



# **Project Local Energy Centers (LEC)**

**Cogeneration Technology**

**Nord-West Tel-Aviv Jaffa – Plan 3700**

**Request for Information (RFI)**

**Israel**

**Tel Aviv Jaffa - 2017**



## **Outline:**

### **Executive Summary**

#### **General**

1. The policy of the Tel Aviv Jaffa municipality in the area of sustainable energy
2. The purpose of the RFI
3. Description of Tel Aviv- Jaffa Urban Design Plan 3700 (North-West Area)
4. The design principles of energy production and supply to the consumers
5. Planned deployment of local energy centers
6. Local Energy Center configuration and reliability requirements
7. Neighborhood's data to define the LECs
8. Requested data
9. Attachments



### **Executive Summary**

The Tel Aviv-Jaffa Municipality promotes a modern energy policy, including the integration of diverse energy sources, energy management and energy efficiency.

The issue is particularly evident in the development of new areas, the largest and most important of which is the northwest of the city under the new statutory plan No. 3700.

In the Plan 3700, the municipality designs to supply all energy needs, including electric and thermal energy, from local energy centers (LEC).

The municipality is asking for relevant information for the planning and construction of Local Energy Centers (LEC), in order to ensure the quality of the principle design and broad participation of lead equipment manufacturers in the future tenders, if it may be required.

The RFI presents the project, the consumption data and other requirements.

The RFI lists requests for relevant information from equipment manufacturers and relevant EPC companies.

### **General**

The information received in response to the application of this request for information (hereinafter: "**the request**") may be used by the municipality in order to learn and establish insights for writing a tender or any other procedure in order to execute the project (if at all) and its implementation and also to study the market status, the factors working inside it, and the solutions to establish the project.

This request represents the first step of learning the subject and the gathering of the information and should not be viewed as a process to choose a manufacturer of any kind.

Also this request does not represent any kind of guarantee from the municipality, including



advertisement of the tender and/or the implementation of any kind of continued work or follow-up activity with any of the responders or at all.

Also, this request does not hold any ground of a promised communication of any kind between the municipality and any of the responders, and it does not grant to any factor any kind of right and/or expectation.

For the avoidance of doubt, it is clarified, that in this procedure the Israeli law will be applied, and the only court that is authorized to discuss this issue is the appointed courthouse in Tel Aviv-Yafo.

The municipality is not obligated to publish in the future a request for information (RFI) or a tender in order to execute this project or any similar one.

As long as the municipality decides to implement the project in the future, the municipality holds all the consideration for itself in the ruling of the procedure and the process of the implementation of the project, its conditions, its pricing and any other subject relating to this project.

Method of submission to this request:

The response to this application will be submitted until 02/10/2017 at 14:00 inside a closed envelope In Tel-Aviv-Yafo Chief City Architect office in Tel Aviv-Yafo, Philon 5 St., room 209 or by sending e-mail to: [babczyk\\_u@mail.tel-aviv.gov.il](mailto:babczyk_u@mail.tel-aviv.gov.il).

On the envelope will be written: "**Local Energy Centers (LEC) - RFI**".

If required, the municipality is allowed to apply to the responders to clarify, add or receive more information and additional material, as long as it may be required.



Questions and clarifications regarding this request:

The responders to this Request for information are entitled to address their questions in writing only until the 14/09/2017 via e-mail: [babczyk\\_u@mail.tel-aviv.gov.il](mailto:babczyk_u@mail.tel-aviv.gov.il)

For the avoidance of doubt, it is important to emphasize that all the expenses that are required in addressing this request for information will be applied on the responders only, and under any circumstances, the responders will not be entitled to any kind of payment or refund due to any expenses or damages that will be caused to them (the responders) due to the response to this request for information.



## **1. The policy of the Tel Aviv Jaffa municipality in the area of sustainable energy**

The Tel Aviv-Jaffa Municipality promotes a modern energy policy, including the integration of diverse energy sources, energy management and energy efficiency.

The issue is particularly evident in the development of new areas, the largest and most important of which is the northwest of the city under the new statutory plan No. 3700.

New plans in the city are committed to sustainable building according to the Israeli and international standards, the use of renewable energy, especially solar engineering in PV technology and other topics.

In recent years, the use of natural gas has expanded in Israel, beyond the use of large power plants, inter alia by using cogeneration technologies.

Climate conditions in Israel, especially along the coastline, require the use of electrical energy for cooling, as part of air conditioning systems.

Refrigeration energy needs in Israel are very high and constitute a significant portion of electricity consumption, especially for commercial consumers, offices, hotels, hospitals and residences.

