

Ministry of Energy

Deputy of Energy and Electricity

# **Directive on Promoting the Deployment of Small scale Generators**

Electricity Industry Privatization Bureau

February 2008

Front cover:

Advancements in gas fed small scale generator technologies, adapted utilization of these generators in all kinds of environments (industrial, residential and commercial) and use of advanced material technologies and advanced control, have made the costs of generating electricity by small scale generator, especially if the exhausted heat is recovered (CHP generator), typically less than that of conventional methods of generation.

Thus, in order to increase the supply of energy, to promote a greater participation of the private sector in supplying of electric power and deregulating the electricity market in the country, the Ministry of Energy has devised appropriate protections for construction of small scale generators.

The main advantages of small scale generators are:

- Increase of the reliability of supply of electric power to the customers.
- Cogeneration of electricity, heat and cold (CHP and CCHP).
- Improvement of voltage profile and decrease in losses of power grid.
- Easily incorporated and no need for a dedicated connection to gas pipeline.
- No need for large volumes of investment and thus the possibility of the participation of the general public and small investments.
- Easy transport.
- Swift installation.
- Supply of energy with a high degree of protection (Passive Defense).
- Lower level of environmental pollutants for operation CHP mode.

Back cover:

The accompanying CD includes:

- About Us.
- What is a small scale generator?
- The Directive on promoting the deployment of small scale generators:
  - Forms, appendixes and a sample of required documents.
  - The electronic version of the Directive for mobile phones.
  - The flowchart of the procedures of the Directive.
  - The software for evaluation and determination of the sale price.
  - The contract of guaranteed purchase of electricity.
- Related laws, regulations and Directives.
- List of related books.

<http://psp.moe.org.ir>

**In the Name of GOD, the Most Merciful, the Most  
Compassionate**

**Directive on promoting the  
deployment of small scale  
generators  
2009**

Subject of letter 52504/350 dated 23/10/2009

Deputy of energy and electricity

The Islamic Republic of Iran

The Ministry of Energy

date: 23/10/2009

number: 52504/350

In the Name of GOD

**From: TAVANIR Specialized Holding Company**

Dear recipients

In reference to section b of article 122 of the third economical, social and cultural development plan (also endorsed by article 20 of the fourth development plan), the executive regulations of section b of article 25 of the fourth development plan and with the authority granted by the minister of power by the letter 103203/350 dated 26/12/1386, the "Directive on promoting the deployment of small scale generators" and a sample of energy conversion contract (under the title of "contract of guaranteed purchase of electric power generated by small scale generators" along with the relevant tables that bear the stamp of this ministry), are hereby declared as certified and are mandated for execution.

Putting in place the necessary structures, devising suitable incentives for the dependant companies and allocating the necessary financial resources in the budget plans of the concerning companies (especially to implement the contents of section 9.1, the remark of section 5.5 and the remark on section 13 of this Directive) is emphasized.

ABBAS ALIABADI

Deputy Minister of energy and electricity

**Cc. to:**

- § Electricity distribution companies; with emphasis on implementation of the contents of sections 7.2 and 7.3 and allocation of necessary resources.
- § Regional electricity companies; with emphasis on implementation of the contents of sections 7.2 and 7.3 and allocation of necessary resources.
- § Iran Energy Efficiency Company (SABA), with the purpose of implementation of the contents of section 7.5 and its remarks.
- § Iran Grid Management Company (IGMC); with emphasis on devising suitable mechanisms to implement the contents of section 14.3 (signing contract of transit on distribution level and contract of guaranteed supply of electricity to the consumer).
- § Iran Power Development Company (I.P.D.C), with the purpose of cultivating the capability of domestic production of small scale generator related technologies.
- § Office of privatization, with the purpose of supervising implementation of this Directive.

The Islamic Republic of Iran

Ministry of Energy

## **Deputy of Energy and Electricity**

### **The Directive on promoting the deployment of small scale generators**

#### **Ratifying authority:**

The Deputy of the minister of power on issues of energy and electricity

#### **Recipients for implementation:**

- § Generation, Transmission and Distribution Management Company (TAVANIR).
- § Iran Grid Management Company (IGMC).
- § Iran Energy Efficiency Company (SABA).
- § Iran Power Development Company (I.P.D.C).
- § Regional Electricity Companies.
- § Electricity Distribution Companies.

#### **Related documents:**

- § Executive regulations on conditions and guaranties of purchase of electricity, subject of letter *h33188t/16825* dated 8/4/1384 ratified by the council of ministers.
- § Regulation on determination of conditions and on procedures of selling and purchasing electricity, subject of letter 32251/20/100 dated 25/5/84 ratified by the minister of power.
- § Act of independence of the electricity distribution companies in their provinces.
- § Article of association of the distribution companies, subject of letter 32623/30/100 dated 14/5/1386 ratified by the minister of power.

## Table of Contents

Chapter one: general considerations.....	8
1. <b>Purpose:</b> .....	8
2. <b>The scope of applicability:</b> .....	8
3. <b>Supervision:</b> .....	8
4. <b>Definitions:</b> .....	8
Chapter two: executive regulations.....	12
5. <b>Preparations for the project:</b> .....	12
6. <b>Granting of construction permit</b> .....	13
7. <b>Investment promotion unit and center for promotion of distributed generation</b> .....	15
Chapter three: Protections .....	18
8. <b>Fuel Price</b> .....	18
9. <b>Payment of general costs of establishing a connection</b> .....	18
10. <b>Cooperative companies interested in construction of small scale generators</b> .....	18
11. <b>Domestic production</b> .....	19
12. <b>Other facilities</b> .....	19
Chapter four: procedures of selling the generated electricity .....	21
13. <b>Signing contracts of guaranty</b> .....	21
14. <b>Direct sale of electricity:</b> .....	22
15. <b>Sale to network management:</b> .....	24
Chapter five: revision .....	25
16. <b>Revision authority:</b> .....	25
Appendix one: .....	27
How to determine the rate of purchase for contracts of guaranty.....	27
a. <b>The base rate for contracts of guarantee:</b> .....	28
b. <b>The rate of purchase:</b> .....	28
c. <b>Calculations:</b> .....	29
Appendix two:.....	33
The evaluation procedure of an investor for acquiring a construction permit .....	33
1. <b>The agreed capacity</b> .....	34
2. <b>Investor's score</b> .....	34

<b>3. A guide to evaluating the competency of nongovernmental investors for obtaining a construction permit for small scale generators:</b> .....	35
Appendix three: .....	40
Description of proposed services for preparing “investment packages for construction of small scale generators” .....	40
1. <b>Subject of contract:</b> .....	41
2. <b>Description of services:</b> .....	41
Indexes .....	44

## Chapter one: general considerations

### 1. **Purpose:**

This Directive is composed and mandated for implementation to promote the deployment of small scale generators based on section II of article 122 of the third Economical, Social and Cultural Development Plan (also endorsed by article 20 of the Fourth Development Plan) and the executive regulations pertaining to “the conditions and guaranties of purchasing electricity” (discussed on section II of article 25 of the Fourth Development Plan).

### 2. **The scope of applicability:**

Implementation of this Directive is mandatory for the following entities:

- TAVANIR Specialized Holding company
- Regional Electricity Companies
- Electricity Distribution Companies
- Iran Energy Efficiency Company (SABA)
- Iran Power Development Company (I.P.D.C)
- Any investor interested in investing in small scale generators

### 3. **Supervision:**

The responsibility of supervising the implementation of this Directive by the concerning entities is entrusted with the highest executive rank of those entities, and the Privatization Bureau supervises and ensures the strict compliance of their policies with regulations put forth in this Directive.

### 4. **Definitions:**

All definitions listed here in bold and italic are in accord with those listed in “Iran’s Electricity Market Code” except otherwise mentioned.

#### ***4.1. Electricity Purchase Guaranty Bylaw:***

As declared on section II of article 25 of the fourth economical, social and cultural development plan of the Islamic republic of Iran.

#### ***4.2. Effective electricity efficiency:***

That efficiency factor of the generator which takes into account the amount of recovered heat, calculated according to part VI of section III of the first appendix to this Directive.

