Results Measurements: First Aggregated Report

Based on Projects' Close-Out Reports

Year-ended December 2016

Background

In accordance with the Board of Directors (BOD) resolution 2006-24, BECC and NADB developed a joint Results Measurement System (RMS) for certified and funded projects. The RMS includes completing a closeout process for all projects certified since 2006. The BOD instructed staff to present annual highlights and as well as periodic aggregate reports. The annual highlights are included in the year-in-review and contained within this report are the aggregate results of the close-out process (COP) completed to date. This first aggregate COP report provides a comprehensive view of indicators for each infrastructure sector, success stories and lessons learned, as well as the achievements of the institutional programs.

Results Measurement System

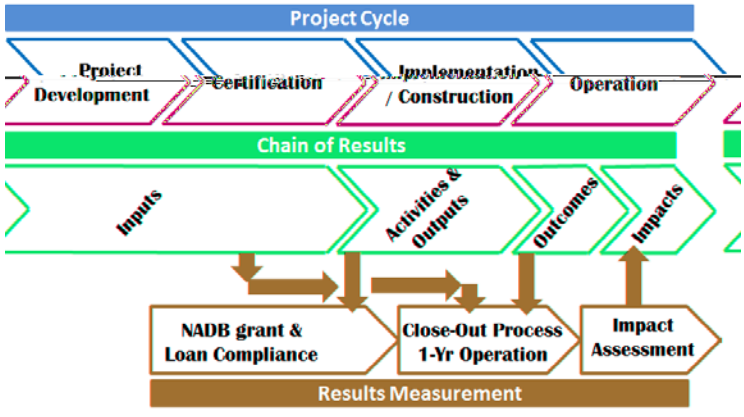
The BECC-NADB RMS was developed to provide an objective assessment of the results of the institutions, moving its practice from 'implementation-based' to 'results-based' evaluation and determining whether or not implemented projects generated the expected results.

The RMS reflects the experience and best practices of multilateral development banks (MDB), emphasizes simplicity and cost-effectiveness, recognizes a continuous system, the outcomes are based on primarily on access to the infrastructure and the impacts are based on the intended use of the infrastructure. Overall, the RMS provides accountability on performance and results achieved.

The main tool in which the RMS relies is the project result matrix with the expected results of a particular project. A matrix is included in every project proposal submitted to the BOD for approval. The matrix specifies project objectives, baseline indicator values, target values, and the recommended measurement methodology[1]. Appendix A includes a standard project results matrix format.

The Project Cycle and Chain of Results

The figure illustrates the relationship between the project cycle, results chain, specifically, how the RMS is integrated into this parallel system to review and document the achievement of the anticipated results chain values.



[1] Result matrix started in 2008

The RMS establishes the following definitions for the components of the results chain reviewed by the COP. The COP is usually conducted after one year of operation of the certified project and allows measuring results along the following components of the results chain:

- Inputs - defined as the 'resources at the disposal of the project', and activities, defined as the 'actions taken…to convert inputs to outputs', are established in the certification document and tracked as part of the day-to-day activities of the institutions (through fund disbursement and monitoring processes).
- Outputs - or 'the tangible goods and services that the project activities produce', are measured to determine whether the project deliverables, as certified were achieved, in terms of their physical characteristics (*i.e.* dimensions, capacity, technology), schedule, costs and funding structure.
- Outcomes - defined as the 'results likely to be achieved once the population benefits from the project outputs', measured as access to or performance of the infrastructure.

The Impact Assessment (IA) represents the next logical step in the measurement of results by shedding light onto whether the constructed project is indeed achieving the project's fundamental objective (i.e. having an impact), beyond the "physical" outputs and outcomes by providing health and environmental benefits to the intended population. The IA process is part of the BECC and NADB standard operating procedures and is conducted for projects in which the assessment is deemed valuable and feasible. Due to limited resources in both institutions, the assessments are carefully selected.

Closeout Process

The COP for environmental projects is an effective tool for measuring results. This activity fosters the opportunity to confirm a project's achievement of its fundamental objective, to the extent to which physical targets are met (outputs), and the intended benefit achieved (outcomes), as well as to seek feedback for improved practices (lessons learned) through on-site observation and direct dialogue with project sponsors and operating personnel. The COP objectives include to:

- Evaluate constructed / operational conditions vs projected conditions at project's certification
    - Were all construction works (outputs) completed?
    - Is the infrastructure operating as expected?
        - Technical – flows, energy, quality, operator training
        - Financial – connections/hook-ups, revenue
    - Were the uses and sources of funds modified? Were program requirements met with any change in funds?
    - Was the anticipated access to service (outcome) achieved?
- Determine causes for project deviations (lessons learned)
    - Identify what may have influenced the deviation
        - Insufficient funding / fluctuating costs
        - Design or operation issues
        - Unanticipated conditions – climate, land, customer characteristics
        - Slow connections, unmet population projections, etc.
- Create a feedback loop to identify if the lessons learned can be applied for future projects.

