



Fuel
Choices
Initiative



Prime Minister's Office

Israel Fuel Choices Initiative

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*The National Program for the
Development of Alternative fuels in
Transportation*

FREEDOM TO CHOOSE THE WAY WE MOVE

The U.S.-Israel Bio-Energy Challenge



FREEDOM TO CHOOSE THE WAY WE MOVE

Outline



- 1. Alternative Fuels – Description and Forecast***
- 2. Alternative Fuels Program Overview***
- 3. Promoting activities – Things are happening!!!!***

Why we must get off oil

Oil Is a Monopoly in Transportation



Oil Reserves Peaking



Economic Effects



Environmental Problems

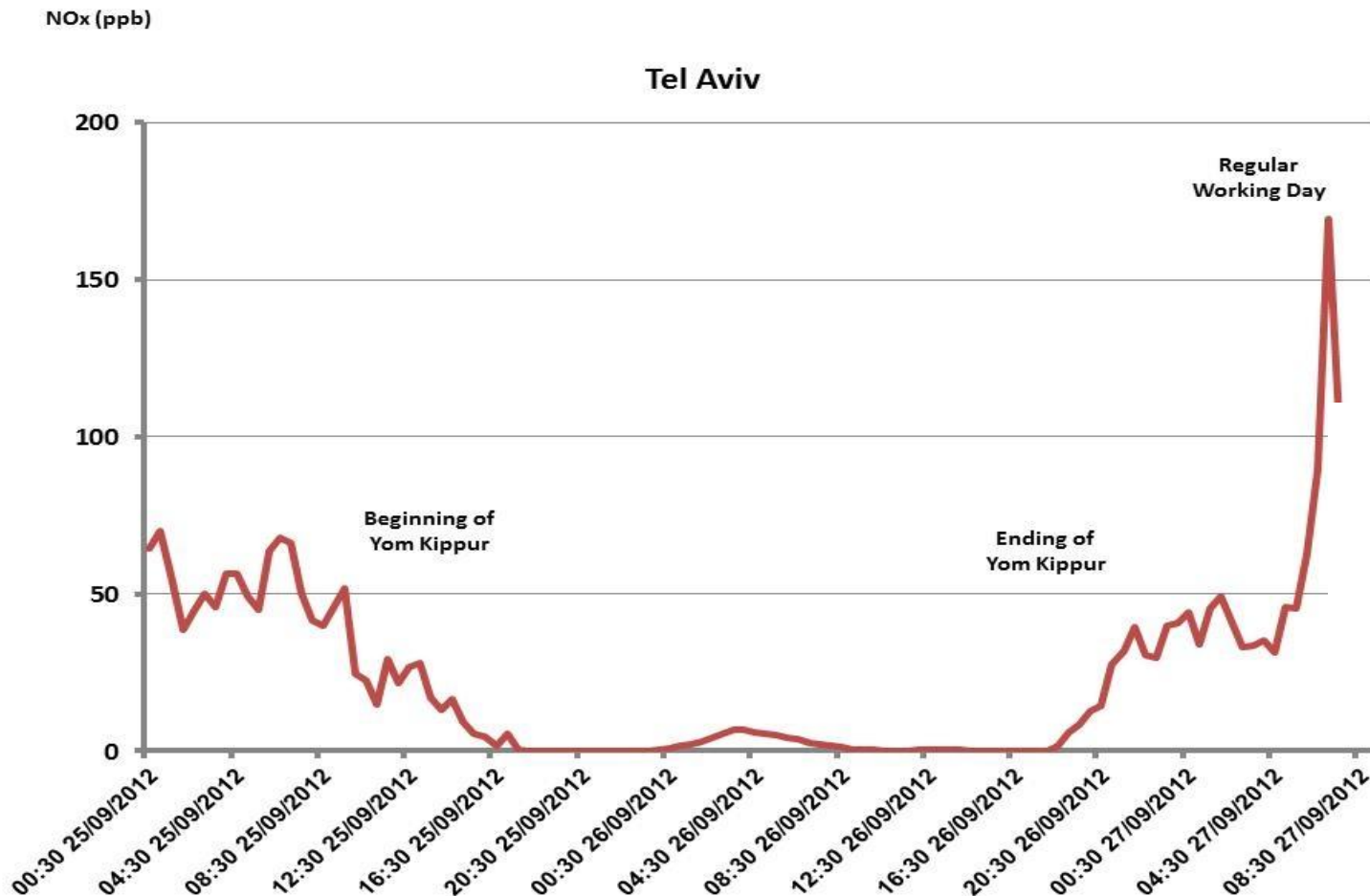


- **The End of the “Cheap Oil Era”**

In 1900, the “price” of harvesting 100 barrels of oil was 1 barrel, Today one barrel of oil nets only three to five in return