#### ***4.3. Construction permit:***

A document which grants legal permission to its possessor for construction of a generator according to technical and other specifications set therein.

#### ***4.4. Investor:***

An Iranian legal person, either singly or in a partnership with other Iranian legal persons or foreign legal persons, who is interested in construction of small scale generators for the purpose of electricity generation (or combined heat and power generation) and supply of electricity, totally or in part.

Remark 1:



If the investor is in fact a group of partnership, it must produce documents describing the composition and responsibilities of each partner in that group.

Remark2:

An Iranian natural person can apply for construction of small scale generator; however he must contract out the construction, operation and maintenance to those with relevant qualifications for such matters.

**4.5. Dedicated network:**

A set of required components (including transmission lines; a dedicated substation; measurement, protection, monitoring and communication equipment) that connects the generator to the power grid.

**4.6. Distribution network:**

On distribution level the power grid includes transmission lines (overhead and underground) and distribution substations. In this Directive the medium voltage bus of the sub transmission substation is considered a part of the distribution network.

**4.7. Distribution company:**

Local electric power distribution company (also called regional electricity company where the generator is connected either directly or via a dedicated feeder to the medium voltage bus of the sub transmission substation) on the premises of which the small scale generator is connected to the distribution network.

**4.8. Application form:**

A compilation of the construction permit, construction permit and letter of introduction which is prepared by the office of privatization of electric industry and is accessible on its website<sup>1</sup>.

**4.9. Evaluation committee:**

A committee comprised of three experts appointed by the deputy minister.

**4.10. Financial competency report:**

A set of documents that proves the financial ability of the investor (in proportion to the intended capacity) and economical feasibility of his decision to build a generator.

**4.11. Technical report:**

A set of documents proving that the choice of the construction site and the proposed specifications for the generator meet the technical, environmental and other obligatory standards. It must declare the technical specifications of the generator and of the network (the immediate substation and its downstream network which the generator connects to) and also the results of studies concerning the effects of connecting the generator to the network.

**4.12. Average variable costs(AVC):**

The average cost of each kilowatt hour of generated electric power (variable costs of maintenance, consumed material and fuel).

**4.13. Local network management:**

An organizational unit which has the responsibility of monitoring and managing the local network to which the generator is connected.

**4.14. Center for promotion of distributed generation:**

An organizational unit with the main mission of supporting the development of small scale generation technologies. It also sets the level for effective electricity efficiency and average variable costs and issues technical certificates for any kind of generator.

**4.15. Investment consultant:**

A qualified, natural or legal, person who offers counsel on the level of financial competency required for and on economical soundness of the project. In case of request by the investor, the investment consultant can, within the framework of a contract, file the financial competency report on behalf of the investor or approve the investor's financial competency and the economical feasibility of his project upon assessing such report.

**4.16. Letter of introduction:**

A letter by which a person is declared as able to the competent authorities for constructing a generator in a specific site. The letter must bear a period of validity.

**4.17. Deputy minister:**

The deputy of the Minister of Energy, presiding over electricity and energy.

**4.18. Construction Permit:**

A document by which the Ministry of Energy declares its agreement in principle on construction of a generator by the investor. This letter is mostly required to acquire documents that are necessary for obtaining construction permit and for facilitating the stage of construction of the generator (also for being provided with facilities as described in this Directive).

**4.19. Small-scale generator:**

Small scale generator, also called the generator, comprises equipment and facilities that form a unit of electricity generation, which could technically be utilized by being connected to the local distribution network. The actual capacity of the generator must not exceed 25 MW at the point of connection to the distribution network.

A group of generators which meet the above mentioned restriction on their total capacity and are connected to the distribution network at the same point, irrespective of whether they are conventionally called a power plant, a generator or else, are called a generator in this Directive.

Remark1:

In cases where the actual capacity of the generator exceeds the above mentioned threshold, but the difference between the actual capacity and the load that is fed by the local network (downstream of the immediate substation) remains less than 25 MW, just 25 MW of generated power is covered by the regulations of this Directive.

Remark2:

regulations of this Directive cover those small scale generators that use natural gas (gas turbines, gas engine and other electricity generating technologies that use natural gas) or hybrid fuel<sup>2</sup> as their source of energy; but if requested by the investor, regulations of this Directive can be applied to small scale generators that use non conventional fuels (fuels that are extracted from wastes or from waste gases of refineries) or to those generators

that are based on recovering of energy (expansion turbine) or are based on renewable energy sources (it could also cover contracts of selling electricity with TAVANIR). In such case the investor shall be responsible for supplying those fuels and also must bear all of its costs. These types of generators are exempt from respecting the lowest effective electricity efficiency discussed in section 7.7 and its remark, concerning obtaining the technical approval letter, and also from regulations of section 13 pertaining to the contract of purchase of electricity.

**4.20. Combined Heat and Power generator (CHP):**

A generator who's exhausted heat is either used directly (pumping heat into greenhouses or furnaces and the like) or is recovered in order to generate steam, hot water etc. the effective electric efficiency for such generator is one and half times larger than that of the average efficiency of a thermal power station.

Remark:

In this Directive any small scale generator having an electric efficiency larger than one and half times that of a thermal power station is considered a combined heat and power (CHP) generator.

**4.21. Rate of purchase:**

The amount paid for each kilowatt hour of generated electricity, calculated according to section II of the first appendix to this Directive.

**4.22. Investment promotion unit(s):**

Unit(s) that provide counsel to the investor and promote and support investment in construction of small scale generators.

**4.23. Costs of connection:**

Costs of upgrading, supplementing and enhancing the network (installation of new lines and substations, enhancement of the existing ones and supplementing the network with measurement, protection, monitoring and communication equipment) in order to meet the technical standards of connecting the dedicated network of a generator to the distribution network.

Technical specifications and costs of connection are specified according to regulations of connection and operation of the grid, based on the condition of the network, point of connection to the network and technical specifications of the generator.

## Chapter two: executive regulations

### 5. Preparations for the project:

The investor is responsible for both preparations for the construction project (including feasibility studies, deciding on the site of construction, sealing contracts for supplying of gas, determining of the generator, financial competency and obtaining construction permit) and its execution (providing lot for the site of construction, sealing contracts of selling, construction and commissioning of the generator and setting up the dedicated network).

With the completion of construction and of tests of connectivity to the power grid, an operation license is issued, so that the investor can operate and, maintain a generator and supply electricity in accordance with technical standards.

5.1. The investment promotion unit collaborates with the investor on preparations for the project, in areas such as providing counsel on obtaining construction permit and making use of available facilities, as well as on all stages of construction, operation and selling of the generated electricity.

5.2. Investor is responsible for obtaining a permit for connecting the premises of the generator to the natural gas pipeline, from either that province's gas company or Iran's national gas company. The Ministry of Energy (TAVANIR and its subsidiary companies) will assist the investor in this task.

5.3. Investor must bear the initial costs of connection to the natural gas pipeline, cost of consumed gas as well as any other financial liabilities set in the contract with the gas company.

Remark:

In cases where the required gas is supplied by a power station or any other facilities that are owned by TAVANIR or its subsidiary companies, the price of consumed gas falls under the category of "power plant fuel".

5.4. Investor must set up the dedicated network; but before that he is supposed to set a scheme for connecting the generator to the power grid and declare it to the relevant distribution company, who will scrutinize it and in no more than five days either approve it or declare its deficiencies and provide possible solutions to the investor.

Remark:

The distribution company will take up the task of setting up the dedicated network provided that the investor bears all the costs.

5.5. Upon receiving the construction permit, the investor shall act to sign a contract regarding connection to the power grid and relevant fees with the distribution company.

Remark:

Regarding the last part of remark 6 of the "Electricity Purchase Guaranty Bylaw", in the following cases the distribution company must bear the costs of connection, to ensure that the technical standards are met when the dedicated network is connected to the national power grid:

1. Generators that are constructed on sites that are the subject of discussion on sections 7.3 and 7.4.

2. Generators that are subject of discussion on remark 3 of section 6.1.
3. CHP generators for which there are sufficient consumers of the generated heat available on the site.

