Hydrogen Network Investment Plan

Market Assurance Grant Concept

IEPR Workshop

April 23, 2014

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About the H2NIP Project

- Founding Question: How should incentives be designed to facilitate the rapid development of California's hydrogen fueling station network?
  - Supported by CaFCP, ARB, SCAQMD, Toyota, Daimler and EIN donors
  - Based on stakeholder input, and iterative feedback
  - Analysis of incentives and structures in other industries
- Backed with financial modeling
  - Performance of individual stations in different market segments/scenarios
  - Impacts of incentive structures on rates of return to investors & costs to government

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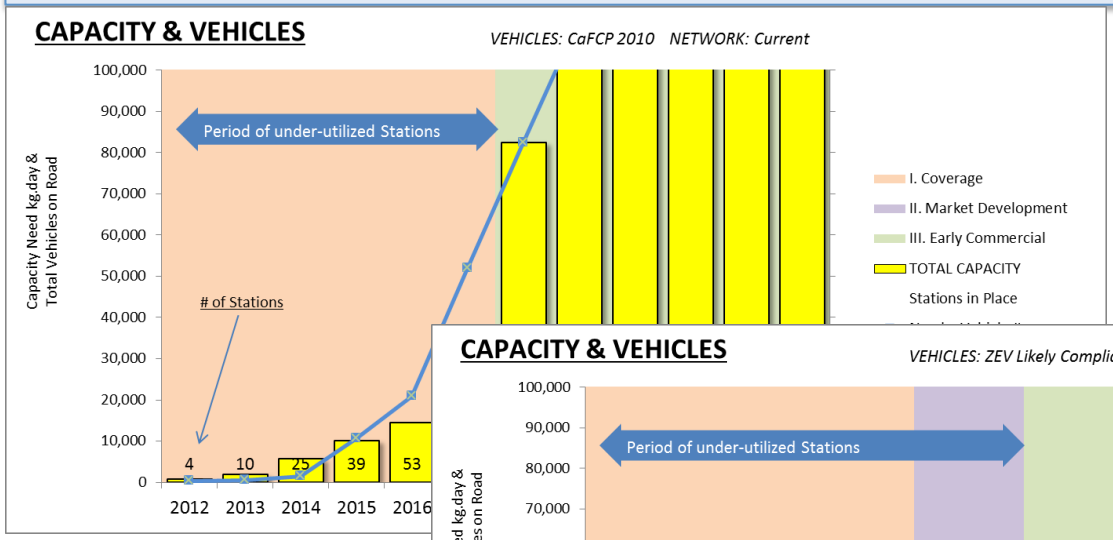
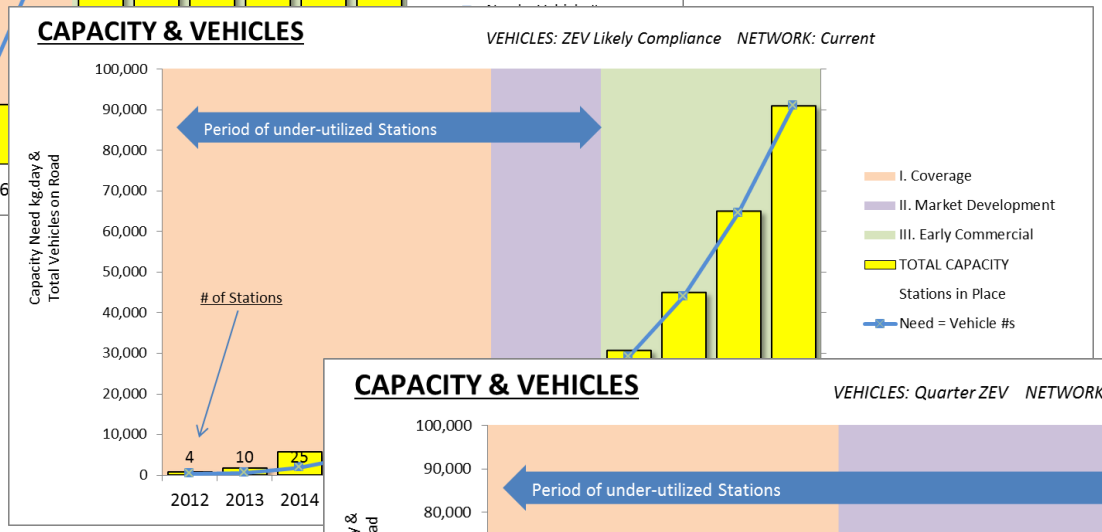
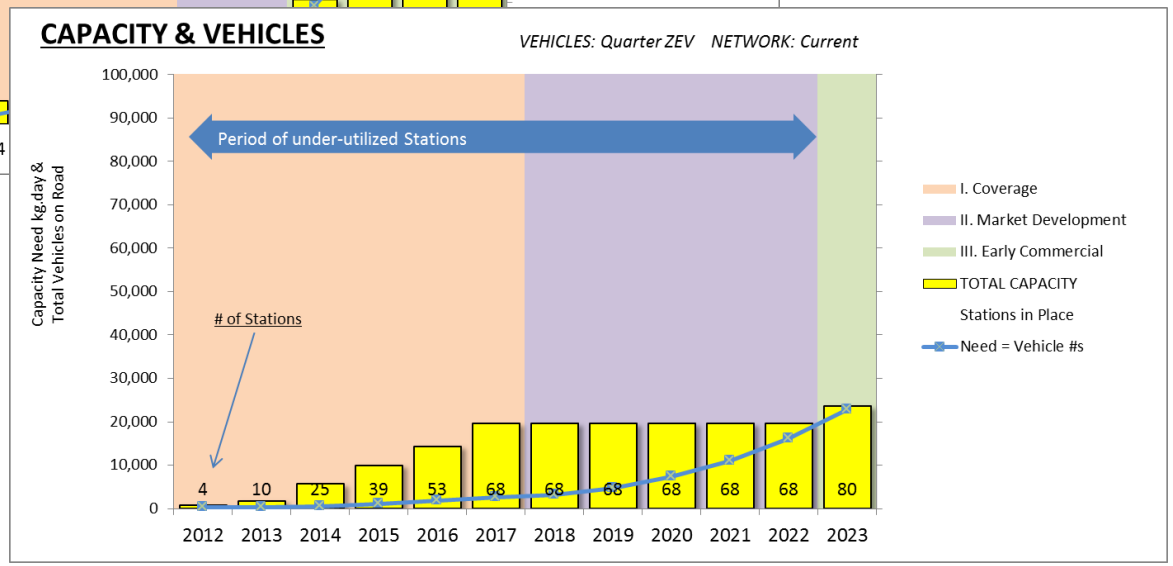
Station Developers Face Significant Marketplace Uncertainty



