Potable Water Supply

General overview of the sector
By the end of the Lebanese war, potable water installations were limited to half completed networks in main cities and smaller networks in the rest of the regions. The inadequacy of this service began to show accompanied by the aggravation of the underground and surface water pollution problem as a result of random wastewater infrastructure, thus threatening the environment and citizen’s health. The insufficient service of potable water has many reasons, mainly:

1- An increased demand of water and the incapacity of existing networks
2- Increase in water loss as a result of network deterioration
3- Absence of means to protect water from pollution (random wastewater infrastructure, industrial and agricultural pollutants…)
4- Insufficiency of consumption in both water and wastewater sectors, i.e. scant investment necessary to improve and modernize installations and developing them to the required service and environmental levels.
5- Non development of an adequate administrative and executive structure in the sector to accompany the urgent increasing needs for potable water service and wastewater and the application of new methods adopted in the administration and in modern technologies of water purification.

To put up with such a difficult reality, the Lebanese government started in 1992 to act in several fields:

1- Execution of urgent rehabilitation activities for existing equipments relative to water sources and other networks and pumping and purification stations, and solving all existing or upcoming problems.
2- Completion, expansion and rehabilitation of networks according to needs.
3- Development and increase in water sources and limiting the water comedown and thus increase nutrition average.

In other words, this sectoral action plan aims at completing rehabilitation and expansion of potable water in all Lebanese regions and increase water sources to put an end to the deficit expected and that through large projects like building dams and mountain lakes.

However, on the institutional level, the promulgation of Law 221/2000 was an essential step towards restructuring and modernizing both water and wastewater sectors; as it determined the water public properties (surface and ground) and assigned water administration (potable water, irrigation, wastewater) to 4 public institutions (excluding the Litani river which remained under the authority of the Litani National authority to exploit its water for irrigation in South Lebanon and West Bekaa) into which it integrated all water departments, under the tutelage authority of the Ministry of Energy and Water. In 2001, boards of administration for water institutions were appointed. In 2005, new regulatory and structural decrees were issued and work started on their application, in order to reach many objectives mainly rehabilitating and improving the service of these institutions, the expansion of coverage and the maintenance of administrative stability and financial equilibrium of these institutions.

In parallel with the aim of the government to involve the private sector in the management of these establishments, the Ministry of Energy and Water commissioned a French company to study the ways for the private sector to participate in the management of Beirut and Mount Lebanon Water Establishment. Furthermore, the Ministry authorized the CDR to award contracts for the management of the other regional water establishments.

Main achievements in the sector (1992-2012)
At the end of the civil war in Lebanon, the water projects implemented by the CDR aimed to fulfill national objectives; they included:

- Emergency rehabilitation program for water authorities
(National Emergency Reconstruction Program – NERP – first year) At a cost of US$ 60 million, financed by the World Bank and the European Investment Bank, the program aimed at the rehabilitation of networks and equipment of potable water supplies for 19 potable water authorities.

- Rehabilitation and expansion of potable water treatment plants, pumping and chlorination stations in the regions: The program covered projects for the rehabilitation and expansion of seven main potable water treatment plants in Zahle, Kfar Halda, Tripoli, Jbeil, Kousba, Ras el Ain and al-Bass (Sour). It also covered rehabilitation of 200 pumping stations located in all Lebanese regions. The cost of this program started in August 1996, amounted to approximately US$ 54 million and was funded by the financial French-Lebanese Protocol.

- Technical assistance to the Ministry of Energy and Water: A technical assistance project of 30 million FF, funded by the financial French-Lebanese Protocol was completed. Under this program assistance was provided to the Ministry of Energy and Water and to major water authorities in the form of capacity building, institutional development and supply of necessary equipment.

