Hot Topics:
Networking, Security, and Energy
Share Session Boston
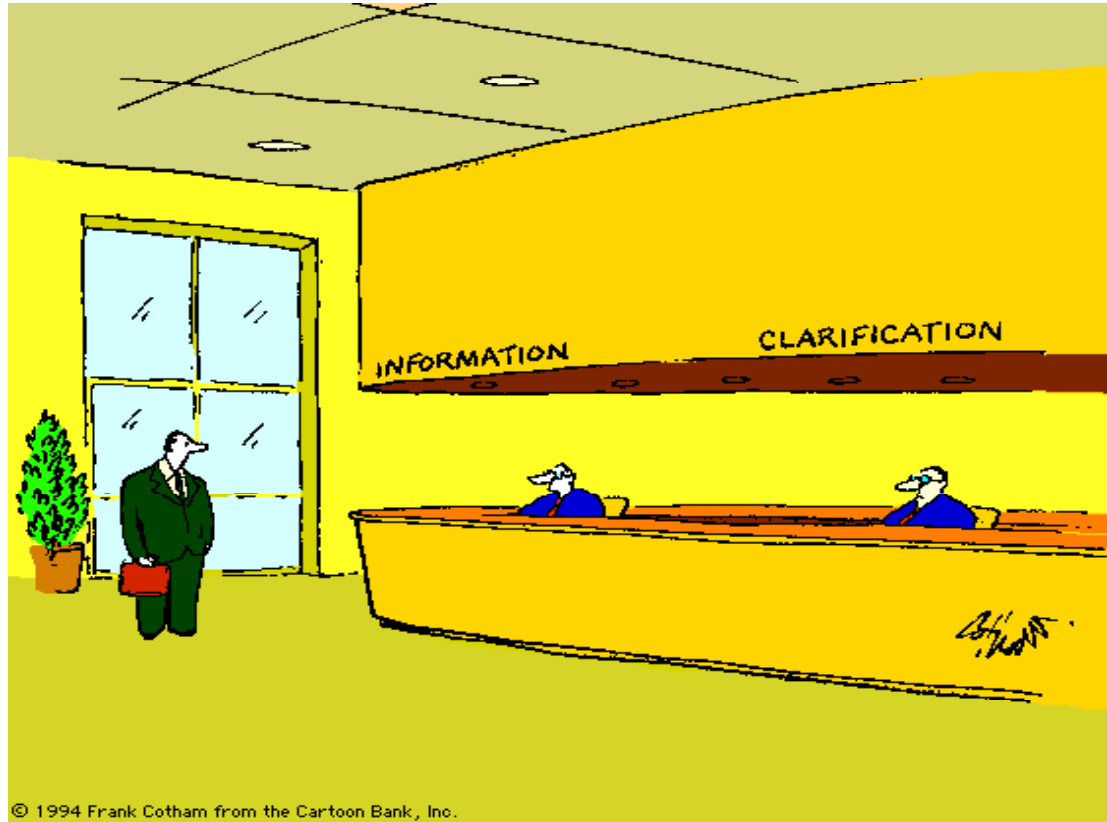
Laura Knapp
WW Business Consultant
Laurak@aesclever.com

650-617-2400
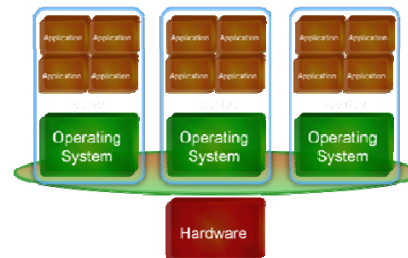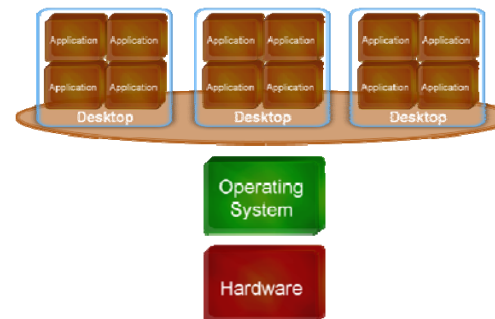
Network

Security

Energy

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New Era of Mainframe Computing
Types if Virtualization

Server/machine

Desktop/Session

Application

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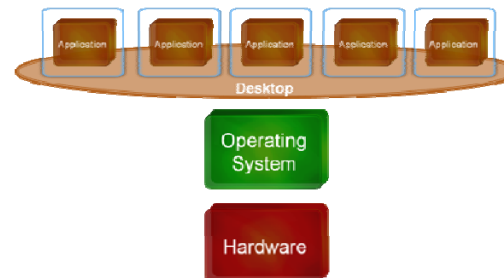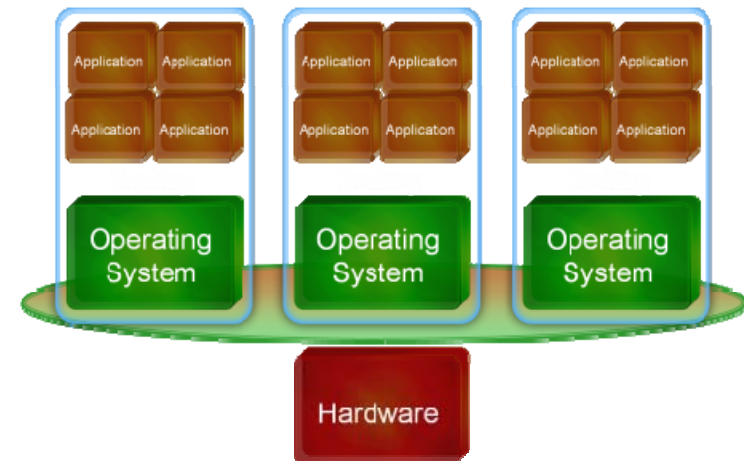
New Era of Mainframe Computing?

Server/machine

Masking of server resources from server users

Consolidation of multiple physical servers onto a single physical base

AKA virtual private servers, guests, instances, containers

Three popular approaches:
   virtual machine (VM) – host guest

   paravirtual machine – variation on VM where the guest OS is modified

   Operating system layer – all guests use same OS as the host – single OS kernel

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New Era of Mainframe Computing?
Desktop/Session

(Aka server side virtualization - virtual desktop – client virtualization)

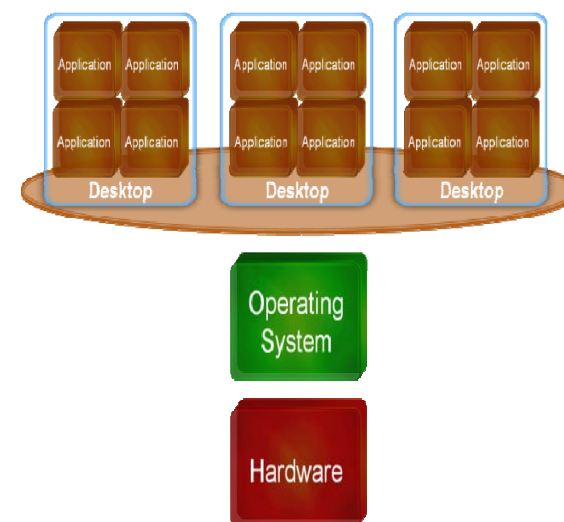**Separates a personal computing desktop from a physical machine**

