Euro-CASE Annual Conference 2012: ” Energy Independence for Europe”

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Two main messages I want to drive home in this presentation

(1) There is an enormous need for education in the energy area

(2) Europe has the *potential to take the world-wide lead* in the field of education towards innovative and entrepreneurial energy

if

universities can start to work together in higher education

and if

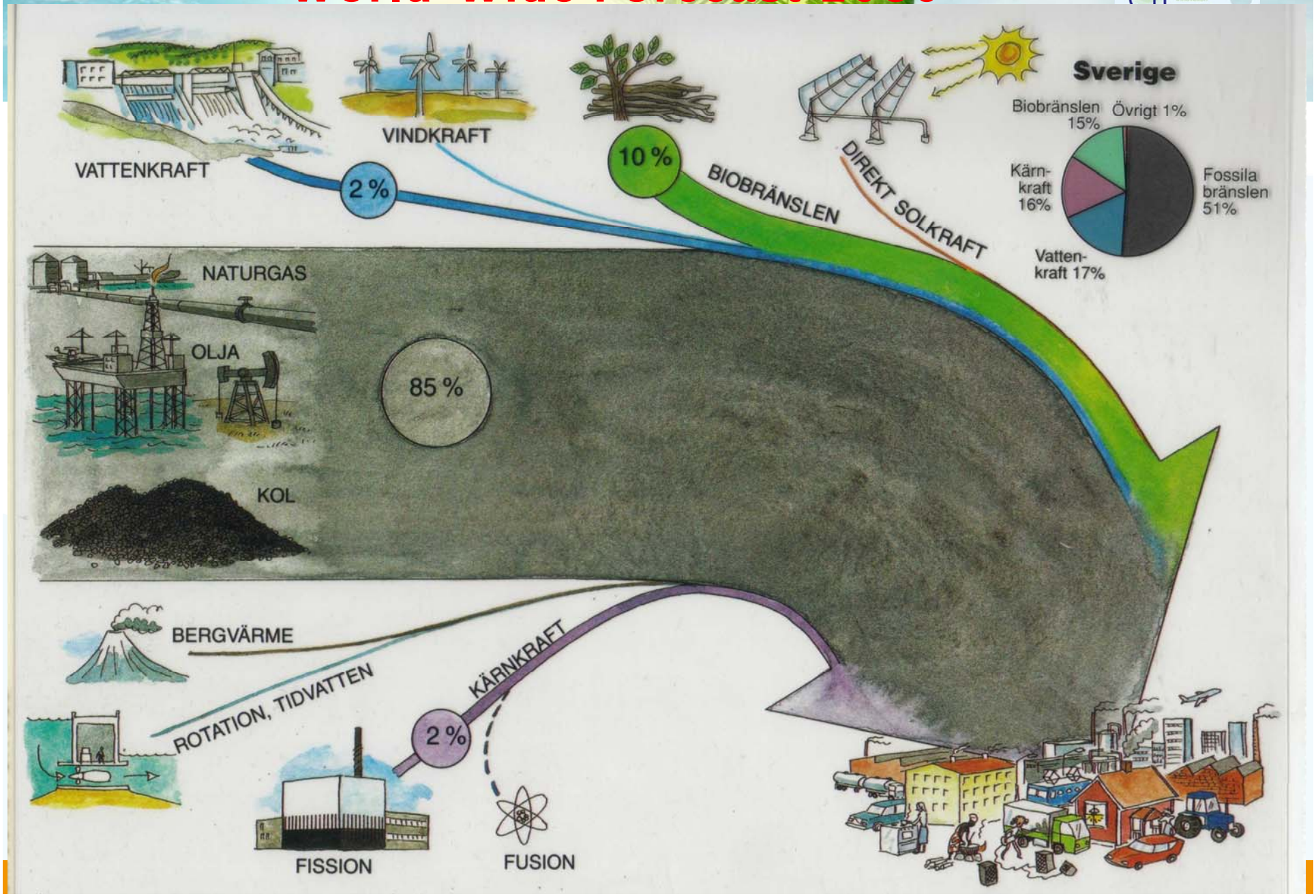
they use modern means for learning

and if

universities and industry create true interactions

But: **The US ”modern world-wide education” train is leaving the station**

Education in InnoEnergy
World-Wide Forecast 2030



Energy sector & EU

Societal challenge

- 27% of any good or service cost is energy cost
- 1% decrease in energy cost => 20B€ savings on annual basis (Europe)

