



A collaborative quest for sustainability at DTU

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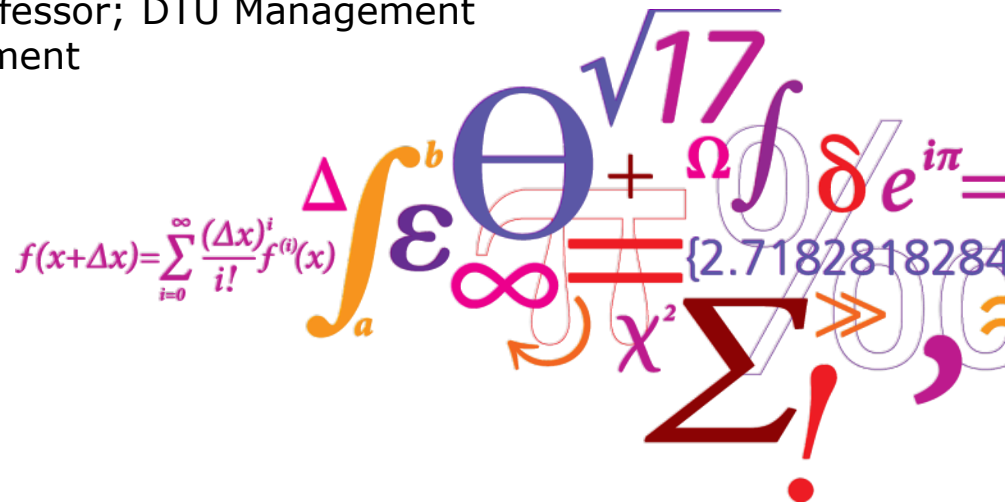
A collaborative quest for sustainability at DTU

Lisbet Michaelsen, Sustainability Coordinator; DTU Campus Service

Stig Irving Olesen, Associate professor; DTU Management Engineering, Quantitative Lifecycle Assessments

Susanne Balslev Nielsen, Associate professor; DTU Management Engineering, Centre for Facilities Management

Sustain DTU – 17. December 2014



Abstract 135: Lisbeth Michaelsen, Sustainability Coordinator, DTU Campus Service:

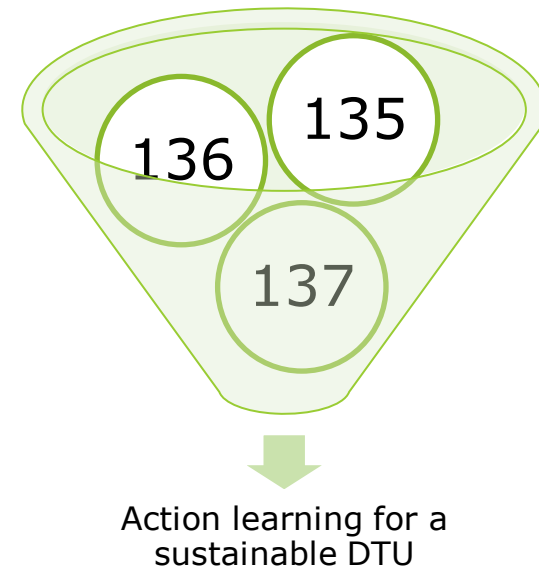
Sustainability at DTU from Campus Service point of view -an invitation to use campus as *learning lab*

