

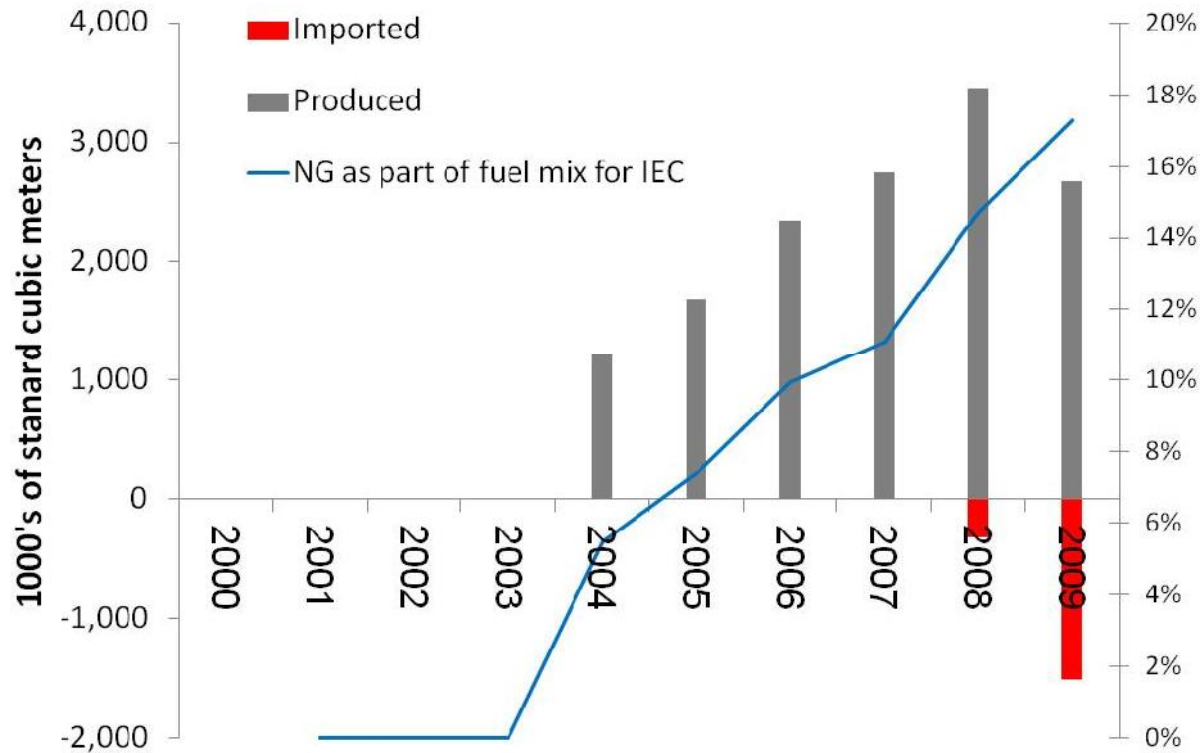
What Should Israel Do With Its Natural Gas?

Economic Perspectives on End-Use

Agenda

1. Framing Israel's NG Finds
2. What Consumers Want: Energy Security
3. What Consumers Want: Cheaper Products
4. What Consumers Want: Competing Energy Sources
 - Oil Dependence
 - Israel hub Global Oil Alternative Technologies
 - Fuel Switching Benefits to consumers
 - Flexible fuel platform Benefits to consumers
5. What to do about Israel's NG - Conclusions

