Clean Cities 2004
-A Decade of Drive-

Pathway to Hydrogen

May 05, 2004
Ft. Lauderdale

Stephen Ellis
Manager AFV Sales
American Honda Motor Co., Inc.

Objectives and Challenges

Fuel Cell Vehicles
Public Awareness

Objective

Introduce FCV and Hydrogen transportation broadly to society and future vehicle customers.

Gain understanding with and commitment to H2 refueling & FCV Technology

Challenges

Multiple hurdles:

- Safety & Confidence
- Comfort with H2
- Acceptance of technology.
  - (e.g. value/benefits performance, cost issues)
- Refueling
- Patience with progress
- Beginning Steps vs Mainstream
  - (e.g. early fleet deployment and low volumes vs dealership showroom sales)

HONDA

Honda's Environmental Technology

LEV ULEV SULEV (Near-Zero Emissions)

EV-PLUS (Electric Vehicle)

Electric Drive Technology

CIVIC-GX (Natural Gas Vehicle)

High Pressure Gas Storage Technology

INSIGHT (Hybrid)

CIVIC (Hybrid)

High Precision Energy Management Technology

FCV V 1 , V 2 V 3 V4

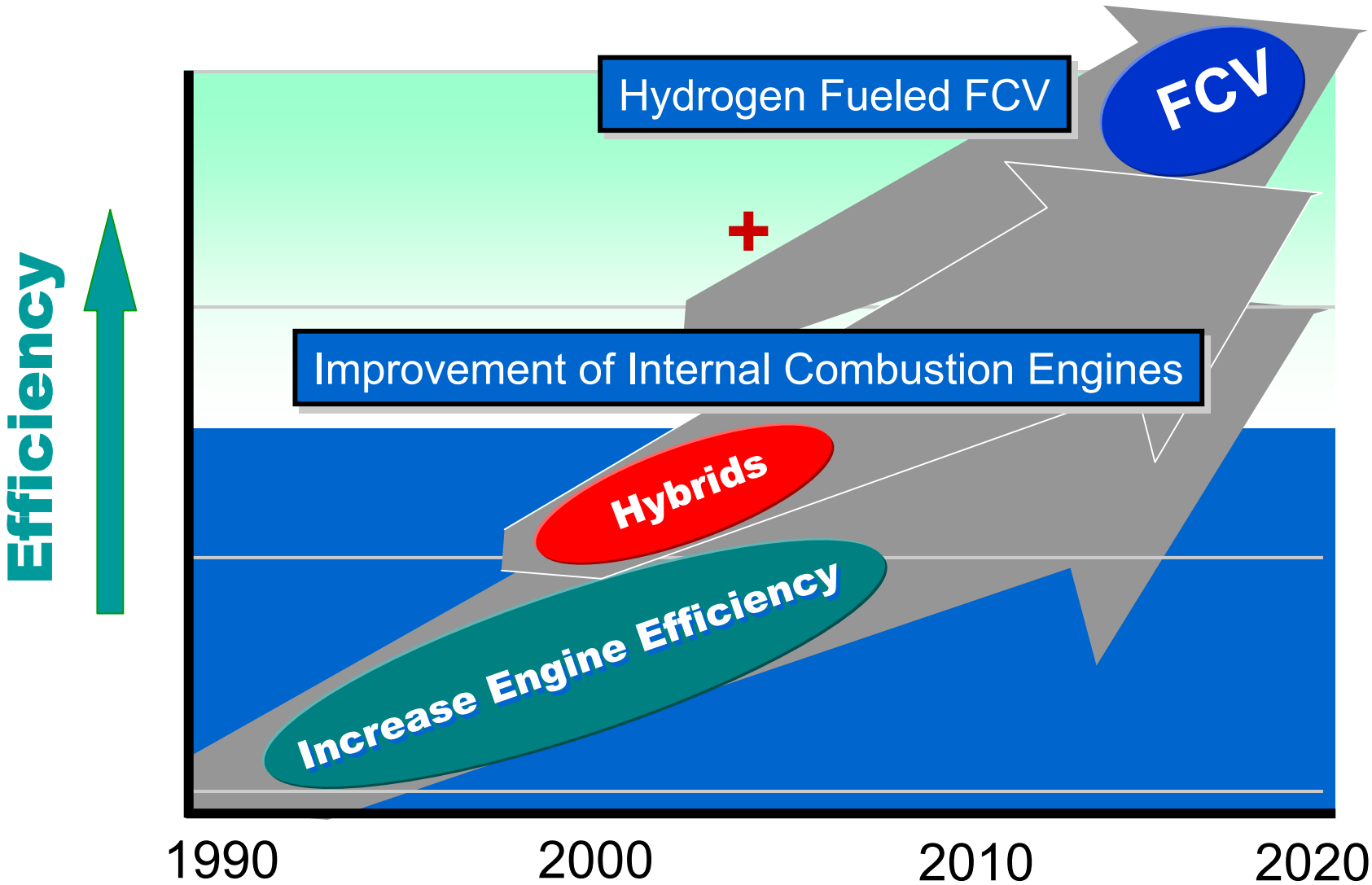
Prototype Stages

2003 FCX

Certified Production Vehicle

HONDA

Honda's Power Plant Roadmap



HONDA

Honda's Building Blocks Pathway

CNG

HOME REFUELED AFV

FUEL CELL VEHICLES

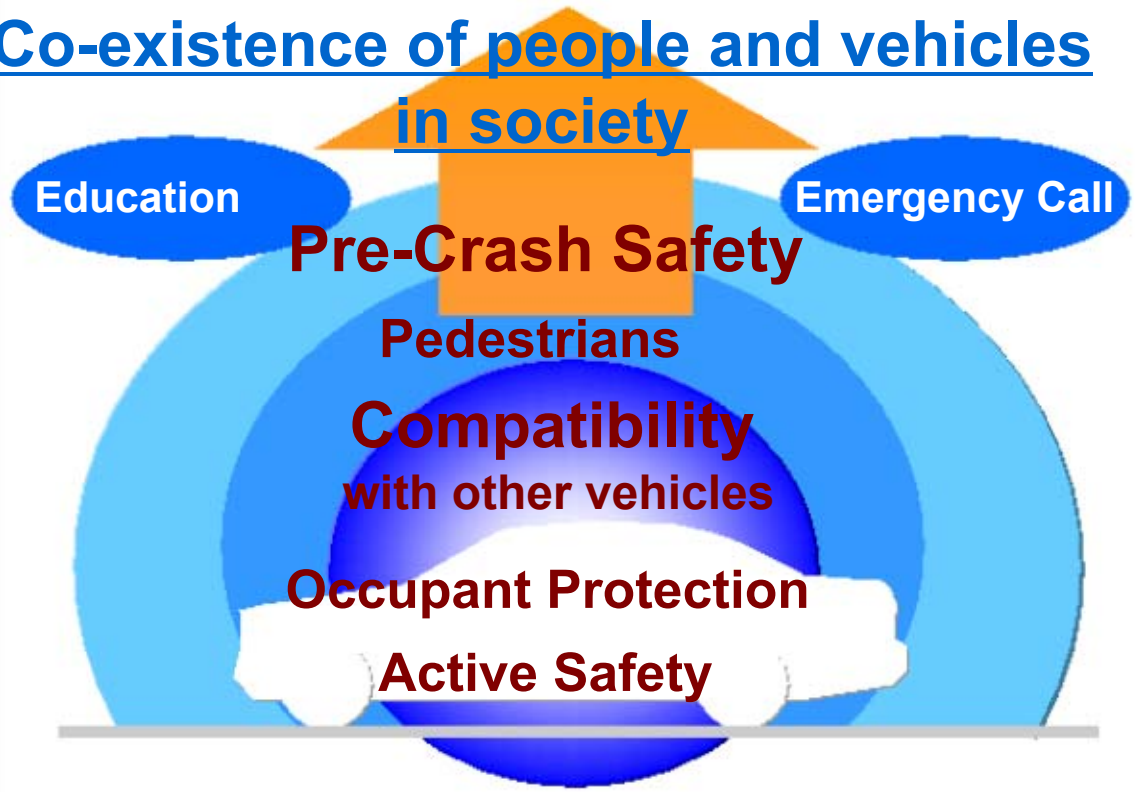
PURE ELECTRIC

GASOLINE-ELECTRIC HYBRIDS

CLEAN GASOLINE

"Safety for Everyone" Concept & Approach

- "Safety for Everyone" requires involvement of everyone
