Safe and Sound Network Technology

Objective

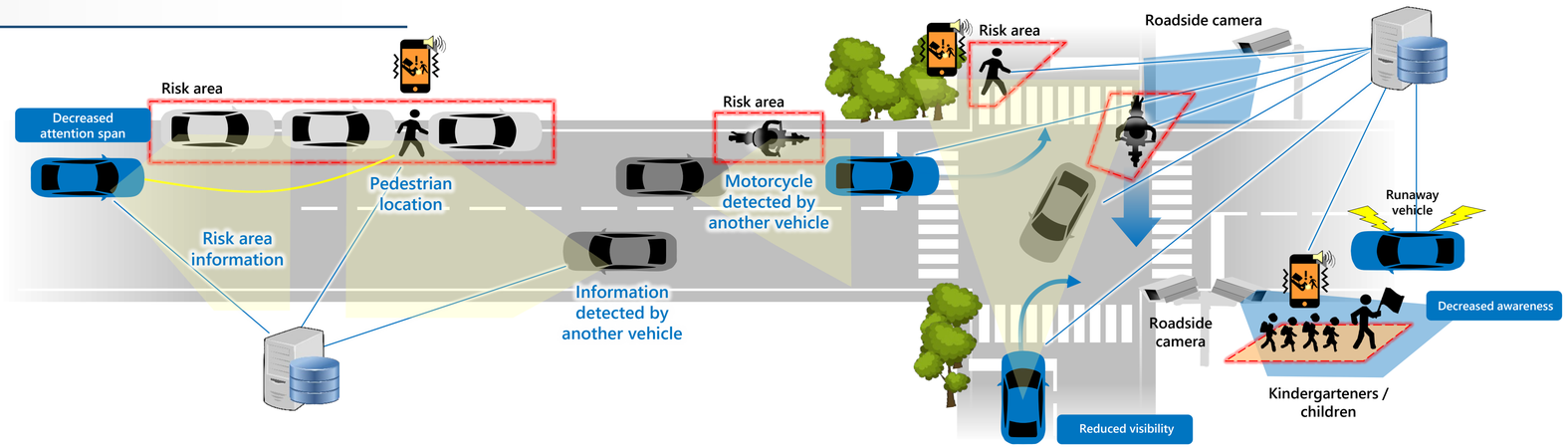
Aim for the achievement of a traffic society where no one collides by providing appropriate information according to the respective conditions of road users and traffic situations by utilizing communication technology.

Technology Features

- Connects with all road users through the utilization of telecommunication
- Consolidates risks hidden in the traffic environment through camera/probe information
- Transmits risk information appropriately in accordance with individual conditions and characteristics

Technology Details

Contributes to accident prevention through technology that estimates the behaviors and conditions of very road user, judges them in an integrated manner, and predicts risks.



Understanding Personal Characteristics

Personal Sensing/State Estimation

Elation/Anger

Stress, Changes in Physical Condition

Estimate the individual states of all traffic participants

Anticipation/Prediction

Collaborative Platform

Digital Twin

Integrates the information groups collected on the server onto the map.

Real-Time Property: H / L

Dynamic	•Locations and personal states of traffic participants
Semi-dynamic	•Presence of parked vehicles •Broken down vehicles, traffic information
Semi-static	•Personal characteristics of traffic participants •Regulation information / Weather information
Static	•Lane information

Traffic Participant DB

Integrated Risk Judgment Algorithm

Estimates the behaviors and states of all traffic participants and judges these comprehensively to predict risks.

Synlogue based communication

Promotes the understanding of potential risk

Rather than taking action right before an accident happens, be prepared before it happens.

Promote the standardization of a collaborative platform through industry/public and private collaboration toward early-stage social implementation.

