

Subject: Preliminary Request for Information (RFI) regarding “Modular Residential Construction - Constructing Structures and Establishing Factories for the Manufacture of Modular Units”

The National Technological Innovation Authority (“**Israel Innovation Authority**”) and the ministry of Housing and Construction of Israel (hereinafter: “**the Requestors**”) hereby invites the public to provide information on “Modular Residential Construction Using Modular Structures and Establishing Factories for the Manufacture of Modular Units” (“**the RFI**”). Any one interested in responding to the RFI, and in providing information, shall proceed in accordance with the details in these documents.

1. **The Issue and the Background for the RFI**

- 1.1. As part of the advancement and incentivization of innovation activity and streamlining the construction industry in Israel, while advancing the Government’s goals, the requestors would like to examine the construction of a multistorey residential building as an innovative means of construction featuring advantages in this respect. In this context, it is possible that a pilot may take place, consisting of the construction of residential structures with volumetric modular units.
- 1.2. The designation options to be evaluated as part of the said pilot may be apartment buildings for rent, following examination of the responses to this RFI. This RFI is intended, among other things, to help the requestors reach a future decision to consider the execution of a pilot for examining the integration of modular construction as a wide-spread, significant component in the construction processes in Israel. It does not bind and/or restrict the Requestors, or any of them, on any decision or future agreement.

2. **General**

- 2.1. The Requestors hereby invite the companies which comply with the terms detailed below, to obtain information regarding the design, fabrication and maintenance of residential buildings constructed using volumetric modular units and/or manufacturing of volumetric modular units. The Requestors are considering the possibility initiating a modular construction pilot, within which, high-rise module-based construction technologies manufactured through industrialized production, will be evaluated as part of the implementation processes of innovation in the construction industry (hereinafter: “**the Pilot**”).

- 2.2. The RFI is intended for developer companies and/or contracting companies and/or manufacturing industries in the construction industry in Israel or to companies operating abroad, and also to anyone that has information relevant to this RFI.
- 2.3. Following receipt of the information as part of this RFI, the Requestors will consider carrying out a coordinated initiative, in which the feasibility and method of integrating volumetric construction technologies will be evaluated and demonstrated in high-rise residential structures, to a minimum height of 8 floors, combined with the setting up of manufacturing infrastructure for modular construction in Israel. All this shall be subject to budgetary, professional and competitive considerations. The Requestors intend that this Pilot, should it be carried out, will include applied R&D plans for the execution of the Pilot, including detailed design for the construction of the structure and for the manufacture of the units. The structure and the fabrication of the units shall be done, as part of the Pilot, by certified contractors, all in accordance with the law, including obtaining all the required permits from the Construction Methods Unit at the Technion, compliance with the requirements of the Standards Institute, permits from the local and/or regional planning committees, compliance with the requirements of the Urban Building Plan according to which the project is going to be carried out, etc.
- 2.4. All of the information that is going to be provided as part of the RFI shall be disclosed in full, including regarding commercial aspects and considerations. It is hereby made clear that all the information which will be disclosed will be retained under duty of confidentiality as detailed in section 4.5.6 below.
- 2.5. The work, which is the object of this RFI and the Pilot shall be based on support from all of the different entities (including also the regulators), from various aspects, in order to enable the Respondents to the RFI to focus on introduction of the need and to bring up the relevant information, while minimizing obstructions - if this is going to be possible, all in accordance with the following principles:
- 2.5.1. The possibility of including the work as part of existing benefit tracks of the Israel Innovation Authority and for financial support for the Pilot.
 - 2.5.2. Assistance and setting up of a special, orderly process for evaluating the volumetric modular methods through the Unit for Assessing and Approving New Building Methods in the National Building Research Institute (NBRI) at the Technion.

3. The Requested Information

- 3.1. Appendix A - Responder's Contact Details Form
- 3.2. Appendix B - RFI Responder's Profile
- 3.3. Appendix C - Carrying out a Pilot for the **Construction of a residential structure** via volumetric modular units (intended for Information regarding the design, building and operation of a residential structure by means of modular units)
- 3.4. Appendix D - **Setting up a local factory** in Israel to manufacture modular units