In parallel with the beginning of execution of these programs at the national level, the CDR focused on the development of water treatment plants in all Lebanese regions. These projects are detailed below according to the distribution of governorates, as follows:

**Greater Beirut area**

NERP: Several contracts have been awarded regarding the rehabilitation and construction of potable water supply systems in the Greater Beirut area, for a total cost of US$ 45 million, financed by Kuwaiti Fund for Arab Economic Development – KFAED. These contracts included the following works:

- Rehabilitation of water sources, such as Qashkoush, Ain al Delbe springs and Daychounieh wells
- Rehabilitation of Daychounieh and Hazmieh potable water treatment plants
- Rehabilitation and construction of potable water supply and distribution networks in the Greater Beirut area.

Expansion of Dbayeh potable water treatment plant (First phase): the capacity of Dbayeh potable water treatment plant has been increased to 430000 m3 per day. This project was financed by the Italian-Lebanese Protocol, with a total amount of US$ 5.7 million.

In addition to these projects, and within the framework of the Beirut infrastructure rehabilitation, the water supply and distribution networks were rehabilitated and upgraded in streets covered by this project.

**Bekaa and Baalback Hermel Governorates:**

- Baalback-Nabi Sheet potable water supply and Baalback wastewater network: the contract amounting to US$ 32 million was financed by the World Bank. By virtue of this project, the rehabilitation of potable water reservoirs, pumping stations and installation of distribution pipes were completed, digging and installation of wells in the region of the project, as well as generating a wastewater discharge network in Baalback.

- Baalbeck-Nabi Sheet domestic connections and additional distribution lines: the contract amounts to about US$ 1.25 million was financed by the World Bank.

- Construction of wastewater and additional potable water distribution pipes in Baalback and Amshki: these works are considered to complete the project on potable water distribution and wastewater pipeline network construction for Baalback-Nabi Shit region mentioned above; through it a pipeline network to distribute potable water and execute domestic connections and wastewater networks at a cost amounting to about US$ 11.7 million financed by the World Bank.

- Construction of wastewater and additional potable water distribution pipes in 17 villages in Baalback district: these works are considered to complete the project on potable water distribution and wastewater pipeline network construction for Baalback-Nabi Shit region mentioned above; through it a pipeline network to distribute potable water and execute domestic connections and wastewater networks at a cost amounting to about US$ 12.2
million financed by the World bank.

- Yammouneh potable water supply: the contract amounts to US$ 11.9 and was financed by the Islamic Development Bank (IDB). This project includes the construction of a dam for capturing of the Yammouneh spring water and installation of 76 kms long of water supply pipes, 246 kms long of water distribution pipes, and construction of 23 new water reservoirs and two artesian wells.

- Ouyoun Orghosh potable water supply: the contract amounts to US$ 7.8 million financed by IDB. This project includes the installation of pipes for the supply of water from Qabua and Shemali springs, 72 kms of supply pipes, 110 kms of distribution networks and construction of 18 new water reservoirs.

- Habilitation and expansion of potable water systems in Bekaa governorate (North-West Bekaa) Third stage of Phase 1: this project includes the drilling of wells and distribution networks. The cost of the project is of US$ 13.4 million locally funded by virtue of Bekaa Development Decree number 12919, dated 27/8/1998.

- Installation of potable water conveyor lines to al-Bustan and al-Harf from spring waters of Nassara and Harik: the contract amounts to US$ 2 million and was funded by the Kuwaiti Fund.

- Execution of irrigation works in Hermel region: the contract amounts to about US$ 1 million funded by the Kuwaiti Fund for economic and social development

- Al-Yammouneh infrastructure: this project includes the construction of potable water supply and wastewater networks, in addition to a wastewater treatment plant in al-Yammouneh. The works amount to US$ 3.96 million financed by the IDB.

- Domestic connections for the regions covered by Yammouneh-Ouyoun Orghosh potable water systems: by virtue of this project, domestic connections are being set up for all villages that benefited from the Yammouneh-Ouyoun Orghosh projects, which were achieved as shown above; the project amounts to approximately US$ 6.5 million through local funding, by virtue of Bekaa Development Decree number 12919 dated 27/8/1998 and 95% of works have been achieved until today.

- Shmistar potable water supply: this project was estimated at approximately US$ 4.5 million, aiming to provide potable water to Shmistar region and its surroundings.

