

CONDUIT VENTURES  
LIMITED



## CONDUIT VENTURES FUND

Hydrogen & Fuel Cell Technology: Future Market and Important Building Block for Achieving Climate Change Goals

*Perspectives from a Venture Capital Investor; Herten 22<sup>nd</sup> October 2009*

# Introduction

- ▶ **Introduction**
- ▶ **Challenges for Hydrogen & Fuel Cell investments**
- ▶ **“Big picture” Considerations**
- ▶ **Positive Examples**
- ▶ **Recommendations**

# Introduction

## **CLIMATE CHANGE:**

### **Where are we?**

- ▶ Carbon abatement: CO2 levels target 450ppm
- ▶ Scale and mass deployment of higher efficiency carbon reducing energy conversion solutions required

### **Are Hydrogen/Fuel Cells viable solutions? Yes... but require:**

- ▶ Accelerating economically viable H2 generation from regenerative forms of energy
- ▶ Accelerating the deployment of higher efficiency energy conversion devices

### **Potential Impact of Hydrogen/Fuel Cells on Climate Change**

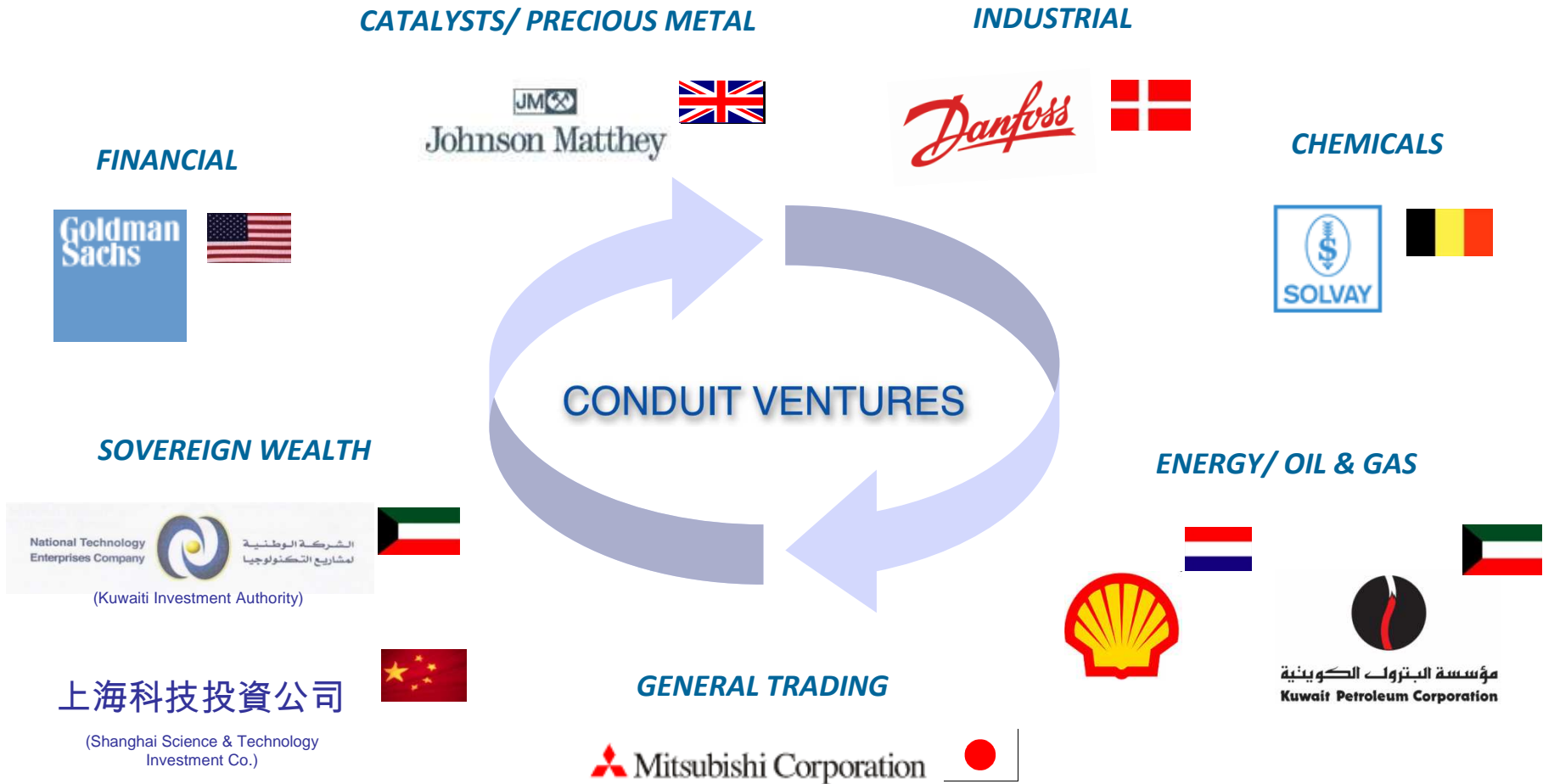
- ▶ Currently mixed. Promise plentiful, action limited by comparison to other solutions currently being deployed
- ▶ No 'silver bullet' solution to climate change issues. Mix of solutions essential

