



# Human Systems

How We Depend on Them

# Human Systems

- Our human systems depend on natural systems.
- We make use of natural systems to meet our “needs” and “wants.”
- We are the only species on earth that can manipulate our environment.





# Human Systems



- We use technology to harvest natural resources.
- We clear forests to build farms.
- Create chemicals to control pests.
- Build transportation routes to make connections between places.
- Build dams to reduce flooding and create hydro-electric power.

# Characteristics of Human Systems

- o Are interconnected in a complex network of relationships.
- o Depend on natural systems.
- o Can be affected by outside events and influences.
- o Are not well understood by humans.
- o Operate on shorter timelines than natural systems.
- o May recycle wastes but usually end up with some, and more often with a lot of, harmful waste.
- o Display **synergy**.



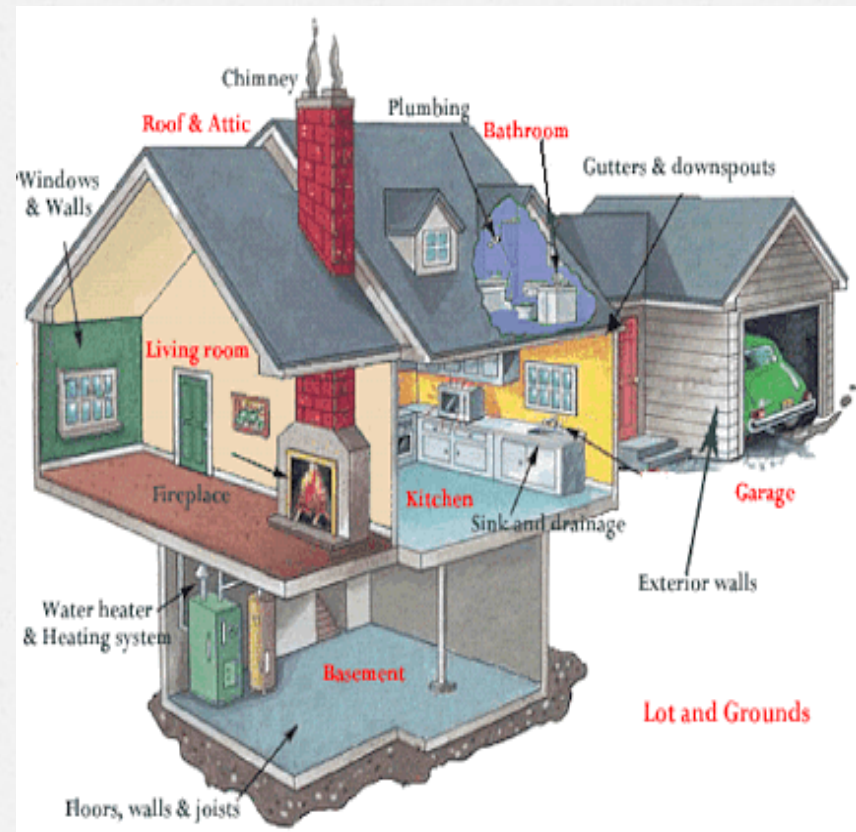
# Synergy

- o The phenomenon wherein the set of several elements that produces superior effect these components alone.



# Example:

- o A house is an example of the synergy effect.
- o All parties work (together) to provide a secure and comfortable shelter.







**Types:**

# 1. Communication:

## Satellite:

- o First country in world to build non-military satellite.
- o Help Canadians communicate with one another via radio and television.