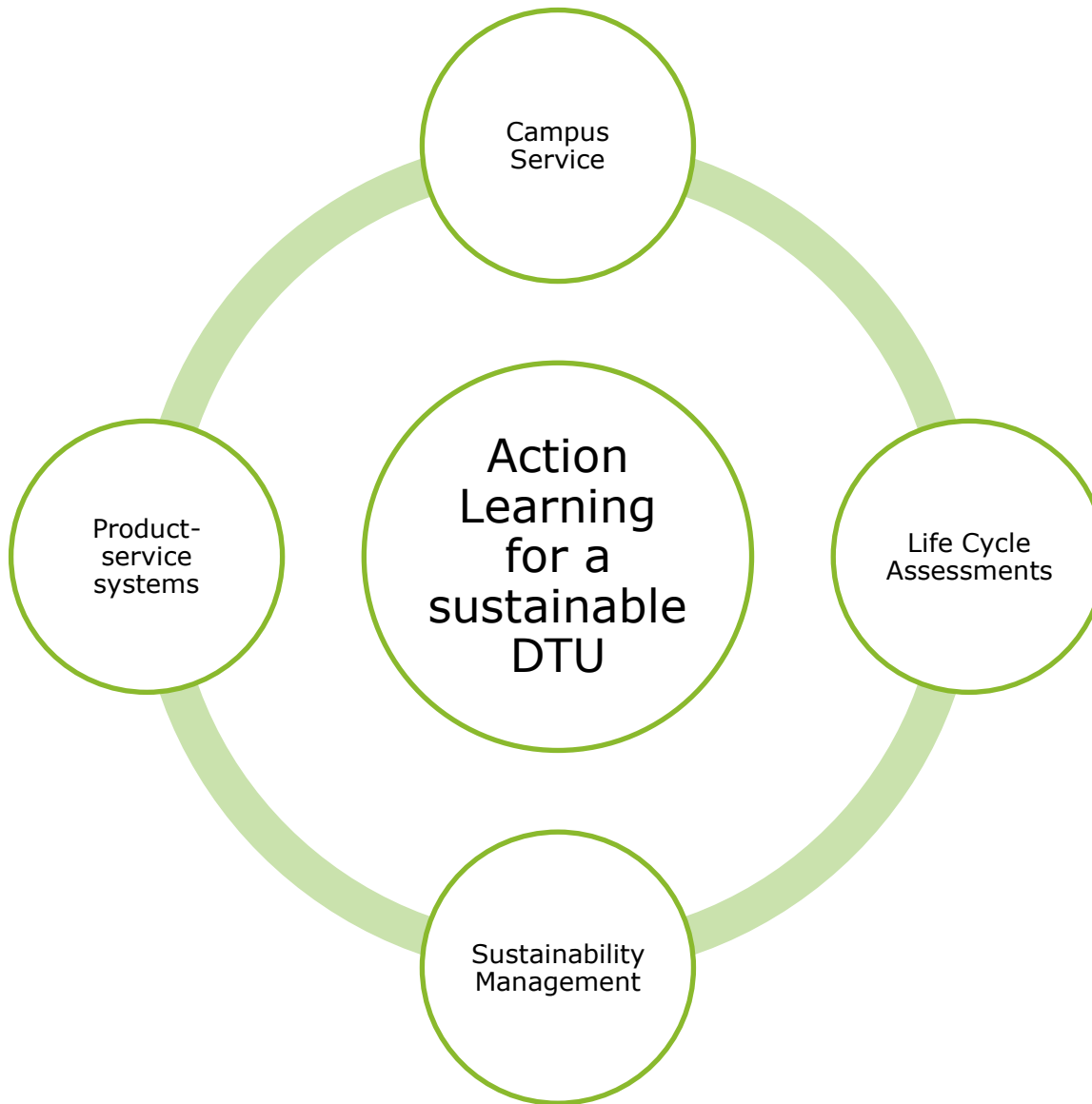
Abstract 136: Susanne Balslev Nielsen and Per Anker Jensen; Centre for Facilities Management; DTU Management Engineering. Lisbeth Michaelsen, DTU Campus Service:

The quest for sustainability in existing buildings

Abstract 137: Stig Irving Olsen and Susanne Balslev Nielsen, DTU Management Engineering. Tim McAloone, DTU Mechanical Engineering:

Teaching sustainability in engineering solutions with Campus Service as case





Content:

The societal challenge and FM as solution

Campus Service and sustainability at DTU

Teaching Sustainability in Engineering Solutions

Next steps

The societal challenge and FM as a solution

Susanne Balslev Nielsen and Per Anker Jensen

Transforming cities through FM

- working with people, places and processes



DTU the case of a

- building owner, building user and building operator
- sustainability in Facilities Management: a management journey from vision to reality.