Israel is a newcomer to NG

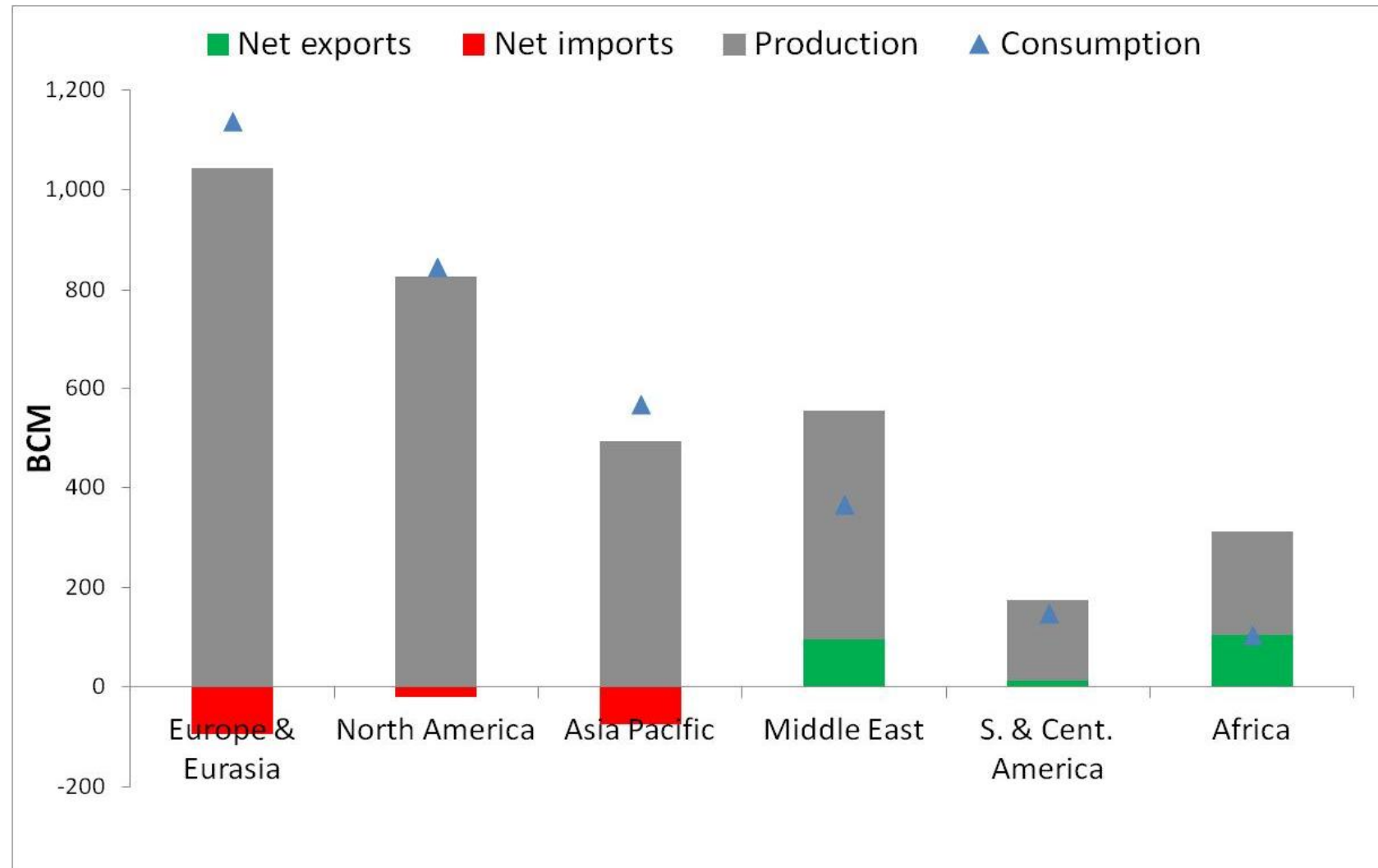


Proven Reserves and Discoveries
Natural Gas, Israel 2011

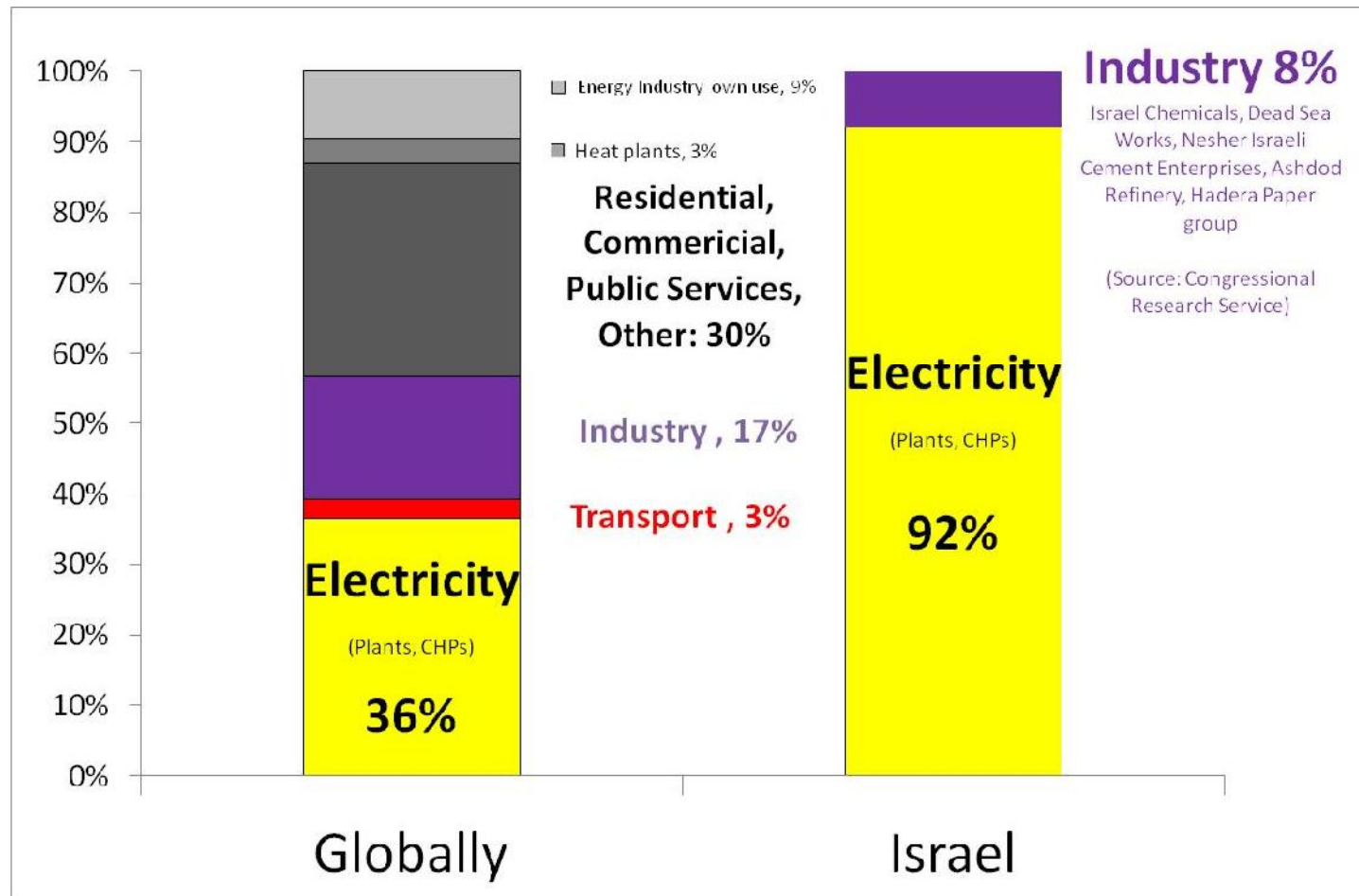
Proven reserves:	Estimated Size (BCM)
Tamar	258
Dalit	14
Yam Tethys	7
Others	2
Total	281
Other Discoveries	BCM
Leviathan	480
Dolphin	3
Total	764

