

LIFE CYCLE MANAGEMENT FOR AN INVESTMENT PROJECT IN CLUJ-SĂLAJ AREA, ROMANIA

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Abstract

The Project Life Cycle refers to a logical sequence of activities to accomplish the project's goals or objectives. Regardless of scope or complexity, any project goes through a series of stages during its life. Authors' experience in preparing and implementing investment projects in the water sector has led to several conclusions: there is first an identification phase, in which the outputs and critical success factors are defined, followed by a planning phase, characterized by breaking down the project into smaller tasks, an execution phase, in which the project plan is executed, and lastly a completion phase, that marks the closure and exit of the project. Investment project activities must be grouped into phases because by doing so, the project management and the core team can efficiently plan and organize resources for each activity, and also objectively measure achievement of the goals.

This paper introduces several issues related to the Project Cycle Management for a large local infrastructure investment project in the Cluj-Sălaj area, Romania. Successfully managing the project cycle and making timely decisions at every stage (identification, planning, execution and sustainability) require the Project Management Unit from the Cluj-Sălaj Water Company to constantly understand and adapt to strategic considerations, both external and internal.

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1. Overview

Countries in the Danube region are undergoing rapid transitions towards more integrated societies in the European Union. Municipal infrastructure projects are being designed and implemented within the settings of these complex transitions, which include political, legal, economic, financial, technical, environmental, social and other aspects. The setting of an infrastructure project is referred to as the project's strategic or enabling context. Some elements of the strategic context include:

- the background and the rationale of the project, including policies and strategies;
- the international, national or regional goals that the project contributes to; and
- key issues linked to the project, such as policy and regulatory concerns.

Given the importance of these elements with regard to a project's success, we will refer to them as the project manager's "strategic considerations" (Cleland, 2006).

To further illustrate the dynamic nature of the project's strategic context, this article introduces an investment project case: *Extension and Rehabilitation of the Water and Wastewater Systems in Cluj-Sălaj*. The project consists of investments for improving the drinking water's treatment and distribution as well as the wastewater's collection and treatment in the agglomerations located in the Cluj and Sălaj Counties (Feasibility Study, 2007), in the North-West part of Romania, including:

- construction and modernization of water sources intended for drinking water abstraction;
- construction and rehabilitation of water and wastewater treatment plants;
- extension and rehabilitation of water and sewerage networks;
- construction and rehabilitation of sludge treatment facilities; and
- metering, laboratory equipment, leakage detection equipment etc.

The following figure shows the location of the project and the towns included in the project.

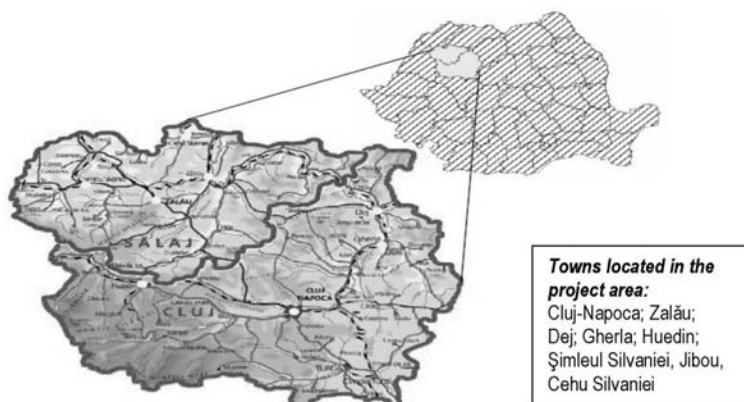


Figure 1: Map of Romania: Location of the project area

2. Needs to be addressed in the small and medium towns

Due to historic under-investment, water and wastewater services in many towns of Romania are in a poor state of repair and the levels of service are below what is considered acceptable by national and international standards. In Romania, out of the 320 urban localities, around 270 are considered small and medium-size towns. Until recently, water and wastewater services in such towns have been provided by municipal departments or small commercial companies serving individual municipalities. Due to their size, such service providers had limited institutional, commercial and technical capacity. Furthermore, they had to rely on central budget contributions for capital investments as they have been unable to attract financing from either the international financial institutions or private operators. Over the past 20 years, very limited capital investment was possible and, as a result, water and wastewater systems are generally limited in extent and are in a poor state of repair (Sustainable Development Strategy for Water and Wastewater Services in Romania, 2003).