2010 OEM Surveys

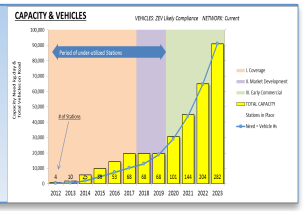


ZEV Likely Compliance



¼ ZEV Likely Compliance

Capital Cost Share Can Help Enable Economically Viable Stations



Core Market, **ZEV Likely Compliance**, $2m 500kg/day Delivered Gas Station, Built in 2015:

Better for Consumer ⟷ Better for Station Provider

Cost Share: Private / Govt. (70%)

IRR of a 2015 Core Market: 500-DH2 Station *Vehicle Sale: / Likely Compliance*

Capital Expense of Station	If long term Hydrogen Retail Price								
	$8.00	$8.50	$9.00	$9.50	$10.00	$10.50	$11.00	$11.50	$12.00
$1,000k	-0.8%	14.0%	24.4%	33.0%	41.0%	48.9%	56.8%	64.6%	72.4%
$1,100k	-2.0%	12.8%	22.8%	30.9%	38.6%	45.9%	53.1%	60.5%	67.6%
$1,200k	-3.0%	11.6%	21.3%	29.1%	36.4%	43.2%	50.0%	56.9%	63.6%
$1,300k	-4.0%	10.3%	19.9%	27.6%	34.5%	40.9%	47.3%	53.7%	60.1%
$1,400k	-4.9%	9.1%	18.6%	26.1%	32.7%	38.9%	44.9%	50.9%	57.0%
$1,500k	-5.7%	8.0%	17.5%	24.8%	31.1%	37.1%	42.8%	48.5%	54.1%
$1,600k	-6.5%	6.9%	16.4%	23.6%	29.7%	35.5%	40.9%	46.3%	51.6%
$1,700k	-7.2%	5.9%	15.4%	22.5%	28.4%	33.9%	39.2%	44.3%	49.4%
$1,800k	-7.9%	5.0%	14.4%	21.4%	27.2%	32.5%	37.6%	42.5%	47.4%
$1,900k	-8.5%	4.1%	13.4%	20.4%	26.1%	31.2%	36.2%	40.8%	45.5%
$2,000k	-9.2%	3.3%	12.4%	19.4%	25.1%	30.0%	34.8%	39.3%	43.8%
$2,100k	-9.7%	2.5%	11.5%	18.5%	24.1%	28.9%	33.6%	38.0%	42.3%
$2,200k	-10.3%	1.8%	10.6%	17.6%	23.2%	27.9%	32.4%	36.7%	40.8%
$2,300k	-10.8%	1.1%	9.8%	16.8%	22.3%	26.9%	31.3%	35.5%	39.5%
$2,400k	-11.3%	0.4%	9.0%	16.0%	21.4%	26.1%	30.3%	34.3%	38.3%

