

EXTERNAL EVALUATION - SHORT REPORT

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Strengthening the quality infrastructure in the areas of renewable energies and energy efficiency

Country/Region: Bolivia

Project number: 2017.2081.2
Project term: 10/2019 to 07/2024

Lead executing agency: Ministry of Productive Development and Plural Economy
(*Ministerio de Desarrollo Productivo y Economía Plural*)
Executing agency: Bolivian Institute for Standardization and Quality (IBNORCA)
(*Instituto Boliviano de Normalización y Calidad*)

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Date: 15.03.2024

This evaluation is an independent assessment. Its contents reflect the evaluator's opinion, which is not necessarily equivalent to PTB's view.

List of abbreviations

BMZ	Federal Ministry for Economic Cooperation and Development <i>Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung</i>
CAB	Conformity Assessment Bodies
CAF	Development Bank of Latin America and the Caribbean <i>Banco de Desarrollo de América Latina y Caribe</i>
CCRT	Technical Regulation Compliance Certificates <i>Certificados de Cumplimiento de Reglamento Técnico</i>
CW	Capacity Works
DTA	Technical Accreditation Department of IBMETRO <i>Dirección Técnica de Acreditación del IBMETRO</i>
FIMO	Financial Monitoring
GIZ	German Agency for International Cooperation <i>Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH</i>
IAAC	Inter-American Accreditation Cooperation <i>Cooperación InterAmericana de Acreditación</i>
IBMETRO	Bolivian Institute of Metrology <i>Instituto Boliviano de Metrología</i>
IBNORCA	Bolivian Institute for Standardization and Quality <i>Instituto Boliviano de Normalización y Calidad</i>
IDB	Inter-American Development Bank
ISO	International Organization for Standardization
KfW	KfW Banking Group <i>KfW Bankengruppe</i>
KOICA	Korea International Cooperation Agency
MDPyEP	Ministry of Productive Development and Plural Economy <i>Ministerio de Desarrollo Productivo y Economía Plural</i>
MFB	Module Progress Report <i>Modulfortschrittsbericht</i>

MV	Module Proposal to the BMZ <i>Modulvorschlag</i>
MW	Megawatts
NDC	Nationally Determined Contributions
OECD-DAC	Development Assistance Committee of the Organization for Economic Co-operation and Development
PAEE	Strategic Plan for Energy Saving and Efficiency <i>Plan Estratégico para el Ahorro y la Eficiencia Energética</i>
PDES	Social Economic Development Plan 2021 – 2025 <i>Plan de Desarrollo Económico Social 2021 – 2025</i>
PEN	National Strategic Plan 2023-2025 <i>Plan Estratégico Nacional 2023-2025</i>
PTB	National Metrology Institute of the Federal Republic of Germany <i>Physikalisch-Technische Bundesanstalt</i>
PV	Photovoltaic
QI	Quality Infrastructure
SNMAC	Bolivian System of Standardization, Metrology, Accreditation, and Certification <i>Sistema Boliviano de Normalización, Metrología, Acreditación y Certificación</i>
TC	Technical Cooperation
UNEP	United Nations Environment Program
UNIDO	United Nations Industrial Development Organization
WTO	World Trade Organization

1. Executive summary of the project

The evaluation object of this report is the project "Strengthening of the Quality Infrastructure for the Areas of Renewable Energies and Energy Efficiency in Bolivia," implemented from October 2019 to July 2024. The German Federal Ministry for Economic Cooperation and Development (BMZ) financed the project of EUR 1,300,000.

The political counterpart of the project is the Ministry of Productive Development and Plural Economy (MDPyEP), involving key implementation institutions such as the Bolivian Institute of Metrology (IBMETRO), its Technical Accreditation Department (DTA), and the Bolivian Institute of Standardization and Quality (IBNORCA), as well as planned collaboration with the Ministry of Hydrocarbons and Energy.