Natural Gas Authority

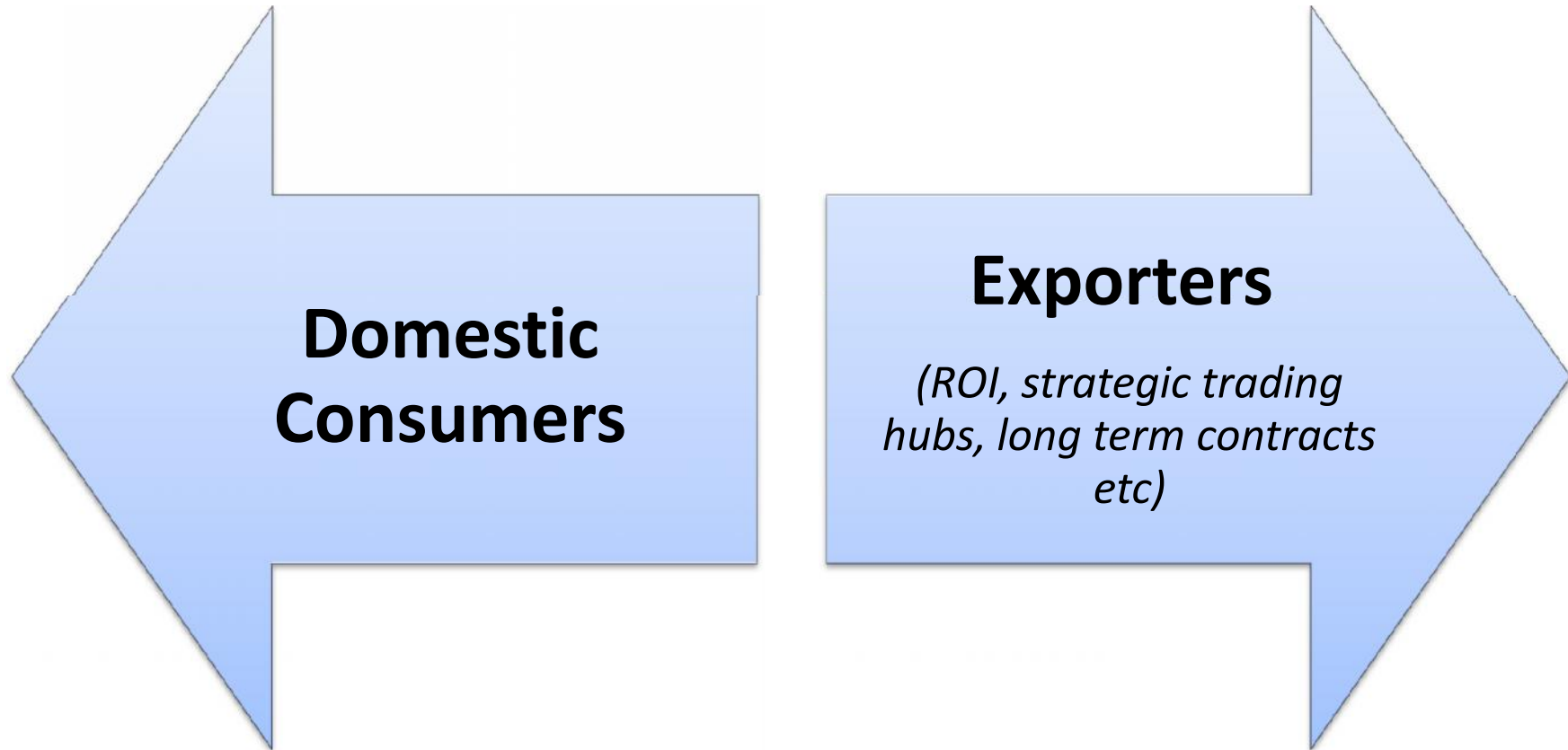
Global Perspective, 2010



The global “norm” signals significant domestic opportunities for Israel’s NG



Divergence of interests



What consumers want

I) Energy Security

- Fuel supply diversity
- Proven reserves vs demand

II) Cheap Products

- Water
- Electricity
- Transport

III) Competing energy sources

- Water
- Electricity
- Transport

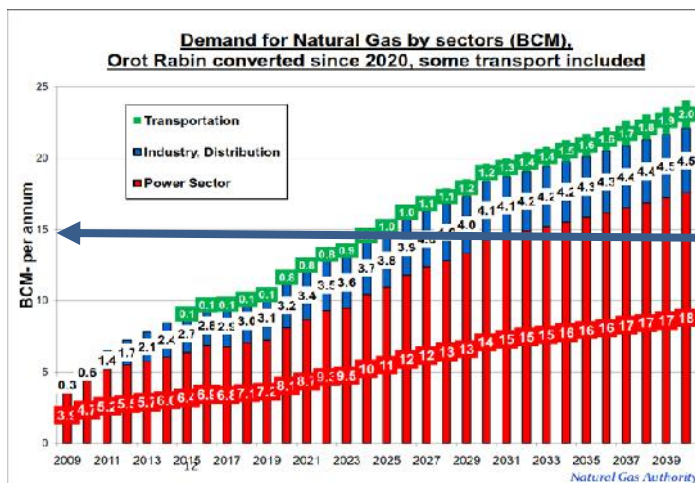
I) Long Term Energy Security

Typical NG exporter profiles, 2010

	Global	All exporters	Gas Exporting Regions		
			S. & Cent. America	Africa	Middle East excl Israel
Proven Reserves, trillions cubic meters	187	98	7	15	76
Consumption, BCM	3169	465	148	105	360
Net Production		831	161	209	461
Consumption/Production		56%	92%	50%	78%
Years left (Proven Consumption/Annual Consumption)	59	211	50	140	210

Israel's current profile does not appear to be a typical exporter

	Global	All exporters	Gas Exporting Regions		
			S. & Cent. America	Africa	Middle East excl Israel
Backing out average annual consumption rates by dividing generous 800 BCM reserves by the numbers of years	14 BCM pa i.e. 800 BCM/59 years	4 BCM Pa	16 BCM pa	6 BCM pa	4 BCM pa



“Business As Usual”
15 BCM pa consumption projected as soon as 2025 by Natural Gas Authority

II) Cheap Products

Water

- Electricity generation- major desalination cost
- National Water Carrier
 - Cost probably greater than desalination
 - Opportunity – review replacing it with desalination and export surplus “Kineret” water to Jordan using existing infrastructure

Electricity

- Reexamine level of use of NG in the sector
 - Displace remaining oil – save 1 NIS billion /year