As a consequence, the condition of these systems is very poor. Given all these, the towns still need to comply with environment and health standards regarding drinking water quality and treatment of wastewater, and to assure an adequate living standard to their inhabitants and a continuous water supply. As part of the EU accession treaty, the Romanian Government agreed to achieve these objectives by the following dates: for drinking water quality, by 2015, and for sewerage and waste water treatment, by 2018.

So, Romania is determined to improve the quality of water and wastewater services by specifically raising environmental quality in order to achieve compliance with EU standards. It is recognized that this will take considerable investment to be phased over an extended period of time to meet affordability criteria. In this respect, a national investment program has been developed to assist local authorities in Romania to improve their water and wastewater services (Ministry of Environment and Sustainable Development, 2007).

2.1. Specific issues in Cluj - Sălaj

Except for Cluj – Napoca and Zalău, the other agglomerations in the project area did not benefit in the past from any substantial investments from international financial institutions or the European Union for improving their water and wastewater infrastructure. Lack of long-term development programs and underinvestment have caused poor efficiency and poor sustainability of the water and wastewater infrastructure (Ciomoş, 2009a).

Thus, the standards of service in the agglomerations mentioned above differ significantly from each other. Whereas service levels are acceptable in Cluj-Napoca for water supply and wastewater drainage and treatment, the other agglomerations face multiple problems. The existing drinking water and wastewater systems face serious operating and maintenance difficulties due to obsolete and under-performing

facilities and equipment, the use of old technologies, and poor quality construction materials. These factors affect the quality of water supply and wastewater services in the area. Equipment failures and breakages in drinking water distribution networks result in frequent service interruptions. The high rate of water loss in the system is a serious economic drain on the Regional Water Company.

In conclusion, urgent rehabilitation and extension works are required to solve these problems. Considering the present situation, there is a need to refurbish the water and wastewater networks, and the water and wastewater treatment plants in both counties, Cluj and Sălaj. That is the reason why, in the project area, a Regional Water Company (RWC) was founded in 2005 to operate and develop the water and wastewater infrastructure. The company was developed from the largest water company in the two counties, the one who had, previously, served the municipality of Cluj-Napoca. However, it is expected that the RWC will ultimately become responsible for water and wastewater services in both counties, especially as the company is the best placed to fulfill the Government objectives noted above (Ciomos, 2009b).

3. Project identification and enabling environment

In Romania, as in most of the Central and Eastern European countries, the municipal services are key elements to economic growth, and operation of local infrastructure has important environmental implications. The municipal sector faces the following **problems**: deteriorated assets, institutional weaknesses and policy problems. The water sector has the **opportunity** of major grant funds from the European Union and loans from the International Financial Institutions. Part of the institutional **weaknesses** is a severe “management gap”, meaning that project management practitioners in the region, both in central and local administration, lack some of the knowledge and tools required to bring large-scale infrastructure projects to fruition (Ciomos, 2006).

3.1. Legislative framework assessment

Romania’s joining the European Union in January 2007 requires the continuous harmonization of the national legislation with the *acquis communautaire*. This goal became a mandatory obligation for Romania arising from the Treaty of Accession.

The development and implementation of an investment project depends directly on the national legislation framework and on its harmonization status with the EU legislation. The most significant legislative field that applies to the water investment project is the environment, which comprises the main regulations regarding the quality of water to be used for drinking and of the wastewater to be discharged into the natural water courses. Another legislative area of importance for the water investment projects is the building sector, especially the water and wastewater infrastructure sector, which includes the general design rules for water quantities and for the physical infrastructure. Both the national legislation and the EU one, which are relevant for the project, are presented in Table 1.

Table 1 shows the main European regulations regarding environment, water supply and wastewater. The first three directives listed are the main drivers for the present project; others are secondary, but may be of particular relevance to specific sub-projects. The requirements of the EU directives in the water and wastewater sector have been incorporated in the Romanian laws, as presented in Table 2.

The main pieces of national regulation on water and wastewater sector, together with a short presentation of their contents, are shown in Table 3.