## Conduit Ventures is venture capital.

- ▶ **Venture capital** (also known as VC or Venture) is a type of private equity capital typically provided for **early-stage, high-potential, growth companies** in the interest of **generating a return through an eventual realization** event such as an IPO or trade sale of the company.
- ▶ **VCs also take a role in managing entrepreneurial companies at an early stage**, thus adding skills as well as capital (thereby differentiating VC from buy out private equity which typically invest in companies with proven revenue), and thereby potentially realizing much higher rates of returns.
- ▶ **Venture capital is also associated with job creation, the knowledge economy and used as a proxy measure of innovation within an economic sector or geography.**

Source: Wikipedia

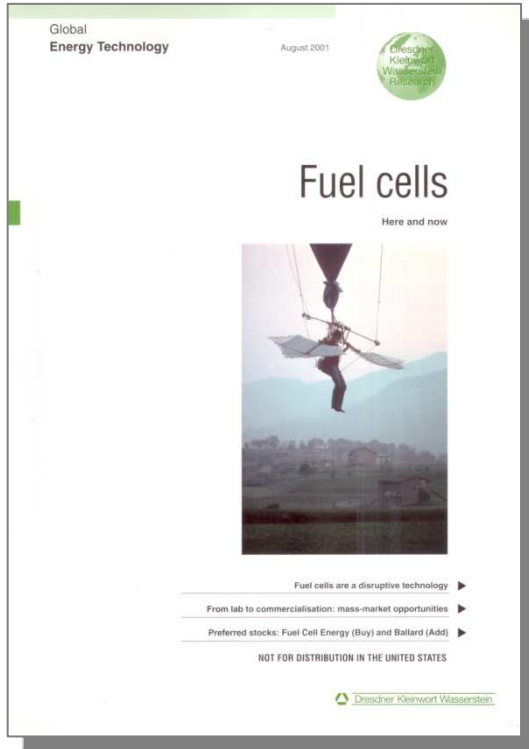
# Conduit's partners



# What Start-Ups think Investors are thinking...



# Market is tired of unmet expectation...



August 2001



# Fuel cells

Here and now

Someone's lament - *The long and winding road, That leads to your door, Will never disappear, I've seen that road before, It always leads me her, Lead me to you door...by Beatles*