Indicators

A menu of typical indicators has been developed for each of the sectors under the BECC-NADB mandate. Each indicator was selected considering its appropriateness to represent the change in status - before (baseline) and after (post intervention) - of the most important environmental or human health conditions addressed by the project as well as its characteristics of simplicity, representativeness, feasibility and verifiability. The following consistently applied indicators are used in this aggregated report:

Outputs indicators

Drinking water (DW) infrastructure projects:

- Length of DW distribution lines (miles)
- DW storage capacity (#, MG, % increase)
- Water meters (#)

Wastewater (WW) infrastructure projects:

- Length of WW collection lines (miles)
- Number of WW lift stations (new or improved) (#)
- Capacity of WW treatment plants (new, expansion or rehabilitation) (MGD)

Solid waste (SW) infrastructure projects:

- SW transfer stations (new or improved) (#, mT/d)
- Capacity of sanitary landfills (new, expansion or rehabilitation (#, mT)
- Closure of SW illegal open dumpsites (#, ha)
- Acquisition of SW collection vehicles (#)

Air quality improvement (AQ) infrastructure projects:

- Street and roads paved surface w/concrete (sq. m)
- Street and roads paved surface w/asphalt (sq. m)

Renewable and clean energy (CE) infrastructure projects:

- Number of facilities and power generation installed capacity (#, MW)
- Number of facilities and biodiesel production installed capacity (#, MG)

Water conservation (WC) infrastructure projects:

- Length of improved water conveyance canals (miles)

Outcomes indicators

Drinking water (DW) infrastructure projects:

- Benefited population (residents)
- Increased access to DW services (MGD)
- Improved DW quality (MGD)
- Number of DW domestic hookups (#)

Wastewater (WW) infrastructure projects:

- Benefited population (residents)
- Increased access to WW treatment services (MGD)
- Reduction of untreated WW discharges to water bodies (MGD)
- Number of WW domestic sewer connections (#)

Solid waste (SW) infrastructure projects:

- Benefited population (residents)
- Improved SW disposal management (mT/day)

Air quality improvement (AQ) infrastructure projects:

- Benefited population (residents)
- Particulate matter emissions avoided (mT PM_{10}/year)
- Rehabilitation of DW hookups
- Rehabilitation of WW sewer connections

Renewable and clean energy (CE) infrastructure projects:

- Benefited population (eq. residents)
- Greenhouse gases emissions displaced (mT CO_2 eq./year)
- Power generation (GWh/year)
- Other harmful emissions displaced (mT/year: SOx)
- Biodiesel production (MG/y)

Water conservation (WC) infrastructure projects:

- Benefited population (residents)
- Yearly volume of water saved (MG/year)

Methodology

An electronic 'tracking tool' was developed to document the universe of projects eligible for close out and its current COP status. The tracking tool is basically a database in a tabular form that includes the entire set of selected indicators under each project's official ID; its main purpose is to facilitate aggregate results by indicator and sector.

Projects' Classification by Programs

As per the BOD instructions, a Close-Out Report is to be completed for all certified projects funded by NADB since the merged BOD began operating in 2006. Additionally, per EPA requirements, a COP process should be completed for all BEIF projects implemented since the inception of the program. The total number of certified projects by BECC to date is 272 (December 2016). Of those, 147 implemented projects are eligible for COP and are classified by programs[2] as follows:

Project classification	Eligible periods to develop COP	Implemented projects	COP reports completed
BEIF	1997-2005	40	7
	2006-2016	32	17
Loan-BEIF	1997-2005	16	6
	2006-2016	14	13
Loans	After 2016	31	6
Loan-SWEP	After 2016	1	1
SWEP	After 2016	7	6
CAP	After 2016	4	3
WCIF	After 2016	2	1
Total		147	60

COP reports completed as of December 31, 2016

The above table also summarizes the COP status reports. To date (December 2016), 60 COP reports have been completed. COP factsheets can be reviewed on the BECC website. The COP pipeline for the next years contains more than 80 projects.

Refer to Appendix B for a summary of 'outputs' and Appendix C for the summary of the 'outcomes' documented for the 60 projects.

Aggregated Report by Sectors

Drinking Water Projects

Outputs indicators			
Drinking water (DW) infrastructure projects			# projects
Number of certified projects			12
Length of DW distribution lines	113.05	miles	10
DW treatment plants (new, expansion or rehab)	4	plants	4
	21.46	MGD	

Outcomes indicators				
Drinking water (DW) infrastructure projects		Target	Actual	Objective achievement
Benefited population	Residents		57,359	
Increased access to DW services	MGD	20.50	20.50	100%
Improved DW quality	MGD	1.46	1.46	100%
DW domestic hook-ups (new and improved service)	Homes	15,948	13,414	84.1%
Investment ratio (actual $ / at certification $)		$ 51.86	$ 50.95	0.983

[2] BEIF – Border Environmental Infrastructure Fund; SWEP – Solid Waste Environmental Program; CAP – Community Assistance Program; WCIF – Water Conservation Infrastructure Program