20-20-20 agenda

- Renewables as 20% energy mix
- Energy efficiency +20%
- GHG emission -20%

4 top EU priorities (Energy 2020)

- Achieving an energy efficient Europe
- Building a truly integrated Energy market
- Empowering consumers and achieving highest level of safety and security
- Extending European leadership in Energy Technology and Innovation

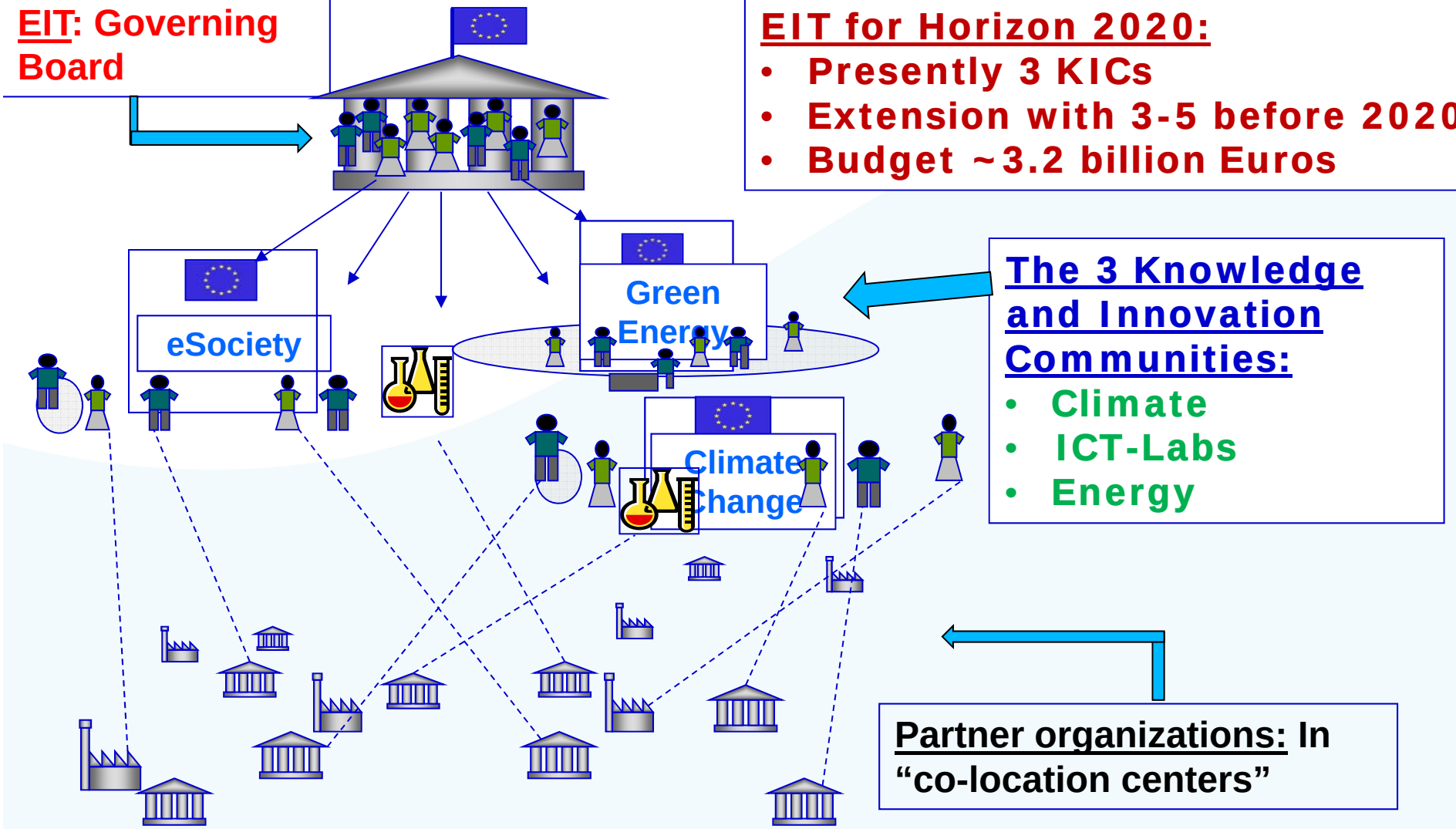
SET Plan

- Road map ahead built and maintained by all key stakeholders:
  - Industry
  - Research
  - Academia
  - Member States
  - EU bodies (DG R&D, DG ENER, ….)

