Future of Hot Water, What's Possible

- technology
  - new technology
    - recycling heat and water
    - efficient and safe heaters
  - old technology
    - lessons of the past
      - good
        - simplicity works
      - bad
        - safety concerns
- how tech is used
  - How much water do we need?
    - how big is the problem
      - How the world uses freshwater:
        • about 70 percent for irrigation
        • about 22 percent for industry
        • about 8 percent for domestic use (UN)
    - Daily indoor per capita water use in the USA is 69.3 gallons (AWWA)
    - 20-50 litres (5.3 to 13.2 gallons) of water/day needed for drinking, cooking & cleaning. (UN)
    - Space Station use
      - "The Water Recycling System will reclaim waste waters from the Space Shuttle's fuel cells,urine, oral hygiene and hand washing, and by condensing humidity from the air. 40,000 pounds per year of water from Earth would be required to resupply a minimum of four crewmembers."
      - That's about 3.28 gallons per person per day
  - recycling heat
  - efficient distribution
  - efficient fixtures
  - unusual sources of water
    - recycling water
    - water from air
- questions to ask
  - Is there a silver bullet?
    - It isn't the heat maker!
    - It is systems thinking.
  - Can we afford to use less?
    - Space station recycling is likely expensive.
  - How do we get efficient, cheaply?
  - How do we make our work durable?
  - Is water saving different than energy saving?
- The future = very little water/energy use
  - how do we get there?
    - redefine the need
  - What barriers exist?
    - physics
      - how much can efficient equipment do?
      - distribution
      - fixtures
    - non-physics
      - codes
      - perceptions
- Where do we learn?
  - the past
  - other places
  - getting creative
- Imagining the future
  - many possibilities
  - one possibility
    - no water toilets
    - one gallon showers
    - pure water only for cooking/drinking
    - heat recovery
    - low volume plumbing
    - combined appliance scavenges heat
    - simple solar preheat