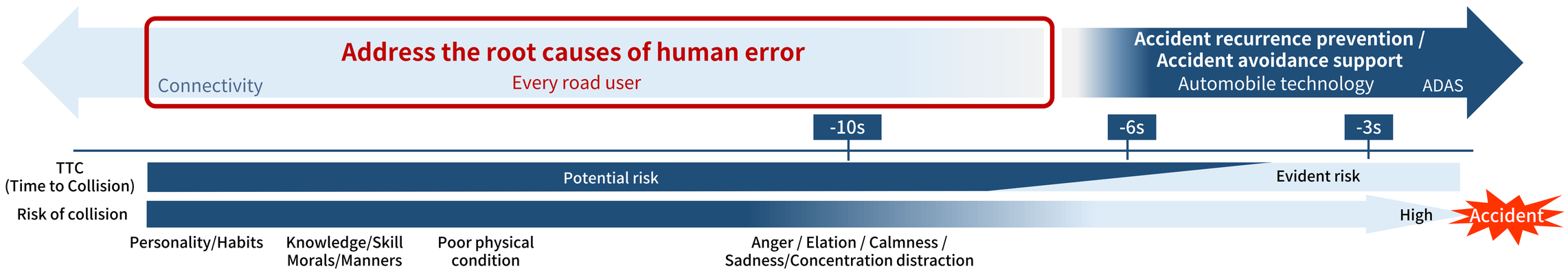
HONDA

Safe and Sound Network Technology - Core Technologies -

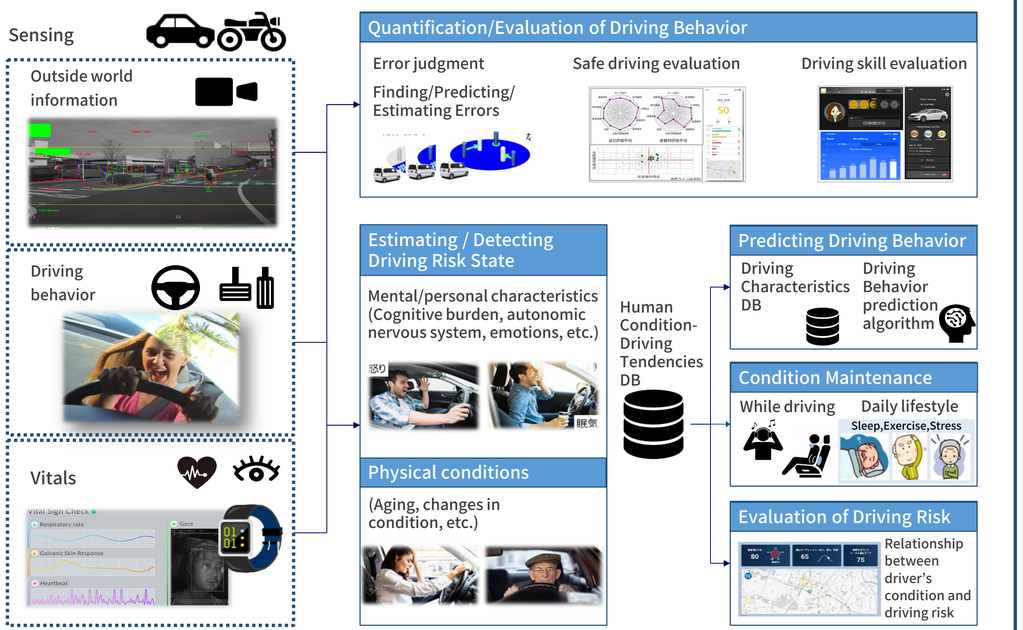
Support Concept

Understand the predictions of risks caused by humans and address them before human error can occur.

Find the causes of risks caused by humans (Ex.: Poor physical condition, anger, impatience, etc.)

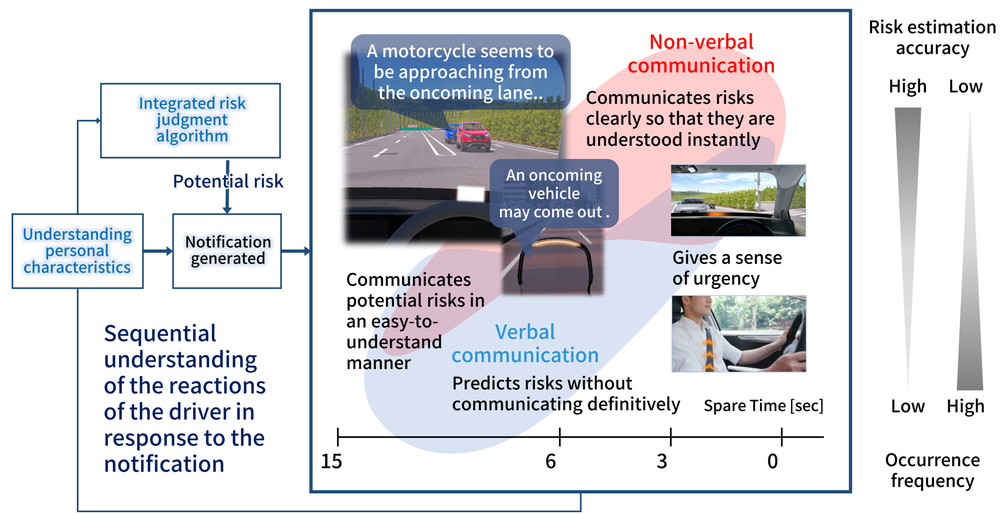


Understanding Personal Characteristics



Synlogue based communication

Empathetic communication facilitating the understanding of potential risks while people and vehicles understand each other's reactions through a combination of verbal and non-verbal communication.