## **6. Granting of construction permit**

6.1. To apply for a construction permit, the investor is required to complete and provide a request form along with a technical report and his financial competency report to either the investment promotion unit or the evaluation committee.

Remark 1:

Any one of the following items provided by the investor is deemed as a proof of his financial competency and as such renders the “financial competency report” unnecessary.

1. A written declaration by the investor affirming his financial competency for construction of a small scale generator with a capacity of less than 2MW.
2. A letter of approval from the investment consultant according to “investment consultant approval form”.
3. A connection to the power grid (or possession of a generator) for constructing a small scale generator with a capacity twice that of the existing connection (or existing generator).
4. Presenting a construction permit issued by the competent authorities, which approves of the financial competency of the investor, in order to construct a small scale generator whose capacity, equals the power consumption of that building or facility.

Remark2:

Using generators that have a technical certificate issued by the Center for Promotion of Distributed Generation, indicates compliance with technical, environmental and other obligatory standards in setting of specifications for the generator.

Remark3:

Providing technical specifications of the network (immediate sub transmission substation and downstream network of the generator) and results of studies concerning the effects of connecting the generator to the network are not necessary to obtain construction permit for the following cases:

1. Being the first generator, with a nominal capacity of 2MW, that connects to the medium voltage feeder.
2. Being the first generator which connects either directly or via a dedicated feeder to the medium voltage bus of the sub transmission substation with a maximum capacity of 0.8 times that of the substation.
3. Being the first generator which connects with the low voltage bus of the distribution substation with a maximum capacity of 0.8 times that of the substation.

For the cases 2 and 3, the above mentioned maximum capacity will be raised to “0.8 times that of the substation plus the minimum load of the substation” with completion of a study of the substation’s minimum load in an interval of one year.

- 6.2. Investment promotion unit offers assistance to the investor on preparing necessary documents for obtaining the construction permit.
  - 6.2.1. The investment promotion unit of the electric power distribution company will process the request submitted by the investor, vis à vis obtaining a construction permit for connecting a generator to the low voltage network or connecting a generator with a capacity of less than 7 MW to the medium voltage feeder, in no more than five days, and if the request is approved, the investment promotion unit will issue a construction permit within two days and in case any reassessments are deemed necessary, it will notify the investor.
  - 6.2.2. The investment promotion unit of the regional electric company will process the request submitted by the investor, vis à vis obtaining a construction permit for connecting a generator with a capacity of less than 15MW either directly or via a dedicated feeder to the medium voltage bus of the sub transmission substation, in no more than five days, and if the request is approved, the investment promotion unit will issue a construction permit within two days and in case any reassessments are deemed necessary, it will notify the investor.
  - 6.2.3. Investment promotion unit will refer all requests of construction permits for generators of larger capacities to the evaluation committee (provided that a complete set of required documents are submitted by the investor) and will inform the investor of the progress of his application.
- 6.3. The evaluation committee must process the requests submitted to it either directly by the investor or through the investment promotion unit in no more than ten days, and if the request is approved, the evaluation committee will issue a construction permit, and in case any reassessments are deemed necessary it must notify the investor.
- 6.4. The investor must constantly update the state of advancement of the generator construction project with the investment promotion unit. If the project is not progressing according to the proposed timetable, especially if it has not completed by the date set in the construction permit, the investor must provide sufficient and convincing reasons for such delay, otherwise the investment promotion unit would, as a primary measure, issue a notice of delay and if after six months the state of progress of the project is still unsatisfying, it will nullify the investor’s construction permit.

Remark:

The investor can request to let his construction permit, while within the period of its validity, to another financially competent investor (or request to join in a partnership with another investor); in such case, upon verification of financial competency of the substitute investor, the existing construction permit is annulled and a new one with the same period of validity is issued for the substitute investor.

- 6.5. The investment promotion unit will process request forms submitted by any person regarding a specific site or region for the purpose of initial studies for construction, and will issue a letter of introduction within two days.
- 6.6. The investor can apply for a construction permit if it becomes necessary for obtaining a technical or financial competency report (necessary documents for obtaining a construction permit) by submitting a request form to the investment promotion unit.
  - 6.6.1. Investment promotion unit of the electricity distribution company will issue the construction permit for a generator which connects to the medium voltage or a low voltage feeder within five days.
  - 6.6.2. Investment promotion unit of the regional electric company will issue the construction permit –for a generator with a maximum capacity of 15MW, which connects to the medium voltage bus of the sub transmission substation within five days.
  - 6.6.3. Investment promotion unit will refer requests for capacities that exceed 15 MW to the evaluation committee, which will either issue the construction permit within seven days or will instruct the investor on attaining necessary conditions for obtaining the construction permit.

Remark1:

The evaluation procedure for issuance of construction permit is explained in detail in the second appendix to this Directive.

Remark2:

The investor must continuously update the state of progress of the project throughout the period of validity of the construction permit. If not successful in obtaining a construction permit within that period, along with presenting his reasons of failure, the investor can apply only once for its extension.

## **7. Investment Promotion Unit and Center for Promotion of Distributed Generation**

- 7.1. Investment promotion units, with sufficient authorities, are set up in companies and organizations that are subject to this Directive to inform of opportunities of constructing small scale generators, providing counsel to the investor, coordinating between the investor and those companies as well as to encourage and support the investment in small scale generators.
- 7.2. The CEO's of regional electricity companies and electricity distribution companies must act immediately on setting up investment promotion unit and report the state of its progress to all competent authorities within their provinces and to local media.

Remark:

The above mentioned companies can sign contracts with eligible persons as a measure of offering services for promotion of investment on small scale generators, including formulation of “investment packages for small scale generators” (according to the third appendix to this Directive).

- 7.3. The investment promotion unit of electricity distribution companies must compile, publish and keep up to date a list of locations where construction of a small scale generator will improve the indexes of power quality or will lead to reduction of losses of the distribution network (preferably along with setting a commissioning date).
- 7.4. The investment promotion unit of regional electricity distribution companies must compile, publish and maintain a list of sub transmission substations, which connecting a generator to their medium voltage bus would reduce the amount of required additional investment or will reduce losses in the transmission network (preferably along with a commissioning date).
- 7.5. Iran Energy Efficiency Organization (SABA) is assigned the task of supporting and providing consulting services to investors with the intention of preparing and implementing investment plans for construction of small scale generators as well as supervising the activity of investment promotion units, drafting executive instructions, coordinating between the concerning entities in order to promote small scale generators, informing the public of small scale generators, endorsing applied research on the subject of the small scale generator, expanding human recourse development and publishing the applied data.
- Remark1:  
Iran Energy Efficiency Organization (SABA) must support and encourage investments on CHP generators (according to the concerning regulations) in order to benefit from financial facilities for energy consumption optimization (including from managed funds, subsidies on loan interest and other contributions).
- Remark2:  
Iran energy efficiency organization (SABA) reports on the performance of the investment promotion units to the Ministry of Energy, it also issues periodic reports on their performance of compiling lists of suitable locations or substations for construction of small scale generators and of formulation of investment packages for construction of generators and of the under construction and operating generators
- 7.6. In order to introduce to the investor, different technologies and manufacturers and provide evaluation and comparison facilities on the functioning of different generators, the Center for Promotion of Distributed generation will provide a space to showcase generators of all kinds (an exhibit for small scale generators) and will connect them to the distribution network.
- 7.7. The center for promotion of distributed generation sets the level for effective electric efficiency and average variable costs (AVC); it also issues technical certificate for any kind of generator (both domestically and foreign made). The technical certificate is issued, for any kind of generator, based on compliance of specifications of the small scale generator with technical and environmental standards (including parallel operation with the distribution network and having effective electricity efficiency beyond the acceptable minimum) as well as the after sales service provided.

Remark1:



The center of promotion of distributed generation will compose the “The regulations for determination of effective electric efficiency, average variable costs and issuing technical certificate for small scale generators” and will have it approved by the office of technical support for generation (TAVANIR).

Remark2:

Power and energy macro planning office, annually, sets the minimum acceptable level on effective electric efficiency so as to connect to the distribution network.

