

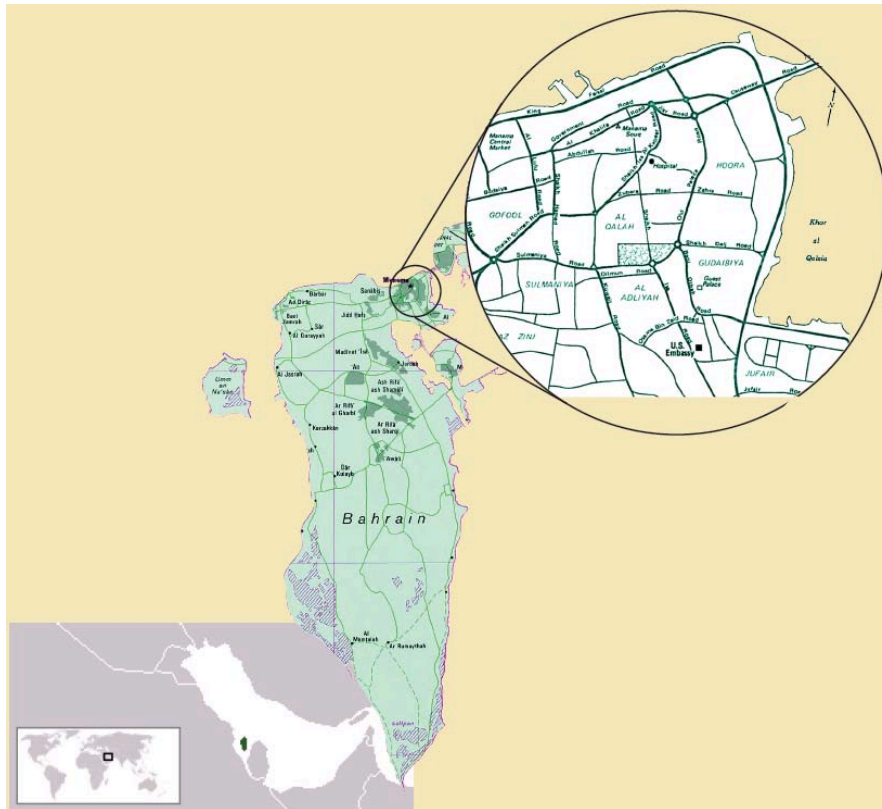
# The Bahrain World Trade Center

ENVS 662-660

Green Design and the City

Richard W Berman

# Background



Former colony of United Kingdom

Location: Manama, Bahrain

Population: 688,300

Primary Industries: oil and tourism

Climate: periodic droughts

Overview

Energy Saving Features

Wind Turbines

Conclusion

# Function



- Office Space
- Business Complex
- Shopping Mall
- Dining
- Parking



Overview

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# Technology and Resource Efficiency

- SMART features
  - Wireless Capabilities
  - Advanced Security Systems
  - Intelligent Lighting Controls
  - New Management Systems



Overview

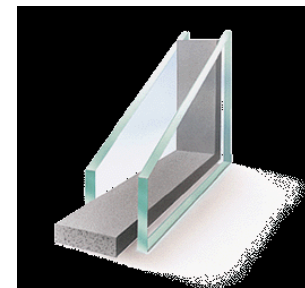
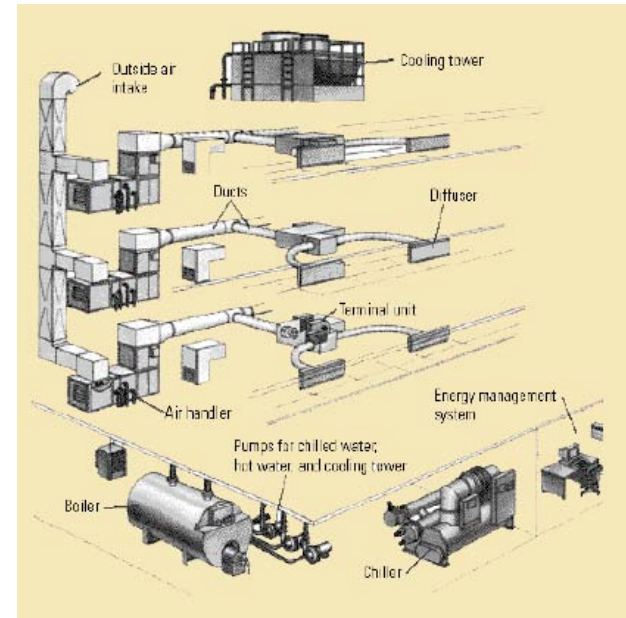
Energy Saving Features

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# Cont.

