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BIOENERGY POLICY WITH FOREST PROTECTION BETTER FOR CLIMATE MITIGATION

Greenhouse gas emissions from the land-use sector will be lower if the rising demand for bioenergy is met with worldwide protection for areas important for biodiversity and carbon storage.

生物能源政策結合森林保護有利於減緩氣候變遷

生物能源結合生物多樣性及碳儲存全球重要保護領域，土地使用部門溫室氣體排放量將減少

Protecting biodiversity and carbon storage worldwide could lead to global greenhouse gas emissions from the land-use sector 10 metric megatons lower than without protections, according to a new study conducted by International Institute for Applied Systems Analysis (IIASA) for the European Commission. The study assessed the greenhouse gas implications of different policies for bioenergy and forest protection.

本期摘要(KEY INFORMATION)

◎根據國際應用系統分析研究所（IIASA）為歐盟委員會進行的研究顯示，全球性地保護生物多樣性、保護未使用森林及碳儲存，與減少來自土地使用部門的全球碳排放間存在明顯的協同效應。研究使用 IIASA 全球生物圈管理模式（GLOBIOM）和全球森林模型（G4M）評估了不同的政策選擇。其研究揭示了一種減少排碳情境，即在 2050 年前歐盟溫室氣體排放量減少 80%的目標下，若未實施森林保護，將導致進口到歐盟的木質顆粒量上升，歐盟森林砍伐提高，且用於快速增長的種植園土地面積擴大。研究人員並評估了生物能源需求上升有利於鋸木產業，因為他們能夠販售木材刨花和其他用於生物能源發電的副產品。

◎由 IIASA 研究所共同開發、使用於無線充電巴士的公車系統分析模型，於 2016 年 12 月在瑞典的斯德哥爾摩首度亮相。利用該模型可找出在斯德哥爾摩的公車網絡上安裝充電器的最佳位置，如果城市安裝 150 個充電器用於 94 條巴士路線，有助於減少 CO2 排放並降低能源消耗 34%。相關研究人員並指出，該模型還為用戶提供了成本優化的選擇，在斯德哥爾摩的案例中，成本優化的情況將意味著電動公車路線減少，但是能源消耗降低，其排放量減少了 40%。該模型可應用於任何城市，只要有一張詳細的公共汽車網絡圖和可靠的公車時刻表，則可以為任何一個城市導入該系統。

"Bioenergy is demand set to rise in coming years, as it isa key type of renewable energy, but there are major uncertainties about the impacts on biodiversity and greenhouse gas emissions," says IIASA researcher Nicklas Forsell, who led the study. "We found that there are clear synergies between conserving biodiversity, protecting unused forests, and reducing global emissions from the land-use sector."

With the 2030 EU renewable target enshrined in the newly proposed EU Renewable Energy Directive, projections suggest that the demand for bioenergy will rise. However, the impacts of this increase on greenhouse gas emissions, land use, and biodiversity are not well understood. The new research builds on previous work led by IIASA—Study on Impacts on Resource Efficiency of Future EU Demand for Bioenergy—examining more explicitly the consequences of pursuing different bioenergy policies from 2010-2050. The report provided crucial input for the European Commission's new Sustainability Policy for Bioenergy.

The researchers assessed different policy options using the IIASA Global Biosphere Management Model (GLOBIOM) and Global Forest Model (G4M). The study showed that an emissions reduction scenario, with a target of an 80% reduction in EU greenhouse gas emissions by 2050 and no forest protections, would result in a rise in the amount of wood pellets imported into the EU, wood harvested from EU forests, and area of land used for fast-growing tree plantations.

A scenario with worldwide protections in place for biodiversity and carbon storage, however, was significantly more effective for emissions savings. By 2050, net global emissions from the land-use sector would be 10 metric megatons of CO2 lower with protections than in the emissions reduction scenario.

Under the protections scenario, EU imports of pellets would fall, and the use of domestic wood would rise. It should be noted that the biodiversity and carbon storage protections in this scenario would apply to all wood uses, not energy alone, and a policy taking only bioenergy into account would be less effective.

"Our results highlighted the importance of examining the global implications of EU policy," says Anu Korosuo, IIASA researcher and coauthor. "Increased bioenergy demand in the EU also affects other regions, as EU imports increase. This may lead to more global emissions from the land-use sector if areas with high biodiversity values and carbon storages are not protected."

