

# Air Change's pioneering force



Sydney-based IAQ specialists Air Change prides itself on innovation and the ability to address energy efficiency and indoor air quality (IAQ) problems with simple solutions. *CCN* editor Derek Royal spoke to founder and managing director John Urch, who gave him the inside oil on a company that just goes from strength to strength.

**2007: the Air Change team was victorious in winning AIRAH's excellence in HVAC award.**

**E**stablished in 2000, Air Change is a market-driven company specialising in outdoor air energy and heat recovery systems that improve IAQ. Urch founded the company when he designed and patented a new heat exchanger and a range of HVAC units incorporating the heat exchanger.

"My role has been predominantly to design, patent, develop, prototype, test and commercialise a full range of new products based around the enthalpy and sensible air-to-air counterflow heat exchanger," Urch tells *CCN*.

"We have pioneered displacement air conditioning with heat reclaim, direct coupled fans and motors with VSD's, sandwich panel cabinets (which are virtually mini coolrooms in all our packaged products for best practice insulation and durability), de-superheaters for hot water heating, economy cycles and CO<sub>2</sub> sensors to monitor the amount of fresh air needed for varying size venues.

"Our heat exchanger has no moving parts, doesn't wear out or rust and is very efficient. The plates are designed for either sensible or enthalpy media. We have the best engineers and a great marketing and production team – all capable of meeting new challenges. I am happily involved in any new design challenge."

Air Change's product range has diversified into a comprehensive range of units for HVAC applications and indoor pools. Spacious airflows through the heat exchanger allow the company to make products up to 12,000l/s and the heat

exchangers cover sensible, enthalpy applications in normal or corrosion resistant versions.

The first Air Change heat exchanger design lodged in 2000 is now an accepted patent in the USA, China, Canada, Korea and Australia, and pending in Europe and India. "Our rooftop is patented in the USA and there are other patents for products and different heat exchangers in the patent system internationally."

**>>| "The technology at Air Change is at the cutting edge today of reducing the energy consumption of buildings and improving air quality at the same time" |<<**

Industry gongs and awards have also been forthcoming. In 2002 and 2003 the company won the SEDA (Sustainable Energy Development Authority) Green Globe award; and in November 2007, AIRAH awarded Air Change the prestigious "Excellence in HVAC" Award for its rooftop package unit. According to Urch the unit has the ability to improve IAQ, reduce energy consumption and contribute to reducing greenhouse gas emissions.

"With the company strengths of innovation and engineering, centred around patented energy

reclaim, we will continue to progress the industry and new product development to meet the changing demands required by the reality of climate change. In the last five years, Air Change has supplied fresh air to clubs and hotels to solve indoor smoking concerns. Mission accomplished, this major concern has been replaced by the need for energy efficiency and the growing concerns for IAQ.

"Now we have green star buildings and section J, all needing energy efficient fresh air," Urch says. "At last the things I have been working on since the 1980s are in the here and now. As a company we are prepared for the changes in thinking on climate change that are now taking place. These major trends have had a huge impact on our company in a short period of time."

Urch is renowned throughout the industry as an innovator. A pioneer. So it's no surprise when he tells *CCN* he started his own air conditioning manufacturing business at just 20.

"I started off in a large shed I built in my father's back yard," he says. "I pioneered reverse cycle split air conditioning in the early 1960s, when my mother was ill. I decided to make her a window air conditioner for her bedroom. She complained of the noise and wanted it out of the house. I went out to the shed and redesigned it into the first reverse cycle split system air conditioner. I fitted the fancoil unit into the room and connected it to a home made condensing unit outside. After making a few units, I tried to

patent it but was blocked from doing so because I had sold some units to the public first."

Urch subsequently formed Diamond Air Conditioning, which became one of the biggest privately-owned air conditioning firms in Australia during the 1970s and 80s. Split system ducted air conditioners were the company's biggest selling product, after package water cooled air conditioners and pool heat pumps.

"I thought that recirculating air conditioning was a health hazard, but at the time it could not be solved efficiently," he says. "I tried to sell fresh air in the 70s by bringing a duct of fresh air and mixing it with the return air and then go through the fan coil for conditioning. Diamond manufactured 25,000 ducted systems, but only a handful of clients wanted the fresh air system at the extra cost.

"The largest size air conditioners for houses in those days was 6HP so going larger to cover the extra fresh air was not practical. It was only during the 1980s when searching for a better alternative to bringing in raw fresh air that I designed my first air-to-air counterflow heat exchange concept.

During the mid 80s Urch sold Diamond Air and concentrated on a new venture to make energy efficient fresh air conditioning systems.

"This was because I had been concerned for many years with the lack of air quality in houses and commercial buildings with recirculating air conditioning systems," he says.

"I formed Thermal Research in 1986/87 to design and prototype counterflow plate heat exchangers. In 1988/89 I patented my first plastic framed multi media heat exchanger."

In the early 90s Urch tried to sell energy efficient fresh air into the market and was told very quickly that energy was so cheap, there was no justification for spending money on heat reclaim for fresh air.

"Many times it was said to me *who needs fresh air anyway?*" he laughs.

"I felt like I was hitting a brick wall by trying to market fresh air and energy efficient equipment in air conditioning applications."

So Urch set about using heat reclaim in other areas such as drying clothes, using waste energy from the clothes dryer to preheat clean dry air. Other thoughts were drying products such as pasta and fresh air for laboratories where the air was obnoxious.

Coolroom ventilation was another area for which he developed products, to remove the "rotting and ripening gas" – ethylene.