Wastewater Projects

Outputs indicators				Outcomes indicators				
Wastewater (WW) infrastructure projects			# projects	Wastewater (WW) infrastructure projects		Target	Actual	Objective achievement
Number of certified projects			40	Benefited population	Residents		2,513,453	
Length of WW collection lines	706.44	miles	37	Increased access to WW treatment services	MGD	180.06	170.05	94.4%
WW lift stations (new or improved)	25	lift stations	3	Reduction of untreated WW discharges	MGD	141.47	133.85	94.6%
WW treatment plants (new, expansion or rehab)	23	plants	21	WW domestic sewer connections	Homes	355,453	319,035	89.8%
	173.91	MGD	21	Investment ratio (actual $ / at certification $)		$ 493.34	$ 477.99	0.969

Solid Waste Projects

Outputs indicators				Outcomes indicators				
Solid waste (SW) infrastructure projects			# projects	Solid waste (SW) infrastructure projects		Target	Actual	Objective achievement
Number of certified projects			7	Benefited population	Residents		2,062,003	
SW transfer stations (new or improved)	3	#	2	Improved SW disposal management	mT/d	1,022	963	94.3%
Capacity of sanitary landfills (new, exp or rehab)	3	#	4	Improved SW disposal capacity	mT	285,344	285,344	100%
	294,945	mT	4	Transfer stations		4	3	75.0%
Illegal open SW dumpsites closed	5	#	3	SW collection and operations vehicles			70	100%
	0.77	ha	3					
SW collection and operations vehicles	70	#	3	Investment ratio (actual $ / at certification $)		$ 19.45	$ 15.84	0.814

Air Quality Projects

Outputs indicators		Outcomes indicators			
Air Quality (AQ) infrastructure projects	# projects	Air Quality (AQ) infrastructure projects	Target	Actual	Objective achievement

The DW hookups and the WW sewer connections are secondary benefits of the AQ paving projects.

Renewable and Clean Energy Projects

Outputs indicators				Outcomes indicators				
Energy (ENE) infrastructure projects			# projects	Energy (ENE) infrastructure projects		Target	Actual	Objective achievement
Number of certified projects			2	Benefited population	Residents		824,161	
Facilities for power generation, installed capacity	1		1	Power generation	GWh/year		53.36	
	23.00	MW	1	Biodiesel production	MG/y	25.00	11.30	45.2%
Facilities for biodiesel production, installed capacity	1		1	Greenhouse gases emissions displaced	$mTCO_2eq/y$	34,273	24,765	72.3%
	20.00	MG/y	1	Other harmful emissions displaced	mTSOx/y	23	24	104.3%
				Investment ratio (actual $ / at certification $)		$ 117.75	$ 93.98	0.798

Water Conservation (WC) Projects

Outputs indicators				Outcomes indicators				
Water conservation (WC) infrastructure projects			# projects	Water conservation (WC) infrastructure projects		Target	Actual	Objective achievement
Number of certified projects			1	Benefited population	Residents		1,155	
Improved water conveyance canals	2	miles	1	Water saved	MG/y	4,008	4,008	100%
				Investment ratio (actual $ / at certification $)		$ 1.88	$ 1.26	0.668

Total

Outputs indicators				
Total (TOT) infrastructure projects		Target	Actual	
Number of certified projects			60	
Benefited population	Residents		5,489,385	
Investment ratio (actual $ / at certification $)	US millions	$ 755.66	$711.77	0.942

The population figures do not duplicate benefited residents in communities with more than one project.

The ratio between ($ actual investment / $ at certification estimated investment), for the 60 reviewed projects, is 0.942; the actual investment was 5.8% lower than estimated at certification (equivalent to $US 44 millions).

Conclusions

- This first aggregated report compiles all the available data, including BECC and NADB records, field visits, and extended interviews with key actors for 60 BEIF and Non-BEIF completed projects: 35 in Mexico and 25 in the United States.
- Due to the number of projects in operations for water, wastewater, and solid waste, conclusions and lessons learned can only be derived from the closeout reports of these sectors. Since the other sectors (i.e. air quality and clean and renewable energy) represent a small fraction of the completed COP reports, it is not possible to identify tendencies that can be considered for improvements or success factors.
- Some important aggregated indicators are:
    - Drinking Water Projects
        - 21.46 MGD of improved DW treatment with 1 new and 3 expanded or rehabilitated plants [objective achievement = 100%]
        - 20.50 MGD of increased access to DW services [objective achievement = 100%]
        - 13,414 new DW domestic hookups [objective achievement = 84%]
    - Wastewater Projects
        - 319,035 new WW domestic sewer connections [objective achievement = 89%]
        - 170.05 MGD of increased access to WW treatment services [objective achievement = 94%]
        - 133.85 MGD reduction of untreated WW discharges [objective achievement = 94%]
    - Solid Waste Projects
        - 275,745 mT of new capacity in 3 new sanitary landfills [objective achievement = 100%]
        - 963 mT/d of improved SW disposal management [objective achievement = 97.3%]
        - 0.77 ha of illegal open SW closed in 6 dumpsites [objective achievement = 100%]
    - Air Quality Projects
        - 746,644 m^2 of urban streets and roads paved [objective achievement = 105%]
        - 695 mT PM_{10}/y of particulate matter emissions avoided [objective achievement = 106%]
    - Energy Projects
        - 53.36 GWh/y of power generated from renewable sources [objective achievement = 106%]
        - 11.30 MG/y of biodiesel from spent grease and oil is produced [objective achievement = 45%]
        - 24,765 mTCO_2eq/y of greenhouse gases emissions displaced [objective achievement = 72%]
        - 11.3 MG/y of biodiesel produced [objective achievement = 45.2%]
    - Water Conservation Projects
        - 4,008 MG/y of water saved in irrigation districts [objective achievement = 100%]
- The benefited population associated with the 60 projects is 5,489,375 residents and the actual investment is $711.77 US millions.