NOx Emission – Tel Aviv, Yom Kippur 2012



So what the world has to offer



Ethanol

Methanol

Bio Fuels

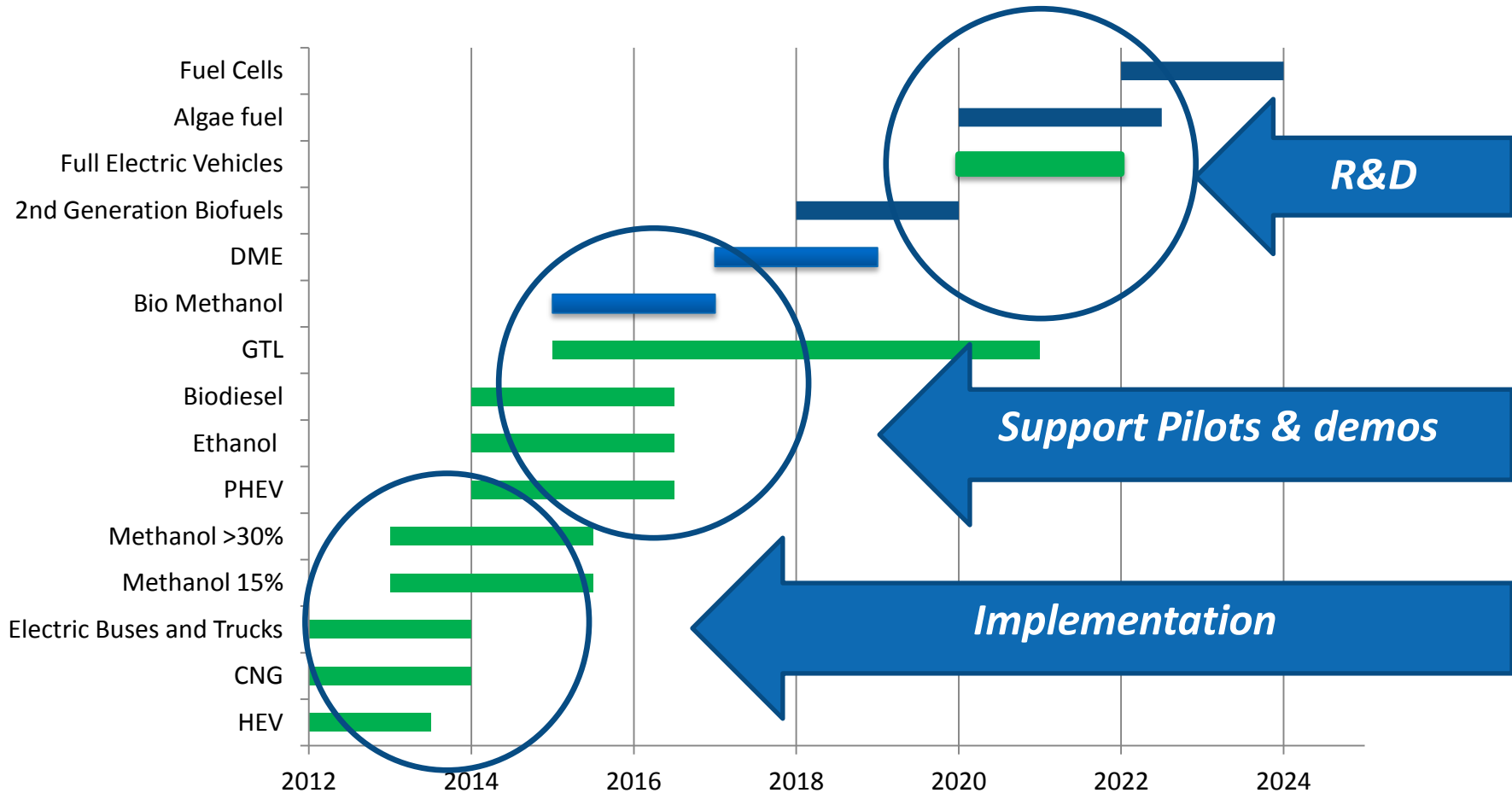
Natural Gas - CNG

Electric Cars

Fuel Cells



Forecast of economic viability of Technologies



Reality of Fuels Alternatives

- *There are many solutions*
- *No gold standard*
- *Some solutions are already economically viable*
- *Solutions are locally based*