Uses client-serve computing and virtual desktop interface (VDI)

The desktop is stored on a remote central server

Programs, applications, processes and data are run centrally'

Access from PC, notebook, smartphone, thin client

Security and other items controlled at central location

Providers
Cendio ThinLinc , Citrix XenDesktop , Ericom WebConnect ,
Iland Workforce Cloud , Leostream , Microsoft Remote
,Desktop Services , MokaFive Suite , NComputing ,
NX technology , Pano Logic , Parallels Virtual Desktop ,
Infrastructure , Red Hat, RingCube vDesk , Sun Virtual
Desktop Infrastructure , Systancia, ThinDesk ,
Userful , VMware View , Wyse

New Era of Mainframe Computing?
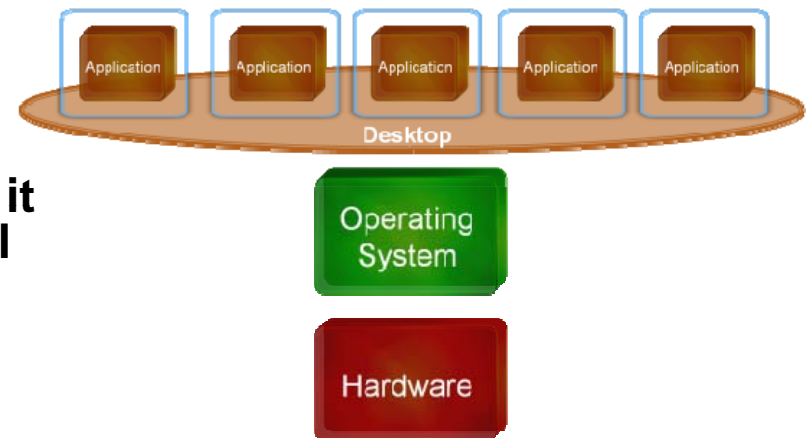### *Application*

Application

Encapsulating application from underlying operating system

  Application is fooled into believing it is directly interfacing to the original OS

Application streaming

  Application code is delivered when first needed

  Normally a lightweight client is used

Products:
Ceedo, InstallFree, Citrix XenApp, Microsoft Application Virtualization, Software Virtualization Solution, Vmware .

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And you thought the FEP was Dead!

In the days of old the FEP offloaded the Communication protocols and let the mainframe process transactions

Today the new FEP will be an application delivery controller offloading computationally intensive tasks

General network optimization

Layer 4 through Layer 7 redirection, and load balancing and failover

TCP connection multiplexing

Server off-load (for example, SSL termination and TCP connection management)

Data compression

Network-address translation

Network-level security functions, distributed denial-of-service protection and server cloaking

Compression

Caching

Application/framework optimization

Application layer proxy, which is often bidirectional and stateful

Content transformation

Adaptive compression

Selective caching of dynamic content

Dynamic use of browser cache

HTML or other application protocol optimizations

Web application firewall

XML validation and transformation

Data Center

Private, Public, Hybrid Clouds
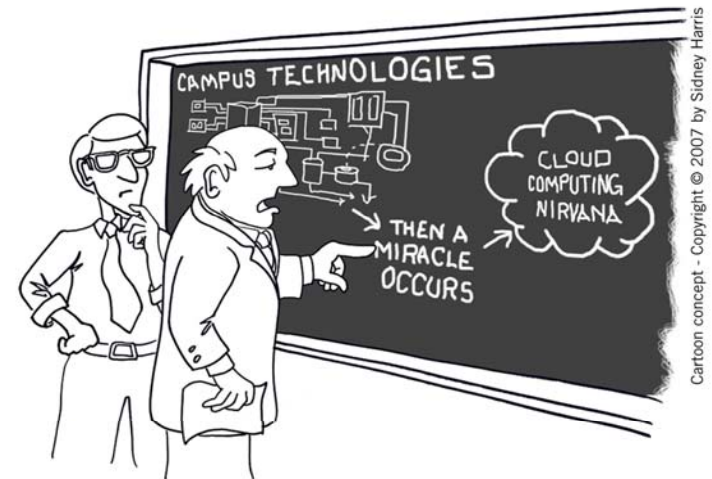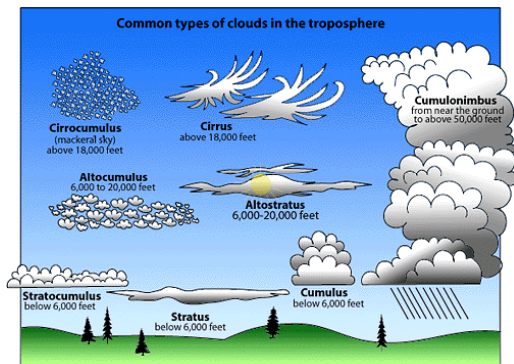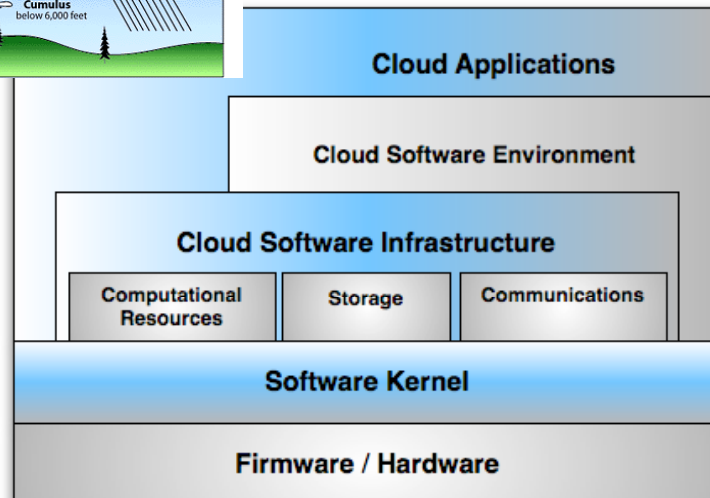
Disaster Recovery

Volcanoes, Outside Smoke and Oil Spills

LEGISLATURE
Lawmakers pass ban on field burning
Democrats muster just enough votes to send the bill to the g...
expected to sign it. The ban takes full effect next year

BY DAVID STEVES
The Register-Guard

Appeared in print: Tuesday, Jun 30, 2009

The Oregon Legislature Monday passed a ban on open field burning on the Willamette Valley floor.

