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The Power of Dreams

Automotive propulsion **M**obility **I**nnovations

what are the propulsion systems of tomorrow?

International AMI Congress

31st March 2009, Congress-Center Leipzig (New Exhibition Area)

“What kind of propulsion corresponds to the future demands of mobility – Hybrid and Fuel Cell Vehicles – are derivates allowed?”

Thomas Brachmann
Honda Research & Development Europe
Department Manager and Senior Engineer

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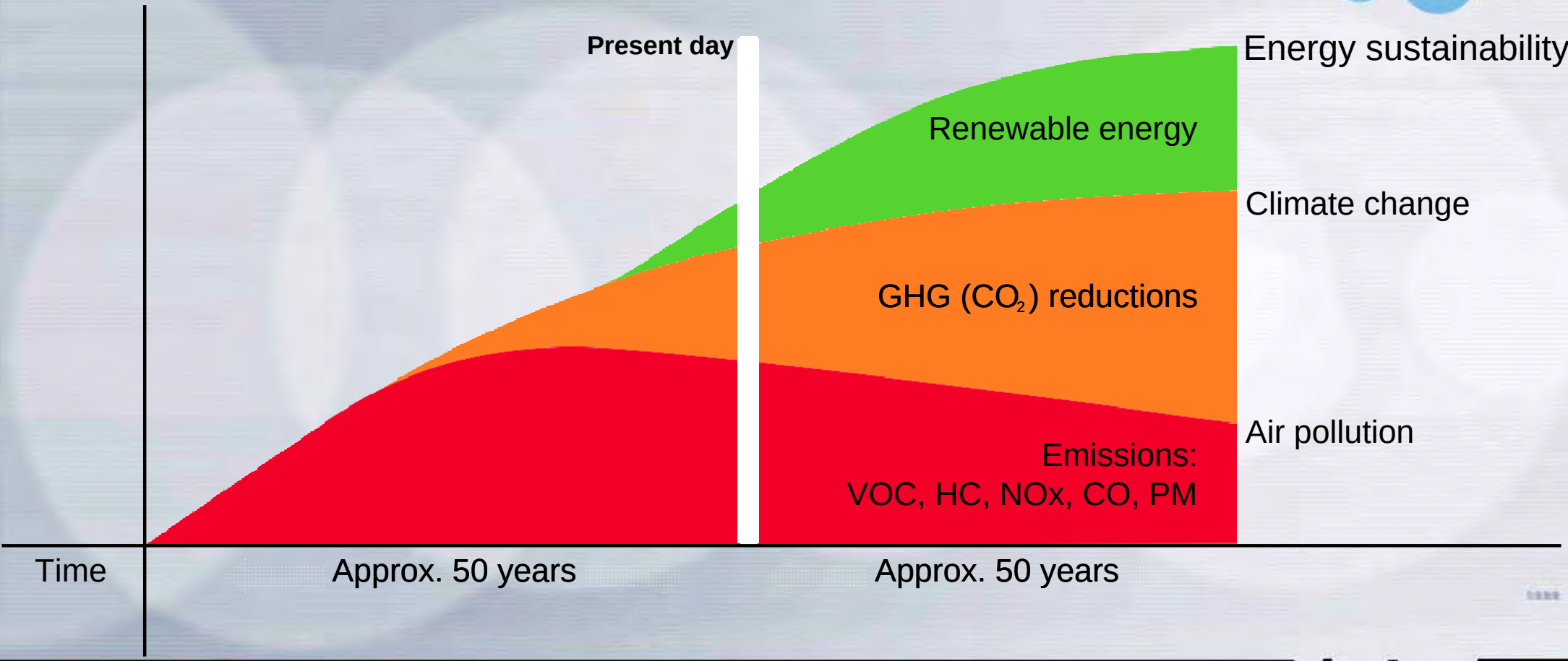
Environmental concerns