DTU Campus Service (CAS) and sustainability at DTU

Lisbet Michaelsen

About Campus Service

Strategy

1. "DTU's infrastructure is to support education, research, research-based advisory and innovation"
2. "DTU must prioritise a beautiful and functional campus with a visible and versatile social life, including an attractive student environment"
3. "DTU administration of its activities as an independent institution is to be developed into a model of efficient university operations"

Mission

CAS is DTU's Facility Management organisation. CAS must ensure that the operation, maintenance and development of DTU's buildings, as well as areas and facilities **support DTU's core activities; research, education, research-based advisory and innovation.**

Vision

CAS must ensure that the campuses, buildings, facilities and service of DTU is nationally and internationally attractive, and CAS shall lead in its contribution to increasing the applicable standard.



CAS organisationsdiagram april 2014



KONCERNSTAB - DANMARKS TEKNISKE UNIVERSITET

CAMPUS SERVICE

Jacob Steen Møller



FUNKTIONEN
BYGHERRE
Ole Kristian Bottheim

FUNKTIONEN
DRIFTSHERRE
Anders B. Møller

FUNKTIONEN
**PORTEFØLJE- &
SPACEMANAGEMENT**
Uffe G. Thomsen

LYNGBY

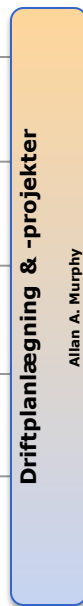
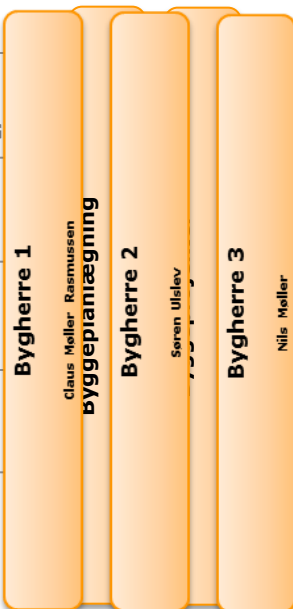
FREDERIKSBERG

MØRKHØJ

BALLERUP

RISØ

LINDHOLM



Park & Vej
Michael Jepsen

Bygninger
Synne Remvig

EL
Allan Egetoft

VVS
Anders Wang-Holm

CAS Frederiksberg
Finn L. Mosegaard

CAS Mørkhøj
Finn L. Mosegaard

CAS Ballerup
Finn L. Mosegaard

CAS Risø
Poul Erik Søderdahl

CAS Lindholm
Jesper Dose



-- Fagligt ansvar

Campus Service – 2014 figures

Handle 13.234 error reports

Approx. 700 daily guests in the meeting centre

Handle 1.433 orders

Project investments
Approx. 600 mio. Dkr.