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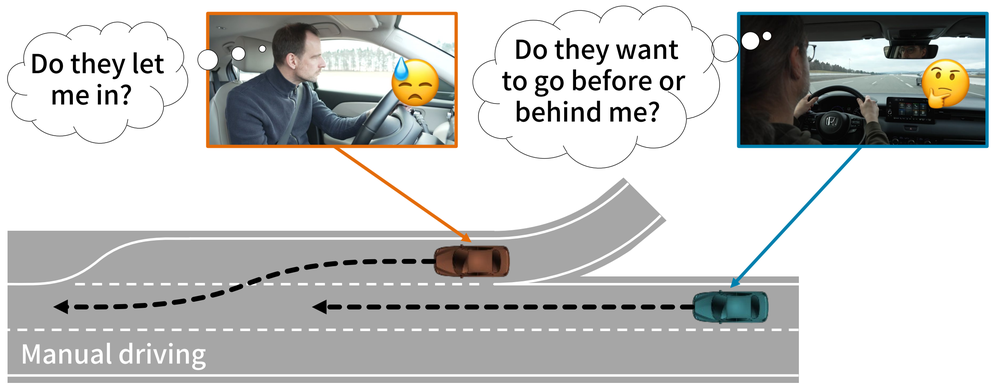
Automated merging at highway on-ramps based on V2V communication

Objective

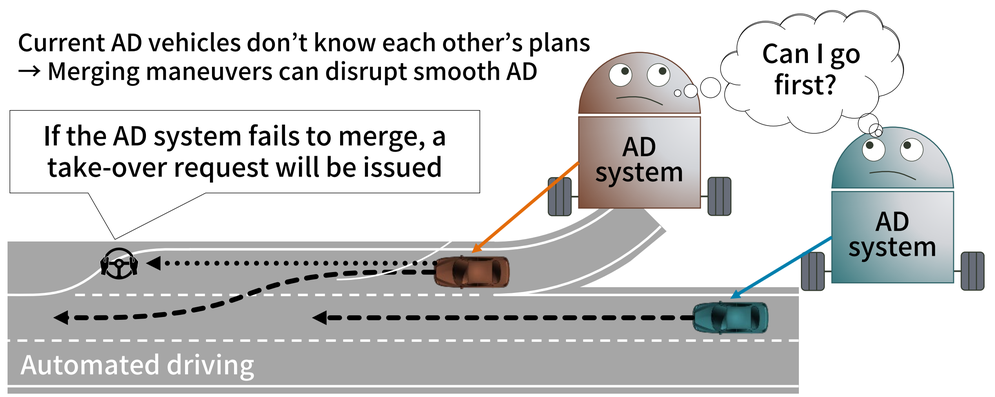
Ease on-ramp merging situations which can be challenging, as intentions are often unclear

Challenge while merging



Limit of automated driving (AD)

Current AD vehicles don't know each other's plans
→ Merging maneuvers can disrupt smooth AD

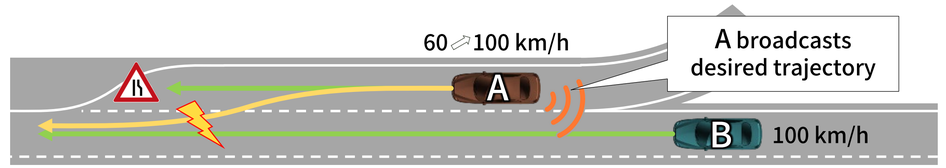


Technical Features

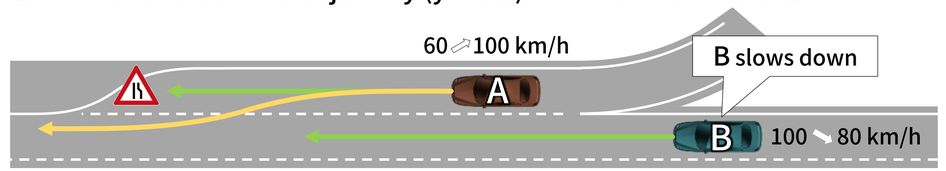
Allow for negotiation by sharing intentions via vehicle-to-vehicle (V2V) communication to achieve less take-over requests, more comfort and safety, and a smooth and safe traffic flow

Technology Details

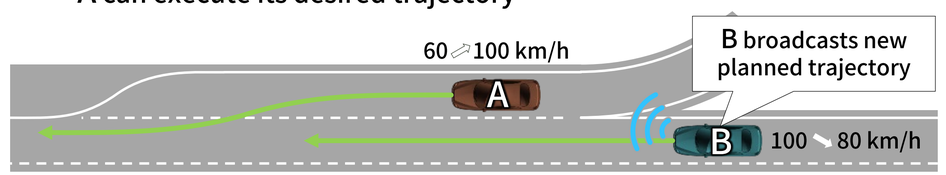
Connected AD



1. A aims to enter the highway, but can't change its planned trajectory (green), as the planned trajectory of B blocks the way
2. A sends a desired trajectory (yellow) which conflicts with B



3. B receives the desired trajectory of A
4. B slows down (and accordingly shortens its planned trajectory) so that A can execute its desired trajectory



5. B sends its new planned trajectory, which is received by A
6. A turns its desired trajectory into a planned trajectory

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101006664.