- *Implementation can start now*



Before

- ❖ *No Choice*
- ❖ *Expensive*
- ❖ *Not Available*

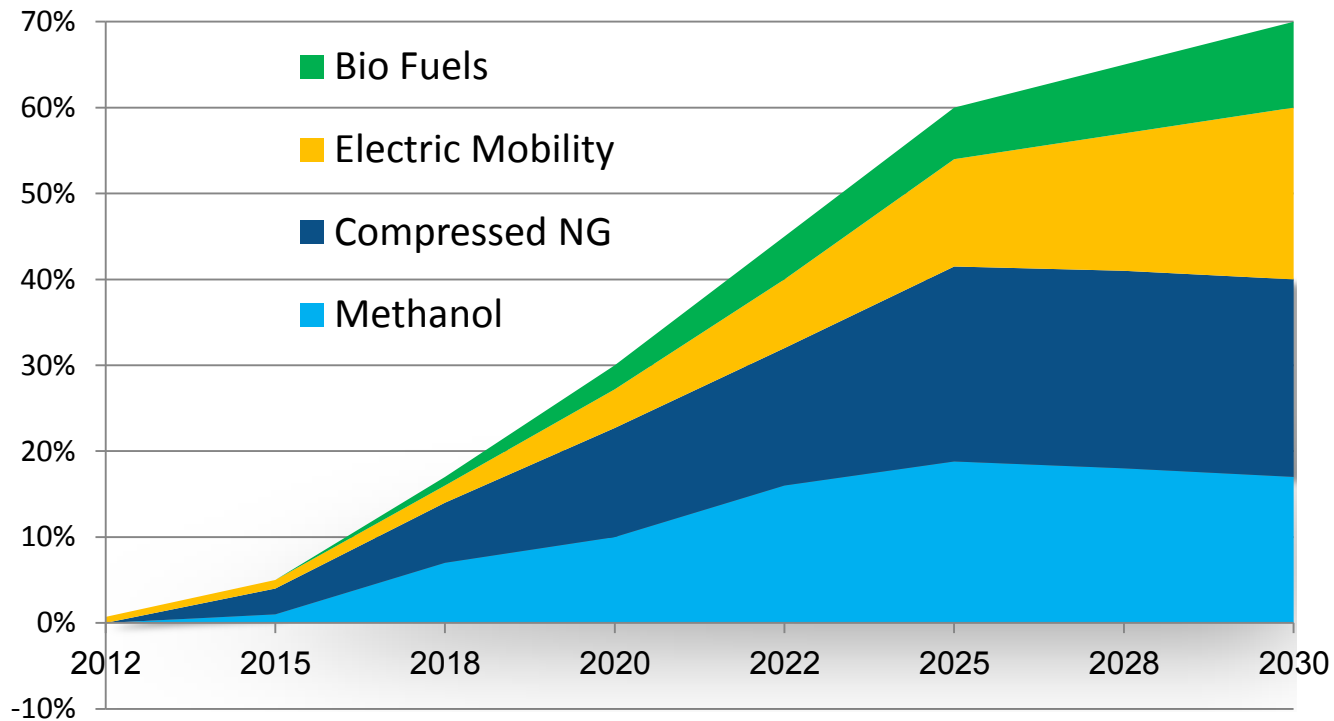


Now

- ✓ *Multiple Choices*
- ✓ *Cheap*
- ✓ *Available Now*

Reduce the usage of oil In Israel

Expected Penetration Rate for Alternative Fuels in Israel



Fields of Alternative fuels

Energy Agriculture

¹⁰ *Israel is a global leader in agro-technology*

(limited land and water)

