HANON SYSTEMS

Corporate Day, Seoul

October 2018

Major Strategic Initiatives

1. Accelerate Growth and Diversify Customer Base
2. Strengthen Business Footprint in China through Joint Ventures
3. Establish Strategic Position in Electrified Product Business
4. Improve Operational Efficiency of Global Operations
5. Realize Inorganic Growth through Strategic Acquisition: FP&C

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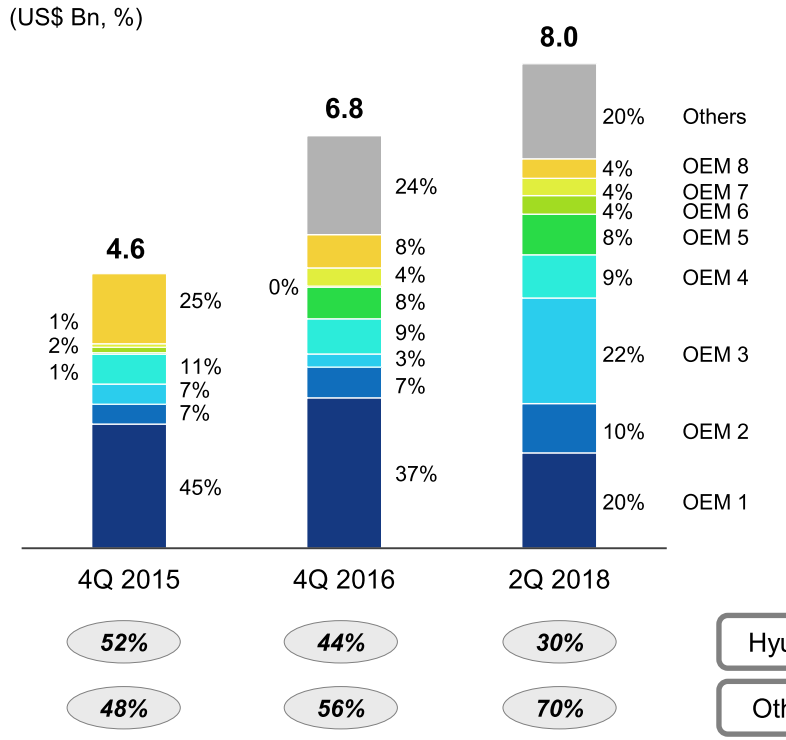
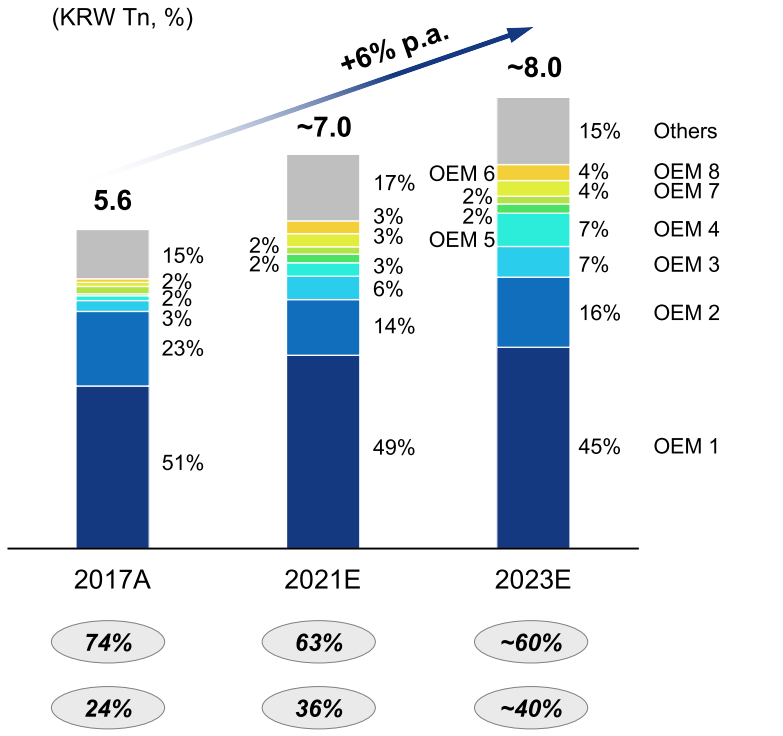
Business Growth with Diversified Customer Portfolio

- ☑ **Hanon Systems has been successfully winning new incremental businesses from global customers over the last couple of years**
- ☑ **While the two largest customers are expected to provide solid revenues, business growth from other global customers will further diversify customer portfolio**

Hanon Systems New Business Win backlog[1]



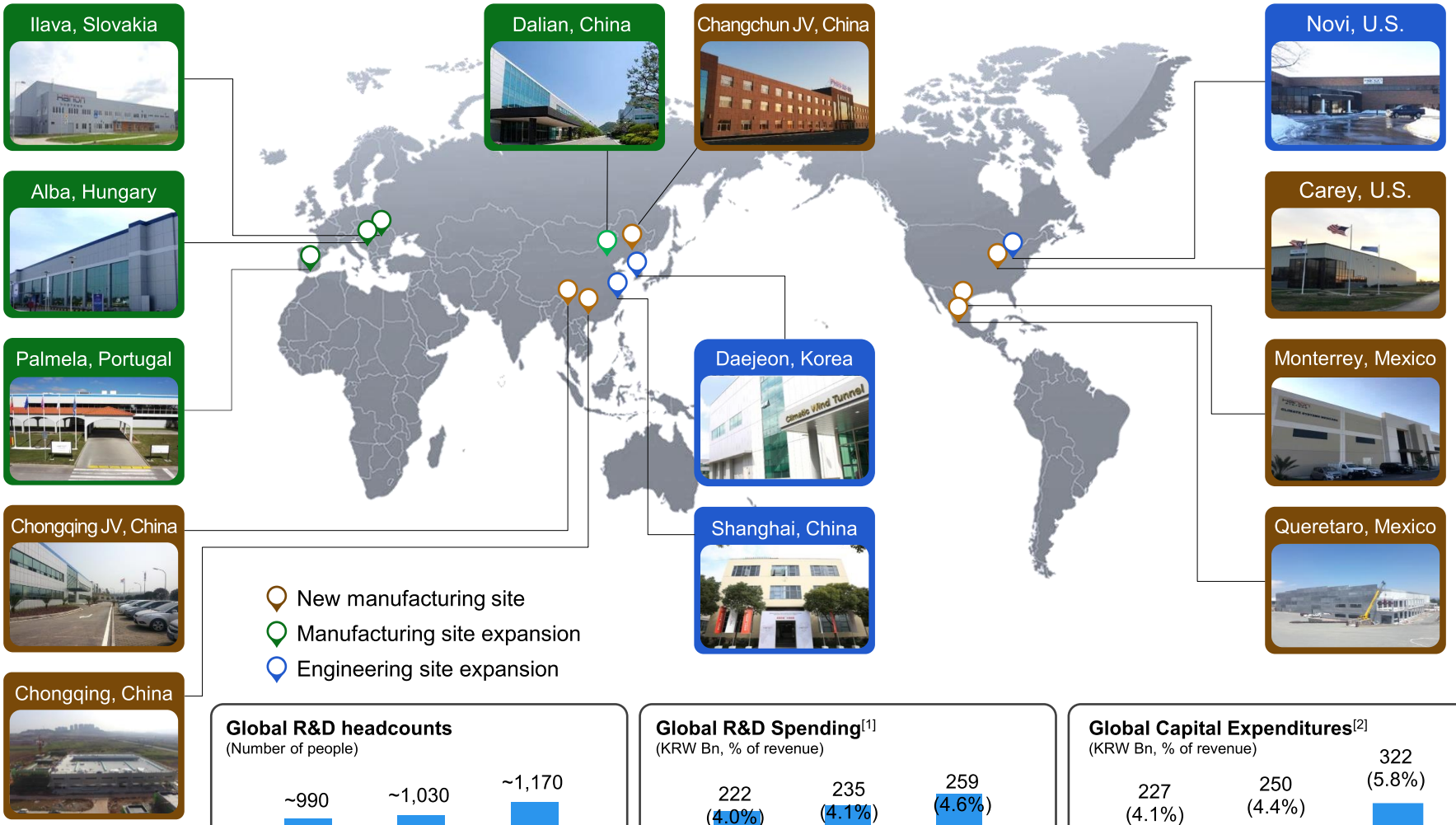
Hanon Systems Stand-alone Revenue[2]

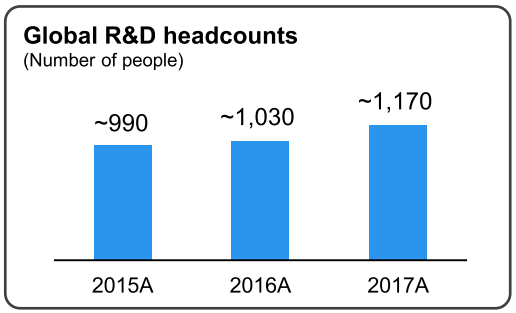


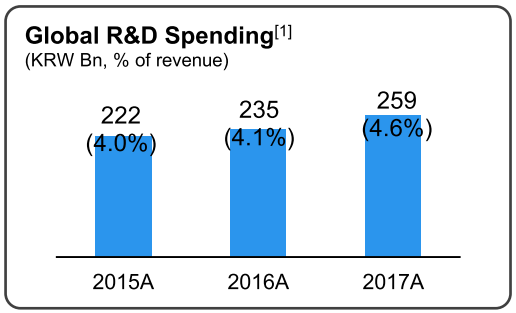
Notes:

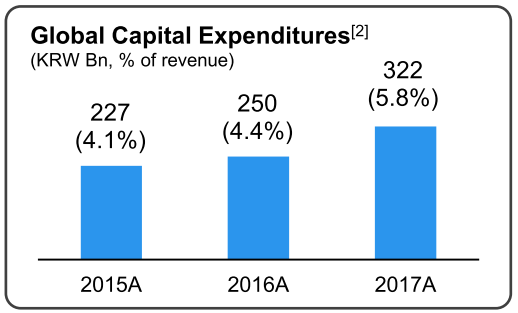
[1] Only revenue backlog from newly-awarded incremental programs which have yet to start production included; excludes revenue backlog from replacement programs and from programs which have already started production; [2] FP&C revenue excluded; [3] Sources: Hanon Systems

Investment to Accelerate Business Growth









Notes:

[1] Including R&D capitalization; [2] Excluding R&D capitalization

Global Recognitions from Customers and Industry

- ☑ **Hanon Systems received multiple technology recognitions mostly for R&D focus on solutions for electrified vehicles**
- ☑ **Hanon Systems has been acknowledged by major customers and automotive industry associations for its quality, cost and delivery**

Technology recognitions

Customer recognitions

2012

- HV BLDC Cooling Fan Module Assembly for Fuel Cell Vehicle
- High Efficient Heat Pump System for Heating of EV
- Excellent Supplier Award
- Top Supplier Award

2013

- PACE Award: Metal Seal Fitting
- HVAC Smart Intake Door Technology for EV

2014

- PACE Finalist: Centrifugal Air Compressor for FCEV
- Centrifugal Air Compressor
- 2014 Best Supplier Award

2015

- Heat Pump System for Electric Vehicles

2016

- PACE Finalists: UV Photocatalyst LED for Deodorizing A/C; Centrifugal Air Compressor for FCEV
- Triple Zone HVAC
- Special Award from Hyundai Motor India
- Top Supplier Award

2017

- PACE Finalist: Electronic Expansion/ Shutoff Valve Family
- Vehicle Carbon Dioxide Sensing Solution; Water-Air Cooled Condenser
- Ford World Excellence Gold Award
- Best Product Development Partner
- Jaguar Land Rover Quality award

2018

- Aligned Business Framework (ABF)
- 2017 Supplier of the Year
- Quality Award

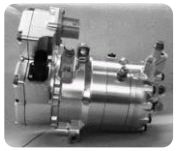
Customized Engineering Support for Various Customers

Customers	Product Development Engagements
OEM 1	• Co-developing eco-friendly products with customer, including climate control & thermal mgmt. system for BEV and FCEV • Leading cost optimization for emerging market • Recognized as *Best Product Development Partner* in 2017
OEM 2	• Early engineering engagements with visibility of long-term cycle plan and technology strategy, as ABF supplier[1] • Regarded as a strategic partner to Ford's electrification initiative to develop EV components such as e-compressor
European OEMs	• First-to-market applications of advanced technologies (e.g., CO_2 refrigerant) • Advanced engineering projects funded by customers for multi-million dollars annually
American OEMs	• Engaged with global platform businesses since 2015 • Early engagements on select EV / autonomous vehicle projects
EV-Oriented Automakers	• Providing comprehensive system support for EV oriented companies with lack of system integration capabilities • Applications of innovative solutions (e.g., mini HVAC)

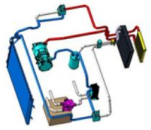
Advanced Product Examples

Centrifugal Air Compressor[2]

R744 Refrigerant e-Compressor[3]



Heat Pump System



HViCOOL™ [4]

Notes:

[1] Ford grants Aligned Business Framework (ABF) distinctions to select suppliers to strengthen collaboration and develop a sustainable business model to drive mutual profitability and technology development; [2] Turbo blower which generates electricity by supplying oxygen to the stack of a fuel cell of FCEV; [3] Electric compressor based on eco-friendly R744 (CO2) refrigerant; [4] Modularized mini-sized heat pump system

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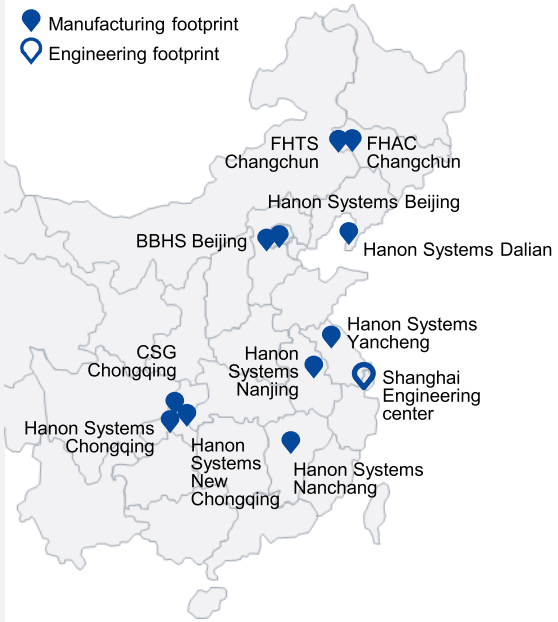
Continued China Growth through Joint Ventures

Hanon Systems Business Footprints in China

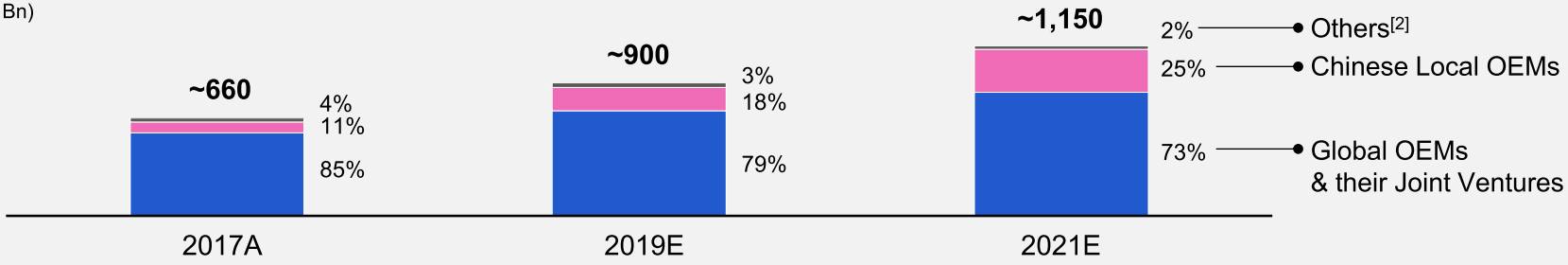


Est. Year	Manufacturing Plants	Hanon Systems share	Major Products[1]
1995	FHTS Changchun	45%	HVAC module, PTC module
1996	Hanon Systems Nanchang	81%	Fluid transport
2002	Hanon Systems Beijing	80%	A/C system assembly
2004	Hanon Systems Dalian	100%	Variable/electric compressor
2005	Hanon Systems Chongqing	100%	HVAC module, PTC HEX
2007	Hanon Systems Nanjing	51%	PTC module, HVAC HEX
2013	Hanon Systems Yancheng	100%	A/C system assembly
2016	Hanon Systems New Chongqing	83.25%	A/C system assembly
2017	BBHS Beijing	49%	HVAC module
2018	FHAC Changchun	55%	Electric compressor, refrigerant valves
2019	CSG Chongqing	50%	Variable compressor, A/C system

Fully owned | Consolidated JV | Non-consolidated JV

Hanon Systems China Plant Revenue Forecast by Customer

(KRW Bn)



Notes:

[1] HVAC module: heating, ventilation and air conditioning module; PTC module: powertrain cooling module; HVAC HEX (heat exchanger): heater core, evaporator; PTC HEX: radiator, condenser;

[2] Aftermarket revenue, engineering service revenues, others

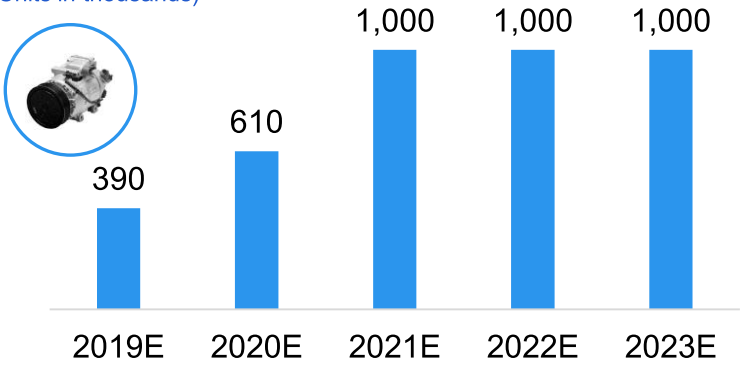
Consolidated JVs with Leading Chinese Automotive Groups

JV with China South Industries Group

- Joint Venture agreement with **China South Industries Group Corporation**, a parent company of Changan Automobile Group, on Nov 2017
- **Hanon Systems to consolidate JV financials** (50% share)
- Products: Mechanical compressors, PHEV A/C systems, etc.

