



Carrier's training programme to promote the use of natural refrigerants

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# CARRIER® EXPERIENCE

## Coping with technology evolution

High **GWP** of **HFCs** in focus long before 1<sup>st</sup> **F-Gas Regulation**

- > Refrigerant charges reduced
- > System tightness improved
- > Training & qualification of service
- > Search for solutions based on natural refrigerants

**Looking for long-term solution!**



**Ammonia** systems with secondary refrigerant / waste heat circuits  
(> 60 stores in Europe starting 1994)

**Propane** systems with secondary refrigerant / waste heat circuit  
(17 stores in 4 countries starting 1996)

**HFC** systems with secondary refrigerant circuits MT refrigeration **brine** / LT refrigeration **CO<sub>2</sub>** indirect  
(6 stores in 2 countries starting 1998)

**HFC / CO<sub>2</sub>** cascade systems, MT refrigeration **HFC-DX** / LT **CO<sub>2</sub>-DX**  
(> 340 Hybrid**COOL** stores in Europe starting 2000)

**CO<sub>2</sub> / CO<sub>2</sub>** refrigeration systems, MT refrigeration **CO<sub>2</sub>-DX** / LT **CO<sub>2</sub>-DX**  
(> 580 **COOLtec** stores in Europe starting 2004)

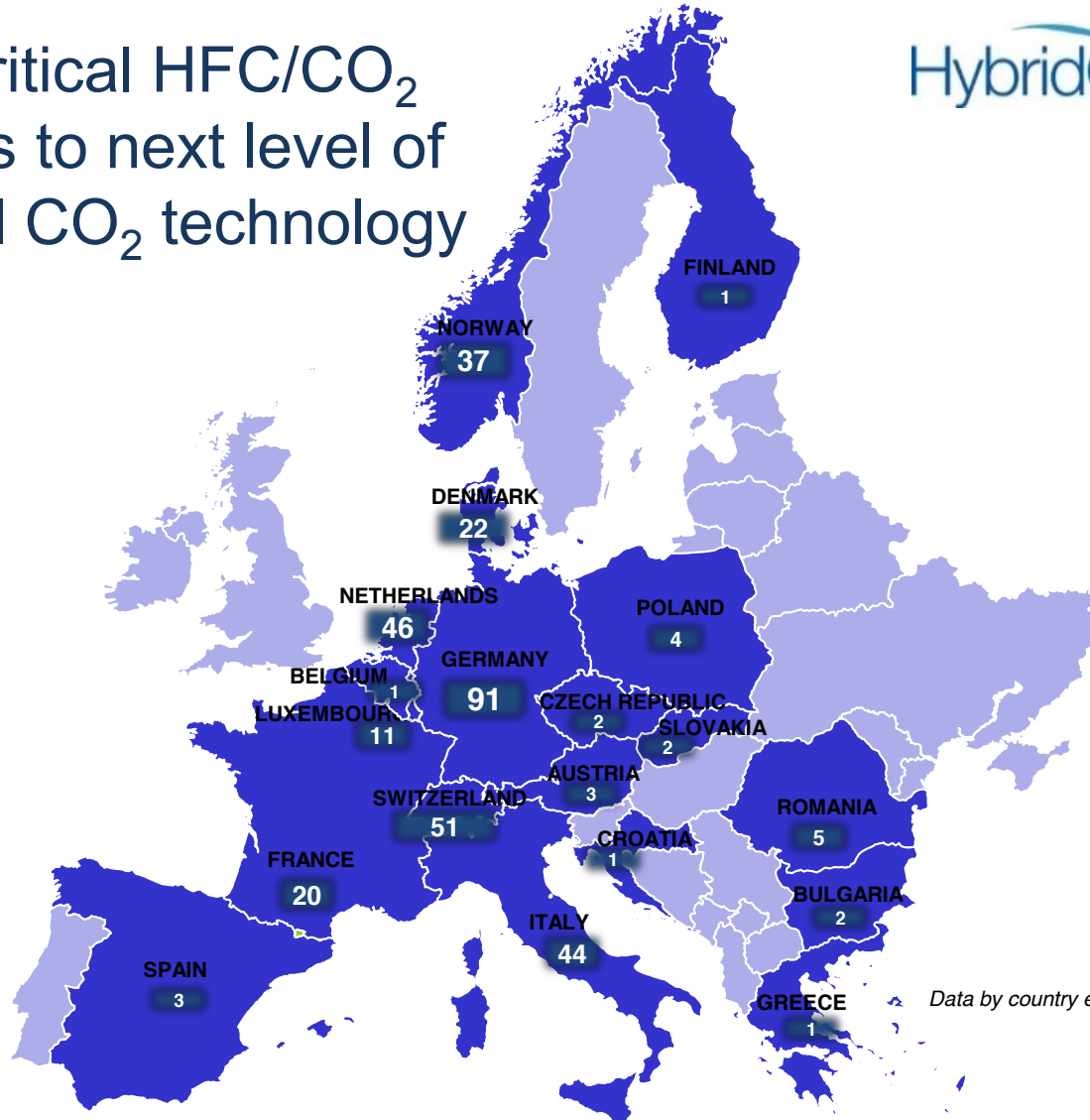
# KEEPING UP WITH RAPID GROWTH

## Carrier HFC/CO<sub>2</sub> subcritical projects in Europe

From subcritical HFC/CO<sub>2</sub> installations to next level of transcritical CO<sub>2</sub> technology