**Market Assurance Grants not Included*

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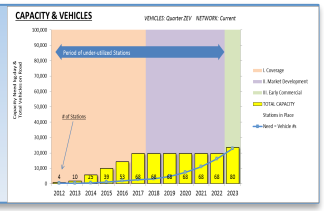
…But not if market adoption is slow



Core Market, **Quarter ZEV**, $2m 500kg/day Delivered Gas Station, Built in 2015:

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$1,100k	-20.8%	-9.1%	-2.4%	2.4%	6.3%	9.7%	12.9%	15.8%	18.6%
$1,200k	-21.2%	-9.4%	-2.8%	1.9%	5.7%	9.1%	12.2%	15.0%	17.6%
$1,300k	-21.5%	-9.9%	-3.2%	1.5%	5.2%	8.5%	11.5%	14.2%	16.8%
$1,400k	-21.8%	-10.4%	-3.6%	1.1%	4.8%	8.0%	10.9%	13.5%	16.0%
$1,500k	-22.1%	-10.8%	-3.9%	0.7%	4.3%	7.4%	10.3%	12.9%	15.3%
$1,600k	-22.4%	-11.2%	-4.3%	0.3%	3.9%	7.0%	9.7%	12.2%	14.6%
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$1,900k	-23.2%	-12.4%	-5.5%	-0.8%	2.7%	5.7%	8.2%	10.6%	12.8%
$2,000k	-23.4%	-12.7%	-5.9%	-1.1%	2.4%	5.3%	7.8%	10.1%	12.3%
$2,100k	-23.7%	-13.1%	-6.4%	-1.5%	2.0%	4.9%	7.4%	9.7%	11.8%
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$2,300k	-24.1%	-13.7%	-7.1%	-2.2%	1.4%	4.2%	6.6%	8.8%	10.9%
$2,400k	-24.3%	-14.0%	-7.5%	-2.6%	1.0%	3.8%	6.2%	8.4%	10.5%

**Market Assurance Grants not Included*

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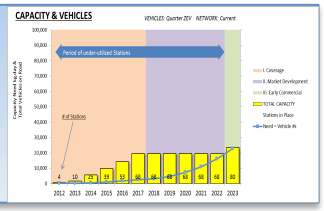
Market Assurance Grants (O&M) can buffer against slow rollout



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$1,400k	-11.6%	0.4%	7.6%	12.8%	17.0%	20.6%	24.0%	27.1%	30.1%
$1,500k	-12.4%	-0.6%	6.6%	11.7%	15.8%	19.3%	22.6%	25.6%	28.4%
$1,600k	-13.1%	-1.5%	5.7%	10.7%	14.7%	18.1%	21.2%	24.1%	26.9%
$1,700k	-13.7%	-2.4%	4.8%	9.8%	13.7%	17.0%	20.1%	22.9%	25.5%
$1,800k	-14.3%	-3.1%	4.0%	8.9%	12.8%	16.1%	19.0%	21.7%	24.2%
$1,900k	-14.8%	-3.9%	3.2%	8.1%	11.9%	15.1%	18.0%	20.6%	23.1%
$2,000k	-15.4%	-4.5%	2.4%	7.4%	11.1%	14.3%	17.1%	19.6%	22.0%
$2,100k	-15.9%	-5.2%	1.6%	6.7%	10.4%	13.5%	16.2%	18.7%	21.1%
$2,200k	-16.3%	-5.8%	0.9%	6.0%	9.7%	12.7%	15.4%	17.9%	20.2%
$2,300k	-16.8%	-6.4%	0.3%	5.3%	9.0%	12.0%	14.7%	17.1%	19.3%
$2,400k	-17.2%	-6.9%	-0.3%	4.7%	8.4%	11.4%	14.0%	16.3%	18.5%

