



# Natural Gas for Transportation in Israel

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# The Oil Alternatives National Program

## ■ ***PMO administration for the promotion of oil alternatives for Transportation***

- Started January 2012 (Following 2010 resolution)
- January 2013 – The Government set a very ambitious implementation targets:
  - 30% in 2020
  - 60% on 2025

## ■ ***The Ministry of Energy and Water Resources***

- Focus on oil alternatives based on natural gas (NG)
- Specific administration has been in operation since 2010
- Support studies, R&D projects... (Academia, Startups, Pilot & demonstration projects)

# Selected platforms for analysis

CNG	Methanol	GTL
<p>Connected to <b>transmission lines</b>:</p> <ul style="list-style-type: none"> <li>Fast fuelling from reservoir</li> <li>Direct slow fueling</li> </ul>	<p><b>M15- no modifications</b></p>	<p><b>Stand-alone facility: grass-root plant</b></p> <p>LPG- 50,000 tons</p> <p>Gasoline- 950,000 tons</p> <p>Diesel: 950,000 tons</p>
<p>Connected to <b>distribution lines</b>:</p> <ul style="list-style-type: none"> <li>Fast fuelling from reservoir</li> <li>Direct slow fueling</li> </ul>	<p><b>M30</b></p>	<p><b>Integrated in Refinery: petrochemical &amp; fuels</b></p> <p>LPG- 100,000 tons</p> <p>Gasoline- 760,000 tons</p> <p>Diesel: 300,000 tons</p> <p>Propylene- 200,000 tons</p> <p>Ethylene- 80,000 tons</p> <p>Butylene- 180,000 tons</p>
<p><b>Mother-daughter stations</b></p>	<p><b>M85</b></p>	<p><b>Integrated in Refinery: dedicated to transportation</b></p> <p>LPG- 50,000 tons</p> <p>Gasoline- 950,000 tons</p> <p>Diesel: 950,000 tons</p> <p>Ethylene&amp;Propylene- 50,000 tons</p>

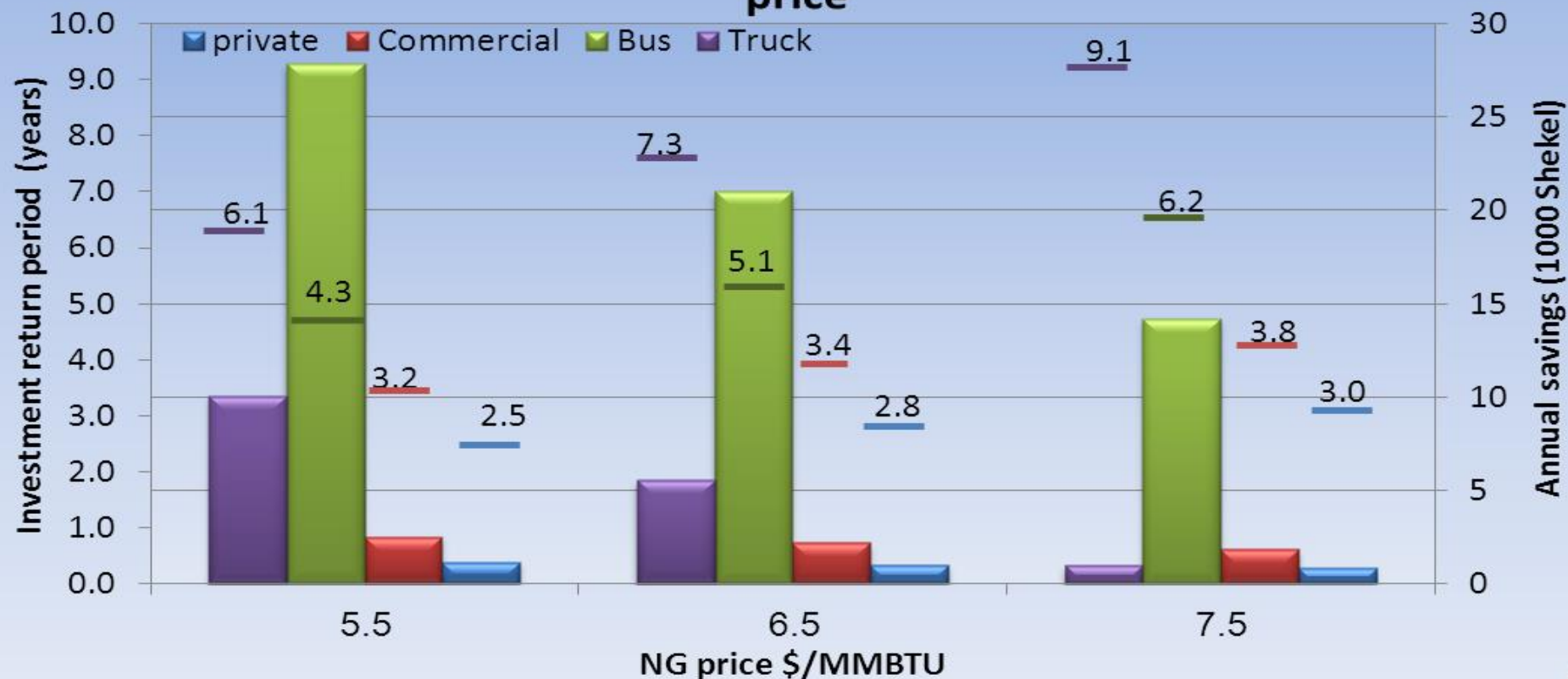


# CNG



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## Sensitivity of annual savings and investment return to NG price