4. RFI Rules

- 4.1. Response to this RFI shall be sent to the following email address:
modular_construction@innovationisrael.org.il, **no later than 12 May, 2022 at 17:00**
- 4.2. Questions and requests for clarifications regarding the content of this RFI may be submitted no later than 17.04.2022 at 17:00 to the abovementioned email address.
- 4.3. **To dispel any doubt, this document is not a tender process, nor is it a Request for Proposals (RFP)**, and it in no way obliges the Requestors or any one of them to conduct a tender or quasi-tender competitive process, or to form any other contractual commitment between the Requestors and those that are submitting a response to the RFI or to take any action whatsoever. Following receipt of the responses to this RFI, the Requestors shall consider whether to continue with their activities, in accordance with their sole discretion.
- 4.4. Furthermore, it is hereby made clear that the submission of a response on the part of any party whatsoever does not constitute any advantage or precondition for its participation in a tender, should such be conducted in future, and it shall not require its inclusion in a tender or entry into an agreement with the party in any other way.
- 4.5. Further to this RFI, the Requestors reserve the right, in accordance with their sole discretion, to:
 - 4.5.1. Contact potential suppliers and meet with them, seeking presentation of information and clarifications, to present the product and for demonstrations ("Pilot") and to visit their sites or their customers' sites.
 - 4.5.2. Use the information which will be gathered under this RFI in order to write a tender, or to compile a list of potential suppliers.

- 4.5.3. Should there be, in future, any process concerning the obtaining of the services which are the object of the RFI, including a tender - to alter or add conditions and requirements, all in accordance with the needs which will be determined by the Requestors.
- 4.5.4. Publish, through a tender or by any other means, specifications or characterizations which will be based on the information which will be assembled as a result of this RFI.
- 4.5.5. Subject to Section 4.5.6 below, the Requestors are at liberty to make use of the information which is going to be provided by the Respondents to this RFI, for evaluating the possibility of entering into an agreement on this issue and for the formation of the requirements in such agreements.
- 4.5.6. Subject to any law, the Requestors shall keep the information which they have obtained under this RFI confidentially, and no use shall be made of it, as detailed below:
- 4.5.6.1. The information shall not be made public.
 - 4.5.6.2. The Responder's intellectual property shall not be infringed upon.
 - 4.5.6.3. The information shall not be put to any commercial use, with the exception of the purposes listed in the RFI.
 - 4.5.6.4. Transfer of the information to any third party, with the exception of an entity that is involved in the shaping of the agreement, such as a professional consultant.
- 4.5.7. The above notwithstanding, the Requestors shall be at liberty to contact the Responder and request permission to make use of the information as per section 4.5.6.
- 4.6. All of the expenses involved in the provision of a response to this RFI are the sole responsibility of the Respondents to the RFI and at their expense. It is hereby emphasized, that a Respondent to the RFI shall not be entitled to any compensation, indemnity, refund or payment of any sort from the Requestors due to their response to the RFI.
- 4.7. Through the very fact of the submission of a response to this RFI, the Respondent to the RFI declares and confirms as follows:

- 4.7.1. That it agrees to whatever has been set forth in the RFI document and undertakes that it shall have no claims or demands from the Requestors or from any other entity, regarding the use of the information which is going to be submitted by it.
- 4.7.2. That the information provided by the Supplier, or any future use thereof, does not infringe on any trade secrets or third-party rights, including copyrights, and that the provider alone shall be accountable for any demand or claim originating in an allegation that as part of the use of the submitted information, third-party rights have been violated, and it shall indemnify the Requestors immediately upon receiving a demand due to any sum which it will be required and/or demanded to pay due to a lawsuit or demand as per the above, including expenses and legal fees.
- 4.7.3. These RFI documents are the exclusive property of the Requestors.

5.1. Appendix A - Responder's Contact Details Form

Date: _____

To

Ministry of Construction and Housing and the Israel Innovation Authority

1 Via Email: **modular_construction@innovationisrael.org.il**

I/We, the Undersigned, _____ *[Respondent Name]*, Identifying Number:

_____ *[Authorized Dealer/Corporation Number]* declare that I/we have read the Request for Information (RFI) Documents, and that I/we request that you send us any notification concerning the said RFI, according to the following details:

Contact person's name: _____

Contact person's role: _____

Email: _____

Complete address (including postcode):

Telephone number: _____ Mobile: _____

Sincerely,

Signature: _____

If it is a corporation:

Name of signatory: _____

Name of signatory: _____

Role: _____

Role: _____

Signature: _____

Signature: _____

Corporation/Company Stamp _____

Appendix B - RFI Responder's Profile

Names of owners of the respondent: 1. _____ ID No. _____

2. _____ ID No. _____

3. _____ ID No. _____

(If the owner of the corporation is a corporation, then the owners of that corporation shall be listed)

