



Environment-Enhancing Energy (E²-Energy) Forum 2010

2010 中美环境增值能源论坛

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Location: Beijing, China

地点: 中国北京

Organized by:

China Agricultural University
Zhejiang University
University of Illinois at Urbana-Champaign

组织单位:

中国农业大学
浙江大学
伊利诺依大学

Sponsored by:

Ministry of Science and Technology of China
Ministry of Agriculture of China
Ministry of Education of China
China Machinery Corporation (SINOMACH)
China PetroChemical Corporation (SINOPEC)

指导与赞助单位:

中华人民共和国科学技术部
中华人民共和国农业部
中华人民共和国教育部
中国机械工业集团有限公司
中国石油化工股份有限公司

Synopsis

This Forum explores next generation of hydrocarbon fuel production technologies using biowaste and biomass with environment-enhancing capabilities. The Environment-Enhancing Energy (E²-Energy) technologies should be economically viable, environmentally sustainable and have the potential to ultimately meet the human need for liquid fuel.

论坛简介:

本论坛旨在探讨以生物废弃物与生物质为原料同时有利于改善环境的下一代碳氢燃料生产技术—环境增值能源。环境增值能源(E²-Energy)技术具有经济可行性与环境可持续性,并且有可能最终满足人类对液体燃料的总需求。

China and the United States are the top two energy users, and at the same time the top two CO₂ emitters. Environmental protection and energy production are among the greatest challenges facing mankind in the 21st century. The shared responsibilities on these two great countries to meet these grand challenges are unprecedented.

中国与美国是最大的两个能源消耗国,同时也是最大的两个二氧化碳排放国。环境保护与能源生产是人类21世纪面临的巨大挑战。在面对如此重要挑战之时,中美两个伟大的国家需共同承担空前的历史责任。

Economic development demands energy, yet energy consumption has historically led to increased environmental pollution. In the context of our modern society, the relationship of 'environment' and 'energy' are more often opponents rather than friendly co-existents. To sustain our economy and environment, our energy sources must be environmentally enhancing. We envision that Environment-Enhancing Energy (E²-Energy) technologies should be explored aiming at meeting our entire liquid fuel need, achieving net-zero carbon emission and water use, and recycle the nutrient in the feedstocks.

经济发展离不开能源,但能源的使用在历史上却导致了严重的环境污染问题。在现代社会的背景下,“环境”与“能源”往往处于对立的两面而不能互善共存。为了持续发展经济与保护环境,我们所使用的能源必须具有环境增值特性。开发环境增值能源(E²-Energy)技术的预期目标为:满足整个人类对液体燃料的需求;实现零碳排放与零用水量;循环利用原料中的养分。

Purposes

1. *Identify emerging and future Environment-Enhancing Energy technologies for next generation hydrocarbon liquid fuels with a total net-zero, or negative carbon*

论坛主旨:

1. **确定新兴和未来的环境增值能源技术,实现新一代碳氢液体燃料在其整个生命周期中的零碳排放。这类技术应包括将生物废**

emission during their life-cycles. Such technologies include liquid fuel conversion from biowaste (of animal, municipal and food processing) and biomass (of algae and lignocellulose). An example is hydrothermal process (HTP) of biowaste and algae into crude oil which mimics nature's process by using similar feedstocks to produce crude oil within minutes instead of geological time. It first converts the solid fractions of undried biowaste into crude oil; Then, algae are grown in the process wastewaters to reuse nutrients and sequester carbon dioxide; Finally, algae are fed back to the HTP to produce more crude oil. This synergistic single process produces biofuels, improves water quality and captures carbon.

2. *Promote collaboration among, and invest in the academia, industry and government agencies between China and U.S, jointly or independently, in the R&D of Environment-Enhancing Energy area.* Such collaboration and invest may include (but not exclude) establishing research centers, exchanging scientists, allocating special funding for such R&D programs (China and U.S.), and being included in the 'Five-Year Plan' (in China).

Topics

- Issues of energy, environment, national security and economic development
- State-of-the-art of next generation of hydrocarbon fuel technologies
- Bioscience and engineering of biomass production
- Biowaste (animal, human and food processing) for liquid fuel conversion
- Biomass (Algae and lignocellulose) for liquid fuel conversion
- Waste water cleaning and water resources in bioenergy production
- Carbon sequestration and nutrient reuse
- Catalysis of biomass conversion
- Socio-Economic issues related to bioenergy

Format

The forum will have oral presentations from invited speakers to lead discussion. There will be a poster session for all participants, and several round table discussions involving all participants to identify the needs and research/development strategies for Environment-Enhancing Energy,

Deliverables

It is anticipated that this forum will result in a white paper that summarizes the state of knowledge, needs and research/development strategies for next generation biofuels that has the potential to meet the liquid fuel demand, with a net-zero carbon emission and waste-water cleaning and reuse capabilities.

废弃物（源自于动物，市政以及食品加工）与生物质（藻类与木质纤维素）转化为液体燃料。例如利用水解热转换技术将生物废弃物与藻类转化成原油，其所用原料类似于自然界原油产生的原料，但在数分钟内完成了自然界原油形成所需的亿万年漫长过程。该技术首先将原态生物废弃物中的固相部分转化为原油；然后利用转化过程中所产生的废水培植藻类，使废水中的养分和环境空气中的二氧化碳在藻类生长过程中得以吸收和储存；最后用生成的藻类作为原料通过水解热反应过程生产更多的原油。这种协同一体的反应过程既生产生物质燃料，又改善水质，还捕获空气中的二氧化碳而改善环境。

2. **促进中美两国学术界、工业界与政府机构之间在环境增值能源研究与开发领域内的联合或独立的投资与研发。**这类合作研发与投资包括（但不局限于）：建立研究中心；中美科学家之间的交流合作；为研究与开发项目（中美）提供专项经费；纳入中国“五年规划”的范畴。

论坛议题：

- 能源、环境、国家安全与经济发展相关议题
- 下一代碳氢液体燃料开发前沿技术
- 关于生物质生产的生物科学与工程
- 可用于生产液体燃料的生物废弃物（源自于动物、人类与食品加工过程）
- 可用于生产液体燃料的生物质（藻类与木质纤维素）
- 生物质能源生产中的废水净化与水资源
- 碳捕获与养分再用
- 催化剂在生物质转化中的作用
- 相关的生物质能源的社会经济学议题

论坛形式：

本次论坛将采用先由受邀演讲者口头陈述，与会者展板展示，再相互讨论的方式进行。所有与会者将参加若干轮圆桌会议讨论以确定环境增值能源技术的研究与发展策略。

论坛成果：

本次论坛所取得的成果将形成白皮书，对具有零碳排放、废水净化与再利用机制、并可能满足人类未来对液体燃料需求的下一代生物质能源的认知、需求、以及未来研究与发展策略予以总结。