Table 1: Main EU regulations regarding environment

Number, regulation and enforcement date	Name of regulation
Main Drivers:	
Council Directive 91/271/EEC of May 21, 1991	Concerning urban wastewater treatment, modified by Directive 98/15/EC
Council Directive 98/83/EC of November 3, 1998	On the quality of water intended for human consumption
Directive 2000/60/EC of the European Parliament and of the Council of October 23, 2000	Establishing a framework for Community action in the field of water policy
Other Relevant Directives:	
Council Directive 75/440/EEC of June 16, 1975	Concerning the quality required of surface water intended for the abstraction of drinking water in the Member States
Council Directive 76/464/EEC of May 4, 1976	On pollution caused by certain dangerous substances discharged into the aquatic environment of the Community (and the 7 "daughter" directives)
Council Directive 76/160/EEC of December 8, 1975	Concerning the quality of bathing water
Council Directive 86/280/EEC of June 12, 1986	On limit values and quality objectives for discharges of certain dangerous substances included in List I of the Annex to Directive 76/464/EEC
Council Directive 80/68/EEC of December 17, 1979	On protection of groundwater against pollution caused by certain dangerous substances
Council Directive 79/869/EEC of October 9, 1979	Regarding the methods of measurement and frequencies of sampling and analysis of surface water intended for the abstraction of drinking water in the Member States
Council Directive 78/659/EEC of July 18, 1978	On the quality of fresh waters needing protection or improvement in order to support fish life
Council Directive 85/337/EEC of June 27, 1985	On the assessment of the effects of certain public and private projects on the environment
Council Directive 2001/42/EC of June 27, 2001	On the assessment of the effects of certain plans and programs on the environment

Table 2: Romanian legislation concerning water and wastewater

Community Acquis	National legislation
<p>Directive 98/271/EC of May 21, 1991 concerning urban wastewater treatment, amended by Directive 98/15/EC</p> <p>Amended by 398L0015 Amended by 303R1882</p>	<p>Government Decision no. 188/28.02.2002 and subsequent amendments regarding the approval of the technical norms concerning the wastewater discharged into the aquatic environment published in Official Monitor no. 187/20.03.2002</p> <p>Governmental Ordinance no. 21/16.01.2003 regarding the approval of the procedure and the requirements for the issue of water management permits and licences published in Official Monitor no. 1141/06.12.2002</p> <p>Governmental Emergency Ordinance no. 104/19.02.2003 regarding the approval of the procedure to modify or withdraw the water management permits and licenses published in Official Monitor no. 1241/16.01.2003</p> <p>Ministry Order no. 49/2004 regarding the approval of the technical requirements for the protection of the environment, and in particular of the soil, when sewage sludge is used in agriculture (published in Official Monitor no. 66/27.01.2004), which transposes the provisions of the Directive 86/278/EEC regarding the environment protection, and in particular the soil protection provisions, when sewage sludge is used in agriculture</p>
<p>Council Directive 98/83/CE of November 3, 1998 on quality of water intended for human consumption</p> <p>Amended by 303R1882</p>	<p>Law no. 458/08.07.2002 on the drinking water quality published in Official Monitor no. 552/29.07.2002</p> <p>Law no. 311/28.06.2004 to amend the Law no. 458/2002 (published in Official Monitor nr. 552/29.07.2002) regarding drinking water quality published in Official Monitor nr. 582/30.06.2004</p> <p>Government Decision nr. 974/15.06.2004 regarding the approval of the monitoring, sanitary inspection and drinking water quality norms, and the procedure for sanitary authorizations to use and store drinking water published in Official Monitor no. 669/26.07.2004</p>
<p>Directive 2000/60/EC of the European Parliament and European Council of October 23, 2000 establishing a framework for Community action in the field of Water policy.</p> <p>Amended by 301D2455</p>	<p>Water Law no. 107/25.09.1996 published in Official Monitor no. 244/08.10.1996</p> <p>Law no. 310/28.06.2004 (published in Official Monitor no. 584/30.06.2004) to amend the Water Law no. 107/25.09.1996 (published in Official Monitor no. 244/08.10.1996)</p> <p>Government Decision no. 472/09.06.2000 (published in Official Monitor no. 272/15.06.2000) regarding the measures to be taken for the aquatic environment quality</p> <p>Ministry Order no. 281/11.04.1997 regarding the approval of the procedure for the access mechanism to information on water management, published in Official Monitor no. 100 bis/26.05.1997</p> <p>Ministry Order no. 913/15.10.2001 regarding the approval of the framework of the Water Management Plan with regard to hydrographical basins (unpublished)</p> <p>Ministry Order no. 1146/10.12.2002 on the approval of norms for reference objectives to classify surface waters published in Official Monitor no. 197/27.03.2002</p>