European Institute of Innovation and Technology: Overall Structure

EIT

EIT: Governing Board



EIT for Horizon 2020:

- Presently 3 KICs
- Extension with 3-5 before 2020
- Budget ~3.2 billion Euros

The 3 Knowledge and Innovation Communities:

- Climate
- ICT-Labs
- Energy

Partner organizations: In "co-location centers"

KIC InnoEnergy:
The leading engine for innovation and entrepreneurship in Sustainable Energy

Six co-locations centers & thematic areas in line with SET Plan

InnoEnergy education: General

- EIT is about the future of Europe
- This means people and jobs
- Uniqueness of EIT is to combine education and research, in the knowledge triangle, with special emphasize on innovation/entrepreneurship
  - This is not done by DG Education
  - It is not done by DG R&T
  - It is not done by any other DG
- EIT is thus *not* about research. *Nor* about innovation
- It is about *human capital*

EIT is about people and jobs

This starts with education

Education "As Is"

- Traditional higher education in Europe is good!
  - But education *is* very"traditional", goes slow on pedagogical innovation, and lags behind modern social learning patterns
- "Industrial management" students succeed often very well in industry
  - But science and business courses often only "stacked upon" each other
- Many students have extremely good innovative ideas
  - Unfortunately the ideas are not "taken care" of during their education
- Spin-offs come out of universities
  - Spin-offs too seldom successful, from Ph D level and too seldom "world-wide"
- Industry/university participate in Life-Long Learning
  - Seldom fully integrated, not using the high potential of dynamic modern didactics
- High-level research results find its way into teaching at universities
  - Yes, but extremely seldom outside the individual professor doing the research

InnoEnergy Education "To Be": A paradigm shift

EIT/KIC label programs attributes

- Set a new standard by ***full integration*** of entrepreneurship, innovation, management, business models into the energy engineering curricula
- Establish "***student-centered***" education
- Include ***innovation projects*** into the MSc and Ph D courses
- Drive students to create energy businesses, fail and re-start
- Address both students and mid career professionals
- Use modern pedagogical tools for "***students without borders***", on-campus & LLL, including "borderless" incubators
- ***Integrate industrial companies into the education*** by internships, hands-on experiences, combination MSc/PhD level research (SME's & large industry)
- ***Objective to become the main sustainable energy educational "engine" in the world***

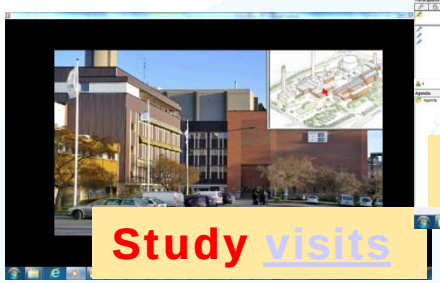
Interactive learning in an international environment

- **Bring the discussion teacher / student to a higher intellectual level**
  - ***But: Not "replace the teacher"!***

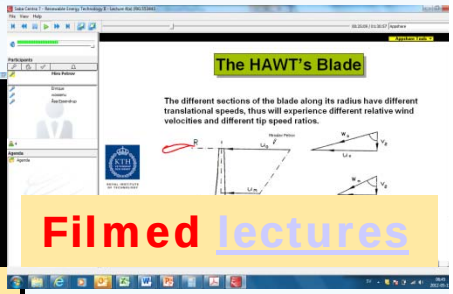
Interactive education with MCQ and exercises

