



1. Project Data

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| Project ID P099895 | Project Name MUNICIPAL INFRASTRUCT DEVT | |
| Country Bulgaria | Practice Area(Lead) Water | |
| L/C/TF Number(s) IBRD-78340 | Closing Date (Original) 31-Dec-2015 | Total Project Cost (USD) 63,797,393.70 |
| Bank Approval Date 24-Nov-2009 | Closing Date (Actual) 31-Dec-2019 | |
| | IBRD/IDA (USD) | Grants (USD) |
| Original Commitment | 118,700,000.00 | 0.00 |
| Revised Commitment | 102,580,246.91 | 0.00 |
| Actual | 64,854,030.71 | 0.00 |

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2. Project Objectives and Components

a. Objectives

Original Objectives

According to the Financing Agreement (FA, p.4) and the Project Appraisal Document (PAD, paragraph 10), the project development objectives (PDOs) were:

- to improve the reliability and quality of water provision to the communities in selected settlements in the project area



- to assist municipalities to improve investment planning capacity.

Revised Objectives

According to the Second Amendment to the FA (paragraph 1.1), the PDOs were revised:

- to improve bulk potable water provision in target areas
- to assist municipalities to improve investment-planning capacity

b. Were the project objectives/key associated outcome targets revised during implementation?

Yes

Did the Board approve the revised objectives/key associated outcome targets?

Yes

Date of Board Approval

04-Aug-2014

c. Will a split evaluation be undertaken?

Yes

d. Components

1. Project Implementation Support (US\$7.47 million at appraisal, revised to US\$11.4 million, further revised to US\$15.4 million, US\$11.17 million actual). According to the PAD, this component would finance support to carry out activities under the third component below, including consultant services associated with project implementation. These would include preparing feasibility studies, updating designs and Environmental Management Plans (EMPs), preparing bidding documents, and construction supervision. Other consulting services for project support included audit, develop and implement a communication plan to raise awareness in project-related land issues, training of the project implementation unit and staff of the Ministry of Regional Development and Public Works (MRDPW).

2. Preparation of Master Plans (US\$30.60 million at appraisal, reduced to US\$23.7 million, reduced again to US\$18.0 million, and further reduced to US\$17.10 million, US\$13.08 million actual). This component would finance the preparation of forty eight (48) regional Master Plans for Water Supply and Sewerage systems (ViK systems), including forty (40) Master Plans for urban settlements, within the six (6) economic development regions, as described in the Operational Manual. These master plans would support the MRDPW to: (i) identify investment needs for rehabilitation of water supply networks and construction of sewerage networks and wastewater treatment plants and (ii) meet applicable EU commitments for directives in water and wastewater. The Master Plans would include corporate development plans and other activities promoting improved service delivery and greater efficiency. At the 2011 restructuring the preparation of Urban Master Plans was removed from this component. The component retained support for the preparation of regional master plans for water supply and sewerage systems. The Bulgarian government passed the Urban Water Act, established Water Associations and removed the responsibility of preparing Urban Master Plans from the project's implementing agency, the Ministry of Regional Development and Public Works (MRDPW) (ICR, paragraph 16). This removal reduced the budget for this



component. Component 2 budget was further reduced during the 2014 restructuring to acknowledge the cost overrun for completed activities.

3. Completion and Rehabilitation of Dams (US\$109.91 million at appraisal, increased to US\$112.8 million, reduced to US\$94.8 million, and increased to US\$95.70 million, US\$49.85 million actual). This component would finance the completion of Luda Yana, Neikovtzi, and Plovdivtzi dams and rehabilitation of the Studena dam. The Studena dam was operational at project start and supplied water to the town of Pernik. This component would also finance the completion of water treatment plants. The feasibility studies for the dams would be financed under this component and completed during project implementation. During the 2014 restructuring, the budget for this component was reduced because the Neikovtzi dam and its water treatment plant were dropped from the project and replaced by the Studena water treatment plant.

e. Comments on Project Cost, Financing, Borrower Contribution, and Dates

Project Cost: The total project cost was US\$148.3 million at appraisal, according to the PAD. The actual cost was reported US\$74.33 million in the ICR (Annex 3) and US\$79.2 million in the ICR data sheet; the difference is most likely due to exchange rate fluctuations between dollar and euro. The amount disbursed was low because the construction of the Neikovtzi dam and water treatment plant were dropped from the project.

Financing: The International Bank for Reconstruction and Development (IBRD) financed this project, originally at US\$118.70 million. This was later revised to US\$102.58 million and disbursed at US\$64.9 million.

Borrower Contribution: The government committed US\$29.6 million, revised to US\$25.6 million and disbursed US\$14.4 million. The project maintained a co-financing ratio of 80% (IBRD) /20% (government) throughout implementation.

Dates: The project was approved on November 24, 2009 and was made effective on April 30, 2010. The Mid Term Review (MTR) was completed on November 18, 2012. The project was originally scheduled to close on December 31, 2015 and was extended twice for 24 months each time and closed on December 31, 2019. The project was restructured three times:

- On April 26, 2011, a level 2 restructuring revised the resource allocation among the components (see above) and introduced changes to the Results Framework at the outcome indicator level, removing the 40 urban master plans but retaining the 48 regional master plans for water supply and sewerage system to cover the entire country excluding the municipality of Sofia. The country's Urban Water Act established the Water Associations and removed the responsibility of preparing Urban Master Plans from the project implementing agency, the Ministry of Regional Development and Public Works (MRDPW).
- On August 4, 2014, a level 1 restructuring revised the PDO and the associated outcome indicators; reallocated resources, and extended the closing date to December 31, 2017. The scale of the project was reduced by the removal of the construction of the Neikovtzi dam and water treatment plant, and replaced by the rehabilitation of Studena water treatment plant. The PDO was revised to better align with the reduced scale of the project.
- On July 15, 2016, a level 2 restructuring reallocated cost savings to component 3, extended the closing date by another 24 months to December 31, 2019, and amended the Results Framework



arising from this reallocation and extension. The project was extended a second time to complete two contracts that could not proceed earlier because of insufficient budgets. This financing gap was belatedly resolved by the government and required an additional 24 months to complete. In addition, the name of the implementing agency was changed from the Ministry of Regional Development (MRD) to the Ministry of Regional Development and Public Works (MRDPW).