  - Industry
  - Government
  - 3rd parties
- Work together for the benefit of society



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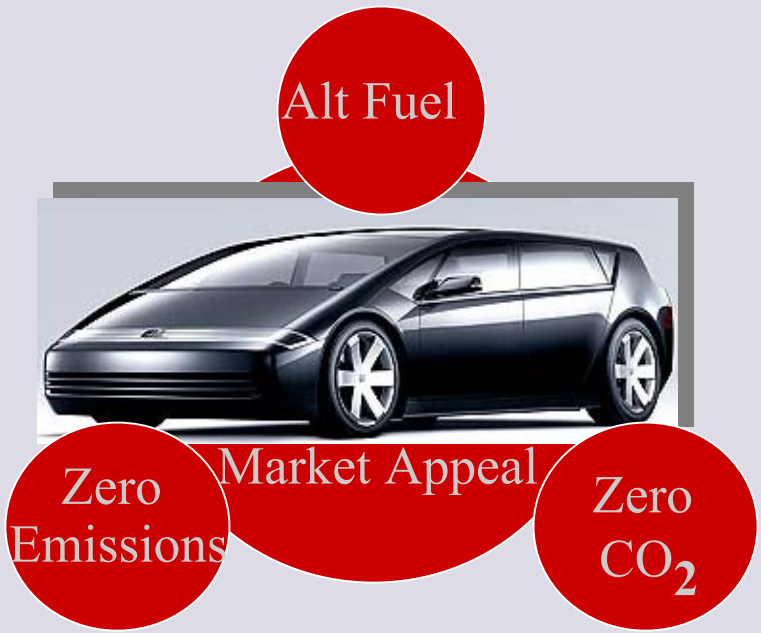
Fuel Cell Vehicles & H_2 Infrastructure



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Honda's Ultimate Vision

Natural Gas Vehicles
- Infrastructure Issues
- Gaseous Fuels know-how
- Fuel Storage Technology

Alternative Fuel

Fuel Cell Vehicle

Near Zero/Zero Emissions

High Efficiency

HYBRIDs
- Efficient Designs
- Electric Drive Technology
- Precision Energy Mgmt. & Controls

ULEVs-SULEVs
- Catalyst technology
- Minimize Precious Metals
- Advanced Control Technology

