

# Complexities of Saving Energy in Qatar

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# Organization

- Geography
- Pronunciation
- Why Qatar matters



# Where is Qatar?



Population 2M

Area = Denmark



## How to Pronounce Qatar ...

**Qatar**

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[youtube.com/PronunciationBook](https://www.youtube.com/PronunciationBook)

# Why Qatar Matters



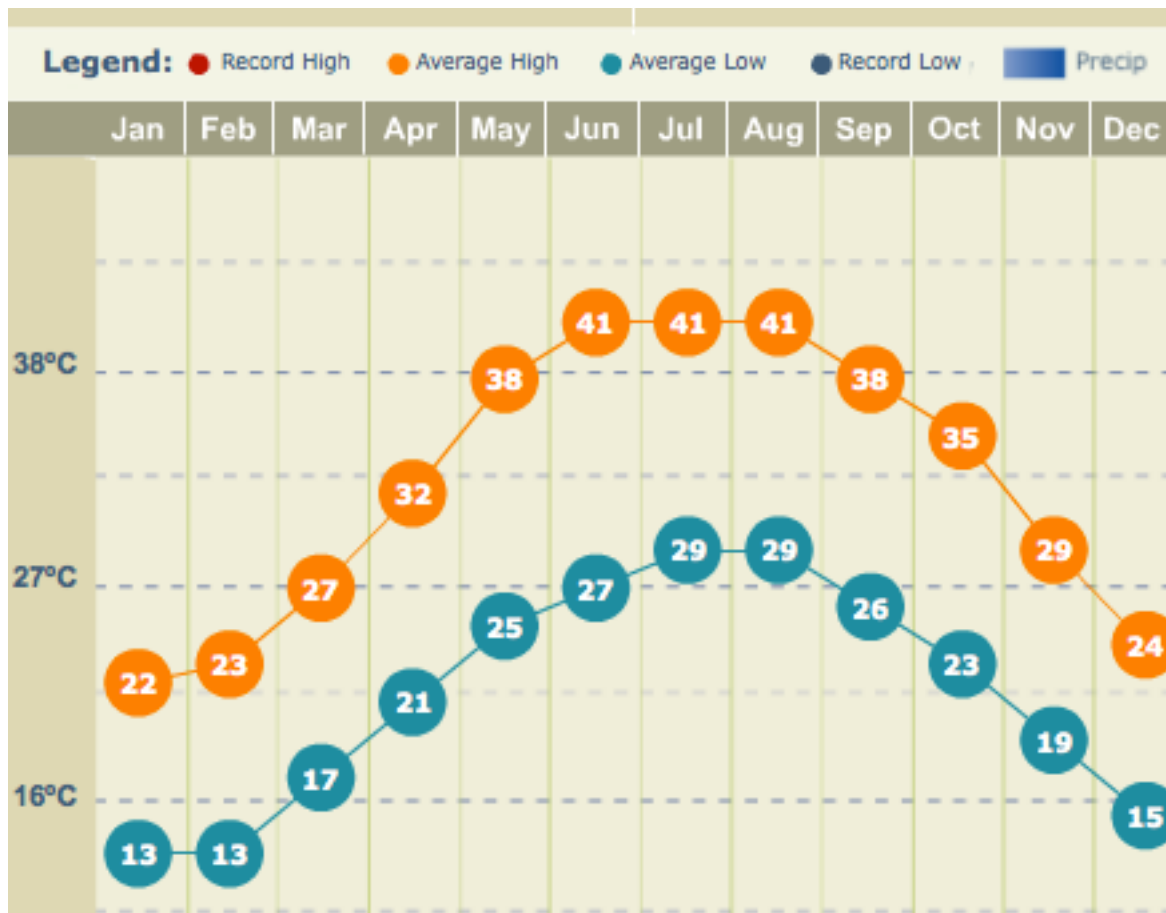
- World Cup 2022
- 20% of global natural gas reserves?
- Close links between energy and water
- Energy consumption implications of rapid infrastructure development
- Potential testing ground for efficiency & renewable technologies in an extreme climate
- Gulf area is neglected with respect to energy demand but it's rising, especially Saudi, Iran

# Extreme Qatar

- World's highest per-capita:
  - energy consumption & CO<sub>2</sub> emissions
  - H<sub>2</sub>O consumption
  - GDP (sort of)
- Extreme population growth
- Extreme GDP growth
- Extremely low energy prices
- Extreme air conditioning (AC = 70% of site electricity use?)