****Add Market Assurance Grant (e.g. O&M Support)***

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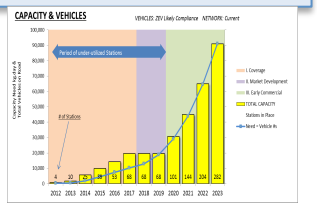
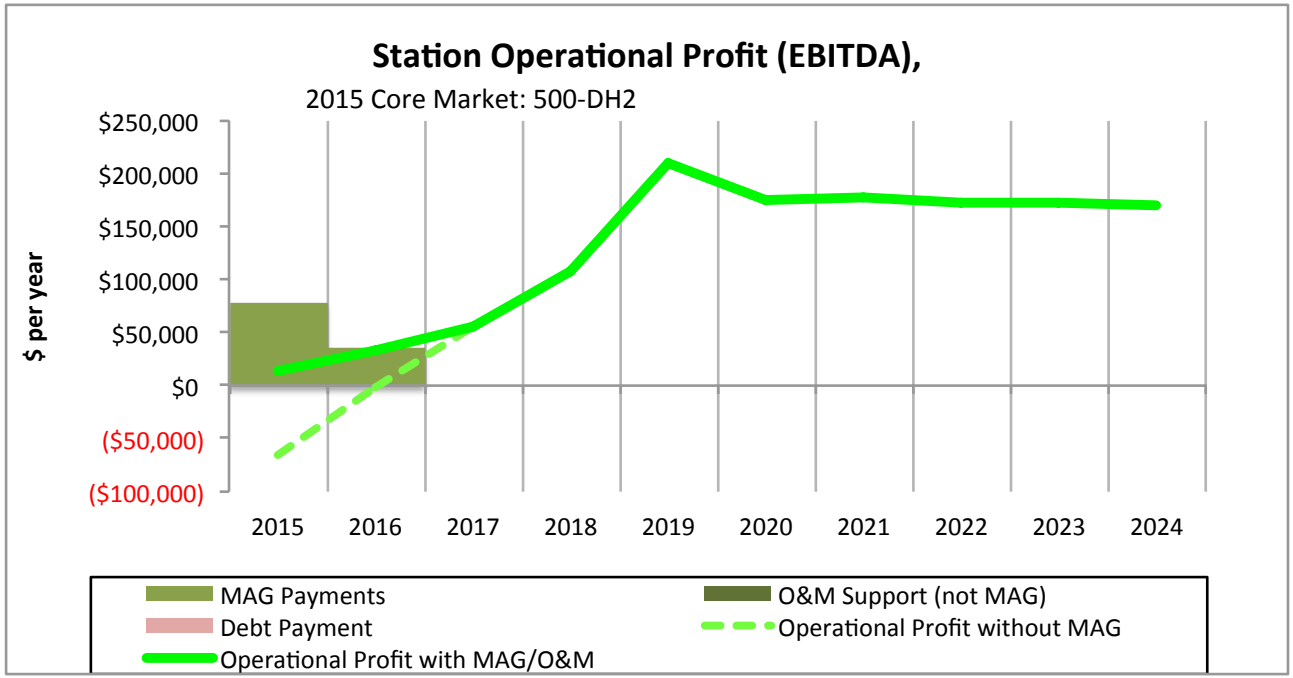
Market Assurance Grants – Station Perspective



ZEV Likely Compliance (10,500 FCEVs by 2017):



		Incentive Funding			Developer	
	IRR	Capex Grant	MAG Support	Total Grant	Capex	TOTAL COST
No Incentive	-7.9%	0	0	-	$2,000k	$2,000k
Capital Grant	12.4%	$1,400k	-	$1,400k	$600k	$2,000k
Capital Grant + MAG or O&M	16.4%	$1,400k	$114k	$1,514k	$600k	$2,114k

Core Market, 500 kg/day Station, $2M station (70% Cost Share), $9/kg H2 ($5.50 wholesale) - $2.18 Net Margin