Podcast: CSP / Turbo

3D lecture

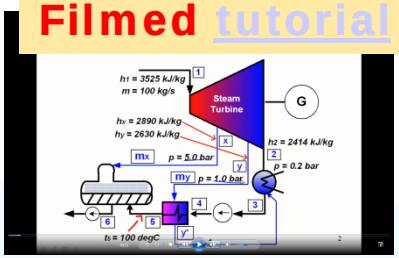


Study visits

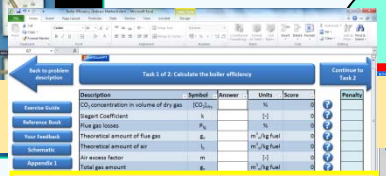


Filmed lectures

Filmed tutorial



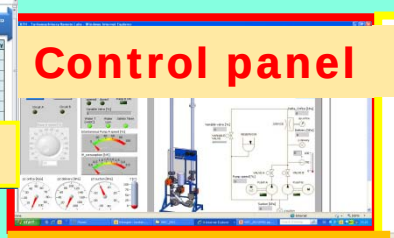
Filmed lab



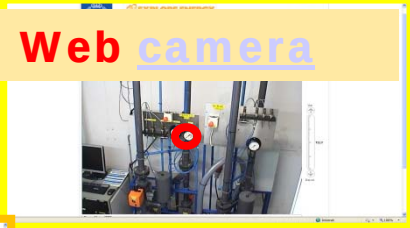
Exercises-hints

Remote lab exercises

Control panel



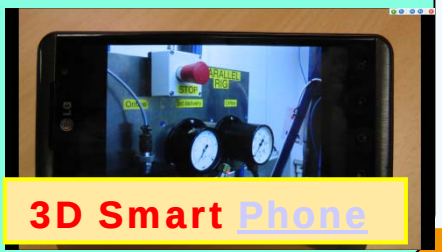
Web camera



Zoom by user

Different media

IPad



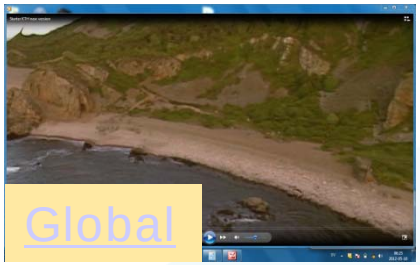
3D Smart Phone

InnoEnergy-wide teacher/studentintegration

Transfers education into Future Job-skills

Student-centered example in action

Teacher Audience



Global

SELECT PoY

SENSE – Smart Electrical Networks and Systems

Entrepreneurship:

- **"Virtual" incubator**
- **Filmed & on-line business cases and mentoring**

Students action

Goal:

- **Market oriented energy education**
- **Transfer education into modern job-skills**
- **World-leading in energy education**
- **Bring higher education down into high-schools**

Student success

Present InnoEnergy Educational Programs

120 ECTS Master programs

- 7 tracks
- 310 students (>2'200 applicants for 190 places intake 2012)

Excecutive programs

- 3 tracks
- 35 students

Ph D programs

- 6 tracks
- 28 Ph D candidates today
- 65 Ph D candidates from Sept 1

LLL & OER initiatives

- "Learning Modules", of various kind, integrated in courses
- LM & LLL programs towards industry for 2013
- Massive Open On-line Course and On-line complete MSc planned

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Some issues?

Do EU universities really want to change?

- Very slow? Keep the same programs/courses as usual? Why?
- How get universities to accept *common* programs?

Does EU industry really want to be involved?

Why does not the expected educational revolution take of?

- A lot of *information* available on internet
  - But not yet transferred to useable job-market *knowledge*
- *Some* teachers uses this *information* in higher education
  - Very few teacher collaborations for common edu growth
- Distance studies still looked upon as “less worth”. Basic criticisms:
  - Real life laboratory feeling missing: Can be done!
  - Can’t interactive properly with students/teachers
    - Neither teachers nor students yet learned how to “walk”
- Under any circumstances: On-line learning is here to stay

Will the 2012-kid be an ”on-campus” student in 2031?

Vision Energy Education 2031?

- Globalization and the “digital world” has reached universities
  - Teachers have started to work together on educational matters
  - Have “local universities” survived as independent units?
- Learning material readily available at the internet
  - (E) learning will be everything that people today imagine and much more
- Lectures at any university open to any world-wide learner via web
  - Social interactions will be world-wide
  - Enormous social/psychological research on on-line cooperation needed
- Learners world-wide will select different course modules at different universities and put together their own curricula
- Extended life-long learning offers from major educational providers
- University <-> industry collaborations worldwide (PBL)
- Academic accreditation will not be limited to “on-campus” education and be open to other educational providers

Concluding remarks

- Research/development fragmented:
  - It is EITHER technology OR social behavior OR content, but seldom the three together.
  - Development of content seems to be lagging behind the available technology.
  - Expensive to develop interactive learning material. But *enormous potential*
- Is “educational revolution” on its way?
  - Rather a slow evolution
- How to get teachers ”on-board” towards “learning anytime & anywhere”?
  - Do teachers want to work together or are we to “NIH”?
- Students interest very difficult to keep. Games are much more attractive?
  - Is “collecting points in continuous exam” enough?
  - How to get socializing, PBL, etc between far-away students working fully?
- “E-learning technology” will soon be available:
  - E-Readers will soon have foldable screens? And virtual keyboards?
  - But what about “E-learning content?