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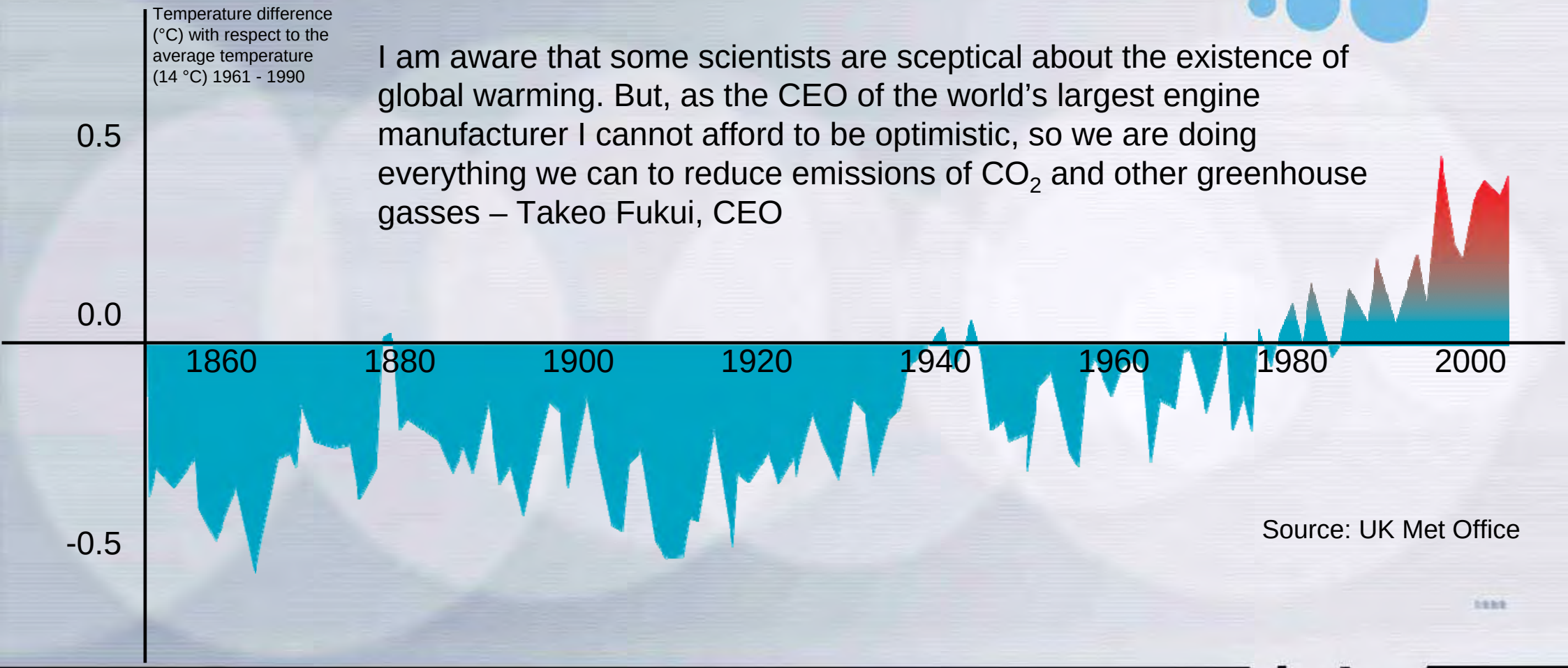
Environmental concerns

I am aware that some scientists are sceptical about the existence of global warming. But, as the CEO of the world's largest engine manufacturer I cannot afford to be optimistic, so we are doing everything we can to reduce emissions of CO_2 and other greenhouse gasses – Takeo Fukui, CEO



Source: UK Met Office

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Strong Focus on Environmental Issues

1 We will make efforts to recycle materials and conserve resources and energy at every stage of our products' life cycle from research, design, production and sales, to services and disposal.

2 We will make every effort to minimize and find appropriate methods to dispose waste and contaminants that are produced through the use of our products, and in every stage of the life cycle of these products.

3 As both a member of the company and of society, each associate will focus on the importance of making efforts to preserve human health and the global environment, and will do his or her part to ensure that the company as a whole acts responsibly.

4 We will consider the influence that our corporate activities have on the local environment and society, and endeavor to improve the social standing of the company.

Innovation Initiatives

Honda's initiatives continue apace with the introduction of hybrid automobiles, further improvements to the efficiency of our engine technologies and the production of low-emissions vehicles with good fuel economy.
We are clearly strengthening our clean-energy initiatives.

- Introduction of the 5th Honda Hybrid vehicle: Honda INSIGHT a new dedicated hybrid vehicle

- The next-generation FCX Clarity fuel cell vehicle introduced in November 2007. Mass production started August 2008.

- In the U.S., Honda began experimental operation of its latest Home Energy Station IV, designed to provide fuel for a hydrogen-powered fuel cell vehicle, as well as sufficient heat and electricity for a home.

- In October 2007 affiliate Honda Soltec began production of thin-film solar cells at its factory in Japan. It is designed to produce solar cells with an annual capacity equivalent to 27.5 MW

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Innovation Initiatives

If you choose the simple way, it will be the easiest way,
it may be profitable but that is not my way of business.
I believe that only by choosing the hard way is there progress" Soichiro Honda

1972 1974 1983 1993 1996 1998 1999 2002 2003 2006 2008 2009

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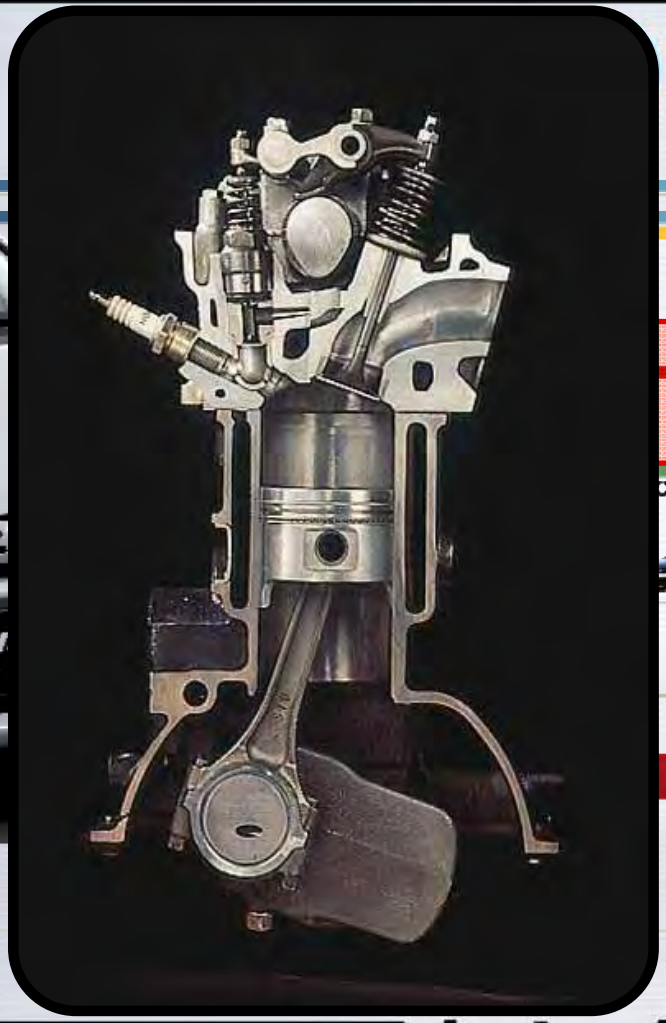
Honda's Clean Vehicle Line-Up