- Projects with deviations from expected results – All of the projects aggregated in this report have a closeout report. Upon review of the reports, only seven projects noted differences in target values which had a notable deviation from original project expectations. These are described below.
    - 450 – DW Water Treatment Improvement in Lordsburg – Although the infrastructure investments were successfully implemented, post-project operational results have not met expectations. The treatment system has not consistently met water quality expectations for fluoride levels in compliance with primary drinking water standards and the community has received Notice of Violations from the state environmental agency. In this case, the technology selected to remove fluoride and arsenic from the water supply was not effective and the sponsor, due to staff turnover, did not have adequate experience or training to address operational challenges.
    - 467- SW Matamoros / Valle Hermoso - The original project scope anticipated the construction of a comprehensive infrastructure for a regional waste management program for the cities of Matamoros and Valle Hermoso; however, the expected outcomes were not fully reached as some of the elements included in the project were not implemented, such as the construction of one SW transfer station in Matamoros and the closure of the open dumpsite in Valle Hermoso. Additionally, it was not possible to evaluate operational performance since the components that had been installed, such as the Valle Hermoso transfer station, were vandalized and most of the equipment at the site was stolen, leaving the investment inoperable.
    - 485 - WW SLRC (PIMAS II) - Connections of households to the new system – The cost estimate and funding structure at certification included the cost of the connections (i.e. from the house to the new laterals) for only one of three areas (Zacatecas); in the other two areas residents would pay the additional cost of the connection. As a result, the number of connections at project completion was only 20% of the target, reaching 31% by July 2012.
    - 486- WW Mexicali IV - The certified project considered wastewater infrastructure needs for urban development in a growing area to the east side of the city of Mexicali. However, the current population in the project area shows that population growth rates did not occur as expected and therefore only a portion (~50%) of the infrastructure was built and is not in use. The target value for sewer connections was 6,000 and none was achieved. The infrastructure is maintained by the utility.
    - 503 - WW Rosarito 1 – The entire project was built considering 4,681 sewer connections, but only 1,233 households were actually connected to the sewer system as of May 2013, when the COP was completed. This represented 26% of the certification objective. The situation was caused by the following factors:
        - The original goal was based on full build-out, as defined in the project's final design.
        - Some residents did not connect to the sewer system because they did not have the money to pay both contracts (water and wastewater services).
        - The verification of property ownership increased the delays for contracting new sewer connections.
    - 506 - WW Tijuana River Basin – Although the entire project was built, from the 8,075 sewer connections considered by the project, only 1,775 households were actually connected to the

sewer system. This corresponded to 22% of the certification objective. The situation was caused by the following factors:

- The original goal was based on full build-out, as defined in the project's final design.
- The local utility (CESPT) had just introduced the wastewater service in the areas and required the corresponding payments and fees from the users.
- Some residents did not connect to the sewer system because they did not have the money to pay both contracts (water and wastewater services).

- 531 - AQ Metropolitan Road System for Playas de Rosarito - The main objective of the project was to improve regional traffic flow and decrease congestion of existing roadways, which would help to reduce emissions released into the atmosphere caused by the inefficient traffic flow of vehicles. The sponsor could not complete land acquisition and did not obtain authorization for rights-of-way necessary for the proposed infrastructure. Given the significant lack of paving coverage in the city, the Sponsor proposed revised scope to utilize funds to increase paving coverage and continue to achieve an important reduction in PM_{10} emissions.

Lessons Learned

All of the COPs contain a section on lessons learned which include what worked well (best practices) and areas of improvements. These were analyzed and included in the tracking tool in order to determine commonalities amongst the projects. Below are the most common lessons learned primarily for water, wastewater, and solid waste projects based on tendencies, project experience, and relevance for future projects.

- Internal Process Perspective

  - For both internal tracking purposes and to support accurate comparisons of matching investments, all projects should be identified by consistent project name, component (output) title, or ID number. This applies to projects transitioning through the project cycle from technical assistance to development to financing and implementation. Additional this consistency needs to be considered between the certified project description of outputs and matching investment documentation *(i.e. Anexos Técnicos* or *Actas de Entrega y Recepción*).
  - To confirm the environmental objective has been met all wastewater collection projects should document and record the information related to septic tanks, latrines and cesspools eliminated through the project's implementation. This should be considered when developing the project matrix to include specific targets. The aggregate report was unable to document the number of malfunction systems that were decommissioned.