- Execution of water supply networks and potable reservoirs for some regions in Bekaa governorate: amounting to US$ 1.1 million, funded by the Arab Fund for Economic and Social Development.

- Work execution project of potable water network in Jrebeta in Baalback: amounting to US$ 1.4 million, locally financed.

- Project of provisioning villages in Baalback district (north east part) in potable water – first and second lots: this project is executed in 3 parts to supply potable water to the regions along Hadeth – Arsel, reaching Kaa region in North Bekaa, with the execution of reservoirs and distribution networks. The project amounts to about US$ 13 million through local funding.

- Execution of distribution lines and additional potable networks and domestic connections in Baalbeck, Khodr, Nabi Sheet and Kherbe: amounting to US$ 4.9 million, funded by the International Bank for Construction

**Akkar Governorate**

- Potable water supply network for Kobayat Water Authority and Akkar Wastewater Network: the contract amounts to US$ 14.8 million, financed by the European Investment Bank; it included the execution works of wells and reservoirs and pumping stations as well as potable distribution pipes.

- Potable water supply network for some villages in Akkar provided from wells: the contract amounts to US$ 4 million, financed through a grant from the Kingdom of Saudia Arabia.

- Akroum and Kfartoun potable water supply: the contract value is of US$ 6.6 million, financed by the Saudi Fund for Development. It included a limitation of Sabeh spring and the execution of wells, reservoirs, pumping stations and potable water pipe lines.

- Installation of potable water supply for Beit Mallat and surrounding villages in Akkar: the project covers the installation of reservoirs, potable water supply pipes and pumping
stations. The value of the contract reached approximately US$ 19.5 million, jointly funded by the IBD and OPEC International Development Fund.  
- Execution of works for Ain Yacoub potable water supply: the contract amounts to US$ 5.9 million funded by the Saudi Fund for Development; it included the execution of reservoirs, a pumping station and pipes.  
- Installation of potable water in Barghash-Hrar, Kaf al Tineh, Kobaait in Akkar: the contract is estimated to US$5.8 million funded by the Saudi Fund for Development. This project includes the execution of the limitation of Kaf al Tineh spring, establishing local reservoirs and a main reservoir, pumping stations and transmission lines.  
- Supply potable water to Akkar al-Atika region: this project aims at supplying Akkar al-Atika region and its surroundings with potable water. The works included limitation of springs, establishing local wells and a main reservoir, pumping stations and transmission lines. The works amount to US$ 7.6 million, through local funding.  

**North Governorate**  
- Installation of potable water supply networks for Tripoli Water Authority and Tripoli wastewater networks: the contract amounts to US$ 34 million, financed by the European Investment Bank. Works were expanded to include construction of potable water reservoirs to meet the needs of the population until the year 2025. The project is currently in operation.  
- Renewal of water networks and domestic connections in Tripoli: the value of the project is 7.4 million euro and is funded by the AFD.  
- Expansion of Bahsas water treatment plant: this project includes upgrading the capacity of Bahsas water treatment plant from its present capacity of 40000m3 per day to 70000m3 per day. The value of the project is US$ 4 million; it is funded by the AFD.  
- Minyeh potable water supply: the project aims at supplying Minyeh and surrounding villages with potable water. The project amounts to US$ 1.8 million and is financed by the Saudi Fund for Development.  
- Equipping two wells of Deir Aamar and Nabi Yousha in the north: amounting to US$ 862 thousand through local funding.  
- Execution of water works in various regions of Zgharta: amounting to an approximate value of US$ 1.7 million, it is financed by the Kuwaiti Fund for Arab Economic Development.  
- Installation of potable water supply networks for Batroun Water Authority and some wastewater networks: the contract amounts to US$ 20.5 million, financed by the European Investment Bank.  
- Arranging Abi Yaghi well and its annexes in Batroun: amounting to US$860 million, through local funding.  
- Execution of water supply pipe lines for water purification station in Kousba, Koura district: contract amounts to US$387 million, through local funding.  
- Tripoli Water Authority Management contract: This contract is considered to be part of the Government’s efforts to restructure the water sector and to involve the private sector in its operation. The Tripoli Water Authority Management contract awarded to a French firm reached 8.9 million euro, financed by the French Development Agency. The management contractor is operating and managing Tripoli Water Authority installations and facilities, as well as billing and collection of water fees, in addition to operating and managing the human and financial resources of Tripoli Water Authority. Furthermore, the management contractor will supervise the rehabilitation of Tripoli water supply network including increasing the capacity of Bahsas water treatment plant from its current capacity of 40000 m3 to 70000m3 per day.  
- Development contract and improving performance and enlarging utilization client management program X7 for North Lebanon Water Authority: this contract is also considered as part of the Government’s efforts to reorganize and redevelop the water sector in Lebanon. The contract amounts to about 400 thousand Euros, funded by the AFD.  