Will the 2031 student really be an "on-campus student"?

Are we ready for the

"21st Century World Virtual Energy University"?

Probably not

Will universities in Europe keep the monopoly on academic accreditation?

- **How important with the academic degree versus "accredited job-skills be?**

Many students "will do anything" to get a scholarship to reputed universities:

- **Thus they will acquire the knowledge before they join these universities.**
- **And if they pay a high tuition fee they will also expect to get much more and better than what they can get "for almost free" on the internet?**
- **So: University teaching will "soon" change drastically**

And:

- **We educate for the job market**
- **Industry/university collaboration must increase**
- **Only 2% of the worlds higher education students study abroad**
- **Students can learn a lot from computer if they study coherently in groups**
- **75 million kids do not go to school today**


where do we want to go from here?


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Student Successes

HULT Global Case Challenge: 2010 intake SELECT Students 2nd Prize April 2012

More HULT slides

1 Euro Lamp

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Virtual and Artificial, but 58,000 Want Course

By JOHN MARKOFF

Published: August 10, 2011

PALO ALTO, Calif. — A free online course at Stanford University on artificial intelligence, to be taught this fall by two leading experts from Silicon Valley, has attracted more than 58,000 students around the globe — a class nearly four times the size of Stanford's entire student body.

Enlarge This Image

Noah Berger for The New York Times

The teachers, from left, Peter Norvig and Sebastian Thrun.

The course is one of three being offered experimentally by the Stanford computer science department to extend technology knowledge and skills beyond this elite campus to the entire world, the university is announcing on Tuesday.

The online students will not get Stanford grades or credit, but they will be ranked in comparison to the work of other online students and will receive a "statement of accomplishment."

For the artificial intelligence course, students may need

Related

58'000 students from 175 countries

No academic credits though

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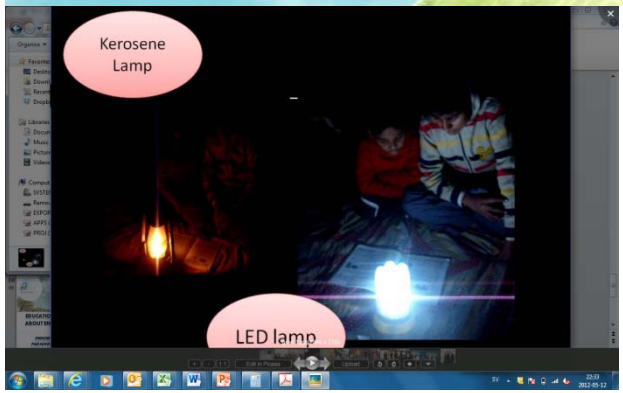
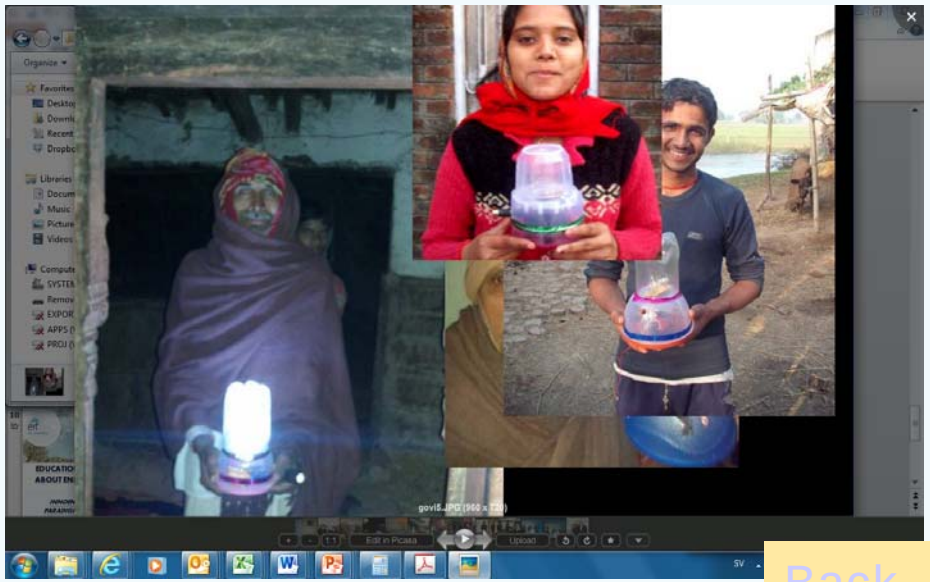
1 Euro Lamp Slides