## Chapter three: Protections

### 8. **Fuel Price**

In case the investor sells electricity directly to consumers or to other suppliers for domestic consumption, if the fuel is sold to the generator at a higher price than that of the power plant fuel, the investor shall receive the difference of those amounts (according to “instructions on calculation and application of the difference of the fuel price and the value of the reduced gas consumption”).

### 9. **Payment of general costs of establishing a connection**

9.1. According to remark 6 of “Electricity Purchase Guaranty Bylaw”, any subscriber of a regional electricity company or of an electricity distribution company who wishes to set up a small scale generator for his facilities, can sign a contract for lower capacities (provided that the threshold of “generator’s safe capacity” is not breached), and thus not only receive the equivalent for general costs of establishing a connection at current rates but also benefit from protections of section 14.3.

9.2. In order to encourage construction at the location of the facilities of the consumers, investor interested in setting up a small scale generator for his own facilities can apply to change a portion of their connection capacity from “permanent” to “temporary” rate, after obtaining the construction permit<sup>3</sup> (not breaching the threshold of “generator’s safe capacity”).

9.2.1. The electricity distribution company/regional electricity company shall pay the general costs of connection to the power grid at current rates (for that portion that has been converted from “permanent” to “temporary” rate) to the investor and accordingly charge the investor for his “temporary” rate connection according to the relevant tariffs.

9.2.2. Within the period of validity of his construction permit<sup>4</sup>, the investor can, change the status of his connection to permanent by transferring the entire received amount according to section 9.2.1, to the bank account of the electricity Distribution Company or regional electricity Distribution Company. After expiration of the construction permit<sup>5</sup>, the investor would be treated like any other subscriber regarding the request for change of connection type.

### 10. **Cooperative companies interested in construction of small scale generators**

In order to empower and increase the share of cooperative companies in generation of electric power for the country, any cooperative company that has “investment on construction of generator (or power station)” declared in its article of association as its main field of activity, and that its members have sufficient technical knowledge of generation or the business of electricity will receive legal support for productive cooperative companies according to relevant regulations, including the contents of chapter three of the “fourth economical, social and cultural development plan correction act” and will benefit from implementation of the overall policies of article 44 of the constitution in addition to supports and facilities granted to the private sector.

- 10.1. In evaluation of the capabilities of a cooperative company, those members who have sufficient technical expertise on generation or the business of electricity are considered its employees.
- 10.2. Distribution companies can hand over their generators through a lease to own contract to cooperative companies. The definitive transfer of ownership at the end of the period of the contract depends on whether or not its activities have been legal and of electricity generation in nature.  
Remark:  
Regional electricity companies can hand over their CHP generators for the purpose of cogeneration to cooperative companies as described in the section above.
- 10.3. TAVANIR (or its subsidiary companies) can bear part of the financial burden of the project within the framework of a partnership agreement with the cooperative company. In this case TAVANIR (or its subsidiary companies) is obliged to transfer its share to the private sector (and the cooperative company having the highest priority) in no later than three years.
- 10.4. Cooperative companies are introduced to either the ministry of cooperatives or the cooperative fund or the banking system by the Ministry of Energy in order to receive loans.

#### 11. **Domestic production**

- 11.1. In order to support the development of capacities for domestic production of technologies relevant to small scale generators, it is possible to double the down payment on purchase of electricity to the investor for small scale generators that incorporate domestically developed technologies.
- 11.2. Iran power development company(I.P.D.C) must support the private sector on creation and development of capacities for domestic production of technologies relevant to small scale generators.

#### 12. **Other facilities**

The investor is also assisted, especially as an aid to his financial capabilities, by the following facilities:

- 12.1. The investor can benefit from banking facilities (in both domestic and foreign currencies) just like any other production (industrial) projects.  
Remark:  
The investor can submit his request to the investment promotion unit for consideration, after obtaining the construction permit<sup>6</sup>, so that his project may be designated as approved by the Ministry of Energy and thus benefit from facilities (including loans from the foreign exchange reserve) or be granted the exchange authority or benefit from other facilities.
- 12.2. TAVANIR supports the investor by providing a portion of the total contributions made by the investor, through granting soft loans (with a minimum interest\charge rate demanded by the relevant regulations).
- 12.3. In case of a request by the investor, and in order to facilitate investment on small scale generators, TAVANIR (or its subsidiary companies) can provide financial resources to aid the investor in paying the costs of establishing a connection, to put in place necessary facilities

for connecting to the gas pipeline and also connecting the generator to the power grid, by down payments of purchase of electricity (in addition to other down payments) or from managed funds (in addition to facilities discussed on section 12.2).

12.4. The real estate within substations for construction of small scale generators which could technically be used for operation of these generators is provided to the investor in form of long term rentals (or in form of transfer of ownership in cases where it is legally possible).

Furthermore the owner of the substation (regional electricity company or electricity distribution company) can assist the investor in receiving loans by mortgaging the lot for the generator to a bank or financial institution that grants loans (but retaining the right to use it as a substation).

## Chapter four: procedures of selling the generated electricity

### 13. Signing contracts of guaranty

If the effective electric efficiency of the small scale generator is higher than the average efficiency of a thermal power station, in case of a request by the investor, TAVANIR will sign a contract on energy conversion in which TVANIR accepts the burden of fuel expenses or on purchase of electricity with the investor.

Remark:

TAVANIR can relegate these contracts, either in form of brokerage or by transferring of rights, interests and costs to distribution companies or qualified persons.

#### 13.1. **Rate of purchase:**

The rate of purchase is determined according to article six of the “regulations of guaranties of purchase of electricity” along with the rules described in the first appendix to this Directive and is submitted to the Ministry of Energy for ratification.

#### 13.2. Guaranty of supplying of fuel:

Supplying of fuel is guaranteed for nine months in each year.

Remark1:

In case of lack of supply of the guaranteed fuel and preparedness of the generator for generation of electricity:

- a. The investor will be paid an amount equal to the rate of purchase minus average variable costs.
- b. The amount paid for providing the demanded energy by the consumer party of the contract (subject of part 13.4) will be paid to the investor with AVC being cut.

Remark2:

TAVANIR can extend the period of guaranteed supply of fuel according to the situation of fuel supply for that region.

Remark 3:

The guaranteed period of supplying of fuel for CHP generators is the entire twelve months (one year).

Remark 4:

Small scale generators that by design and choice of location have the potential for:

- a. Installation of facilities for the purpose of heat recovery, and
- b. Utilization of the recovered heat at their site,

will be treated as CHP generators with regard to the length of the period of guaranteed supplying of fuel, until the end of 1393.

13.3. **Preparedness and Generation Suspension Order**

A small scale generator which despite its preparedness has been ordered to suspend or reduce generation by the local network management, will receive payments for the available capacity that is left unexploited, based on the rate of purchase reduced by the average variable costs.

13.4. **Down payment on purchase of electricity:**

If the investor plans the direct sale of the generated electricity to the consumer so that the committed amount of purchase of electricity by TAVANIR does not exceed the equivalent of generated electricity in five years by the generator, the investor will receive a down payment equal to 25 percent of the estimated worth of annual generation of the generator, at the base rate agreed upon in the contract of purchase of electricity, within the period of construction.

If the investor plans the direct sale of generated electricity to consumers so that the committed amount of purchase of electricity by TAVANIR is reduced from what has been mentioned above, the down payment to the investor can increase up to 2.5 times that of the above mentioned value, in proportion to this reduction.

Remark:

According to remark one of article seven of the “Electric Purchase Guaranty Bylaw”, offering the advance, or making any modifications in the manner of the payment or applying a different rate in the course of contract shall not lead to any change in the current value of payment. The current value of payment is taken to be the interest rate decided by the Money and Credit Council at the time of signing the contract plus a two percent extra.

14. **Direct sales of electricity:**

14.1. The investor can directly provide (transit) his intended consumers with the generated electricity by signing a “contract of supplying electricity to the consumers”. The investor can also transfer to other providers his rights and profits which result from operating the generator with full or partial capacity.