3. Relevance of Objectives

Rationale

Bulgaria acceded to the European Union (EU) in 2007. In preparation, the government prepared the 2004 Strategy for Water Supply and Sewerage Management and Development. The strategy outlined a plan of actions to meet the 1998 EU Drinking Water Directive and the 2000 EU Water Framework Directive. These directives contained EU-wide minimum quality standards for water supply systems, water supply planning, regulation, monitoring, and reporting. At the same time, the country experienced precipitation patterns that negatively affected the volume and reliability of its water supply. In response, the government began investments to complete eight water supply dams that were under construction during the 1970's and 1980's, but stopped due to lack of funds. This project included three of those eight dams - Luda Yana, Neikovtzi, and Plovdivtzi. However, following accession, a global recession affected the local economy by mid-2009. The government responded by reimposing fiscal discipline, reduced budgetary spending, while complying with the legal, regulatory, and organizational needs of the sector directives. These factors affected how the government planned its water related investments outlined in its strategy. Plans included (i) replacing about 70 percent of existing water transmission and distribution networks, thereby reducing Non-Revenue Water (NRW) from around 60 percent; and (ii) increasing coverage of sewerage connections from 50 percent to 85 percent and wastewater treatment coverage from 35 percent to 85 percent as provided in municipal-level water supply and wastewater utility Master Plans. This project offered support for these Master Plans to identify priority investments to meet EU directives.

The revised PDOs remained aligned to the country's national development program, Bulgaria 2030. This plan set out 3 strategic goals - accelerated economic development, improvements in demographic indicators, and reduced inequalities. The PDOs supported priority 6 - Sustainable Agriculture, and priority 9 - Local Development. The PDOs were relevant to efforts to mitigate and adapt to climate change, promote sustainable development and the efficient management of natural resources such as water, soil and air, protecting biodiversity, improving ecosystem services, and safeguarding habitats and landscapes (Bulgaria 2030, p. 21). Under local development, resources would improve residents' quality of living conditions by construction and/or rehabilitation of technical infrastructure, such as those in the water sector by reconstructing and modernizing the supply network to increase efficiency in use, increase connections to wastewater treatment plants, and improve treatment technologies (Bulgaria 2030, p. 29)

The PDO remained relevant to the World Bank's Country Partnership Framework for Bulgaria (FY17-22). Under Objective 5: Improved access to essential services (housing, water, early childhood development (ECD), long-term care) including for the bottom 40 and marginalized groups. The Plovdivtzi dam would benefit an estimated 30,000 people in poverty. The PDO was relevant to Objective 3: Better protected natural assets and improved efficiency in use of resources, noting the support for the construction of two



dams - Plovdivtzi and Luda Yana - and the rehabilitation of Studena dam. These dams would provide access to reliable water supply of good quality to 40,000 people, 100,000 people, and 40,000 people respectively.

The Bank had substantial water sector knowledge in Bulgaria. From October 1995 until December 2002, the Bank supported the Water Companies Restructuring and Modernization Project (P089152) and developed 21 water and wastewater utilities (Vodosnabdiavane i Kanalizacia or ViKs). In early 2000, with support from the Bank's Public Private Infrastructure Advisory Facility (PPIAF), the Bank assisted the government in drafting legislation to establish the water regulatory framework and included the water regulator in the State Energy and Water Regulatory Commission (SEWRC). In April 2005, the Bank prepared, 'Bulgaria-Financing the Water and Wastewater Sector,' that outlined sector issues and reviewed the government financing plan to meet EU directives. The Bank partnered with the MRDPW in these activities. The preparation of the Master Plans in ViKs in this project were similar to this earlier project. In all prior activities mentioned above, it was the Bank's primary sector partner. This long-standing partnership, Bank familiarity with the sector, and MRDPW familiarity with Bank procedures would facilitate project implementation (PAD, paragraph 6).

The revised PDO remained relevant to the EU accession program, in particular, to the 2021-2027 EU funding program. This program outlined enabling conditions that required strengthening the state and its institutions through better management and institutional settings. The government expressed interest in continuing the World Bank Group (WBG) support to strengthen its institutional capacity, particularly in the areas of water resource management and disaster risk mitigation. Unaddressed concerns in water security weakened the formulation of the PDO. The development challenge posed by water security and maintaining climate resilience required more than improving bulk water supply. Reliability, acceptable quality, adequate quantity, and uninterrupted availability of water to consumers for health, livelihood, and economic activity were also important considerations. This weakness brought the rating of the relevance of the objective of this project to substantial.

Rating

Substantial

4. Achievement of Objectives (Efficacy)

OBJECTIVE 1

Objective

To improve the reliability and quality of water provision to the communities in selected settlements in the project area.

Rationale

Theory of Change: The causal chain indicated that new water storage dams and water treatment plants would be constructed in Prodvist, Luda Yana, and Neikovtzi, and rehabilitate a water storage dam in Studena. The dams and the plants would increase the capacity of reservoirs. The facilities would increase the volume



of water stored to serve target municipalities. The new dams would improve the reliability of water delivered to the consumers in the target area by making available uninterrupted water supply. The water treatment plants would improve the quality of water delivered by generating potable drinking water that met national or EU standards, whichever was higher. However, the outcome indicators were not sufficiently clear in measurement of improved reliability and quality of the water provided to target beneficiaries. The target beneficiaries were also not defined. The causal chain assumed that: (i) a distribution network existed; (ii) uninterrupted access would be maintained; (iii) operations and maintenance (O&M) needs of the infrastructure in storage, treatment, and distribution met industry standards - target municipality water management systems monitored quality and regulated water withdrawals; and (iv) the authorities maximized benefits from improved drinking water supply. In its October 6, 2020 email to IEG, the Task Team clarified that the municipal water operations were tasked with and budgeted for O&M function of the local water management systems. The scope of the project addressed the needs of the target communities. However, the scale was not sufficient to achieve the uninterrupted availability (reliability) aspect of the PDO. Budgetary constraints emerged during implementation resulting in a scale-down (see ToC in revised objective below). The following risks were not adequately addressed and marked a lack of readiness to implement the project: (i) lack of technical and project management capacity - both the Bank and the government were simultaneously rebuilding operational experience in storage infrastructure; these were the first contracts to use templates of the *Fédération Internationale Des Ingénieurs-Conseils* (FIDIC); (ii) budget constraints from fiscal measures; and (iii) government decision-making processes (ICR paragraph 55).