Hi-Drive Designing Automation

HONDA

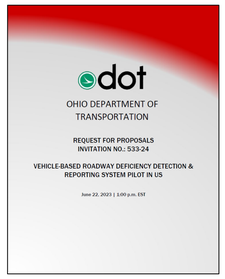
Road Hazard Monitoring System

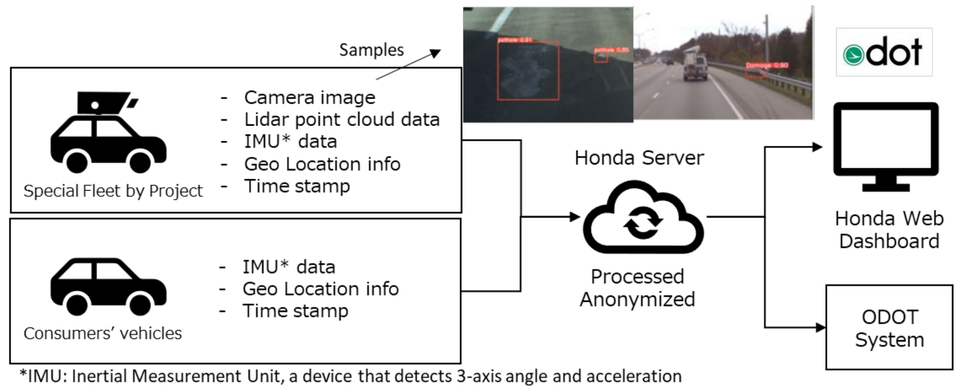
Objective

Fully utilize a large amount of data to strive for the creation of a safe and secure society by promoting data utilization with higher added value while protecting the rights and interests of individuals.

Demonstration Tests

Honda has been proceeding with paid demonstration tests with the State of Ohio.





*IMU: Inertial Measurement Unit, a device that detects 3-axis angle and acceleration

Conditions to be monitored

Technical Features

Use vehicle data to effectively manage road maintenance management work that includes not only road surfaces, but also road infrastructure, such as signs and guardrails.

Future Goal

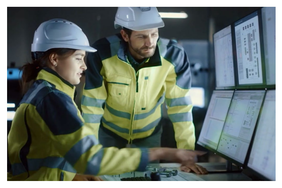
”Honda’s vehicles will run, and your city will be happy.”
Changing drivers into community builders will contribute to the realization of safer, more comfortable roads.

Value to Honda:
“Nicest People Brand!”