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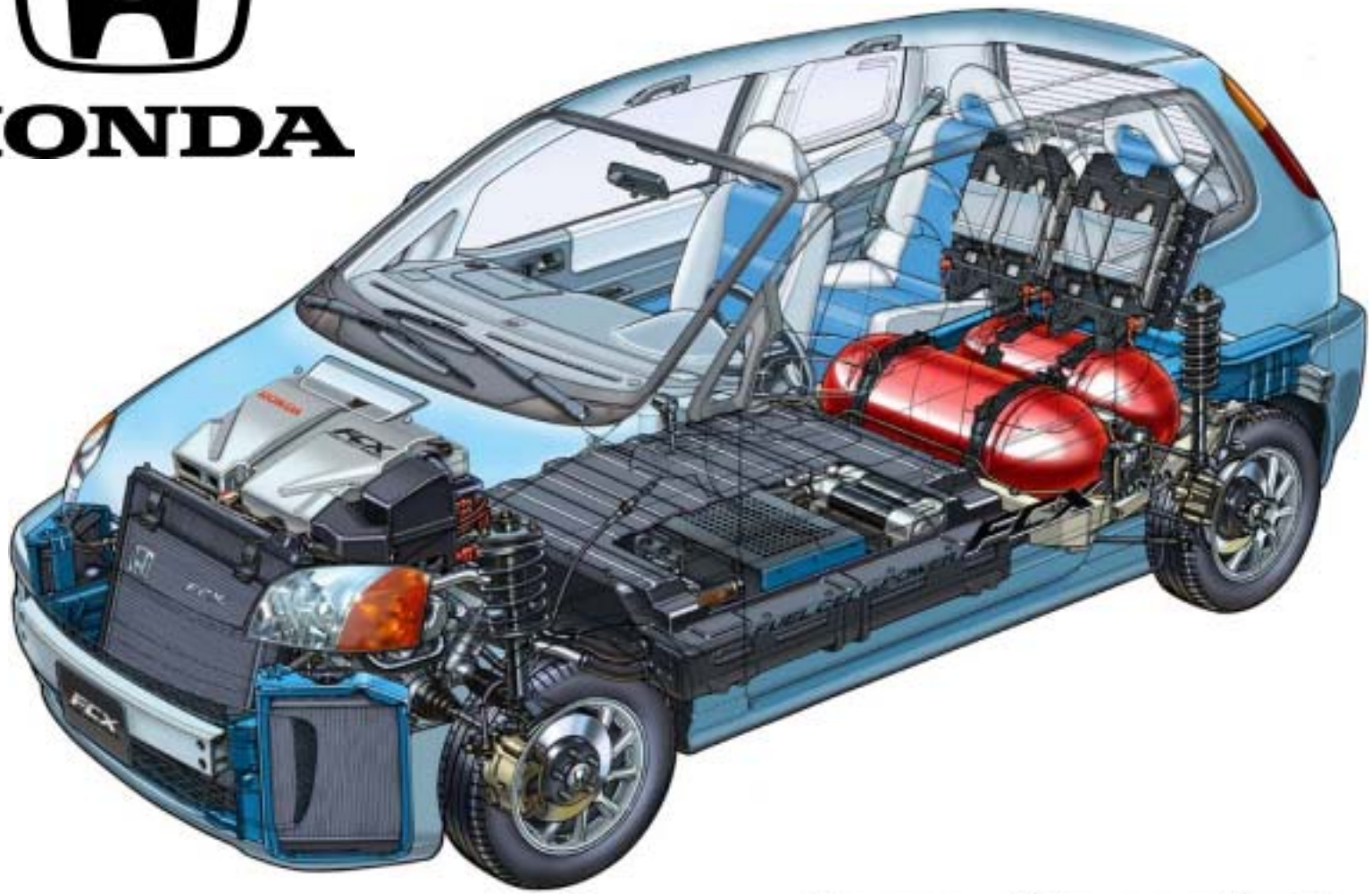
HONDA



FCX

FUEL CELL POWER

FCV Success: Early Awareness

Honda's Focus:

- Technology Advancement
- Real World Applications
- H_2 Infrastructure Feasibility & Development
- Effective Cooperation (e.g. CaFCP)

HONDA

FCX: the World's First Fuel Cell Vehicle Certified for Commercial Use

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF MOBILE SOURCES
ANN ARBOR, MICHIGAN 48105

2003 MODEL YEAR

ZERO-EMISSION VEHICLE (ZEV) AND INHERENTLY LOW-EMISSION VEHICLE (ILEV)

CERTIFICATE OF CONFORMITY
WITH THE CLEAN AIR ACT OF 1990 ISSUED TO:

Honda Motor Co.,Ltd. — HONDA-ZEV-T2-2003-01 — July 16, 2002
MANUFACTURER — CERTIFICATE NO. — EFFECTIVE DATE

