciudades Energéticas en Ecuador.	Se realiza un acercamiento y posterior Pacto con varios GADs para la replicación de CE en sus localidades.	Se busca y asegura el financiamiento para la replicación conjuntamente con los GADs aliados que firmaron el pacto CE.	Con financiamiento externo se implementa CE en los diferentes GADs con el objetivo de mostrar resultados y generar interés en el gobierno central.	El gobierno central toma un liderazgo político en la creación de un programa nacional de CE institucionalizado de Ecuador.
Estado	Culminado	En desarrollo	Plan de Acción	Plan de Acción	Previsto

Figure 2: Timeline for the CE Ecuador establishment (for details, see Component C report)

6.2 Impact / Sustainability

An expected result of the replication phase is to be able to develop energy strategies and pilot projects in new cities in Ecuador. With this, both environmental, social and economic benefits are expected, which are described in a general way below:

- Short, medium and long-term planning for sustainable energy development in cities.
- To design and implement concrete energy projects, which are a priority for the municipality.
- To mobilize specialized funds in sustainable development and energy management.
- To receive training in energy issues and to integrate this learning into their training plans.
- To raise awareness among the local population and the private sector.
- To reduce their energy consumption and greenhouse gas emissions.
- To generate new jobs and local sources of income.
- To improve air quality and wellbeing through interventions in key sectors.
- To Improve the public image and reputation of the city and attract new investment.
- Share knowledge, experiences and solutions between Ecuadorian cities and others Energy Cities worldwide.

7. Lessons Learned / Conclusions

Based on the experience of the consultant team and Swiss experts on the establishment and operation of the EEA tool (European Energy Award) and its application at international level, a number of recommendations have been defined for the proper development of the Energy City (CE) initiative in Ecuador.

General recommendations

- To frame the CE initiative within the political discourse and action lines around the development of new sustainable energy technologies, for example, electro mobility, distributed generation based on solar photovoltaic energy, among others.
- To frame the CE initiative as a savings opportunity for the state, with quantitative data on the results of Phase III (reduction in the energy expenditure of public buildings, improved living conditions, etc.).
- Use the EEA accreditation logic (award and recognition) as an incentive to motivate municipalities and central government around a dynamic tool of continuous improvement, where each city has the opportunity to improve its base situation over time.

Recommendations at the local level

- Ensure guarantees at the beginning of the implementation of CE so that the GADs empower themselves with the EELs and become leaders of their local energy policy:
 - **Analysis of GADs competences:** in terms of sustainable energy and climate management in the six areas of CE; this analysis allows to define the relevant areas and criteria for future CE catalogue and evaluation guide tools.
 - **Local motivation:** identification of possible benefits for the municipality (e.g. savings/opportunity costs, attracting investment, political image, environmental impacts, etc).
 - **Mapping of local organisational structure:** Identifying the departments and officials who are in charge of local development planning. Assess how energy planning could

be articulated with municipal and urban development planning within a single vision. To identify how future energy committees could be structured based on the organizational chart of the GADs and the leaders or possible "champions" who can promote a local energy policy.

Recommendations at the national level

- Maintain constant contact with the central government and keep it informed of the development of the first phases of the initiative. After Phase II, it is recommended to realistically assess the feasibility of a future EC programme. To this end, is recommended to focus on:
 - **interest of the national government to push a local energy policy:** This at the level of different ministries or other instances at the national level.
 - **Evaluation of public incentives:** laws (Energy Efficiency Law), climate commitments (NDC), access to local energy data to attract investment, resource savings/subsidies.
 - **Mapping and analysis of national and regional actors who could be involved:** Assess the relationship between them, the interest they have and the role they could play in a future national programme in a Phase IV.

Local-national recommendations

- Based on the team's experience, it is recommended to maintain a strong relationship between the national government and the GADs. This is because the CE has not been able to function in other countries in the absence of a true pact between the national and local levels. Therefore, it is recommended to enhance the active role of advisors as a bridge between the local and national levels:
 - **Role of the advisor:** Individuals with a transversal profile (environmental/energy education) who can be technically trained and quickly familiarized with the different areas of Energy Cities. It is essential that these actors are geographically close to the municipality they will support.
 - **Exchange of concrete experiences:** It is essential that the government at the central level promotes the replication of successful experiences at the local level. In that sense, successful projects of the action plan in a GAD can be replicated through government support instruments, promoting the exchange of experience and collaboration between cities.

7.1 Final conclusions

To summarize this project, we take into account the different components executed and the interaction between them.

In terms of the local process of Energy City in the municipality of Cuenca, we can conclude that local governments in Ecuador has the internal capacity and the motivation for improving their energy performance and planning capacities. However, it is needed to build capacities and include local experts (universities, energy companies) in the process to ensure the quality and impact of action taken.

The implementation of sustainable energy project at local level still been a challenge, because there is a limited number of companies and experts. Furthermore, regulation for energy efficiency and distributed generation are new in Ecuador, so the market is in a learning phase, and in general they take much longer than is expected for approve licenses or validate solutions.

In terms of the opportunities to implement a national Energy City program in Ecuador. Based on the assessment of secondary context information, interviews with relevant stakeholders and the results of the pilot in, this team states that is possible to implement a national program, but it cannot be implemented immediately until there is interest from the national government.

In view of the above, a strategy divided into three previous phases has been developed that can generate the necessary traction to, in a fourth phase, consolidate the progress of the initiative and establish the national program. To this end, an alliance is to be consolidated between the institutions that have led the implementation of the REPIC project, the FFLA-EBP consortium. Both institutions are willing to invest their own resources to articulate the interest of new local governments and seek funding to begin work in these territories, to demonstrate, based on the methodology of the Energy City, results in energy savings, to improve local capacities in environmental management and to contribute to national goals for reducing Greenhouse Gases (GHG) emissions.



Figure 3: Inauguration of solar energy system in the city of Cuenca.

8. Annex

1. *Local Energy Strategy of Cuenca: Executive Summary*
2. *Strategy for the establishment of a national CE Program in Ecuador*