- *Advanced Energy Agriculture Projects, based on leading Israeli agro-companies*
- *Castor bean farming and industrial processes for biofuels.*
- *Algae farming for as a feedstock for biofuels*
- *Bio-Fuel production processes and technologies*
- *R&D is focused on:*
 - *New varieties of energy plants*
 - *New machinery for harvest of new crops*
 - *Procedures for post harvest processes and production of bio-fuels*

Natural Gas for Transportation

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- *Natural gas is the best short term solution for replacing oil in the transportation and as a bridge towards fully sustainable energy solutions.*
- *NG based transportation in the Israeli market is focused on:*
 - *Condensed Natural Gas (CNG) solutions for trucks, light duty vehicles, buses and private vehicles*
 - *Methanol as a gasoline blend, mainly to be used by private vehicles.*
 - *Gas to liquid technologies, that can turn natural gas into drop-in fuels*

Energy Storage Technologies

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- *Challenge: improved energy storage and integration into mobility platforms*
- *Israel is home to innovative electrochemistry and energy storage applications & research.*
- *Applied research and production is focused on:*
 - *Lithium Batteries*
 - *Super Capacitors*
 - *Fuel Cells*
 - *Hydrogen Storage Systems*
 - *Metal Air Batteries*
 - *Battery Management Systems*



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Prime Minister's Office

Our Mission:

To serve as a catalyst for the reduction of global dependence on crude oil by establishing Israel as a center of knowledge and industry in the field of fuel alternatives for transportation.