COMPUTERWORLD

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Data Center | Business Continuity | Cloud Computing | Green IT | Infrastructure Man...
NOSes and Server Software | Servers | Virtualization

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News

Add volcanoes to your disaster recovery plan, Gartner says

By Mitch Betts
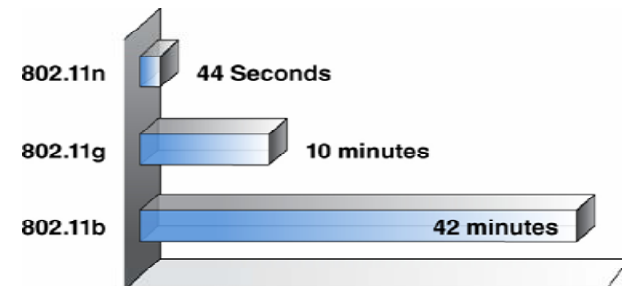May 10, 2010 06:00 AM ET

Comments (2) ✔ Recommended (8) Share

Computerworld - Your business continuity plan covers fires, earthquakes, hurricanes and maybe pandemics. But how about volcanoes?

It's time to update your crisis management plan, according to a report by Gartner Inc., since the ash cloud from the eruption of Iceland's Eyjafjallajokull volcano caused an epic disruption in air travel and stranded thousands of people last month.

"Take advantage of the publicity surrounding this event ... to raise internal awareness of your organization's vulnerability to transportation outages," the Gartner report said, noting that for the past 2,000 years, the larger Katla volcano has always erupted after Eyjafjallajokull.

Network

802.11n reached standard specification
Does this mean the end of Ethernet?

Droid, iPhone 4, iPad, Androiod,
Windows CE

Femtocel

Smart Grid

What will HP do with Palm?

Higher capacity wireless – 4G/LTE

Home entertainment/gaming

802.11n	44 Seconds
802.11g	10 minutes
802.11b	42 minutes

Time to download 30-minute HD television show

Carrier	Application	Band	Bandwidth
Verizon	LTE	Band 13	20 MHz
AT&T	LTE	Band 17	24 MHz
Clear	WiMAX	Band 7	120 MHz

Home of the Future

Microsoft Surface technology
- Camera-based detection and tracking
- Geometric world modeling for context
- Multimodal sensing
- Biometric authentication
- Distributed systems
- Ubiquitous computing

Georgia Tech aware home
- Perceive and assist occupants
- Aging in Place (crisis support)
- Ubiquitous sensing

MIT Intelligent Room
- Natural interaction with room
- Speech-based information access
- Gesture recognition
- Movement tracking
- Context-aware automation
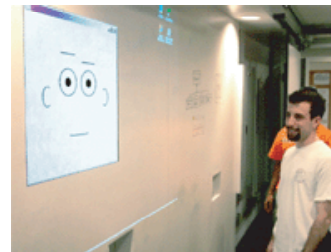
- Optimize inhabitant productivity
- Minimize operating costs
- Improve comfort
- Simplify use of technologies
- Ensure security
- Enhance accessibility
- Optimized climate and light controls
- Item tracking and automated ordering for food and general use items
- Automated alarm schedules to match inhabitants' preferences
- Control of media systems

IPv6

Facebook added IPv6 support (experimental)

IPv6 vs Carrier-grade NAT

D-Day coming for ISP's who have not upgraded – 18 months per John Curran CEO of ARIN

Comcast and Netflix report rise in IPv6 activity

 5550 signed up for Comcast in a matter of days (and some switched ISPs to participate)

 Comcast IPv6 traffic grew 500% in 45 days

Of the top 100 web sites 18 now are IPv6 accessible (Google/Yahoo/

Facebook Adds IPv6 Support

Facebook said Thursday that it was offering "experimental, non-production" support for IPv6, the long-anticipated upgrade to the Internet's main communications protocol.

By Carolyn Duffy Marsan on Fri, June 11, 2010 ☐ Leave a comment

Tweet it!

Network World — Facebook said Thursday that it was offering "experimental, non-production" support for IPv6, the long-anticipated upgrade to the Internet's main communications protocol.

Email

Google leading, but where do other Web giants stand on IPv6?

IPv4 address utilization: 2000 vs. 2010
Millions

100% = 3,706,650,624 IPv4 addresses

Available: 2,092 (2000), 722 / 2,985 (2010)

In use: 1,615 (2000)

January 1, 2000   January 1, 2010
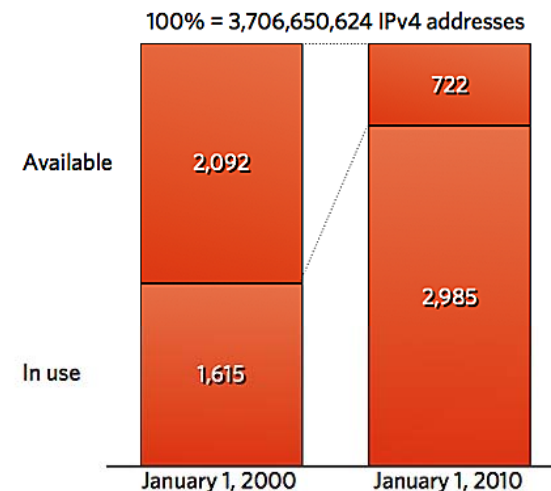
WAN

Server based desktop virtualization needs between 20K and 30Kbps per simultaneous user

VDI user can require at a minimum 200Kbps

VDI needs enhanced compression techniques including bitmap image, screen refresh, and data compression….no one wants a jerk mouse…WAN needs improved compression techniques to overcome WAN latency issues

What about 3D apps, graphic intensive apps and audio/visual? PC-over-IP protocol (teradici)

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Government

US

$795M in Broadband Subsidies

The U.S. National Telecommunications and Information Administration (NTIA) and the U.S. Rural Utilities Service (RUS) will officially announce awards for 66 new broadband projects that will touch all 50 states

DARPA – quintillion computers
((1,000,000,000,000,000,000) calculations per second.)

Finland
1Mbps broadband becomes a legal right... in Finland

UK
77% Brits unhappy with broadband speeds

Network

Security

Energy

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Cloud Computing

Secrecy of providers raises concerns

"Businesses and industry analysts are getting fed up with this cloud computing version of "don't ask, don't tell," where non-disclosure agreements (NDA) dominate, questions aren't answered, and data center locations and practices are treated like national security secrets"
Read more: http://www.sfgate.com/cgi-bin/article.cgi?f=/g/a/2010/07/06/urnidgns852573C40069388000257758003E5DC7.DTL#ixzz0tUq3MfkB

Q: Rate the challenges/issues ascribed to the 'cloud'/on-demand model
(1=not significant, 5=very significant)

Challenge	% responding 4 or 5
Security	74.6%
Performance	63.1%
Availability	63.1%
Hard to integrate with in-house IT	61.1%
Not enough ability to customize	55.8%
Worried on-demand will cost more	50.4%
Bringing back in-house may be difficult	50.0%
Regulatory requirements prohibit cloud	49.2%
Not enough major suppliers yet	44.3%