- ❑ Gravel Roofs with Overhands and Shading
- ❑ Solar Street Lights
- ❑ Concrete core and Floor Slabs
- ❑ Double-paned windows
- ❑ Innovative Cooling System
- ❑ Sewage Treatment system



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# Wind Turbines



Overview

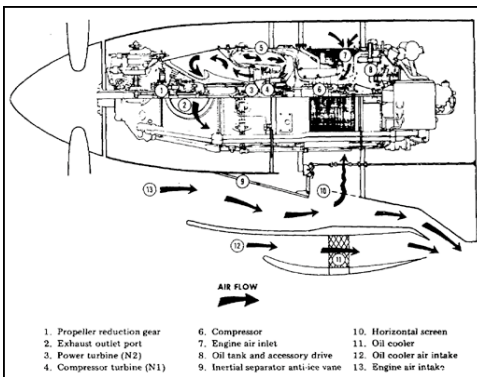
Energy Saving Features

Wind Turbines

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# Wind Turbines

- Three bridges holding 39-meter diameter wind turbines
- Operates 50% of the time
- Generates ~225kW/turbine ~700kW total
- Automated Turbines and Blades



Overview

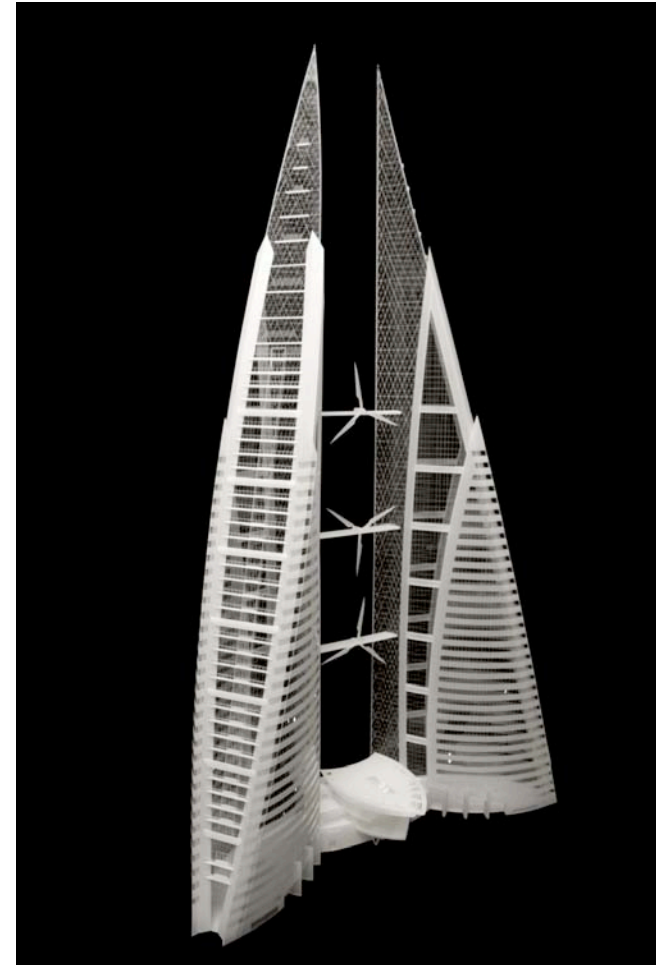
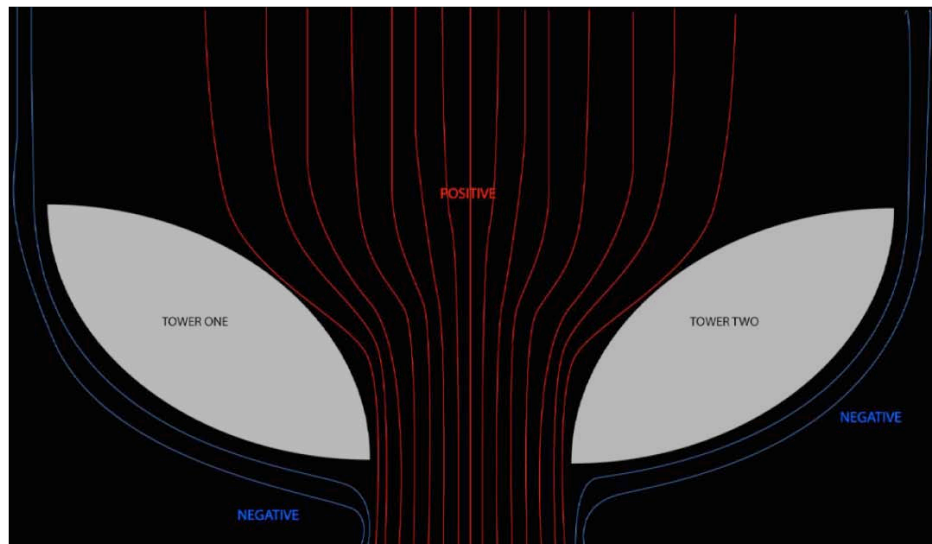
Energy Saving Features

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# Customer Service

## Tower Shape and Curvature



Overview

Energy Saving Features

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# Shortcomings

- Bird Fatalities?
- Accessibility?
- Planning/Design Intentions?
- Certification?



