

Solstice® N40 (R-448A) Refrigerant Adopted by Tesco for its Carbon Reduction Roadmap.

“We continue to streamline the retrofit process along with our contractors in order to minimise impact on the store and cost to change. Also, to add to the 68 % reduction of direct emissions provided by R-448A versus R-404A, we have incorporated a leak reduction process to further minimise our carbon footprint and environmental impact.”

*Matthew Reeves-Smith,
Tesco, Group Head of Refrigeration & HVAC*

Case Study



Leading supermarket retailer Tesco has always supported the UK and United Nations (UN) climate change challenge. As part of this commitment, members of the Tesco executive team attended the UN Climate Change conference in Paris (COP21) in November 2015, restating their support for the actions required to meet long term climate targets.

Tesco’s Climate Commitments:

- **Investment in energy efficiencies and renewable energy sources (e. g. electricity, fuels)**
- **Investment in advanced refrigeration systems to drive carbon reduction**
- **Engagement with policy makers to ensure the right incentives for a low-carbon economy are in place (e. g. decarbonising the grid as this represents about 65 % of Tesco’s direct emissions)**

Tesco is aware of the major impact of R-404A refrigerant on its carbon footprint and has developed its carbon strategy to meet the requirements of F-gas regulation and to optimize the effect on sustainable operation.

The Challenge

Tesco operates over 2,600 UK stores, of which:

- 8 % are carbon friendly stores
- 16 % utilize lower GWP refrigerants
- 45 % will convert to lower GWP refrigerants
- 31 % use equipment over 9 years old

Tesco’s strategy is to follow a sustainability program for today and the future across its worldwide portfolio, taking account of three main scenarios:

- **New stores:** at store opening, use the lowest GWP refrigerants that are fit for 2020 and beyond
- **Current estate:** retrofit with a lower GWP refrigerant where the equipment lifetime exceeds 2022
- **Current systems with aged equipment (+10 years):** Tesco will maintain with recycled refrigerant until end of life and replace to the lower GWP refrigerants as part of its capital replacement program

The Objectives

R-404A accounts for 87 % of the installed volume of Tesco refrigeration and 99 % of the CO₂-eq volume, due to its high global warming potential (GWP). The switch to R-448A will lead to a 40 % reduction in refrigerant emissions in the 1,200 Tesco stores covered. In 2016, refrigerant emissions accounted for 15 % of Tesco’s direct carbon footprint.

In the current state scenario, the second of the three main scenarios, a 35 % reduction in installed volume of R-404A was anticipated through the retrofitting of stores where equipment lifetime would exceed 2022.

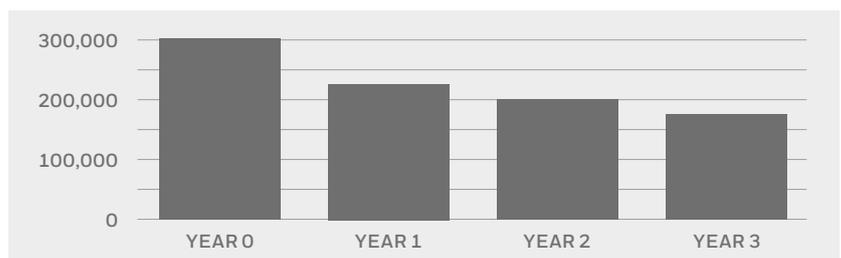
The program objective was to identify the best solution to enable Tesco to convert R-404A-based stores to a lower GWP refrigerant through an integrated offer that would satisfy the key strategic requirements:

On the product side

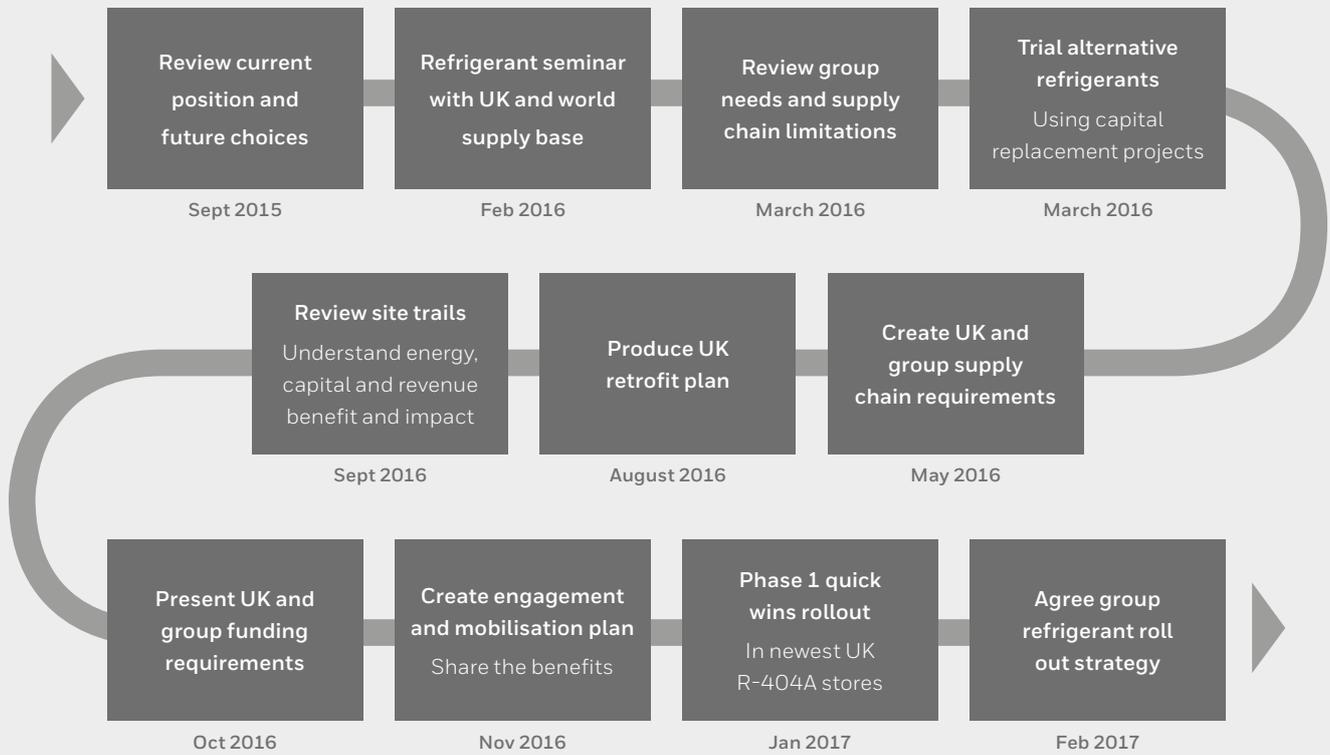
- Be available in required volumes
- Deliver best value across the remaining life of the plant, taking account of performance, energy efficiency and ease of use