- Technical Perspective

  - Planning and design should consider additional factors in besides to actual population or population projections in order to better estimate project outputs and outcomes such as sizing of facilities or connections. Field surveys or other methods should be considered to validate existing data in order to determine anticipated connections rather than considering full build-out projections. Additionally, community characteristics (*i.e.* bedroom communities, dynamics of population movement) should be taken into account for projecting system demands, such as quality of influent and wastewater flows which affects process design and sizing.

- Adding the construction of connections and decommissioning of on-site systems into the project provides the most efficient mechanism to assure the environmental and health objective of the project and improves the financial sustainability of the utility.
- Pilot testing of innovative or uncommonly used proven technologies for water and wastewater treatment is recommended in order to confirm if such technology is the most appropriate for the project and to provide better information to complete the engineering designs.
- Value Engineering (VE) is very effective to improve the quality of projects and results in significant economical savings in most cases. Similar to VE, the effort to find cost savings and operational efficiencies should be embedded into every design process for concepts such as energy efficiency and building resiliency.
- The Border Water Infrastructure Program (BWIP) has improved the utilities' sustainability by requiring a pre-treatment program to protect investments and strengthen institutional capacity. The integration of an existing pre-treatment program as early as possible in the project's scope can improve the design.
- For the SW sector, the institutional strength of the sponsor is key in the success of the projects. Sponsors whose sole responsibility is to handle solid waste, tend to have a higher technical capacity and as a result, a higher probability of achieving set goals
- Proper operational and financial guidance is key for all projects, especially for SW projects that involve closure of open dumpsites. Operational training enables the sponsor to have a smoother operational from the closed dumpsite to the new landfill, resulting in additional benefits such as improved air quality and vector/pest control. In order to avoid noncompliant dumpsites, closures of open ended dumpsites as well as adequate operation of the new landfill are to be confirmed during the site visit review of the COP.

o Financial / Funding Perspective

- It is highly convenient to allow contracts to be aligned with the availability of funds
- While it does create some risks in completing full project implementation and, thus, achieving the anticipated environmental objectives, multi-year investment plans are many times necessary to complete match requirements through funding sources constrained by annual allocations/spending requirements or budget limits. To mitigate risks, the acceptance of previously constructed components (match credit) as well as communication and planning efforts are recommended to avoid delays or incomplete construction. Additionally, the reduction of scope to make a self-sustainable investment should be considered.
- Adding the construction of connections and decommissioning of on-site systems into the project provides the most efficient mechanism to assure the environmental and health objective of the project and improves the financial sustainability of the utility

o Schedule / Time Perspective

- Project sponsors must demonstrate proper legal authority to provide service, obtain funding, contract loans, or construct within the required property.
- Land and rights-of-way must be obtained prior to certification in order to avoid delays during the implementation phase.

- Communication Perspective
    - Effective public participation, particularly in the case of water infrastructure projects, contributes to the cultural readiness of the population to receive the project and/or to mitigate obstacles as early as possible. Additionally, residents are prepared for any inconvenience that may be caused during the construction phase.
    - Project modifications or significant change orders occurring during the implementation phase, which affect the original design or anticipated project outcomes, should be adequately vetted by design engineer, agencies, and sponsor. Timeline and sustainability of the infrastructure may be influenced.

Impact Assessment

The assessment of impacts is an essential tool to determine if projects, in representative sectors, are being successful in meeting their fundamental objectives and providing health and environmental benefits. Impact assessment (IA) studies are very useful to communicate results, benefits and the value created to stakeholders and funding agencies, as well to generate knowledge, identify opportunities for improvement and inform policy direction.

As conceived in the BECC/NADB chain of results, the IA complements an "implementation-based" evaluation with a "results-based" evaluation for selected projects, and is focused in the assessment of specific projects, not on a broader evaluation of environmental or health variables throughout the Border region. Due to cost and resource limitations, the effort should be selective.

To date, two IA studies have been completed:

- IA of Wastewater Projects in Valle de Juárez, Chih.

  The IA was conducted in four communities located in the Valle de Juárez (*i.e*. Dr. Porfirio Parra, Guadalupe, Praxedis G. Guerrero and El Porvenir.

  The wastewater infrastructure projects (sewer lines and wastewater treatment plants) were certified in 2007 and their construction was completed between July 2009 and June 2010. An educational outreach campaign and interviews was conducted with local authorities as to the condition and operation of the new wastewater infrastructure.

