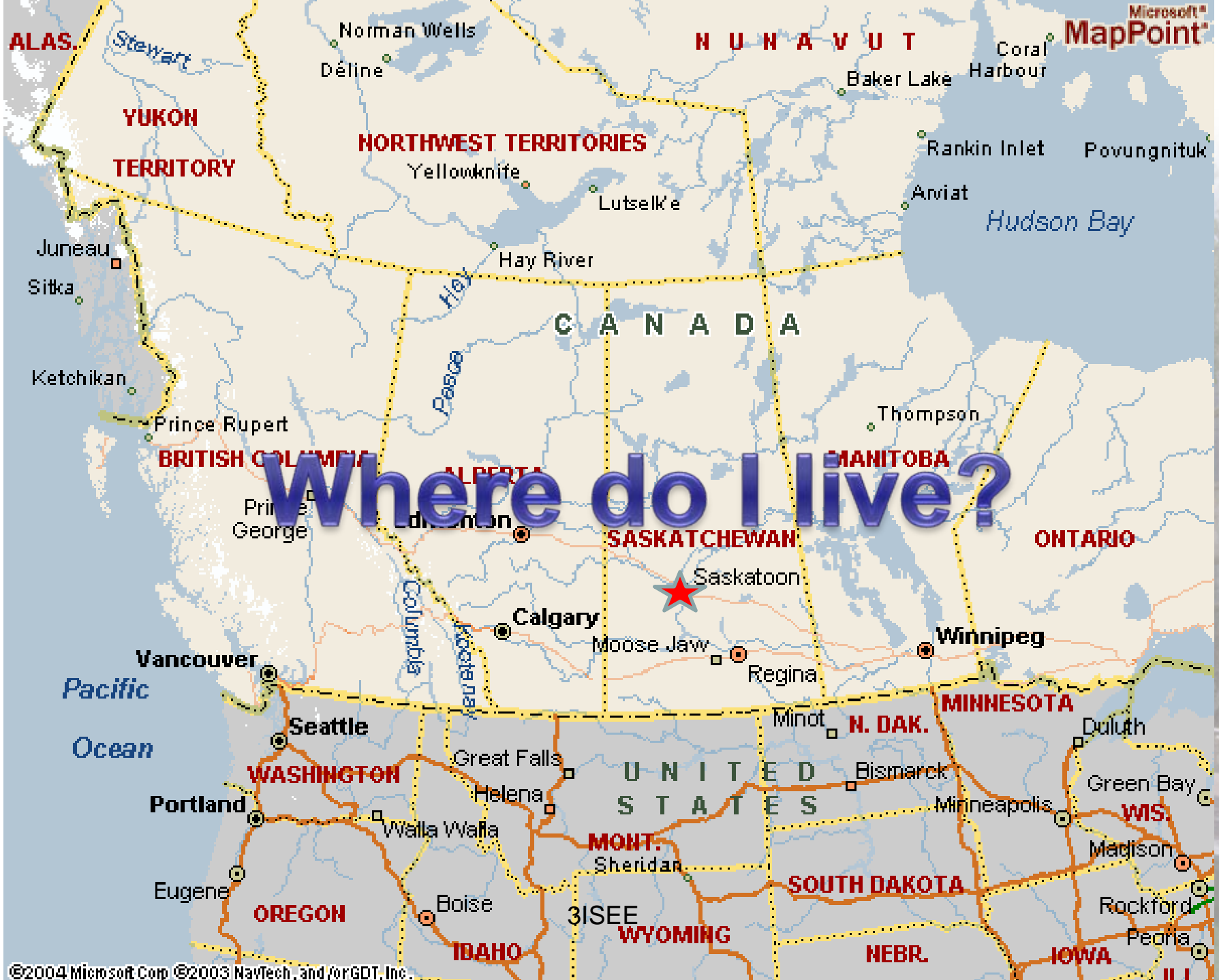


A NEW GRADUATE COURSE TEACHING CHEMICAL ENGINEERING IN USE OF RENEWABLE RESOURCES

ISEE
2010

Hui Wang
Department of Chemical Engineering
University of Saskatchewan
Saskatoon, Saskatchewan, Canada

June 30 – July 2, 2010



Where do I live?