Signed by GREGORY A. GREEN
Director of Certification
and Compliance Division

Test Group:3HNXV00.07XC Evaporative/Refueling Family: 3HNXR0000CDA

Applicable Emission Standards: Tier 2: Bin 1; NLEV: ZEV; CFV:ILEV, ZEV

Date Issued: July 16, 2002

Vehicle Description: Hydrogen-fueled Polymer Electrolyte Membrane (PEM) Fuel Cell Vehicle, 60kW DC brushless motor, single speed transmission, regenerative braking system, ultra capacitor (8.0 farad),fuel cell output 78 kW.

US EPA approval issued July 16, 2002

2003 Honda FCX

Miles per kilogram of hydrogen	
51 city	48 hwy
Annual Fuel Cost: $1515	

EPA Air Pollution Score	Best 10 (0 – 10)
Range	170 miles
Fuel	Hydrogen
Fuel Cell	Polymer Electrolyte Membrane
Motor	60 kW DC
Energy Storage Device	Ultracapacitor

California Environmental Protection Agency
AIR RESOURCES BOARD

HONDA MOTOR CO., LTD.

EXECUTIVE ORDER A-023-0333
New Zero-Emission Vehicles

Pursuant to the authority vested in the Air Resources Board by Health and Safety Code (HSC), division 26, part 5, chapter 2; and pursuant to the authority vested in the undersigned by HSC sections 39515 and 39516;

IT IS ORDERED AND RESOLVED: That the following vehicles produced by the manufacturer are certified as new zero-emission vehicles. Production vehicles shall be in all material respects the same as those for which certification is granted.

MODEL YEAR	TEST GROUP	EVAPORATIVE FAMILY (EVAF)	VEHICLE TYPE (PC=passenger car; LDT=light-duty truck; MDV=medium-duty vehicle; LVW=loaded	EXHAUST EMISSION STANDARD CATEGORY (ZEV=Zero-Emission Vehicle)	FUEL TYPE

State of California **CARB** approval issued July 19, 2002

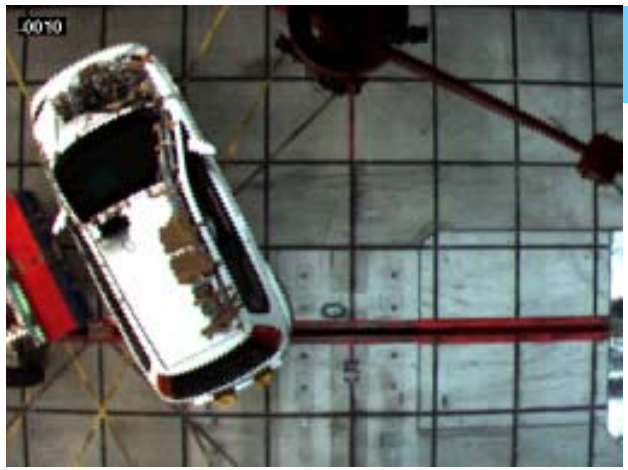
HONDA

FCX: Collision Safety Performance

Multi-directional collision testing helps ensure passenger safety
Meets all applicable Federal Motor Vehicle Safety Standards

Frontal

Side



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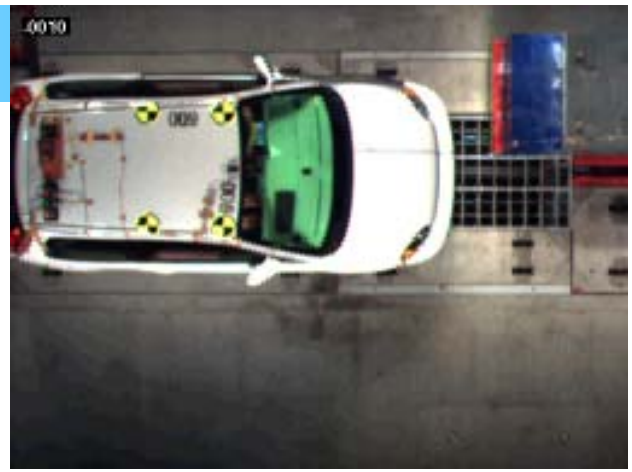