TOTAL  
347



Source: Carrier  
Data by country end of April 2013

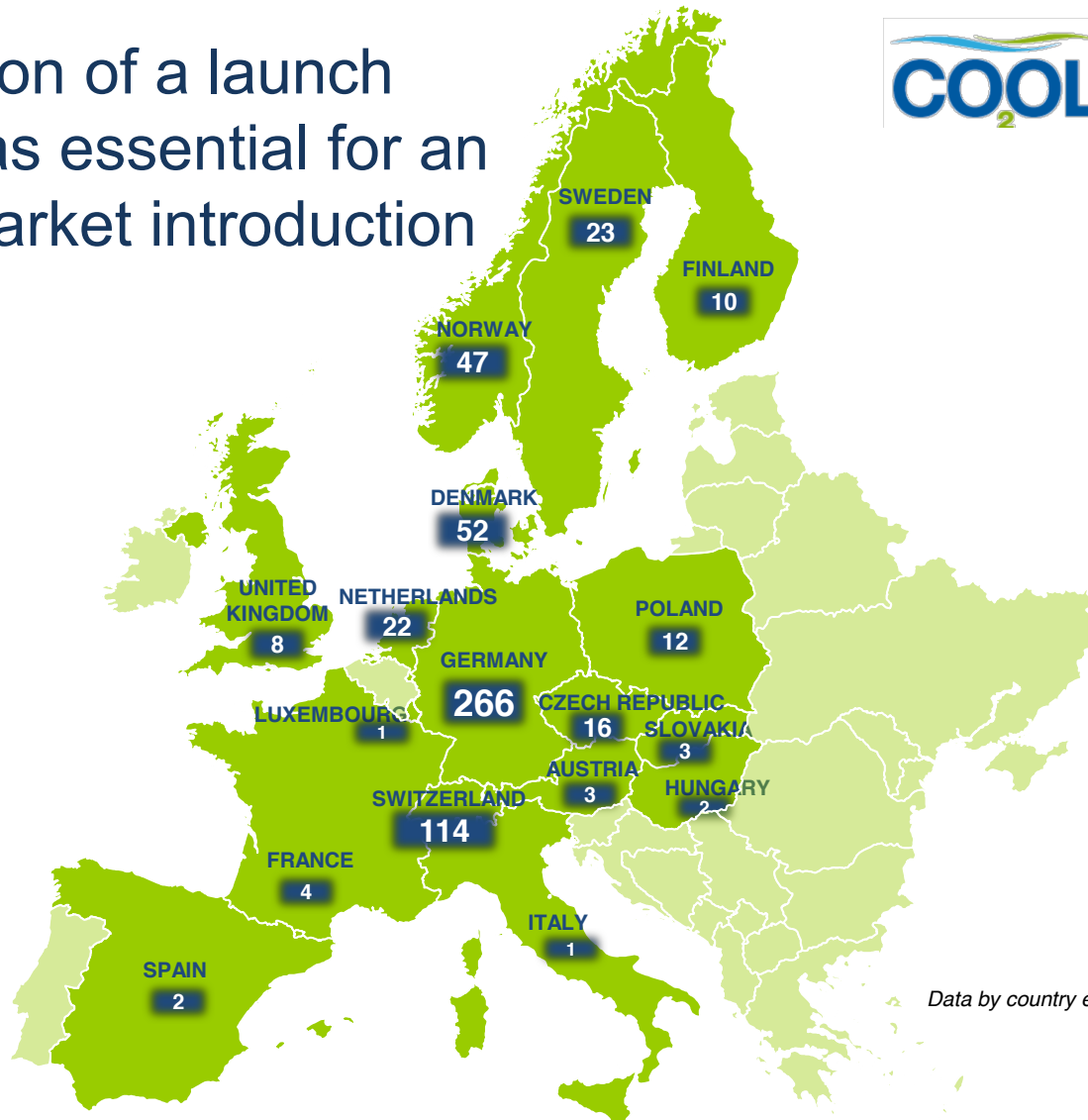
# KEEPING UP WITH RAPID GROWTH

## Carrier CO<sub>2</sub> transcritical projects in Europe

The definition of a launch strategy was essential for an effective market introduction