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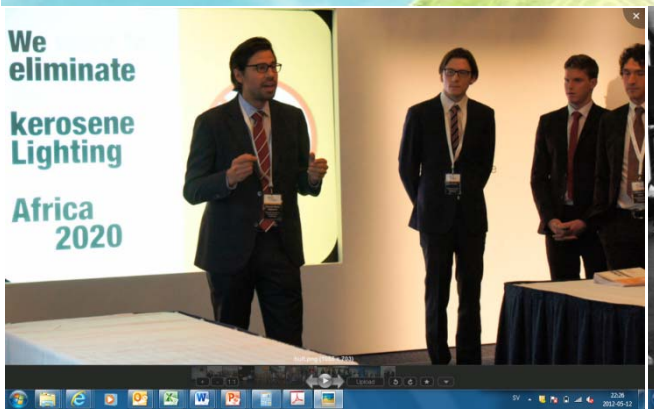
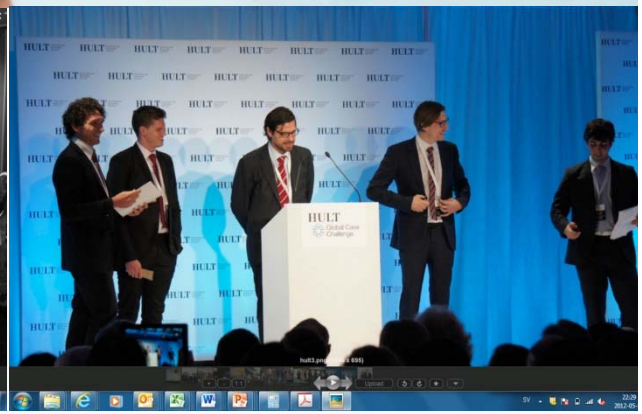
HULT Team Slides





Frederik Geth

http://www.kic-innoenergy.com/

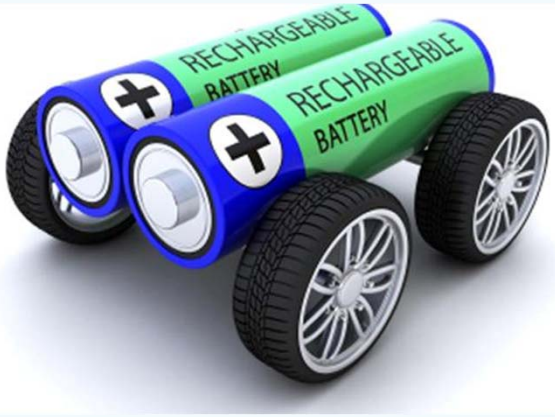
KIC Innoenergy PhD School Goals: Frederik Geth

- do research in the field of sustainable energy and you want this research to have an impact in society improving peoples' welfare,
- research and innovate in the field of sustainable energy to help a company or the whole industry being more competitive,
- research and innovate in the field of sustainable energy to startup a new company, either independently or within a corporation.

http://www.kic-innoenergy.com/

My PhD goal: Frederik Geth

- Multi-objective design and control of small scale electric storage for smart cities:
  - Integrating distributed generation while avoiding unnecessary grid investments
  - Grid upgrades not practical in urban environment!
  - Electric vehicles or dedicated units?
  - Storage control at the home and/or LV grid level?
  - Advanced power electronic conversion vs advanced batteries?