Fuel	2010 cost	Relative Cost	Replace oil with gas
	(million NIS)	IS/kWh	(million NIS)
Coal	3,116	0.09	3,116
Natural Gas	2,874	0.14	3,060
Diesel	1,098	1.31	-
Fuel oil	236	0.48	-
Total	7,324		6,177

- Maintain dual fuel capability in most generation capacity

III) Competing Energy Sources

Enjoys more than one fuel source

Monopolized by one fuel source

Electricity

Transport

Gas

Coal

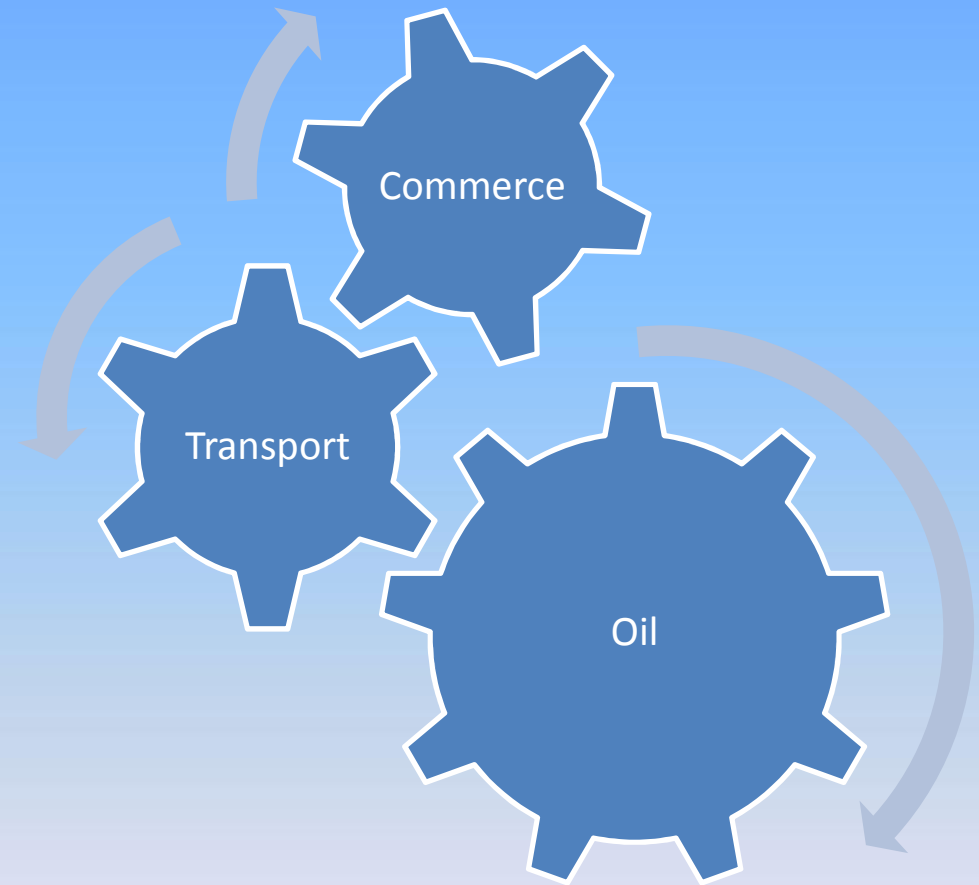
(Oil)

Oil

The
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Oil Dependence- Global Issue

- Oil- a monopoly transportation fuel
 - Transportation – drives commerce
 - Commerce drives global economy
- => Oil has a monopoly on the global economy



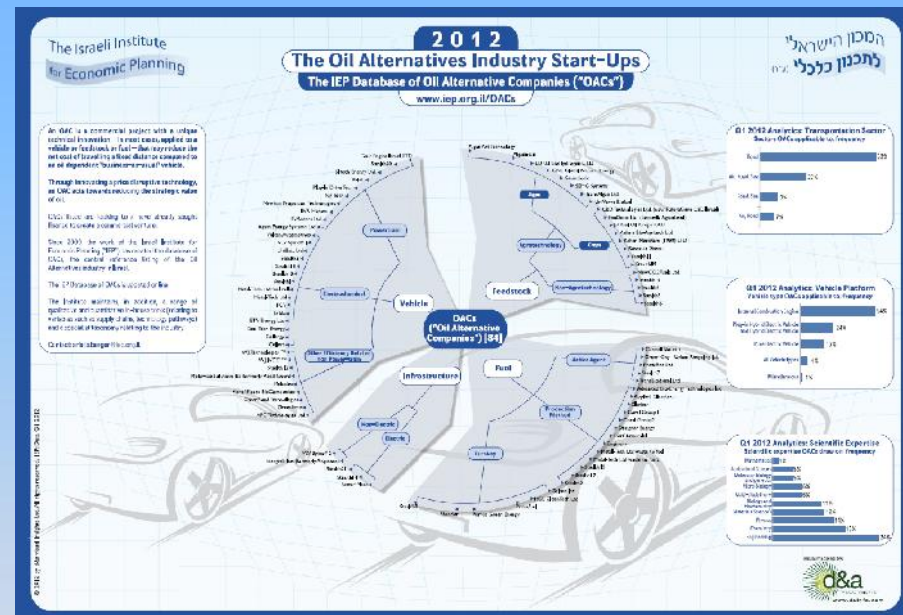
Israel as a hub for Global Oil Alternative Technologies