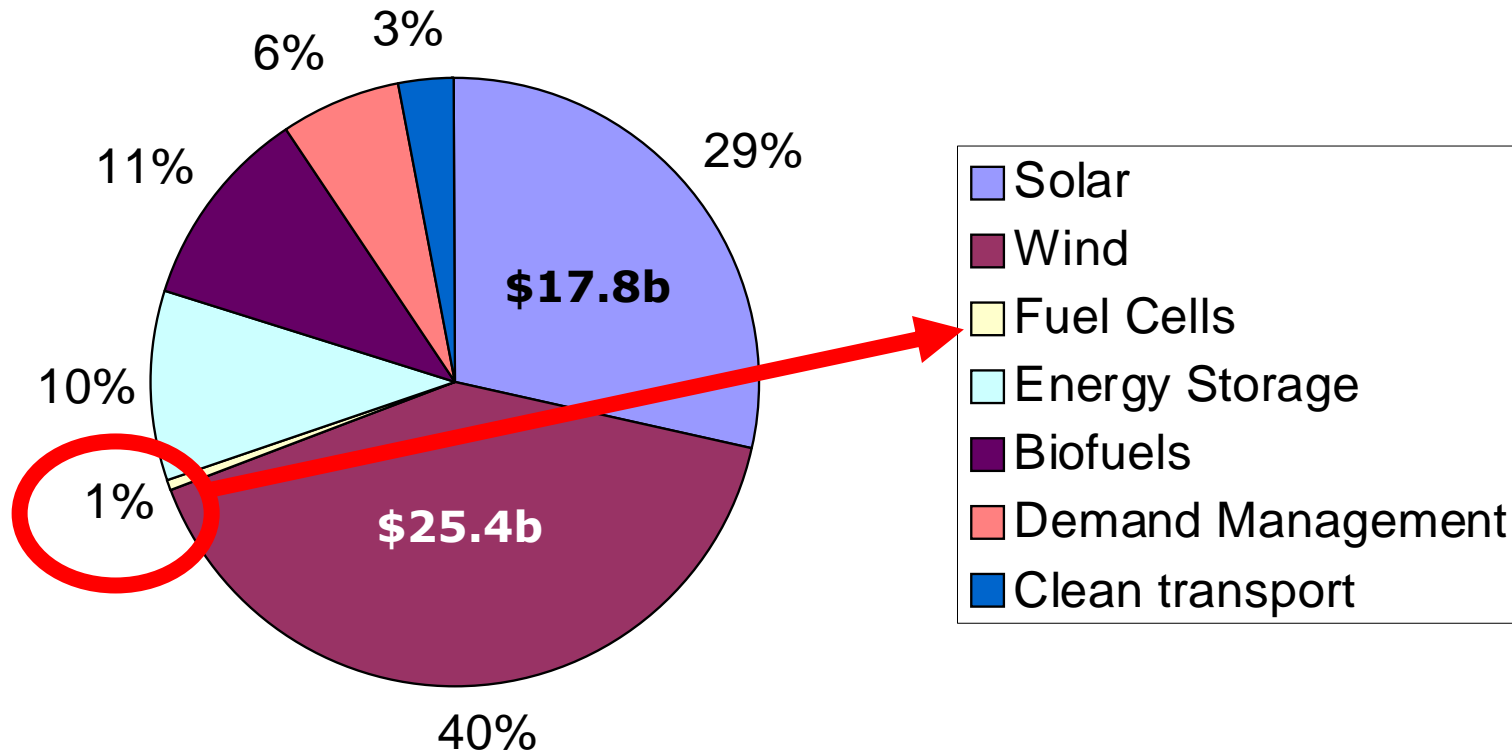
# Windows are shutting...

- ▶ **Battery improvements**  
...electric vehicles, consumer electronics, auxillary power...
- ▶ **Renewables** getting cheaper (solar, heat pumps)
- ▶ **Incumbents** better (IC engines, “smart” grid)
- ▶ Opportunity in next couple years