14.2. According to remark five of article four of the “regulations of guarantees of purchasing electricity” the investor does not need to pay transit fees for direct supply of electricity generated by the small scale generator to the consumer through the medium or low voltage networks. The investor only compensates for technical losses resulting from this transit.

Remark 1:

The amount of technical losses that result from a transit from the generator (situated at point A) to the consumer (situated at point B) is calculated as follows:

$$\begin{aligned}
& \left( \begin{array}{l} \text{the amount of technical losses resulting} \\ \text{from transit from point of origin A} \\ \text{(location of the generator) to destination B} \\ \text{(location of consumption).} \end{array} \right) \\
& = \left( \begin{array}{l} \text{declared amount of technical losses for transmitting} \\ \text{energy from the immediate subtransmission substation} \\ \text{to destination B (location of consumption).} \end{array} \right) \\
& - \left( \begin{array}{l} \text{declared amount of technical losses for transmitting energy} \\ \text{from the immediate subtransmission substation to point of origin A} \\ \text{(location of the generator).} \end{array} \right).
\end{aligned}$$

Remark 2:

The amount of technical losses resulting from transmission of energy from sub transmission substation to other points of the distribution network (on medium or low voltage losses) are declared and updated annually the amount of technical losses resulting from transit in reverse of these routes (from any arbitrary point to the immediate sub transmission substation) is considered as the negative of the above calculated value.

Remark 3:

So long as the amount of technical losses resulting from transmission of energy from the sub transmission substation to different points on the distribution network remain undeclared, it can be assumed uniform over that part of the network that is covered by the distribution company and having a value equal to that which is published in the statistical reports of that company in the previous year.

Remark 4:

Calculation of the amount of technical losses over the distribution network and determination of the type of compensations for the costs of using the network and distribution facilities are for the implementation of transit fees (payable to the electricity distribution companies) according to regulations that will be put forth by the board of regulations of the electricity market.

Remark 5:

If the productive capacity of the generator is less than the consumed load at the local distribution network (downstream of the immediate sub transmission substation) the investor can provide any consumer over the entire national power grid with the generated electricity without paying transit fees (but shall only compensate for losses resulting from transit on the distribution network on the side of the generator and on the side of the consumer).

- 14.3. In case of a request by the consumer having contract with the investor, the network management will sign a “contract for guarantying the supply of electricity to the consumer” that guaranties supply of electricity in cases of lack of supply of guaranteed electricity by the

investor (resulting from maintenance or failure of the generator or lack of supply of fuel or disturbances of the distribution network on the side of the small scale generator) to the consumer.

- 14.4. In order to facilitate conclusion of the contract for transit with the network management and to implement the contents of part 14.3, the distribution company acting as the agent of the network management will assist the investor on these matters.
- 14.5. According to article eight of the “fourth economical, social and cultural development plan correction act and implementation of article 44 of the constitution of the Islamic republic of Iran” just like the distribution company the investor receives a payment for “the difference between the subsidy free and subsidized rate of sale of electricity.
- 14.6. If a consumer installs a small scale generator within the premises of his facilities (self supplying consumer) he will not only benefit from facilities granted to him according to remark six of article four of the “regulations of guarantees of purchase of electricity” and part nine of this Directive and protections described in part 14.3, but also has the following options available to him:
  - a. Consumption of the generated electricity at the location of generation.
  - b. To sell<sup>7</sup> the generated electricity by mechanisms put forth on parts 13 and 14.

Remark:

If a self supplying consumer, partially satisfies his own demands for electricity, he can offer the spare capacity to network management (according to part 15), other providers or to other consumers by signing a “contract of supplying electricity to the consumers”. The self supplying consumer can then make up for the rest of his demand for electricity by means of his subscription to the distribution company/regional electricity company (and according to enacted tariffs) or by signing a “contract of supplying electricity to the consumers” with other providers. The self supplying consumer is treated like other power stations for that part of generated power which he provides to other consumers having contract with the investor.

**15. Sale to network management:**

In addition to methods of supplying electricity discussed on parts 13 and 14, the investor also has the following two options (according to his previous choice) to sell the generated electricity to the network management:

- 15.1. To sell the generated electricity at guaranteed prices plus a ten percent rise, in conformity to executive regulation of part b of article eight of the “regulations of guarantees of purchase of electricity”.
- 15.2. Provide the generated electricity, like other power stations, to the whole sale market. On the condition that the investor possesses the required information to participate in the whole sale market (including information regarding generation capabilities of the generator and electricity generation plan for each hour). The network management will ensure a bias free environment for generation and supply of electricity by small scale generators in the whole sale market.



## Chapter five: revision

### 16. **Revision authority:**

This Directive can be revised on the suggestion of SABA, network management, Electricity Industry Privatization Bureau or by the ratifying authority.

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1 <http://psp.moe.org.ir>

2 A generator which uses natural gas as and only very little amount of gas oil (typically a maximum of 20% and mostly for burning) as its main fuel.

3 after obtaining the construction permit, for cases which the investor obtains a construction permit.

4 during the sum of the periods of validity of the construction permit and the construction permit, for cases which the investor obtains the construction permit.

5 refer to endnote 4

6 refer to endnote 3

7 in this case the consumer must purchase the amount of energy for his consumption in the framework of his subscription with the electricity distribution company/regional electricity company (and according to ratified tariffs) or must supply that energy by signing "contract of supply of electricity to the consumer" with other providers.

## Appendixes

Appendix one: How to determine the rate of purchase for contracts of guarantee

The base rate for contracts of guarantee

The rate of purchase

Calculations

Appendix two: The evaluation procedure of an investor for acquiring a construction permit

The agreed capacity

Investor's score

A guide to evaluating the competency of nongovernmental investors for obtaining a construction permit for small scale generators

Appendix three: Description of proposed services for preparing "investment packages for construction of small scale generators"

Subject of contract

Description of services

**Appendix one:**

# **How to determine the rate of purchase for contracts of guaranty**

**a. The base rate for contracts of guaranty:**

1. By taking into account the changes in basic conditions<sup>1</sup>, the average rate of energy conversion/average rate of generation of power is adjusted as follows:

**average rate of energy conversion (adjusted) =**

$$\left( \frac{\text{average rate of energy conversion}}{1 - L} \right) + \left( \begin{array}{l} \text{average fee of transmission} \\ \text{services for each kilowatt hour} \\ \text{of energy delivered to the} \\ \text{distribution network} \end{array} \right) + \left( \begin{array}{l} \text{adjustments necessitated} \\ \text{by effective electricity} \\ \text{efficiency} \end{array} \right)$$

**average rate of generation of power (adjusted) =**

$$\left( \frac{\text{average rate of generation of power} + \text{difference in the price of equivalent gas}}{1 - L} \right) + \left( \begin{array}{l} \text{average fee of transmission} \\ \text{services for each kilowatt hour} \\ \text{of energy delivered to the distribution network} \end{array} \right)$$

In which:

*L* represents the percentage of the losses of the power grid.

The report of these calculations must be approved by the Ministry of Energy.

2. The minimum rate for contracts of guaranty is determined according to the contents of article seven of the “regulations of guaranties of purchase of electricity” by applying an “adjustment coefficient” , implying the extent of the time that the purchase of power is guaranteed, to the average rate of energy conversion/average rate of generation of power (adjusted).
3. The “base rate of the contract of guaranty”<sup>2</sup> is determined<sup>3</sup> by TAVANIR with the “ceiling for the rate of contract of guaranty” as its upper limit, and is declared in the contract.

**b. The rate of purchase:**

1. Rate of purchase is determined, for the extent of the period of contract by applying the “coefficient of adjustment for the rates of long term contracts” to the base rate of the contract of guaranty discussed on part 3 of sec on a.
2. The coefficient of adjustment for the rate of long term contracts is calculated as follows:

**the coefficient of adjustment for the rate of long term contracts =**

$$\left( \begin{array}{l} \text{retail price index of CPI} \\ \text{at the beginning of the year} \\ \text{of payments.} \end{array} \right)^a \times \left( \frac{\begin{array}{l} \text{average rate of currency fluctuation} \\ \text{(euro) during the month before the beginning} \\ \text{of the payments} \end{array}}{\begin{array}{l} \text{average rate of currency fluctuation} \\ \text{(euro) during the year before the signing of} \\ \text{the contract} \end{array}} \right) \div (1.02)^b$$

In which:

*b* is the difference of the year of signing of the contract and the year that the payments began.