The project's core objective is to strengthen Bolivia's Quality Infrastructure (QI) to meet the growing demand for new services in the energy sector, thus contributing to implementing the country's energy policy. In the long term, it seeks to ensure that the Bolivian population has access to a sustainable, modern, reliable, and efficient energy supply, with an increasing share of renewable sources. Bolivian QI institutions in the energy sector lack the necessary skills and experience, facing challenges with outdated regulations and non-compliance with energy efficiency standards, according to the Module Proposal to the BMZ (MV). This leads consumers to prefer less efficient, cheaper imported products due to unreliable information. The target group is the energy users who benefit from the improved QI and QI services in the Bolivian energy sector. The following outputs were defined: Efficiency conformity assessment system in place (1); Capacities for assessing the energy efficiency of electrical household appliances developed (2); A system for the conformity assessment of components of autonomous photovoltaic systems introduced (3); The institutional basis for energy-related quality infrastructure services strengthened (4); and the Exemplary quality infrastructure services for new topics in the energy sector are developed (5).

The project closely aligns with Bolivia's national energy sector policies and strategies, highlighting the Nationally Determined Contributions (NDC) and the country's economic and strategic development plans.

2. Evaluation of the project

The evaluation covers the project implementation period from October 2019 to November 2023. The review was conducted in hybrid mode: a first block of seven online interviews (9 people) from 6-10 November 2023 and twenty face-to-face interviews (29 people) from 13-17 November 2023 in La Paz, Bolivia. The objectives of the evaluation are to assess the quality of the National Metrology Institute of the Federal Republic of Germany (PTB)'s cooperation and advisory services, accountability to counterparts and the BMZ, and the internal learning processes at the project and the institutional level, the users of the evaluation, IBMETRO, and IBNORCA and PTB. In addition, this evaluation should serve to adjust the project's implementation and achieve its results by the end of July 2024.

The project's evaluation criteria were based on the Development Assistance Committee of the Organization for Economic Cooperation and Development (OECD-DAC) standards and success factors according to Capacity WORKS (CW).

Various data collection and analysis methods were used: Document analysis, semi-structured individual and group interviews, moderated group discussion, and a validation workshop at the end of the mission.

The six OECD-DAC criteria were used as an evaluation basis for this evaluation:

- Relevance: Is the project doing the right things?
- Coherence: How well does the project fit?
- Effectiveness: Is the project achieving its objectives?
- Impact (higher-level development results): What difference does the project make?
- Efficiency: How well are resources being used?
- Sustainability: Will the results last?

The following marking scale was used for the evaluation:

1	2	3	4	5	6
very successful	successful	successful to a limited extent	rather unsuccessful	mainly unsuccessful	entirely unsuccessful

The assessment of the OECD-DAC evaluation criteria is summarized as follows:

Criterion	Assessment of the Criterion
1. Relevance	1.5
2. Coherence	3
3. Effectiveness	2
4. Efficiency	3
5. Effect	3
6. Sustainability	2

Overall, the project received a mark of 2.5.

In addition to the OECD-DAC criteria and the success factors from CW, the PTB identified the need to address specific questions (see Chapter 3).

Relevance

The project is based on the specific policies and priorities of the country, partners, and the BMZ that align with BMZ's 2017 country strategy. The Technical Cooperation (TC) project is part of the Energy Development Cooperation Program (2018), aiming to provide the Bolivian population with affordable, sustainable, modern, reliable, and efficient energy and increase renewable energy. It supports Bolivia's government policies and strategic energy sector goals, including the Strategic Plan for Energy Saving and Efficiency (PAEE), which seeks to incentivize efficient product use and establish minimum efficiency standards and labeling systems. As confirmed in interviews, the project is crucial for implementing Bolivia's energy policy towards sustainable, modern, reliable, and efficient energy.

The project design considers the needs and capabilities of target groups, focusing on energy consumers in households and the private sector, benefiting from a sustainable and demand-oriented energy supply. The impact on target groups (energy consumers) is indirect, primarily aimed at intermediaries (technical and management personnel) and users of IBMETRO services. No specific design or implementation adjustments were made for gender, ethnicity, age, income, or particularly disadvantaged or vulnerable populations, deemed appropriate given the project's scope. The project has the potential to cover the energy needs of rural areas in the long run.