# Stock Markets already abandoned Fuel Cells...

## ENTERPRISE VALUE BY SECTOR



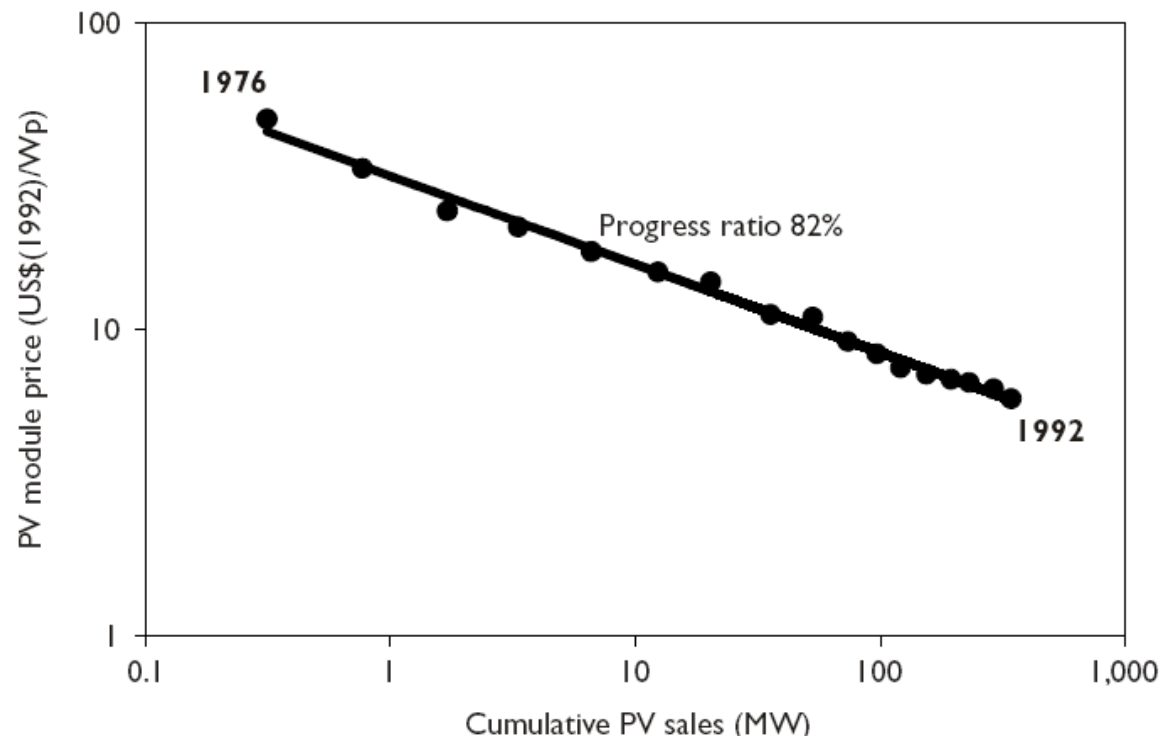
Source: Thomas Weisel Equity Research, as of 31 August 2009

**TOTAL: \$62 billion**  
**(note: ExxonMobil = \$546 billion)**

# Challenges in the