Hybrid Vehicles

1998 1999 2000 2001 2002 2003 2004 2005 2006

1972

CX Clarity

2008

1999

Drivetrain

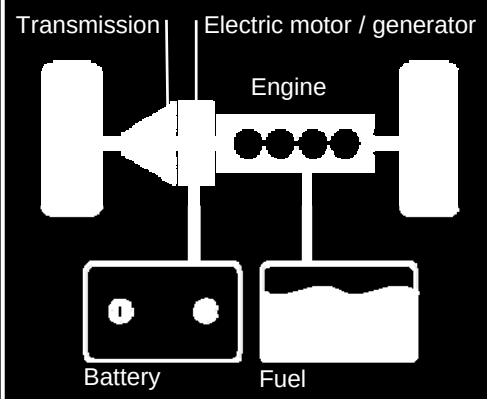
1.3L i-VTEC + IMA

Drivetrain

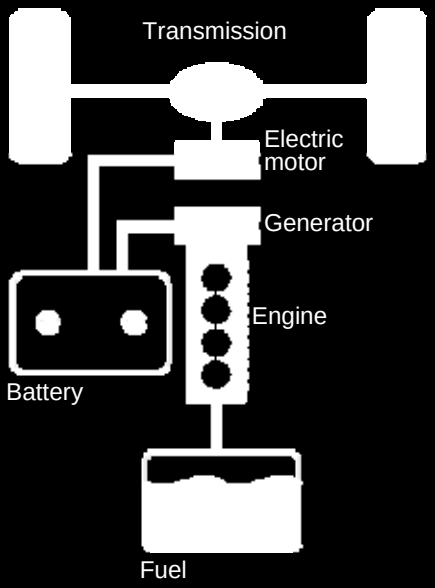
Growth of system complexity and cost →

1.3L i-VTEC + IMA