*a* varies between 0.25 and 0.75 and its value is fixed in the contract.

### c. Calculations:

1. The “difference of rate of equivalent gas” is calculated as follows:

**the difference of rate of equivalent gas =**

$$\left( \begin{array}{l} \text{the difference of the price of unsubsidized natural gas} \\ \text{and power plant fuel price for gas} \end{array} \right) \times \frac{860}{\eta_{ave} \times HV_g}$$

2. Losses of the power grid (L), at the time of writing of this Directive, is taken to be the average of the losses in the distribution and sub transmission networks, which is declared by the network management.

According to remark 2 of sec on 14.2 of this Directive, the losses of the power grid (L) is taken to be the sum of the “amount of losses in the distribution and sub transmission networks”, which is the result of drawing energy from the medium voltage bus of the immediate sub transmission substation, and the “amount of technical losses of the distribution network along the path which connects the sub transmission substation to the point of connection of the generator”.

3. The average rate of energy conversion, average rate of energy generation, the thermal value of the flowing gas in the network and the “average fees for transmission services for each kilowatt hours of energy delivered to the distribution network are determined by the network management at the end of each month based on the performance of the previous twelve months.
4. The adjustment required for the effective electric efficiency (as a reward for efficiency), mentioned in the contracts of energy transformations, is calculated as follows:

**the adjustment required for the effective electric efficiency =**

$$\left( \begin{array}{l} \text{the amount of cutback on gas} \\ \text{for every kilowatt hours of generated power} \end{array} \right) \times (\text{unsubsidized price of natural gas})$$

5. The amount of cutback on gas for each kilowatt hours of generated power is calculated as follows:

**the amount of cutback on gas for each kilowatt hours of generated power =**

$$\left[ \frac{860}{HV_g} \times \left( \frac{100}{\eta_{ave}(1-L)} - \frac{100}{\eta_E} \right) \right]$$

In which:

$HV_g$ : is the thermal value of gas which is flowing in the network in kilocalories per cubic meter.

$\eta_{ave}$ : is the average efficiency of the country's thermal power stations in percent\*\*.

$L$ : is the losses of the power grid\* in percent.

$\eta_\epsilon$ : is the effective electric efficiency in percent\*\*.

6. The effective electric efficiency is calculated as follows:

$$\eta_E = \frac{\eta_e}{1 - \eta_t \times \mu}$$

In which

$\eta_e$ : is the electric efficiency of the generator, with the internal consumption of the generator removed in percent\*\*.

$\eta_t$ : is the thermal efficiency of the generator, incase heat recovery section is operational\*.

$\mu$ : is the coefficient of utilization of the heat recovery section\*.

It must be noted that if heat recovery section is not installed or is not brought into operation, the effective electric efficiency is identical with the electric efficiency ( $\eta_e$ ).

Remark: in the case of the CHP generator which is installed in the center for promotion of distributed generation, the recovered heat is owned by TAVANIR and in contracts of energy transformation the coefficient of operation of heat recovery section ( $\mu$ ) is assigned the value of unity.

7. For the case of a generator which uses combinational fuel<sup>4</sup>, the value of effective electric efficiency calculated as mentioned in the above sections, is adjusted with the following formula:

$$\eta_E = \frac{\text{effective electric efficiency calculated as mentioned in the above sections}}{\text{Pr}_{G2N}}$$

In which

$\text{Pr}_{G2N}$  : is the ratio of the costs of consumed fuel by a generator which uses a combination of natural gas and gas oil to the costs of consumed fuel by a generator which uses natural gas, and is calculated\* by the following formula:

$$\text{Pr}_{G2N} = 1 + Gc(G_{pr} - 1).$$

In which

$Gc$  : is the ratio of the amount of gas oil to the total fuel which is consumed\*.

$G_{pr}$ : is the ratio of the price of gas oil to natural gas (the ratio of the price of one unit of thermal energy to that of the natural gas) and is calculated\* by the following formula:

$$G_{pr} = \frac{\text{unsubsidized price of gas oil (Rials/Lit)} \times \frac{\text{the thermal value of the flowing gas in the network (Kcal/m}^3\text{)}}{\text{thermal value of gas oil (Kcal/Lit)}}}{\text{unsubsidized price of gas (Rials/m}^3\text{)}}$$

Remark: the ratio of the price of gas oil to that of the natural gas ( $G_{pr}$ ) is determined by TAVANIR's office of budgeting (according to rates which are the subject of part seven of the single article in the budget regulation act of 1378 and its future substitutes).

8. The amount of required fuel by the generator, irrespective of whether it has a dedicated connection to the national pipeline or has a shared one for other purposes in which case it will enjoy the guarantees on fuel price as discussed on part eight of this Directive, is determined by the following formula:

$$\text{required fuel for electricity generation} = \frac{\text{the amount of generated electric energy}}{\text{effective electric efficiency}} \times \text{discussed on subpart six of section C}$$

If fuel consumption exceeds the above calculated amount, its excess is regarded as "investor's miscellaneous consumption" and in any case the investor must bear its costs (including long term contracts of energy conversion).

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1 changes in the basic conditions and adjustments of the average rate of energy conversion/average rate of electricity generation are due to the differences which result from the generator's point of connection to the national power grid (the difference of the amount of losses and the amount of utilization of the generator's network facilities with "average of network losses" and "average utilization of the generator's network facilities" relating to the thermal power stations which are connected to the transmission network) and the difference of the effective electric efficiency of the generator with the average efficiency of thermal power plants (in energy conversion contracts).

2 long term contract of energy conversion (ECA) or purchase of electricity (PPA).

3 this coefficient is applied according to the contents of article seven of the “regulations of guaranties of purchase of electricity”.

4 a generator which uses natural gas as its main fuel but also uses slight amounts of gas oil (typically up to a maximum of 20% and mainly for burning as fuel).

\* As a fraction of 1; ex: 37% as 0.37 and 3.5% as 0.035.

\*\* In percent; ex: 37% as 37 and 3,5% as 3.5.



**Appendix two:**

# **The evaluation procedure of an investor for acquiring a construction permit**

## 1. The agreed capacity

The agreed capacity will be evaluated based on the score given to the investor according to the table below:

Table 1: the procedure for determining the maximum capacity which will be agreed upon.

Minimum investor score	Minimum financial competency score	Minimum score given for managers and employees plus the amount of projects previously completed	Or	Contractor's rank	Amount of power plant investment projects	The final agreed capacity
4820	3500	2200	Or	1,2,3	2	100
2350	1600	1250	Or	4	2	50
224			Or	5	2	5

Remark 1:

If the applicant already has a contractor's ranking, and does not wish to be reevaluated, the maximum agreed capacity will be evaluated based upon the "investor's score" or the "contractor's rank".

Remark 2:

If the investor is a self supplying consumer then, twice the connection capacity will be added to their final agreed capacity. In any case, the maximum capacity that will be assigned by this assessment will not exceed 100 MW.

## 2. Investor's score

The investor's score will be calculated by adding 60% of their "expertise and experience" score (discussed in sec on 2.1) to their "financial score" (discussed in sec on 2.2).

2.1. Expertise and experience score:

The "expertise and experience score" is calculated by summing the scores of managers and employees, the amount of projects previously completed and the investor's continuous activity.

2.1.1. Managers and employees score:

The managers and employees score is calculated by summing the scores of each manager and employee (a total of 15 people, managers and employees) according to tables 2 and 3.

**the score of each manager or employee =**

**(degree score + years of experience × coefficient of experience)**

It should be noted that for the board of directors and the CEO the coefficient of experience is assigned a value of 20, and for all employees a value of 10. The maximum years of experience that will be effected is 15 years.