Rear

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FCX Production Vehicle

Conventional “Honda Look and Feel” familiar controls and features

Cool Blue instrumentation for simple driver information yet valuable user feedback

Launch of FCX on Dec. 2nd, 2002

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF MOBILE SOURCES
ANN ARBOR, MICHIGAN 48105

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Director of Certification
and Compliance Division

Date Issued: July 16, 2002

Mayor of Los Angeles takes delivery of FCX at City Hall

Currently 10 vehicles in the U.S.

Prime Minister takes delivery of FCX at his official residence

Currently 7 vehicles in Japan


FOUR EVER
FRIDAY'S
LOHNSON
RETAIL SPACE AVAILABL
Contact
Exclusive Agent
9859

TV Coverage

HONDA

City of San Francisco Commitment to Fuel Cell Vehicle Use

Mayor Gavin Newsom, driving one of City of San Francisco's FCX vehicles

"San Francisco has more than 700 advanced technologies vehicles in the City's fleet and one of the nations largest alternative fuel infrastructures. Adding the Honda hydrogen-powered fuel cell car is the next critical milestone in our evolution towards non-polluting vehicles. Over the next few years we hope to provide a model for other cities wanting to make hydrogen fuel cells a reality."

KURT ROGERS / *The Chronicle*

Look, Ma! No emissions!

San Francisco Mayor Gavin Newsom and Terry Tamminen, state environmental protection chief, take a spin Tuesday in a Honda FCX hydrogen-powered fuel-cell vehicle, one of two leased to the city. The zero-emission vehicles use no fossil fuels. San Francisco has more than 700 alternative fuel and advanced technology vehicles.

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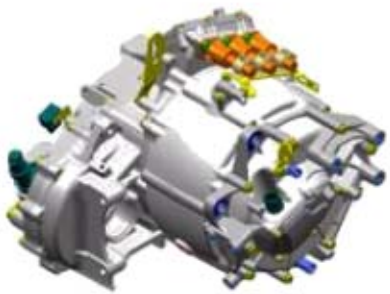
Technology Advancement for the Latest FCV

Power Control Unit

Ultra Capacitor

FC Stack

Traction Motor



FC Sub system

HONDA

Next Generation
Stack Development Concept

FCV widespread use

Compact, High output

Environmental adaptability

For volume production in the future

HONDA

TREET JOURNAL.

AUTOMOTIVE

Honda Motor Co.

Fuel-Cell Car in Development Runs at Subzero Temperatures

Honda Motor Co. said it has developed a fuel-cell car that can run at sub-zero temperatures, a move that may help it pull ahead of its global rivals in the competition to develop environmentally friendly technologies. The Japanese auto maker said it has developed the world's first fuel-cell vehicle equipped with a fuel-cell stack that can operate at temperatures as low as minus 20 degrees Celsius. It expects to save on production costs as its new fuel-cell stack has a simplified structure composed of stamped metal separators, reducing the number of components by 50% compared with the company's 2001 fuel-cell stack model. Global auto makers such as General Motors Corp. are stepping up efforts to develop environmentally friendly technology to lure environment-conscious customers. Fuel cell vehicles are powered by electricity generated via an electrochemical reaction that uses oxygen and hydrogen and generates no toxic exhaust gases.

What's motorin'

Living wit

The Examiner

SPECIAL TO THE EXAMINER

Honda is advocating a Home Energy Station that converts natural gas into hydrogen, electricity and hot water. GM has advanced a similar idea, but at this point, you might have to live in your car after paying for the machine.

HONDA

Freezing Weather Startup and Operation Verification

FCX with new Honda stack
Feb 26, 2004
Startup and operation at freezing weather

HONDA