Value to Drivers
Proud to be a community builder

Connected Data Platform

Value to City/States
Safer, More Pleasant Roadway

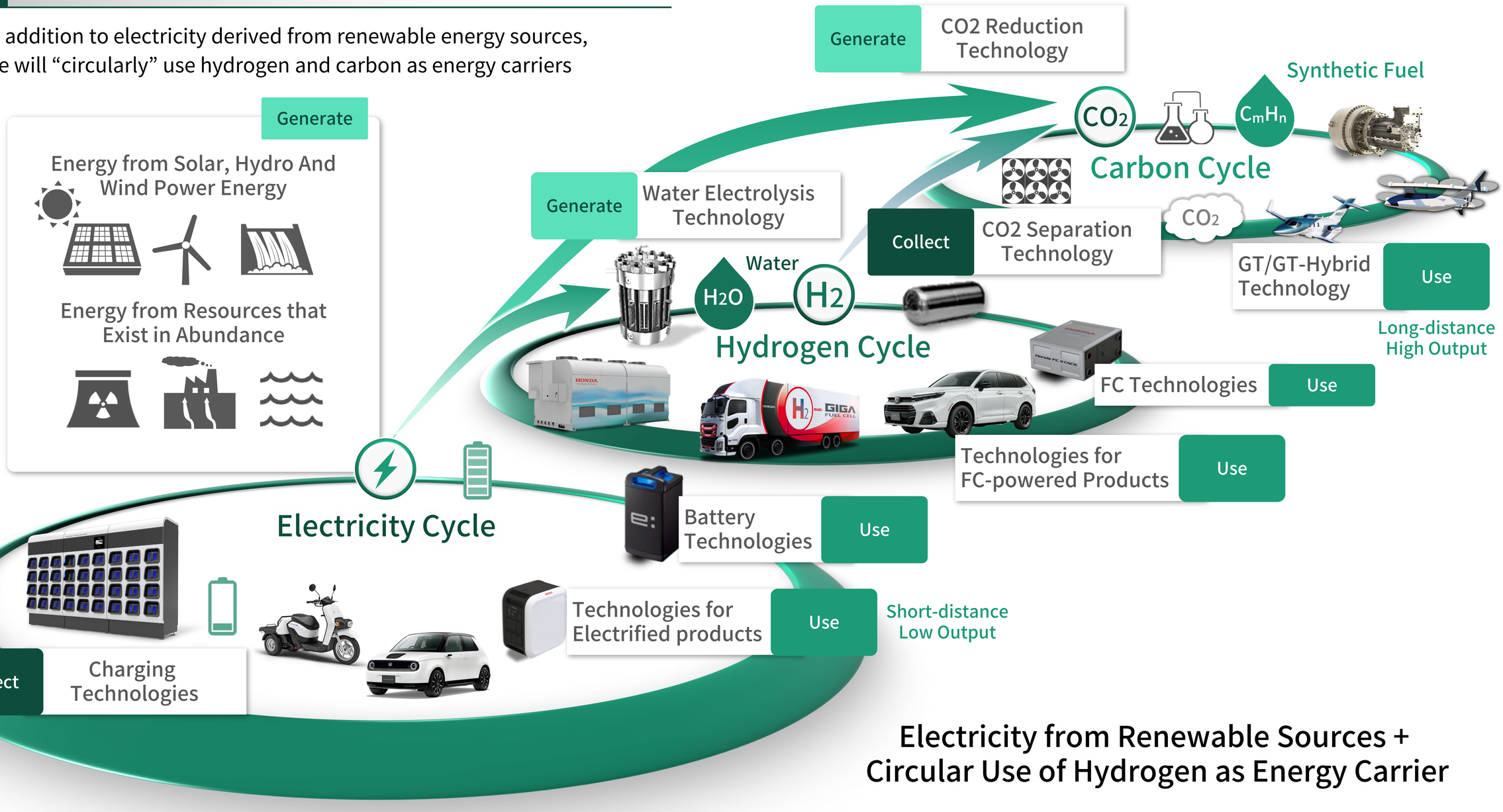


HONDA

Multidimensional Approach toward Carbon Neutrality

Objective

In addition to electricity derived from renewable energy sources, we will “circularly” use hydrogen and carbon as energy carriers



Electricity from Renewable Sources +
Circular Use of Hydrogen as Energy Carrier

HONDA

Clean Mobility and Reliable Power Supply through Energy Combination of Electricity and Hydrogen

Realization of a carbon-neutral society

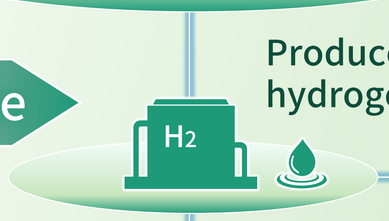
Renewable energy

Obtain energy from natural sources

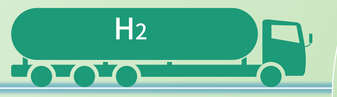
Power supply with renewable energy

Generate

Produce hydrogen

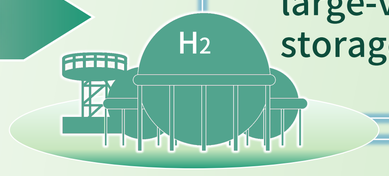


Long-distance transport

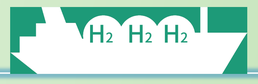


Store

Long-term large-volume storage



Intercontinental transport



Pipeline transport

Transport

Use

EV

The joy of mobility

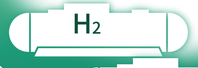
FCEV

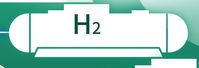
FC commercial vehicles

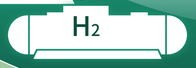
Expand electrification to Larger / longer-range vehicles

Reliable power supply

FC power station







FC construction machinery

FCEV

Honda to contribute in the area of “Use” of hydrogen

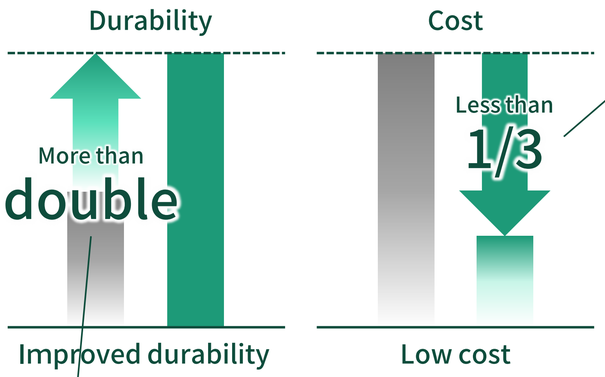
HONDA

Honda Fuel Cell System

Objective

Promote the creation of a hydrogen cycle, an electrical cycle, and a carbon cycle and strive to become carbon neutral by evolving the fuel cell system.

Next-Generation Fuel Cell System



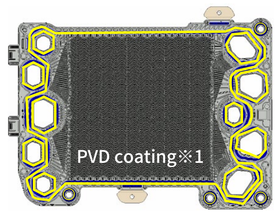
Technology for improving durability

Previous stack

Cross-section image

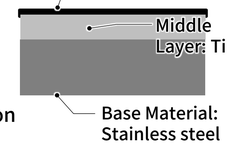
Base Material: Stainless Steel

New stack



※1: Physical Vapor Deposition

Cross-section image

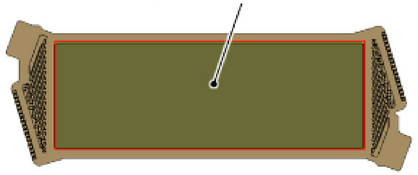


Improved the quality of the BPP coating to suppress Fe elution from the stainless steel base material that causes membrane degradation to improve durability. Also, changed to non-gold-plated coating material to successfully reduce the cost.