- A list of related and unrelated academic majors, divided by field, are given in table 3. Determination of the field and relevance of other majors which are not listed in table 3 is undertaken by the evaluation committee.
- The degree score will be verified by producing a reliable degree.
- Regarding a group of partnership, the score for each manager and employee will be taken into account for only one of the participating firms.

2.1.2. Score of the amount of projects previously completed:

The score of the amount of projects previously completed is a combination of the scores for “number of projects previously completed and those that are ongoing by the investor” in the last 15 years in that specific field, “finished costs”, “current year”, “year of commissioning” and “year of completion”; and is determined by relations that are set forth in article 13 of the regulations.

2.1.3. Score of investor’s continuous activity:

The score of investor’s continuous activity is the product of the amount of the score of the amount of projects previously completed (discussed in section 2.1.2) and the score of the number of years that the investor was active, divided by one hundred.

2.2. Financial competency score:

the financial competency score is equal to the sum of the “long term financial competency of the investor”, “1.5 times the current financial competency” and “50% of their fiscal turnover”.

Remark:

Long term financial competency, current financial competency and the fiscal turnover are determined in million Rials and according to the latest tax statements.

### **3. A guide to evaluating the competency of nongovernmental investors for obtaining a construction permit for small scale generators:**

- a. Issues regarding the procedure of evaluating the competency of the applicant for obtaining a construction permit for small scale generators are as follows:
  - The investor fills out a request form and places the related documents in a sealed envelope which has the statement “documents related to the evaluation of applicants for obtaining a construction permit” and their name written on it and submits it to the investment promotion unit and receive a receipt.

- The investor can resolve any possible ambiguities regarding the above mentioned issues in stumbled upon in this Directive, via the investment promotion unit.
  - All documents must be signed by authorized persons whether the investor is a legal or a natural person or their legal attorneys<sup>1</sup>.
  - The investor must submit the filled out forms along with the other documents to the investment promotion unit. In any event the submitted forms and documents will not be returned to the investor.
  - This evaluation procedure is for investors applying to acquire a construction permit for generators with a maximum capacity of 100MW; should the investor be interested in larger capacities, they must follow the procedures for acquiring the large scale power plant license.
  - Calculations relating to this table can be done by software (Evaluation.exe) that is included in the accompanied CD of this Directive.
- b. The terms and definitions used in the evaluation procedure of an investor for acquiring a construction permit (in this Directive) :

**The regulation:** refers to the contractor classification and competency verification regulation, enacted by the president's deputy of planning and strategic oversight, under *h23251 t/48013*, dated 11/12/81.

**Long term liability:** collateral and non collateral loans and loans taken from affiliate companies or other members of the investment partnership group.

**Current liability:** consists of loans, excess bank withdrawals, current shares, long term and payable liabilities (commercial accounts and payment documents, payments to managers and member or affiliate companies, income tax, stock payment profit etc.).

**Long term financial competency:** is a figure that describes the investor's financial competency for performing their obligations, and guarantying their contracts, which is calculated by the following formula:

**long term financial competency = constant assets - long term liabilities**

**Current financial competency:** is a figure that describes the financial competency of the investor for short term investments in already active projects, and is calculated by the following formula:

**current financial competency = current assets - current liabilities**

**Constant assets:** capital, goods, machinery and equipment, land and construction, amortized value, long term investments (in subsidiary and affiliate companies), long term income (accounts and income and commercial documents, income from managers and affiliate companies that are part of the investment partnership, and

other incomes) , key money, patent rights, commercial indicators and transition expenses into future phases.

**Current holdings:** on hand cash, investing in stock and bonds not including long term investments and incomes and commodity and materials inventory.

**Company capital:** cash and non cash income brought in by the partners that is considered capital and is declared and registered in the bureau of corporations and industry ownership registration and the bureau of documents and property registration.

**Employees:** employees which their work contracts include employee insurance (according to the social security or civil service law) and have received premium payments for three years before filing for a certificate application.

**Previously completed projects:** completed or ongoing projects in any field that are considered provisionally delivered or those that their status has been verified.

**Fiscal turnover:** the total income and expenses of the investor in a fiscal year.

**Company's field of activity:** activities determined in the companies article of association in accordance with the desired fields and those which the company is founded upon.

**Table 2: the degree scores**

degree	Background major [*]	Related major [+]	Unrelated major [ ]
Junior college diploma	150	75	
Bachelor's degree	250	125	80
Masters	275	135	90
PHD	300	150	100

Table 3: background majors [\*] related [+] non related [ ]

Number	Major	Relatedness
1	Civil engineering road and structure fields	
2	Hydraulic engineering	
3	Soil mechanics and geotechnical engineering	
4	Urbanism (village and town urbanism)	
5	Bridge engineering	
6	Reinforced concrete, concrete structures	
7	Military fortification engineering	
8	Military engineering (field of fortification)	
9	Earthquake engineering	
10	Building management	
11	Agricultural engineering (water related fields)	
12	Marine affairs	
13	Hydraulics engineering	
14	Dam engineering	
15	Tunnel engineering	
16	Port engineering, agricultural engineering (irrigation, drainage and water supplies management fields)	
17	All fields of Civil engineering (applied science degree)	
18	Engineering : Irrigation and development, water resource utilization, piping and drainage	
19	Hydrology	
20	Architectural engineering	
21	Urban planning	
22	Civil engineering (field of surveying)	
23	Photogrammetry	
24	Hydrography	
25	Building management	
26		
27	Project management	
28		
29	Railway engineering	
30	Value engineering	
31	Road engineering	
32	Railway, transportation engineering	
33	Traffic engineering	
34	Hydrology, hydro geology, ground water engineering	
35	Mechanical engineering (all fields)	
36	Marine engineering, ship building	
37	Electromechanical engineering	
38	General engineering	
39	All fields of Mechanical engineering (applied science degree)	
40	Electrical engineering (all field): electro technique, signal engineering, all fields	

	of electrical engineering (applied science degree)	
41	Communications engineering	
42	Instrumentation engineering	
43	Mining engineering (all fields)	
44	Geological engineering (all fields)	
45	Medical engineering (all fields), materials, metallurgy	
46	Chemical engineering (all fields)	
47	Industrial engineering (all fields)	
48	Petroleum engineering (drilling extraction)	
49	Petrochemical engineering, petrochemical industry operations, petroleum and gas engineering, petroleum engineering	
50	Polymer engineering, chemical engineering (oil process design)	
51	Petroleum extraction engineering	
52	Computer engineering (hardware software)	
53	Information technology (IT)	
54		
55		
56		
57	Geophysics engineering	
58	cartography	
59	Metal working, arc welding	
60	Lathing, metal industries	
61	Agricultural mechanics, food and natural resources engineering (wood and paper industries)	
62	Textile engineering, dyeing, chemistry (all fields), casting, metal melting (casting)	
63	Aerospace engineering	
64	Safety engineering	
65	Management (all fields)	
66	Management (all fields)	
67	economics	
68	Accounting, banking, marketing, physics, law, mathematics	
69	Insurance	
70	Agricultural engineering (other fields), natural resource engineering	
71	Environmental engineering	
72		

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1 the investor can also obtain the construction permit if, in fact, it is group of partnership; in which case the request form is completed by the representative of the group.

**Appendix three:**

**Description of proposed  
services for preparing  
“investment packages for  
construction of small-scale  
generators”**



The “subject of contract” and “description of services”, as elaborated bellow, are offered as guides in settling a contract of “preparing an investment package for small scale generators (CHP generators) which targets the private sector investors”. They are subject to revision, removal and complementation by the investment promotion unit.

**1. Subject of contract:**

Subject of contract refers to all necessary studies with the purpose of providing the private sector investor with an investment package for small scale generators (or CHP generators). The parties to the contract agree that, when finalized for the intended site of construction, the right of transferring these investment packages to investors is relegated for a period of six months<sup>1</sup> to the consultant, in other words for obtaining the permit or the construction permit for constructing a small scale generator within the site(s) for 6 months after the conclusion of the contract, only the application of those investors will be processed that are introduced by the consultant; and the employer refers all of the investors that are interested in constructing a small scale generator within that specific site, to the consultant.