Planned Production Volume of Mechanical Compressors

(Units in thousands)

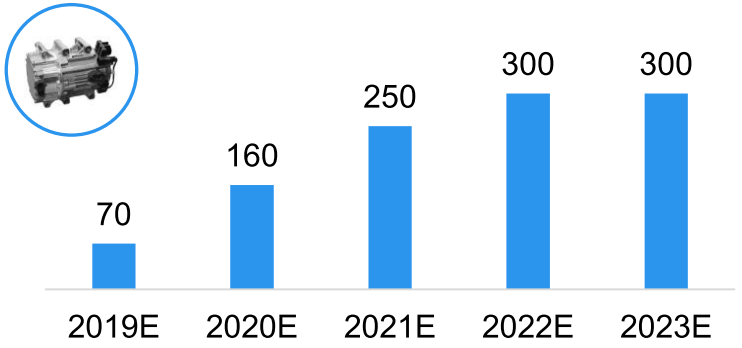


JV with China FAW Group

- Joint Venture agreement with **FAWER Automotive Parts**, a subsidiary of China FAW Group Corporation, on Dec 2017
- **Hanon Systems to consolidate financials** (55% share) of the new JV
- Products: Electric compressor, refrigerant valves, etc.

Planned Production Volume of Electric Compressors

(Units in thousands)



Notes:

[1] Source: Hanon Systems

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Hanon Systems Product Portfolio for xEV Solutions

☑ **Hanon Systems has focused on development and production of electrified thermal & energy management solutions for xEV**

- Market leadership in electric compressor; technology leadership in heat pump system; early engagements with global customers to expand other electrified solutions such as battery cooler and electronic pumps and valves

Hanon Systems Major xEV Thermal & Energy Management Solutions

e-Compressor

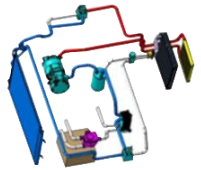
Functions

Compressor that independently operates by battery power, without connection to engine power

Heat Pump System

Functions

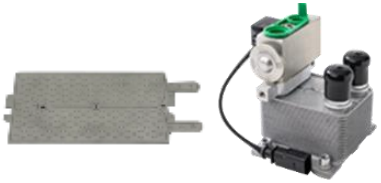
Integrated system that heats and cools cabin efficiently through redirection of the refrigerant via valves



Battery Cooler (BTMS[1])

Functions

Plate-to-plate heat exchanger that transfers thermal energy to optimize temperature of battery systems



Electronic Water Pump & Valve

Functions

Precise and active control of coolant pressure and flow with electronic controls to cool down powertrain

Notes:

[1] Battery Thermal Management System

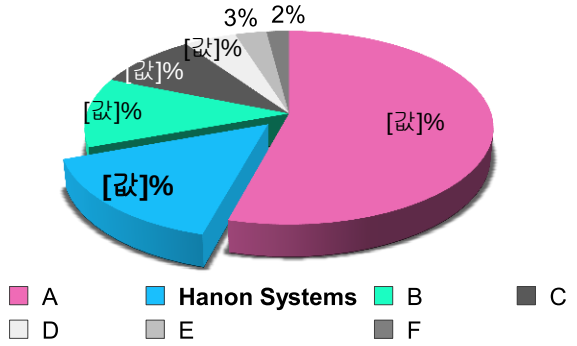
e-Compressor: Significant Growth with Multiple Customers

☑ **Hanon Systems has been successful in growing e-compressor business and diversifying customer base**

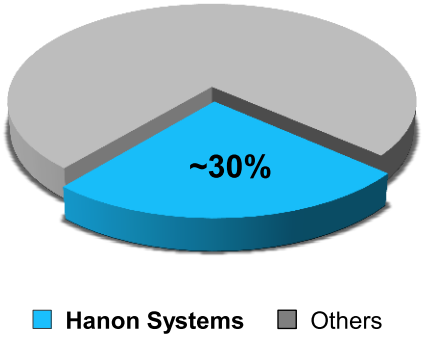
- Hanon Systems has won a series of global flagship xEV platforms from various OEMs and secured significant share of wallet

e-Compressor Market Share

2017 market share (%)

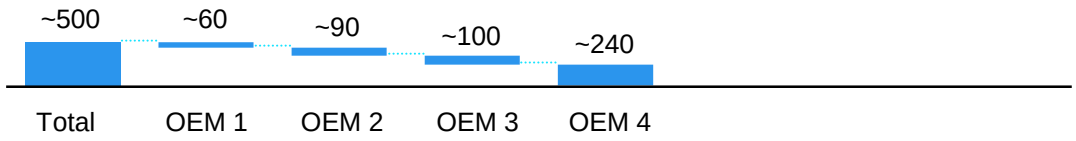


2023E market share (%)

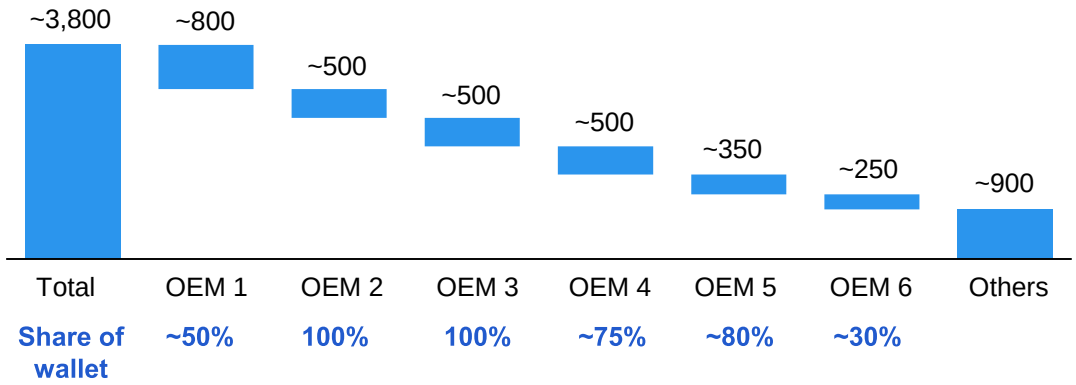


Hanon Systems e-Compressor Volume by Customer

2017A Hanon Systems Production Volume (Units in thousands)



2023E Hanon Systems Production Volume (Units in thousands)

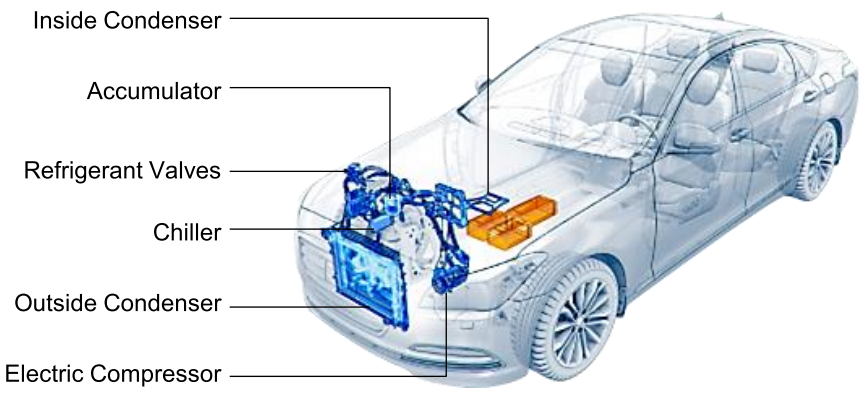


Notes:

[1] Sources: IHS, Hanon Systems

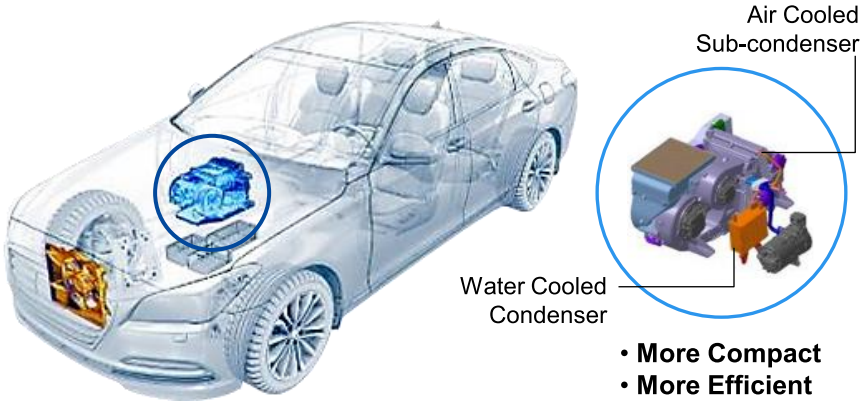
Heat Pump System: Product Evolution Roadmap

Heat Pump System



- Conventional heat pump system
- Cooling and heating via redirection of refrigerant

HViCOOL™ (*"Climate in a box"*)



- New concept heat pump system (Industry 1st)
- Increased cabin space (HVAC-free cockpit) Ultimate design flexibility