Technology for cost reduction

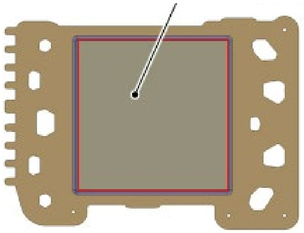
Previous stack

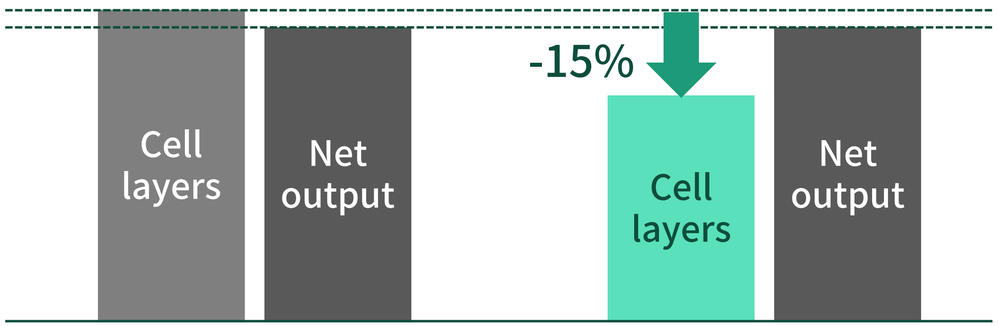
Power generation area



New stack

Power generation area





Along with increasing the output per cell, thoroughly reduced the power consumption of the auxiliary equipment through the application of a highly active electrode catalyst and optimized designs for the gas flow passage and power generation area. While this resulted in a 15% reduction in the number of cells compared to conventional systems, equivalent output was achieved, and the cost was reduced.

HONDA

Initiatives with Stationary Power Generator

Objective

We will propose the application of our fuel cell systems in the area of power generation, starting from the application as a clean and quiet backup power source.

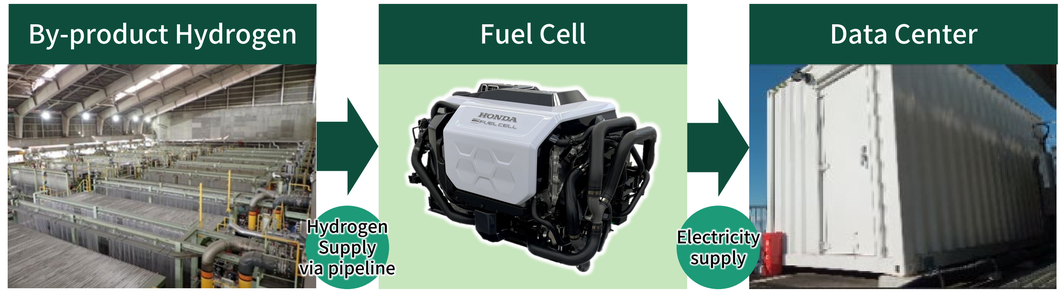
Features of the Technology

- Our fuel cell system can achieve a various output by connecting dozens of units.
- High responsiveness that adapts to output needs

In-house Demonstration (American Honda Motor)

Installed in the premises of American Honda Motor
Started in-house demonstration as emergency power generation for data center

Joint Demonstration (Shunan City, Yamaguchi)



TOKUYAMA

- Supplies by-product hydrogen
- Provides venue for the demonstration

HONDA

- Develops stationary fuel cell power generator
- Verifier of technology and operability

三菱商事

- Manages the project
- Verifies business feasibility
- Installs and operates data center

Joint Demonstration of de-carbonizing data centers with by-product hydrogen and reused fuel cells from FCEVS for Stationary Fuel Cell Power Generators.

Adopted by the New Energy and Industrial Technology Development Organization (NEDO) as one of the projects for the "Development of Technologies for Realizing a Hydrogen Society / Development of Technologies for Regional Hydrogen Utilization." Demonstration period: FY2023 FY2025

Develop technology and verify business feasibility through demonstrations, leading to hydrogen utilization and decarbonization of electricity generation

HONDA

Initiative with Commercial Trucks

Objective

We are aiming for the early realization of a carbon-neutral movement offering clean mobility and reliable power supply and safe movement movement for commercial trucks with a long cruising range by utilizing the advantages of hydrogen energy.

Technical Features

- -High reliability cultivated through fuel cell vehicle development
- -Highly efficient power unit suitable for long-distance driving

Technology Details: Initiative Example

Start of the joint development for FC Heavy Truck with Isuzu

GIGA FUEL CELL performing a final check run on
a public road before the start of monitoring (Photo taken on November 15, 2023)