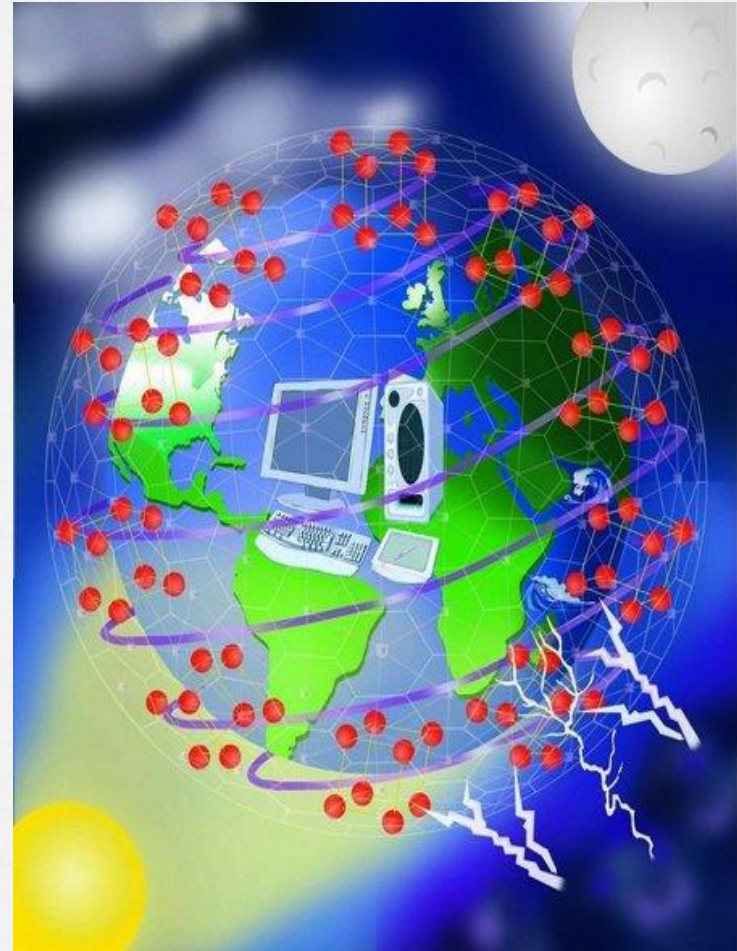


## Cell Phones:

- o Early users of wireless technologies
- o Wireless saves the trouble of filling our country with wires and poles for communication
- o People choosing to have cell phone as their main phone
- o Centre of entertainment

## Internet:

- o Used in daily lives of Canadians.
- o World of information
- o Email and texting is common way to communicate.
- o More affordable way to stay connected to people.
- o Used in educational settings (smart board)





## Internet Continued:

- Blogs (on line journals) (audio files) and podcasts are ways we communicate
- Banking moved online (President's Choice Financial)
- Video conferencing among groups of people
- Changing the world of work (people working from home)



## 2. Transportation:

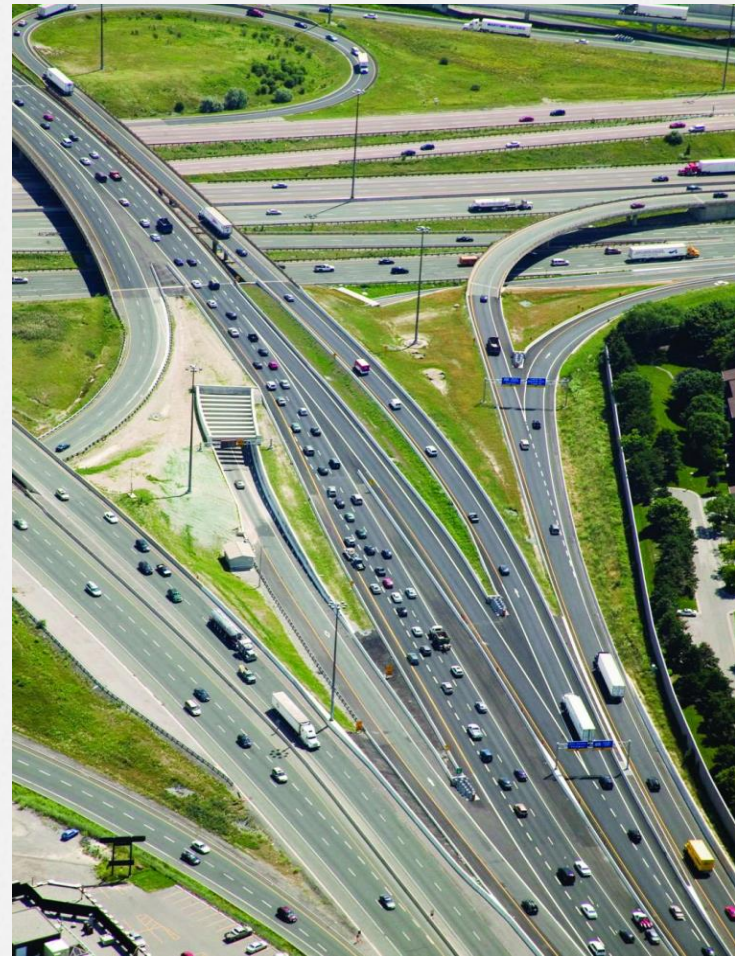
- o The interconnected networks of roads and the bus, train, airline, and cycling routes that link you with other people and places