The project's conception is appropriate, realistic, and feasible for achieving its objective, although it does not measure the usage of QI services. Outcome indicators measure the strengthened QI and services contributing to Bolivia's energy policy implementation, yet they do not capture general development impacts or whether QI services meet demand or need. The financial agreement with the International Organization for Standardization (ISO), supported by BMZ funds, aims to strengthen IBNORCA and the private sector in standards and practices.

The project adapted well to changing conditions, aligned with strategic plans like the Strategic Energy Saving and Efficiency Plan, and considered these plans during implementation.

Overall, the criterion received the mark: 1.5

Coherence

The concept and implementation of the project were carried out in a complementary and collaborative manner within German development cooperation, aligning closely with the 2017 BMZ country strategy emphasizing renewable energy and energy efficiency. The project aligns with international and national standards and

commitments of German development cooperation. While the conception was collaborative, implementation could have been more coherent with the KfW Banking Group (KfW). Important synergies were primarily between PTB and the German Agency for International Cooperation (GIZ), such as the coordinated development of energy efficiency labeling on electromobility regulation and standards. Despite ongoing exchanges between GIZ and PTB and annual coordination meetings facilitated by the German Embassy, more collaborative interaction with KfW was suggested, according to interviews.

The project aims to complement partner efforts and coordinate with other donors' activities, albeit with limited interaction and complementary coordination during implementation. The initial design of the project identified potential coordination actors such as the Inter-American Development Bank (IDB) and the World Bank, with expressed interest from the United Nations Industrial Development Organization (UNIDO) and Korea International Cooperation Agency (KOICA) for collaboration with IBMETRO. However, no concrete cooperative themes emerged. Despite contacts with international organizations and cooperation, such as the United Nations Environment Program (UNEP) and the Development Bank of Latin America and the Caribbean (CAF) in the field of QI for the energy sector, systematic and strategic coordination remains an area for improvement.

The Bolivian System of Standardization, Metrology, Accreditation, and Certification (SNMAC) was established to guarantee quality products and services to the Bolivian population. The project seeks to strengthen the SNMAC to fulfill its coordination and coherence functions. The project is conceived using the partners' existing systems and structures. There is no indication of a common system for monitoring and evaluation, learning, and accountability.

Overall, the criterion received the mark: 3

Effectiveness

The project's objective was not fully achieved according to the outcome-level indicators. However, it is feasible to achieve it by the end of the project next year (2024). The project has defined four indicators to measure its objective at the outcome level, of which two were met 100%, one met 85%, and 50% the last indicator:

1. Three out of four services were achieved by 2023. Still, this indicator is only fully met with the necessary conformity assessment schemes for lighting and appliances and pending service pricing approval (85% achieved).
2. The development of 26 new standards surpassed the target, yet the absence of mandatory regulation for these standards remains a critical gap (100% achieved).
3. A regulatory project for LED lamps' minimum energy efficiency standards was developed and is expected to be effective in early 2024 following its World Trade Organization (WTO) notification in October 2023 (100% achieved).
4. Three measures (rather than the stipulated two per QI institution) were implemented to strengthen the national QI. This indicator may be met before the end of the project, given that there is a plan of activities to align national processes towards international good practices of standardization (50% achievement).

The project activities, services, and products have significantly contributed to its objectives. Developments include conformity assessment services for lamps and refrigerators, energy pattern calibration services, and standards for LED lamps, refrigerators, photovoltaic (PV) systems, and electromobility. A quality control concept for LED lamp efficiency was drafted. Conformity assessment schemes and more extensive socialization of the standards are needed to enhance these services.

Personnel fluctuation at IBMETRO posed a significant challenge. Both IBMETRO and IBNORCA have protocols for internal knowledge management to face this challenge.

The participatory approach in implementing the project, in collaboration with institutions, their partners, and PTB, has strengthened individual and organizational capacities within the QI. During the validation workshop, participants suggested improving the internal approval processes for "Concepts" with clearly defined criteria and more transparency.

