



Ministry of National Infrastructures



# Charging of Electric Vehicles

## Policy Principles





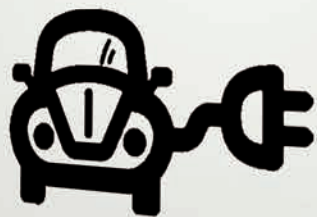
## Contents

<b>1. Status and future prospects – Overview</b>	<b>5</b>
1.1 The electric vehicle (EV) market in Israel	5
1.2 Actions taken by the Ministry of National Infrastructures and the Government to advance the subject	6
<b>2. Policy – General Principles</b>	<b>9</b>
<b>3. Policy – Specific Principles</b>	<b>11</b>
3.1 The charging device and the charging method	11
3.2 Installation of the charging device	12
3.3 Billing for electricity consumption	13
3.4 Control of the charging and load management	13
3.5 Standards	14
3.6 Charging suppliers - licensing and licenses	14
3.7 Financing the charging infrastructure and the ancillary infrastructures	16





Welcome to  
Elektromotive  
Please present  
Tag to charge



**CHARGING  
OF ELECTRIC  
VEHICLES**



## 1. Status and future prospects – Overview

### 1.1 The electric vehicle (EV) market in Israel

Electric vehicles (EVs) incorporating batteries and an electric motors and charged from the electricity grid have been around since the start of the 20th century (for example, the **Detroit Electric** car in the United States). Other electric vehicles were manufactured at times of fuel shortages, such as a Japanese car manufactured after the Second World War; a French car manufactured in response to the oil crisis of 1973/4; General Motors' **EV1** in the 1990s.

At present, different types of electric vehicles in Israel and around the world are used for a diverse range of purposes: mobility scooters for the elderly and the disabled, small electric motor scooters and bicycles, forklifts, municipal utility vehicles (such as the German Postal Service), small municipal electric vehicles, and electric utility vehicles at manufacturing plants, airports, golf courses and military bases.

Recent developments in the field are turning it into a realistic option that contributes to reducing dependence on oil, decreasing direct air pollution from transportation, as well as advancing the use of non-oil based generation of power for transportation (coal, natural gas, renewable energy, nuclear energy).

#### The types of electric vehicles expected in Israel:

An electric vehicle for the purposes of this document is a vehicle type **M** or **N** under Section 271a of Transport Regulations 5721 – 1961; such vehicles shall be charged using devices dedicated to electric vehicles.

#### Four types of chargeable electric vehicles are expected in Israel:

1. Full/pure EVs, with a fixed battery;
2. Full/pure EVs, with an exchangeable battery;
3. EVs with an auxiliary engine that runs on liquid fuel and a generator for charging the battery, as necessary;
4. Hybrid vehicles that run on a combination of an internal combustion engine and an electric motor.

## 1.2 Actions taken by the Ministry of National Infrastructures and the Government of Israel to advance the subject

The issue of conversion of transportation to electric vehicles played an important role in the Master Plan for Development of Sustainable Energy for Transportation (2006) and the Master Plan for the Fuel Sector (2007).

### Government Resolution No. 2452 to reduce air pollution from transportation:

The Minister of National Infrastructures and the Minister of Environmental Protection submitted a comprehensive proposal for the reduction of air pollution from transportation by a range of measures, that was approved as Government Resolution No. 2452 HS /3 of October 21, 2007.

At the request of the Ministry of National Infrastructures, the Resolution included Section 12(a): "To examine within a year the pros and cons of vehicles recharged with electricity from the national electricity grid and to recommend policies on this issue, including the generation and transmission of electricity for charging the vehicles, creating a solution for used batteries and formulation of a long-term tax policy for this new technology."

Section 14 was also added, which requires the Ministry of National Infrastructures to support "ventures that develop alternative means of propulsion characterized by high energy efficiency, which contribute to significant reduction in air pollution and greenhouse gas emissions relative to existing technologies, granting preference to technologies according to their potential for improvement."

### Government Resolution No. 2580 of November 11, 2007 (Section F):

"... the Government also resolved to review favorably the integration of non-polluting technology alternatives to transportation fuels, in order to reduce the dependency of the State of Israel on fuel and to join the global trend seeking to reduce environmental harm in general and harm resulting from the use of fuel in private vehicles in particular; to examine, within a short timeframe, the possibility of preliminary implementation of these technologies in Israel, and for this purpose, to appoint an inter-ministerial Steering Committee, headed by the Budget Director of the Ministry of Finance, with the participation of representatives from the Prime Minister's Office, the Ministry of Transportation and Road Safety, the Ministry of National Infrastructures, the Ministry of Industry, Trade and Labor, the Ministry of Environmental Protection, the Ministry of Justice, the Tax Authority, the Israel Antitrust Authority and the Planning Administration in the Ministry of the Interior, to examine proposals to encourage the use of clean and non-fuel transportation (hereinafter – the Steering Committee)."