Local Intelligent Networks and Energy Active Regions

- Linear project in Flanders, Belgium
- Smart grids R&D and demonstration
- 100+ household field test with smart metering roll-out pilot
- Focus on LV distribution + household level

http://www.linear-smartgrid.be/

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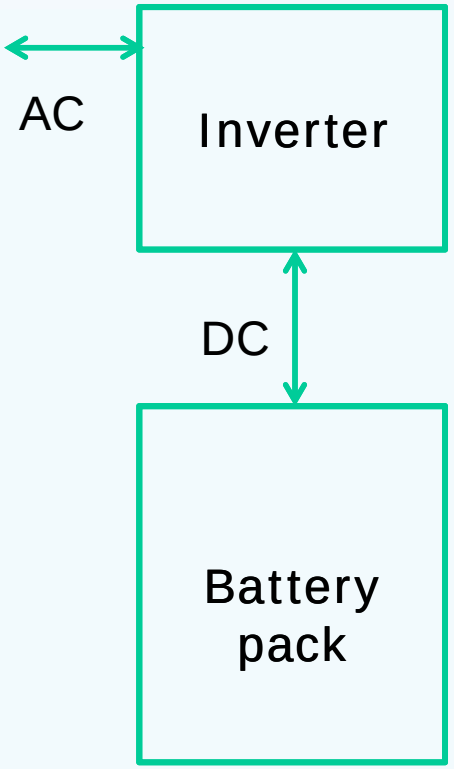
Added value of KIC: Frederik Geth

- Geographical and cross-organisational mobility
- Active engagement in entrepreneurial activities
- Develop grid supporting battery storage units which deliver multiple services at the same time
  - Active (inter-phase) balancing
  - Voltage regulation
  - Transformer peak shaving
- Work together with Inno-energy Partners (e.g. EDF) for field trial
- Demonstrate small scale storage as a real alternative to low voltage grid upgrades



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september 2012

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17.-21.09.2012 *Introductory Crash Course on Entrepreneurship* ESADE, Barcelona, Spain more Information					22	23
24	25	26	27	28	29	30

october 2012

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8.-14.10.2012 *Renewables BootCamp* Pico, Azores and Évora, Portugal more Information						
15	16	17	18	19	20	21
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29	30	31				

november 2012

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05.-09.11.12 *KIC InnoEnergy Scientist Conference* Leuven, Belgium					10	11
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december 2012

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KIC Innoenergy Scientist Conference

- Kick Off week 5-9/11
  - all PhD students gather in Leuven (@Iers College)
  - per track ½ day
    - keynote speakers
    - project presentations
    - PhD students' work
  - last two days: training activities

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Shourov Akter

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InnoEnergy Masters in RenE: Shourov Akter

About MSc Renewable Energy - RenE

The goal of RENE is to make best use of renewable energy and to reduce carbon dioxide emission by 2020.

Coordinating and partner universities of RenE

- UPC Spain (coordinating university)
- KTH Sweden
- Ecole polytechnique (ParisTech) France
- IST Portugal
- ESADE Spain

Industrial partners: Gas Natural Fenosa (Spain), EdP (Portugal), Total (France), and EdF (France) and others.

RenE methodology and ESADE Business Courses: Shourov Akter

RenE Methodology

- Concept of ***Learning by doing***
- Industrial Masters Thesis
- Mobility is part of the InnoEnergy educational and innovation strategy

ESADE courses in entrepreneurship

- Introductory Crash Course in Entrepreneurship
- Management and Entrepreneurship Summer School

Key takeaways: How to evaluate business ideas, Environmental analysis, difference between idea and opportunity, strategy making, market analysis and planning, consumer understanding, financial assist- profit and loss calculation.

ESADE business school help us to merge engineering knowledge with business idea to create new business for the better future.

RenE competence and Carrier goal: Shourov Akter

Competence Obtained:

- Pursue a PhD degree or work as a scientific and industrial researcher
- Problem solving skill in academic and industrial environment
- Developing new concept by partnering and starting up new business
- Use full range of renewable energy skills
- Work efficiently as a team member in multicultural environment

My carrier goal:

Pursue a PhD degree on Solar photovoltaic. After completing my PhD, I want to work as a scientific officer in an industry to contribute my knowledge in Renewable Energy field towards a sustanianeable society.

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Prototype of EEM: Shourov Akter