Fuel Cell Sector

**Experience Curve:** The Boston Consulting Group (1968):  
Experience curve concept for ('black box') modeling of total cost as function of cumulative production

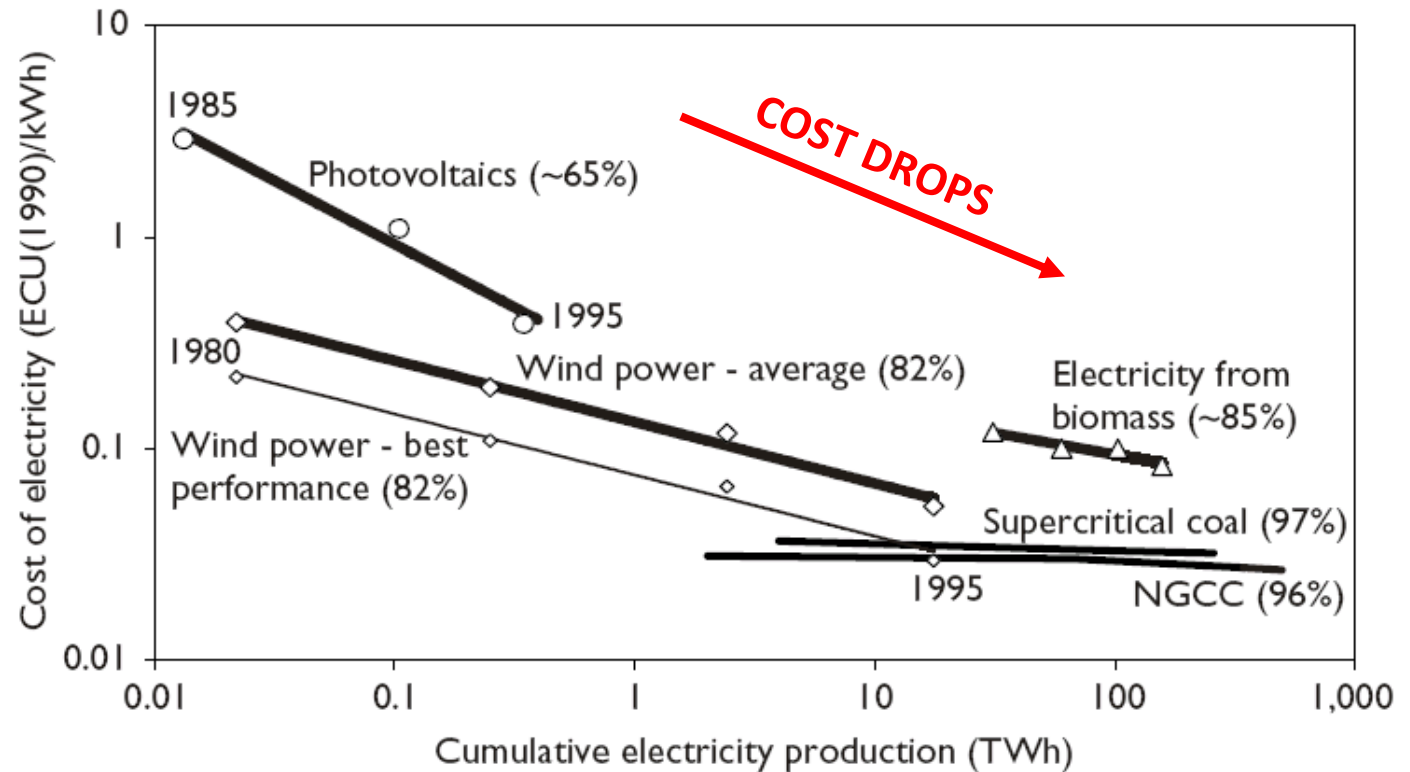
**Experience Curve for PV Modules, 1976-1992**