OUTPUTS

The following targets were achieved:

- All preparatory studies were completed for Plodivtsi, Luda Yana, and Studena dams and water treatment plants (baseline 0, original target, 100 percent, revised target 98 percent). The Neikovtzi dam and water treatment plant site investigation and due diligence studies to update the earlier feasibility and design studies were completed. Construction of the Neikovtzi dam and water treatment plant was dropped under the 2014 restructuring (ICR, paragraph 34).
- The construction of the Plodivtsi water storage dam was completed (baseline 36 percent completed, original target 100 percent)
- The construction of the Plodivtsi water treatment plant (WTP) was completed with equipment installed (baseline 0, target 100 percent)

The following target was partially achieved:

- The rehabilitation of the Studena dam was 90 percent complete (baseline, original target 100 percent).

The following targets were not achieved:

- The construction of the Luda Yana dam was 37 percent completed (baseline 0, original target 100 percent). Three overhead power lines were relocated. Completed 49 percent of the dam wall. Completed the ground works for the dam service building. Completed 55 percent of the spillway, chute and stilling basin. Completed 9 percent of the works for the water intake tower and water supply pipeline.
- The construction of the Luda Yana water treatment plant was 8.5 percent completed (baseline 0, original target 100 percent).



- The Neikovtzi dam and water treatment plant were dropped from the project.

OUTCOMES

With regard to the reliability and quality of water provision to the communities in selected settlements, the following outcomes were partially achieved:

- The Plovdivtzi dam contributed 2 million cubic meters a year in storage capacity (original target was 2.45 million cubic meters, target achieved). The Plovdivtzi (2 million cubic meters a year) and Luda Yana (6 million cubic meters a year) dams would store an additional 8 million cubic meters a year. The overall target was not achieved since only Plovdivtzi dam was completed at closing.
- The Plovdivtzi water treatment plant contributed 6.6 million cubic meters a year of potable water (original target was to enhance the reliability and quality of 32.1 million cubic meters a year coming from all water treatment plants). 100 percent of samples from water produced by the Plovdivtzi water treatment plant met or exceeded national standards (baseline 0, original target 95 percent). Meeting EU standards was not mentioned but the Task Team confirmed in its October 6, 2020 email to IEG that Bulgaria's national standards were harmonized with those of the EU. The facilities served Rudozem and Madan or a combined population of 19,306, exceeding the revised target of 17,000 and females were 50 percent of the beneficiaries, as planned. The original target were residents of Rudozem, Madan and Smolyan or 40,000 residents. Smolyan was not yet served at closing because the planned conveyance from the reservoir to the municipality of Smolyan had not been constructed. This conveyance was outside the project scope and was to be undertaken by the government.
- The contracts for the remaining 10 percent of the works to complete the rehabilitation of the Studena dam and 50 percent of the Studena water treatment plant were in place by closing. According to the ICR, the government's 2020 budget included funds to complete the project (ICR, paragraph 29). Because the Studena dam continued operating during construction, the municipality managed to deliver water supply during the dry season. The project contractor indicated a November 2020 target completion date but a drought in Pernik that fed Studena dam in 2019 and the ongoing Covid 19 pandemic might delay it.
- The potable water from the Studena water treatment plant, when completed, would store 16.4 million cubic meters a year of potable water, to indicate reliability of water supply to its communities. 100 percent of the water samples taken from Studena met national standards for water quality. The Studena dam and water treatment plant, when completed, would serve seven settlements (no population data provided), including Pernik with 90,000 residents.
- The Luda Yana dam and water treatment plant, was only partially completed. The contract for this sub-project remained in place but the report indicated a moderate likelihood of completing the sub-project in the near term. This sub-project once completed would benefit Panagyurishte with 35,000 residents and settlements in Strelcha, Pazardzhik, Lesichovo, and Septemvri. No population data were provided for these settlements but when completed, the sub-project would serve 69,000 consumers by 2050. (ICR, footnote 11). Once completed, the Luda Yana dam would contribute 6 million cubic meters per year to achieve the original target of 8 million cubic meters a year in additional storage capacity. And, once completed, its water treatment plant would add 9.1 million cubic meters a year of potable water to the original target of 32.1 million cubic meters a year. These were not achieved at closing.



- The Neikovtzi dam and water treatment plant were removed from the scope of the project based on the 2014 restructuring because of slow implementation progress and insufficient budget. This sub-project did not contribute to achieving the original objective.

Rating
Modest

OBJECTIVE 1 REVISION 1

Revised Objective

To improve bulk potable water provision in target areas.

Revised Rationale

Revised Theory of Change: The causal chain indicated that new water storage dams would be designed and constructed in Prodvist and Luda Yana, and a rehabilitated water storage dam in Studena together with three new water treatment plants. The increased capacity in these reservoirs would provide year round bulk potable water for the target municipalities. The revised PDO was expressed as an unconventional outcome indicator, to avoid misinterpreting project achievements (see the 2014 restructuring paper, p.7). The project would contribute to the long term goal of uninterrupted water supply by making available bulk potable water year round, mitigating seasonal water shortages. The revision introduced specific target outcome indicators to measure how the activities would contribute to improving potable water. The outcome indicators were made more quantitative and components revised in direct response to the budget constraint that emerged during implementation. This constraint did not figure as a critical assumption of the original causal chain. The scope and scale of the project were adequate to achieve the revised PDO. Inputs and outputs were expected to achieve the revised PDO. The assumptions used in the above original PDO also applied here.