A shower dryer concept was sold to a Singaporean listed public company where the clothes drying took place in the shower to save space and stop the practice of drying clothes hanging out on poles and balconies.

"With this injection of research funds, I then concentrated my efforts on fresh air indirect evaporative cooling with gas heating. This was an energy efficient product providing fresh air for health, gas for heating and water-based cooling.

"At this time my private research company, Thermal Research, was approached to become a public company and in 1997 this was listed as Eco Air. The gas heating/indirect evaporative

cooling unit was developed with a gas manufacturer in Melbourne, but it proved difficult to get through the AGA's Gas appliance approval process. I found out later that it was virtually impossible to get a flueless gas heater approved, even with 100 per cent outdoor air. To my knowledge no new products of this type had ever been approved in Australia, nor are they likely to be in the future."

Urch left Eco Air in 1999/2000 due to differences with the public company board, which had a policy of outsourcing product development and manufacturing through licensing which restricted his ability to develop and mould the product range.

"This decision meant I had to leave behind all my development work, and start all over again with Air Change in 2000. I developed new patents and designed a new range of products. We found we had a major call for rooftops, pool ventilation and heat/energy recovery ventilators and so the product range developed from there."

Boasting almost half-a-century in the industry, when Urch talks, people tend to sit up and take notice. When asked what has been the single-most significant issue in IAQ, he doesn't hesitate to nominate passive smoking within the hospitality industry.

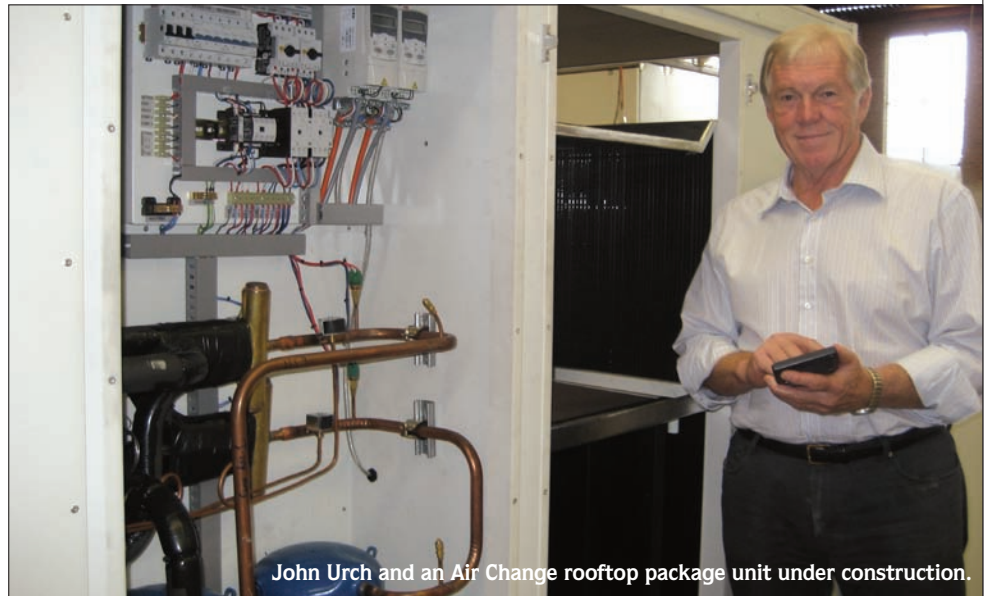
complex wheel units. The first sensible cross flow plate heat exchangers made of metal were developed in the 1970/80s. Enthalpy type corrugated cardboard heat exchangers were developed in the 1990s.

"I must make mention of *air cleaners* in the evolution of IAQ technology, but I have a low opinion of these systems. They do not introduce fresh air but take out particles from re-circulating air if the expensive carbon filters are continually replaced. Many clubs tried them but opted for our technology when it was available and replaced the cleaners."

Urch says he wanted to develop a counterflow heat exchanger as that method is more efficient than crossflow. He also wanted the same heat exchanger to be sensible or enthalpy and had a concept of making a plastic framed heat exchanger that could hold a variety of medias, either sensible and/or enthalpy.

"The first media I used was an aluminium foil wrapped around multiple plastic frames," he says. "After experimentation and testing of many types of media, Air Change has two excellent enthalpy and sensible medias which were commercialised into products in 2002."

Section J of the BCA mandated improvements in the efficiency of indoor air quality and star



John Urch and an Air Change rooftop package unit under construction.

"The start of IAQ issues was with passive smoking claims in the hospitality industry," he says. "People and companies were getting sued over IAQ. Laws about improving fresh air came into being in the early 1990s starting in the ACT. We were able to get rid of the smoke and provide 100 per cent fresh air conditioning without increasing the size of the air conditioner. We did a lot of pubs and clubs around Australia which kick started Air Change and the IAQ market. This to me has been the most significant change in my time in the industry."

Has technology changed in IAQ?

"Heat wheels were pioneered in the 1960s and 1970s and were an accepted way of doing heat reclaim. I saw a need in the mid 1980s to simplify the heat reclaim design from these

ratings system is now in operation to measure the ecological performance of buildings. This means businesses must lower carbon emissions and energy must be saved.

"The technology at Air Change is at the cutting edge today of reducing the energy consumption of buildings and improving air quality at the same time," he says.

"IAQ will change again using much more energy efficient systems without compressors. Heat exchangers save energy but then must cool or heat with compressors or gas. I have formed a research company to work on new technology such as solar air conditioning that will work in the tropics. Indirect evaporative cooling can work in high temperature and low humidity areas using less water." 