# Heat Pump Water Heaters: Path to Harmonisation of Test Standards

## Session 1: The Project

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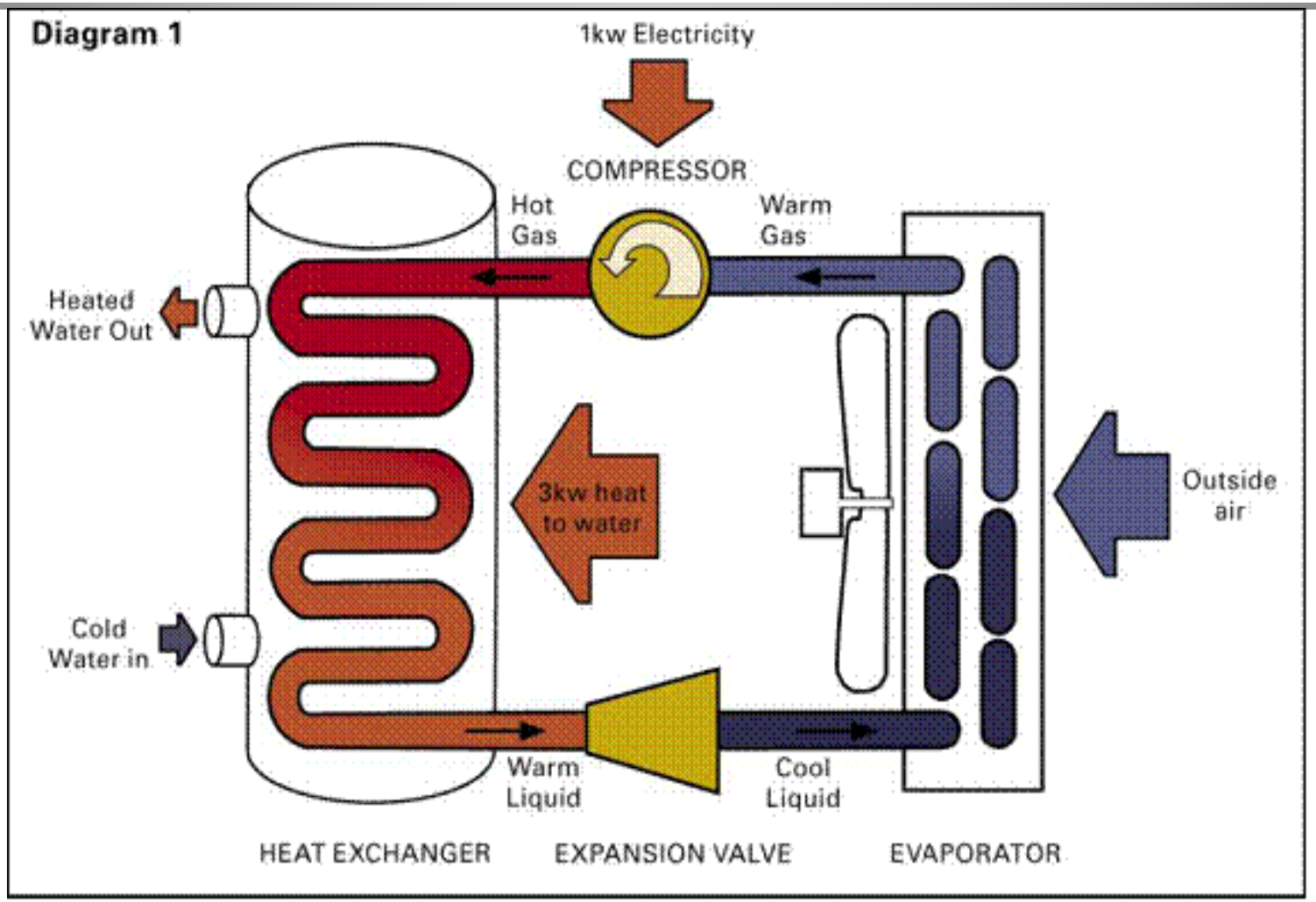
# Background to the Project

- What is a heat pump water heater (HPWH)
- Their energy-efficiency advantage
- Different types
- Trade in HPWHs
- Energy tests, standards and labels
- Value of harmonisation
- This project
- Aims of this Workshop

# How they work

- Same principle as refrigerator or air conditioner
- Transfer energy from ambient medium to water in a storage tank
- Electricity used only in the compressor motor
  - » In some designs there is backup resistance element
- This makes it a more efficient way to heat water
- Ambient heat source can be air, water or earth
  - » Most common type is air-to-water design
  - » This is the only type covered in our report