Business areas: _____

Main technologies on which the Respondent's business is based: _____

Owners of a controlling interest in the Respondent (all entities owning a 25% stake or greater in the Respondent shall be listed):

Key personnel - CEO, VP's and development personnel:

Years the Respondent has been in business: _____

Business areas (infrastructure/residential/offices/hotels/student dormitories):

If this is a Company dealing in the construction of structures made out of modular units:

* State the average number of projects per year _____

* In which countries does the Company construct the structures? _____

* Please list 5 projects (type, size, year constructed and location) _____

* Additional documents may be attached and also any relevant information.

Appendix C - Construction of a residential structure using volumetric modular units

1. Financial model and risks of a Pilot for the construction of a residential structure by means of modular units

- a. Please provide a risk assessment for the construction of a residential structure in Israel by means of modular units, such as risks in terms of costs, returns, legal, engineering and design risks:

- b. Please provide a financial model which will incentivize the Respondent to construct the Pilot - state the proposed mechanism, the amounts, percentages etc., as required in order to achieve support for the construction of the first structure in the Pilot, in order to enable financial viability of the project.

Detail the financial and entrepreneurial model on which the project is based, such as - the overall cost of constructing the structure (including the cost of the land), the profit expected once the structure has been constructed and a year-by-year forecast of the revenues and expenses involved in operating the structure and maintaining it in leased accommodation projects, protected accommodation and other scenarios, if any.

- c. Please state whether the Respondent has land available for constructing the Pilot, and if so - please state the type of land, its designation, area, ownerships, location, availability etc.

2 Design aspects for a structure made of volumetric modular units

Licensing and adaptation to the spatial planning (urban planning scheme):

- a. Please provide details of the methods and ways of designing in order to match with the urban building scheme, the benefits of using these means for testing and matching to the spatial planning:

- b. Please provide details of the benefits of constructing a modular structure in terms of shortening the licensing processes:

- c. Please provide details regarding the soil selection considerations for the modular construction Pilot, the licensing stages and the challenges to be expected in matching the area for modular construction and for obtaining building permits:

Detailed design of the structure:

Please provide details of the existing possibilities, methods and means for designing a structure using a modular method. Refer to the following aspects:

- a. Design stages - preliminary design, for tender and final detailed, and according to the licensing stages and design information required for obtaining building permits and construction plans.

- b. The various design disciplines, including: Architecture, structural, water and drainage systems, electricity, plumbing, air conditioning down to the finishing level and the structural materials.

- c. reference to structural design in accordance with the construction stages.

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- d. Please compare between designing the modular structure using two-dimensional methods and using three-dimensional methods, including benefits, required training etc.

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- e. Please provide information regarding standards and regulations regarding the structure's design (architecture, structural and other disciplines).

Obtaining information regarding the existing options for building design, structural design and the gaps, which are required in order to approve the plans in Israel

- a. Please provide details regarding the existing options for building the multistorey structure. Emphasize the number of modules and their area, which are required for the construction of a housing unit with a floor area of 70-100 sq.m.
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-
- b. Please provide details regarding the existing options for pricing a 9-storey structure, consisting of 32 housing units, and a 20-storey structure, consisting of 80 housing units (without pricing the land and development component). Refer to the overall technical specification of the building, including the following aspects: number of elevators, external cladding, solar panels on the building's roof, residential secure spaces / floor secure spaces, other public areas, underground parking and storerooms.
-
-

3 Please provide details regarding advanced technologies which are expected to be used, name the potential technology companies which are candidates for collaboration and the impacts on the pricing:

- a. In the modules' production process (for example: using robots in the manufacturing process in the factory).

- b. In the construction processes at the site (for example: advanced systems for managing the construction processes at the site including purchasing, on-site safety etc.).

- c. Inclusion of technology in the modules themselves - refer to the apartment-level technical specification (for example: finishing level, including inclusion of smart sensors as part of the "smart home").

4 Obtaining information on the environmental benefits in the structure built out of volumetric modular units

Please provide details about:

- a. Benefits from reducing the waste created in the building processes through modular construction, compared with conventional and industrialized construction.

- b. The benefits of reducing the carbon footprint and the pollutant emissions, such as CO₂, throughout the project's construction chain, including transport.