It was also decided that the Ministry of National Infrastructures would take the lead in driving this sector forward (Section F/4): "A panel headed by the Director General of the Ministry, with the participation of the Budget Director of the Ministry of Finance and the CEO of Israel Electric Corporation, will examine the implications of establishing the nationwide network and running it in the electricity sector. The panel will submit its conclusions and recommendations by February 15th, 2008."

### Subsequent activity:

At meetings held pursuant to Government Resolution No. 2580 and in the sub-panels set up by virtue of this resolution, the Ministry of National Infrastructures was asked to express its opinion on the

following issues:

- a. The Electricity Law and the need for amendments and/or promulgation of relevant regulations;
- b. Requirements in respect of the method for charging batteries, and their implications for the electricity sector;
- c. The need for additional electricity transmission infrastructure for the purposes of the project.

To complete the opinion of the technical staff at the Ministry of National Infrastructures, technical specifications were required in respect of the positioning of the charging points, the charging regimes, the power outputs of the battery and a typical battery exchange station, and estimates of the charging load curves according to the time of day, area, etc.

The technical personnel at the Ministry of National Infrastructures believe that priority should be given to overnight charging, and that rapid random charging during the day is liable to require the construction of additional power stations. In addition, the Ministry emphasized that only after the various entrepreneurs have presented the technical specifications and their plans in full will the Ministry be able to examine how to go about adapting the various regulations that will be issued by virtue of the Electricity Law.

This position is also reflected in a feasibility study conducted by the Israel Electric Corporation (IEC) which investigated the points raised above.

### Activity in 2010–2011

1. Preparation of a draft policy document by the Ministry of National Infrastructures and inviting comments from stakeholders and from the general public - December 30, 2010.
2. Formulation of regulations for the Electricity Law and the Law for the Electricity Sector in order to implement the policy principles outlined in this document.
3. Submission of detailed questions to electric vehicle entrepreneurs.
4. Meetings with professional Government entities and with various entities in the automobile industry (some of which have differing expectations that conflict with Government policy, such as on the issue of a battery charging standard).
5. Identifying and collecting international information on electric vehicles and preparing deployment and integration scenarios liable to have implications for the development of the electricity sector.
6. Conducting a comparative study based on information from international sources about the characteristics of the various types of electric vehicles, anticipated electricity consumption in real time, realistic travel ranges, strengths and weaknesses, standardization and regulation.









## 2. Policy – General Principles

1. Stringent safety requirements and minimization of electrocution risks and other harm to humans and the environment will be ensured.
2. The charging infrastructure shall comply with high international and Israeli standards.
3. Electric vehicle owners may install a private charging device for their own use in their private parking at home.
4. Electric vehicle owners may enter into a contract with a charging supplier to manage the charging of their electric vehicles, but will not be obligated to do so.
5. Implications of charging electric vehicles on the national electric system, including the need for upgrading network infrastructures, shall be minimized, and optimization of electricity consumption shall be pursued.
6. Electric vehicles charging costs will not be imposed upon all of the electricity consumers.
7. Every business entity complying with predetermined minimal specifications and with the requirements of the law shall be granted a charging supply license.
8. Charging suppliers shall not limit their customers to use of charging devices owned or managed by them only.
9. The principle of open access shall be upheld in private parking lots serving the public; this will enable multiple suppliers' market and access by "casual customers".
10. In private parking lots serving the public, the charging suppliers shall not prohibit electric vehicle owners who are not their customers from charging their vehicles.
11. Termination by an electric vehicle owner of its contract with a charging supplier, if requested, shall be quick and simple.
12. Fair competition in the EV industry shall be maintained.
13. Confidentiality of information pertaining to the customers of the charging suppliers, including their electricity consumption routines, shall be strictly maintained according to the law; use of information liable to prejudice customer privacy shall be prevented.

**CHARGING  
OF ELECTRIC  
VEHICLES**







### 3. Policy – Specific Principles

#### 3.1 The charging device and the charging method

##### General

1. The standard charging device will be used either as a private/ home unit, or as a unit used by a business entity for its own needs, or as a unit utilized for sale of charging services.
2. Electric vehicle owners shall be billed for the electricity consumed by their car either by the IEC or by the charging supplier, as the case may be, based on the meter readings of the charging device.
3. The “smart” charging device will communicate with the charging control system of the IEC or of the charging supplier it is linked to, according to the agreement between them, in order to authorize the charging process, subject to the prevailing constraints within the local electricity distribution network, and subject to the requirements of the IEC’s national control center, in accordance with the electricity generation and transmission capacity.
4. In the case of a charging device operated by a charging supplier, charging shall be managed subject to the supplier’s agreement with it’s customers.