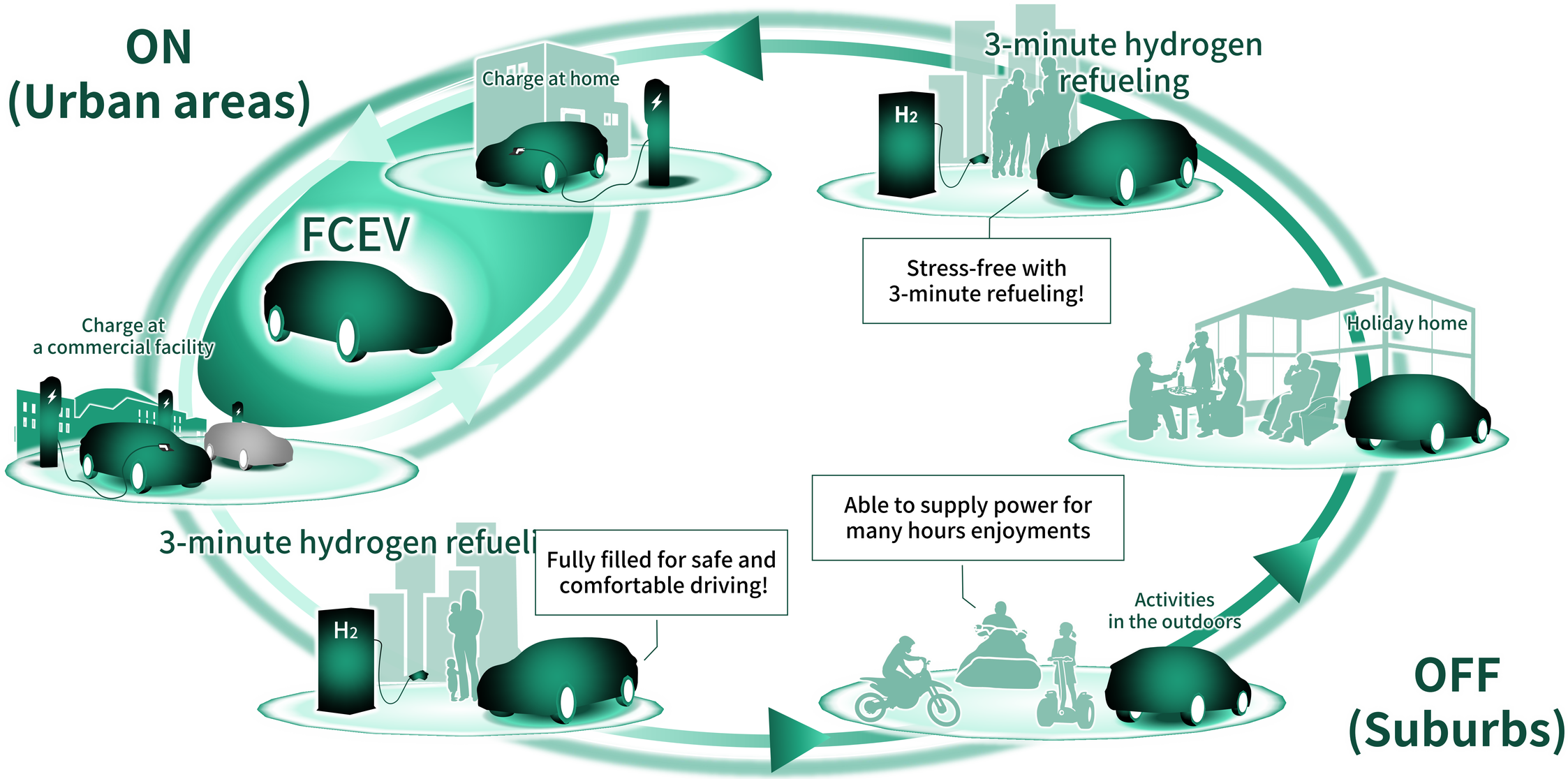
GIGA FUEL CELL Vehicle Overview		
Vehicle	Base model	CYJ77C-WX Low floor4shaft × 4
	L/W/H	11,980mm /2,490mm / 3,770mm
	Total Vehicle Weight	25t
Fuel Cell Stack	Type	PEFC (Honda FC stack)
	Power	103kW × 4
High pressure H2 system	Charging pressure	70MPa
	On-board H2	56kg
Motor	Type	Synchronous motor
	Power	Rate 320kW
HV battery	Type	Lithium-ion battery
Driving range		800km min. (Isuzu evaluation mode)
Others	Output supply port	2 ports (CHAdeMO connector) Max supply 530kWh

Since the signing of an agreement in January 2020 to conduct joint research on FC-powered heavy-duty trucks, the two companies have been working on the verification of the compatibility of the FC system and heavy-duty trucks and the establishment of a foundation for basic technologies such as vehicle control technologies. The two companies are planning to introduce the production model to market in 2027 by fully leveraging the technology, experience and knowledge gained through the joint research.