Regarding the success factors of CW, it is considered that the **strategy** was developed together with the project partners and for capacity building. The **cooperation** and communication between IBMETRO and IBNORA remain weak but have improved and will most likely continue to improve. SNMAC requires further strengthening. The **management structure** works and considers the relevant actors and their interests. Cooperation, learning, and management processes are in place. However, the **processes** in the sector framework were not analyzed systematically, and the process map, which provides a visual overview of the cooperation system, was not elaborated. **Learning** was constant but not based on a capacity development strategy. Knowledge is disseminated internally. There are some initiatives for innovation. Documentation shared with the evaluators showed that CW tools were not systematically applied.

No unforeseen positive or negative impacts have been identified. However, concerns have been raised that energy efficiency labels might restrict the market to only high-cost equipment, potentially increasing living costs for the poorer population. Concerns about the high costs of testing PV equipment could hinder the domestic market. Excessive requirements might demotivate local companies. To mitigate these risks, efforts are being made to identify social risks during the standard formulation process.

Overall, the criterion received the mark: 2

Efficiency

Expenditure, implementation, and outputs were low during the first three years. Results and outputs were not achieved within the planned timeframe. Only EUR 259,000 was spent between 2019 and 2022. Some delays may be attributed to the pandemic. With a total budget of EUR 1.3 million and EUR 689,980 spent by November 2023, according to the Financial Monitoring (FIMO), spending was notably low in the initial years. The distribution of spending shows that 49% of the total budget spent until 11/2023 was spent on Output 4 (the financial agreement with ISO). Outputs 2 and 3 each accounted for about 20% of the investment, while Outputs 1 and 5 received less than 10% each. The percentage for Output 4 is high compared to the other outputs due to the transfer of funds to ISO in 2023, while activities in this output will continue into 2024. Output 2, with 26 developed standards beyond the target in energy efficiency and renewable energies, appears efficient compared to other outputs. Adopting standards within about six months is considered efficient. The most considerable anticipated expense was over 60% of the costs for experts. Funds were allocated to demand-driven training. Using regional experts for training was considered efficient since they offer high competence at lower travel costs than international experts. Transparency in fund usage and partner's voluntary participation in Standards Committees enhance the project's efficiency.

Implementation faced delays due to a lack of commitment from MDPyEP, irregular SNMAC meetings, and challenges from the COVID-19 pandemic, leading to an extension until July 2024. The increased budget, including the ISO financial agreement, defined two additional outputs.

PTB faced administrative delays in procuring a photometric bench and intensity lamps, indicating inefficient acquisition services. IBMETRO also delayed setting parameters for equipment calibration, contributing to service development delays. Nonetheless, IBMETRO's ability to make some purchases within its budget marks an efficiency improvement.

As outlined in the module proposal, partners' contributions must be more utilized, although IBNORCA's potential financing of activities represents an advancement. If partners had contributed more financially (e.g., travel expenses for their staff), more output could have been achieved with fewer external resources. Validation workshop discussions and interviews highlighted challenges in funding travel and training measures with their partner's own budget allocation due to public austerity policies, underscoring the dependence on PTB for training and travel facilitation. However, there are efforts from partners to increase their budgets.

A high turnover of project coordinators (four in five years) likely diminished efficiency due to the potential loss of critical information and the time each new coordinator requires to familiarize and manage the project effectively. A lack of proactive interaction by the partners with other donors and projects suggests that more funds and support could have been acquired, which could have enhanced the efficiency of the project.

For IBMETRO's services to be more efficient, a medium-term development plan is needed to encourage new private Conformity Assessment Bodies (CABs). The anticipated future demand necessitates accredited private laboratories, which could provide competitive services.

The roles between IBMETRO and IBNORCA must be clearly defined, which is currently leading to duplication in certification services, particularly in Technical Regulation Compliance Certificates (CCRT), which IBMETRO is mandated to issue. IBNORCA is accredited to issue certificates based on Bolivian Standards and Management Systems. Clarifying these roles could improve operational efficiency (Indicators 1 and 5).

Both institutions have established mechanisms to maintain and disseminate post-training knowledge within their organizations to prevent knowledge loss. However, improvements in knowledge management systems (e.g., open access to knowledge data banks and internal capacity building within the institutions) are necessary to preserve the competencies developed over time.