As an alternative, cogeneration enables the production of electric energy and thermal energy for cooling using exhaust gases fired absorption chillers.

In the case of domestic consumption and hotels, as in the project in question, there is also a demand for hot water supplies (tri- generation).

It is important to emphasize that the Mediterranean Sea submerged natural gas transmission system pipeline reaches the beach southward Reading Power Station, two (2) kilometers from the 3700 project. That means that the source of the gas is very close to the project.



## 2. The purpose of the RFI

In the Plan 3700, the municipality designs to supply all energy needs, including electric and thermal energy, from local energy centers (LEC).

The municipality is currently preparing a business plan for the realization of the projects and the preparation of tenders for the supply, construction and operation of local energy centers.

The municipality is asking for relevant information for the planning and construction of local energy centers (LEC) in order to ensure the quality of the conceptual design and broad participation of lead equipment manufacturers and EPC companies in the future tenders.

## 3. Description of Tel Aviv- Jaffa Urban Design Plan 3700 (North-West Area)

This project extends over an area of about 500,000 m<sup>2</sup> of natural ocean-sand. The area bordered by Namir Rd. from the East, Mediterranean Sea from the West, Unitzman str. from the North and "Sde Dov" Airport from the South. The plan has already been approved and waiting for a detailed plan for high-density buildings with mixt use of about 13,000 apartments including 2,160 affordable housing, combined with 150,000 sq. m of businesses, 70,000 sq. m of commerce, 2,000 hotel rooms and different public buildings.

The new quarter will include green parks, a seafront promenade and all the services that will be required by the new residents of the northern shore of the city.

Plan 3700 will be very important to the development of Tel Aviv-Jaffa in the future, as it is the largest and the most significant unplanned land reserve. The area is divided to five (5) neighborhoods. Four (4) of them (No.1' 2, 3, 4) are located on East and West Micro-Neighborhoods by the Ibn Gvirol str.



This area supposes to include approximately 13,000 apartments,  $100 \div 120 \text{ m}^2$  each, hotels, shopping malls and high-tech industrial areas, as could be seen from the diagrams in Attachment 1.

#### **4. The design principles of energy production and supply to the consumers**

Tel Aviv-Jaffa municipality's authorities decided that the electricity, thermal energy (cold water for the air-conditioning) and hot tap water to the apartments will be supplied from Local Energy Center (LEC) in each from the (9) nine Micro-Neighborhoods (in this step of the design).

The energy production will be based on natural gas combustion in small Co-Generation plants with electricity units that could be Gas Engine-Generators or Gas Turbine-Generators and Exhaust Flue Gas Operated Absorption Chillers with supplementary firing. The selection of the electricity generation units' type should be mainly based on the thermal energy TR consumption.

The electricity supply to the customers will be through the Israel Electric Company (IEC) 22 kV or 0.4 kV distribution grids, so IEC will provide the electricity in case of failure of one or both of the co-generation units (emergency reserve).

As the thermal energy supply' reliability should be very high, each LEC will include two (2) Co-Generation trains and (1) one electrical chiller, thus, the configuration of cold water supply will be  $3 \times 50\%$ . It is assumed that the cold water consumption profile will be at the maximal capacity in the day hours and will drop to half during night time. So, one of the two co-generation trains will run around the clock and the second will be operated in Two Shift Operation mode. The hot tap water will be produced in heat exchangers water/flue gases from the absorption chillers' exhaust.

Each building in the neighborhood should be considered as a customer of electrical and thermal energy of the Local Energy Center. To the residential



buildings and hotels will be supplied hot tap water, as well. This means that in each neighborhood there will be four (4) headers:

- Cold water (for air-conditioning) supply header
- Cold water (for air-conditioning) return header
- Hot tap water supply header
- Hot tap water return header

From each header located near each building will split a branch connection nozzle with valve and flange, which will be under the responsibility of the Local Energy Centers Operation and Maintenance Companies. Each building will be provided with two (or four in case of residential buildings and hotels) heat exchangers, while in the primary side will flow the media supplied from the LEC, the secondary circuit will supply the needs of each customer in the building. Those heat exchangers will be under building maintenance management's responsibility. The headers of adjacent neighborhoods will be connected to provide mutual support in case of lack of energy production.

## **5. Planned deployment of local energy centers**

In this step of the design planned 9 LEC, see Attachment.

## **6. Local energy Center configuration and reliability requirements**

### **6.1 General**

The following description is only the initial principal design and if the Respondent has its own configuration solution, he is invited to present it.

Natural gas from the low pressure distribution grid will be the only fuel of the Co-Generation Units. No backup liquid fuels will be used.

