



**Half Day Seminar on
EARTH DAY
April 25, 2015
Institute of Engineers (IEP)
Karachi Chapter, Pakistan**

Environment Friendly Electronics

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Outline

- Environmental impact of Electronic Devices / Consumer Electronics
- Eco-Friendly Electronics
- Green Energy
- E-waste
- Recycling the E-waste
- Conclusion

Impact of Electronic Devices / Consumer Electronics

Plus	Minus
<ul style="list-style-type: none">• Efficient• Fast• Convenient /easy to use• Comfortable• Compact• Advanced day by day• Cost effective• Multitasking• SMART Devices/System	<ul style="list-style-type: none">• Environmental impacts in manufacturing<ul style="list-style-type: none">• Energy consumption• Human exposure to chemicals• Energy consumption during use• Environmental impacts at disposal<ul style="list-style-type: none">• difficult disassembly• Toxics (Lead, mercury, cadmium)• Dumping in poor countries

Eco Friendly Electronics

- Reduction in environmental hazards of Electronic systems
 - Toxics reduction
 - Improving Energy Efficiency
 - Longer lifecycles
 - Recycling the E-waste

Green Energy

- Energy Efficient Circuit designing
- Green Energy Generation
- Green Energy Storage
- Energy Harvesting
- Photovoltaic Devices
- Thermoelectric Devices

Green Energy Generation

➤ E Turbine on the Highways

- wind generation system due to air movement caused by passing traffic to produce and accumulate energy
- generated energy from air movement - transferred to a main battery for storage as well as source
- Stored energy can be used for
 - street and road lighting
 - information panels
 - emergency phones



Green Energy Generation

➤ Wind Turbines

- cause no pollution
- Require small land area
- But wind is unpredictable
- birds can fly into wind turbines and get killed



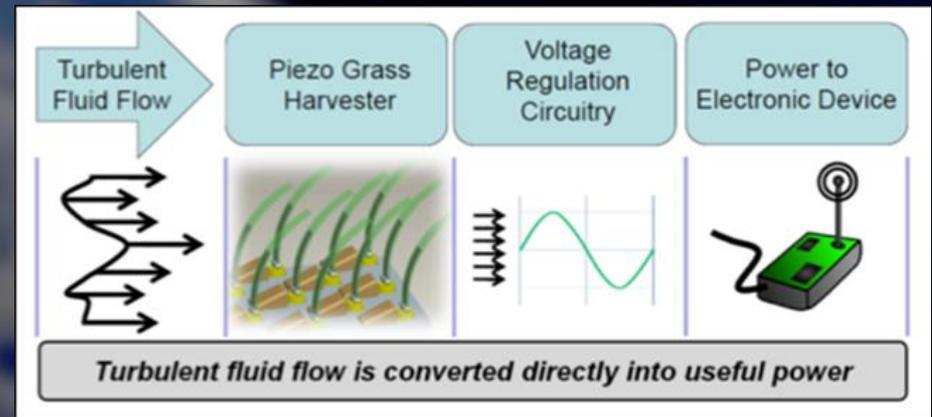
➤ Solar Energy

- cause no pollution
- Sun is everywhere (in Pakistan)
- Sun shines more energy in one hour than the total annual requirement of the world – rich and poor both included



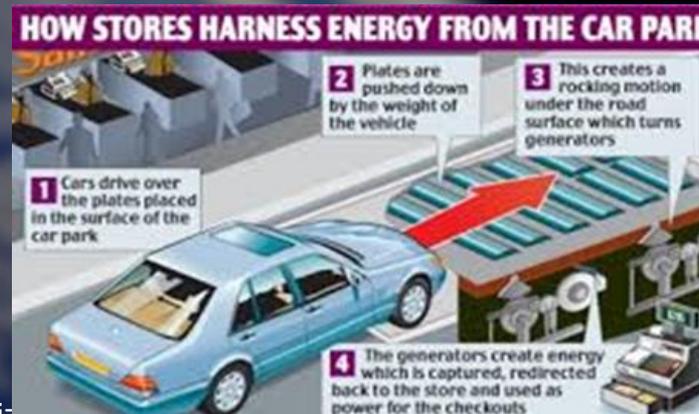
Green Energy Harnessing /Harvesting

- Using low velocity highly turbulent water flow environments
- Electrical power generated directly from these vibrations via the piezoelectric effect
- Energy conversion from movements