Isuzu Selects Honda as Partner to Develop and Supply Fuel Cell System for its Fuel Cell-Powered Heavy-duty Truck to be launched in 2027

HONDA

Advantageous usages of FCEV's electricity charging and hydrogen refueling

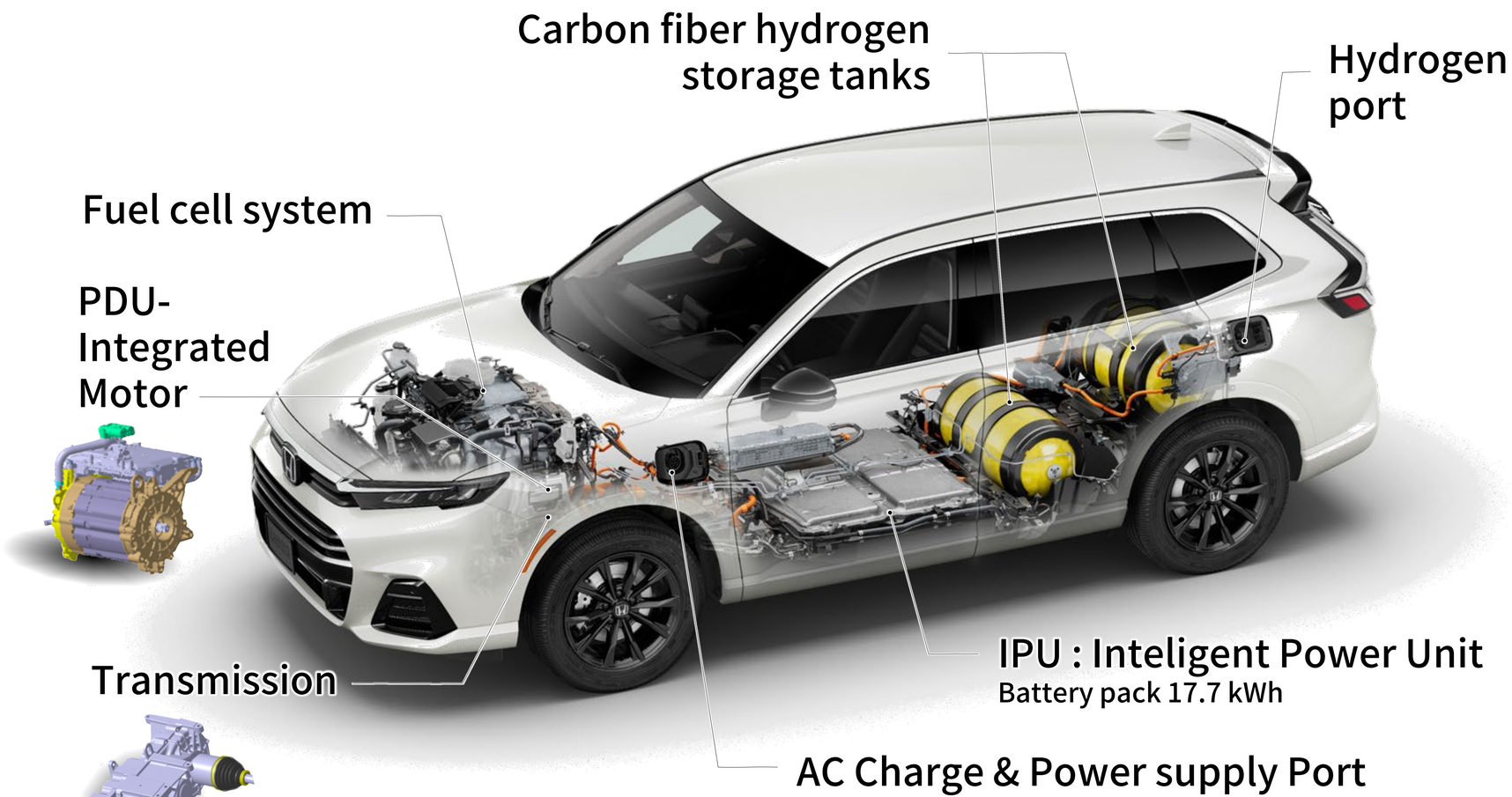


FCEV with plug-in charging function delivers wider satisfaction of various usage with zero emission

HONDA

CR-V e:FCEV

POWERTRAIN PACKAGING and Key Specifications



ENGINEERING (Honda Fuel Cell Module)	<Displayed only for reference purpose> <For sale in Japan & United States only>
Estimated Power Output	92.2kW
ENGINEERING (Electric Motor)	
Peak Horsepower	130kW
Peak Torque	310N・m
BATTERY	
Capacity	17.7 kWh
FUEL	
Fuel economy[1] (WLTC Mode, Honda figure)	129km/kg
EV Range[2] (WLTC Mode, Honda figure)	61km
Driving Range[2] (WLTC Mode, Honda figure)	621km
Required Fuel	Compressed Hydrogen Gas
Fuel Tank Pressure	70MPa
Fuel Tank Capacity	4.3kg
WHEELS AND TIRES	
Wheel Size	18-inch
Tire Size	235/60R18
EXTERIOR MEASUREMENTS	
Wheelbase (mm)	2,700
Length (mm)	4,805
Height (mm)	1,690
Width (mm)	1,865
Track (mm, front/rear)	1,610 / 1,625

1. Use for comparison purposes only; your mileage will vary depending on how you drive and maintain your vehicle, driving conditions, and other factors.
2. Use for comparison purposes only. Actual range will vary based on several factors, including temperature, terrain, battery age & condition, loading, use and maintenance.

HONDA