Table 3: Water and wastewater legislation relevant for the project

Law / Gov. Decision	Name	Short description
Law no. 458/2002	Law on drinking water quality published in Official Monitor no. 552/29.07.2002	The law sets the maximum allowable limits for microbiological, chemical and quality parameters; parameters for control monitoring, audit monitoring; minimum sampling frequency and analysis of drinking water distributed through public system, mobile reservoir or used as a source in food industry and for bottled drinking water.
Government Decision no. 100/2002	Quality norms to be met by surface water used for abstraction of drinking water – NTPA-013 published in Official Monitor no. 130/19.02.2002	The norms regulate the quality requirements which fresh surface waters intended for abstraction of drinking water must meet after adequate treatment. The norms do not apply to groundwater and brackish water. Surface waters are classified under three categories, each of which corresponds to a standard level of treatment and physical, chemical and microbiological characteristics.
Government Decision no. 101/1997	Special norms on the characteristics and dimensions of sanitary protection areas published in Official Monitor no. 62/10.04.1997	It establishes special norms on the characteristics and dimensions of sanitary protection areas around water sources, catchment works, constructions and water supply installations. It establishes measures for the use of land located within the hydrological protection area.
Government Decision no. 472/2000	Government's resolution on protection measures of quality of water resources published in Official Monitor no. 272/15.06.2000	It establishes protection measures of surface water and groundwater resources and aquatic ecosystems with a view to improve and maintain their natural quality to avoid negative effects on environment and human health, in the context of sustainable development.

3.2. Institutional framework assessment

The Small and Medium Town Investment Development (SAMTID) Program was prepared and implemented under the EU pre-accession arrangements and it aimed to develop the institutional capacity of national and local authorities that are responsible for the local infrastructure. The main national organizations overseeing the institutional development and investment program in this sector are: the Ministry of Environment and Water Management, the Ministry of Administration and Interior and the Romanian Water Association.

Together with the discipline of the legal framework, the goal of the SAMTID program was to group a large number of weak services providers in a limited number of big and strong operators, capable of providing better services at affordable levels of tariffs, which ensure full cost recovery and loan reimbursement for local authorities.

The municipalities included in the program were pooled together in **Associations of Municipalities (AoM)**, representing collaborative structures established to allow local authorities to better monitor and supervise the implementation of the rehabilitation and modernization works, as well as the performance of the **Regional Operator**. In

this regard, a Management Support Unit (MSU) was established at the level of each AoM in order to act as the representative of the association and to monitor the financial and operational performance of the RWC, via the concession contract. Mirroring this situation, a Project Management Unit (PMU) was established in each RWC for at least the duration of the investment projects.

The regionalization is, in fact, regarded indispensable to the extent that the Sectorial Operational Program for Environment (SOP Environment) conditions the provision of grant financing in the water and wastewater sector to the establishment of Regional Water Companies. “The regionalization process represents an essential element for achieving the environmental acquis in the water and wastewater sector, as experienced water companies are needed in order to accomplish the investments and to guarantee the operations” (Ministry of Environment and Sustainable Development, 2007).

In the case of Cluj – Sălaj Project, the challenge is to be the third-largest operating company from Romania, extending its expertise into different parts of Cluj and Sălaj Counties to translate the objectives of SOP Environment Priority Axis 1 in higher life quality for the citizens. Therefore, in the hydrographical basin Someș – Tisa, the County Councils from Cluj and Sălaj, and the Local Councils from Dej, Gherla, Huedin, Zalău, Șimleul Silvaniei, Jibou and Cehu Silvaniei have established the AoM called ***Asociația Regională pentru Dezvoltarea Infrastructurii în Bazinul Hidrografic Someș – Tisa*** (Regional Association for the Infrastructure Development in Hydrographical Basin Someș –Tisa).