Source: IDC Enterprise Panel, August 2008 n=244
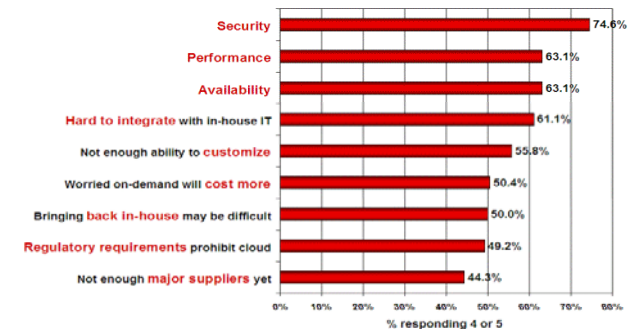
Security as a SAAS

Strong authentication is available only through delegation

Federated identity generally not available

Delegated authorization generally not available

Generally weak credential management – of weak credentials

No audit standards specific to the 'cloud'

Not operational, procurement (e.g., FAR), or security

SAS-70 Type 2 is an audit format – not specific audit criteria

Compliance: so-called Patriot Act Problem

   Location, location, location

   Issue is assurance of compliance (e.g., data lineage – let alone data providence)

Cyber infrastructure visualized
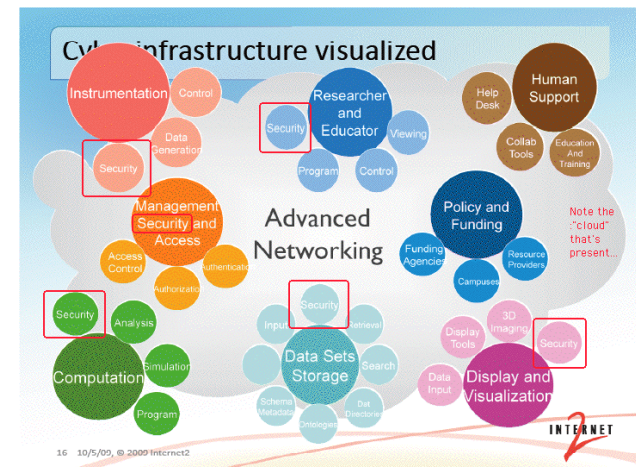
Data over Power Lines

PLC (also known as BPL) is a technique for sending high speed data through the medium voltage power distribution network
The idea of sending data through the power distribution network is not new

- Utilities use LF for network control and telemetry (typically < 0.200 MHz)
- Schools have used carrier current system for "campus radio" systems that operate in the AM band (0.530 – 1.700 MHz)

What makes BPL different is that it uses frequencies between 2 and 80 MHz
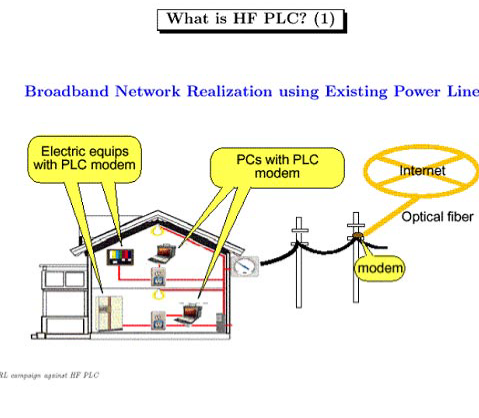
Not sure the electric companies understand the potential

What is HF PLC? (1)

Broadband Network Realization using Existing Power Line

Social Networking

Suspicious Facebook app attracts newly 300,000 fans

DefCon contest

Malware flames use natural disasters

Social Networking – Fake Pages
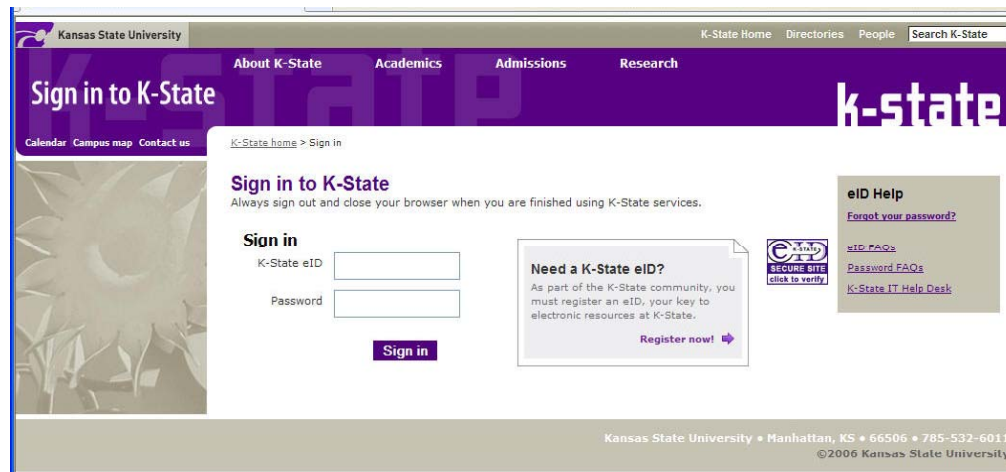
Fake SSO web page
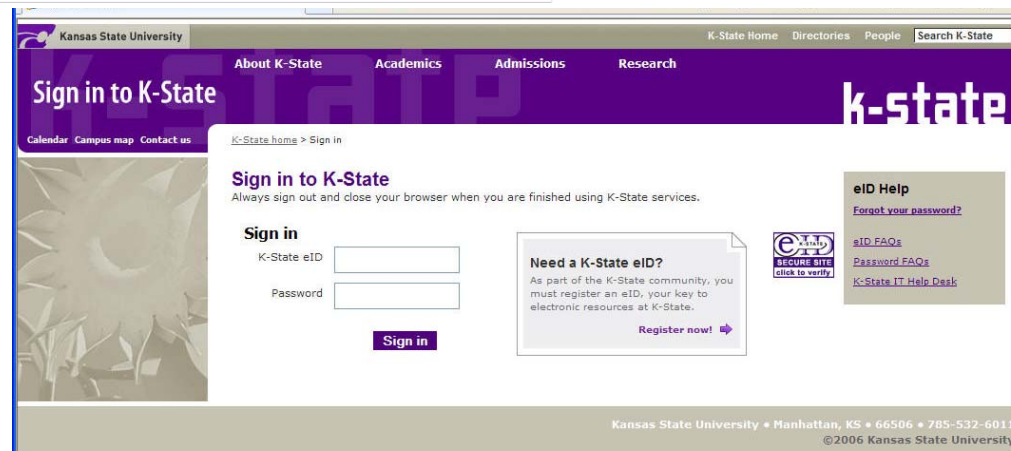
Real SSO web page

Social Networking – Tiny URL

Welcome to TinyURL!™

Are you sick of posting URLs in emails only to have it break when sent causing the recipient to have to cut and paste it back together? Then you've come to the right place. By entering in a URL in the text field below, we will create a tiny URL that **will not break in email postings** and **never expires**.

Enter a long URL to make tiny:

[   ] [Make TinyURL!]

Custom alias (optional):

http://tinyurl.com/ [   ]
May contain letters, numbers, and dashes.

An example

Turn this URL:

http://rover.ebay.com/rover/1/711-53200-19255-0/1?type=3&campid=5336224516&toolid=10001&customid=tiny-hp&ext=unicycle&satitle=unicycle

into this tinyURL:

http://tinyurl.com/unicycles

What is the TINYURL really hiding?