As the LECs will be located in area with high-density housing combined with commerce, business and leisure, the architectural and environmental requirements to their appearance, noise, exhaust gases pollutions and



waste water etc. would be very important.

As was already mentioned above, the most probable mode of operations of the LECs will be as follows: one train will be in a mode of continuous operation – 24/7 and the second in a mode of Two-Shift operation – 12/6 or 12/5. The electrical Absorption Chiller supposed to be in operation during maintenance of one of the trains or during very hot weather conditions, when the demand of cold water for air conditioning systems will be higher than the Co-Generation units could supply.

Most probably the LECs wouldn't be of an open type. They will be erected in special designed buildings, or on special industrial type roofs, or in basements, or in built-in public parking lots.

## 6.2 Local energy Center configuration principals

The main guideline for the design of the Local Energy Centers' configuration is the high reliability of thermal energy (cold water for air-conditioning,  $\sim 7^{\circ}\text{C}$ ). Therefore, the possible configuration should be as follows: each Local Energy Center will consist two (2) Co-Generation Trains; each train will supply 50% of the thermal load of the Neighborhood and an appropriate amount of electricity. If there will be an excessive amount of electricity, it'll be sold to municipality' consumers by wheeling through IEC' distribution grid. In addition, there will be an Electrical chiller of 50% of the load, so the configuration will be  $3 \times 50\%$ .

Each Co-Generation Train will consist of:

- Gas Engine or Gas Turbine (the choice should be made according to the thermal demand calculations),
- Flue gases operated Absorption Chiller with supplementary firing,
- Flue gases from the Absorption Chiller exhaust/Tap Hot Water Heat Exchanger.
- The cooling of the system should be implemented in a manner that will



prevent the mist visibility and water drops in the vicinity, air cooled condensers, for example.

- The BOP elements of the Center, including Cold Water Pumps and Hot Tap Water pumps should be redundant, which means  $2 \times 100\%$  or  $3 \times 50\%$ .
- Demineralized water storage tank and, if necessary, an appropriate Demineralized water plant should be considered.
- Wastewater and polluted rainwater collection and treatment system should be envisaged.
- The center should be equipped with a Fire Extinguishing System, consisted water storage tank and electrical and diesel pumps.
- Each train should be equipped with a Step-up Transformer to match the Generator voltage to the grid voltage, and if necessary, Auxiliary Transformer, Auxiliary Switchboard, Electrical, Control and Communication cabinets, UPS, etc.
- Special compartments should be provided for IEC's Circuit Breaker and measuring equipment.
- The LEC should be equipped with Local DCS Computer with Keyboard and Monitor, to permit local operation in case of necessity.
- The DCS system of each LEC should be designed for remote operation from a central control room.

## **7. Neighborhood's data to define the LECs**

The following data specifies the characteristics of each neighborhood and should be the basis for selection of the LECs' capacity and configuration (the coefficient 0.6 is the Simultaneity Factor):



| Thermal Power with Coef. 0.6 | El Power with. Coef 0.6 | Thermal Power TR | El Power kW | Business m <sup>2</sup> | Hotels m <sup>2</sup> | Commerce m <sup>2</sup> | Housing m <sup>2</sup> | N <sup>o</sup> of Apartments | Neighborhood | Project N <sup>o</sup> |
|------------------------------|-------------------------|------------------|-------------|-------------------------|-----------------------|-------------------------|------------------------|------------------------------|--------------|------------------------|
| 2,383                        | 4,014                   | 3,972            | 6,690       | 42,300                  | 5,527                 | 21,080                  | 36,960                 | 366                          | W            | 3700/1                 |
| 1,885                        | 2,578                   | 3,142            | 4,297       | 25,296                  | -                     | 13,264                  | 49,080                 | 496                          | E            | 3700/1                 |
| 2,902                        | 2,252                   | 4,837            | 3,753       | 735                     | 10,000                | 8,575                   | 116,520                | 1,091                        | W            | 3700/2                 |
| 1,547                        | 2,130                   | 2,578            | 3,550       | 18,800                  | -                     | 14,300                  | 37,080                 | 353                          | E            | 3700/2                 |
| 2,838                        | 2,379                   | 4,730            | 3,966       | 5,058                   | 11,513                | 8,350                   | 107,040                | 946                          | W            | 3700/3                 |
| 3,864                        | 2,207                   | 6,440            | 3,679       | -                       | -                     | 2,888                   | 188,880                | 1,804                        | E            | 3700/3                 |
| 7,039                        | 5,152                   | 11,732           | 8,587       | 7,402                   | 21,000                | 8,496                   | 300,300                | 2,830                        | W            | 3700/4                 |
| 5,002                        | 6,061                   | 8,336            | 10,102      | 74,621                  | -                     | 4,692                   | 168,420                | 1,685                        | E            | 3700/4                 |
| 3,294                        | 2,573                   | 5,490            | 4,288       | 950                     | 10,000                | 2,450                   | 145,080                | 1,643                        | W            | 3700/5                 |

It's should be emphasized, that when possible, the thermal loads and the electrical loads of the neighborhoods are quite similar, the LECs should also be similar.