OUTPUTS

- The outputs achieved under the original objective above also apply to this revised objective. The reduced scope referred to replacing the construction of the Neikovtzi dam and water treatment plant with the construction of the Studena water treatment plant. The Studena water treatment plant was 50 percent complete at closing (original target 100 percent, not achieved).

OUTCOMES

- The improvement in providing bulk potable water was expressed as a percentage of samples from the water produced by the completed dams and water treatment plants that met national standards. According to the ICR, 100 percent of the samples from the completed Plodivtsi water treatment plant and the rehabilitated Studena water treatment plant met these national standards (original target 95 percent, target exceeded).
- An additional 2 million cubic meter per year was attributed to the Plodivtsi dam. The potable water from the Studena water treatment plant, when completed, would store 16.4 million cubic meters a year of potable water, which would contribute to the volume of bulk potable water. The Studena dam and water treatment plant, when completed, would serve seven settlements (no population data provided),



including Pernik with 90,000 residents. In addition, the rehabilitation of the Studena dam replaced ageing infrastructure to reduce safety risks to workers, downstream assets, and target communities (ICR, paragraph 53). When completed, the Luda Yana dam would contribute another 6 million cubic meter per year to achieve the additional 8 million cubic meter per year of bulk potable water. This target was not achieved at closing. According to the ICR, the Bank was not optimistic that the ongoing Luda Yana contractual dispute would lead to completing the dam in the near term (ICR, paragraph 62).

Revised Rating

Modest

OBJECTIVE 2

Objective

To assist municipalities to improve investment planning capacity.

Rationale

Theory of Change (TOC): The causal chain for this objective involved the preparation of diagnostics showing the current status and identifying investment needs for water supply and sewerage systems. Outputs were 48 Regional Master Plans for Water Supply and Sewerage systems and 40 master plans for urban settlements in the six economic regions of the country. MRDPW would prepare these plans to identify investment in water supply networks, sewerage networks, and wastewater treatment plants to meet EU directives in water and wastewater. The investments would be funded from the national budget and the European Union Structural Funds. These investments would contribute to the higher level objective of improving service delivery, meet EU directives in water and wastewater sector, and facilitate Bulgaria's integration into the EU (PAD, paragraph 7). The investments would also contribute to a higher level objective of reducing the incidence of water borne diseases thereby reducing associated hospitalization and health care costs. Consultative processes involving stakeholders from the national, municipal, and non-governmental organizations accompanied the preparation of these plans. These actions enhanced the capacity of municipalities to plan and mobilize resources for investing in the water supply and sanitation sector. The TOC was valid and the causal chain was logical. The activities were properly sequenced. When the government passed the Water Act creating the Water Associations, the MRDPW was no longer responsible for preparing Urban Management Plans. As a result, plans were to be submitted to both MRDPW and the Water Associations. Urban management plans were dropped and were not required to achieve the PDO, as stated by the ICR (paragraph 16). The outcome indicator was replaced by the number of plans that would be accepted by Bulgaria and the European Commission. This indicator was an output and not an outcome. The TOC did not offer critical assumptions that would affect the achievement of this PDO.

OUTPUTS

The following targets were achieved:

- Completed 51 Regional Master Plans for Water Supply and Sewerage systems and submitted to the MRDPW and Water Associations. The plans satisfied quality standards and were accepted by the government and the European Commission (baseline 0, original target 48, revised target 51). These plans included current status, management practices, planning criteria, assessed demand,



defined technical solutions, compared options, and proposed medium and long term investment programs. These plans also included corporate development plans, outlined organization and institutional arrangements, assets control and management, budgeting, accounting and cost control, tariff setting methodologies, revenue collection procedures, and operational performance to improve service delivery and achieve greater efficiency.

- The project supported the planning and investment capacity of 51 municipalities (baseline 0, original target 51). Monthly meetings were held by water authorities for development planning. Municipalities commented on the plans. Non-governmental organizations and communities were consulted during plan development.
- Feasibility studies were completed for 14 water associations and construction works underway to benefit 12 water associations - Varna, Plovdiv, Smolyan, Stara Zagora, Kurdjali, Sliven, Yambol, Pernik, Vidin, Silistra, Ruse, and Vratsa). Feasibility for six additional water associations (Veliko Tarnovo, Gabrovo, Haskovo, Sofia district, Pleven, and Targovishte) were under preparation at project closing.
- Urban management plans were dropped.

OUTCOMES

- The Water Associations in 20 of the 51 municipalities used the regional master plans to generate investment proposals for national and EU financing (baseline 0, original target 51, target achieved). In its October 6, 2020 email to IEG, the Task Team confirmed that the original target was 51 municipalities. This was evidence of moving toward the higher level outcomes of significant investment in the sector.
- More than 2 billion BGN (or approximately US\$1.1 billion or Euros 1 billion) were mobilized for water supply and sanitation investments arising from the plans as confirmed by the Task Team in its October 6, 2020 email to IEG.

The Task Team confirmed in its October 6, 2020 email to IEG that the US\$1.1 billion generated for water supply and sanitation investments were obtained from the plans that were generated by the project. According to the ICR, the completion of the cancelled Urban Master Plans were not required to achieve the PDO (ICR, paragraph 16).

Rating

Substantial

OBJECTIVE 2 REVISION 1

Revised Objective

Unchanged. As above.

Revised Rationale

Rating and outcomes remained unchanged.



Revised Rating

Substantial

OVERALL EFFICACY

Rationale

Contributions to achieving the target outcome indicators reflected modest achievement under the first original objective. The efficacy of the project to achieve the second objective is rated substantial because of the investments generated from using the regional plans as confirmed by the Task Team in its October 6, 2020 email to IEG. The overall efficacy of the original objective is rated modest due to the low achievement of outcomes.