- c. Compliance with green construction standards and details of the specific standards/guidelines.

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-
- d. Impact on the structure's energy consumption, referring to the quality of the thermal insulation, thermal bridges and the materials comprising the structure, including the units.
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5 Obtaining information regarding the advantages and disadvantages of constructing multistorey buildings employing the modular construction method. Fill in the data in the tables below. Following are several highlights for your specific response, free text can be added in the notes:

- a. Please provide details regarding the added value of modular construction, referring to the processes of the design, construction, maintenance for all the stakeholders in the project - entrepreneurs, designers, construction companies and owners of the asset
-
-

- b. The advantages and opportunities within this construction method, over conventional building, and over industrialized construction methods for the structural skeleton
-
-

- c. The expected drawbacks and challenges in construction of buildings which will be erected using the modular construction method, relative to current construction: differences in direct and indirect construction costs - itemized - and in the other items comprising the final apartment cost, differences in the required construction time, between the modular and conventional method
-
-

- d. The maintenance processes required in a residential structure built using the suggested methods - required maintenance costs, advantages and disadvantages relative to the processes prevailing in conventional construction
-
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- e. Estimate of the time necessary from the moment the agreement to build the Pilot through to the final handover of the building (Form 4)

- f. Conclusions and lessons learned from projects which have been built by them or which are still in progress in other countries, in which the modular construction method is applied (if relevant)

6 Details of the main features of constructing a residential structure - comparison between modular and conventional construction

Table A: 9-storey structure and 36 apartments, 70-100 sq.m. floor space, including construction of an underground parking garage

Item	Modular construction	Conventional construction	Notes
Direct construction cost per sq.m.			
Indirect construction cost per sq.m.			
Final apartment cost per sq.m.			
Transport costs			
Transporting duration (from the fabrication of the modulars through to assembly in-situ - please refer to the various stages separately, for example duration of maritime shipping, overland shipping, etc.)			
Estimated expenses due to repairing construction defects			
Costs of investment in equipment and machinery			
Special equipment required for constructing the structure (for example: lifting devices, etc.)			
Structure design duration			
Duration of the construction at the construction site			
Refer to separate stages, including the time between contract signing			

to sinking foundations and time from sinking foundations to final handover (Form 4)			
Maintenance costs			
Time to final handover (Form 4)			
Number of (non-skilled) workers for building the structure's skeleton			
Number of (skilled) workers for assembling the units at the construction site			
Number of workers at heights at the construction site			

Table B: 20-storey structure and 80 apartments, 70-100 sq.m. floor space, including construction of an underground parking garage

Item	Modular construction	Conventional construction	Notes
Direct construction cost per sq.m.			
Indirect construction cost per sq.m.			
Final apartment cost per sq.m.			
Transport costs			
Transporting duration (from the fabrication of the modulares through to assembly in-situ - please refer to the various stages separately, for example duration of maritime shipping, overland shipping, etc.)			
Estimated expenses due to repairing construction defects			
Costs of investment in equipment and machinery			
Special equipment required for constructing the structure (for example: lifting devices, etc.)			
Structure design duration			
Duration of the construction at the construction site Refer to separate stages, including the time between contract signing to sinking foundations and time from			

sinking foundations to final handover (Form 4)			
Maintenance costs			
Time to final handover (Form 4)			
Number of (non-skilled) workers for building the structure's skeleton			
Number of (skilled) workers for assembling the units at the construction site			
Number of workers at heights at the construction site			

7 Obtaining information regarding optimal configurations in which the modular construction method will be integrated in Israel

Please provide details regarding the possible options for integrating the modular construction method as a means for rapid construction of multistorey structures, the advantages and disadvantages of each one of them, and which one brings the advantages of the method to bear optimally. These options may be, for example:

- a. Structure skeleton - reinforced concrete or steel skeleton

- b. Configuration of the modular unit- units made of light steel thin-walls or of reinforced concrete

- c. Skeleton units or drawer/capsule units

- d. How generic are the units and are they adaptable to customer requirements/changes

- e. Options for future enlargement of the unit floor areas

8 Obtaining information about the data which can be collected and analyzed as part of running the pilot

Details regarding the types of data which can be collected and analyzed as part of a pilot as described above, such as:

- a. Process of approving the method for construction

- b. The timetables from breaking sod through to final handover

-
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- c. Electricity consumption data (post-handover) and other relative to an equivalent conventional structure
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- d. Relevant malfunctions in the construction process, if any
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-