# ATKINS



Overview

Energy Saving Features

Wind Turbines

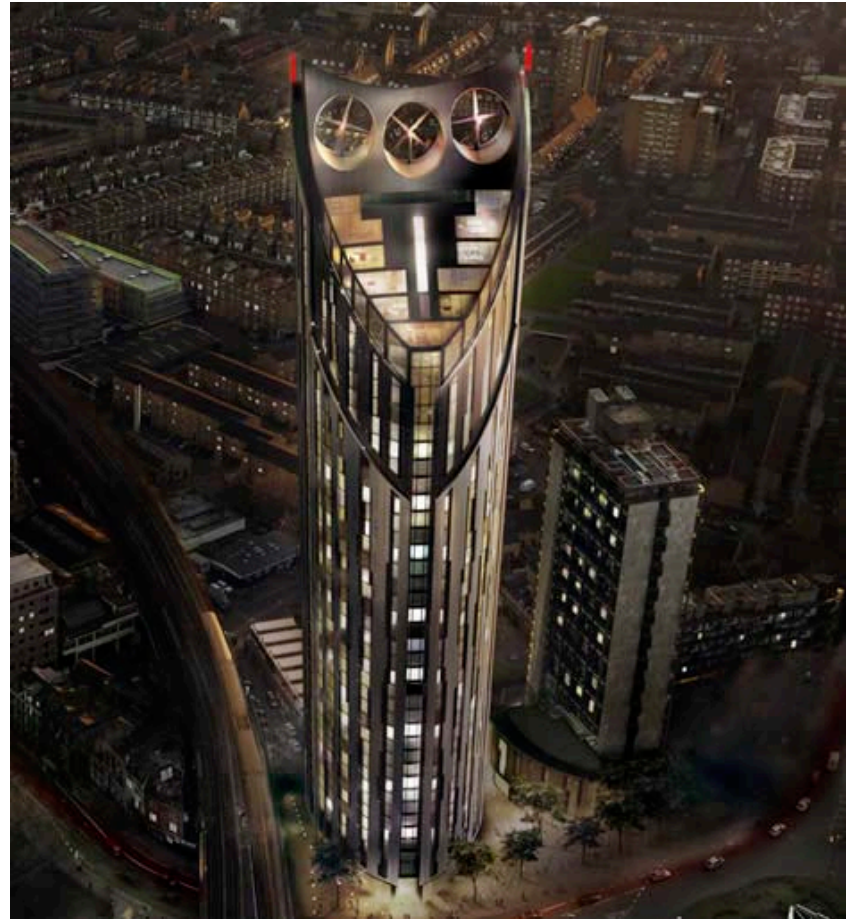
Conclusion

# Shortcomings

- “This building is not intended to be a low carbon emission solution by **European and other world-wide standards,**” and only, “reduce carbon emissions when compared to other buildings in the Middle East.”

- Shaun Killa, principle architect

# Conclusion



Overview

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# Works Cited

Karolides, Alexis. *Green Building: Project Planning & Cost Estimating*. Kinston, MA: construction Publishers & Consultants, 2002.

Killa, Shaun and Richard F Smith. *Harnessing Energy in Tall Buildings: Bahrain World Trade Center and Beyond*. United Arab Emirates, Dubai. 2008

Bahrain World Trade Centre, Manama, Bahrain. *Designbuild-network.com*. <http://www.designbuild-network.com/projects/bahrain/> Accessed 2009.

Bahrain WTC Wind Turbines 2009 NOVA Award Nomination 15. *Bahrain WTC: First Ever Integration of Large-Scale Commercial Wind Turbines into a Building*. <http://www.cif.org/noms/2009/15 - Bahrain WTC Wind Turbines.pdf>. Accessed 2009

BWTC Press Release. *World's First Integrated Wind Turbines Inaugurated in Bahrain*. [http://74.125.93.132/search?q=cache:jKoOl4uYlbYJ:www.cif.org/noms/2009/15\\_Bahrain\\_WTC\\_Wind\\_Turbines.pdf+bahrain+WTC+pdf&cd=4&hl=en&ct=clnk&gl=us&client=firefox-a](http://74.125.93.132/search?q=cache:jKoOl4uYlbYJ:www.cif.org/noms/2009/15_Bahrain_WTC_Wind_Turbines.pdf+bahrain+WTC+pdf&cd=4&hl=en&ct=clnk&gl=us&client=firefox-a) Accessed 2009

Bahrain World Trade Center Press Release. *Bahrain WTC*. Accessed 2009

Bahrain World Trade Center announces plans for kingdom's first intelligent buildings. *MENA Report*. <http://www.menareport.com/en/business/198880>. Accessed 2009

The Bahrain World Trade Center Official Website. 2009. <http://www.bahrainwtc.com>