Overall Efficacy Rating

Modest

Primary Reason

Low achievement

OVERALL EFFICACY REVISION 1

Overall Efficacy Revision 1 Rationale

The efficacy of the project to achieve the second objective remained substantial. With the low achievements in target indicators primarily of the revised first objective, the overall efficacy of the project was rated modest.

Overall Efficacy Revision 1 Rating

Modest

Primary Reason

Low achievement

5. Efficiency

Economic and Financial Efficiency: At appraisal, there was no economic assessment of the project. According to the PAD (paragraph 32), economic analyses of the dam and water treatment plant sub-projects were to be part of the feasibility studies. Ex-ante cost-benefit analyses (CBA) for the three dam sub-projects, Luda Yana dam and water treatment plant, the Plovdivtzi water storage dam and water treatment plant; and Studena dam, were prepared using the "with and without project" methodology to calculate the Economic Rate of Return (ERR) for a 30-year project period. A CBA was not conducted for Neikovtzi sub-project. Benefits came from: (i) savings in healthcare (or over 60 percent of benefits); (ii) savings from hospitalization (or 20 percent of benefits); and (iii) new jobs created (during construction and operations). Costs and benefits of the institutional strengthening support were not included in the ex-ante analyses. An aggregated ex-ante cost-benefit analysis for the project was calculated at closing, using individual sub-project CBA data and including costs occurred under Component 1 and 2 of the Project. The aggregated ex-ante ERR was estimated at 2.21 percent (it is not reported in the table a below as it was not calculated at appraisal). The ICR reports (paragraph 43) that the ex-ante NPV for the full Project produced a negative NPV due to limited consideration of benefits of the Project and because all anticipated Project costs were included in the ex-ante aggregate calculations.



At closing, an ex-post ERR was prepared for each sub-project and then aggregated for an overall project level inclusive of all dams sub-projects and costs of the institutional strengthening activities. The applicable EU Regulation (480/2014) for 2014-2020 program period called for the use of a 5 percent discount rate and a 30-year infrastructure life. The ex-post analysis envisaged materialization of benefits once the corresponding dam was in operation given that water supply distribution networks were in place in Project areas and no additional physical works were required to realize the benefits of more reliable and improved quality of water supply provided by the Project. At closing, the project ERR was 10.09 percent while those of the sub-projects ranged from 6.16 percent for the Luna Yada dam, 10.46 percent for the Plovdivtzi dam, to 15.37 percent for the Studena dam. The aggregated EER accounted for all project costs, including institutional strengthening, project implementation support and preparatory studies for Neikovtzi.

Administrative and Operational Efficiency: The project, originally planned for a four year and eight months implementation period, closed after two extensions, at nine years and eight months. Similar projects carry a conventional eight year implementation period. The following contributed to implementation delays: (i) dam design were not ready at approval due to insufficient budget arising from government expenditure ceilings; (ii) a lack of responsive bidders for major works; (iii) a slow decision making by the authorities; and (iv) unfamiliarity with the FIDIC contract template used in procurement (see Section 10 for details). Project implementation was extended twice but works were not completed for two of the three dams. Budget constraints during implementation resulted in hiring less staff for the implementing agency. A Project Implementation Support Assistance (PISA) consultant was added in 2011. The specialized technical needs of constructing dams, prolonged implementation period, and government requests for additional expert reviews raised the costs of project support (ICR, paragraph 45). The Covid 19 pandemic and the impact of the 2019 drought in Pernik region that fed the Studena reservoir might delay the estimated November 2020 project completion of the remaining works (ICR, paragraph 29).

In sum, the modest ERRs at closing was accompanied by the operational and administrative setbacks during implementation. The lengthy implementation period did not complete all the planned works for two out of three dams. The ICR acknowledged (paragraph 46) that project efficiency was lower than the industry standard.

Efficiency Rating

Modest

a. If available, enter the Economic Rate of Return (ERR) and/or Financial Rate of Return (FRR) at appraisal and the re-estimated value at evaluation:

| | Rate Available? | Point value (%) | *Coverage/Scope (%) |
|--------------|-----------------|-----------------|---|
| Appraisal | | 0 | 0 <input type="checkbox"/> Not Applicable |
| ICR Estimate | ✓ | 10.09 | 100.00 <input type="checkbox"/> Not Applicable |

* Refers to percent of total project cost for which ERR/FRR was calculated.



6. Outcome

The relevance of objective was rated substantial. The efficacy of the project in achieving the first objective was rated modest because of low achievements in meeting the outcome indicators. Similarly, the efficacy of the project in achieving the revised objective was rated modest because low achievements remained. The efficacy of the project in achieving the second objective was rated substantial because, as clarified by the Task Team in its October 6, 2020 email to IEG, substantial investments in the water and sanitation sectors were generated by the regional master plans funded under the project. The efficiency of the project was rated modest.

According to the guidelines, a split rating is applied because the objectives and outcome indicators were revised, and the project scope was reduced. The overall outcome rating is moderately unsatisfactory under both the original and revised objectives. At the time the PDO was revised, the loan had disbursed US\$18.35 million (out of a total disbursement of US\$64.85 million) or 28.3 percent (the ICR data sheet).

a. Outcome Rating

Moderately Unsatisfactory

7. Risk to Development Outcome

Risks to development outcomes:

- **Risk of losing the government's commitment to complete remaining works.** At closing, some works were not completed but contracts remained in place. Funds were allocated in the 2020 budget. The contractor estimated project completion by November 2020. However, impact from the 2019 drought in Pernik reduced the runoff to the Sudena reservoir, and may lead to further delays. Budgetary commitments may also be affected by the Covid 19 pandemic response.
- **Financial risks from insufficient resources for operation and maintenance (O&M) of infrastructure.** The ICR was unclear regarding the availability of O&M resources for the built infrastructure but the Task Team noted in its October 6, 2020 email to IEG that water operators and their budgets are tasked with O&M functions for the local water systems. The ICR mentioned and confirmed by the Task Team in the same email to IEG that there are O&M capacity needs for water management systems and in managing reservoir levels. These capacity gaps may result in water shortages, such as that experienced in Pernik at project closing. To mitigate this risk, the government may consider including measures to address capacity gaps in investment packages of the Water Associations.
- **Risks from encountering technical design setbacks of the remaining works.** The technical design of the remaining works were addressed before closing. However, when implemented, technical design revisions may require more resources. To mitigate this risk, the implementing agency needs to complete the works according to specifications.
- **Risks from noncompliance with environmental and social safeguards.** The government is fully funding the completion of the remaining works. They may not comply with the World Bank's environmental and social safeguards processes. This risk is mitigated by the government's adoption of the European Union environmental regulations and social measures into its national law, according to the ICR. These measures were similar to the World Bank safeguards. In addition, at closing, the Bank team and the supervisory engineer offered the government expert advice for completing the



Luda Yana dam. These included securing the site, and how to avoid accidents in abandoned sites with partially completed infrastructure. Project completion will not require further land acquisition.

8. Assessment of Bank Performance

a. Quality-at-Entry

The project supported the country's and the World Bank's strategy for cooperation and development. After acceding to the EU in 2007, the country needed to invest in water supply and sanitation services to meet EU drinking water regulations. Water storage and dams, however, were not supported by EU structural funds. The country last invested in dams in the 80s, had no recent studies or designs for dam sub-projects, nor technical capacity to oversee its construction. At the same time, the Bank began to re-engage in 'high-reward–high-risk' hydraulic infrastructure, using a more effective business model, based on the 2003 Water Resources Sector Strategy. The technical, financial, and economic aspects of the projects were prepared with the knowledge that both the Bank and its client were rebuilding their operational experience in storage infrastructure.

Environmental and social risks were adequately assessed. In contrast, operational risks were poorly assessed. The project was approved in 2009 just as the government adopted fiscal controls to address the impact of global recession. Governmental priorities shifted. Budgetary spending was reduced. Measures to address the operational risks posed by budgeting issues, complex design, contracting challenges from using the International Federation of Consulting Engineers (*Fédération Internationale Des Ingénieurs-Conseils* or FIDIC) contracts, and delays in decision making reared its shortcomings during implementation. The inadequate assessment of the risks associated with restrictive government fiscal controls and overestimated project management capacity to implement complex infrastructure projects proved to be a shortcoming. According to the ICR (paragraphs 24 and 56), the project was not ready for implementation. Dam design were not ready at approval because the government was unable to allocate sufficient budget due to expenditure ceilings. The Bank may have rushed to remain a relevant partner in the EU market. The country may have adopted political expediency in response to the drought preceding the project. At preparation, there was no economic assessment of the project (see Section 5 Efficiency above). The implementation arrangements proved inappropriate (see restructuring during implementation below) and the implementation period proved unrealistic. The M&E arrangements were a weakness (see Section 9 Monitoring and Evaluation below).

Quality-at-Entry Rating

Moderately Unsatisfactory

b. Quality of supervision

The Bank team conducted 21 supervision missions over the 10-year implementation period. Seven task team leaders managed this project. Specialists on the Bank team also changed frequently. Eight governments spanned the implementation period. The Bank team's commitment and attention to the project varied over the project period as shown by delays in decision making, meager staff resources to



coordinate implementation, and limited ability to resolve project-related challenges. As the project was implemented, the country acceded to the European Union and was simultaneously maneuvering through new administrative, policy, and regulatory environments, ranging from establishing Water Associations for water and sanitation planning and development to permitting requirements. These actions resulted in delays in decision making (see Section 5 Efficiency above).

The Bank team restructured the project three times to address the weaknesses in the quality at entry and implementation delays due to procurement and technical design setbacks. World-class experts were mobilized to advise the government in complex and innovative actions, such as those required for the Studena dam rehabilitation. Budget resources were reallocated following shortfalls brought about by persistent government budgetary constraints. Candor and quality of performance reporting were captured in acknowledging the impact from poor decision making as the sector evolved to conform with the European Union's regulatory environment (ICR, paragraph 60). After the project reached the 10 year implementation period, the Bank did not extend the project because capacity and experience gained were sufficient to complete the remaining works. In addition, the dispute surrounding the Luda Yana dam contract was anticipated to take some time to resolve.

Quality of Supervision Rating

Moderately Unsatisfactory

Overall Bank Performance Rating

Moderately Unsatisfactory

9. M&E Design, Implementation, & Utilization

a. M&E Design

The PAD outlined a results framework and monitoring arrangement (Annex 3) and described the reporting arrangements (PAD, paragraph 23). The baseline for the water quality to be delivered was "to be determined" but with no further explanation in the PAD. The outcome indicators for the first original objective did not show how the outputs would improve reliability and quality of water. M&E arrangements and reporting needs were identified and embedded in the implementing agency. M&E design improved after the 2014 restructuring and those improvements covered 71 percent of the loan disbursements.

At the 2014 restructuring, M&E design improvements introduced quantitative targets for the outcome indicators. The specified additional volume generated by the dams measured the revised objective of providing bulk potable water. The Bank acknowledged, however, that this indicator was not well defined nor it was widely used. In addition, another outcome indicator provided a target for the samples from the water treatment plants completed under the project to measure improved quality of water. There was no outcome indicator for the Studena dam that replaced the Neikovtzi sub-project in the 2014 restructuring. Even after the introduction of new metrics, baseline data remained uncollected.



b. M&E Implementation

The Ministry of Regional Development and Public Works implemented the M&E. The revised PDO and additional outcome indicators monitored implementation progress until closing. Benchmarks were introduced, problems and challenges identified and corrective measures suggested during M&E implementation. Additional information showed results from beneficiaries, and supplemental outcome and impact data were gathered.

c. M&E Utilization

The ICR reports that based on M&E monitoring for master planning and a consultative process, 20 of the 51 municipalities submitted water and sanitation investment applications for financing by the national and European Union following consultative planning efforts. Dialogue between the task team and the government supplemented the weak M&E design to inform the Mid Term Review and project restructurings.