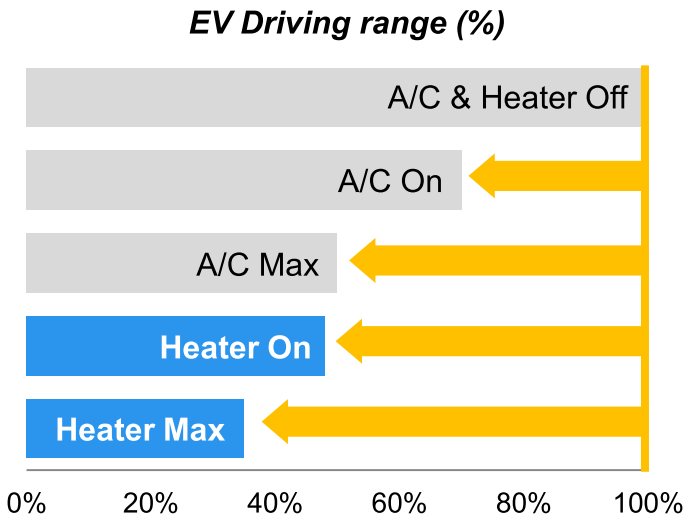
Hanon Systems Heat Pump System Business

2014	2015	2016	2017	2018	2019	2020	2021
OEM 1 EV (1st heat pump system)		**OEM 1 EV**		**OEM 1 EV** **OEM 1 EV** **OEM 2 PHEV**		**OEM 3 EV** (1st HViCOOL™)	**Gen 2 Heat Pump System**

Heat Pump System: Differentiation of Hanon Systems Solution

Electrical heating can decrease EV driving range significantly

Need high efficient heating system to minimize the impact



Driving range down to ~ 50%~

Anxiety on driving range Makes consumers to hesitate to buy EV most seriously

	Electrical Heater	Heat Pump
COP (Efficiency)	**0.9**	**1.5 ~ 3.0**
Driving Range		**~35% ~ Up**
Energy Source	**Electricity**	**+ Ambient Air** (via heat exchange)

Heat Pump can minimize the loss in driving range with higher efficiency

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Material Cost Structure Improvement

Specification Re-engineering

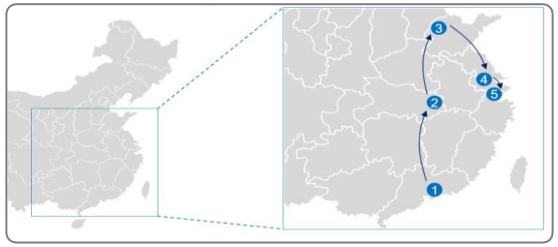
- Lead engagements with **automaker's product development function** to apply cost competitive product designs
- Optimize product specifications for **emerging markets**
- Re-establish **APL** (acceptable performance level) and **AQL** (acceptable quality level)

Design to Cost Approach

- Define optimal cost estimate for major components through **'Should Cost Analysis'**
- Continue comprehensive **tear-down benchmarking exercises** of competitor products
- Develop **material cost roadmaps** for all major products

Low Cost Country Sourcing

- Expand cost competitive and qualified supplier base in **low cost countries**
  - China, India, Mexico and Eastern Europe
- Encourage existing suppliers to enhance cost competitiveness
- Develop **well-balanced strategic supplier chain network**



Enhance material cost structure to protect and improve profitability

Plant Operational Efficiency Maximization

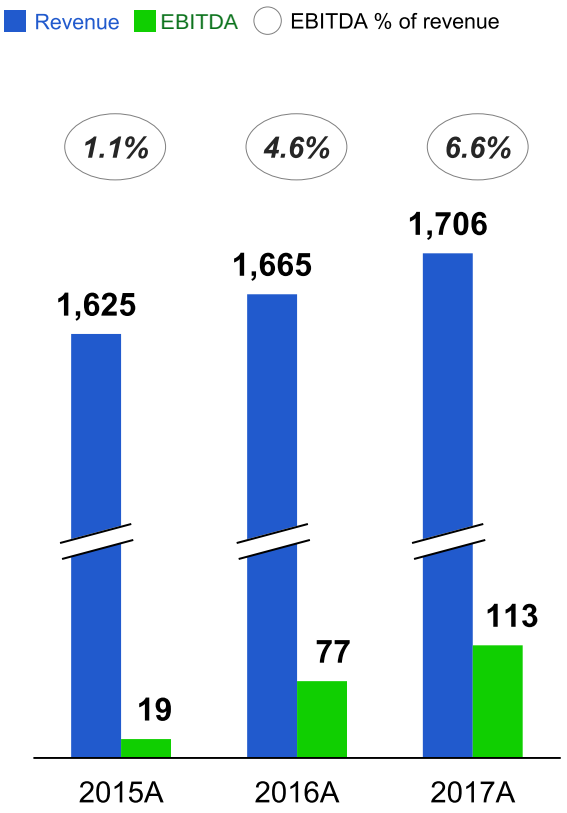
Lean manufacturing roll-out in Eastern Europe

- Continuous **labor and overhead cost optimization activities** to offset impacts from wage increases in developing countries
- Centralized and reinforced **global manufacturing engineering function** to roll out **lean initiatives** and standardize manufacturing processes
- Flawless execution of **site expansion and new program launches**

Strategic re-positioning & turnaround in Western Europe

- **Strategic re-positioning** of ailing plants (e.g. **Palmela** plant became a hub of electric compressor in Europe)
- **Re-balancing of global product volumes** to maintain sustainable volume to avoid costly large-scale plant restructuring
- **Orchestrated communications with various stakeholders**, including customers, employee representatives, government authorities, etc.

Hanon Systems Europe Plant Financials[1]
(KRW Bn, % of revenue)



Proven capabilities and experiences of improving plant cost structures in high cost countries

Notes:
[1] Based on actual financials of Europe-based production entities

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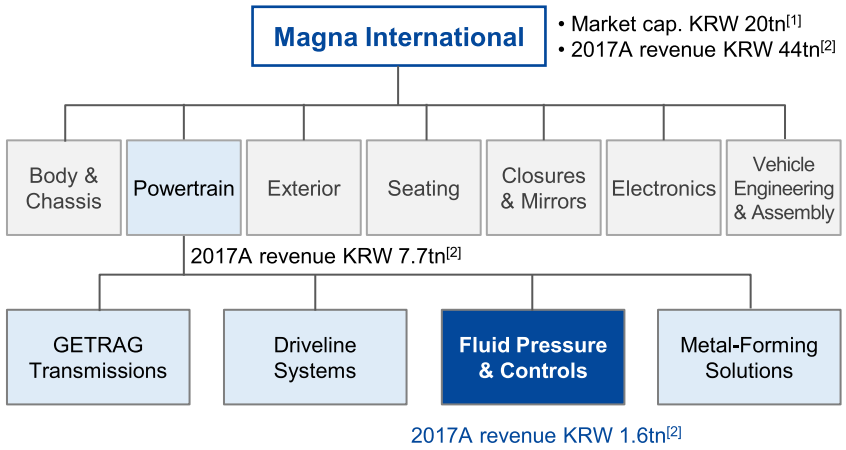
- A Fluid Pressure & Controls (FP&C) Business Overview
- B Synergies & Investment Highlights
- C Hanon Systems Position after FP&C Acquisition

FP&C Overview

Magna International

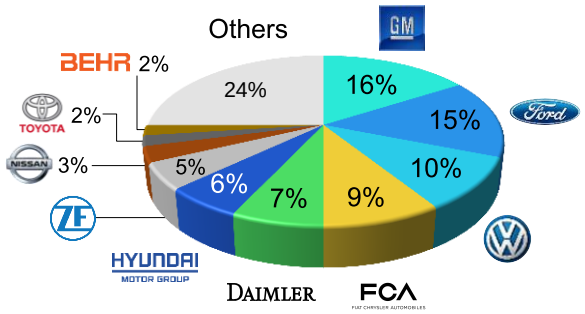


FP&C Company Overview

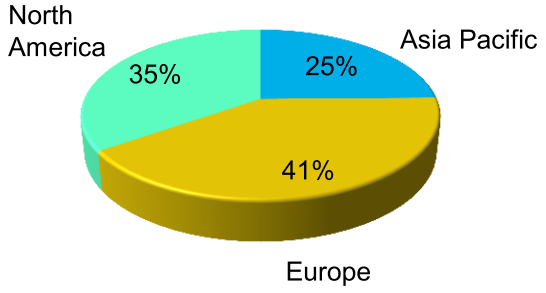
- Fluid Pressure & Controls ("FP&C") business under Magna Powertrain unit of Magna International, Inc.
- A leading provider of various automotive pump products, enabling cooling and pump technology to support OEM's thermal management needs, improve fuel economy and reduce emission
  - #2 in Europe electronic cooling fan market
  - #2 in Global primary electronic water pump market
  - #1 in North America electronic transmission oil pump market
  - #1 in Europe mechanical transmission oil pump market
- Expects to generate business synergies with Hanon Systems to reinforce electrification and mechatronics capability and diversify customer base

☑ Revenue Breakdown 2017A (Unit : %)