CAS has worked
274.636 hours

Used more than 125.000 hours on cleaning

Used more than 10.000 man hours on moving jobs

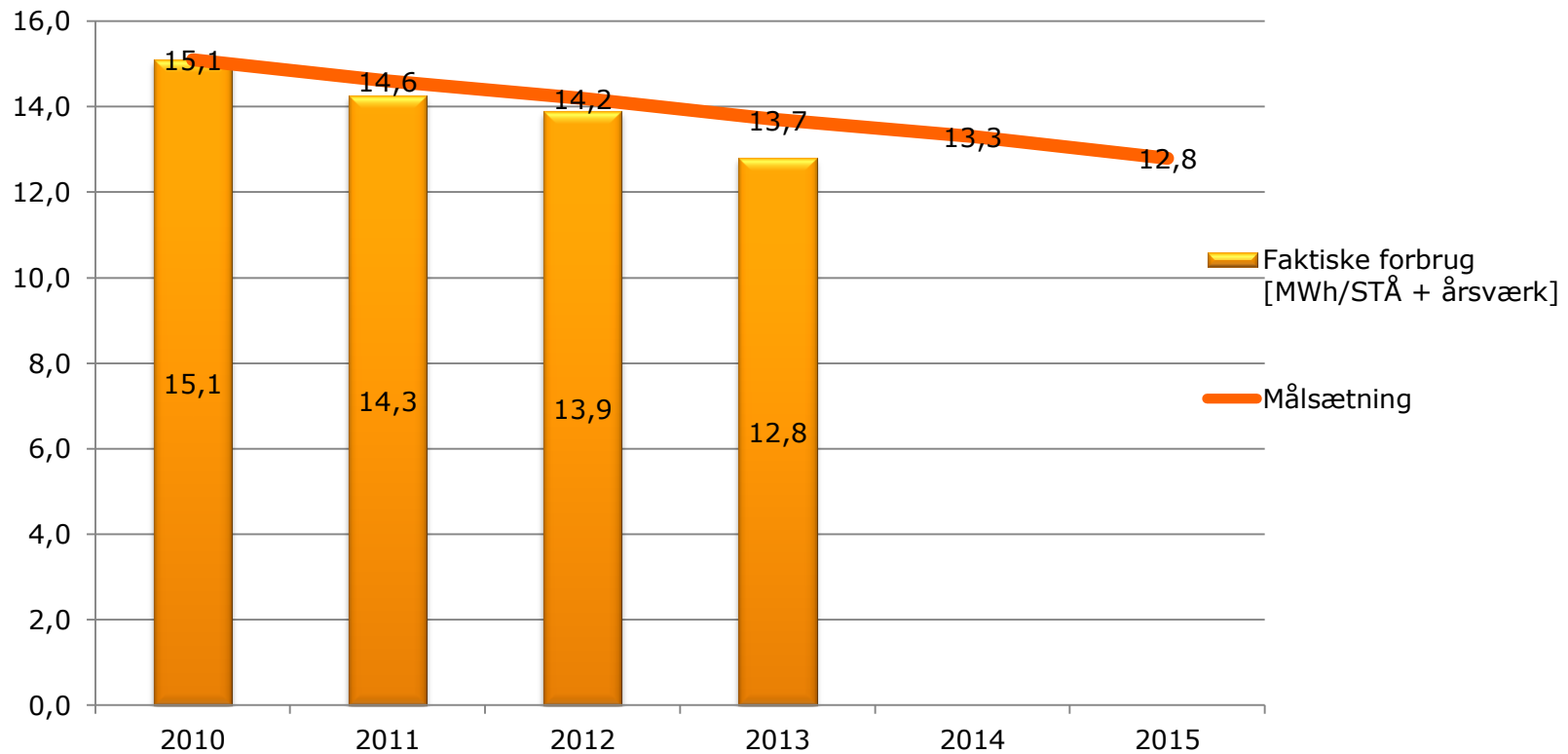
Served food to more than 800.000 guests in the canteens