## 8. Requested data

8.1 Recommendation of the best possible configuration/configurations of the LECs.

8.2 Lists of equipment for each recommended configuration/configurations including BOP equipment.

8.3 Data sheets of the main components of the LECs.

8.4 Budget prices.

8.5 The best preferable location of the LEC: special designed buildings, special industrial type roofs, basements, built-in parking lots.

8.6 Site dimensions for each size of LEC, including the height. Please, take in to account the possible location of the plant (special designed buildings, special industrial type roofs, basements, built-in parking lots).

8.7 LEC Specific consumption (per hour, per year) of Natural gas, Demineralized Water, Lubricants.



8.8 Environmental influence of the plant: Noise, Vibrations, Emissions, Industrial and sanitary wastewater. Ways to reduce the negative influence.

8.9 The life cycle of the LEC system in the suggested solution, and the maintenance costs.

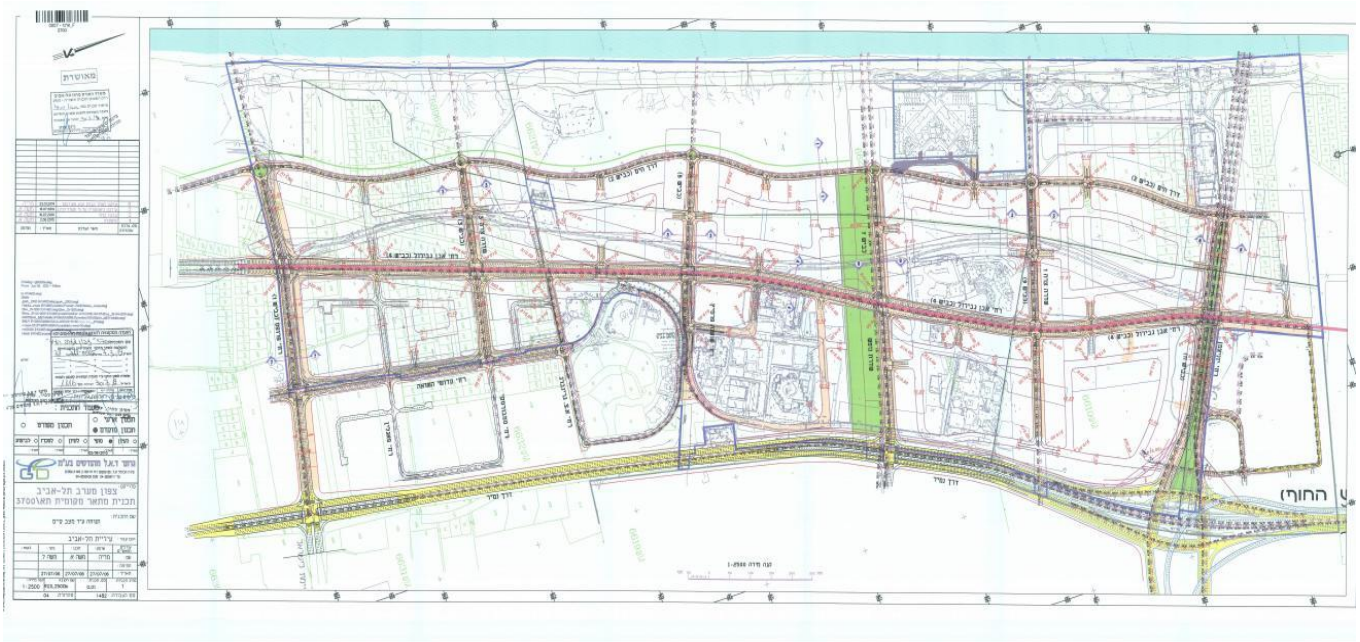
8.10 Examples of similar projects, including different types of installations (special designed buildings, special industrial type roofs, basements, built-in parking lots) over the World and, if it's possible, names, telephone numbers, e-mails of persons to coordinate a visit with.

8.11 Any other possible recommendations for successful execution of this project.

## 9. Attachments

### 9.1 Detailed Urban Design Diagrams

- 3700 project area



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- 3700-3



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