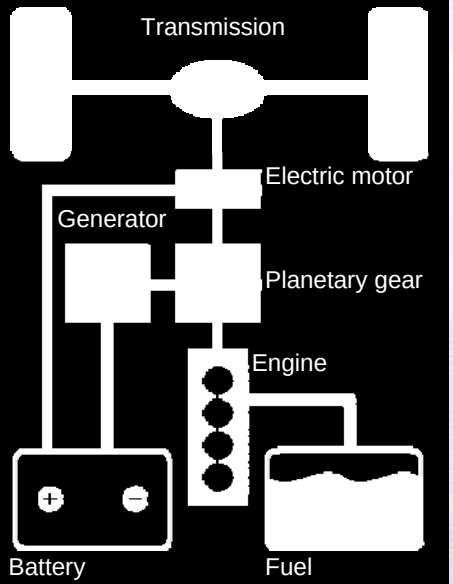
Parallel Hybrid



Series Hybrid



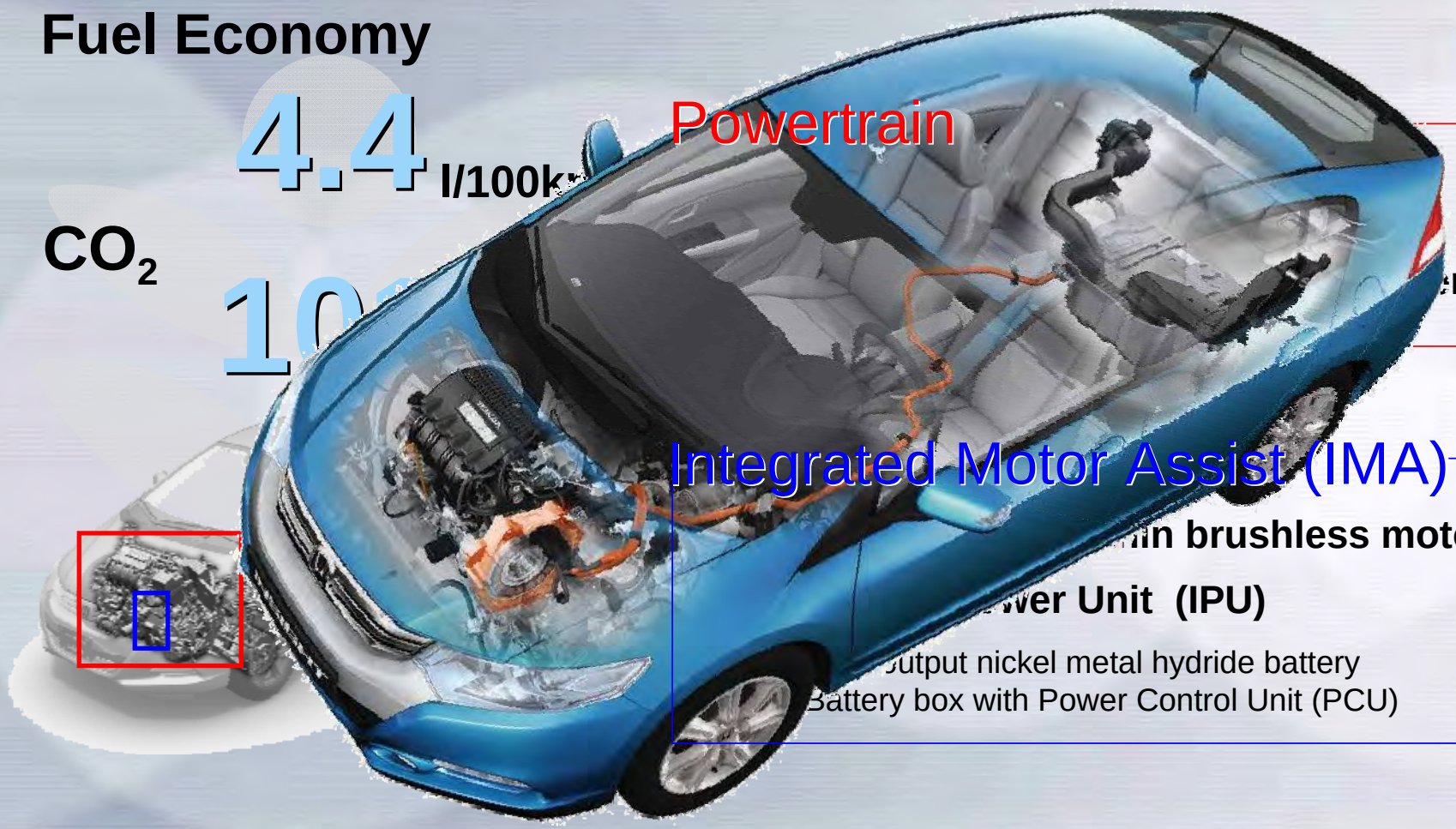
Power Split



Fuel Economy

4.4 l/100k

CO_2 10



Powertrain

engine

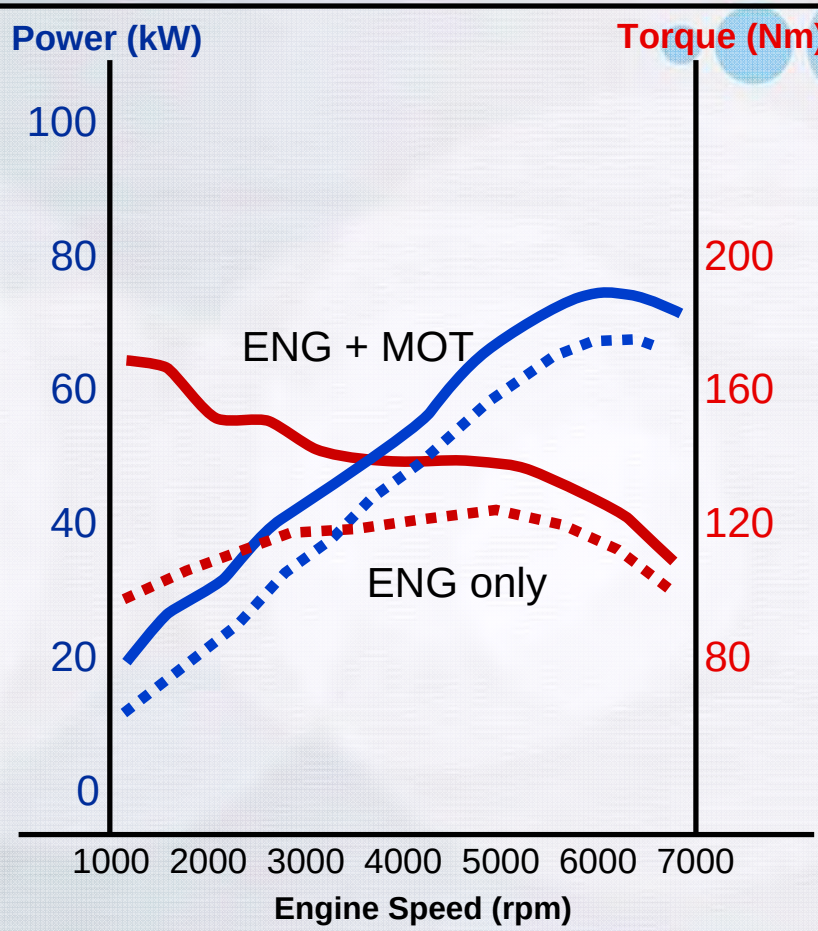
Integrated Motor Assist (IMA)