- e. Safety incidents while carrying out the construction

- Malfunctions and defects in factory-built modules
 - Malfunctions and defects when carrying out the construction process in-situ
 - Documentation of tenant malfunctions and time to repair
 - Ability to obtain continuous information regarding malfunctions post-handover, through the appropriate sensors installed within the modules
-
-

9 Obtaining technical information regarding the capabilities, characteristics and limitations of the modules manufacturer

Obtaining infrastructure regarding companies which have the infrastructure for fabrication of modules in Israel and abroad, with which it is possible to make contact for erecting the structure as part of the said pilot, addressing the following data:

- a. Construction method - the standards (including environmental) with which it is compliant
-
-

- b. Manufacturing capacity per annum
-
-

- c. Manufacturing volume per annum
-
-

- d. Manufacturer's ability to make adjustments to the Israeli construction requirements

e. Training and certification programs, which the manufacturer will carry out at the manufacturing site and at the construction site, for the crews which are going to engage in erecting the pilot

f. Module transporting capacity, if fabricated abroad, to Israel - including costs and durations, regulatory barriers, customs barriers and others, throughout all of the stages of the process, from the modules fabrication through to their shipping for installation at the construction site. Please comment on potential delays which might arise upon entering the country at the ports

g. Technical specifications the Company currently incorporates in the construction processes, and its ability to improve and upgrade the specification according to the requirements of the Israeli entity ordering the units

h. Capabilities and tools for managing the construction process at the site

i. Description of projects in which high-rises have been built, using modules made by the Company and a history of the malfunctions and incidents which occurred in the course of the construction and following the construction

j. International standards

10 Estimate of the time necessary from the moment the agreement to build the Pilot through to the final handover of the project

In this context, please provide details regarding the total time required for preparations for erecting a Pilot which will put the abovementioned to the test, if budgetary assistance will be provided by the Ministry for its execution. Please provide the total time needed from the day the agreement is signed through to Pilot kickoff and until it starts operation, with reference to the following durations:

- a. Estimated time to signing the agreement between the developer/contracting company and the company which will be building the modules

- b. Time required for specification of the modules, their technical specification and their quality for the Pilot

- c. Estimated time needed for preparing for the fabrication of all the modules needed for the building as described above in Israel

- d. Time required to erect the multistorey building at the chosen site through to its final handover as a significant part of the pilot

11 Timetables and milestones for executing the Pilot

Milestone / stage	Task details	Task duration	Required resources	Key factors

Appendix D - Setting up a local factory in Israel to manufacture modular units

1. Financial model and risk assessment for the construction of a local factory in Israel for the fabrication of modular units

a. Please provide a risk assessment and obstructions assessment for the setting up of a factory for the fabrication of modular units, such as risks in terms of set-up costs, required manpower, customs restrictions, business licenses, local authorities, permits and any other relevant information:

b. Please provide a financial model which will incentivize the Respondent to setting up the factory - state the proposed mechanism, the amounts, percentages etc. - in order to achieve support for the setting up of the factory, in order to enable financial viability of the construction.

c. Additional information regarding obstructions and ways of incentivizing the set-up of the factory:

2. Module factory set-up - Stages

The responder shall detail all the stages required for setting up a factory in Israel for the fabrication of residential modular units, including set-up cost, equipment purchasing cost, manpower cost, knowledge transfer, licensing aspects, training aspects etc.

Milestone / stage	Task details	Task duration	Required resources	Key factors	Costs (NIS)

3. Characteristics of the modular fabrication factory

The responder shall detail the following characteristics regarding the factory output, construction costs and the required infrastructure (built-up floor space, maintenance, accessibility to traffic arteries etc.)

Item	Year				
	1	2	3	4	5
Percentage of penetration into the domestic market					
Factory manufacturing capacity (units per year)					
Revenue forecast NIS (per year)					
Expected profitability NIS (per year)					

Total area required for the factory _____

Required production area _____

Required storage area _____

Other area (details) _____

Specify roofed factory areas and non-roofed areas _____

Maximum production output per day _____

Number of trucks per day (according to the previous period): _____

Units loading capacity on each individual truck _____

Requirements for accessibility to transport infrastructures (highways, trains):

Minimum production sq.m. required to achieve economic viability for the factory

1. Details of the equipment required

Details of the equipment required for setting up the factory - equipment and materials	Costs (NIS)