- The advantage of using CNG is significantly higher for high mileage vehicles



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# METHANOL



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## Examined cases:

<b>Case</b>	<b>incremental maintenance costs</b>	<b>Fuel economy compared to conventional vehicle</b>
<b>A</b>	9%	49%
<b>B</b>	9%	63%
<b>C</b>	4%	49%
<b>D</b>	4%	63%



# Annual market savings per vehicle methanol sold according to import market price:

## Import price





# GTL



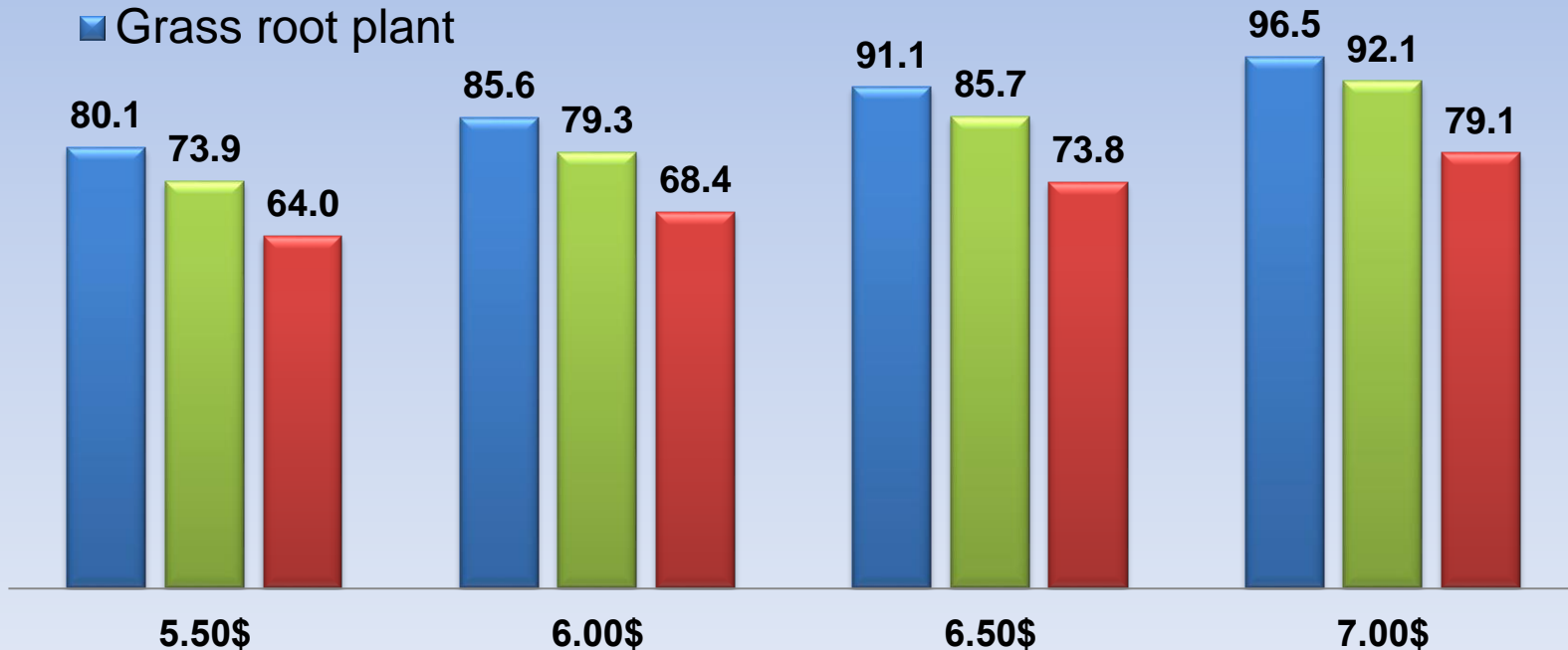
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## Break-even Barrel prices for different NG Prices (\$)

■ integrated in refinery - dedicated to transportation

■ integrated in refinery - designed for petrochemical industry

■ Grass root plant



The price of the GTL fuel can still be attractive, even at \$7 per MMBTU although it is a major component of the total plant operation cost- 66-75%.



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# Closing Remarks

- ***No “silver bullet” but...***
- ***Natural Gas can provide oil replacement in a very short term and it has economical justification***
  - ***CNG***
  - ***Methanol***
- ***GTL is an excellent solution that can be employed in the next decade***
- ***NG based hydrocarbons and chemicals can be economically produced and can have a tremendous impact on the Israeli hi-tech chemical industry***

# Thank you



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