in brushless motor

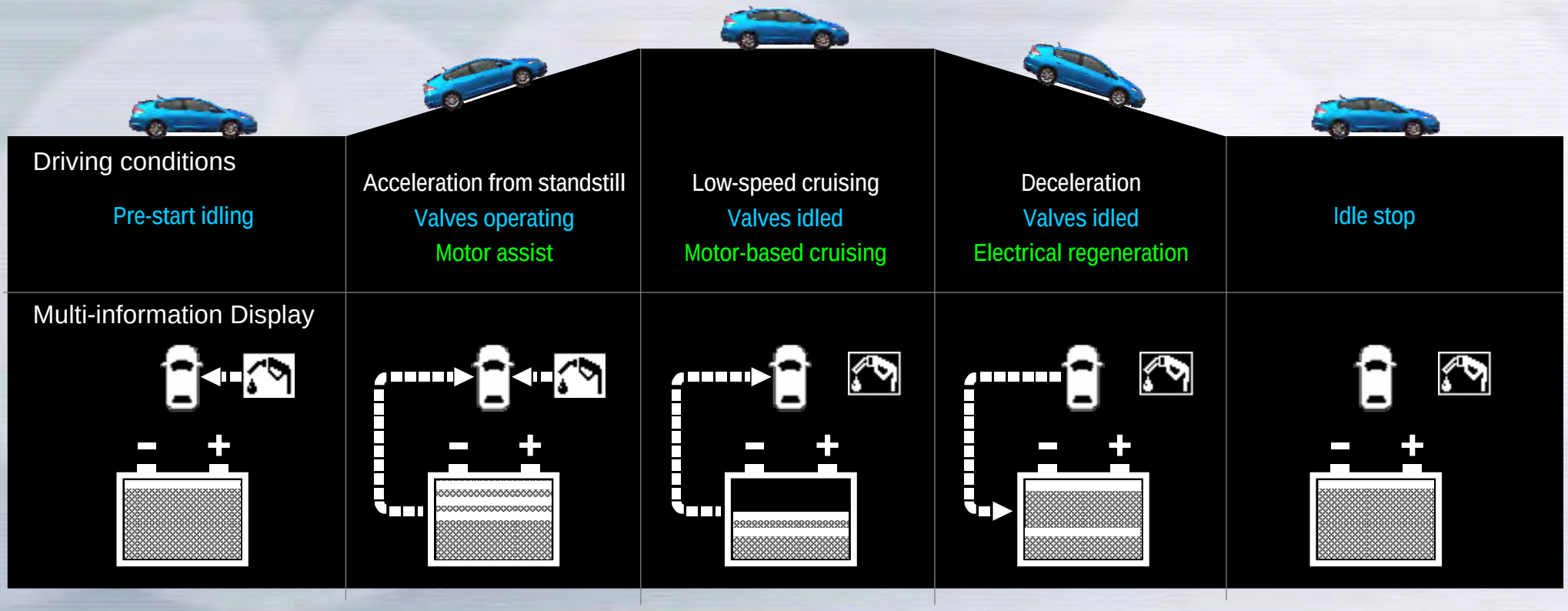
wer Unit (IPU)

utput nickel metal hydride battery
Battery box with Power Control Unit (PCU)

ENG Spec.	1.3L i-VTEC + IMA
Power:	
ENG	88 PS, (65 kW)
MOT	14 PS, (10 kW)
System	98 PS, (72 kW)
Torque:	
ENG	121 Nm
MOT	78 Nm
System	167 Nm



Driving conditions-based energy management



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INSIGHT

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Speedometer background changes color

ECON Mode button

ECO guide
(Multi-information Display)

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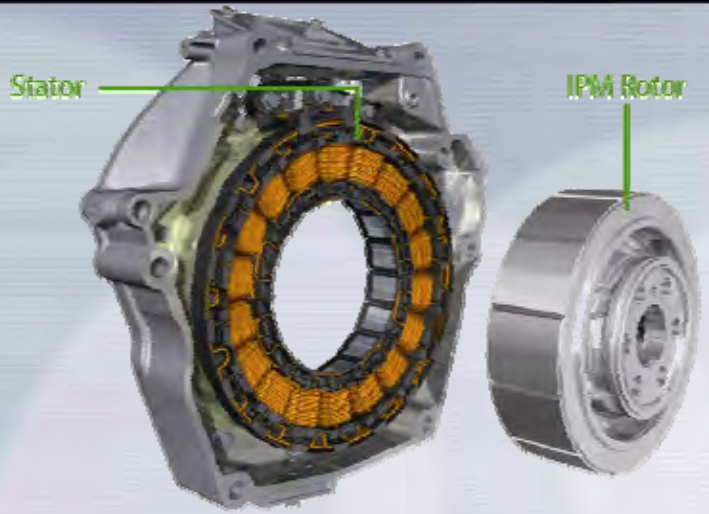
INSIGHT