Social Networking – Who Can you Trust?

Major *ad networks* (aka "ad aggregators") affiliated with Google (e.g. Doubleclick.com), Yahoo (yieldmanager.com), Fox and others, covering more than 50% of online ads, have been infiltrated with "poisoned ads" containing malicious code (Source: Avast!)
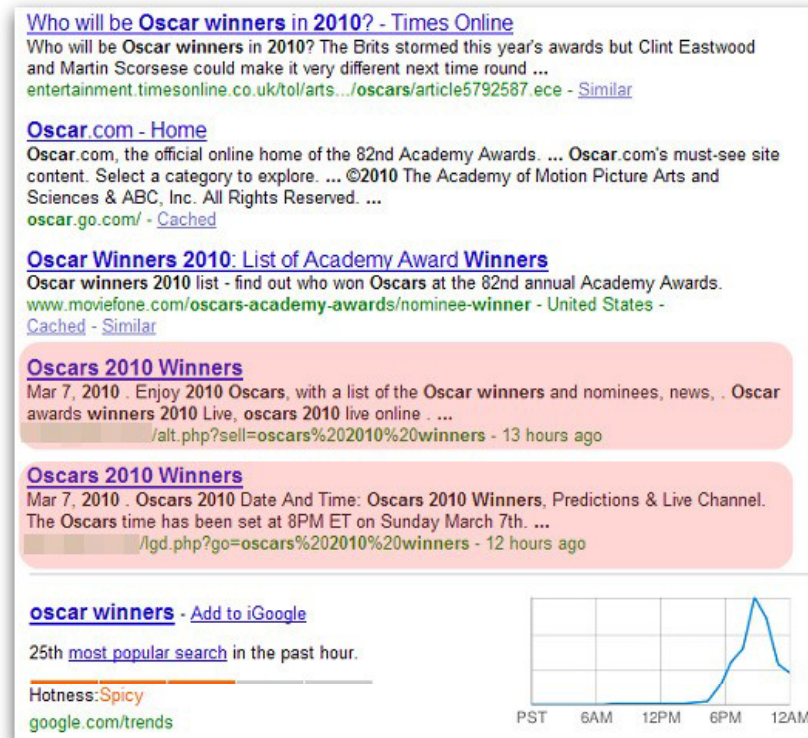
Social Networking – Blackhat SEO

Search for
"Oscars 2010 winners"

Malicious pages
that infect with
FakeAV scareware

13% of Google searches for popular or
trendy topics yield malicious links

Source: Sophos security blog March 8, 2010

Data Center/Corporate

Honeypots for hacker

Apple App Store hacke

YouTube hack

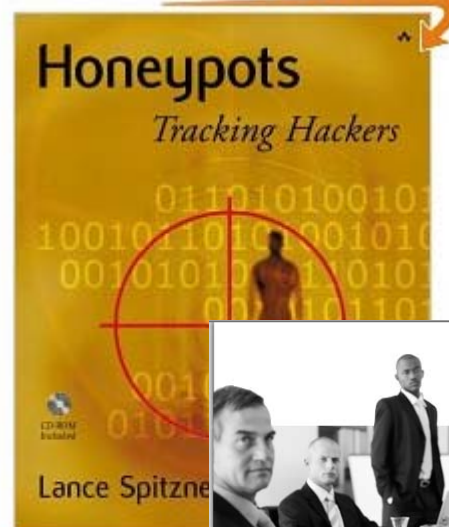**Trojan targets UK bank**

Cyber liability insuranc

Tabnapping on the increase

iPhone and iPad in the enterprise

Legal Issues

Anonymity Online and Unwanted Content

Privacy

Social Media

Eavesdropping and Unauthorized Access

Global Internet Censorship

Hardware Hacking

Location Tracking

Social Networking Privacy

Cybersecurity and Patriot Acts

Web Browser Privacy

Fair Use of Trademarks

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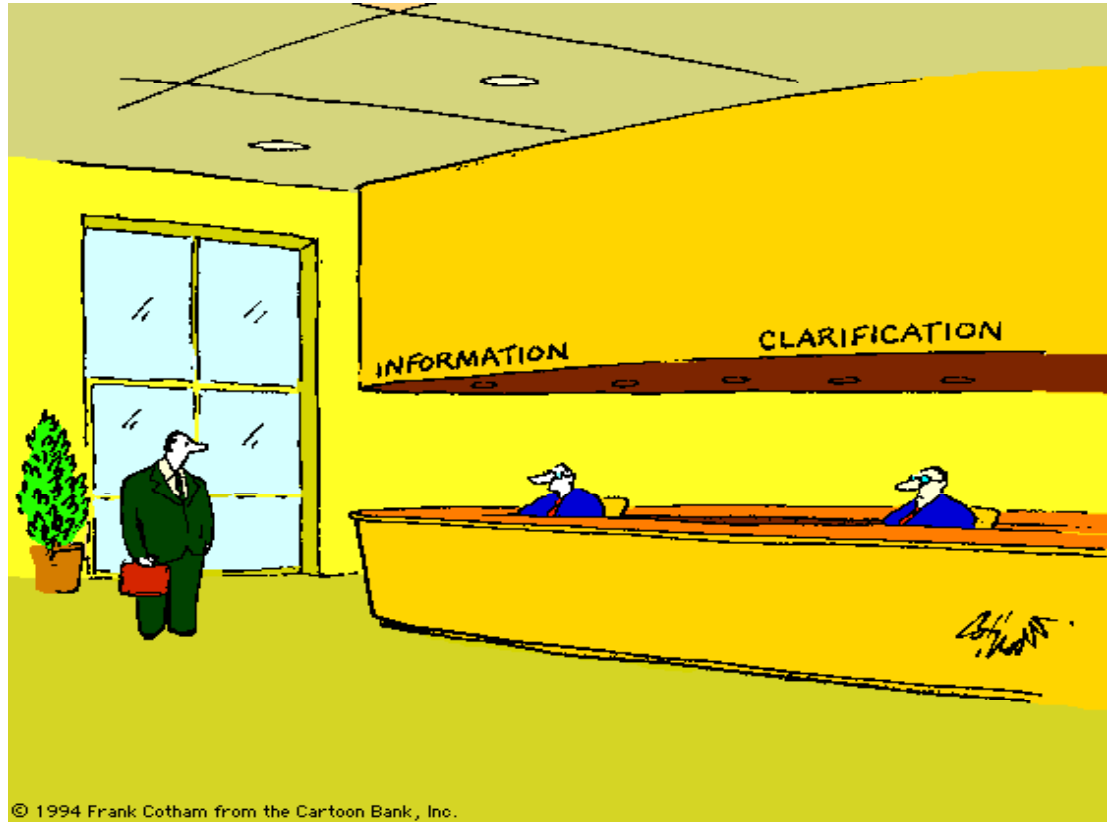
Solar Cells