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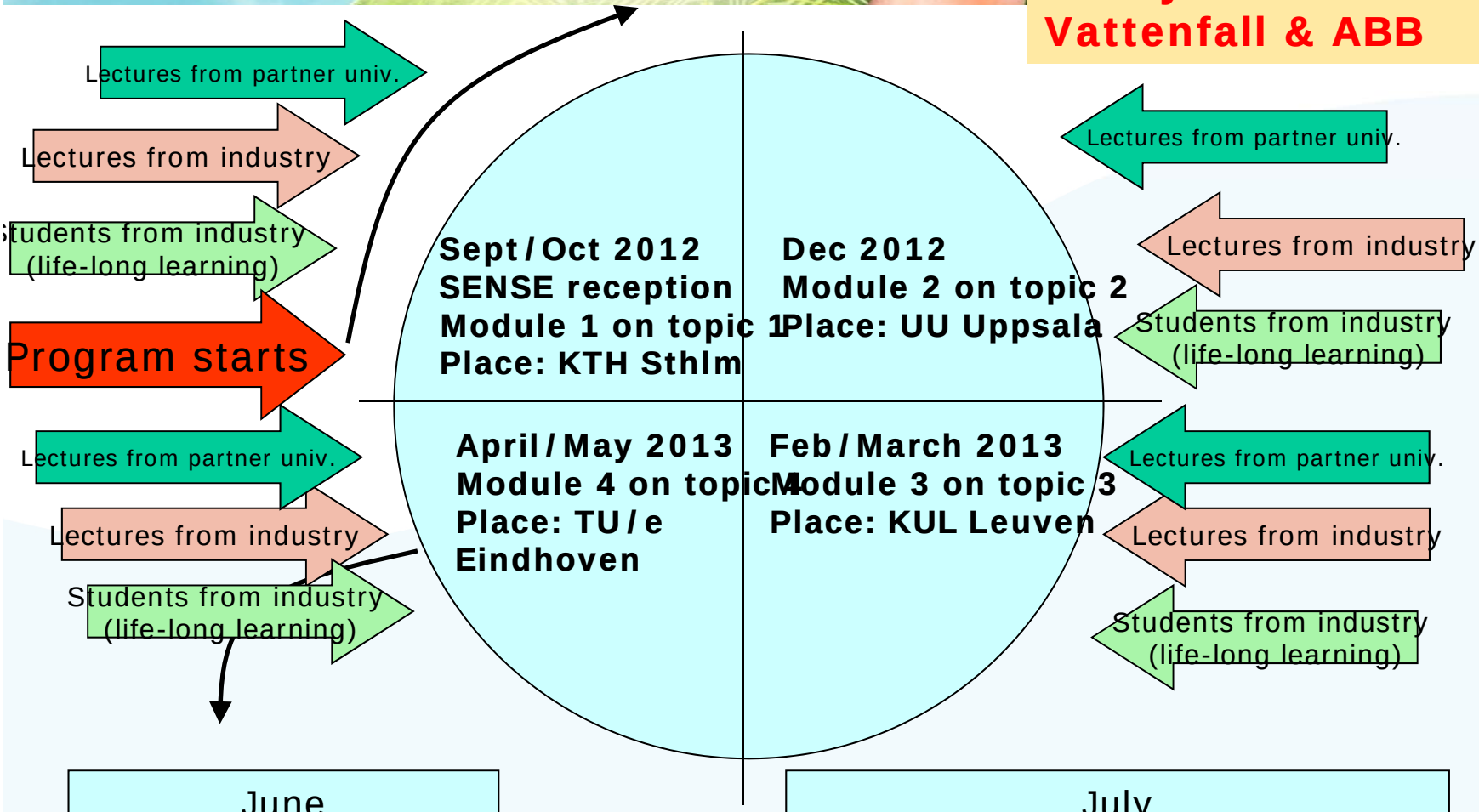
SENSE Program

http://www.kic-innoenergy.com/

SENSEcourse – Joint thematic course (7,5 ECTS) over the whole first year that links the Thematic subject with Innovations and Business and Entrepreneurship activities. All students are together during 4x1 intensive weeks

Heavy involvement from Vattenfall & ABB



June
SENSE Summer School
KTH, Stockholm

→

July
Business and Entrepreneurship module
ESADE, Barcelona

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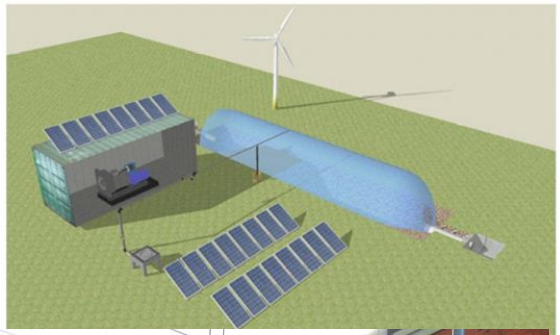
Project of the Year – Emergency Energy Module demo



Goal: Prototype in operation in Africa 2015