# Qatar is Very Hot

Monthly Average Maximum and Minimum Temperatures

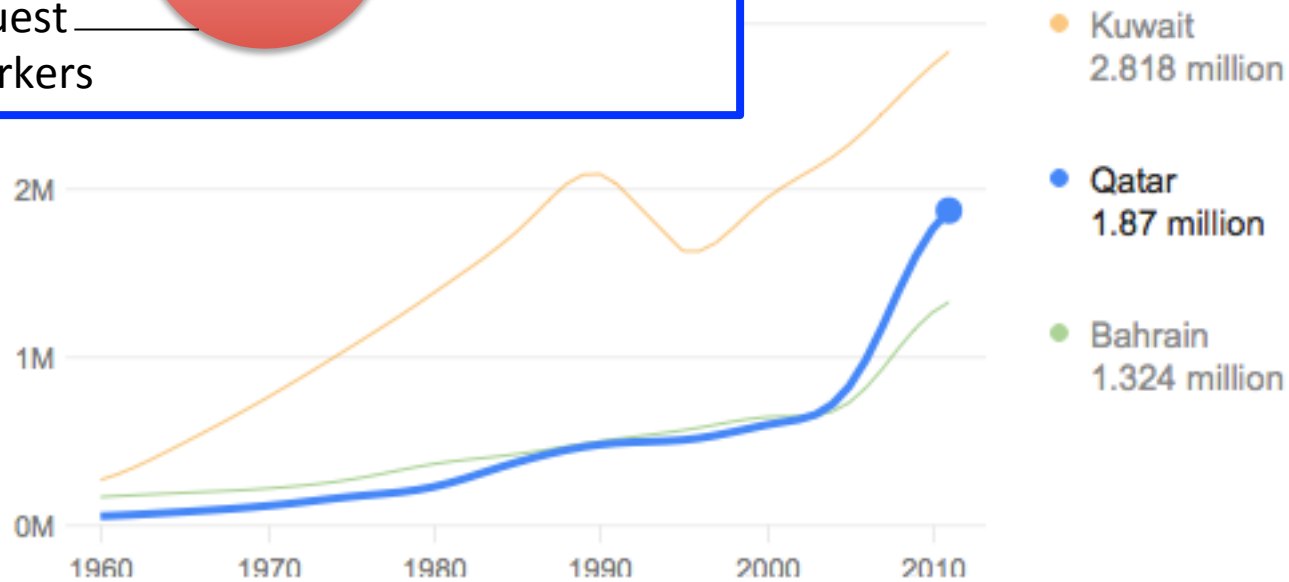
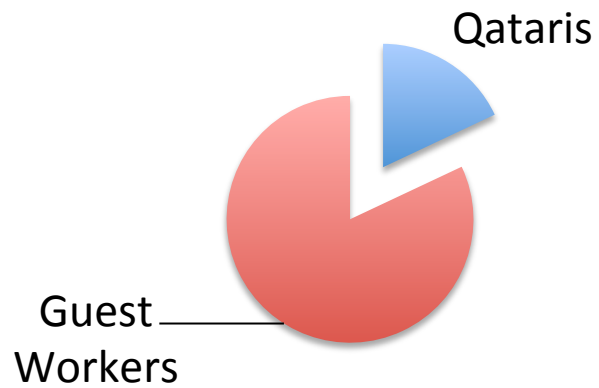