M&E Quality Rating

Modest

10. Other Issues

a. Safeguards

The project was classified as an environmental assessment category A due to the works related to completion of the dams and possible environmental impacts during dam construction and operation. The supporting and relating dam infrastructure, such as the rehabilitation of water treatment plants and temporary road in Ploddivtsi was classified as category B; no significant environmental impacts were anticipated for these components and were managed through site specific Environmental Management Plans (EMPs). The following safeguards were triggered under the project: OP/BP 4.01 Environmental Assessment, OP/BP 4.04 Natural Habitats, OP/BP 4.37 Safety of Dams, and OP/BP 7.50 Projects on International Waterways.

Environmental safeguards compliance: Some of the works on sub-project investments were started prior to Bank involvement. The Environmental Impact Assessments (EIAs) were updated to comply with World Bank requirements. Environmental Management Plans (EMPs) were prepared. For Luda Yana and Neikovtzi dams, EIAs were not required under Bulgarian law but were prepared in compliance with OP/BP 4.01. For Plovdivtsi dam, an EIA was approved by MoEW in 2000, and a supplemental document was prepared with additional information and analysis to comply with OP/BP 4.01. EIA documents were disclosed prior to appraisal and updated in the feasibility studies for the dams. For the Studena dam, a stand-alone EMP was prepared and disclosed.



The project triggered OP/BP 4.04 Natural Habitats because small areas of or more dams sites may fall within Protected Areas. Only the protected sanitary zones of the dams overlap with the Protected Areas and their management regime were compatible with the Protective Area management. The updated EMPs included required mitigation measures. During the works on Luda Yana Dam, a colony of European ground squirrels was discovered and successfully relocated.

The project did not trigger OP/BP 4.11 on Physical Cultural Resources but EMPs included provisions for cultural heritage and archaeology if chance finds occur during construction. The EAs included a chance-find clause that was triggered and applied on the archaeological findings at the Luda Yana Dam.

The project triggered OP/BP 4.37 Safety of Dams because of the completion of the Luda Yana, Neikovtzi, and Plovdivtisi dams, and the rehabilitation of the Studena dam. Bulgarian dam safety requirements were aligned with those of the Bank. Design, construction, and operation of the dams followed the Bulgarian and Bank policies. The government appointed a panel of experts on dam safety to review the feasibility studies and engineering designs and provide guidance during implementation of works.

The project triggered OP/BP 7.50 Projects on International Waterways because the four dams were located on streams that discharged to riparian countries or international waterways. On March 19, 2008, and then again on May 13, 2009, the riparian countries, Turkey and Greece, and the International Commission on Danube River Protection were notified and were requested to reply by June 15, 2009. This was extended to July 15, 2009 and again to August 27, 2009 at the request of the Government of Greece. No further comments were received after the deadline or since. The Studena water treatment plant investment added during the 2014 restructuring fell within the exception notification provided in paragraph 7(a) of OP 7.50 since the activity was limited to rehabilitation of existing facility. There was no change in current capacity. The Europe and Central Asia Vice President signed the exception notification memo. An Environmental Management Plan was prepared, disclosed, and included in the bid document for the Studena water treatment plant contract, as reported in the Restructuring Paper. There were reported incidents of adverse impacts to the environment. According to the ICR, safeguards compliance was moderately satisfactory (ICR, paragraph 70).

Social safeguards compliance. The scale of social impacts of the three dams (Luda Yana, Neikovtzi, and Plovdivtisi) was limited because dam constructions were partially undertaken in the 1980s and 1990s. Most of the necessary land acquisition had been completed prior to the Bank's involvement. Past land acquisition was deemed a legacy and not a current issue; OP 4.12 was not triggered. A Land Acquisition Policy Framework (LAPF) was prepared to address the needs of project investments to be identified under the plans funded by the second component. People were not expected to lose their residences or other structures. All three dam areas had informal use of the land for grazing animals; local authorities agreed that project- affected people would be provided alternative land for grazing purposes.

The ICR reports (paragraph 71) that land acquisition and introduction of restrictions on land use were in compliance with the Bank social safeguards requirements, the Land Acquisition Policy Framework (2009) and Abbreviated Land Acquisition Plans (ALAPs), and applicable national legislation. No land acquisition procedures were undertaken for Neikovtzi Dam because this component was replaced by the Studena dam. Abbreviated Land Acquisition Plans for the Luda Yana and Plovdivtisi dams were implemented. Land acquired were compensated. With the dropping of the Neikovtzi dam and water treatment plant, no land acquisition took place at the site. In the case of Plovdivtisi dam and its water treatment plant, private individuals were compensated for 0.99 hectares or equivalent to 13 plots from 2008 to 2014. In the case of the Luda Yana dam, 6.89 hectares of private land and easement rights for 0.25 hectares from 2014 to 2016.



In the case of Studena dam, there were no lands acquired. During the construction of Luda Yana dam, the Panagyurishte Municipality published information annually about alternative pasture lands to address the loss of access to grazing land. No negative impacts on livelihood or physical displacement were reported during project implementation.

Municipalities with land acquisition had Grievance Redress Mechanisms (GRMs) in place. In Luda Yana, an additional Commission for voluntary settlement on grievances related to land acquisition was established but never utilized. The only land-related dispute for Luda Yana was settled by the administrative court in 2014. In 2018/9, the information boards at Studena and Luda Yana dam construction sites were supplemented with information on various grievance channels, including onsite grievance logs.

b. Fiduciary Compliance

Financial Management: At appraisal, the implementing agency was found to have adequate financial management capacity. According to the ICR, the project financial management performance was found satisfactory (ICR, paragraph 76). The project was staffed with an experienced team who used the Project Operational Manual's accounting policies and internal control procedures. Quarterly Interim unaudited Financial Reports were submitted on time and accepted by the Bank. The annual audits were also submitted on time with unmodified (clean) opinion throughout implementation. The last project financial audit was due on June 30, 2020.