The RWC that was set up to operate in this area is ***S.C. Compania de Apă Someș S.A. Cluj*** (CASSA) (Someș Cluj Water Company); it resulted after the transformation of R.A.J.A.C. Cluj in a commercial company. Also, on the basis of a delegation management contract, the company started to supply water and sewerage services to the other towns and in the long term, it hopes to become the provider of water and sewerage services within the whole Someș River basin (Ciomoș, 2010).

3.3. Socio-economic assessment

From the socio-economic prospective, the project will contribute to the improvement of the quality of life for the population living in the service area by ensuring the access to quality potable water and sanitation services:

- 96% of the population will have access to compliant drinking water supply after project implementation, compared to 69% before.
- 79% of the population, instead of 75%, will be connected to a sewerage system.
- All wastewater discharged into centralized sewer networks will be treated in compliance with the EU standards.
- The hygienic conditions and the health situation in the project region (safe drinking water will contribute to reduce health risks, especially for children) will be improved.
- The project achieves cost savings for the future users by avoiding the cost for well pumping and septic tank cleaning.

- The project directly creates new jobs during the construction phase.
- The project stimulates economic growth by the general improvement of the infrastructure in the region.

Wastewater disposal and treatment according to the European standards will contribute to improve the hygienic conditions in the towns and in the environment through the reduction of the wastewater exfiltration from faulty sewers into the ground and the improved quality of effluents of the Wastewater Treatment Plants. This will also have a positive impact on the health situation in the project region.

3.4. *Technical and design issues*

There are numerous standards and guidelines related to the design and construction of water and wastewater facilities. At the planning stage of the project, there are three key norms to be considered, as described in the table below.

Table 4: Short description of the most important technical issues

Technical norms	Name	Short description
NTPA – 001/2002	Technical norms establishing the pollution load limits of industrial and urban wastewater discharged into natural receiving waters, NTPA – 001 published in Official Monitor no. 187/20.03.2002	The norms set the pollution load limits of industrial and urban wastewater discharged into natural receivers; introduces restrictions on the disposal of wastewater, pollution load limits for industrial and urban wastewater discharged into natural receivers. It sets the method to establish the acceptable limit values of pollutants in wastewater discharged into natural receivers.
NTPA – 002/2002	Norms on discharging conditions of wastewater into sewerage systems of localities and directly into wastewater treatment plants, NTPA – 002, published in Official Monitor no. 187/20.03.2002	They set the main quality parameters/indicators for wastewater, acceptable conditions for discharge and restrictions for discharge of wastewater into sewerage systems and/or directly into municipal and urban wastewater treatment plants.
NTPA – 011/2002	Technical norms on the collection, treatment and disposal of urban wastewater, NTPA – 011, published in Official Monitor no. 187/20.03.2002	The norms stipulate regulations for collection, treatment and disposal of urban wastewater; design, construction and maintenance requirements for sewerage systems and wastewater treatment plants; prescriptions for discharge of urban wastewater from urban wastewater treatment plants and in sensitive areas subject to eutrophication (parameters/ quality indicators, concentration and reference determination method); industrial sectors and enforcement conditions. They establish the monitoring program and procedures of discharges of urban and industrial wastewater from wastewater treatment plants into natural receiving waters: sampling practices, the minimum number of samples, quality criteria, maximum number of samples which can exceed quality criteria and reporting obligations.

3.5. Environmental impact assessment

The documentation required by the Local Environmental Protection Agencies, comprises: i) Technical Fiches; ii) Technical Memoirs for the first Project Phase; iii) Reports to the Environment Impact Assessment Studies. The mentioned documents contain, in different degrees of details, the evaluation and description of the environmental impact assessment for every environmental factor: emissions in the atmosphere, wastewater discharges, impacts on biodiversity, impacts on human health, noises and odors, aesthetic and disturbances during construction.

3.6. Economical and financial assessment

The main international organizations funding the investment projects in the water sector are: European Union, European Investment Bank, European Bank for Reconstruction and Development, and International Bank for Reconstruction and Development. This is the reason way, the financial Cost–Benefit Analysis (CBA) was carried out in accordance with the general principles laid down in the EU Guidance, applying the “incremental method” and based on a period of 30 years. In order to determine the incremental cost and incremental benefits, two basic scenarios were designed: “with-project” and “without-project”. The “without-project” scenario assumes a reasonable set of parameters and actions that could be expected in the absence of the project (including, but not limited to, maintenance and repair cost, small replacement investments, water sales, tariffs etc.). The “with-project” scenario considers the project investments and their impacts, such as improvements achieved in service level, non revenue for water, collection efficiency, tariffs and other items. The incremental values result from the difference between the “with-project” and the “without-project” scenario (EU and Government of Romania, 2010).