# Experience Curves in EU Cleantech

## Energy Technologies in EU, 1980-1995

- ▶ Fuel cell further up the experience curve other technologies
- ▶ Incumbent and new technologies improving, making market entry for Fuel Cells more difficult



*Experience Curves for Energy Technology, IEA, 2000*

# Communications Challenges...

## NICHES HARD TO EXPLAIN

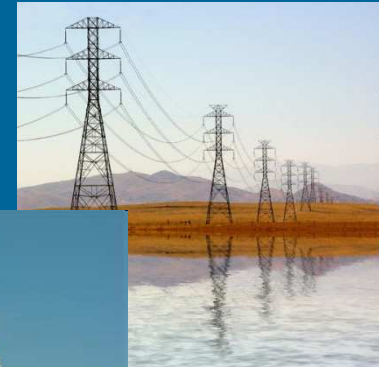
Fuel cells = cars. Still

Potentially damages credibility of niche applications

Vehicles perceived to be in the distant future

**Solar, Wind** and **Smart Grid** are all *simple and easy to message* (and all are scalable)

## SIMPLE: EASY TO MESSAGE



## DISTANT FUTURE



## DIFFICULT TO EXPLAIN SIMPLY



## Cars – 2015 distant future?

### **Automakers Sign Joint Letter of Understanding Supporting Fuel Cells and Hydrogen.**

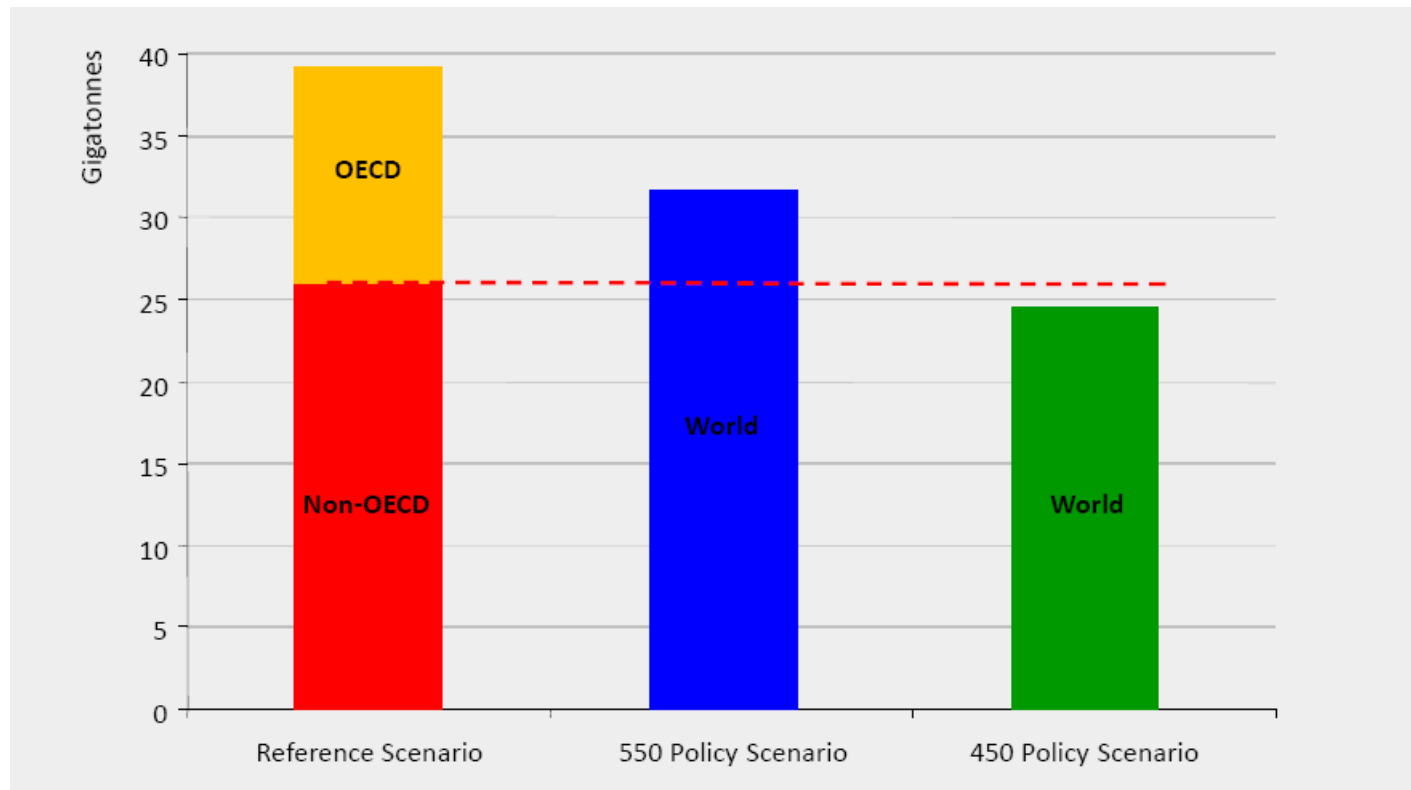
Kia Motors Corporation, Hyundai Motor, Daimler AG, Ford Motor Company, General Motors Corporation/Opel, Honda Motor Co Ltd, the alliance Renault SA and Nissan Motor Corporation and Toyota Motor Corporation have signed a joint 'Letter of Understanding' addressed to all oil and energy companies and governmental organizations to push forward the development of hydrogen refueling stations in each region, ahead of the carmakers' launch of fuel cell vehicles.

The companies "strongly support the idea of building-up a hydrogen infrastructure in Europe and at the same time develop similar concepts for the market penetration of hydrogen infrastructure in other regions of the world, with the US market, Japan and Korea as further starting points."

***COLLECTIVE AND INTERNATIONAL ACTION IS THE KEY!***

# World energy-related CO2 emissions by 2030

## World Energy-related CO2 in 2030 by IEA Scenario



- ▶ OECD alone cannot put world on 450 ppm trajectory
- ▶ This should be a macro **opportunity for fuel cells**, especially off-grid

# Positive Examples...



- ▶ successfully selling its fuel cells to industrial and retail customers for already more than four years



