SAVING ENERGY WITH SMARTFRESH™
The application of AgroFresh's SmartFresh™ Quality System enables CA & RA storage at higher temperatures leading to **energy savings of 13% to 19% per 1°C temperature increase**. The quality of fruit is maintained, and the payback is immediate. This was shown in a six-packhouse commercial trial in South Africa, aside from many other trials around the world.

**Active storage tool for freshness**

The SmartFresh system is an active tool in the storage process for maintaining the freshness of high quality apples. SmartFresh was introduced to Australian growers 10 years ago. Today astute growers use SmartFresh as the essential investment in delivering the expected fruit quality demanded by retail.

AgroFresh continues to deliver value-added propositions including energy efficiency for customers using SmartFresh.

**SmartFresh™ is a valuable tool for saving energy**

Independent research and investigation into the use of SmartFresh shows that apple storage temperatures may not need to be as low as those customarily used in the industry for RA and CA, without compromising product quality.

Upward adjustments in temperature will result in energy savings, helping to offset one of the steepest rising inputs faced by growers. This is in addition to benefits of night cooling of SmartFresh treated products, when the electricity rates are cheaper.

While the energy saving data for storing with SmartFresh is dramatic — savings of 21 - 38% per kWh of consumption — AgroFresh recommends a cautious approach will still deliver savings, and eliminate potential risks. This is because changing temperature is not a stand-alone variable. Other factors to be considered are:

- Cooling regime
- Scrubbing CO₂
- Ventilation
- Fruit Weight loss
- Defrosting frequency

According to Apple and Pear Australia Limited’s “Watts in your Business” energy survey, all growers use electricity in their operations. The average price is $0.26 a kWh, and the average annual spend is almost $105,000.

**A CASE STUDY**

**Potential Energy Savings Using 1-MCP with Gala Apples in commercial CA Storage**

- Presented in Antalya, Turkey
- 6th International Postharvest Symposium

R. McCormick, D. Neuwald and J. Streif
Kompetenzzentrum für Obstbau-Bodensee, Germany

This was a comparative study to quantify potential energy savings. Involving two identical CA storage rooms (600 bins each) filled the same day with Gala apples from the same origins, and stored for 5.5 months. One room was treated with SmartFresh and maintained at a higher temperature regime (set point 4°C). The other was untreated and kept at 1.5°C. The SmartFresh storage room used 35% less energy than the control storage room.

**Conclusions:** Long term storage of fruit needs a high amount of energy for cooling in order to reduce the ripening processes and preserve fruit quality. SmartFresh technology may be a useful tool for energy savings during apple storage without a noticeable reduction in fruit quality and keepability.
AgroFresh has undertaken energy and CO2 research in the UK, using Auditel to calculate energy efficiency, Germany (Kompetenzzentrum für Obstbau-Bodense), South Africa (ARC Infruitec-Nietvoorbij and ExperiCo), Israel, France, Spain, Italy and New Zealand (Plant and Food Research). The results are broadly similar.

**Research findings**

**Europe:** There have been 12 trials over two seasons resulting in quantified energy saving regardless of whether storage practices changed. Varieties included were Royal Gala and Cripps Pink.

**South Africa:** Trials extended to monitoring 6 rooms of Golden Delicious, Granny Smith, Pink Lady and Red Delicious. Data shows average savings of 15% in consumption per each 1°C increase in storage temperature. During the 6 months of CA storage at higher temperature, there were energy/electricity cost savings of an average of AU$4.50 per tonne.

**Israel:** In CA storage, comparing current commercial practice (pre-cooling, covered bins at greater than 0°C) with SmartFresh’s recommended practice (stepwise cooling, uncovered bins at greater than 1°C), there were savings of over AU$10 per tonne.

**Australia:** Research here examined the differences in fruit quality between rooms with temperature fluctuations versus rooms with constant temperature. Even untreated fruit was 17% firmer in constant temperature rooms. The fruit was stored for up to six months with 14 days shelf life evaluation. Aside from any energy savings, increases in storage temperature reduce the weight loss on stored fruit.

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**Ascorbic Acid (Vitamin C) Content**

Once the apple comes off the tree the vitamin C content diminishes rapidly over time. Research has shown that vitamin C decreases generally very quickly and at least by 50% in 2 months of storage and 10 days of shelf life at regular temperature.

SmartFresh contributes to slowing down the decrease of vitamin C throughout the whole supply chain, and contributes to maintaining better vitamin C content.

Several German studies show, depending on the variety, that SmartFresh fruits had about 10% more Ascorbic Acid content than apples that have not benefitted from SmartFresh.
A cautious approach is best

While there is no firmness loss when increasing storage temperature (even up to 4°C), other quality parameters can change such as background colour, core flush risk, and the potential for disease development. These can be managed. For recommendations on storing apple varieties at increased temperature talk to the AgroFresh team in Australia.

To maximise energy efficiency with SmartFresh, it is important that storage is operated according to AgroFresh’s recommendations. This involves CA settings, scrubbers and refrigeration equipment all running to needs and not to automated default settings.

AgroFresh is acutely aware of the behaviour change required to store at increased temperatures, and the financial risk borne by growers as the result of going too far too fast. For these reasons initially small temperature adjustments are recommended. AgroFresh is confident these will demonstrate fruit quality benefits as well energy savings and reduced CO₂ emissions.

Almost all growers would like a three-year payback on any investments in energy savings. With SmartFresh and storage at higher temperatures, the payback can be immediate, and complement best practice in their other energy saving efforts.

The SmartFresh Quality System—from delivering quality to focus on quality and energy efficiency.

SUMMARY:

Saving electricity with SmartFresh cool storage.

1. Freshness protection and energy savings
2. World of investigations and data
3. Increasing storage temperature without risk to fruit quality
4. Delivering quality and energy efficiency
5. A cautious stepwise approach is best
6. AgroFresh is committed to helping you