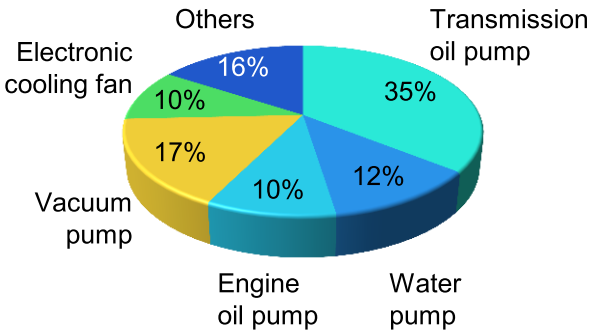
By Customer



By Region



By Product

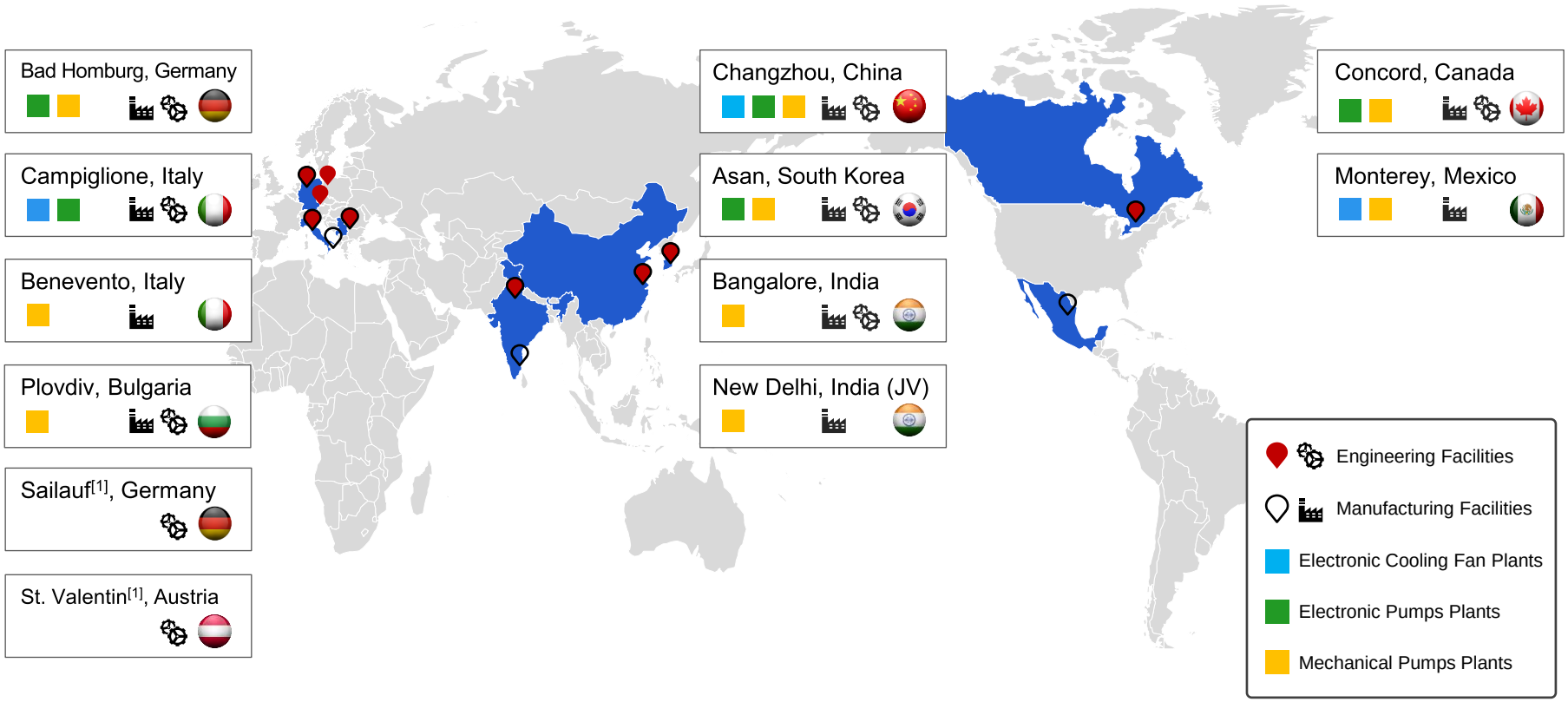


Notes:

[1] FX rate of KRW/US$ 1,111 as of Sep 28, 2018; [2] FX rate of KRW/US$ 1,131 in 2017A; Transaction scope only

FP&C Global Footprint

- **Operates global business footprints with 10 manufacturing and 9 engineering facilities**
  - Recently consolidated two sites in Canada (Concord); soon to complete shutdown one site in Germany (Hückeswagen)
- **Employs approximately 4,200 employees, including approximately 340 engineers**

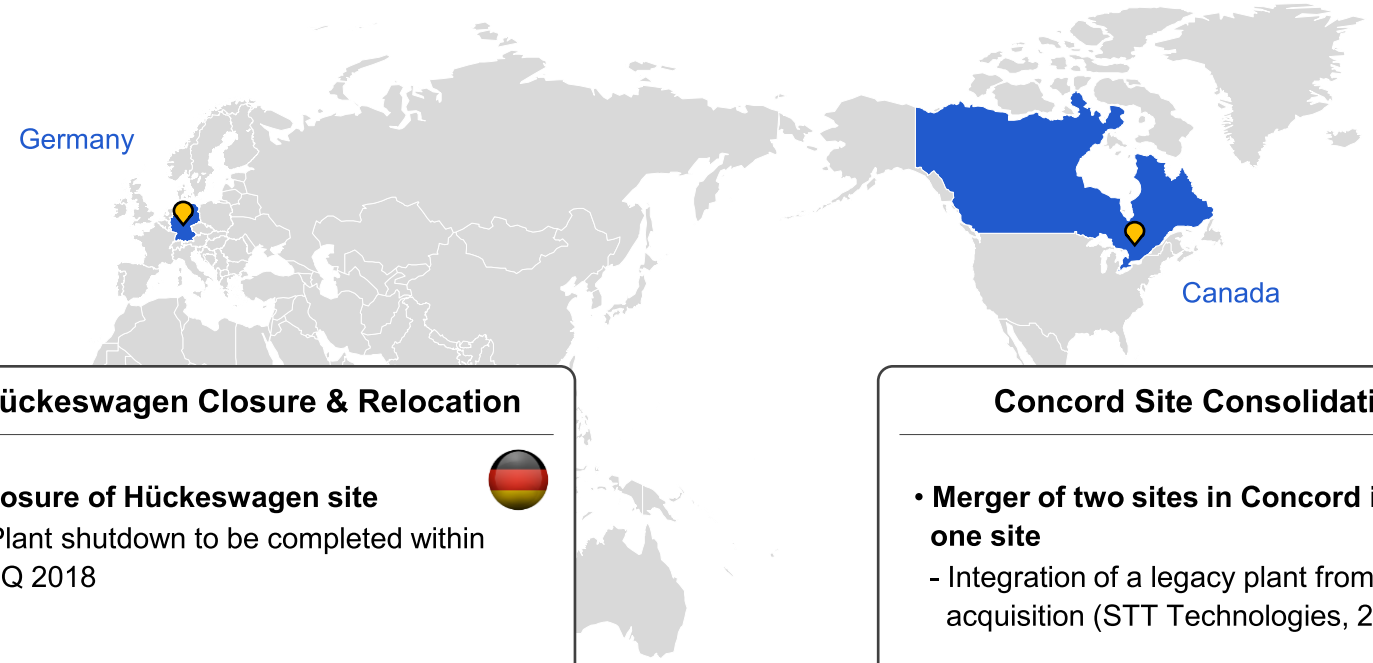


Notes:

[1] Magna engineers in Sailauf and St. Valentin to continue to provide engineering services to FP&C for a transitional period of time based on service agreement

FP&C's Recent Restructuring Activities

☑ **FP&C has completed restructuring of two plants in Germany and Canada over the last 2~3 years**



Hückeswagen Closure & Relocation

- **Closure of Hückeswagen site**
  - Plant shutdown to be completed within 4Q 2018
- **Relocation remaining businesses to Plovdiv (Bulgaria) and Bad Homburg (Germany)**
  - Relocation of 4 assembly lines completed and related customer agreement received
- **Reduction of direct/indirect labor**

Concord Site Consolidation

- **Merger of two sites in Concord into one site**
  - Integration of a legacy plant from previous acquisition (STT Technologies, 2012)
- **Relocation of 14 production lines completed**
  - Renovation of existing facility completed
  - Establishment of new test labs completed
- **Reduction of indirect labor**

FP&C Product Portfolio

Electronic Cooling Fan

BLDC Motor

Cooling Fan

- Provide air flow to radiator and condenser to cool down powertrain components with limited emission and fuel consumption

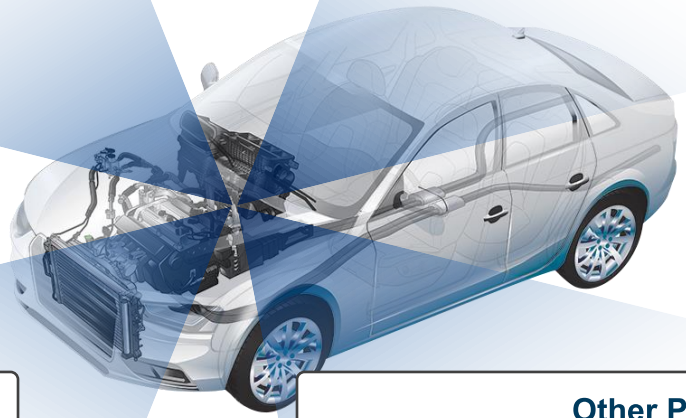
Water Pump

Electronic (Primary)