Procurement: At appraisal, procurement risk was rated high (PAD, Table accompanying paragraph 26) because of difficulties in retaining trained staff in the implementing agency. A Project Operations Manual and training of the staff of the implementing agency and planned targeted training were identified to mitigate this risk. In addition, a covenant in the FA indicated that the implementing agency would retain adequate and competent staff, with reviews ex-ante or ex post reviews of procurement activities following Bank guidelines (PAD, paragraph 41). At closing, implementation delays were attributed to procurement and contracting challenges and slow disbursements. The local market did not have sufficient contractors to undertake complex projects. In some key contracts, only one bid made an offer, or bidders were deemed unresponsive, impeding award negotiation. In the Luda Yana sub-project, a dispute arose between parties to a joint venture that was awarded the construction contract because one partner declared insolvency (ICR, paragraph 33). Onsite mobilization was slow and disagreements between contractor and design/supervisory engineer over materials meeting specifications or the conduct of laboratory testing. The implementing agency was unable to resolve these disputes in a timely manner. In some design or technical investigation contracts, contract periods proved insufficient requiring extensions. The implementing agency reflected limited procurement capacity in the use of the contract template and in managing large contracts for complex infrastructure projects.

c. Unintended impacts (Positive or Negative)

According to the ICR, while the Plovdivtsi dam was not designed for flood control, the completed dam would regulate flow in the catchment area. This would benefit downstream communities and reduce their losses from floods. The PDO outcome indicator did not include flood reduction as an outcome indicator. In



addition to flood control, the rehabilitated Studena dam enhanced the safety of the facility, protected workers, assets and neighboring communities (ICR, paragraph 53).

d. Other

11. Ratings

| Ratings | ICR | IEG | Reason for Disagreements/Comment |
|------------------|---------------------------|---------------------------|----------------------------------|
| Outcome | Moderately Unsatisfactory | Moderately Unsatisfactory | |
| Bank Performance | Moderately Unsatisfactory | Moderately Unsatisfactory | |
| Quality of M&E | Modest | Modest | |
| Quality of ICR | --- | Substantial | |

12. Lessons

The Review selected two lessons from the ICR, with some adaptation of the language:

- Complex projects require laser focus in assessing readiness to implement.** This project lacked technical and operational readiness in designing and implementing at the time of approval and those risks delivered the delays. Corrective measures could not keep pace with the implementation challenges. The timeline was underestimated and unrealistic. Convention for the sector pointed to an even lengthier period to implement such a complex project. Recognizing these challenges may reduce frustration and repeated project extensions. Some of the readiness factors to consider include adequately assessing capacity to manage operationally complex projects and large contracts (e.g., capacity to respond to complex technical issues that may arise during implementation and resolving these in a timely manner) and adopting a procurement strategy that responds to market conditions (e.g., availability of local contractors to undertake complex projects). Other vital readiness factors include having key contracts at advanced stages of procurement prior to approval, or bundling procurement packages for efficiency so that timely technical studies are undertaken in time to implement sub-project investments.
- Institutional capacity building may be a powerful development tool that could trigger further investments in support of infrastructure development.** In this project, the master planning component, which focused on capacity building at the local level, generated discrete investments in water and sanitation of more than one billion euros. Clients are usually reluctant to borrow for capacity building alone. The rest of the Bank, both at the central office through its global practices, and in the region, could advertise the positive outcomes of strong institutions built over the years. In addition, technical breakthroughs or procedural efficiencies or emerging best practices in the sector arising from



project experience would also prove useful in increasing client interest in enhancing native technical capacity. For example, in this project, lessons learned from the use of technical elements related to geomembrane attachments and working with divers would be useful to design and implement future dams.

13. Assessment Recommended?

Yes

Please Explain

An assessment may be useful to go over lessons learned regarding the use of Bank procedures for financing complex projects such as dams. In this case, the accession of the country to the European Union and continually competing for time, resources, and attention to the project while complying with accession procedures pose vital lessons to the Eastern European lending market of the World Bank. An assessment could also highlight complementary or conflict in safeguard procedures and laying out measures or frameworks to mitigate conflicts in processes and compliance needs. The convention regarding how dams are typically implemented, how this fits into the Bank's project cycle may also strengthen the case for flexibility in implementation or adopting a Multi Phased Approach to complex infrastructure projects. Documenting the procurement and technical lessons from this project may also serve design and implementation of future dam projects.

14. Comments on Quality of ICR

The ICR followed the guidelines and provided a detailed narrative to support the project outcomes and ratings. A theory of change, prepared at project closing, framed the discussion of results. The report was candid, pointing out the deficiencies in the formulation of the objectives, both original and revised; the choice of weak indicators; and implementation setbacks from overestimated capacity in procurement and contracting. An exhaustive analysis of efficiency was presented in Annex 4. Evidence were appropriately referenced throughout the report. For example, the government's commitment to complete the remainder of the project, referenced in the report, was evident in the implementing agency's Minister's letter to the World Bank in Annex 5. The report was internally consistent, cross referencing the setbacks brought by the lack of procurement and contracting capacity in discussions of the efficacy of the sub-projects (paragraph 33), lack of readiness to implement (paragraph 56), likelihood of completion (paragraph 62), fiduciary compliance (paragraph 77), and underestimating time required to implement a complex project, among others. The report highlighted the impact of capacity building in support of the master plans for investments (second component) and how these generated almost one billion euros in investments as a result. Lessons were based on operations, highlighting hurdles inherent in complex projects that Bank processes could not overcome and discoveries in technical design. A minor shortcoming was the missing information regarding the O&M capacity needs of the project (to be clarified by the Task Team) and its length exceeded the recommended 15 pages.



a. Quality of ICR Rating
Substantial