# The Refrigeration Cycle

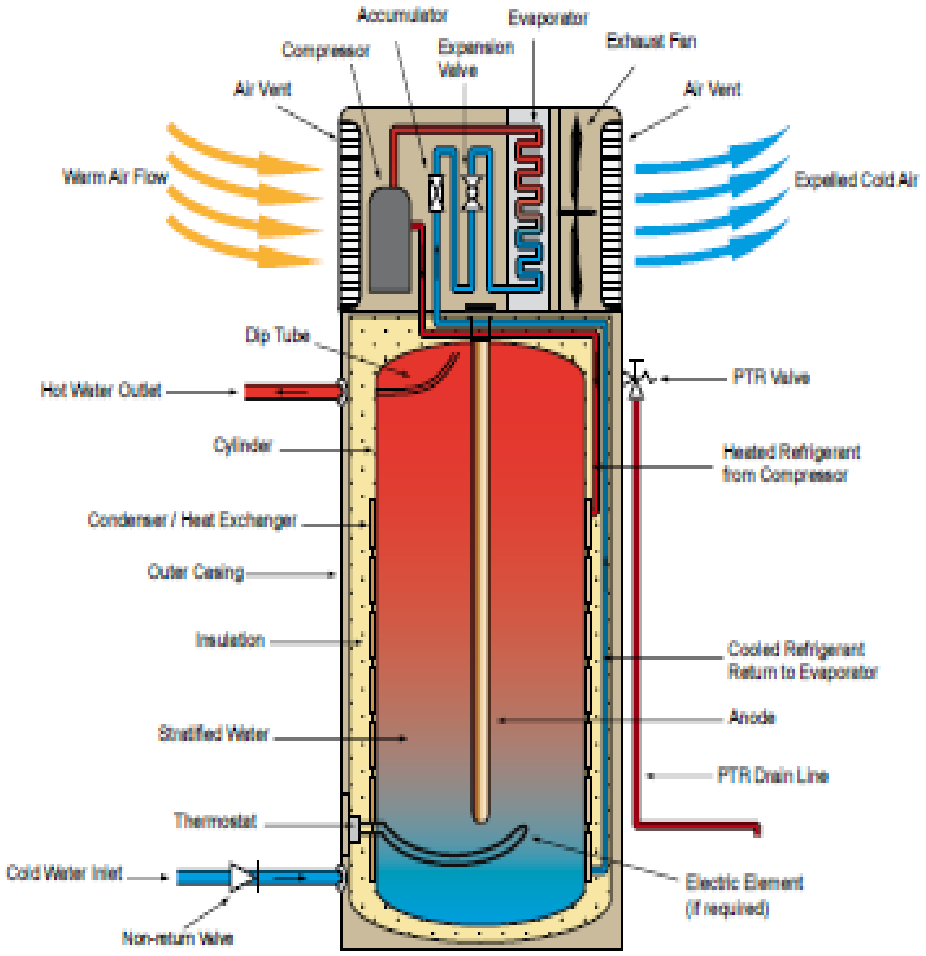


# Unitary Heat Pump Water Heater

# Unitary Heat Pump Water Heater

May be designed to be installed outside, inside or with ducted air

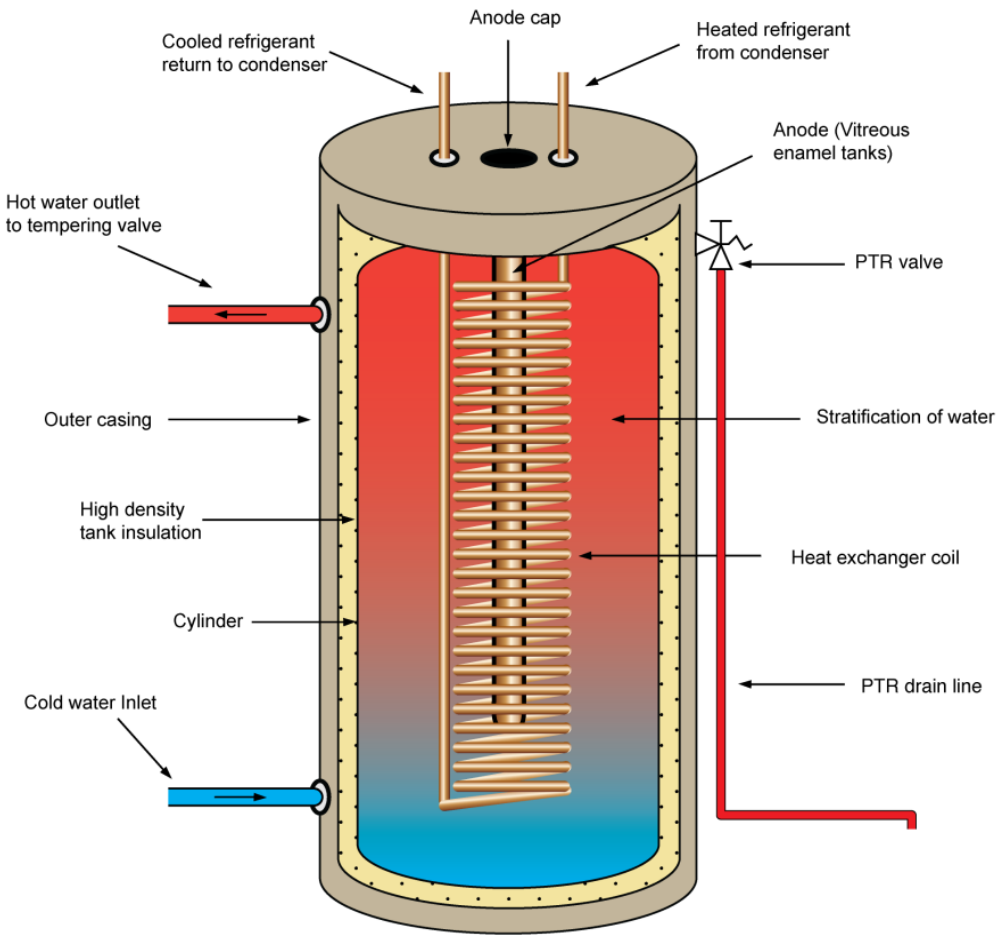
Heat exchanger may be wrap-around or immersion coil



# Split Heat Pump Water Heater

Heat exchanger could be in tank or in evaporator unit

# Storage tank (with heat exchanger)



# Markets and Trade

- HPWHs are manufactured in many places
- They are widely traded
- Energy efficiency is the main selling point – so there is incentive to state highest possible value
- But there are different ways to test units and determine their energy efficiency
- Suppliers have to test to the standards required in all market where the product is sold
- This adds to costs and customer confusion and acts as a barrier to trade

# This project – Supported by:

- CLASP - Collaborative Labeling and Appliance Standards Program
- DRET - Department of Resources, Energy and Tourism, Australia
- KTL – Korea Testing Laboratory
- ICA – International Copper Association
- APEC EGEE&C– Asia Pacific Economic Cooperation's Expert Group on Energy Efficiency and Conservation
- SEAD – The Super-efficient Equipment and Appliance Deployment Initiative of the Clean Energy Ministerial

# The project team

- George Wilkenfeld and Associates
- Energy Efficient Strategies (Lloyd Harrington)
- Thermal Design (Prof Graham Morrison)
- Waide Strategic Efficiency (Paul Waide, UK, Philippe Riviere – Armines, Paris)
- Experienced in energy efficiency policy, international standards issues, product testing, thermal performance modelling

# Objectives of project

Analyse current standards and test methods, with the aim of developing proposals for internationally-comparable energy efficiency test methods, metrics and efficiency classes for use in future efficiency policy measures

- » So far we have only considered test methods and metrics
- » Have a lot to solve before we can consider efficiency classes (eg COPS indicating low, med, high eff)

# Stages

- Analyse existing HPWH test standards – done
- Prepare Interim Report – done
  - » Will finalise after your feedback (by 31 May, please)
- Present report to this workshop of experts
- Analyse KTL test results
- Final report – guidelines for internationally comparable test methods
- Present final report to second workshop
  - » Place and date to be decided – late 2013

# Today's Workshop Program

1. Overview of international test standards
2. Preliminary findings from KTL testing
3. Experiences with testing by a major Chinese HPWH manufacturer
4. Some possible ways forward – using selective physical tests and modelling
5. Discussions

# Aims of Workshop

- Get your first reactions to Interim Report
- Help identify issues we have overlooked
- Seek your suggestions for other stakeholders who should be involved
  - » If so, please pass on the report to them
- To request your comments by 31 May, please
  - » To geosanna@ozemail.com.au