**Mount Lebanon Governorate**  
- Potable water supply to Keserwan coastal region from al-Madik spring: the value of the project amounts to US$ 76
million funded by the Japanese Bank for International Cooperation (JBIC). The work contract was signed in June 2001 and included: construction of the Madik spring water captage dam; installation of main water piping (through a tunnel) to Keserwan coastal region; construction of main water reservoirs and potable water distribution networks for Keserwan coastal region.

- Potable water supply networks and wastewater networks in Chouf and Metn regions: the contract amounts to US$ 25 million, financed by the World Bank. The project includes the construction of 22 water reservoirs, installation of conveyor pipes and potable water distribution networks, in addition to wastewater networks.

- Rehabilitation of infrastructure in displaced villages: rehabilitation works and installation of potable water networks in the displaced villages of Baabda, Aley and Chouf districts have been carried out by the Saudi Fund for Development and reached US$ 7.15 million.

- Convey Ra’ayan spring water to Aley main water reservoir: this project will convey about 12000m3 of water per day from Ra’ayan spring to Aley main water reservoir. The project amounts to US$ 15 million financed by the Kuwaiti Fund for Arab Economic Development.

- Execution of various water works in Barouk region: this project amounts to US$ 5.25 million; it is financed by the Kuwaiti Fund.

- Rehabilitation of wells and execution of wastewater installations in Ain el Delb: this project amounts to US$ 4.15 million; it is financed by the Kuwaiti Fund.

- Nahr Ibrahim water conveyor – Jbeil plant: this project is financed locally and amounts to about US$ 2 million.

- Qattine-Azar potable water supply: this project amounting to approximately US$ 4.25 million aims at exploiting Qattine spring water to supply potable water to the upper areas of Metn and is financed by the Kuwaiti Fund for Arab Economic Development.

**South and Nabatiyeh Governorates**

- Rehabilitation, improvement and equipment of Taybeh potable water treatment plant (phases 1 and 2): executed operations amount to about US$31.50 million distributed in two stages: 1st stage amounting to about US$23.40 million funded by the Islamic Bank for Development and aims at installing a potable water treatment plant. Upon completion of works the plant will be capable of treating 25000m3 per day of water and pumping it through potable water networks operated by Jabal Amel Water Authority. The 2nd stage amounting to US$ 8.15 million aims at executing rehabilitation works of old constructions and providing electric power, operation and maintenance through local funding.

- Execution of potable water conveyor lines from Nabeh al-Taseh to Nabatiyeh region: this project aims at increasing the capacity of potable water and services in this region. The project amounts to approximately US$ 5.2 million and is funded by the French Agency AFD.

- Digging and installation of 4 wells and reservoirs and potable water network in Nabatiyeh region: amounting to approximately US$ 2 million, funded by the European Union.

- Execution of potable water in al-Habbariyeh region in Hasbaya:
the project amounts to approximately US$ 10.2 million and it is financed by the French Agency.
- Execution of potable water works of Jabal Aamel water installations in Marjeyoun and Bint Jbeil amounting to about US$ 12.15 million, funded by the Islamic Bank for Development.

**Progress of works in ongoing projects**
**Bekaa and Baalback Hermel Governorates**
- Rehabilitation of water supply systems in West Bekaa and villages in east Zahlé (first lot): financed by World Bank, amounting to US$ 13.7 million and includes the construction of pumping stations, purification and water reservoirs, installation networks, domestic connection distribution in many villages of West Bekaa and Zahlé districts; and about 90% of works have been achieved.