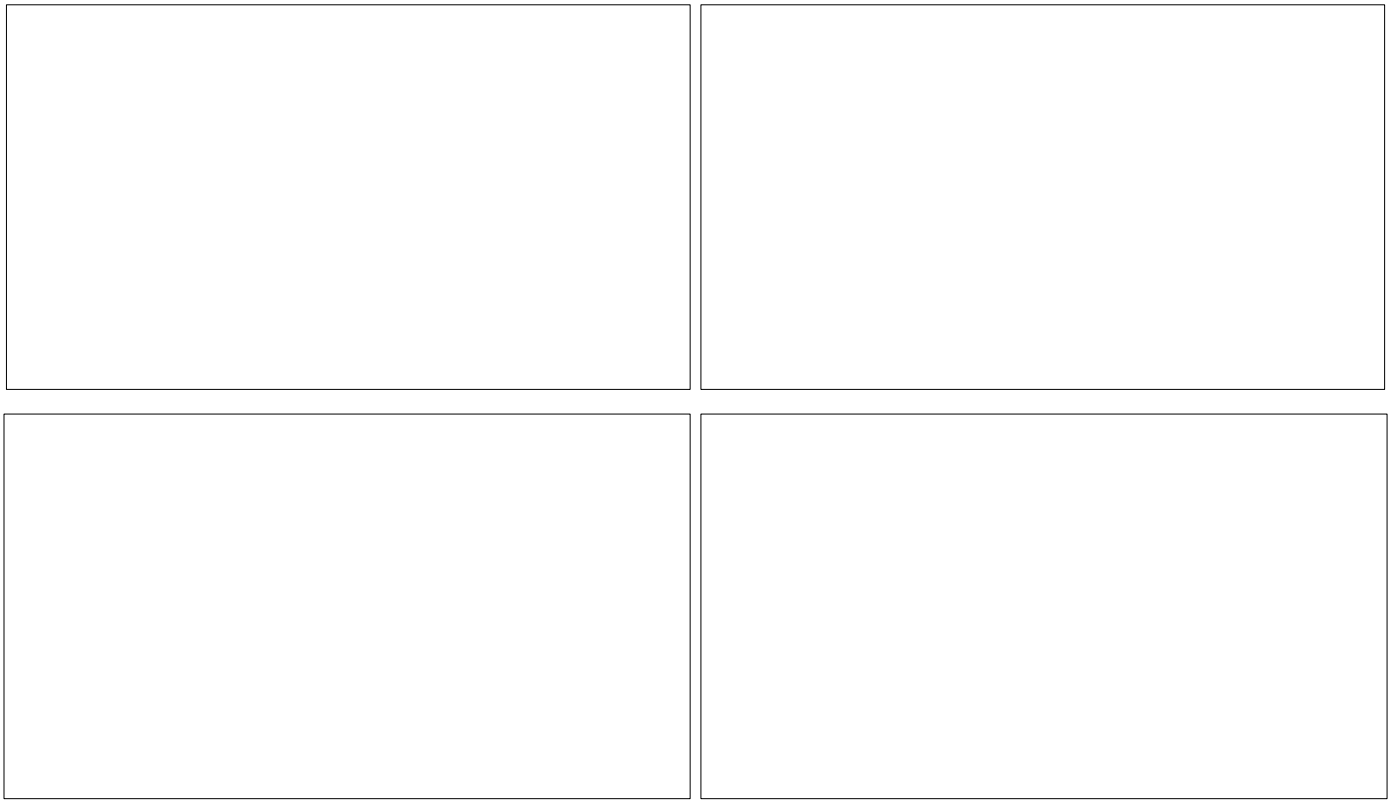
  The required baseline information prior to project implementation for the IA was gathered in 2008-2009 by UACJ, UTEP, COLEF and the Pan-American Health Organization (PAHO) with funding from Border 2012 and PAHO; also, a set of impact indicators were selected to be tested for the first time in this project. The final phase of the IA study was conducted after the project was implemented from 2012 to 2014 and the comprehensive report (2008-2014) was released on July 2014.

  The main conclusions of the study after the wastewater collection and treatment system was implemented were:

  - The percentage of households connected to the municipal wastewater system increased in the four studied communities to over 88%.
  - Consequently, the percentage of households with plumbing inside the house increased in the four studied communities.
  - The percentage of households with latrines and cesspools decreased in the four studied communities to almost 0%.

- 100% of the wastewater collected for all of the communities was not properly treated.

The following tables summarize the results of the IA of wastewater projects in Valle de Juárez, Chih.



- IA of Wastewater Projects at Regional Level in the State of Baja California

  The IA study at the regional level in the state of Baja California was completed in December 2015. The technical information provided by the local utilities, as well as the information generated in the COP of the wastewater collection and treatment projects was collected, classified, georeferenced and analyzed. Surveys of public opinion for 3,409 households were designed, pilot-tested and applied in the urban areas benefited by projects in Tecate, Playas de Rosarito and Tijuana. The main conclusions of the study after the wastewater system was implemented were:

  - Sanitation conditions in the cities of Tijuana, Rosarito, Tecate, and Mexicali, measured as coverage of services for the collection and treatment of wastewater, significantly improved between the years 2000 and 2015; infrastructure projects implemented by the BECC and NADB were an important catalyst for this achievement.
  - The decrease in the incidence of gastrointestinal diseases was significant in three of four communities studied ranging from 16% to 33%.
  - Opinion surveys showed a high degree of satisfaction with the operation of the utility (87%+) as well as a perception of well-being associated with the implemented project (90%).