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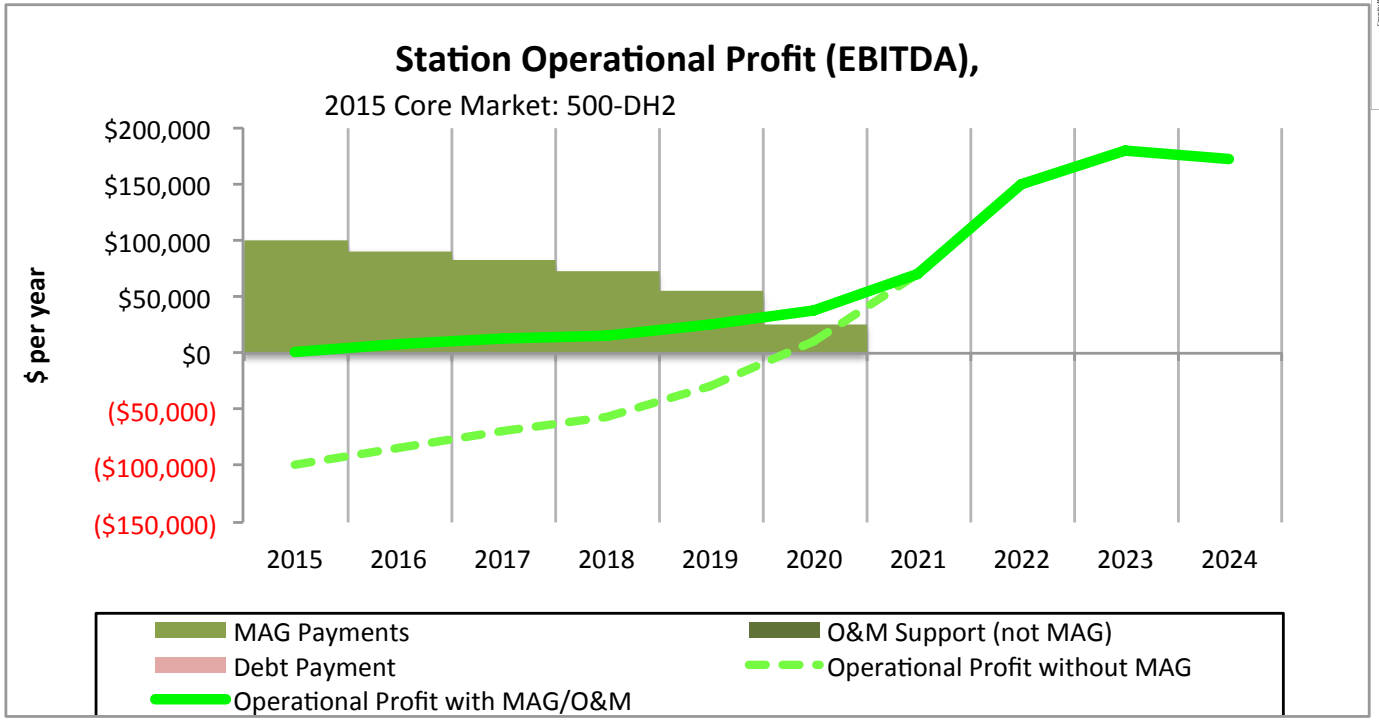
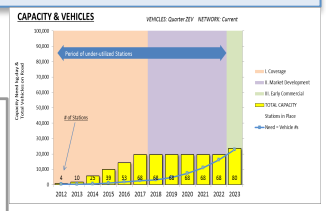
Market Assurance Grants to Buffer Uncertainty

¼ ZEV Likely Compliance (2,625 FCEVs by 2017):





	IRR	Incentive Funding			Developer Capex	TOTAL COST
		Capex Grant	MAG Support	Total Grant		
No Incentive	**-16.6%**	**0**	**0**	**-**	**$2,000k**	$2,000k
Capital Grant	**-5.9%**	**$1,400k**	**-**	**$1,400k**	**$600k**	$2,000k
Capital Grant + MAG or O&M	**2.4%**	**$1,400k**	**$427k**	**$1,827k**	**$600k**	$2,427k

Core Market, 500 kg/day Station, $2M station (70% Cost Share), $9/kg H2 ($5.50 wholesale) - $2.18 Net Margin

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Thank You

The H2NIP Report Offers in-depth recommendations, (many not coved in this presentation) analysis, and explanation.

- The full-report is posted on EIN's website:
  - http://www.einow.org/resources/reports.html

- Please direct any questions you have to:

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