**North Governorate**
- Execution project of water works in Koura and Tripoli regions: the value of the project is approximately US$ 7.9 million, it is funded by Italy and 60% of works have been achieved until today.
- Execution of Barissa Hill Lake dam: the project aims to supply potable water and irrigation to villages in the upper parts of Minyeh-Danniyeh district. The project is funded by the Saudi Fund for Development through a grant offered by the Kingdom of Saudi Arabia, it amounts to US$ 14.25 million, 95% of works have been achieved.
- Completion works of water projects in Batroun district (or what is known by Sad El Fajwat): amounting approximately to US$ 4.32 million, funded by the Kuwaiti Fund for Arab Economic Development and about 75% of works have been achieved.

**Main contracts awarded during 2011**
- Rehabilitation and development of Nabatiyeh district water supply: the project amounts to about US$ 4 million funded by Abu Dhabi Fund for Development

**North Governorate**
- Execution of water supply networks from Nabeih al-Aasal to Bhannes reservoirs – Phase 1: this project amounts to approximately US$ 7 million, it is financed by the Kuwaiti Fund and about 95% of works have been achieved.

**Greater Beirut**
- Provisioning Greater Beirut in potable water: this project aims at constructing a dam in Bisri region and conveying potable water after purification to Greater Beirut from al-Awali River. It is a vital project to meet needs of people living in Greater Beirut region in potable water for the coming years. The cost of the first phase of this project (supplying water to Beirut) is of about US$ 370 million, and its second phase (construction of Bisri dam) is of about US$ 250 million. The World Bank has agreed to finance the first part of the project amounting to US$ 200 million and the Islamic Bank for Development will finance the second phase amounting to US$ 70 million, it is expected that the Saudi Fund participates with US$ 60 million and the Lebanese Government and Beirut and Mount Lebanon Water Authorities will ensure the remaining funds to start execution of the first phase of the project expected by the beginning of 2013.
Bekaa and Baalbeck-Hermel Governorates
- Habilitation and expansion of potable water systems in West Bekaa and villages of East Zahle district: this project includes the drilling of wells and distribution networks to most villages in West Bekaa and East Zahle district. The cost of the project is estimated at about US$ 52 million, an economic and environmental feasibility study of the project was carried out and execution of the works of the first phase has started and the execution of second and third phases is expected to start during fall 2012. The World Bank will take part in financing this project through a grant of US$ 15 million, in addition to the Kuwaiti Fund for Development through a grant of US$ 37 million for second and third phases.
- Potable water supply to Zahle region: this project includes the construction of water reservoirs, supply of potable water and distribution networks and pumping plants to Zahle. The cost of the project is estimated at about US$ 30 million, and it is expected that the Kuwaiti Fund with finance the project, and it is expected that works will start during spring 2014.