www.iep.org.il/OACs

Oil Alternatives Government Decision

1. \$500 million, 10 years
2. Price Disruptive technologies
3. Government doesn't pick winners
4. Outstanding domestic resources
 - Academia
 - Industry
 - Engineering
 - Defense /Military
 - Automobile Parts
 - Metal & Industrial Equipment
 - Electronics

IEP Database of OACs



An OAC is a commercial project with a unique technical innovation – in most cases, applied to a vehicle or feedstock or fuel – that may reduce the net cost of travelling a fixed distance compared to an oil dependent "business-as-usual" vehicle.

Through innovating a price disruptive technology, an OAC acts towards reducing the strategic value of oil.

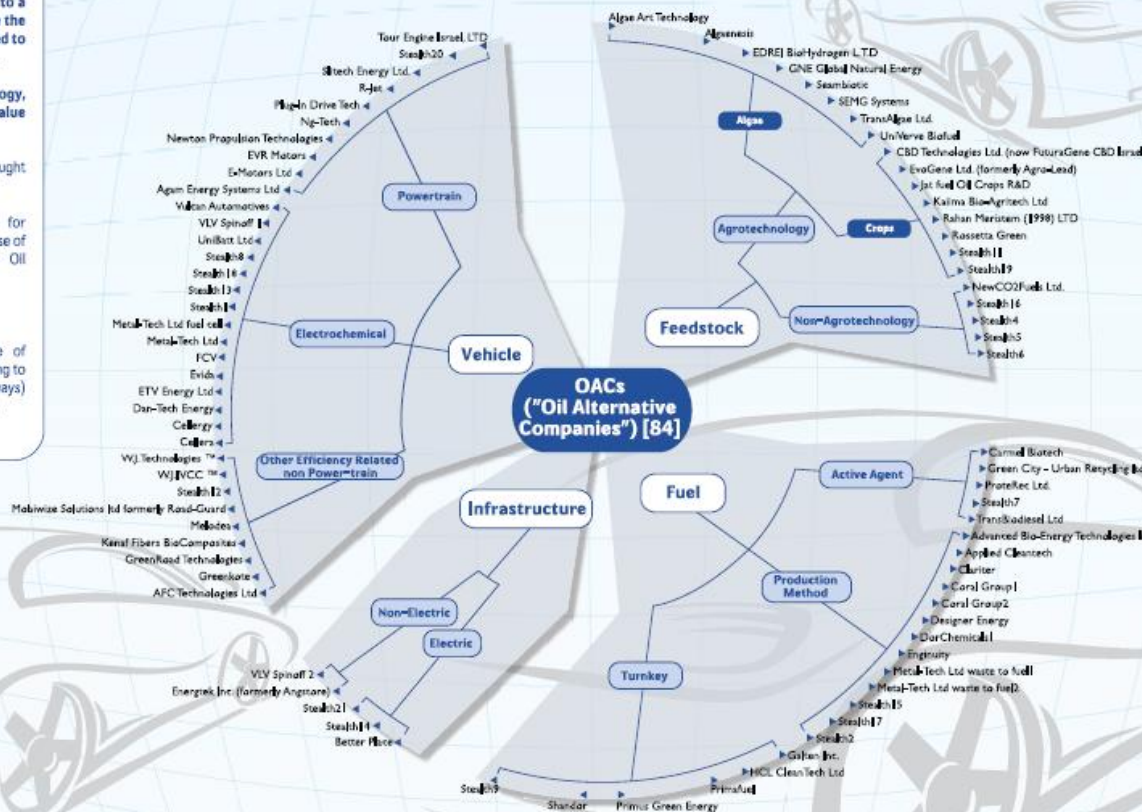
OACs listed are looking to / have already sought finance to create a commercial venture.