##### The method for connecting a electric vehicle to the charging device

1. Electric vehicle charging shall be performed while ensuring the appropriate safety of users and of passersby, in compliance with safety regulations and standards.
2. Electric vehicles shall be equipped with a suitable charging cable fitted with a standard plug that shall be kept in the car, as shall be defined by the Standards Institution of Israel (SII); the charging device will be equipped with a standard socket. Alternatively, the charging device will be equipped with a charging cable that will not be detachable.
3. The plug at the end of the charging cable shall comply with the standard requirements, as shall be defined by the SII, and shall be compatible with all electric vehicles.
4. Connecting the electric vehicle to the charging device will enable a two-way communication between them. This two-way communication will prevent electrocution as a result of accidental



contact with the socket on the device, as the socket will be energized only after valid communication has been established. The two-way communication will also prevent attempts at charging with a nonstandard charging cable. The charging cable will facilitate such two-way communication between the charging device and the electric vehicle.

5. The cables used for charging will be able to withstand sustained, continuous and long duration charging.
6. In addition to control over the two-way communication with the electric vehicle being charged, the charging device will enable control of earthing continuity; cut-out in the event of a buildup of leakage current in the charging unit ("leakage current circuit breaker"/ "safety switch" action); immediate cut-off of the charging voltage if the charging plug is disconnected from the vehicle during charging; current limiting capability based on the charging cable cross-section.
7. The charging device will be linked to the control system of the local distribution network, or to the management system of the charging supplier, as the case may be, for the purpose of controlling the charging.
8. The charging device, including the charging station for exchanged batteries, shall enable measurement and transmission of the electrical power consumption.
9. The electrical connections shall be compatible with both single-phase and three-phase current supply, at least at public locations.

### 3.2 Installation of the charging device

1. The charging device shall be installed by an appropriately certified electrician, in a manner that shall secure the unit to the wall of the building or otherwise fixed, non-portable setup.
2. Electric vehicle owners may have a private charging device installed for their own personal use in their own private parking, by a suitably certified electrician. The charging device will be connected to the electricity grid by means of a specially designated distribution cabinet equipped with a meter for measuring electricity consumption, which will be installed by the entity possessing the distribution license for the respective locality (generally the IEC). Alternatively, the charging device will be connected to the vehicle owner's residential electric circuitry.
3. Electric vehicle owners who are customers of a charging supplier may order the installation of a charging station in their own private parking by the charging supplier, according to the contract between them.
4. In public areas (areas owned or held by the State or by a local municipality and serving as public thoroughfares, including sidewalks, paths, roads, streets and lots the use of which is free or incurs payment of a parking fee according to municipal bylaws), the charging devices will be installed by the entity possessing the electricity distribution license (currently, the IEC).
5. The charging device shall be inspected by a licensed electrical inspector before its first use, in order to verify compliance with the provisions of the Electricity Law 5714-1954 and pursuant regulations.
6. Accessibility for the disabled: in public areas, charging devices for the disabled will be marked and shall enable easy access for charging.



### 3.3 Billing for electricity consumption

#### Determination of electricity tariffs for an electric vehicle charging:

1. The tariffs for charging through an essential service provider will be set by the Electricity Authority and published by it. It is proposed that the tariffs be defined as load & time tariffs specific to this sector.
2. The tariffs for casual customers at private locations used by the public determined by charging suppliers shall be published by the charging suppliers in the manner that shall be determined.
3. The Minister and/or the Ministry of National Infrastructures will be able to decree the imposition of controls over electricity tariffs for the electric vehicle owners, as necessary, in order to protect consumer interests.

#### The billing for battery charging by an essential service provider shall consist of:

The essential service provider will bill customers at their private homes, or bill their charging suppliers, as the case may be, according to the electricity consumption tariffs as shall be determined by the Electricity Authority.

At public locations, the essential service provider will bill casual customers as well as the charging suppliers for the consumption of their customers, as the case may be, in respect of three components, as shall be determined by the Electricity Authority.

1. Infrastructures (set-up): the cost of setting up the charging stations at public locations and the cost of the connecting infrastructure to the electricity grid.
2. Infrastructures (maintenance): the cost of maintenance for the charging stations at public locations and the cost of the connecting infrastructure to the electricity grid.
3. Electricity consumption: billing for the consumer's electricity consumption via the charging station.