TOTAL  
**586**

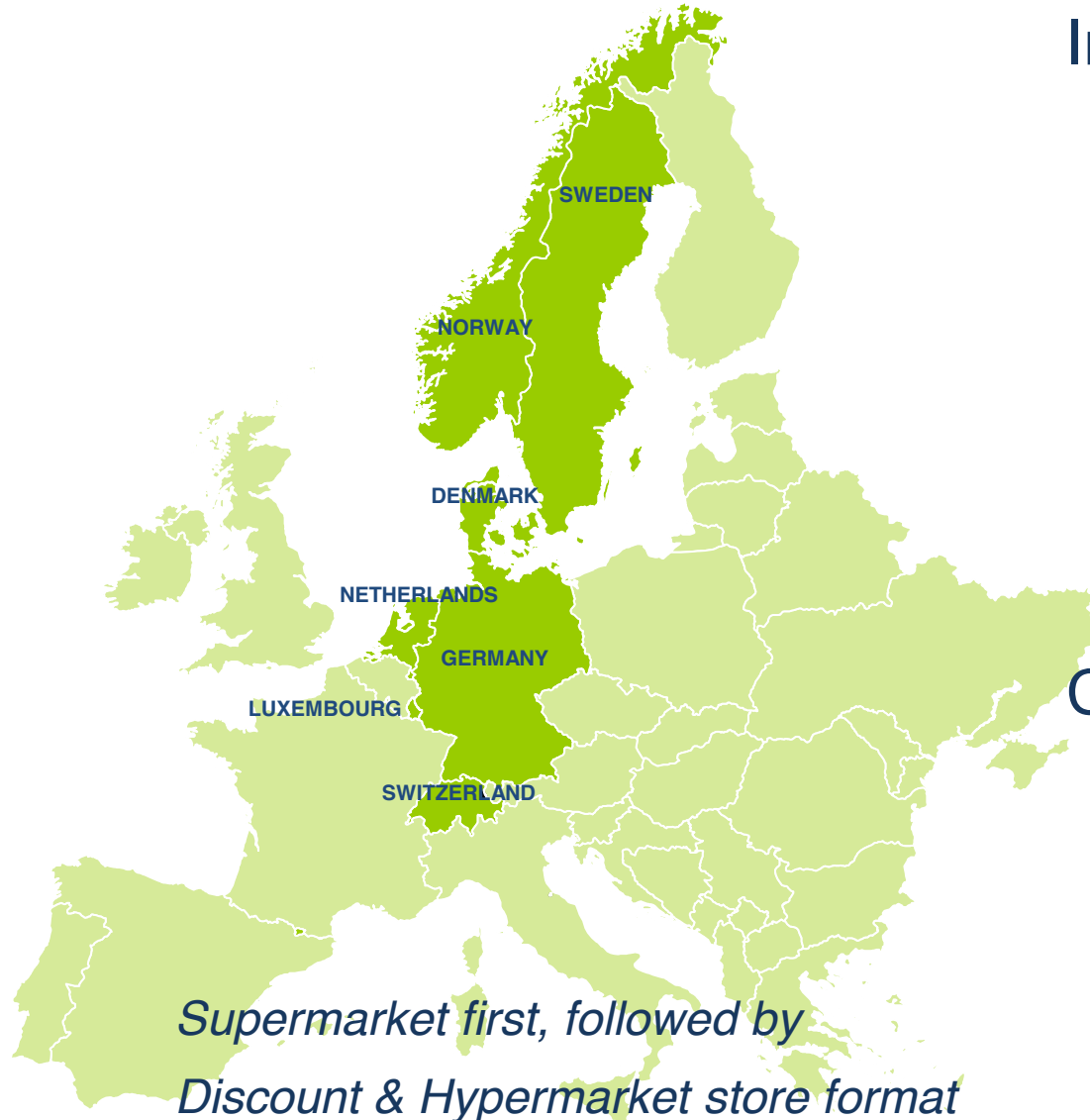


Source: Carrier  
Data by country end of April 2013

# LAUNCH STRATEGY ESSENTIAL

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## Establish frame conditions in pilot countries