Electronic (Auxiliary)

Mechanical

- Provide coolant flow to powertrain system to enable optimal vehicle thermal management



Transmission Oil Pump

Electronic

Mechanical

- Supply oil through transmission system for lubrication, actuation and thermal and energy management

Other Products

Engine Oil Pump

Vacuum Pump

Tandem Pump Module

Thermal Management Module

- Engine Oil Pump: Engine cylinder lubrication
- Vacuum Pump: Evacuation of the brake booster to amplify pedal force

FP&C Product Portfolio *(cont'd)*

☑ FP&C has recently won new businesses with a strong focus on electrified products

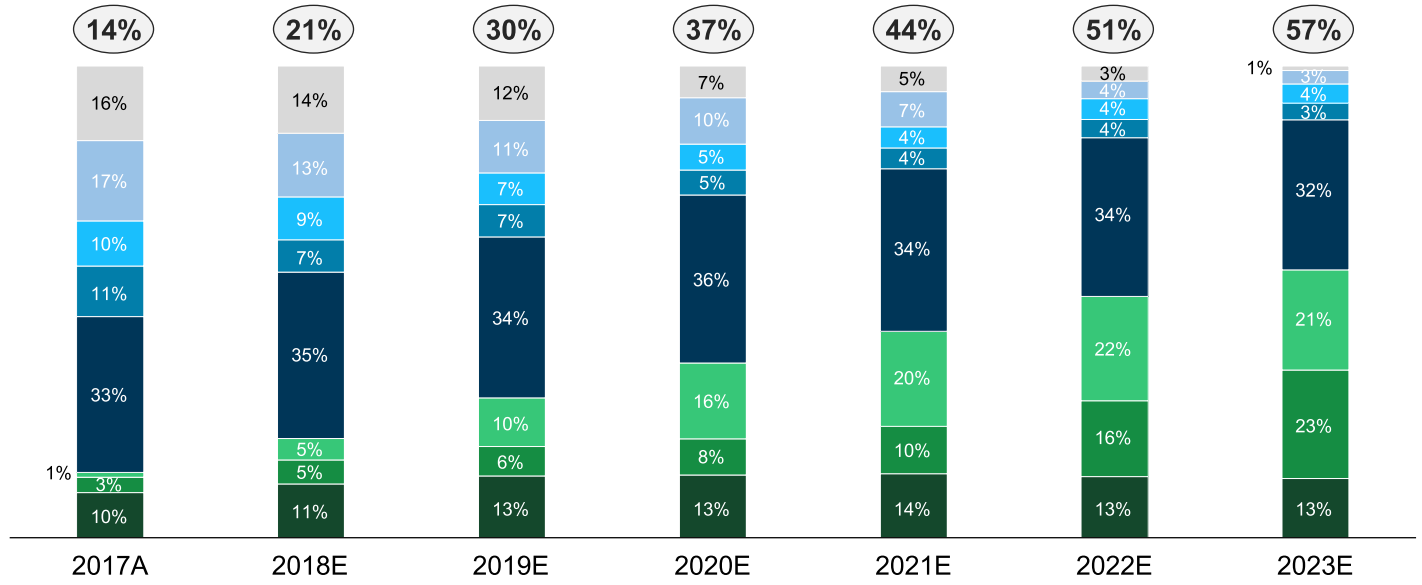
- Revenues from electronic cooling fan (ECF), electronic transmission oil pump (eTMOP) and electronic water pump (eWP) are expected to account for 57% of total FP&C revenues in 2023E

☑ FP&C has a strategic position and core capabilities to further develop electrified products and win new businesses

- FP&C holds a leading position in mechanical water pump (mWP) and mechanical transmission oil pump (mTMOP); as an incumbent pump supplier, FP&C is in an advantageous position to win new electronic pump businesses of next-generation electrified vehicles
  - Similar to Hanon Systems mechanical and electric compressor business
- FP&C has core technologies (e.g. brushless DC motor, electronic control unit, etc.), manufacturing facilities and customer relationships which are critical to win electrified products

Revenue Forecast by Product

Unit : %



Notes:

[1] Electronic cooling fan, electronic transmission oil pump, and electronic water pump

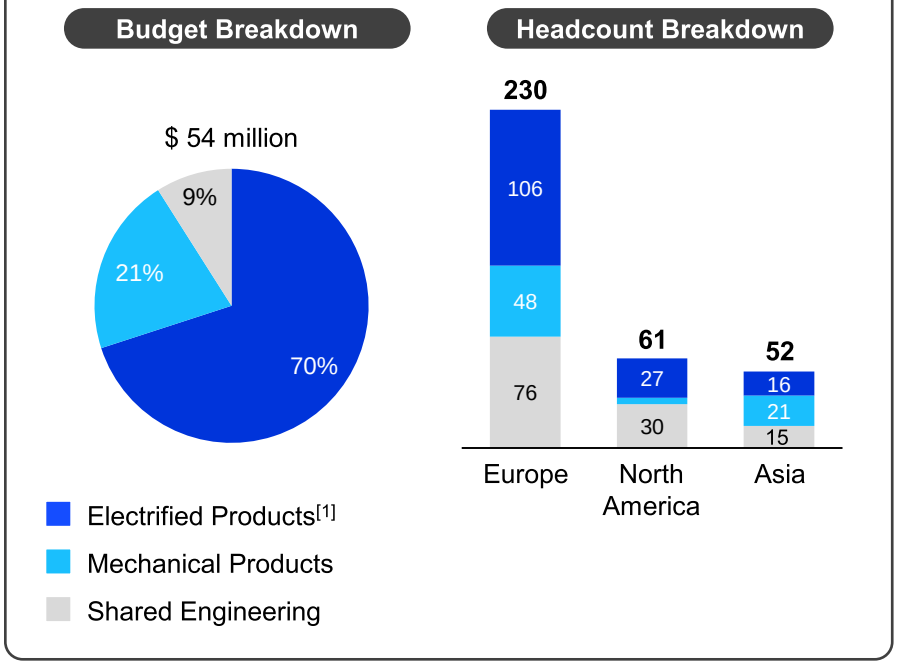
FP&C Engineering Capabilities

☑ **FP&C has in-house engineering capabilities of major electrified and mechatronics products**

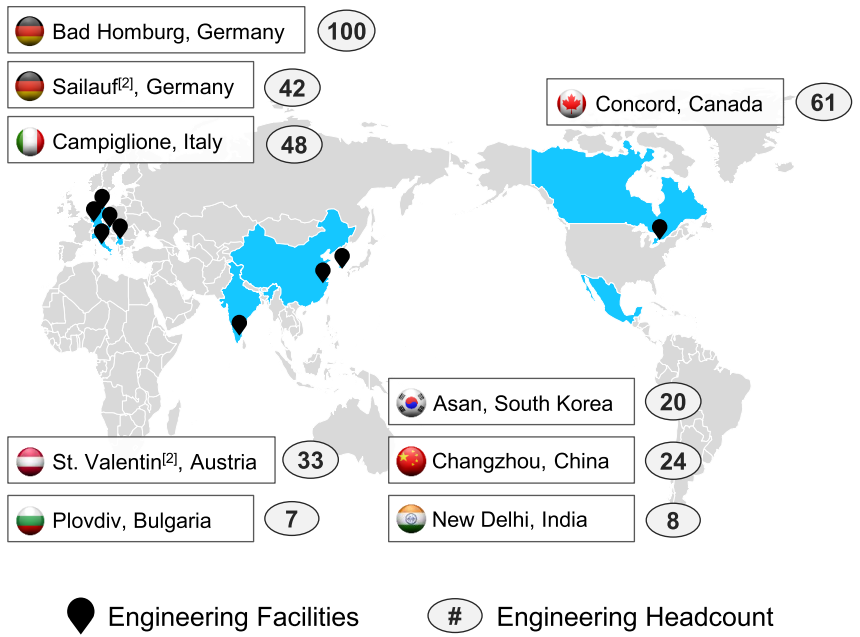
- Germany, Italy and Canada sites have core engineering functions of electrified products – ECF, eWP and eTMOP
- FP&C designates hub engineering centers of each core product to improve expertise as well as efficiency

☑ **FP&C has been spending approximately 70% of engineering budget on electrified products to reinforce engineering capabilities to address increasing demands for electrified solutions**

Engineering Resources



Engineering Facility Overview



Notes:

[1] Electronic cooling fan, electronic transmission oil pump, and electronic water pump;

[2] Magna engineers in Sailauf and St. Valentin to continue to provide engineering services to FP&C for a transitional period of time based on service agreement

Synergy ① xEV Product Leadership

☑ **Reinforce competitiveness of Hanon Systems' strategic products such as ECF, eWP, e-compressor for xEV**

- Internalize electrified solutions, such as brushless DC (BLDC) motor and electronic control unit (ECU) technologies
- Expand eWP business scale and strengthen competitiveness by adding new products, global footprints and engineers

☑ **Acquire mechatronics engineering capabilities, software technologies and global engineer resources**

Electronic Cooling Fan

- **Internalize BLDC motor to reinforce ECF competitiveness for conventional and eco-friendly vehicles**
  - BLDC motors applied in most of HEV/BEV
  - Increasing BLDC motors in ICE vehicles (Better NVH[1], efficiency, durability)
- **Design and manufacture motor and PCB[2] controller in-house to improve cost competitiveness**

