

TAERE 2019 Summer School
Environmental Footprints
 台灣環境與資源經濟學會 2019 暑期課程
 環境足跡

July 15-16, 2019

Venue: Institute of Economics, Academia Sinica, Taipei, Taiwan

Organizers: Taiwan Association of Environmental and Resource Economics

Institute of Economics, Academia Sinica

Center for Global Change and Sustainability Science, National Taipei University

College of Management, National Chiao Tung University

07 月 15 日 (星期一) / July 15, 2019	
時間(Time)	議程(Program)
08:30~08:50	報到 Registration
08:50~09:00	開幕致詞 Opening Remarks <ul style="list-style-type: none"> • 簡錦漢 中央研究院經濟研究所所長 Kamhon Kan, Director, Institute of Economics, Academia Sinica • 蕭代基 台灣環境與資源經濟學會理事長 Daigee Shaw, President, Taiwan Association of Environmental and Resource Economics
09:00~10:30	講師/ Instructors: Professor Jiří Jaromír KLEMEŠ , Brno University of Technology, Czech Republic Professor Petar Sabev Varbanov , Brno University of Technology, Czech Republic <ul style="list-style-type: none"> • Introduction to environmental impacts and interactions, foundations of Circular Economy <ul style="list-style-type: none"> ➢ Introduction – main issues and problems of pollution and resource depletion ➢ Natural resources and their natural storages – circularity of extraction, use, and discharge ➢ Circular Economy principles and strategy ➢ Global energy and (virtual) water flows – the scale of the flows and the problems ➢ Sustainability – definition, components, and metrics ➢ Life Cycle thinking and the LCA framework ➢ The Environmental Performance Strategy Map ➢ Direct, indirect and total effects ➢ Measuring environmental sustainability
10:30~11:00 Coffee break 休息	
11:00~12:30	<ul style="list-style-type: none"> ➢ Life Cycle thinking and the LCA framework ➢ The Environmental Performance Strategy Map ➢ Direct, indirect and total effects ➢ Measuring environmental sustainability
12:30~14:00	Lunch & Discussion
14:00~15:30	講師/ Instructors: Professor Jiří Jaromír KLEMEŠ , Brno University of Technology, Czech Republic Professor Petar Sabev Varbanov , Brno University of Technology, Czech Republic <ul style="list-style-type: none"> • Environmental Footprints – Introduction, definitions, implementation <ul style="list-style-type: none"> ➢ General footprint principles and concepts ➢ GHG (Carbon) footprint ➢ Water footprint ➢ Energy footprint ➢ Nitrogen footprint ➢ Ecological footprint ➢ Other footprints ➢ Virtual footprints ➢ Measures and degrees of freedom to reduce footprints – resource saving via the resource/waste hierarchy, renewables, CO₂/carbon sequestration
15:30~16:00 Coffee break 休息	
16:00~17:30	<ul style="list-style-type: none"> ➢ Nitrogen footprint ➢ Ecological footprint ➢ Other footprints ➢ Virtual footprints ➢ Measures and degrees of freedom to reduce footprints – resource saving via the resource/waste hierarchy, renewables, CO₂/carbon sequestration [Small group exercise: Valuation]
17:30~19:00	Dinner
07 月 16 日 (星期二) / July 16, 2019	
08:40~09:00	報到 Registration
09:00~10:30	講師/ Instructors: Professor Jiří Jaromír KLEMEŠ , Brno University of Technology, Czech Republic Professor Petar Sabev Varbanov , Brno University of Technology, Czech Republic <ul style="list-style-type: none"> • Methods for Energy Saving and GHG/Haze Footprint Minimisation <ul style="list-style-type: none"> ➢ Examples and case studies ➢ Introduction to Heat Integration and Pinch Analysis
10:30~11:00 Coffee break 休息	

11:00~12:30	<ul style="list-style-type: none"> ➤ Advanced Process Integration Techniques – Heat Transfer Intensification, Locally-Integrated Energy Systems, integration of renewable energy sources, process-specific heat transfer properties in Total Site Heat Integration, accounting for preheating in steam generation, Power Pinch Analysis ➤ Energy storage for handling supply and demand variations ➤ GHG and Haze Footprint Minimisation
12:30~14:00	Lunch & Discussion
14:00~15:30	講師/ Instructors: Professor Jiří Jaromír KLEMEŠ , Brno University of Technology, Czech Republic Professor Petar Sabev Varbanov , Brno University of Technology, Czech Republic
15:30~16:00 Coffee break 休息	<ul style="list-style-type: none"> • Methods for Reduction of Water Footprint, Water-Energy-GHG Nexus <ul style="list-style-type: none"> ➤ Data extraction for Water Integration ➤ Water network design using Water Pinch Analysis ➤ Design for Maximum Water Reuse for Single Contaminant
16:00~17:30	<ul style="list-style-type: none"> ➤ Source/Sink Composite Curves ➤ Significance of the Water Pinch ➤ Water network design/retrofit (Cost Effective Minimum Water Network) ➤ Reversal of the WEN – using it as a synergy mechanism <p>[Small group exercise: Applications of findings in environmental policies]</p>

※ The timetable is subject to minor changes. 課程時間可能會視情況而微調。