On the supply side

- Provide combined commercial arrangements for recycling recovered gas
- Offer a wide distribution network
- Provide reporting and tracking capability
- Enhance fleet management



Refrigerant Leakage CO₂-eq



Tesco's project timeline



The Project

A team at Tesco defined the project timeline, starting with a seminar for the UK and the world supply chain base to share the goals and set out the need for cooperation. The process would include a review of possible alternative refrigerants that could satisfy Tesco's requirements. An asset database was created to validate and register the age of the refrigeration equipment.

Following meetings with major industry suppliers, a detailed specification schedule was put in place and plans formulated for store trials. These would include four main stores and four convenience stores, divided in the north and south of the country to evaluate the different ambient conditions within the UK.

Two refrigerants were chosen for trial:

- R-448A
- R-449A

Installations were similar, with some variation in equipment type (such as valves, EEV and TEV).

The key performance indicators (KPIs) considered for evaluation were:

- Measured product quality
- System temperature performance
- System energy consumption
- Work order history
- Refrigerant leakage

“We continue working with Honeywell to verify energy performance through monitoring three retrofitted stores with Climacheck equipment (independently verified data). Our experience, together with Honeywell's technical support on the refrigerant, have made the retrofit process problem-free.”

Greg Stringfellow,
Carter Synergy



Honeywell's Solstice N40 (R-448A)

The Proposal

Once the trials had demonstrated the suitability of the selected alternatives for Tesco's retrofit targets, the bid process started, based on calculated entrained volumes. Honeywell has a strong track record of partnering with Tesco in the UK and across the rest of the world. Indeed, Tesco Poland was a pioneer in the first major roll-out of a lower GWP refrigerant to replace R-404A with R-407F, with the resultant energy efficiency gains and ease of adoption delivering payback in less than two years.

Honeywell worked with the company's UK distribution partners to present a proposal combining commercial, supply and logistics agreements, based on collaboration with distributor A-Gas (with their testing and reclaim facility), wholesaler Climate Center (able to provide delivery and collection of new and reclaimed refrigerant nationally), and national contractors Carter Synergy and Space Engineering Services. This offer was judged the strongest in meeting Tesco's goals when measured against choice of refrigerant (providing best value across remaining life of the store), product availability, distribution network (both in the UK and globally), collection and recycling of reclaimed gas, reporting and tracking capabilities and fleet management.

The proposal also included a high level of technical support that included general and specific refrigerant application training for contractors on glide, operation, superheat setting, and support to the contractors on the trial sites on system adjustments. In addition, joint visits to the stores would provide an opportunity for further optimisation and re-evaluation to help define and set-up standard operating procedures for the planned refrigerant retrofit program.

The Rollout Program

The capital and refrigerant strategies for the rollout plans involving retrofitting from R-404A to R-448A for around 1,200 stores in the UK over the next 2-3 years were approved by Tesco's leadership team. With the F-gas phase-down already heavily impacting the price and availability of R-404A, Tesco realised that the change-out process had to begin Q1 of 2017 at the latest. The program kicked off in January 2017, and by end of March 2017 over 50 stores had been successfully converted to R-448A. Based on the success to date of the program, Tesco expects that other EU supermarkets will begin to accelerate the change away from R-404A to lower GWP and more energy efficient refrigerants, such as R-448A, for both existing and new stores.

“R-448A is very easy to use as a retrofit with minimal system adjustment.”

*Gary Nuttall,
Space Engineering Services*

“R-448A allows us to not only improve our environmental commitment though a much lower GWP, but has also helped to substantially reduce our refrigeration energy consumption. The logistics involved in the recovery, reclaim and re-use of the existing R-404A has worked well, with over 50 stores converted in just over two months.”

*Brian Frankland,
Tesco*



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For more information

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