International AMI Congress



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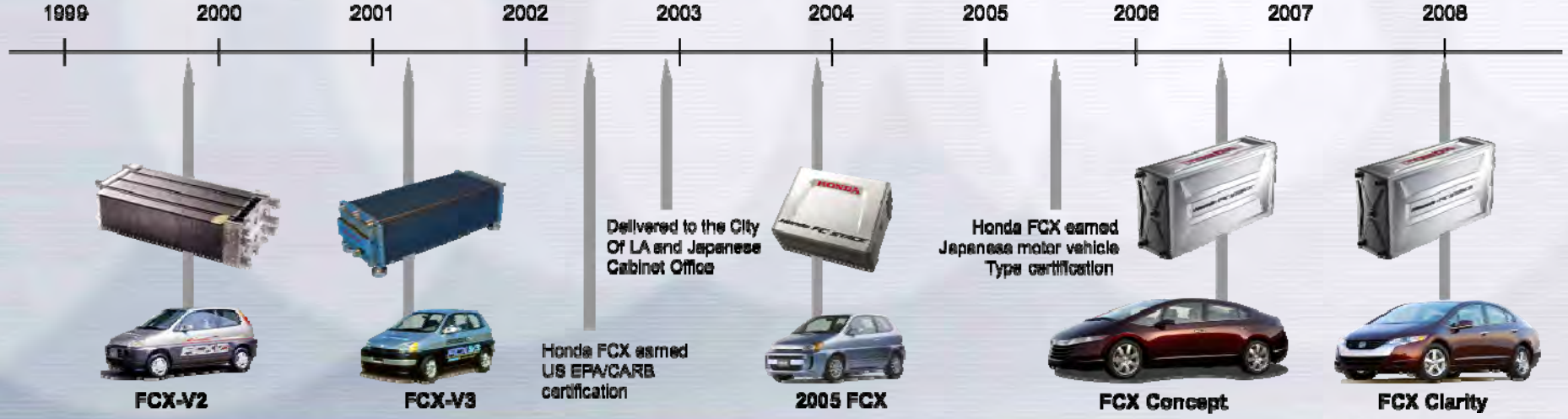
Challenging our Dreams: Honda FCX Clarity Fuel Cell Car

Fuel Cell Leadership
Honda became the world's first carmaker to put a fuel cell car on the road with regular customers, delivering the Honda FCX to fleet users in the United States and Japan in 2002.



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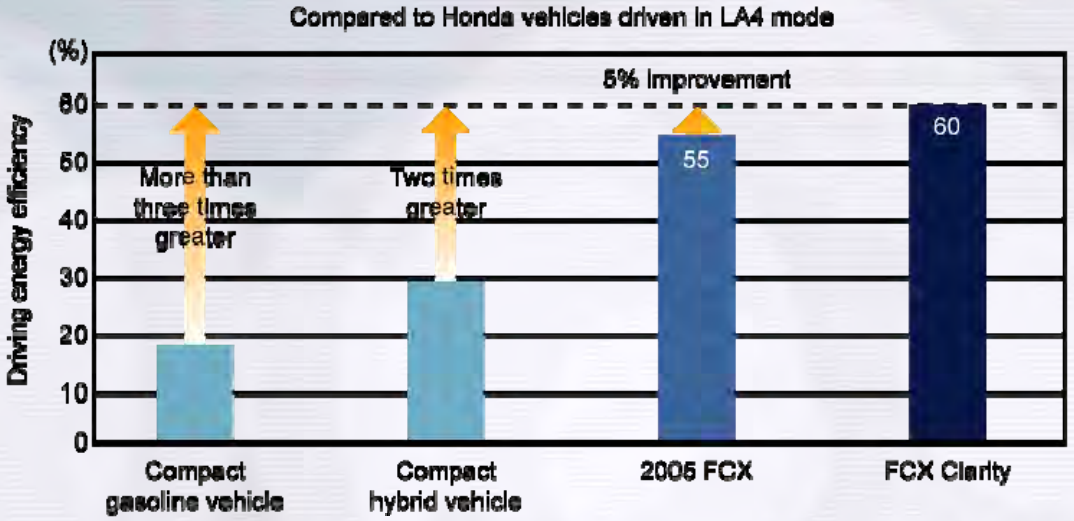
Challenging our Dreams: Honda FCX Clarity Fuel Cell Car



- The FCX Clarity's high-efficiency powerplant and outstanding energy management result in an exceedingly high operating energy efficiency of 60%.
- Furthermore, vehicle weight reduction and superb aerodynamics contribute to an approximate 20% improvement in fuel economy
- The hydrogen tank capacity has been increased, extending vehicle range by 30% compared to the 2005 model.