  The results of the regional impact assessment of wastewater projects in the communities of Tijuana, Playas de Rosarito, Tecate and Mexicali, Baja California, were presented to the respective municipal

utilities for their comments, which were included in the final version of the report. Then, the updated report was submitted to the Pan American Health Organization (PAHO) for a peer-review, through its offices in Mexico City and Washington, DC. PAHO's public health specialists found adequate the study and valid the results and made the only recommendation to perform an in-depth research into the social impacts of projects in future studies similar to the one in Baja California. The final edition of the report can be consulted online at the BECC's website.

The following tables summarize the results of the IA of wastewater projects at regional level in the State of Baja California:

Tijuana WW System	Initial conditions	Impacts	Change
City-wide (Projects by BECC/NADB & Others)	Yr. 2000	Yr. 2015	%
Population (inhabitants, - INEGI)	1,210,520	1,722,348	42%
Population connected to the WW collection system	77%	91%	18%
Existing wastewater domestic hookups	266,762	488,250	83%
Wastewater treatment coverage	73%	97%	33%
Gastrointestinal diseases rate (/100000)	444	320	-28%
Flow of untreated raw wastewater (L/s)	627	0	—
Project Polygons (Projects by BECC/NADB)	Yr. 2000	Yr. 2015	%
Residents within the project polygons	19,450	46,581	139%
Population connected to the WW collection system	0%	90%	90%
Latrines	89%	10%	-89%
Cesspools	11%	1%	-90%
Population with wastewater treatment	0%	100%	100%
Flow of untreated raw wastewater (L/s)	95	0	—
Discharge points of raw wastewater to the community	Multiple	Eliminated	—
Risk of residents exposure to raw WW in rainy season	100%	Eliminated	—
Satisfaction with utility service	No base-line info	91%	—
Project related well-being perception		95%	—

Playas de Rosarito WW System	Initial conditions	Impacts	Change
City-wide (Projects by BECC/NADB & Others)	Yr. 2000	Yr. 2015	%
Population (inhabitants, - INEGI)	63,420	105,150	66%
Population connected to the WW collection system	45%	65%	44%
Existing wastewater domestic hookups	8,493	32,191	279%
Wastewater treatment coverage (in compliance)	36%	100%	178%
Gastrointestinal diseases rate (/100000)	392	329	-16%
Flow of untreated raw wastewater (L/s)	36	0	—
Project Polygons (Projects by BECC/NADB)	Yr. 2000	Yr. 2015	%
Residents within the project polygons	7,255	20,042	176%
Population connected to the WW collection system	0%	79%	79%
Latrines	89%	18%	-79%
Cesspools	11%	3%	-74%
Population with wastewater treatment	0%	100%	100%
Flow of untreated raw wastewater (L/s)	41	0	—
Discharge points of raw WW to the Pacific Ocean	Multiple	Eliminated	—
Risk of residents exposure to raw WW in rainy season	100%	Eliminated	—
Satisfaction with utility service	No base-line info	89%	—
Project related well-being perception		91%	—

Tecate WW System	Initial conditions	Impacts	Change
City-wide (Projects by BECC/NADB & Others)	Yr. 2000	Yr. 2015	%
Population (inhabitants, - INEGI)	77,795	111,098	43%
Population connected to the WW collection system	84%	96%	14%
Existing wastewater domestic hookups	16,454	27,710	68%
Wastewater treatment coverage (in compliance)	0%	100%	100%
Gastrointestinal diseases rate (/100000)	526	632	20%
Flow of untreated raw wastewater (L/s)	200	0	—
Project Polygons (Projects by BECC/NADB)	Yr. 2000	Yr. 2015	%
Residents within the project polygons	9,580	14,995	57%
Population connected to the WW collection system	0%	94%	94.0%
Latrines	68%	6%	-91%
Cesspools	32%	0%	-100%
Population with wastewater treatment	0%	100%	100%
Flow of untreated raw wastewater (L/s)	31	0	—
—	Discharge points of raw wastewater to the Río Tecate	Multiple	Eliminated
—	Risk of residents exposure to raw WW in rainy season	100%	Eliminated
—	Satisfaction with utility service	No base-line info	92%
—	Project related well-being perception		94%

Mexicali WW System	Initial conditions	Impacts	Change
City-wide (Projects by BECC/NADB & Others)	Yr. 2000	Yr. 2015	%
Population (inhabitants, - INEGI)	764,602	1,025,743	34%
Population connected to the WW collection system	83%	95%	14%
Existing wastewater domestic hookups	162,682	488,250	200%
Wastewater treatment coverage	91%	100%	10%
Gastrointestinal diseases rate (/100000)	289	193	-33%
Flow of untreated raw wastewater (L/s)	115	0	—
ect Polygons (Projects by BECC/NADB)	Yr. 2000	Yr. 2015	%
within the project polygons	34,454	50,560	47%
connected to the WW collection system	0%	98%	98.3%
trines	29%	1%	-96%
sspools	71%	0%	-99%
with wastewater treatment	0%	100%	100%
reated raw wastewater (L/s)	103	0	—
points of raw wastewater to the Río Nuevo	Multiple	Eliminated	—
dents exposure to raw WW in rainy season	100%	Eliminated	—
with utility service	No base-line info	87%	—
ted well-being perception		90%	—

