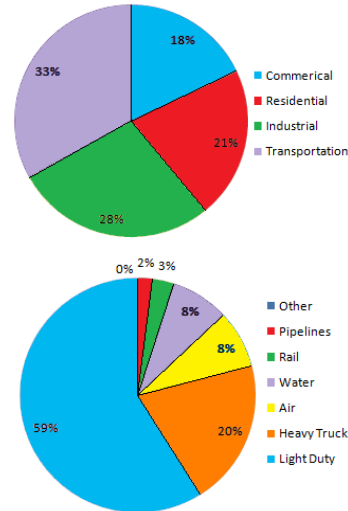


## Research

- General brainstorm for proper approach to solve problem
- State of current problem
- Different fuel types (electric, hybrid, regular, bio-fuels, diesel, hydrogen, etc)
- Different Car Types
- Profound lack of fundamental information discovered
- Compiled basic information to calculate the actual carbon footprint including numerous considerations of the entire vehicle-life:
  - Material – Extraction/production
  - Assembly
  - Recycling/disposal
  - Fuel production
  - Fuel Use
- Calculated carbon footprint for specific vehicles to compare with European values and other provided values
- Europe has more information readily available

## Why should you care?



2006 GHG Emissions (CO2 Eqv)

- CO<sub>2</sub> comprises of over 75% of the total GHGs emitted.
- Current ice cap and glacial melt; rising of sea levels
- Future consequences are predicted to be catastrophic.
- Less fortunate will pay for the consumptive behaviors of the wealthy

## What is Carbon Footprint?

- Total GHG emissions from consumption and production activities
- Individual carbon footprint
- Your personal responsibility!

# IPRO 322

ILLINOIS INSTITUTE OF TECHNOLOGY

## Carbon Footprint of Automobiles



## Problem Statement

- There is a profound lack of information and excess 'mis-information'
- How do you present such complex information in a way that is accurate but socially relevant
- Compile enough necessary basic information to calculate the 'actual' carbon-footprint of a vehicle
- Worked in conjunction with VGTU to assess global condition of current methods to address the global vehicle GHG emissions reductions

## Challenges

- Make carbon foot-print personally meaningful
- Obtain 'accurate' total carbon footprint of a automobile
- Lack of standards in given emissions value (tonne vs. ton, etc.)
- Where do all the given values come from?
- Given values only consider energy costs to produce not environmental impact (extraction)
- Difficulty in comparing cars using different energy sources

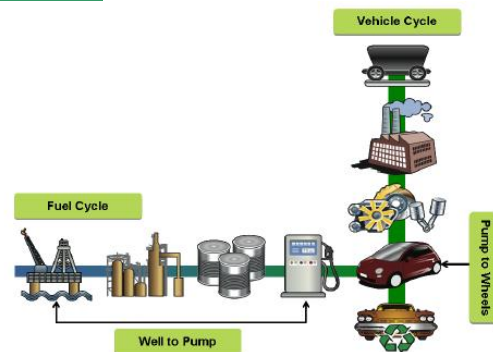
Table 1: Total CO<sub>2</sub> emissions from life cycle of automobiles in United States

Automobile	Total avg. emission of CO <sub>2</sub> (Kg.)
Audi A3	75900.50
Mazda 5	93137.95
Nissan Leaf	20660.54
Hyundai Sonata	85296.15
BMW X5d	116035.19
Chevrolet Impala	95637.84

Table 2: Total CO<sub>2</sub> emissions from life cycle of automobiles in Europe.

Automobile	Total avg. emission of CO <sub>2</sub> (Kg.)
VW GOLF	91022.90
BMW 3 SERIES	98550.49
PEUGEOT 407	92512.14
OPEL ASTRA	121919.17
FIAT PUNTO	78579.76

## G.R.E.E.T.



Greenhouse gases, Regulated Emissions, and Energy use in Transportation Model (Argonne National Laboratory).

## Future

- Determine most accurate carbon foot-print
- Design meaningful method to communicate information to the general public
- Globally standardize emissions calculations and display

## Recommendations

- Research and consolidate other available models (EU, GREET, UN, etc.)
- Work with and further develop tools such as Argonne's GREET; incorporating some of our more fundamental goals
- Improve communication with our VGTU counterparts
- Anticipate events which may disrupt sessions and progress

## Acknowledgements

- Illinois Institute of Technology
- Vilnius Gediminas Technical University (VGTU)
- Andrew Burnham (Argonne National Laboratory)