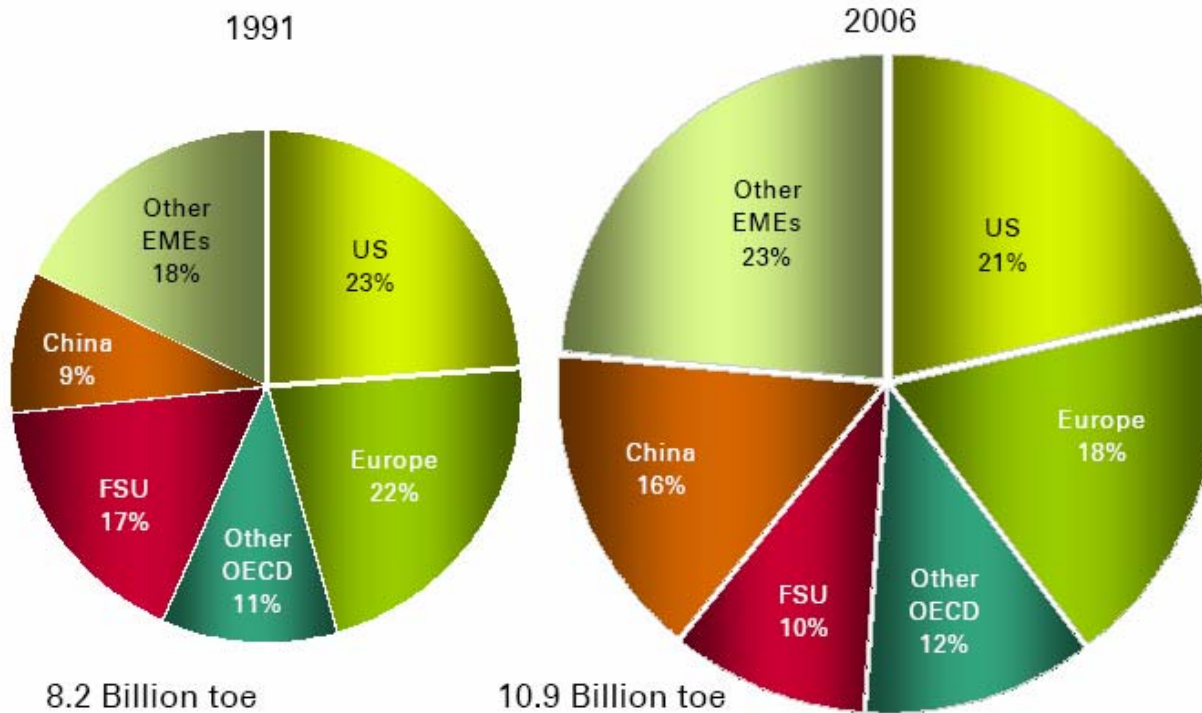


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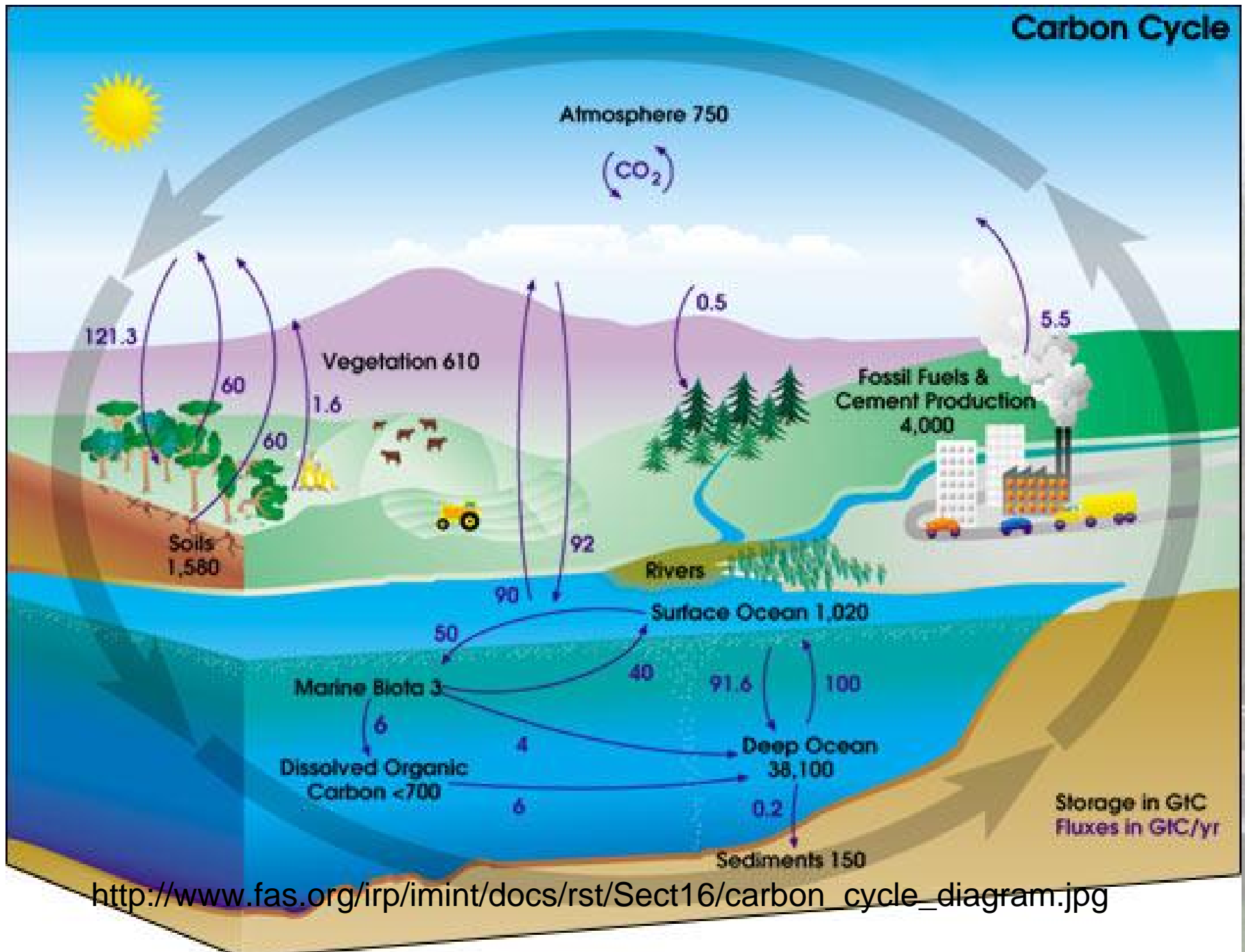