- IA of Water and Wastewater Projects in the El Paso County Lower Valley

  A new IA assessment study of the wastewater collection and treatment infrastructure project in the communities of Socorro and San Elizario in the region of the Lower Valley of the El Paso County, Texas, is underway. This study will build upon previous experiences and include, as recommended by PAHO, include more analysis on social and economic impacts. The team is formed by BECC staff, the Center for Environmental Research Management (CERM) of the University of Texas at El Paso and the Lower Valley Water District (LVWD). This IA is anticipated to be concluded by the summer 2017.

Appendix A – Standard Project Matrix Format

BECC/NADB
Results Measurement
Project Logframe Matrix
Wastewater System Improvements in Miguel Aleman, Tamaulipas

Project Objective:

Eliminate exposure to untreated wastewater discharges by rehabilitating the wastewater collection system in the city's downtown area, including the construction of a lift station, and the construction of a force main to the wastewater treatment plant, contributing to reduce the risk of waterborne diseases and pollution.

Results Measurement	Indicators and Targets	Baseline Value	Measurement Methodology
Outcomes: Access to, use of, and satisfaction with goods and services provided, building evidence of the achievement of the project objective. These should be directly attributable to the project and should describe an improvement in existing conditions related, whenever possible, to environmental and human health, financial, and sustainable development.			
1 **Improve access to wastewater collection services**	Improve wastewater collection service (Target= 1,888 new connections)	0 [2012] 0 [2012]	Reviewed by BECC at project close-out. Measurement supported by available information provided by project sponsor.
2 **Reduction of untreated wastewater discharges to water bodies or other. (Protection of natural resources)**	Eliminate untreated wastewater discharges (Target= 17.5 lps [0.40 MGD])	0.40 MGD [2012]	Reviewed by BECC at project close-out. Measurement supported by available information provided by project sponsor.
3 **Improved financial self-sustainability**	Sufficiency of annual revenues to provide adequate cashflow to properly operate and maintain the system and maintain reserve requirements. (Target Net Cash Flow >= US$0)	N/A	Reviewed by NADB on an annual basis during the BEIF project time period with the financial statements report.
	Maintain appropriate reserve levels for O&M and repair and replacement (Target = US$84,877)	0	Reviewed on an annual basis during the BEIF Project time period with the bank account statement of each reserve.
4 **Strengthen institutional capacity**	Full compliance with all applicable laws, rules and regulations	Non-compliant discharge	Reviewed by BECC at project close-out. Measurement supported by available information provided by project sponsor of regulatory compliance.

Outputs: Goods and services that the project will deliver

Technical:

Wastewater connections (eligible)	1,888
Sewer lines	approximately 19,228 m (64,092 ft)
Manholes	approximately 170
Decommission of septic tanks	0
Reconstruction of existing street section	approximately 21,795 m2

Financial:

Utility annual financial statement	Net Cash Flow >= US$0
Annual reserves account balance statement	US$84,877

Implementation

Inputs and Activities:

Technical:

NADB Implementation Activities

Procurement process	Sep-Nov 2012
Construction	Jan 2013 - Jan 2014
Project financial close-out	May 2014
Project close-out	Jan 2015

Financial:

Inputs

NADB BEIF-CA	US$1,981,099

Activities

Execution of Grant Contract NADB / Utility
Compliance with disbursement conditions
NADB Auditing - covenants compliance review

Public Participation:

Outreach activities - construction updates; education / awareness

Appendix B – Outputs Control Matrix

General data													Outputs																				
													W						WW						SW					AQ		CE	WC
													miles	homes	number	MGD	MG	number	WWTP	MGD	number	number	miles	homes	number	m^3	number	number	units	m^2	m^2	MW	Miles
#	BEIF Region or loan	PID	Project	State	Country	Funding type	Sector (project type)	Certification date	Construction completion date	Close out report (COP) date	Actual cost ($US mill)	Benefited population	DW distribution lines	Number of DW domestic hook-ups	Dinking Water Plant (DWP)	DWP capacity	Construction of Storage Tank (elevated or ground)	Water meters with box lids	WWTP (new or expansion)	(WWTP) Capacity	Decomission of septic tanks	Lift stations (new or improved)	WWC collection lines (miles)	Wastewater connections	Construction or expansion of sanitary landfills	Capacity of new landfill cells	Construction of SW transfer stations	Illegal open dumpsites closed	Acquisition of SW collection vehicles	Concrete paved surface	Asphalt paved surface	Installed capacity	Improved water conveyance canals
1	6	1	Juárez	CHIH	MEX	Loan & BEIF	WW	Sep-97	Apr-01	Dec-14	$ 31.50	1,217,818	N/A	N/A	N/A	N/A	N/A	N/A	2	79.80	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

[redacted]

Appendix C – Outcomes Control Matrix