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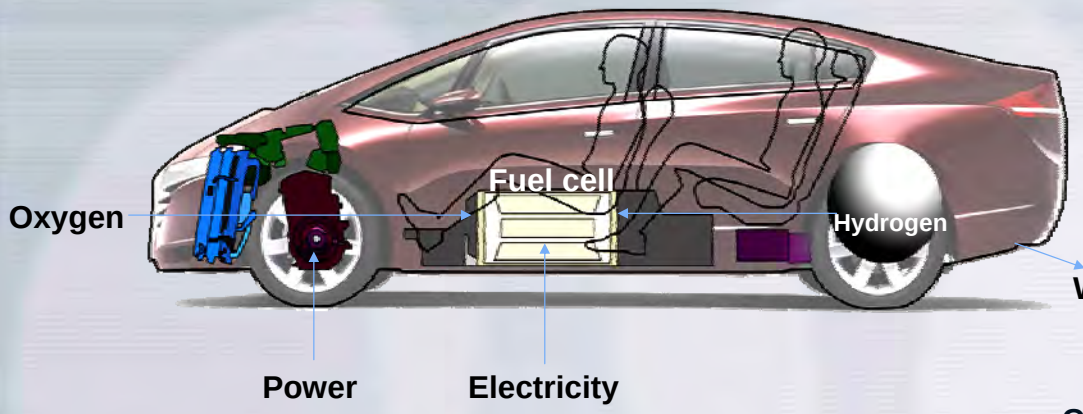
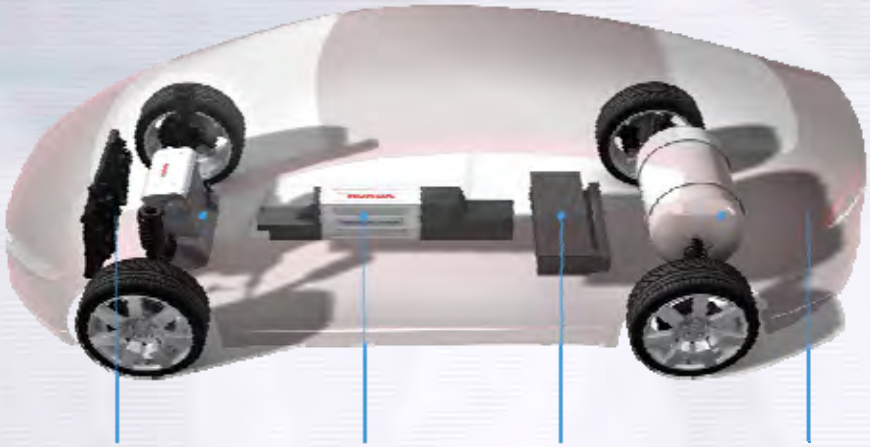
Challenging our Dreams: Honda FCX Clarity Fuel Cell Car

Powerplant layout





Maximum Speed	160 km/h	Maximum Motor Speed	6,000 rpm
Range	570 km*	Maximum Motor Torque	256 Nm
Fuel Cell Stack Output	100 kW	Energy Storage	Lithium-ion Battery
		Motor and Drive	Front-Wheel Drive

*Honda calculation

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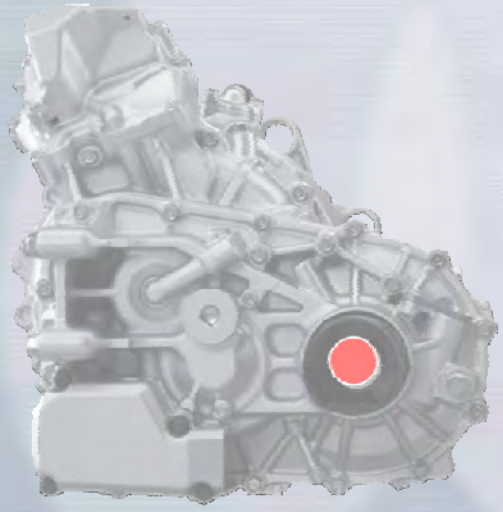
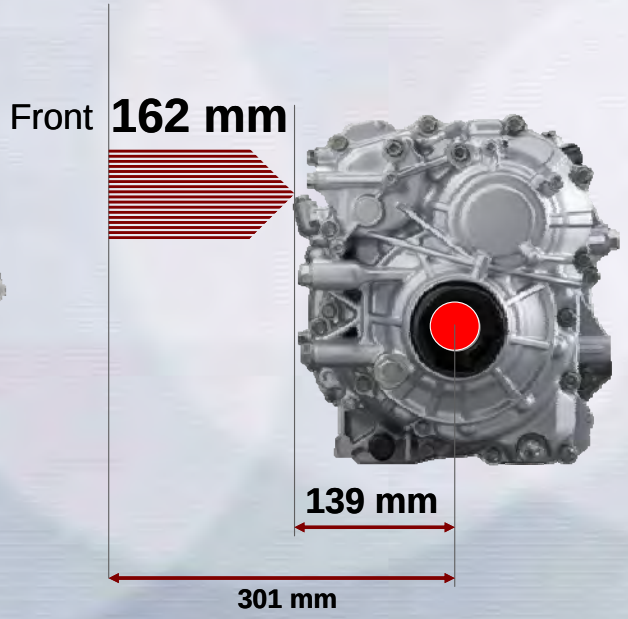
2005 FCX



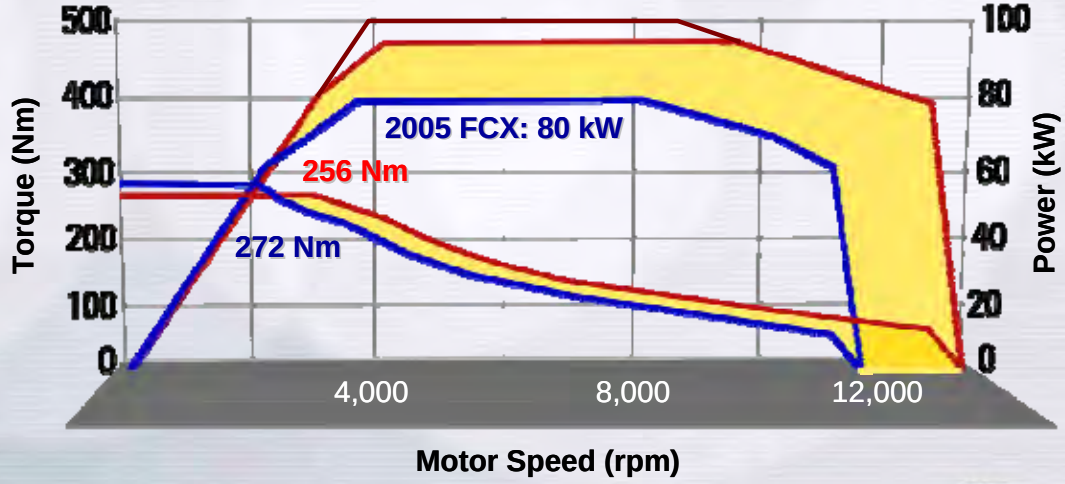
FCX Concept, FCX Clarity

Coaxial layout for reduced length



New high-output, compact motor

FCX Concept: 95 kW
FCX Clarity: 100 kW (new)