Since 2009, the work of the Israeli Institute for Economic Planning ("IEP") has created the database of OACs, the central reference listing of the Oil Alternatives Industry in Israel.

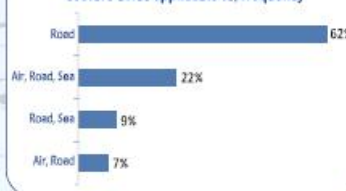
The IEP Database of OACs is updated online.

The Institute maintains, in addition, a range of qualitative and quantitative in-house tools (relating to variables such as supply chains, technology pathways) and a specialist taxonomy relating to the industry.

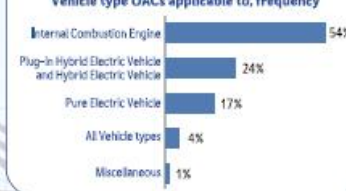
Contact: ariella.berger@iep.org.il.



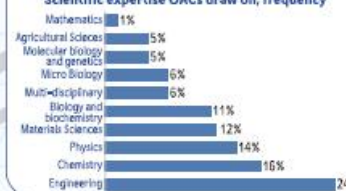
Q1 2012 Analytics: Transportation Sector
Sectors OACs applicable to, frequency



Q1 2012 Analytics: Vehicle Platform
Vehicle type OACs applicable to, frequency



Q1 2012 Analytics: Scientific Expertise
Scientific expertise OACs draw on, frequency



www.iep.org.il/OACs



Fuel Switching from Oil- Long Term Benefits to Consumers

IEA - Alarm Bells

“Even if we were to assume that... the next 20 years of global oil demand growth was flat... we would have to find and develop 4 new Saudi Arabias....we have to leave oil before oil leaves us”

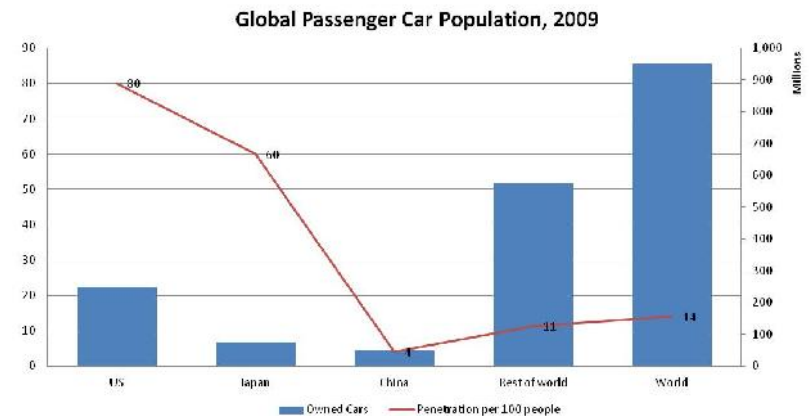
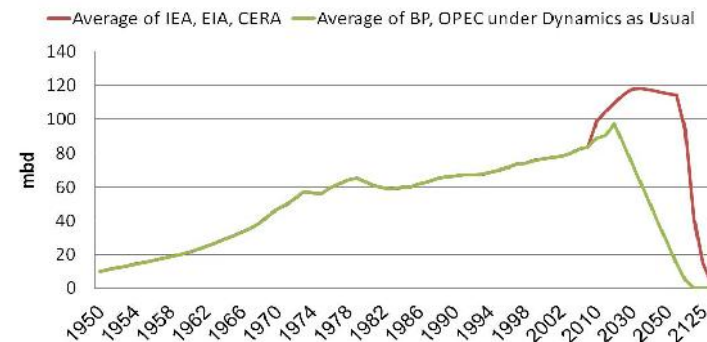
2011

“The current price levels are on average higher than the awful year of 2008 and as such have the capacity to tip the global economy back into recession”

March 23 2012

*Fatih Birol, Chief Economist,
The International Energy Agency*

Projected oil production estimates



Fuel Switching: \$ Speak

In 2010:

Israel (+PA) imported \$8.6 billion of oil

\$5 billion went to transportation (gasoline & diesel)