World Energy Consumption



DOE website

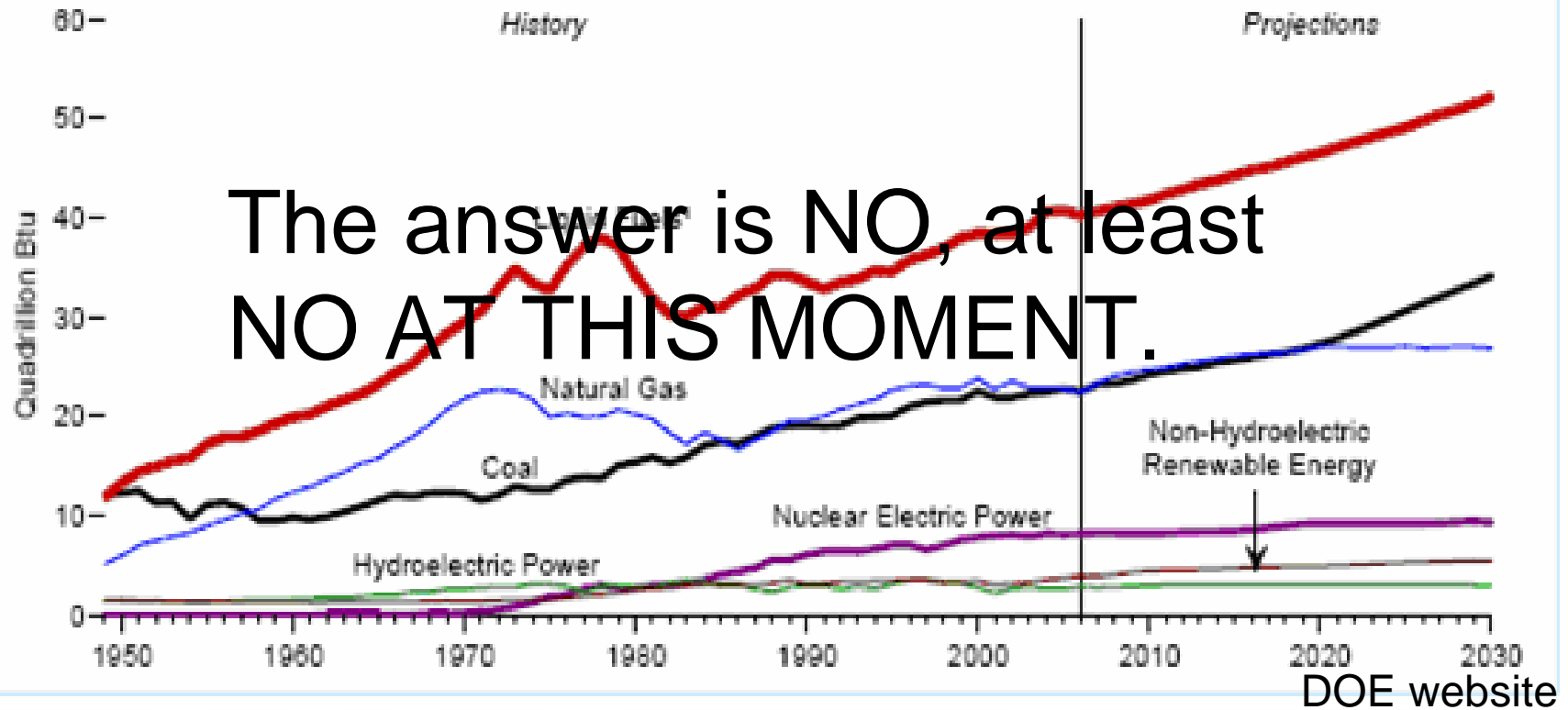
Carbon Cycle



http://www.fas.org/irp/imint/docs/rst/Sect16/carbon_cycle_diagram.jpg

Is Renewable Resource A Savior?

World Energy Consumption History and Outlook



The Responsibility of Engineering Educators

- Bring the issues to students
- Bring the concerns to students
- Bring the controversies to students
- Bring the awareness to students

ChE 888

Chemicals and Energy from Renewable Resources

in

Department of Chemical Engineering

of

University of Saskatchewan

Student Enrolment

<i>School year</i>	<i>Enrolment number</i>	<i>Home department and student number</i>	
2005/06	1	Agricultural and Bioresource Engineering	1
2006/07	3	Chemical Engineering	3
2007/08	6	Agricultural and Bioresource Engineering	2
		Chemical Engineering	4
2008/09	8	Chemical Engineering	8
2009/10	15	Agricultural and Bioresource Engineering	1
		Chemical Engineering	10
		Food and Bioproduct	4

What Instructor Does

- Give lectures on
 - Renewable resources and their use for chemicals and energy production
 - A process example of one product from renewable feedstock
- Have meetings with students
- Facilitate class discussions and presentations
- Guide student paper projects

One of the unique features of this course is to combine the course contents and the students' research topics.

What Students Do

- They bring up a case study to answer a question: how to incorporate renewable resources and sustainability in their research projects?
 - One of the tables in my paper shows the topics we have touched in the years this course was offered.

The Topics

- Resource related: agriculture residues, wood residues, municipal wastes, etc
- Process related: gasification, hydrolysis-fermentation, separations, etc