### 3.4 Control of the charging and load management

1. The electrical load added to the local distribution grid networks and to the national transmission grid networks by charging the electric vehicles will be managed and controlled by the essential service provider (ESP), as defined in the Law for the Electricity Sector (usually the IEC), in order to prevent or minimize the need to expand the existing electricity grid networks and in order to minimize the need for installation of additional power generation plants (hereinafter: "charging control").
2. Licensed charging suppliers will be allowed to manage the charging of the electric vehicles of their customers, according to the agreements between them and their customers, subject to the charging control imposed by the ESP.
3. Charging control will constitute the first smart grid activity to be operated by the ESP. Any constraints arising in the supply of electricity in the local distribution grid or the national transmission grid will affect the charging of electric vehicles, and electricity supply to charging vehicles will be based on the actual capacity of the network, locally and nationally.
4. All charging devices installed to charge electric vehicles at private homes, at public locations and

at private locations that serve the public like parking lots will enable the application of charging control, and will be subject to load management when a decision to that effect is made.

5. The ESP will distribute the charging capabilities available in each distribution area at any given time equally between all the electric vehicles concurrently connected to the charging devices in that area, subject to the supply constraints of the local distribution grid.
6. Consumers who notify the ESP that they are customers of a charging supplier recognized by the ESP, may request the transfer of the allocation of their supply to their charging supplier, who will then divide the available supply among its customers using its own charging management system.
7. Charging that is not limited by the supply constraints in the local distribution network and that is based on higher tariffs defined and published in advance, subject to terms that shall be defined (like confirmation by means of a special button on the charging device, billing at a higher tariff, etc.), will be considered, provided that it does not influence the quality and quantity of the charging of other electric vehicles.
8. Charging control will be implemented at a time to be defined by the ESP, based on its readiness and on the number of electric vehicles in the market. Until that time, charging devices will be connected to the ESP system or to the charging supplier (according to the agreement between them) solely for the purposes of confirming the establishment of good communications (and not for charging control purposes). Once the charging control is implemented, the communications with the installed charging devices will be transferred to the local control unit. It is quite possible that charging control will be implemented in certain areas only, and not throughout the entire country.

### 3.5 Standards

1. The standards that shall be defined shall include all the necessary safety requirements and shall enable adequate competition in the electric vehicle market.
2. International standards shall be implemented and adapted to the principles of this policy document. The Israeli standard will comply with generally accepted and recognized international standards.

### 3.6 Charging suppliers - licensing and licenses

#### General

The electric vehicles constitute a new and developing sector now being formed, and regulating the battery charging involves issues that differ to some extent from those currently prevailing in the electricity sector. The core regulation of existing licenses relates to electricity generation and to the electricity supply chain, and not necessarily to the material issues relevant to electric vehicles (charging control, open access, etc.).

Therefore, charging supply license will be specific to the electric vehicle sector, and different from the existing supply license. The license will incorporate the principles of this policy document.

#### Regulating the activity:

A license track will be introduced that will be regulated within the framework of the Law for the Electricity Sector and its bylaws. Charging suppliers will be required to obtain an appropriate license.





The license will be granted to any business entity requesting such that complies with the threshold conditions and with the requirements of the law, as shall be defined.

**The preconditions for obtaining a charging supplier license shall include the following criteria:**

1. The applicant has no criminal record.
2. The applicant must provide details pertaining to the financial and technical means and facilities at his disposal which will be used in order to execute the activities stipulated in the license.

**The terms of the charging supplier license:**

1. The charging supplier shall not constrain its customers from obtaining charging services from charging devices not owned or managed by it.
2. The licensee shall make open access available to any casual customer or customer of another charging supplier, without discrimination. A charging supplier shall not prevent the owner of an electric vehicle from charging his car at charging devices at its disposal, just because he is not a regular customer, and shall enable casual customers to charge their vehicles on an equal basis.
3. The charging supplier shall keep confidential all information pertaining to its customers and their electricity consumption and driving habits, subject to the law, and shall not make any use of such information which is liable to prejudice the privacy of its customers.
4. The supply agreement between the charging supplier and the customer shall not include provisions limiting the ability of the customer to terminate the agreement at any time. The charging supplier shall enable quick and easy termination of the engagement without exit penalties, at the customer's discretion.
5. The licensee shall hold a compulsory insurance policy.
6. The means for providing customers with reliable and continuous service shall be specified by the licensee. Establishment of a Customer Service department shall be required when a certain level of activity is reached by the licensee, as shall be defined by the Ministry.
7. Licensee shall comply with environmental and other requirements, as required by law.

### **3.7 Financing the charging infrastructure and ancillary infrastructures**

The cost incurred by the installation of the electric vehicle charging systems will be borne by the vehicle owners and/or the charging suppliers.

At public locations, the charging supplier, or any other entity requesting the ESP to install charging devices, will finance in advance the setting up of these devices. The financing of the setup costs will take the form of a loan that will be repaid over time, by remitting part of the fee that users will pay for use of the charging device. In cases where the ESP will be ordered to install charging devices by the Ministry of National Infrastructures, the setup costs shall be incorporated in its designated development program.

In the remaining areas, the financing will be borne by those in possession of the land rights, or by any other party authorized by those in possession of the land rights.