- The Sun will burn for 4 - 5 billion more years

- Solar technologies are quiet, safe, use no fuels, contain no moving parts, and require little maintenance

- They allow local, decentralized control over power

- Developing nations can use solar cookers, instead of gathering firewood

- **Net metering** = PV owners can sell excess electricity to their local power utility

- Solar power does not emit greenhouse gases and air pollution

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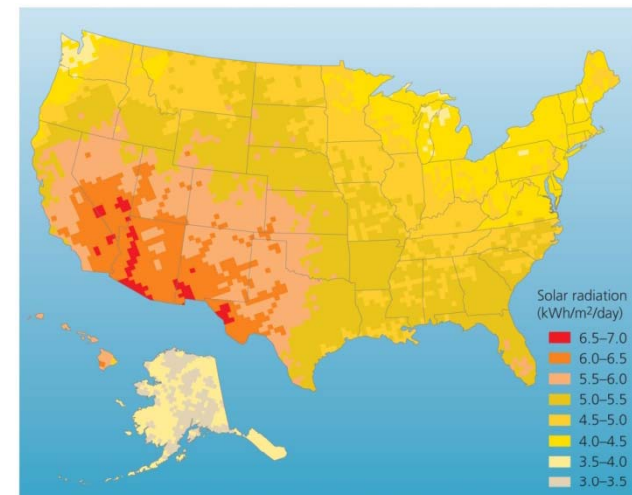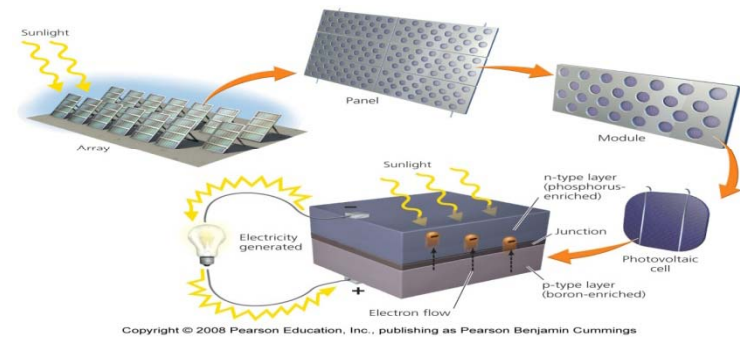
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Fuel Cells
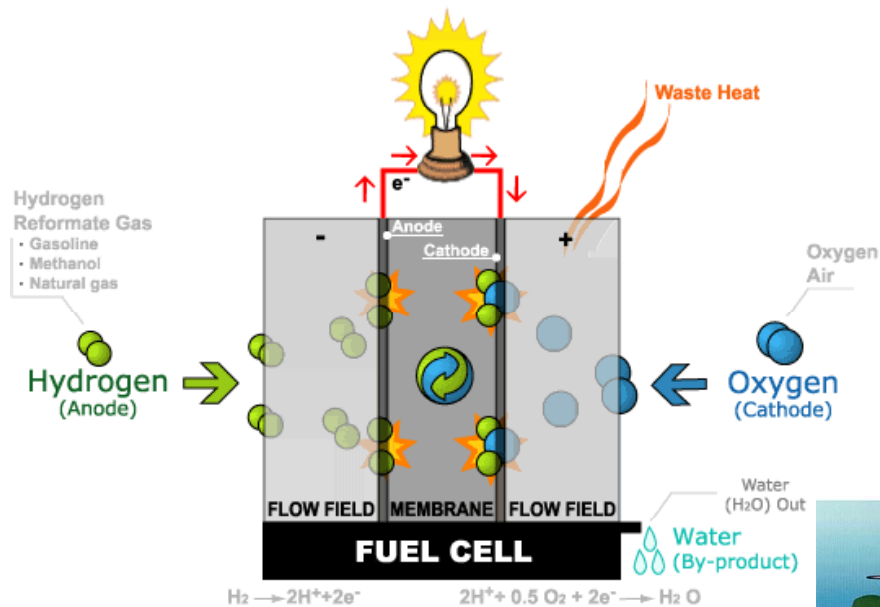
Bloom box in the media
Clients include :
Google, FedEx, eBay, Walmart,
Bank of America, Coca Cola

Electricity costs 8-10 cents/kWh
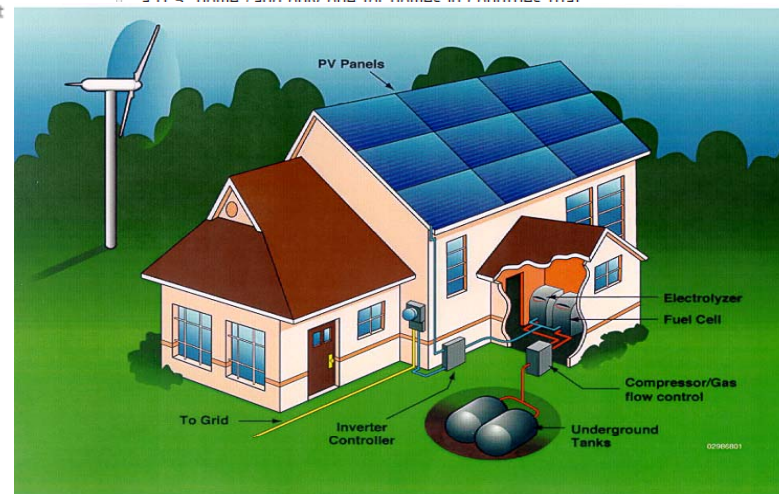
Ocean Renewable

Tide , wave, and currents

Absorb energy equivalent to 250 barrels of oil each day

Ocean current turbines under development (think the size of the oil platforms)

Bora Bora uses cold sea water based air conditioning

No lubricants and emit nothing into the water

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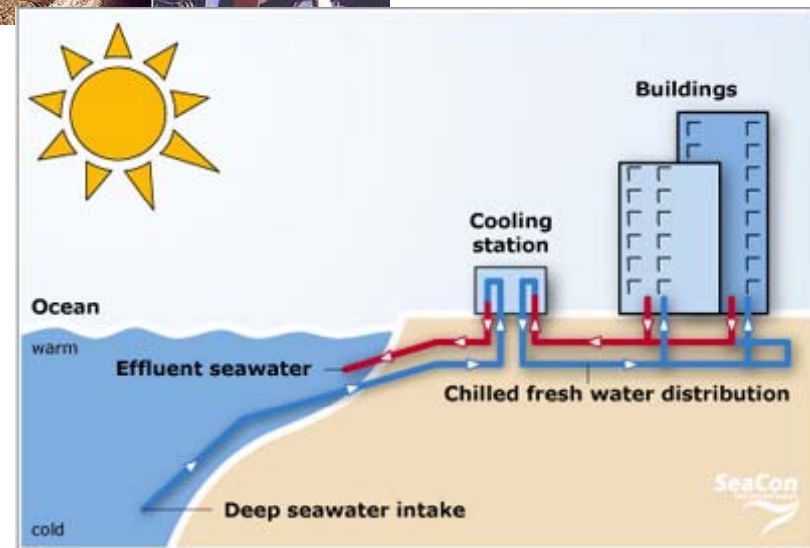
Wind Power