Program Structure



MISSION

To serve as a catalyst for the reduction to the world's dependence on oil

GOALS

Turning Israel into a center of knowledge & best practices

Raise awareness & Int'l collaboration

OBJECTIVES

Developing next generation technologies

Local Test Bed

Support Industry

Raise awareness

Int'l collaboration

GOVERNMENT TOOLS

Research centers & Industry – Academy projects

Support Pilots

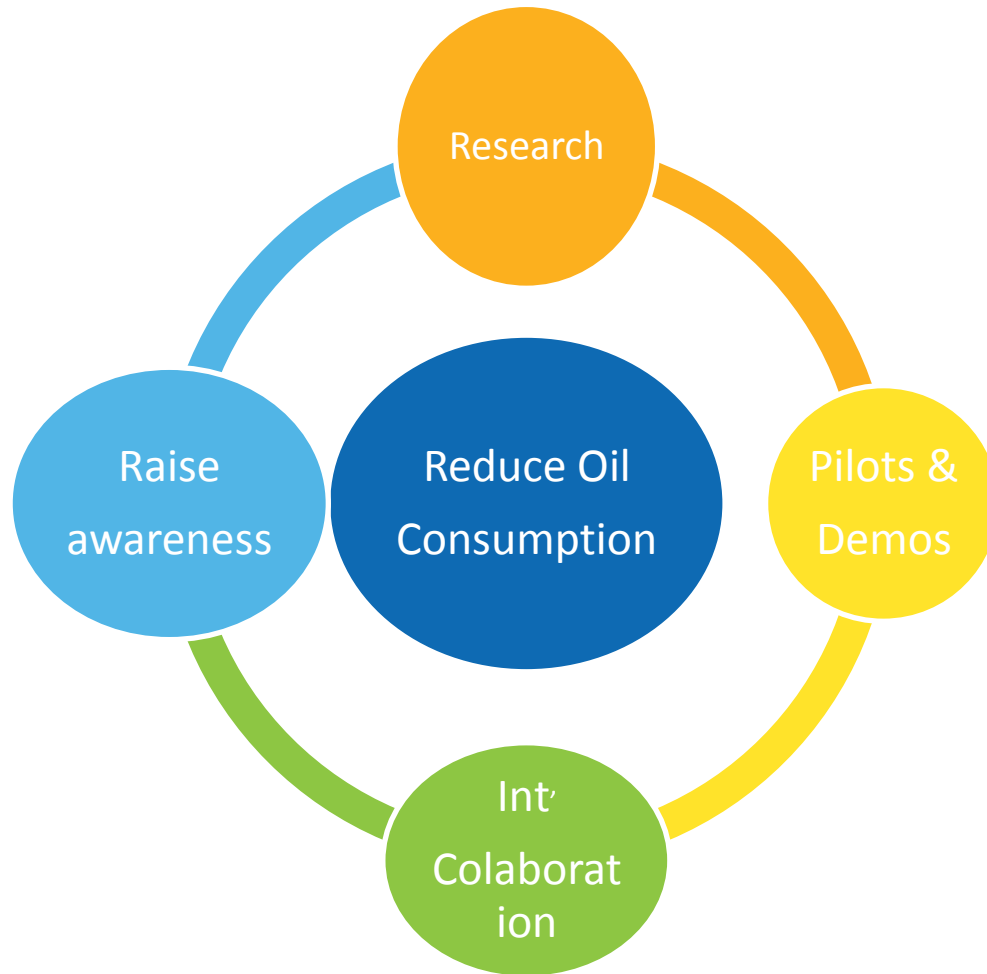
Chief Science +Co-Invest Fund

Seminars & Int'l Prize

Int'l marketing

Gov. offices: Science, Energy, IT&L, MOF, Transportation, Environment, MFA, MOD

Turning Israel into a center of knowledge & best practices





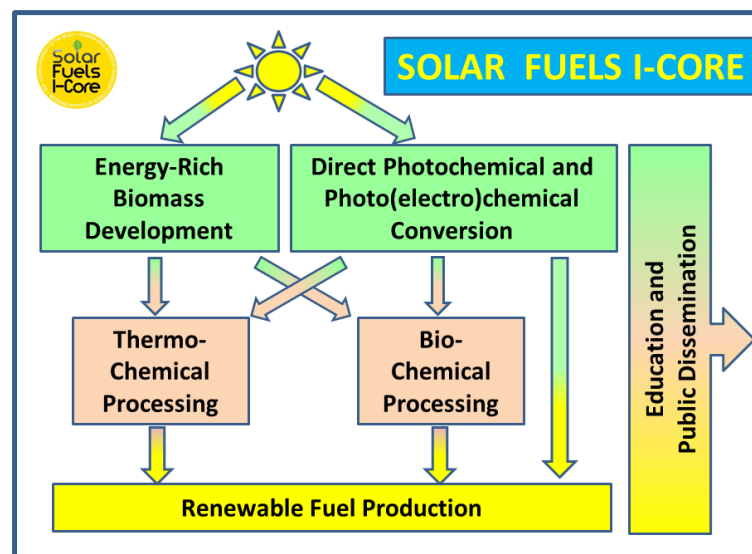
The Solar Fuels

Israeli Center of Research Excellence



focused on:

- *Energy Rich Biomass*
- *Photo (electro) Chemical Conversion*
- *Bio mass Conversion Processes*
- *Renewable Fuels Production*





מרכז מחקר לאומי להנעה אלקטרוכימית

ISRAEL NATIONAL RESEARCH CENTER FOR ELECTROCHEMICAL PROPULSION



Israel National Research center for Electrochemical Propulsion (INREP)

The Challenge: improved energy storage & integration into mobility platforms

Research is focused on:

- *Hydrogen Storage Systems*
- *Metal Air Batteries*
- *Battery Management Systems*
- *Lithium Batteries*
- *Super Capacitors*
- *Fuel Cells*



Agro - Energy Research (Vulcani Center)

Challenge: Generate clean, efficient energy from renewable sources.