Overall, the criterion received the mark: 3

Impact (higher-level development results)

Overarching developmental changes have not yet materialized within the project's execution period. Nonetheless, such changes are expected to emerge more significantly if standards are applied and conformity assessments are implemented at all national levels. Improving the energy efficiency of household appliances and using more efficient LED lamps is expected to impact household electric consumption significantly. Poorer households will also benefit by reducing costs and improving their social conditions. Since a substantial portion of electricity relies on fossil fuels, enhanced energy efficiency is also projected to directly lower greenhouse gas emissions. Expanding professional competencies and services in QI reduces Bolivia's dependency on foreign services, enhancing national autonomy. Statistical data or program-level indicators still need to evidence these anticipated impacts from the project's design phase. Achieved impacts of the project have yet to demonstrate a contribution towards the anticipated overarching development changes.

However, implementing standards in pilot companies could lead to reduced energy consumption and potential replicability and scaling. The ambitious BMZ program goal of providing the Bolivian population with affordable, sustainable, modern, reliable, and efficient energy, with an increased share of renewable energies, targets a developmental impact. Achieving decentralized electricity generation systems in underdeveloped regions of Bolivia appears too ambitious, even considering cooperation with German financial cooperation. Although the program aims to contribute towards this goal, neither reports from German cooperation nor interviews confirm impacts on these intended overarching developmental changes. Given the urgent need to reduce dependence on imported expensive energy resources, there is a good chance that standards will be applied to reduce energy consumption at the national level.

No unforeseen positive or negative general developmental changes were identified. An interview with a trainer highlighted potential risks associated with protecting the national industry by applying standards that could increase product costs, potentially disadvantaging end consumers.

Overall, the criterion received the mark: 3

Sustainability

Partners and involved organizations can sustain the positive results achieved. Standards Committees operate independently, driven by their interest, indicating motivation to continue beyond the project. This independence is a robust mechanism for sustainability. The members of the committees promote and disseminate standards, contributing to an increased interest in standards as evidenced by standards sales data from IBNORCA. If pilot projects are successful, agreements with ten companies on applying ISO standards for enhanced energy efficiency show potential for broad application. IBMETRO is advancing QI services developed under the project and incorporated into upcoming technical regulations, indicating a long-term service improvement. The extension of IBMETRO's laboratory in 2024 will enhance its services further. In the PTB water project, the DTA was strengthened for the accreditation of testing and calibration laboratories (ISO 17025) and inspection bodies (ISO 17020), achieving the Inter-American Accreditation Cooperation (IAAC) international recognition in both standards, marking a significant step towards sustainability, which also impacts the energy project.

The project has significantly built the capacity of partners, target groups, and other involved organizations to continue with positive outcomes. Training sessions have installed lasting capacities in individuals, persons, and organizations. IBNORCA's implementation of the IBNOTECA system ensures the accessibility of training materials for future reference, facilitating internal knowledge dissemination. External dissemination efforts include collaborations with universities and enhancing standards awareness among students and academia, which contributes to sustainability. Similarly, IBMETRO employs knowledge dissemination mechanisms among its staff, ensuring the internal spread of acquired expertise. Efforts to prospect potential clients for new QI services, like the energy efficiency evaluation for refrigerators and calibration services, aim to foster long-term demand for QI services.

The impacts of the project are enduring. Developed standards and the knowledge conveyed remain permanent assets, with norms available for public use and an ongoing record of standards purchases. Besides standards development, post-standardization strategies by IBNORCA, such as dissemination workshops and academic collaboration, ensure the continued application of standards by the target group and partners. The future demand for quality services necessitates more CABs and a network of laboratories for sustained service provision. Although some interviewees perceive the SNMAC as weak, discussions during the validation workshop emphasized its functioning and sustainability, independent of PTB support. Possible political changes may pose risks to the continuity of the impacts, especially concerning the potential loss of trained key personnel and institutional knowledge.

Overall, the criterion received the mark: 2

3. Specific evaluation questions

PTB raised the following specific valuation questions:

1. How can the knowledge gained through training/workshops/internships supported by the PTB be transferred to other staff members of the respective QI institutions to prevent possible loss of knowledge?
2. How can the QI operate in a changing political environment?
3. What experiences has the QI gained that can be replicated in other cooperation projects?
4. Has the QI coordinated the demands of the public and private sectors for developing energy efficiency and renewable energy services? Is demand analysis carried out?
5. Exchange of experiences with Ecuador: What type of services are needed, where there are challenges, possible solutions, demand in training, and needs for planning processes?