**2. Description of services:**

**Stage (1): inspection of a typical site as representing the original one and feasibility studies**

1. Identifying the different loads and units within each site
2. Calculating the maximum energy consumption by studying the blueprints of the units and the relevant documents.
3. Determining the type of required energy for each site by considering the existing units (residential, commercial, industrial etc.) and those that might probably be added in the future.
4. Determining the manner of change in energy consumption for each site.
5. Conducting a study on energy need and thus concluding whether or not a CHP generator is required or not. In case a CHP generator is deemed necessary the following steps must be taken as the feasibility study for this plan.
6. Considering implementation issues including hot water (steam), piping, connection to the power grid, connection to the national gas pipeline etc.
7. Assessing the current conditions of the site including possession of silos, local technical team, machinery, facilities relevant to installation, commissioning and operation of the generator and alike.
8. Concluding whether or not a CHP generator in the site is possible or not, by finalizing the feasibility studies; if the answer is in affirmative then the score of the site is assigned based on that study.
9. Declaring the above mentioned information in the form of investment opportunities.
10. According to the results of the previous section, the employer chooses the site for further studies.

**Stage (2): technical assessments and determination of specification of the construction plan of the small scale generators.**

**Part one:** determination of the optimum capacity of the generator, introduction of the equipment and the overall plan for heat recovery:

1. Determining the required capacity of the generator(s) for each site.
2. Determining how each unit within a specific site can use the recovered heat and also indicate the best way of recovering heat from electricity generation equipment in order to reach the maximum efficiency.
3. Feasibility studies on recovering heat from the electricity generator in order to be used in the existing units in the site and considering its economical soundness.
4. Determining the optimum power for the CHP generator(s) taking into account such scenarios as maximizing the efficiency of the complex, reduction of the finished costs, generation of electricity in excess of the site's consumption and the possibility of its sale etc.
5. Devising for each site the overall placement plan of the generators, given the available space, so that the costs of transmission of electricity and heat are minimized.
6. Exact determination of the type of the generator, the type of electricity generating equipment and their optimum capacity, based on the above mentioned considerations and studies, weather conditions of the site (temperature, humidity and altitude) and the amount of consumption; the equipment must be chosen from the range of products of reputable companies.
7. Declaring the complete set of technical characteristics of the chosen electricity generation equipment, their manufacturers etc.

**Part two:** designing the required networks:

1. Inspecting the existing water and gas pipelines and the electric power network, determining those which need upgrading and those which need to be extended.
2. Proposing a preliminary plan for connecting the generator's electric output to that region's network; proposing methods of compensating these deficiencies.
3. Devising the overall plan for the pipeline that is required to transport heat from the generator to the consumers at each site.

**Stage (3): informing the investor of the required volume of investment by conducting financial studies**

1. Studying the technical financial suggestions expressed by equipment manufacturers and contractors and refining them through negotiations.

2. Estimating the required volume of investment for total execution of the plan, including purchase of the main equipment, accessories, installation and commissioning, training etc.
3. Preparing financial reports on eligible conditions of receiving governmental grants, its sources, the bank which is involved, interest rates of these grants, how to legally access these funds, the required initial capital of the investor etc.
4. Predicting the generated income of the plan of the CHP generator from its commercial commissioning and report it to the investor.
5. Devising the financial model of the plan, including: internal rate of return (IRR), period of return on investment, return on equity (ROE), break even point, net present value of investment etc, and informing the investor of it.
6. Outlining the timetable for the execution of the plan for each site.

**Stage (4): finalizing the studies and composing the technical financial investment packages for each site**

1. Finalizing and preparing a report on the studies that have been conducted through the previous steps, for composing or complementing the technical financial investment packages for construction of small scale generators.
2. Preparing the investment packages in two forms, one as a published report and another as a software package and submitting them to the employer.

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1 in any case, this right is annulled nine months after the completion of step one of this contract even if the six month period has not yet finished.

# Indices

- **By subject**
- **By numbers**
- **By names**
- **By organizations**

# Index of subjects

## Free

- Temporary rate connection
- Temporary rate tariff
- Unsubsidized rate
- Unsubsidized rate of gas
- Unsubsidized rate of gas oil

## Notice of delay

## Connection

- Connection to the distribution network
- Connection to the gas pipeline
- Connecting the generator
- Generator's test of connectivity
- Instructions for connection
- Technical conditions of connection
- Point of connection
- Studies on the point of connection to the network
- Permit of connecting to the network
- Costs of connection

## Lease

- Long term lease
- Lease to own
- Period of lease

## Evaluation

- Evaluation
- Competency evaluation
- Procedure of evaluation for issuing the construction Permit
- Evaluation committee

## Standard

- Environmental and technical standards
- Technical standards

## Information

- Information
- Information technology

## Validity

- Validity of the permit
- Validity of the Permit
- Money and credit council
- Period of validity of the introduction letter
- Money and credit institution

## Transfer

- Transfer of permit
- Energy transfer
- Definite transfer of ownership
- Costs of transmission services
- Transmission network

## Energy

- Energy transfer
- Energy recovery
- Energy
- Thermal energy
- Electric energy
- Optimized energy consumption
- Energy conversion contract
- Average rate of energy conversion

## Connection

- Temporary rate connection
- Electric power connection
- Permanent connection
- Generator's gas connection
- Twice the connection capacity

- Connection capacity
- Costs of connecting to the gas pipeline
- General costs of connection

#### **Load**

- Substation load
- Consumer's load
- Consumed load

#### **Market**

- Whole sale market
- Iran's electricity market regulations

#### **Efficiency**

- Effective electric efficiency
- Thermal efficiency of the generator
- Efficiency of the generator
- Efficiency of thermal power stations
- Reward for efficiency

#### **Annulled**

- Previous permit annulled

#### **Bank**

- Excess bank withdrawal
- Bank
- Banking facilities
- Banking system

#### **Electricity**

- Electric power connection
- Regulation of guarantees of purchase of electricity
- Electricity market
- Generated electricity
- Price of electricity
- Substation
- Supply of electricity
- Electricity trade

- Losses of electric network
- Electricity distribution
- Electricity generation
- Cogeneration of electricity and heat
- Purchase of electricity
- Indexes of power quality
- Electric network
- Public electric network
- Supplying of electricity
- Sale of electricity
- Average rate of electricity generation
- Direct sale of electricity
- Iran's electricity market regulations

#### **Price**

- Bonds
- Price of electric power
- Difference of the price of sale of electricity
- Price of gas
- Average price of transmission services

#### **Permit**

- Construction permit
- Utilization permit
- Large scale power plant
- Validity period of the construction permit

#### **Project**

- Project

#### **Substation**

- Dedicated substation
- Substation
- Immediate substation
- Distribution substation
- New substations
- Transmission substations

- Suitable substations for installation of the generator
- Available substations
- Minimum load of substation
- Downstream network of the substation
- Substation capacity

#### **Down payment**

- Down payment
- Down payment on purchase of electricity

#### **Appendix**

- Appendix one
- Appendix two
- Appendix three

#### **Facilities**

- Facilities
- Facilities that are owned by TAVANIR or its subsidiary companies

#### **Trade**

- Electricity trade

#### **Transit**

- Implementation of transit
- Transit
- Technical losses resulting from transit
- Contract of transit
- Costs of transit

#### **Facilities**

- Obtaining facilities
- Using the facilities
- Providing facilities credited by managed funds
- Granted facilities to the private sector
- Banking facilities

- Granting of facilities for financial support for construction of small scale generator
- Facilities subject of remark 6 of article 4 of regulations of guaranties of purchase of electricity
- Obtaining facilities

#### **Cooperative companies**

- Members of the cooperative company
- Section of cooperative company
- Cooperative companies
- Legal protections regarding cooperative companies
- Cooperative company
- Main fields of activity of the cooperative company

#### **Adjustment**

- Adjustment

#### **Tariff**

- Temporary rate tariff
- Ratifies tariffs

#### **Losses**

- Losses of the transmission network
- Losses of the power grid
- Technical losses
- Technical losses of the network
- Reduction of losses

#### **Ownership**

- Lease to own

#### **Turbine**

- Expansion turbine
- Gas turbine