- ▶ Cost dropping steadily over time due to learning and scale

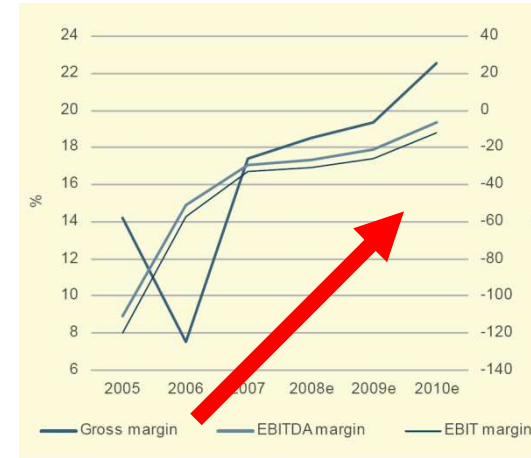


- ▶ PEM CHP in Japan - Thanks to FC Samurais and METI

## Stealth company

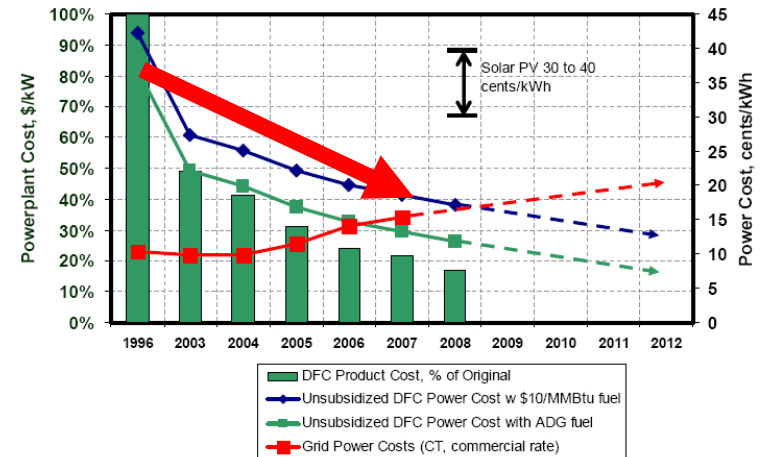
- ▶ Great enterprise valuation?

### MARGINS



source: Oppenheim Research

### POWERPLANT COST vs POWER COST



## Recurring Themes....

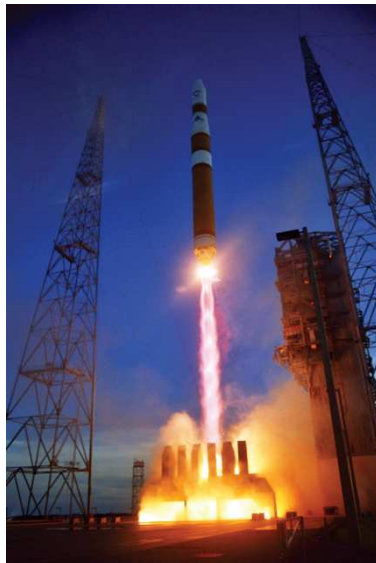
- ▶ **Solve problems**, not sell technologies - Years ago, start-ups and large companies appeared more interested in developing and selling technologies rather than solutions to problems in the energy system
- ▶ **“Carbon”** becoming more important as the US appears to be making legislation and concrete steps; a more global framework for greenhouse gas reduction appears more realistic and businesses addressing carbon will have more opportunities
- ▶ **Cross-sector issues:** Collaboration across sectors is more important than ever, and Conduit Ventures, with its fellowship across industries, is a blueprint for collaboration
- ▶ **Efficiency is key:** our work is in the area of solving efficiency, storage, and emissions problems, rather than promoting technologies

## Lessons Learned

- ▶ **Mix of technology solutions required;** No single approach applies to all markets or customers; Each market has own appropriate energy mix
- ▶ **Synergies** amongst new technologies becoming evident: Smart Grid & CHP, Solar & Fuel Cells, Electric transport & renewables. One solution spurs demand for the other
- ▶ Solutions required not only on **supply**, but also **demand**
- ▶ **Recurring Challenges:** Cost reduction, Efficiency, Reliability and Adoption
- ▶ **Developing countries** e.g. Brazil, China & India important; high GDP growth
- ▶ **Carbon management** (CO2 sequestration, storage, utilization) critical at scale
- ▶ **Technology rate of adoption** dependent upon the intersection of government, technology readiness/breakthroughs and economic growth rates
- ▶ From a VC perspective, **“Chase the money”**, chase early applications and drive relentlessly for product launch of customer validated product

# Recommendations

- ▶ **Launch products immediately before becoming irrelevant**
- ▶ **Sell power solutions rather than fuel cells/hydrogen**
- ▶ **Collaborate, merge ...or call it a day**
- ▶ **No time for rivalry inside shrinking fuel cell sector**
- ▶ **Last chance**



*or...*



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*Thank you.*

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