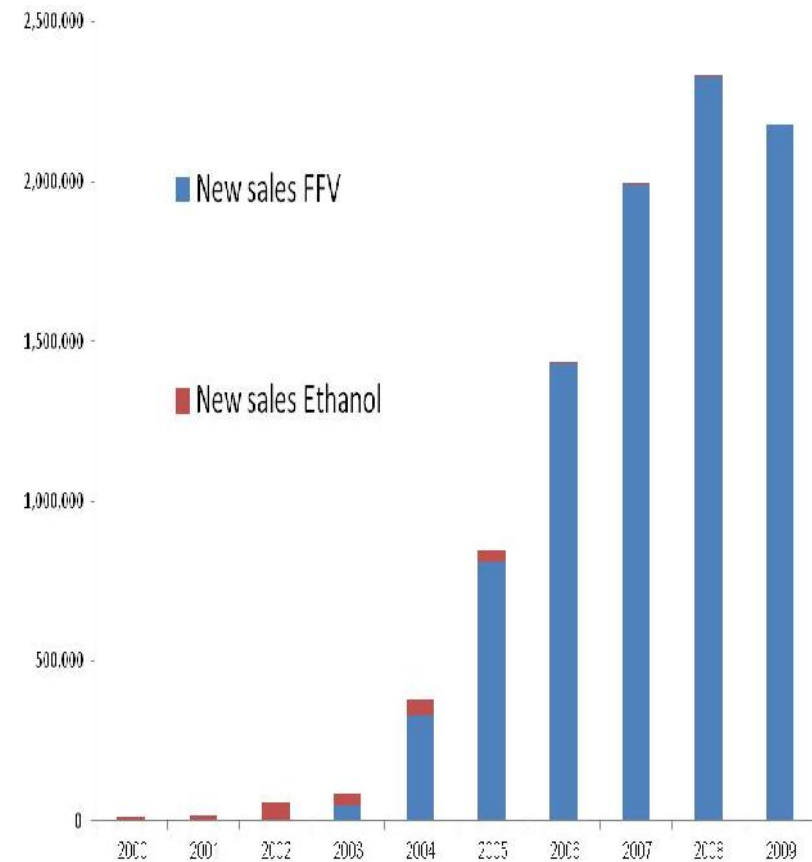
- Every BCM of NG used in transportation can potentially save Israel \$370 million every year on its crude oil bill
- The annual cost difference (\$3.6- 2010 to 10.9 billion-2025) creates a **huge margin for increasing NG profitability and investing in the required infrastructure**

Flex Fuel Vehicles- Lessons from Brazil

Due to FFVs Brazilian is oil independent

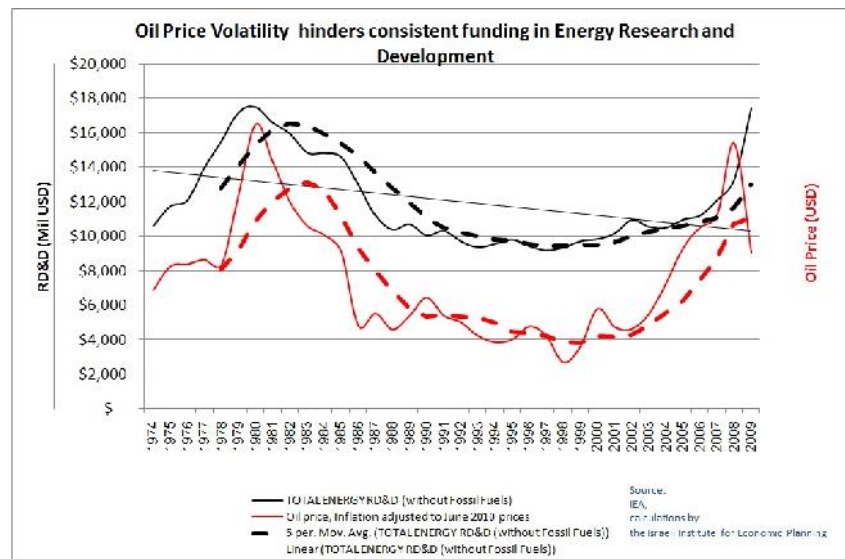
- 2003: Brazil consumers started buying FFVs
- By 2009, as many km traveled on oil alternative fuel as gasoline
- Indications:
 - Overall fuel cost in Brazil dropped due to competition at the pump
 - Brazilian consumers are immune from oil price volatility

2012: ~10 million FFVs in Brazil from a fleet of ~25 million



FFVs benefit consumers

Weakens dependence on expensive volatile oil



1. Enable incremental fleet build up at a variable pace
2. Enable energy security through diversity of fuel supply
3. A tool to break after-market monopolies by increasing competition and reducing costs to consumers

Conclusions

1. PRIORITIZE: Implement domestic uses
2. FUEL SWITCHING: Replace most oil imports with NG and its derivatives. Reexamine the level of use of NG in the electricity sector. Reorganize the water sector using NG resources
3. FUEL FLEXIBILITY: Open the transportation market for competition in order to create certainty for investors. Introduce Flex Fuel Vehicles.

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