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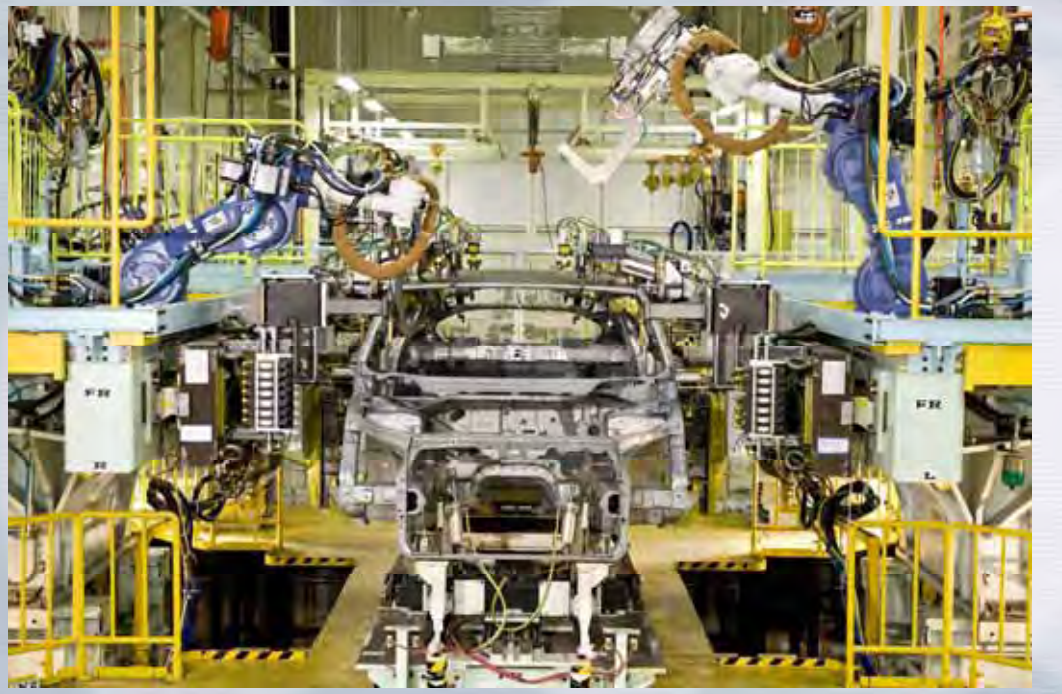
Challenging our Dreams: Honda FCX Clarity Fuel Cell Car



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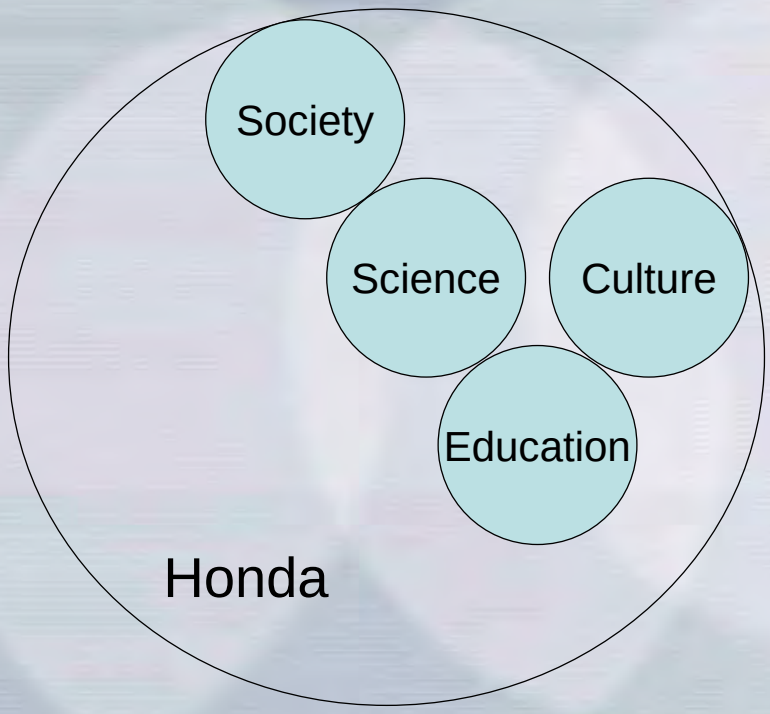
Challenging our Dreams: Honda FCX Clarity Fuel Cell Car

Sharing our dreams



...While Honda will continue to „maintaining on international viewpoint“, as we have done since the founding of the company, we must now focus our business on contributing to the sustainable development of society, based on a global viewpoint.

Honda Philosophy