- Product related: biodiesel, bioethanol, bio-oil, lipid, hydrogen, etc
- Conceptual studies: ideas to make the current processes more sustainable

What We Do in Class

- Natures of renewable feedstock
- Natures of processes using such feedstock
- Properties of products from such feedstock
- Sustainability: more environmentally-friendly? More economical? Ethics, etc

Deliverables

- Two ppt presentations
- Two term papers



Feedback from Students

- If you have 2 or 3 reasons that helped you have selected this course, what are they?
 - *Relevant to research*
 - *Supervisor's suggestion*
 - *Format attractive*

Feedback from Students

- After taking this class, have you learned what you had expected? If there is any difference between your expectations and what you have experienced and/or any disappointment, what is it?
 - *To learn forms of renewable resources*
 - *To learn technologies using renewables*
 - *To improve communication skills*

Feedback from Students

- What is your opinion on utilization of renewable resources? Have your opinion changed after talking this course?

Many students believe:

- *They are more environmentally friendly*
- *They are more secure resources*
- *But economics talks*

- *Students feel more confident about the issues of renewability and sustainability.*

Concluding Remarks

- A new graduate course on utilizing renewable resources for chemicals and energy has been developed and implemented.
- Students are aware of what renewable resources are, what they can do and what they cannot do.
- The format of combining course content and student research area is very attractive to students.

60th Canadian Society of Chemical Engineering Conference

October 23-27, 2010 Saskatoon,
Saskatchewan, Canada

www.csche2010.ca