*Supermarket first, followed by  
Discount & Hypermarket store format*

In launch countries ensure

Design capabilities

Service capabilities

Central monitoring e\*Service

Service contracts

Turnkey approach

Spare parts

Concentrating on

Service coverage

Operating reliability

System efficiency

Spare parts availability

Training key personnel

# SERVICE TRAINING FOR CO<sub>2</sub> SYSTEMS

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## Service & start-up capabilities in pilot countries

### Objective

Build local service and start-up capabilities for pilot countries to become independent

### Approach

“Train the trainer”/build team of experts with multiple levels (basic for all, expert for few)

Certify “CO<sub>2</sub> Experts” per country

Conduct group training sessions



# TRAINING FORMAT

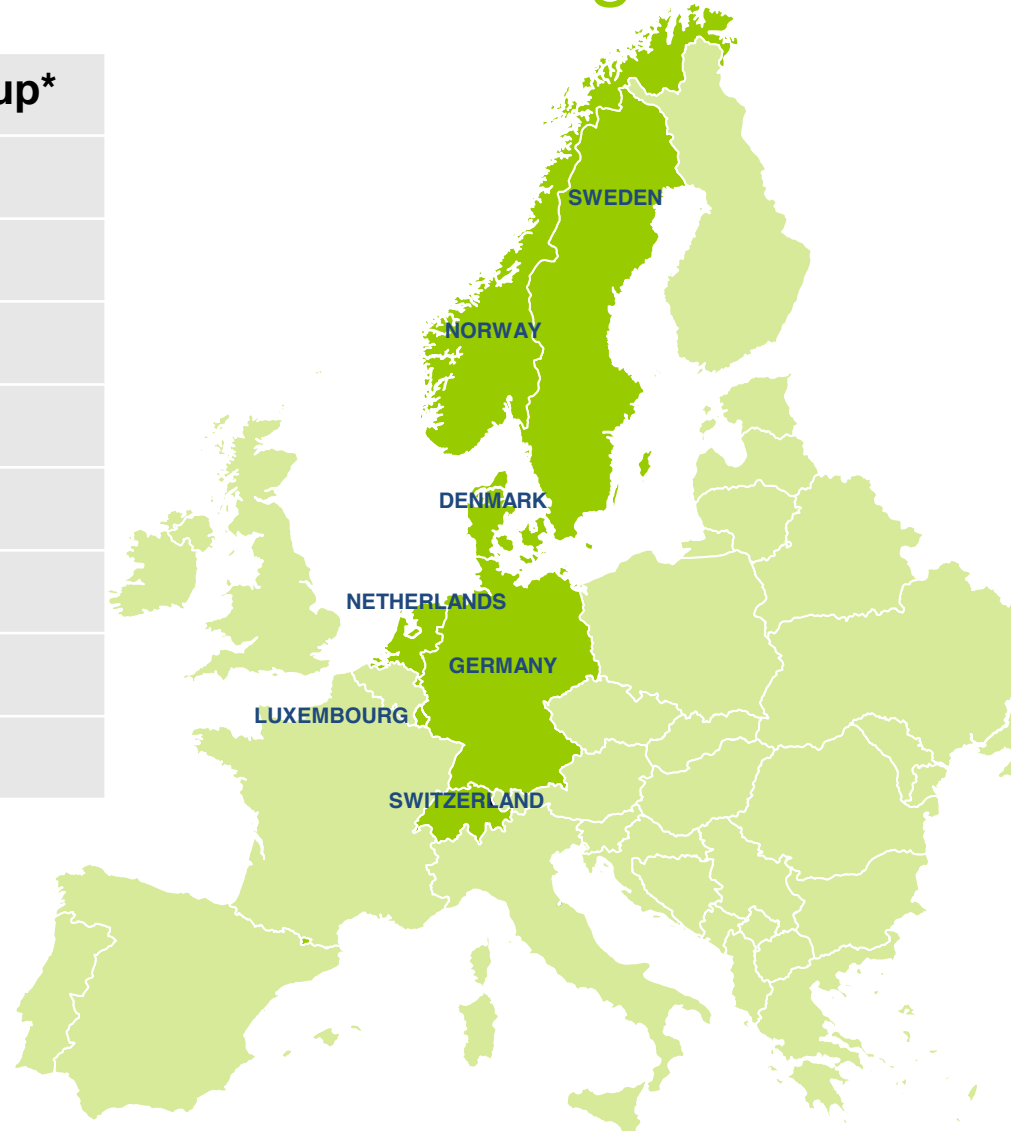
## Multiple levels, basic for all, expert for few