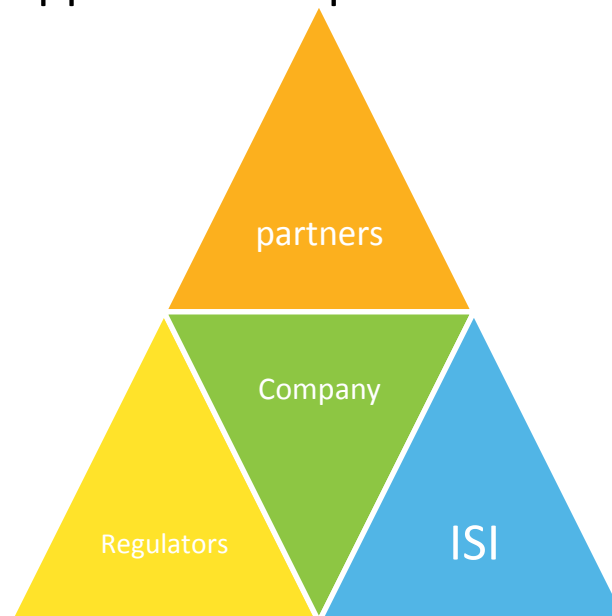
*focused on **Seed – to – Harvest** processes :*

- *New varieties of energy plants*
- *New machinery for harvest of new crops*
- *Procedures for post harvest processes and production of bio-fuels*
- **Seed – to – Harvest** processes of ***Jatropha curcas and Castor bean***



Systemic Approach for Implementation

- Conduct techno-economical studies
- Different technologies benefit different transportation sectors.
- Mechanism: Inter-ministerial teams that accompany the pilot from writing the protocols through analyzing the results. (Include representatives from the Israel Standard Institution).
- Achieve regulatory support and acquaintance of the regulator with the “new technology”.



Supporting pilots and demos – financially and regulatory



Methanol Projects:

M15

- Field trial in vehicles using a mixture of gasoline containing 15% methanol (existing gasoline-operated vehicles).
- The purpose of this pilot: to provide a full characterization of M15 implications required for its standardization in Israel as a motor fuel.
- The trial includes: laboratory tests of the fuel stability, engine performance on test-bench, road tests and vehicle-generated emissions.
- Collaboration with Ten, BGU, Afeka and European laboratories.

FFV

- Fueling of FFV (Flexible Fuel Vehicles) using methanol rich.
- Validate that these cars do run on high methanol concentrations



Pilots and Demonstrations – Electric Public Transportation

Reducing both emissions and noise for the benefit of the citizens.

Advantages of having Electric buses in an urban area are - regular routes, frequent stops, night charging.

Super-capacitor based Electric Urban Public Transportation (EUPT)

Buses run on electricity without overhead contact lines.



Full -Electric Urban Public Transportation

DAN pilot

The DAN pilot will take place in Tel Aviv Q2 2013 till Q2 2014



Pilots and Demonstrations – Tel Aviv – Smart Transportation City



A joint project with the Tel Aviv Municipality

- City Cars (Car sharing A to B model)
- Electric Scooters
- Personal Rapid Transportation



Personal Rapid Transit is a mode featuring small automated vehicles operating on a network of specially built guide ways.

The first public experiment (based on a NASA technology) of such transportation will be trialed in mid-2014.



Integrating CNG vehicles in the transportation sector

- **Potential solution for commercial vehicles.**

Benefits significantly increase for high mileage vehicle fleets, and/or intercity driving characteristics.

- Economical analysis indicates **high market savings for *busses***

- **The “chicken and egg problem”**. Government intervention for both supply and demand side is needed. (Infrastructure, vehicles)

- **Safety Issue!!!!**



Raise awareness.....



Seminars and conferences

To explore the possibilities of partnerships and international cooperation between local industry and leading global enterprises, with the aim of implementing novel technologies in the field.

- Electric Buses and Natural Gas-Based Transportation
- Energy Storage and EV conference
- Agro Energy Nexus Summit - Agro-Energy Projects Global Conference
- Academic seminars and conferences
- Israel Transportation Conference

Un-conferences - EcoMotion

Building an inter-disciplinary community



Prime Minister's Prize

An international prize awarded for global innovation or a major scientific or technological breakthrough.

Raising the world's awareness of alternative fuels. Building global coalition of partners to speed up innovation.

Government Resolution

Create a global impact – first show the world we can do it here!!!!

Reduce the share of oil in Israel's transportation sector by **30% by 2020** and by **60% by 2025**, while supporting *green growth* and becoming a show case to the world.



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Global Challenge

Local Research and Innovation

International Collaboration