The work also examined the impacts of capping the amount of high-quality logs that could be used for bioenergy. When combined with biodiversity and carbon storage protections, this led to even greater greenhouse gas emissions savings worldwide, while also ensuring a more efficient use of wood.

Finally, researchers assessed the effect of rising bioenergy demands on other related industries. Under ambitious emissions targets, the researchers found that sawmills become more profitable as they are able to sell wood shavings

and other by-products for bioenergy generation. However, particleboard producers suffer from the increased price of these wood by-products.

原始連結：
http://www.iiasa.ac.at/web/home/about/news/170113-Recebio.html

TOOL HELPS CITIES TO PLAN ELECTRIC BUS ROUTES, AND CALCULATE THE BENEFITS

An IIASA model helped inform a new tool for cities to optimize electric bus systems, which has now been used in Sweden's first wireless charging bus system, launched in December.

工具幫助城市規劃電動巴士路線並計算其益處

IIASA 的模型有助於優化城市的電動公車系統，該系統已使用於瑞典首個無線充電巴士系統

The roll-out of Sweden's first wireless charging buses earlier this month was coupled with something the rest of the world could use – namely, a tool for cities to determine the environmental and financial benefits of introducing their own electrified bus networks.

The bus system analysis model was presented during ceremonies marking the debut of wireless charging buses in Stockholm – the first in all of Scandinavia. Using the model to propose the optimal locations for installing chargers on Stockholm's bus network, energy technology researcher Maria Xylia at KTH Royal Institute of Technology reported that the fleet could halve CO2 emissions while lowering energy consumption by 34%, if the city installed 150 chargers to electrify 94 bus routes.

The 40% savings in fuel costs would balance out the projected costs of investments in infrastructure such as chargers and connection to the grid, says Xylia, who developed the model in cooperation with the International Institute for Applied System Analysis (IIASA). Xylia, a researcher at the Energy and Climate Studies Unit and Integrated Transport Research Lab at KTH, developed the model as part of her stay at the Young Scientists Summer Program of 2016 at IIASA with a grant sponsored by the Swedish Research Council, Formas.

While that forecast is based on optimized energy usage, the model also offers users the option of cost optimization. In Stockholm's case, a cost-optimized scenario would mean fewer electrified bus lines, but lower energy consumption nevertheless – albeit with a slightly-less-extensive estimate of 40% reduction in emissions.

Xylia says that the model allows for multiple bus charging technologies and even takes into account potentially rising electricity costs in the estimates. "But as long as electricity prices

remain in this range, the infrastructure cost would balance the fuel savings."

However, in order to gain the maximum environmental benefits of electrification, the electricity needs to come from renewable sources, she says. "If you look at the energy mix throughout the EU, you will see a difference – it's a totally different story from Sweden. You have to have green energy in order to maximize environmental benefit."

The model can be applied to any city as a basis for decision making, Xylia says.

"As long as you have a detailed map of the bus network and a reliable bus schedule, then you can do this for any city," she says. "London is much bigger than Stockholm, but if they have this data, then we can generate optimized energy and cost scenarios for that system."

A complete dissemination of the model will be published at a later date.

The project is connected with IIASA's work on energy system optimization methodologies that can be used on the local, regional and national scale, says one of Xylia's supervisors on the project, Florian Kraxner, deputy director of IIASA's Ecosystems Services and Management Program.

One such model is IIASA's BeWhere, which is the basis for the bus electrification analysis tool. Kraxner says that adapting the BeWhere model to transport is a step toward making cities energy efficient and reducing their carbon footprint.

"Cities and urban areas will soon become the major demand driver for energy demand globally," says IIASA researcher Sylvain Leduc, who served as Xylia's co-supervisor. "Many cities are still using a combination of different kinds of busses and tramways. These combined road and rail urban grids can be assessed an optimized in an integrated way."

The research is part of the project "Wireless Bus Stop Charging," which is funded by the Swedish Energy Agency. The project's aim is to implement, test and evaluate the potential of wireless charging for buses in city traffic to reduce emissions, improve energy efficiency and decrease fossil-fuel dependence through electrification. The project partners include Scania, Stockholm's Public Transport Authority SL, energy utility company Vattenfall, and the municipality of Södertälje.

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http://www.iiasa.ac.at/web/home/about/news/170109-bus-kth.html