<u>Curriculum level</u>	<u>Training focus</u>	<u>Format</u>	<u>Duration</u>
<b>Basic</b>	General introduction to CO2OLtec <sup>®</sup> systems: EH&S / Assembly / MT&LT application LDS control system	Workshop and on site training conducted by Expert or Central Support	1 x 4 days
<b>Qualified</b>	<ul style="list-style-type: none"><li>- Standard maintenance work, addressing malfunctions, optimization of case controller, train and supervise installation teams,</li><li>- Prepare start-ups and limited start-up steps</li></ul>	<ul style="list-style-type: none"><li>-1 x Intensive training during commissioning and start-up</li><li>- Regular coaching by Expert or Central Support</li></ul>	<ul style="list-style-type: none"><li>- 2 to 3 weeks</li><li>- frequent coaching by Expert</li></ul>
<b>Expert</b>	<ul style="list-style-type: none"><li>- Full start-up, system fine tuning, trouble shooting, implement new systems into the market</li><li>- Train Qualified level</li></ul>	<ul style="list-style-type: none"><li>- 3 x start-up incl. one start-up alone;</li><li>-Attend regular workshops (2/yr initially, 1/yr after)</li><li>- Training given by Central Support and Controls R&amp;D Team specialist</li></ul>	<ul style="list-style-type: none"><li>- 6 to 8 weeks</li></ul>

# INITIAL TRAINING REQUIREMENTS

## Installations for start-up & service training

Country	Experts	Start-up*
Norway	2	7
Sweden	2	
Denmark	2	
Germany	6	7
Netherlands	2	7
Luxembourg	2	
Switzerland	3	
<b>Sum:</b>	<b>19</b>	<b>21</b>



Start-up by Experts as part of field training conducted by Central support and R&D



# EXPERTS TRAIN & SUPPORT LOCAL TEAMS

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## Knowledge transfer role

### Experts

Nominated per country

Build up local service, engineering and processing capabilities for CO<sub>2</sub>

Provide support for local service and engineering teams

Receive support by central Support and R&D when issues arise

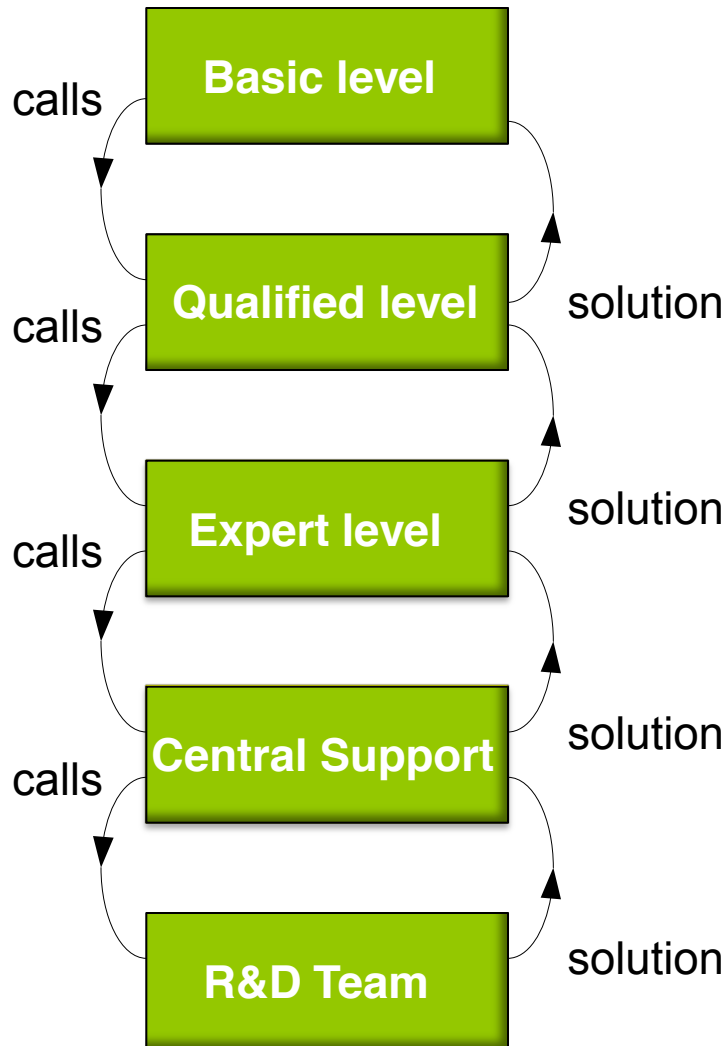
Give feedback to central functions (R&D; Central Support)