Emptied more than 650.000 waste bins

"Used" more than 6 mio. meters of toilet paper

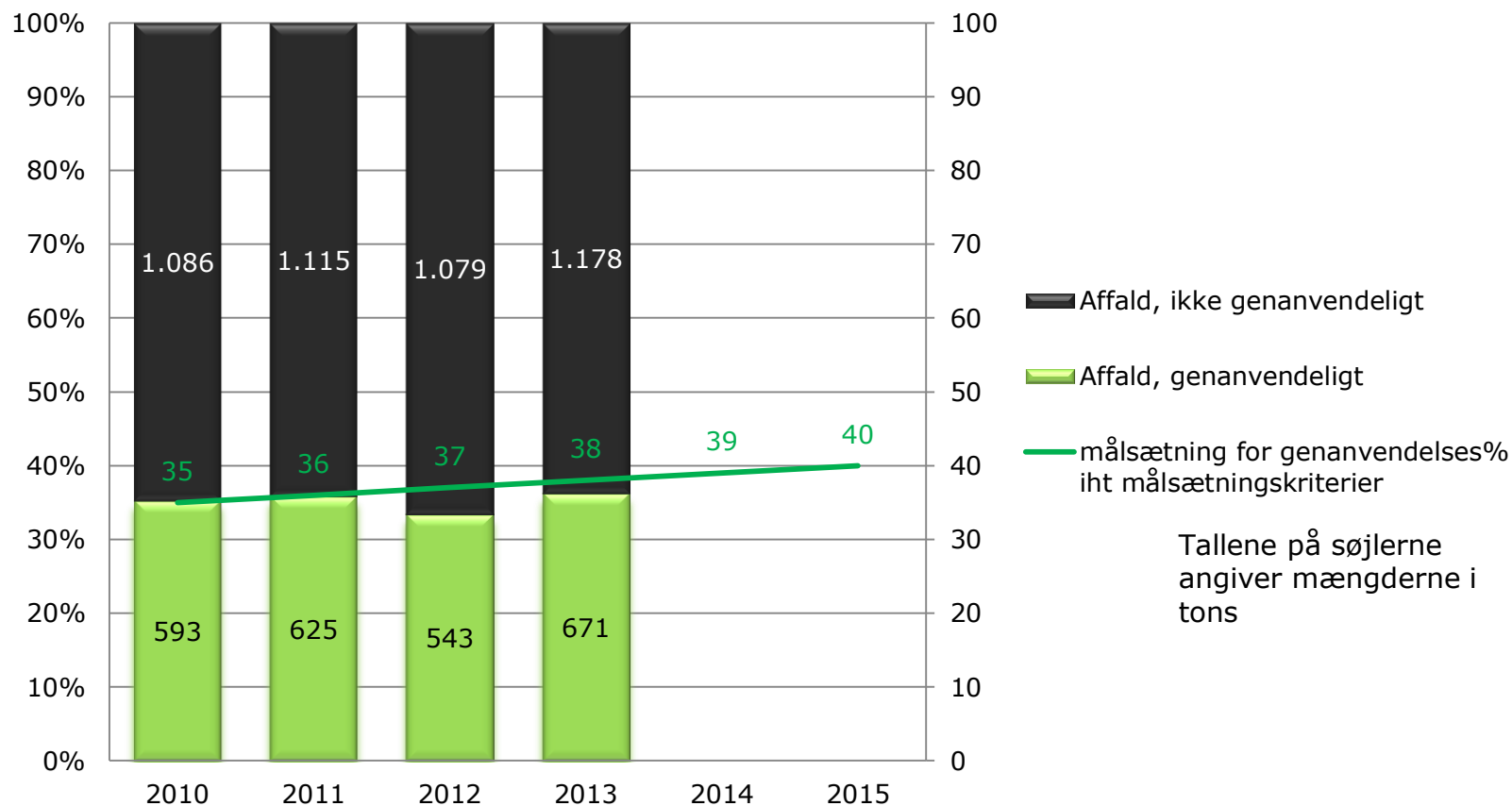
Energy target in contract with FIVU

Target for energy consumption in MWh per FTE (incl. students)



Waste target in contract with FIVU

Target (selected waste fractions) in tonnes per FTE (incl. students)



Numerous choices/dilemmas: What is the more sustainable?