North and Akkar Governorates
- Water network of Barghash-Hrar, Kaf al Tineh, Kobait in Akkar: this project includes establishing reservoirs, and construction of main transmission lines for potable water to supply nearly 25 villages. The contract amounts to US$ 12 million and financed by the Arab Fund for Development and works are expected to start during the last quarter of 2012.
- Installation of potable water supply for Akkar plains: the project covers the installation of reservoirs, potable water supply pipes and pumping stations for all Akkar plain villages. The value of the contract amounts to US$ 58 million, and is funded by the Islamic Bank for Development and works are expected to start during the third quarter of 2013.
- Completion of water network projects of Qalamoun within North Water Authority: cost is expected at about US$ 5.4 million financed by a grant from the Italian Government. Works are expected to start during the second half of 2012.
- Rehabilitation and restoration of water systems in Becharre region: this project includes the supply of potable water to Becharre and surrounding villages from Qadisha spring, and drilling of several artesian wells, rehabilitation and expansion of water supply networks and domestic connections as well as construction of water reservoirs. The project amounts to US$ 9 million and is financed by the Arab Fund for Development, and it is expected that works will start during the first half of 2013.
- Rehabilitation and expansion of water systems in Chekka and Anfe: the project covers the supply of potable water to Chekka and Anfe-Hreishe through the drilling of several artesian wells in Jaradeh area, rehabilitation and expansion of potable water supply networks, domestic connections and construction of reservoirs. The project amounts to US$ 7.5 million and is financed by the Arab Fund for Development, and it is expected that works will start during the second half of 2012.
- Completion of rehabilitation water systems in Minyeh-Danniyeh: this project aims at completing the water system works executed by the Ministry of Energy and Water during 1998 – 2002, and of which 7 parts form the project and are not yet exploited. After the Italian government expressed its will to finance these works estimated at approximately US$ 7.5 million, the CDR started to conduct the necessary studies and works are expected to start during the first half of 2013.
- Completion of water systems in Minyeh: this project aims at completing the water system works executed by the CDR and of which parts are still unexploited. It is expected that works will start by the end of 2012, with an estimated cost of about US$ 11 million funded by the Saudi Fund for Development.
- Completion of water networks projects in Koura and Fouar regions, within North Lebanon Water Authority: cost is expected at about US$ 4 million financed by a grant from the Italian Government. Works are expected to start by the end of 2012.

Mount Lebanon Governorate
- Improvement of Jbeil district potable water supply: The cost of this project is estimated to about US$ 25 million and is funded by the Lebanese-Italian financial Protocol. Currently, the required
upgrading studies are being conducted, and it is expected that invitation to tender for execution will be issued during the second half of 2013.
- Construction of Qaysmani dam in Baabda district: this project aims at supplying Baabda and Aley with potable water. The capacity of the dam is about 550 thousand m3 thus supplying the two district with 6000m3 water per day. The project is estimated to cost about US$ 20 million, and it is expected that works will start during 2012.
- Construction of a lake in Jbailiyeh-Manzoul in Matn district: this project aims at supplying the district with potable water. The project is estimated to cost about US$ 15 million, financed by the Kuwaiti Fund and it is expected that works will start during 2013.
- Project of restriction of Barouk and Kaa’t springs in Chouf district: this aims at increasing Chouf and Aley regions with potable water. The project is estimated to US$ 3 million and is funded by the Arab Fund and works are expected to start during the third quarter of 2013.

**South Lebanon and Nabatiyeh Governorates**
- Execution of several water works within liberated regions in South Lebanon: The cost of this project is estimated to about US$ 6 million and will be funded by the AFESD. It is expected that works will start during the second half of 2013.
### Table of main contracts signed during 2011

<table>
<thead>
<tr>
<th>Project name</th>
<th>contract amount (US$)</th>
<th>Funded by</th>
<th>Expected</th>
<th>achievement date</th>
</tr>
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<tbody>
<tr>
<td>Rehabilitation and development of Nabatiyeh district water supply</td>
<td>3,920,412</td>
<td>Abu Dhabi Fund for Development</td>
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<td>February 2013</td>
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### Table of main projects under preparation (2012-2014)

<table>
<thead>
<tr>
<th>Project name</th>
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<th>Funded by</th>
<th>Expected</th>
<th>achievement date</th>
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<tr>
<td>Execution of first elements of project of Nahr el Awali-Beirut water conveyor</td>
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<td>World Bank</td>
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<td>Construction of Bisri dam completing distribution al-Awali water to Beirut project</td>
<td>280,000,000</td>
<td>Islamic Bank (financed US$ 70 million) Saudi Fund (promised US$ 60 million)</td>
<td>November 2014</td>
<td>November 2018</td>
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<tr>
<td>Rehabilitation and expansion of potable water systems in West Bekaa and villages east Zahle district – second and third phases</td>
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<td>Kuwaiti Fund</td>
<td>(managed and executed by the funding party)</td>
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<td>Kuwaiti Fund (promised)</td>
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<td>Fund/Source</td>
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<td>End Date</td>
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<td>Completion of water systems in Danniyeh</td>
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<td>Qaysmani dam in Baabda district</td>
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