# “HOTLINE” SUPPORTS SERVICE

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Next knowledge level supports previous level



Chain structure ensures:

- No field issue is lost
- All parties are informed
- Feedback is used in future installations

# QUICK KNOWLEDGE GENERATION

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## Fast turnaround of tacit to explicit know-how

Frequent service and design workshops enable teams to:

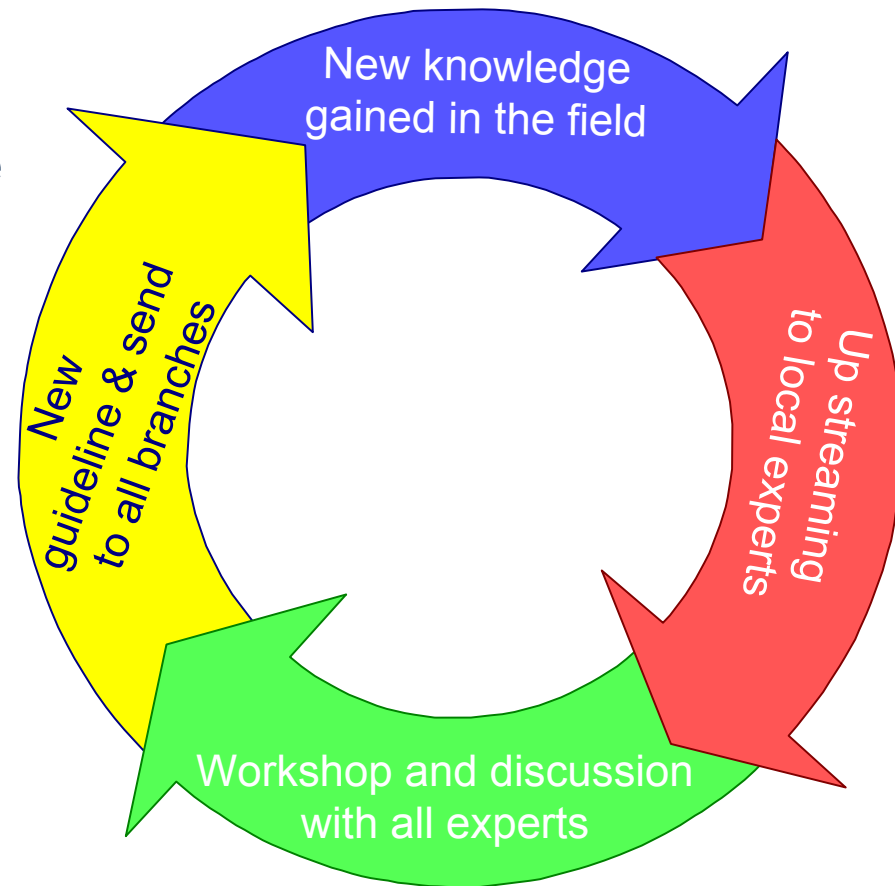
Provide feedback from service to design and vice versa

Analyse field issues

Share best practices

Improve project performance

Decrease service costs



# SUMMARY

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## Comprehensive launch strategy ensures success of technology change

Turnkey approach

Service / start-up capabilities & geographical coverage

Ensuring system reliability and efficiency

Training from basic to expert level

Exchange of knowledge & information up- and downstream

Spare parts availability

Full product range for all food retail store formats





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Thank you for your attention!

Innovative solutions,  
naturally...



*Carrier has the right refrigerant for every application, but every application will not have the same refrigerant solution.*