Student projects investigating:

- Waste sorting at DTU Library
- Use of Oak trees from the Lifescience lot
- Sustainable materials for facades
- Sustainable flooring in laboratories
- Organic waste handling
- Hand drying - Paper vs. Electric dryer
- IT & Server rooms
- Weed control at DTU campus
- Bottled water vs. tap water
- Interior walls: glass vs plaster board



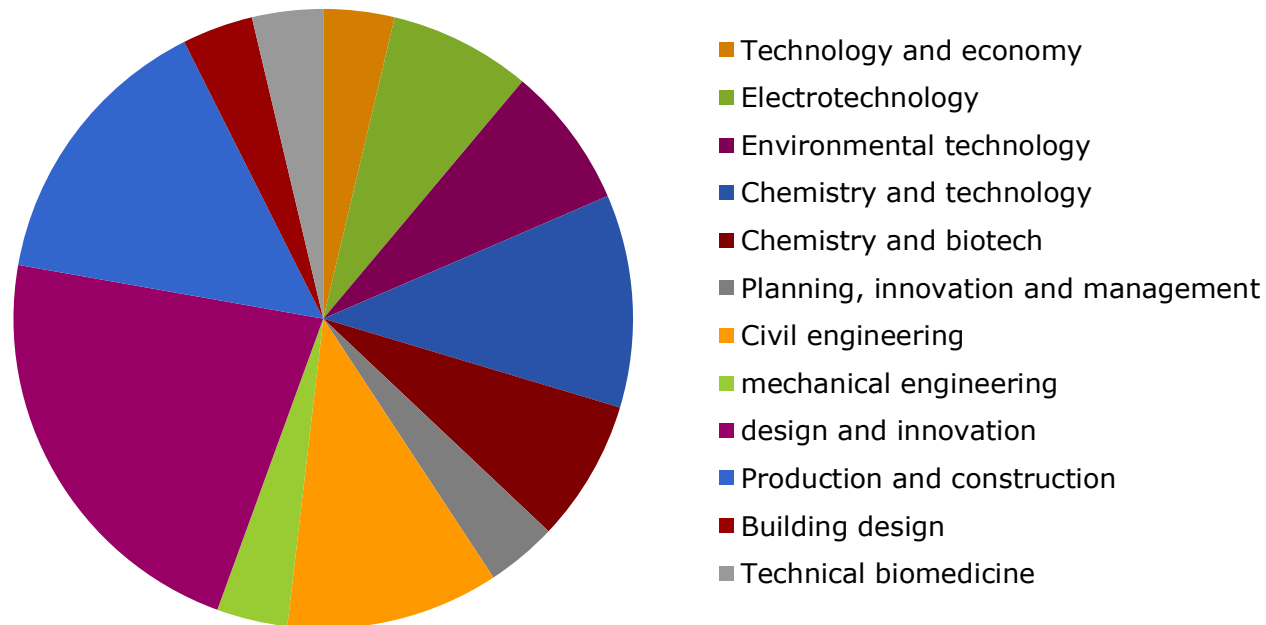
Teaching

Sustainability in Engineering Solutions

Stig Irving Olsen

Teaching sustainability in engineering solutions (42340)

- 5 ECTS June course
- Cooperation between three teachers, two department
- Cases from CAS (Lyngby school, Nordhavn)
- Open to all bachelor study lines (usually 4th to 6th semester students)
- Up til now between 18 and 47 students following (increasing each year in the four years it's been running)
- Up to 13 different study lines (also increasing each year)