PTB's additional evaluation questions were answered as follows:

1. Knowledge dissemination protocols exist in IBMETRO and IBNORCA to share training/workshop/internship insights within the institutions, reducing knowledge loss. Incentives like more internships or training are suggested to decrease staff turnover.
2. In a changing political landscape, the sustainability of QI services can be supported by creating regulations referencing QI services, ensuring more permanence despite governmental changes. Forming alliances with other stakeholders, such as academia and private QI institutions, would help to anchor a sense of need for QI and thus strengthen the position of the established institutions. Internal manuals are being developed to embed the QI within the Ministry and policies.
3. Successful QI experiences include IBNORCA's training by ISO through a financial agreement, IBMETRO's competencies in various calibrations and evaluations, involving the private sector in standard development, and engaging academia for sustainability. These strategies are recommended for replication in other cooperation projects.
4. QI has responded to public and private sector demands for Energy Efficiency and Renewable Energy services, achieving closer sector engagement through workshops and technical visits. This indicates a growing demand for QI in these sectors.
5. A detailed report on the experience exchange with Ecuador regarding service needs, challenges, solutions, training demands, and planning needs was provided after the exchange in January 2024.

4. Learning processes and experiences

The project has effectively facilitated learning experiences, supporting the counterpart in training, learning, and knowledge acquisition for service provision. Key insights include:

- The participatory approach in the project's design and monitoring has been successful, showing increased ownership, commitment, and dedication after a slow start.
- Collaboration with the SNMAC to enhance QI, involving joint efforts between IBNORCA and IBMETRO, is appreciated. However, there are concerns about SNMAC's future role in leading QI, among some from the German cooperation.
- Flexible planning and implementation have been crucial in adapting to changing circumstances such as COVID-19, low demand, and a weak private sector.
- Standards Committees effectively coordinate and engage with end-users, facilitating sector participation.
- PTB's slow administrative and procurement processes have been a source of frustration for QI stakeholders.
- The financial agreement with ISO is highly valued, representing a novel bilateral experience between ISO and PTB that could model future cooperation projects.

5. Recommendations

Recommendations to the partners include:

- Clarifying certification roles between IBNORCA and IBMETRO, as currently only IBMETRO is authorized to issue compliance certificates, excluding accredited bodies like IBNORCA.
- Both institutions should budget for training and exchanges independently of cooperation projects to reduce reliance.
- IBMETRO and IBNORCA should engage authorities to enact regulations referencing QI services (standards and testing) developed in the project.
- IBMETRO needs standards for calibration and tariff adjustments for electrical energy distribution metering to facilitate national services.
- To expand calibration and conformity assessment services, significant dissemination, awareness-raising, and a strategy to establish more Conformity Assessment Bodies (CABs) are required as demand increases.
- Permanent mechanisms are essential for the continuity and function of SNMAC.
- Offering incentives like internships and training could be a motivation factor to retain skilled personnel within the institutions.
- IBMETRO should consider involving external experts in training to meet future demand.
- Seeking synergies with other donors and projects could attract additional funding and support, especially for climate change and energy efficiency initiatives.

Recommendations to the project team:

- The concept approval process should be more widely communicated among Committee members. In one area interviewed (DTA), the team expressed concerns about not understanding why certain activities were not approved. It is also advisable to socialize the concept development procedure, as the PTB team's review process was slow due to repeated requests for changes or updates to improve the quality of concept documents.

Recommendations to the International Cooperation Department (9.3):

- Policies should be established to provide better conditions and incentives to reduce the high turnover of project coordinators.
- The exchange between two similar projects in Bolivia and Ecuador is seen positively but would require more time.

Recommendations to the evaluation unit of Working Group 9.01:

- Ways to expedite administrative and procurement processes within PTB should be explored.
- The inclusion of CW in section 5.1.3 is viewed positively.