53°C on 14 July 2010 at  
Qatar Scientific Club

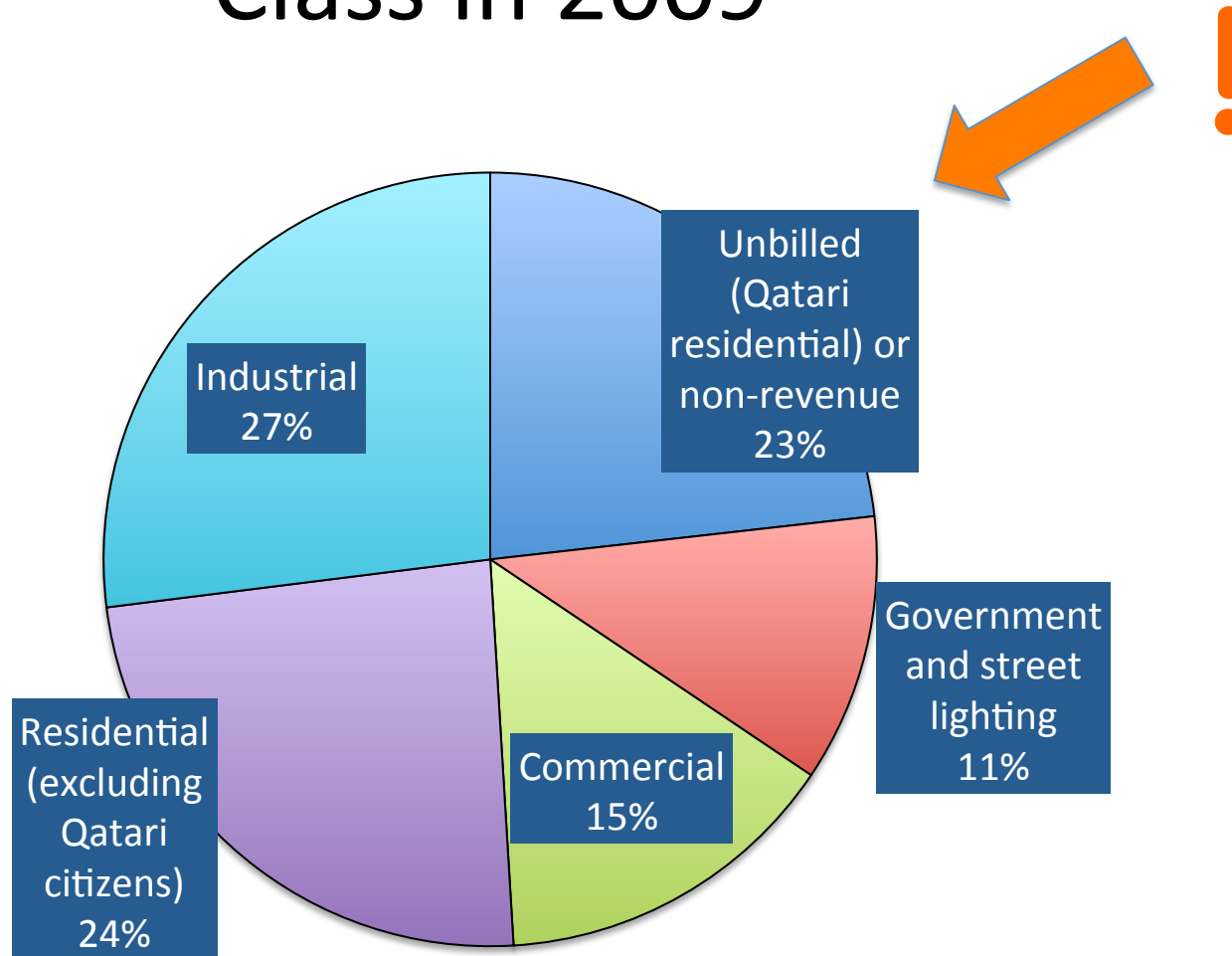
# Complex Qatar

- Non-Qataris outnumber Qataris 5:1
  - Transient population
- Qataris don't pay for electricity, gas, water
- Enormous infrastructure and construction projects underway
  - Energy impact unclear but large
- 100% of water is derived through desalination