In the Cluj – Sălaj investment project, the financing gap analysis was carried out based on incremental values using Euros in constant prices and applying a real discount rate of 5%.

4. Planning investments in Cluj-Sălaj

As part of the project preparation, a Master Plan for the entire area of Cluj and Sălaj counties was developed to identify the most urgent investments. The overall objective of the Water and Wastewater Master Plan (WWMP) was to provide the RWC with a strategic plan for development over a 30 years horizon, taking into account the financial, social, demographic and environmental considerations.

The WWMP comprises a series of phased future capital investments and technical measures required to comply with the statutory obligations of RWA: to provide water and wastewater services to the entire population from its service area and to develop as a self-sustaining and viable utility. Specific points addressed by the WWMP are: background of the area, existing water and wastewater system layouts, development objectives, water supply and wastewater demand. Using this forecast, the WWMP

outlines works required to meet the objectives defined above. Each element of the plan is justified in financial and operational terms, and, where appropriate, alternatives have been given.

The main components of the Feasibility Study are:

1. Improvement of Water Abstraction Facilities;
2. Improvement of Water Treatment Works;
3. Improvement of Water Distribution Network;
4. Improvement of Sewer Collection Network; and
5. Improvement of Wastewater Treatment Facilities.

The main outputs expected from the project measures, expressing improvements envisaged in the water supply and the wastewater drainage and treatment sectors, are: new and rehabilitated transmission pipelines, rehabilitated and new distribution and sewerage pipelines, new and rehabilitated pumping stations, rehabilitated water and wastewater treatment plants, new chlorination plants and new reservoirs.

The total target population of the project is about 520,000 inhabitants of which 96% are expected to benefit from the proposed improvements of water supply facilities and 79% are expected to benefit from improved drainage and wastewater treatment facilities.

5. Execution and controlling

The most important issue in the execution phase (currently on-going) is to ensure that project activities are properly done and controlled. During the execution, the planned solution is implemented in order to solve the problem specified in the project's objectives. This can be also called the Procurement of the Works and Services. After the tendering process, once the winning contractors are awarded, the construction stage follows. An important role is credited to the works supervision, performed by specialized entities. They are responsible to ensure that the project becomes real.

6. Completion

In this last stage, the project is brought to its proper completion. The closure phase is characterized by a written formal project review report, containing the following components:

- a formal acceptance of the final product by the Regional Water Company;
- Weighted Critical Measurements (matching the initial requirements specified by the RWC with the final delivered product); and
- a formal project closure notification.

The testing and commissioning of the new or rehabilitated water and wastewater treatment plants is also part of this phase. During this time, the final beneficiary's staff will be trained to achieve sufficient capabilities and skills to operate these facilities on a sustainable basis.

7. Conclusions

Project practitioners in SEE economies are typically caught in the middle of two opposing forces: the forces of tradition are pulling from one direction, and from the other are the forces of the modern management and globalization.

Project management professionals have traditionally measured success in terms of accomplishing a task on time, within budget and according to technical specifications. Time spent up front in defining stakeholder needs, exploring options and modeling, testing and examining different benefits is central for producing a successful project. The expanding viewpoint of the project management is focused on meeting and exceeding clients' and citizens' expectations, getting the best value for money and shortening implementation schedules. In other words, the strategic context, those legal, economic, technical, environmental and social factors operating in the background must be addressed.

As changes occur, the project manager's strategic considerations also change. A project context that is enabling at one point in time or one stage of the project cycle can become highly non-conducive at another.

Therefore, it is essential that project managers adopt a "flexible management" approach that will allow the project to remain relevant and responsive to the strategic context over time. The project manager and other project staff need to be flexible in the sense of continuously monitoring the strategic considerations, and being prepared to adjust implementation in response to changing conditions, within the overall structure and objectives of the project.

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