## Roadways: (figure 8.22)

- o Cars single most popular form of transportation
- o Not enough people to warrant things like high speed trains-too expensive
- o Highway 401 busiest highway in North America (450 000 vehicles a day)



- o Problems with gridlock (backup of traffic in urban areas)
- o What are the advantages and disadvantages of owning your own car?
- o What are some alternatives to using our cars so much?
  - o Buses and subways





## Waterways:

### o **Advantages:**

- o Carry lots of cargo
- o Less pollution
- o Less expensive
- o Great for goods long-lasting (non-perishable)
- o International export
- o Ports are busy-St. John's sees about 1300 ships annually (1.4 million tons of cargo)

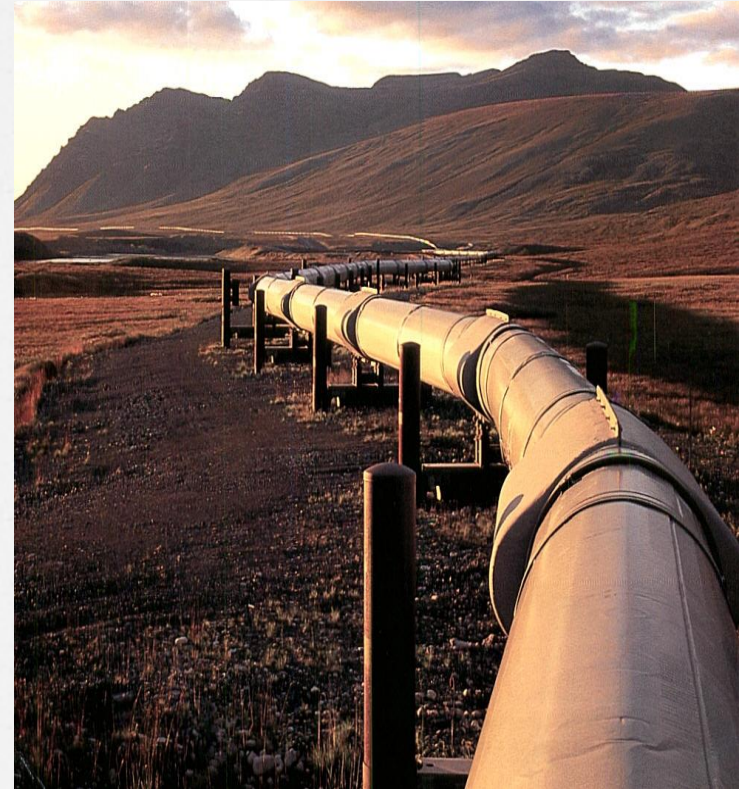
## Airways:

- o Planes can go anywhere
- o Fast service for transporting goods and people
- o Important in areas without roads
- o Perishable cargo especially
- o 80 million passengers a year in Canada
- o Organized around HUBS-major centres used for transfer points (Toronto, Montreal, and Vancouver)



## Pipelines:

- o Transport oil and gas to refineries and water to and from purification plants
- o 540 000 km in Canada
- o Disturb wildlife habitat and migration patterns



# VIDEO TIME

[What the Future of Transportation Looks Like](#)

[North America's Busiest Freeway: Eastbound Ontario Highway 401 thru Toronto, KM 344 To Km 375](#)

[A Possible Future of Urban Transportation](#)

[10 of the world's longest bridges](#)



# 3. Economic:

- o Anything to do with the economy of a country- banks, trade, jobs, manufacturing, service, tertiary, quaternary, finances-money and the transfer of money



# 4. Energy:

- o Oil
- o Natural gas
- o Wood
- o Hydro
- o Nuclear
- o Coal
- o Solar
- o Wind power
- o Geothermal
- o Tidal power
- o Biogas power
- o Ethanol
- o Hydrogen fuel cell
- o All these will be discussed further in the section of the course dealing with energy resources





# Question?????

- Where does your water come from?  
Have you ever thought about this question?
- How does electricity make its way to our home when we switch on the light?



# 5. Infrastructure:

- o The structures or networks of basic services needed for the functioning of a community or economy.*
- o Much of our infrastructure is underground.*
- o The day to day operation of our society is based on the services that infrastructure systems provide.*



- o The buildings, roads, bridges, schools, houses, hospitals, water systems, sewage systems, electrical systems, that make up our human systems



# Infrastructure

- o The next time you are walking through your town, imagine that the ground under your feet is transparent-looking down you would see the many layers of pipes, cables, sewers, drains
- o Look over head and you would fine electric wires, phone wires, and cell phone towers