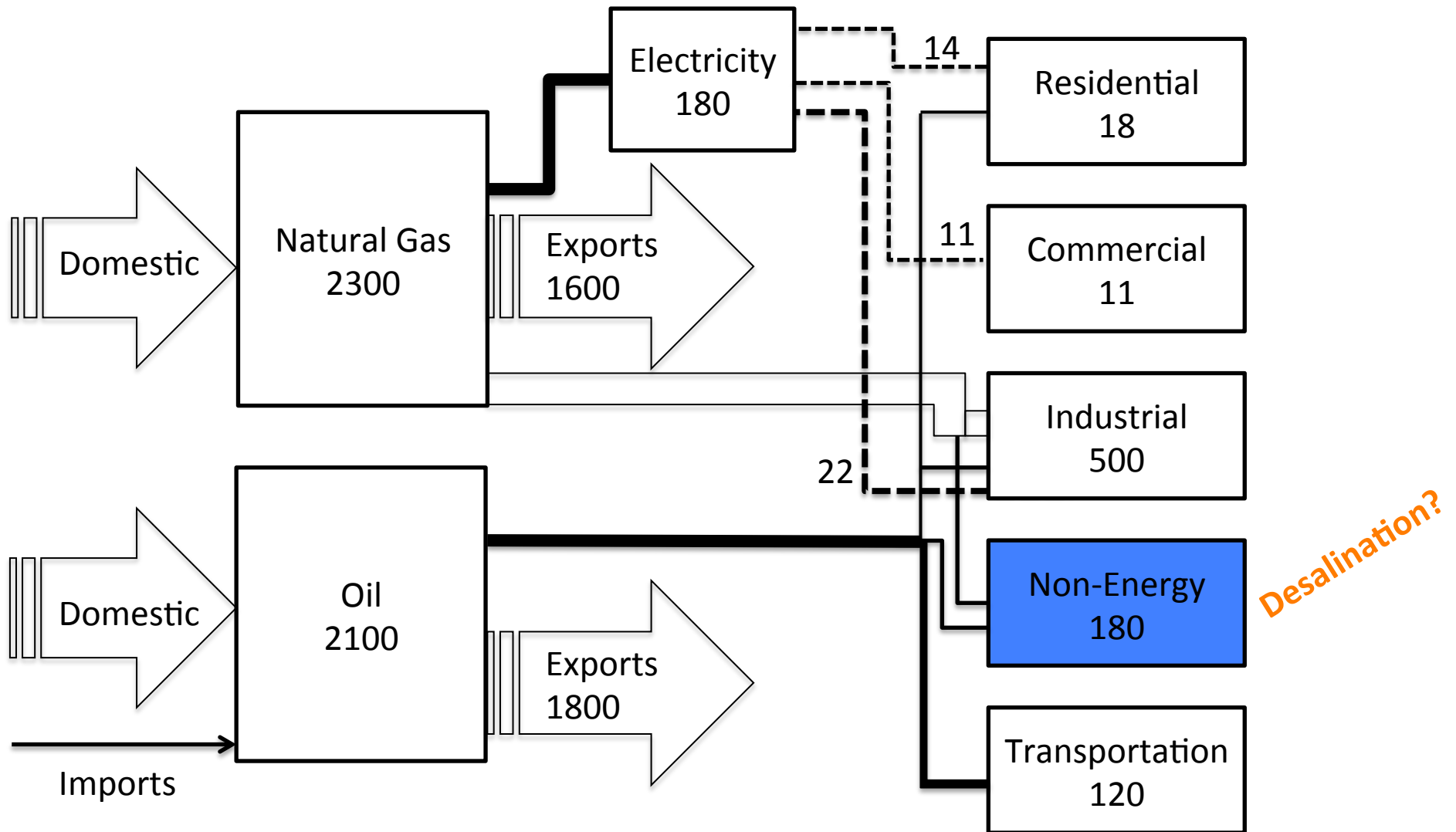
# Population – Growing Pains



# Qatari Electricity Sales by Customer Class in 2009



# Energy Flows in Qatar – 2007 (In PJ)



# 99% of Qatar's Water is from Desalination Plants

- 3-day reserve
- 25% distribution losses
- High per-capita consumption @ 430 litres/day
- Desalination adds >1 kWh/200 litres of indirect energy at the plant
  - ~3000 kWh/ home



Situation will deteriorate:  
Salinity of coastal water is increasing

# Qatar Conserves

- 2008 H<sub>2</sub>O Conservation Law forbids:
  - car-washing and use of open hoses for cleaning
  - Leaving outdoor lights on during daytime
  - Failing to repair internal water leaks
- 2008 Energy Conservation Law requires:
  - Develop “technical specifications” for efficiency levels
  - Audit high users
  - Media campaign
  - Work with religious leaders
- Goals to reduce by 2016
  - Electricity: 20%
  - Water: 30%
- 2012 Plans to cut electrical demand 2%
  - PV on customer premises
  - Prohibition of incandescent lights
  - Solar thermal water heating



# Conservation (2)

- Green Building Program
  - Initially voluntary but may become mandatory after architects become familiar with technologies
  - Voluntary building benchmark system
- No appliance standards (MEPS)
  - Transient population avoids long-term investment
  - Low-cost and inefficient room ACs imported from Middle East
  - Future MEPS in UAE & Saudi may encourage Qatar to adopt the same



# Utility Efforts to Conserve

- Utility recently established conservation office
- Smart meters being tested
- Huge overcapacity discourages utility incentive to conserve
- People have little difficulty paying for energy

# Other Threads

- Leadership from Emir and wife
- International pressure
- Food security
  - Based on sustainable water supplies (PV)
- Technical obstacles to PV
- Gulf Cooperation Council

# There's No Happy Ending

- Energy consumption continues to grow
  - Tapering off when infrastructure construction slows?
- Efficiency efforts are modest
- The country can afford it
- Long term environmental problems may force changes:
  - Water constraints
  - Air pollution
  - Heat island?

# Qatar Illustrates: Conclusions

- Future economies with inadequate fresh water
- Distortions caused by distorted energy pricing
- Energy implications of rapid infrastructure construction
- Problems of saving energy, regardless of wealth