Electronic Water Pump

- **Achieve global business scale and complement product offerings**
  - New eWP footprints in Europe and China
  - Full coverage from low to high-power eWP
- **Reinforce ECU software & hardware engineering technology**
  - ECU applied in eWP and eTMOP
- **Improve pump design leveraging know-hows from various pump products**

Electric Compressor

- **Acquire ECU software & hardware engineering technology**
  - Design PCB[2] controller in-house to improve cost competitiveness
- **Acquire German engineers experienced in eco-friendly refrigerant technology**
  - R744 refrigerant (CO_2) based electric compressor demand from European OEMs

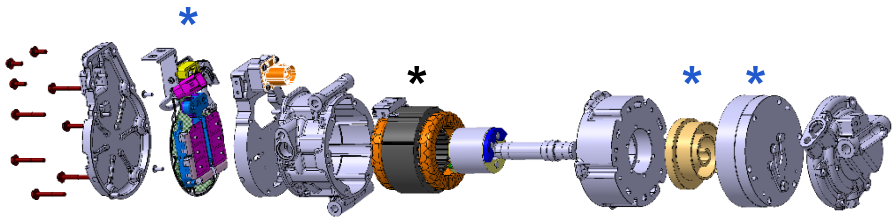
Notes:
[1] Noise, vibration and harshness; [2] Printed circuit board

Synergy ① xEV Product Leadership *(cont'd)*

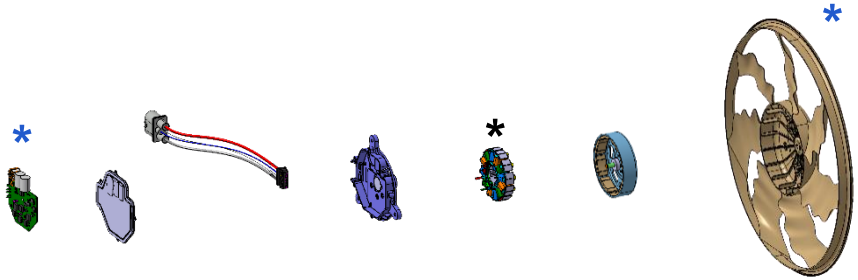
☑ **Hanon Systems and FP&C share common product architectures of major electrified products and expect to generate business synergies across value chain from product design to manufacturing operation**

Magna International

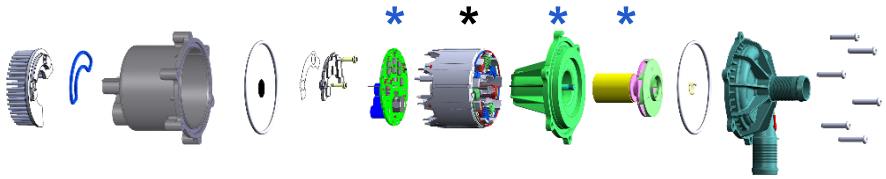
Electric Compressor



Electronic Cooling Fan



Electronic Water Pump



∗ **Control & Rotator Parts** (Inverter + Scroll/Fan/Impeller)

∗ **Motor Parts** (Stator + Rotor)

Synergy Opportunities

☑ **Product design and engineering**

- Advanced and core engineering resource sharing
- Best-in-class product designs available
  - Control parts (FP&C)
  - Machined / molded parts (Hanon Systems)
- Cross-product design benchmarking

☑ **Economy of scale**

- Bargaining power in purchasing common parts
- Expanded global supplier pool
- Enhanced accessibility to customers in each regional market

☑ **Manufacturing excellence**

- Similar manufacturing process and cross-plant process benchmarking opportunities
- Potential opportunity for footprint optimization

Synergy ② Core Technologies for Thermal Products

☑ FP&C has competitiveness in core technologies which can be applied to Hanon Systems' products to enhance their technology leadership and improve product competitiveness

- Electrical & Electronics (E&E) design, fluid mechanics, inverter, and BLDC motor

✅ Applicable in all vehicles ☑ Applicable in future

FP&C Technologies		Hanon Systems Applicable Products				
						
Technology	**Benefits**	e-Compressor	Electronic Cooling Fan	Electronic Water Pump	HVAC Module	Climate Control Unit
E&E design	▪ More stable electronics operation (e.g., lower EMC[1] interference) ▪ Lower PCB[2] control assembly cost	✅	✅	✅		✅
Fluid mechanics	▪ Higher efficiency through better fan/vane design ▪ Lower fluid pressure loss along system path	✅	✅	✅	✅	
Inverter	▪ Higher power efficiency for driving BLDC motor	✅	✅	✅	☑	
BLDC motor	▪ Longer lifetime which leads to longer EV operation ▪ Better NVH[3]	✅	✅	✅	☑	

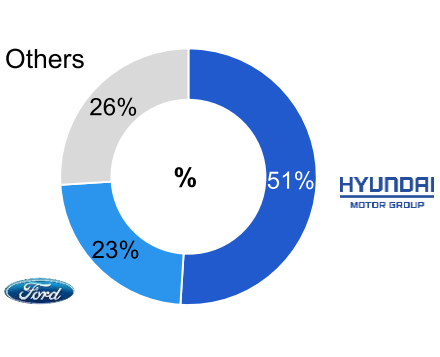
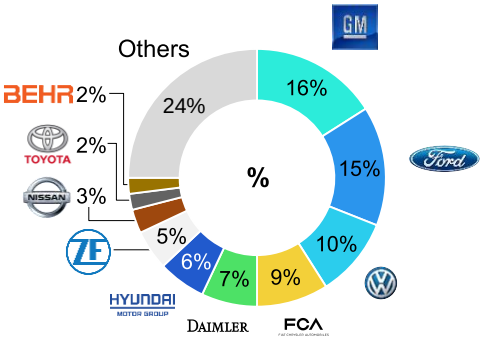
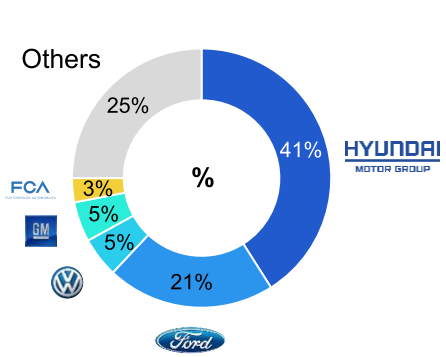
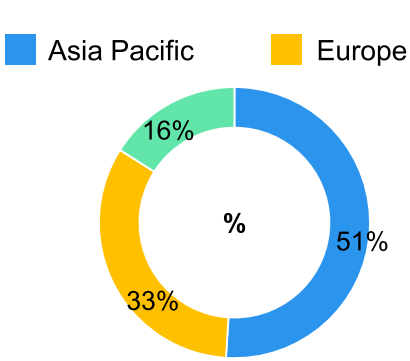
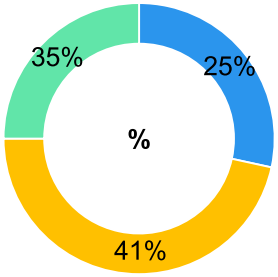
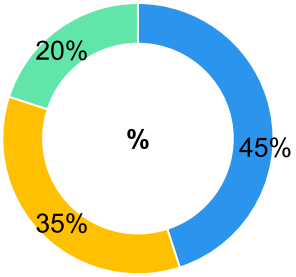
Notes:
[1] Electromagnetic compatibility; [2] Printed circuit board; [3] Noise, vibration and harshness

Synergy ③ Customer / Regional Diversification

☑ **With acquisition of FP&C, Hanon Systems immediately to reduce sales dependency on Hyundai Motor Group and Ford Motor Company from 51% to 41% and from 23% to 21% respectively**

- Sales percentage of the two largest customers expected to decrease from 74% to approximately 50% by 2023E

☑ **Hanon Systems to have a more balanced regional sales portfolio along with customer diversification**

	Hanon Systems	FP&C	Combined
	2017A revenue: KRW 5.6 trillion	2017A revenue: KRW 1.6 trillion[1]	2017A revenue: KRW 7.2 trillion[1]
Revenue by Customer			
Revenue by Region[2]			

Notes:

[1] FX rate of KRW/US$ 1,131 in 2017A; Transaction scope only; [2] Hanon Systems regional revenue based on revenue of legal sales entities

Synergy ④ New Business & Cost Improvement

☑ **Generate business synergies by leveraging Hanon Systems existing business assets and know-hows such as customer relationships, supplier networks, products, technologies and global footprints**

☑ **Successful post-merger integration expected, considering similarities in business regions, organizational structure and corporate culture**

- Hanon Systems has a strong track record of cross-border mergers and post-merger integrations: Climate Control and Powertrain Cooling business from Visteon (2013); Thermal and Emissions business from Cooper Standard (2014)

New Businesses

- Win new tier-1 ECF businesses based on **Hanon Systems' integration engineering capabilities** of powertrain cooling module[1]
- Win new pump businesses from Hanon Systems' core customers

Design Cost Improvement

- Build **optimal design cost structure by adopting the best product designs** between Hanon Systems and FP&C
  - FP&C competitive in electric/electronic components
  - Hanon Systems competitive in injection molding parts