Green Energy Harnessing /Harvesting

- Through revolving door - powered by people
- In car parking and highways
- Through walkways



- Concept of smart cities of future
- The bottomless power generation from various sources of ambient power
 - Motion(Linear motion converters)
 - Light (solar cells)
 - Temperature differentials (thermoelectric converters)



Eco-Friendly Consumer Electronics

➤ Eco-friendly TV

- incorporates manual and automatic energy saving features
- less power consumption when compared to the same size LCD screen



Eco-Friendly Consumer Electronics

- Nokia's Evolve phone uses more recycled plastic and has a highly efficient charger



Eco-Friendly Consumer Electronics

- macbook air
 - Apple's Mac Book Air eliminates the use of toxic mercury and arsenic to raise the bar on toxics reduction



E-waste

- Discarded or Broken Electrical and Electronic Goods appliances
 - Computer (All peripherals)
 - Mobile phones
 - Television
 - Radio
 - Food processors
 - DVD player
 - CD player
 - Printed circuit boards
 - Cables / Switches
 - Integrated circuits

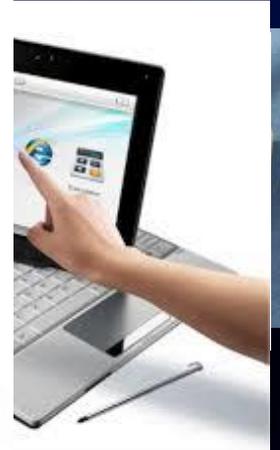


Generation of E waste

The rate at which Electronic Goods are being disposed of is skyrocketing day by day.



- Advanced
- Falling
- Advanced
 - Life
 - Fash
 - Statu
- Mishan
- Not fit f



Disposal of E-Waste

Export of e-waste



Disposal of E-Waste

➤ Dumped in **Asian** and **African** countries.

➤ **E-waste Hotspots**

- China
- India
- Pakistan
- Nigeria
- Ghana
- Thailand
- Indonesia etc.



E-waste hubs in Pakistan

➤ Identified e-waste hubs in Pakistan

- Karachi
- Lahore
- Peshawar
- Faisalabad
- Rawalpindi
- Kamonke
- Gujranwala



Reduce – Reuse - Recycle



Re-use

- Second hand Products- Devices in good working condition
 - can be cleaned up
 - repaired in order
 - sold to the market
- Only 2 – 3% computers are reused.



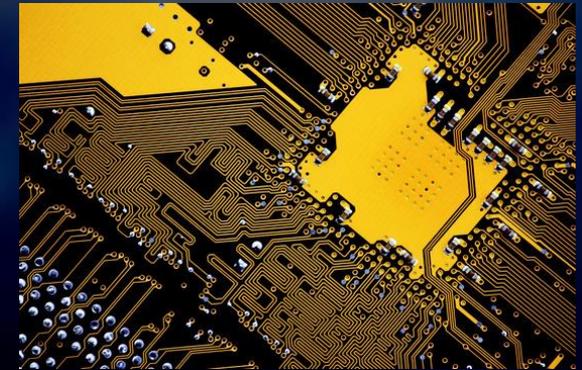
Recycling the E-waste



Recycling- Metal Extraction from E-waste

➤ Hardware of computers, mobile phones, music players, televisions and camera contain metals

- lead (Pb)
- copper (Cu)
- gold (Au)
- aluminum (Al)
- silver (Ag)
- palladium (Pd)
- ferrous metals



Recycling- E-waste

- Manual breaking / dismantling , Sorting, grinding , separating smelters.
 - Highly polluting (ground ,water, environment)
 - open burning of wastes
 - Use of backward technologies
 - Unsafe processes
 - Exposure to toxic gases and metals
- Children as young as 12 years work there



- lack of adequate infrastructure
 - open plots
 - big houses in congested area
- wastes are buried - landfill
- burnt in the open air
- dumped into water (near Lyari river)
- Causes serious health and pollution problems
- damages public health due to the hazardous Chemicals cadmium, mercury and Lead