• Wind blowing into a turbine turns the blades of the rotor, which rotate machinery inside a compartment (**nacelle**) on top of a tall tower

• Towers are 40 - 100 m (131 - 328 ft) tall
  • Higher is better to minimize turbulence and maximize wind speed

• New quiet turbines in test for homes

• Very small turbines in test for residential use

Wind power density
at 10 m height
(watts/m²)
  400–1,000
  300–400
  250–300
  200–250
  150–200
  100–150
  0–100

(a) Annual average wind power

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Gearbox
(increases rotational speed of blades)

Generator
(produces electricity)

Blades

Tower

Nacelle
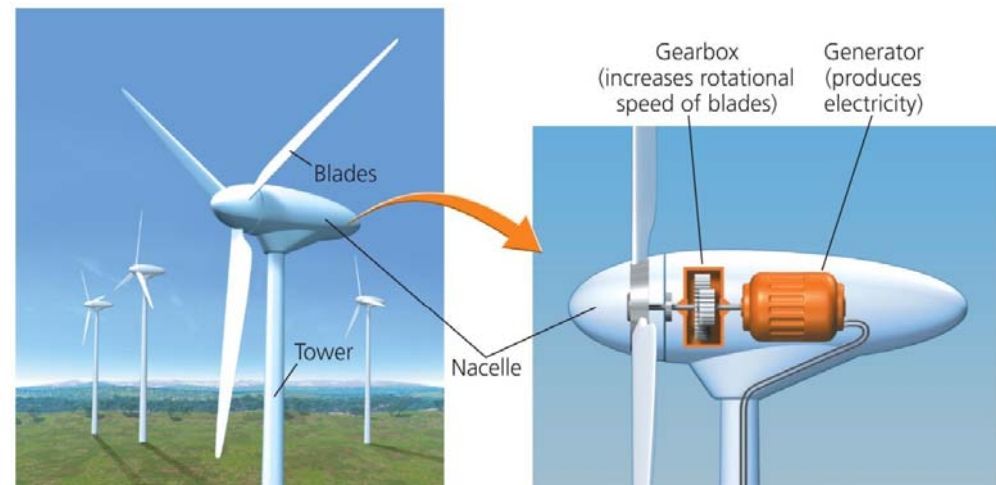
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GEOTHERMAL Energy

- Currently, geothermal energy provides less than 0.5% of the total energy used worldwide
  - It provides more power than solar and wind combined
  - But, much less than hydropower and biomass
- Geothermal energy in the U.S. provides enough power to supply electricity to more than 4 million people
- The U.S., Japan, and China lead the world in geothermal power use
- May not be sustainable
- Corrosion from salts and minerals remains a problem

(a) Geothermal energy

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Waste

Denmark Vestforbraending plant in Glostrup uses district heating for residential and commercial buildings
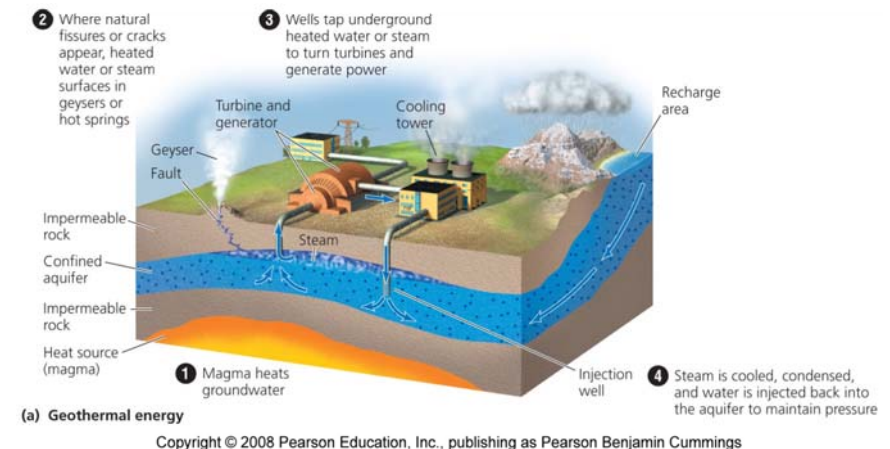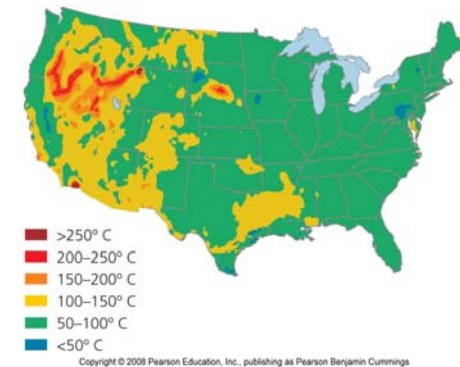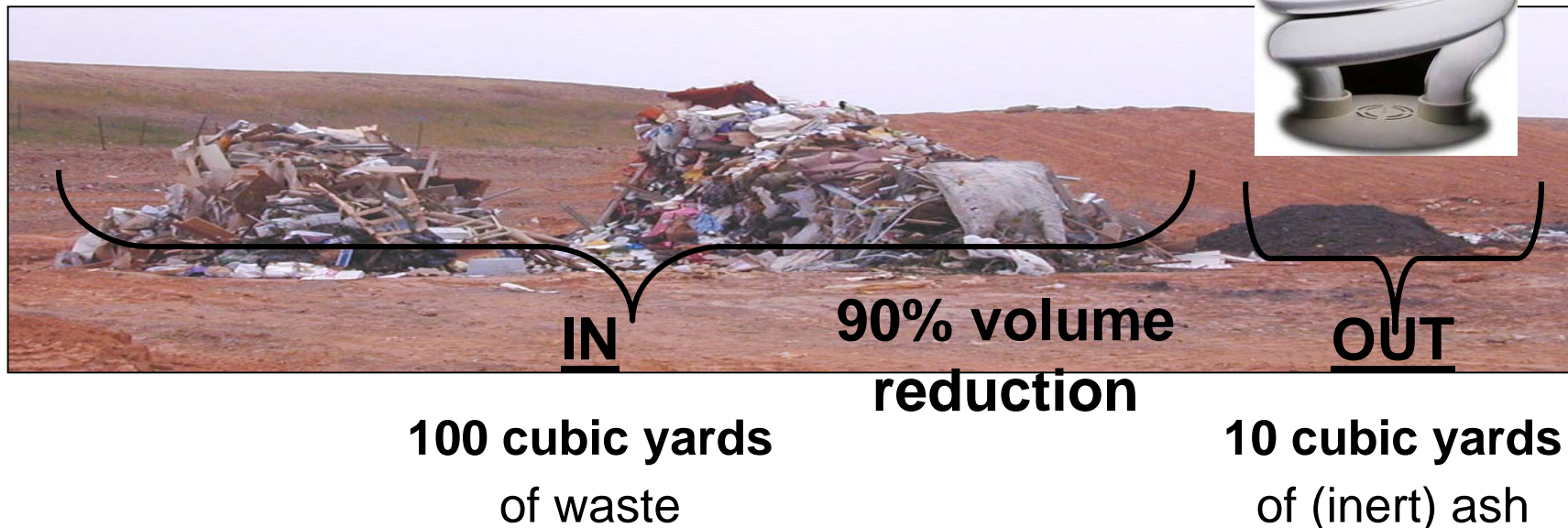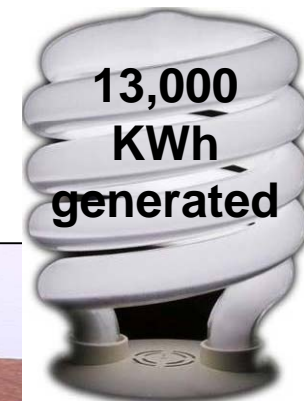
Factors that are making local governments look at WTE:

Energy Prices, Metal Recovery, Renewable incentives, Net-GHG reducer, Long-term price stability, Control over waste stream

13,000 KWh generated

IN

90% volume reduction

OUT

100 cubic yards
of waste

10 cubic yards
of (inert) ash

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Biofuels

- **Biodiesel from vegetable oils**
- **BioGas from starch and sugars from plants like sugar cante, corn, etc**
- **Algae "green gold" with 30 times more oil per acre than current crops**
- **Convert methane wastes from farms, landfills, sewage treatment plants**
- **NC Zoo uses Biodiesel with restaurants providing about 1500 gallons of used oil………..meeting 40% of Zoo fuel demand**
- **Hawaii**
  - **Biofuel production from leftover sugar cane crop**
  - **50 cent per gallon tax on gasoline move to electric cars**
  - **As of 2010 any new HW heaters must be solar**

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Enzymatic Biofuel (E. coli) cell

- **DARPA gave $6M to Ginkgo BIOworks to develop iso-octane from E. coli**
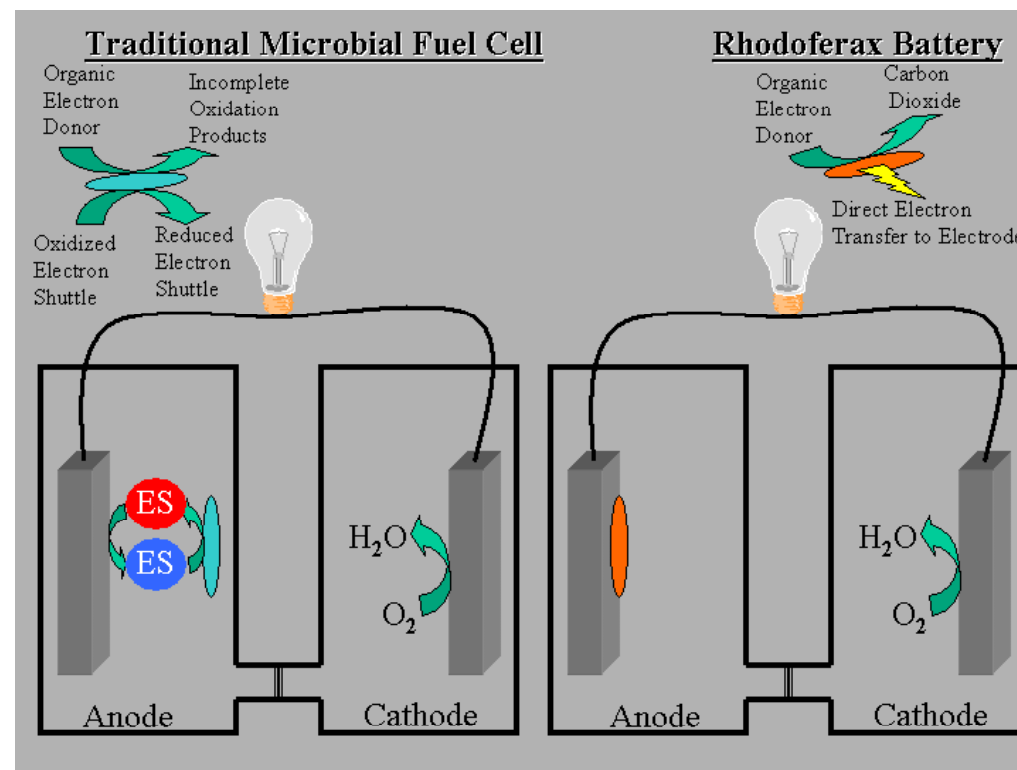
Hot Batteries

PolyPlus Batteries Co got $5M to develop Lithium-air batteries

- **Hot batteries:** Lithium air batteries capable of powering a car for 500 miles on a single charge - a five-fold increase over current plug-in batteries are a hot research topic. Rece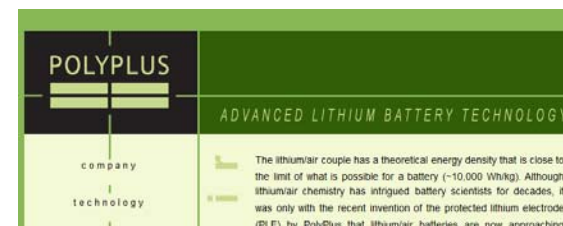ntly the PolyPlus Battery Co. got nearly $5 million from the U.S. to develop lithium-air batteries based on proprietary protected lithium electrodes and Corning glass and ceramics. The U.S. Department of Energy and IBM this year teamed up to let Big Blue and a team of researchers use the Department of Energy's supercomputers to develop new materials required for a lithium air battery. IBM is a big proponent of the oft-controversial lithium-air battery. The controversy surrounds the fact that they tend to be expensive and use an energy-dense, highly flammable metal to react with the readily available oxygen in the air.

POLYPLUS

ADVANCED LITHIUM BATTERY TECHNOLOGY

company

technology

The lithium/air couple has a theoretical energy density that is close to the limit of what is possible for a battery (~10,000 Wh/kg). Although lithium/air chemistry has intrigued battery scientists for decades, it was only with the recent invention of the protected lithium electrode (PLE) by PolyPlus that lithium/air batteries are now approaching

QUESTIONS?

Vielen **Dank**

Köszönettel

Obrigado!

Díky

Gracias

Bedankt

धन्यवाद

Ευχαριστώ

תודה

THANK YOU

Merci

Hvala

Teşekkürler

ขอบคุณ

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Monday, 3:00 am - 4:00 am: Introduction to TCP/IP
Tuesday, 11:00 am – 12:00 pm: What every network manager needs to know about security
Tuesday 1:30 pm – 2:30 pm: Diagnosing Mainframe Network Problems with Packet Trace
Wednesday 11:00 am – 12:00 pm: Cloud Computing Environment
Wednesday 1:30 pm – 2:30 pm: Hot Topics in Networking and Security
Wednesday 4:30 pm – 5:30 pm: Wireless Security Challenges
Thursday 11:00 am – 12:00 pm: Virtualization – The Evolution of the Data Center