Material Cost Reduction

- Reduce material cost by leveraging **Hanon Systems' competitive supplier base in low-cost countries**
  - Focus area: castings, housings and mechanical parts
  - To expand low-cost supplier sourcing of FP&C

Plant Labor & Overhead Cost Optimization

- Improve **FP&C plant labor and overhead cost structure**
  - Strengthen global manufacturing engineering function
  - Roll out lean manufacturing initiatives by leveraging Hanon Systems' manufacturing engineering resources and experiences

Notes:

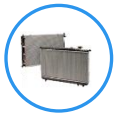
[1] Powertrain cooling module consists of electronic cooling fan, radiator and condenser

Comprehensive Thermal & Energy Management Solutions

☑ **With acquisition of FP&C business, Hanon Systems to bolster fluid management components and internalize control units; both increasingly important in thermal and energy management solutions for xEV**

Thermal and Energy Management Solutions, encompassing conventional & electrified vehicle powertrain systems[1]

Heat Exchangers


Radiator


Condenser

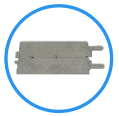

A/C Lines


Low Temp. Radiator


Charge Air Cooler


Transmission Oil Cooler

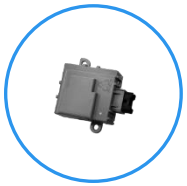

EGR[2] Cooler


Battery Cooler

Air Handling


HVAC Module


Cooling Fan


Ionizer

- Key components of **conventional climate control system**
- Mostly **mechanical parts**, exchanging heats and transporting heated / cooled/compressed fluids

Fluid Management


Compressor


Water Pump


Transmission Oil Pump


Water Valve


Refrigerant Valve

Controls


BLDC Motor Controls


Inverter


Electronic Control Unit


Climate Control Unit

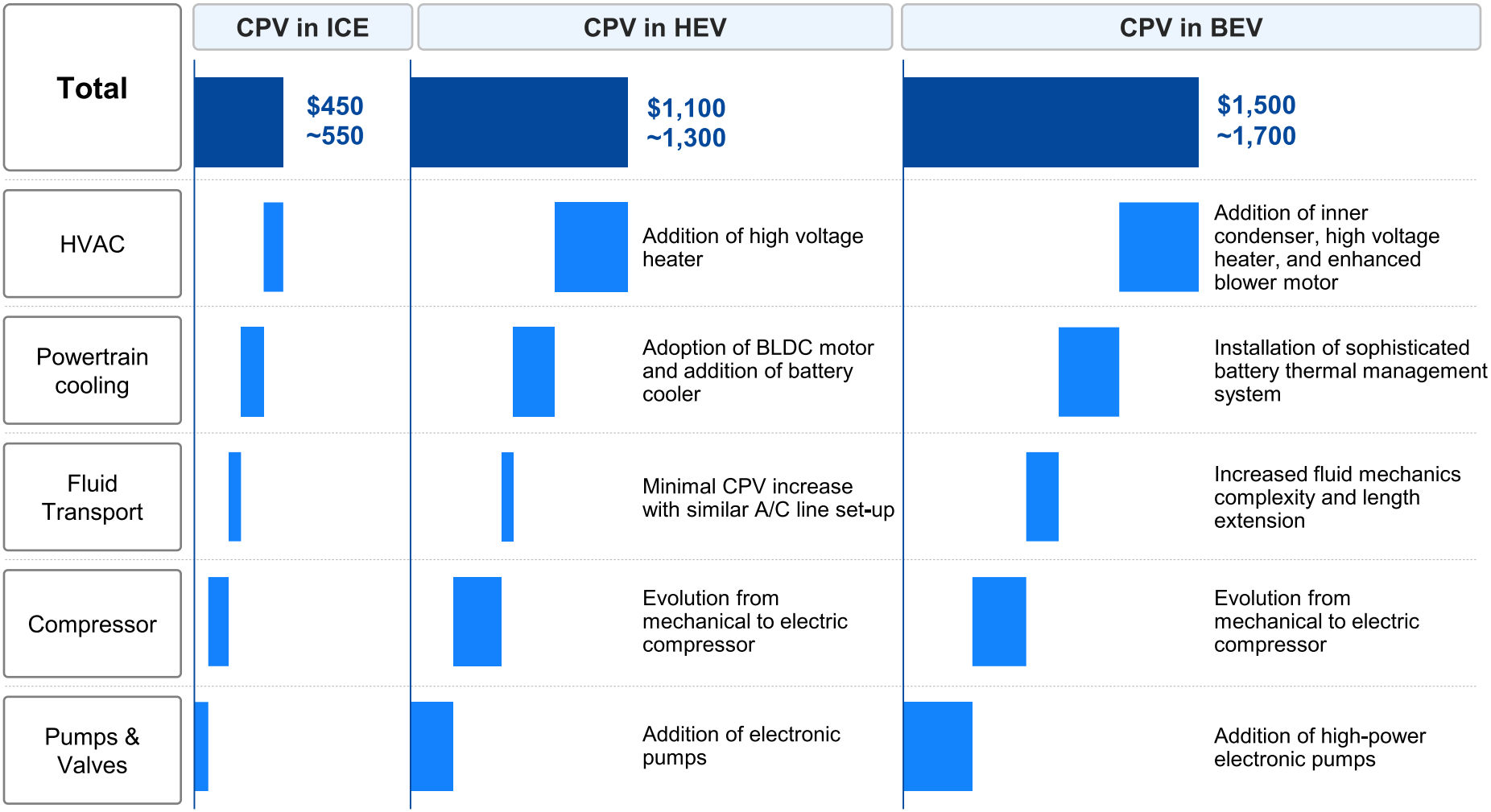
- Key components of **thermal & energy management** systems, **especially for xEV**
- **Mechatronic parts** (mechanical + electronic), actively controlling pressures and flow of fluids – coolant, oil and refrigerant

Notes:

[1] Including engine systems, battery systems and transmission systems; [2] Exhaust gas recirculation

Further CPV Upside along with Vehicle Electrification

- ☑ **Hanon Systems CPV will grow in both HEV and BEV due to increased complexity and electrification**
- ☑ **New components from FP&C acquisition will further increase CPV of thermal & energy management system**

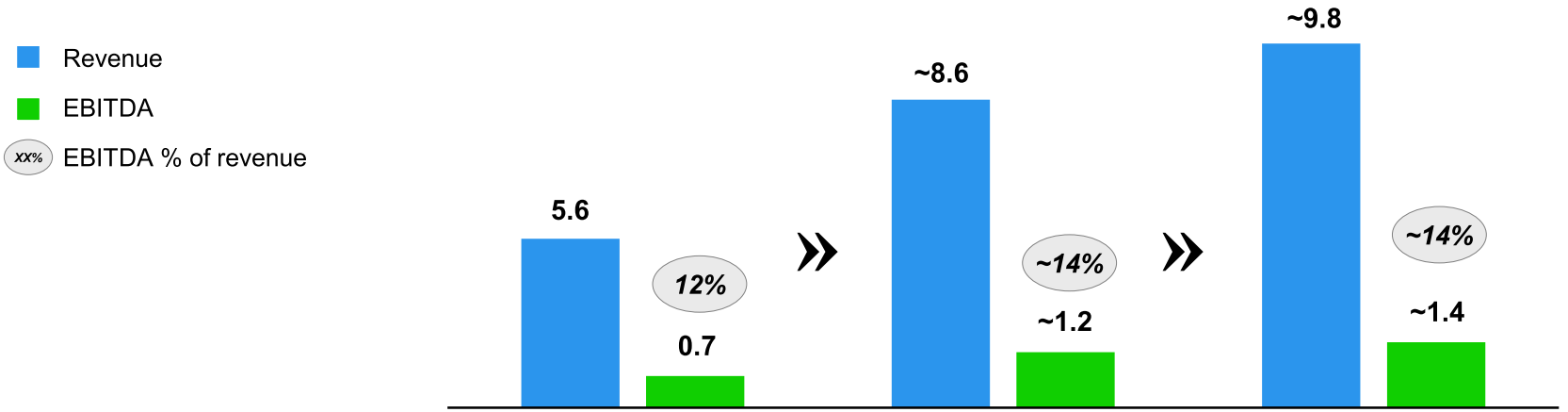


Long-term Financial Projection

- **With FP&C acquisition, Hanon Systems expects to achieve KRW ~10Tn sales by 2023E with 14% of EBITDA margin**
  - Hanon Systems to generate positive levered cash flow with FP&C business to continue to create solid operating cash flows
- **Hanon Systems will be able to establish balanced and competitive business portfolio by reducing dependency on the two largest customers and expanding eco-friendly, electrified product revenues significantly**

Financial Forecast[1]

(KRW Tn, % of revenue)



(% of total revenue)	2017A (Hanon Systems stand-alone)	2021E (FP&C included)	2023E (FP&C included)
Hyundai and Ford	51%, 23%	~40%, ~15%	~35%, ~15%
Eco-friendly / Electrified Products[2]	~10%	~20%	~25%

Notes:

[1] FX rate of KRW/US$ 1,111 as of Sep 28, 2018; [2] Revenues of e-compressor, A/C system for BEV, heat pump valve, eWP, eWV, battery thermal management system, ECF and eTMOP; [3] Source: Hanon Systems

THANK YOU

HANON SYSTEMS