Harmful Health Effects of eWaste



vomiting



fatigue



muscular pain

headache

sleeplessness

lung cancer

abdominal pain



appetite loss



diarrhea

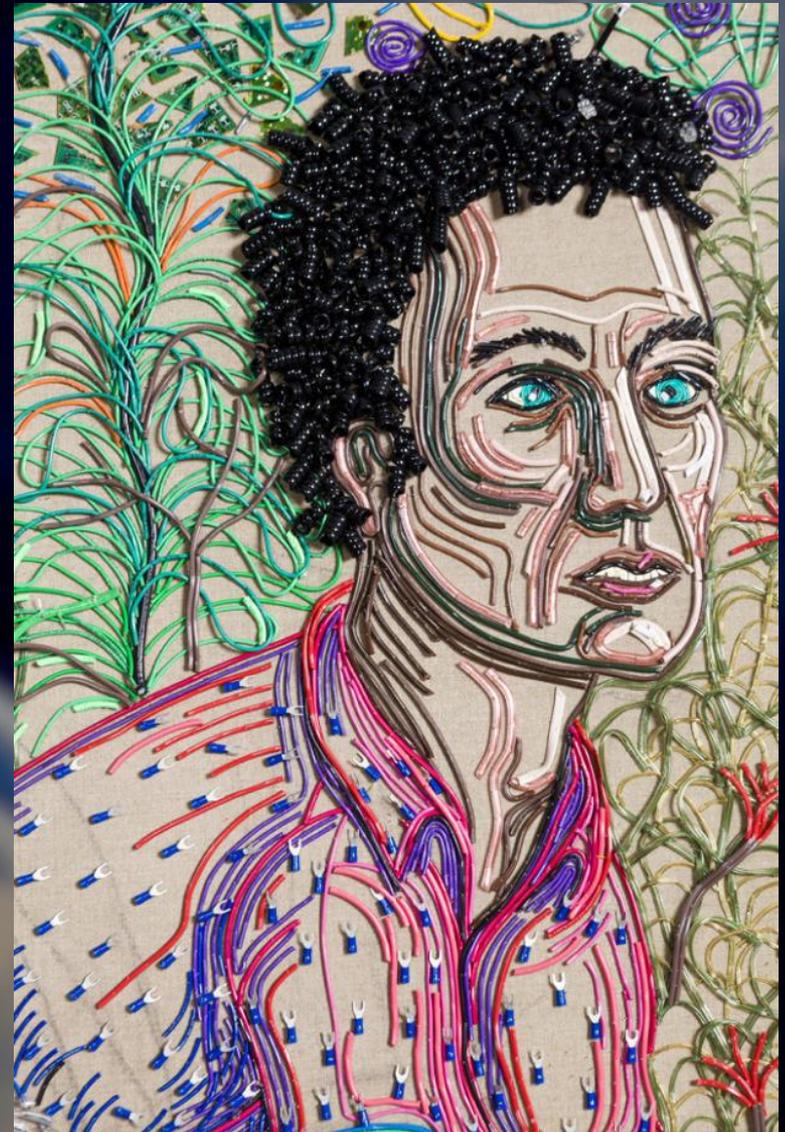
Re-using the Digital Junk



Re - using E-waste



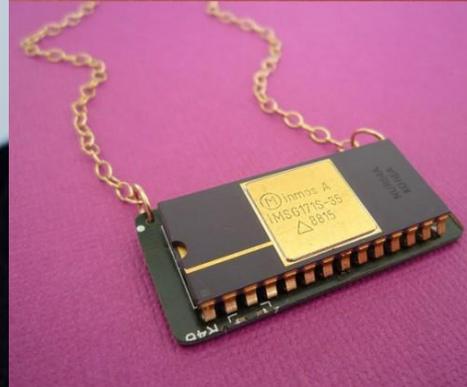
Re - using E-waste



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ARTS & CRAFTS #279 ,January 8, 2014, Painting with Reused Electrical Cables – by Federico Uribe

E waste Jewellery



Re - using E waste

- Making of Scanner from LCD and other parts from trash



Re – using E waste

- Making of Dye sensitized Solar cells from LCD display trash





THANK YOU