Course structure

| Teaching day # | Teacher | Morning | | | Afternoon | | |
|----------------|--------------------|---|--|-------------|--|---|--|
| | | 9:00-9:45 | 10:00-10:45 | 11:00-12:00 | Lunch 12:00-13:00 | 13:00-13:45 | 14:00-14:45 15:00-17:00 |
| 1 | siol/Mic/sbni/tmca | Introduktion til kurset, lærerne, og de medstuderende | Intro til bæredygtighed: Bæredygtighedsledelse; Udvikling af løsninger; Vurdering af miljøbelastninger | | | DTU Campusintroduktion | Introduktion til projektet: del-projekter osv. |
| 2 | siol/sbni/tmca | Inddeling af grupper | Forberedelse til feltarbejde | | DTU Campusintroduktion - bæredygtighedskordinator | Besøg på forskellige institutter/bygninger/faciliteter | |
| 3 | sbni | Gæsteforelæser: Martin Mandrup, C2C COWI | Hvorfor bæredygtighedsledelse? Strategiske overvejelser; Aktører osv. Bæredygtighedsledelse "setting the scene", | | Gruppearbejde: Udviklingsbehov - hvor vil vi gerne hen? Definition af projekt: Formål, undersøgelsens objekt, rammer osv. | Gæsteforelæser: Marine Langgrand: Bæredygtig FM på danske universiteter | Gruppepræsentationer af posters |
| 4 | tmca | Miljøforbedringer i planlægningsfasen: Fastlæggelse af miljøforhold i konceptskabelsen; systemløsninger og livscyklusovervejelser; brugskontekst; miljømæssige aktørnetværk osv. | | | Fastlæggelse af livsforløb for case; brugskontekst for case; hvornår fastlægges miljøforhold og af hvem; hvordan ser livsforløbet ud | | |
| 5 | siol | Miljøvurdering i livscyklus: Livscyklusvurdering generelt; simplificering i temaer og livscyklusstadier; Vurdering af materialer; Vurdering af Energi Plan for indsamling af data | | | Indsamling af data for case: Hvilke data skal bruges; identifikation af potentielle data leverandører; Indsamling af litteratordata - materialer og energi | | |
| Weekend | | | | | | | |
| 6 | siol | Miljøvurdering i livscyklus: Kemikalier, sikkerhedsdatablade, CAS m.m., listen over farlige stoffer; Andet, arbejdsmiljø, potentielle sociale aspekter | | | Indsamling af data for cases og begynde MEKA-vurdering: Indsamling af litteratordata for kemikalier; indsamling af data hos aktører | | |
| 7 | siol | Gæsteforelæser; Karen Andreason, Velux | Projektarbejde på case | | vejledermøder: Milepæl livscyklusoverblik | Gruppepræsentationer af posters | |
| 8 | tmca | Gæsteforelæser: Susanne Kuhn, Rockwool | Miljøforbedring af koncepter: idealkoncepter; negativ brainstorm; nye løsninger | | Arbejde på case med forbedringsforslag | | |
| 9 | tmca | Arbejde på case forbedringsforslag | | | Case: Vejledermøde milepæl forbedringsforslag | | |
| 10 | siol | Case livscyklusoverblik på forbedringsforslag | | | fortsat | | |
| Weekend | | | | | | | |
| 11 | tmca | Case udarbejdelse af endeligt forbedringsforslag | | | fortsat. Vejledermøde tmca/siol: milepæl endelig miljøforbedringsforslag | Gruppepræsentationer af posters | |
| 12 | sbni | Bæredygtighedsledelse i praksis: udarbejdelse af strategi; implementeringsovervejelser; leverandørstyring; marketing; innovation; personaleledelse etc..... | | | Case: muligheder for at styre på parametre | | |
| 13 | sbni | Case arbejde med bæredygtighedsledelse i forhold til konkrete miljøforbedringsforslag | | | fortsat: | | |
| 14 | tmca/sbni/siol | Case arbejde med konkrete miljøforbedringsforslag løser end m.m. | | | Udarbejdelse af posters | | |
| 15 | tmca/sbni/siol | Præsentation af projektarbejde | | | Multiple choice skriftlig prøve | | |

Introduction

Sustainability management

Overview of product/system

Assessing environmental impacts




Making environmental improvements

How to implement?

Next steps in the collaborative quest for sustainability at DTU

Think of your experience as DTU user...

What are your ideas for Campus service and student projects (one idea pr. post-it)

-  - reaching DTU targets: Energy
-  - reaching DTU targets: Waste
-  - other sustainability improvements



Input to 42340 June 2015



Thank you!