



CEU

*Universidad
San Pablo*

GCET19
26-28·SEP·2018



19th GLOBAL CONFERENCE ON ENVIRONMENTAL TAXATION

Environmental Tax Challenges in the 21st Century:
Urban Concentration and Increasing Transport

26-28 SEPTEMBER 2018 - MADRID, SPAIN

Updated version 25.09.2018

19th GLOBAL CONFERENCE ON ENVIRONMENTAL TAXATION

Environmental Tax Challenges in the 21st Century:
Urban Concentration and Increasing Transport

26-28 SEPTEMBER 2018 - MADRID, SPAIN

Conference Programme



CEU | *Ediciones*

GCET19
26-28·SEP·2018

Conference Programme 19th Global Conference on Environmental Taxation

Any form of reproduction, distribution, communication to the public or transformation of this work may only be performed with authorisation from its copyright holders, unless exempt by law. Should you need to photocopy or scan an excerpt of this work, please contact CEDRO (www.conlicencia.com; 91 702 19 70 / 93 272 04 47).

© 2018, Fundación Universitaria San Pablo CEU

CEU Ediciones
Julián Romea 18, 28003 Madrid
Phone: 91 514 05 73, fax: 91 514 04 30
email: ceuediciones@ceu.es
www.ceuediciones.es

Design cover: Departamento de Marketing de la Universidad CEU San Pablo.
Design and layout: Pedro Coronado Jiménez (*CEU Ediciones*).
Cover Image: Pedro Expósito.

Print: Gráficas Vergara, S. A.
Printed in Spain

Contents

Welcome to the GCET19	6
<i>General Information</i>	
About GCET	8
About CEU San Pablo University	8
Social Programme	9
Registration and other information	10
Presenters Instructions	11
<i>Programme Information</i>	
GCET19 General Programme	12
Keynote Speakers	14
Parallel Sessions Overview.....	25
Detailed programme of parallel Sessions.....	26
Workshop	33
Abstracts (01-78).....	34
International Steering Committee.....	106
Advisory Committee	107
Critical Issues in Environmental Taxation Publication	108
Index of participants	109

Welcome to the GCET19

It is a great pleasure to welcome you to Madrid, the capital of Spain and the second city with most green spaces in the world, for the 19th Global Conference on Environmental Taxation. Madrid is a lively cosmopolitan and friendly city where everyone feels at home.

Your host is CEU San Pablo University, the first and the oldest private University in Spain according to the Spanish Law of Private Universities. The venue is easy to reach with public transport from everywhere in Madrid, including the airport.

As you will be aware, the GCET is the leading global forum for exchanges on the principles and practices of environmental taxation and other market-based instruments relevant for greening of the economy and a more sustainable development. Annual conferences provide a unique opportunity to bring together leading experts from academia, governments or corporations. Research presented at the previous eighteen conferences has helped provide a much stronger theoretical and empirical underpinning of the legal, economic and behavioral issues in this area. The GCET19 is very timely. A new Law on Climate Change and Energy Transition is ongoing in Spain as a key instrument to guarantee the achievement of Spain's commitments to the EU in terms of energy and climate within the framework of the Paris Agreement against global warming.

The topic for this year's conference is **Environmental Tax Challenges in the 21st Century: Urban Concentration and Increasing Transport**. The concentration of the majority of the world's population in large cities and the ever increasing transport of people and goods, both international and local, are according to international organizations among the most pressing environmental challenges in the 21st century. The increasing urban concentration and transportation are closely related, interdependent and create a socio-cultural reality that will persist for decades rendering a close examination of their environmental problems and solutions critical. The evidence concerning how globalisation has affected activity levels in maritime shipping, aviation and road and rail freight has led to the need to review the role of economic instruments to address climate change challenges.

Environmental policies are needed to address the interrelated environmental impacts of urban concentration and transport in the context of growing globalisation and address a wide array of issues including the production, transport and supply of energy and water; the water purification and recovery techniques and waste treatment; the selection of packaging materials and their design; the design of cities and construction techniques for buildings for different uses, rehabilitation techniques; different modes of urban transport; town planning; landscape protection; various means of land, sea and air transport, as well as port, airport and transport facilities in general; and education for a better internalisation of environmental needs and the development of capacities to adequately address these needs.

The GCET19 aims to address these issues from the perspective of environmental taxes. The conference will feature 78 paper presentations in parallel sessions. Our distinguished keynote speakers are covering topics from Climate Change policies, environmental design cities, environmental taxation for big cities, and taxation of transport, ocean energy, road transport or environmental protection and fiscal instruments, among others. The role of green fiscal reforms in the transport sector is the topic for a side-event.

We are delighted to host the conference in Madrid. We really appreciate this significance opportunity to join force among the Faculty of Law and the University Institute for European Studies, a Jean Monnet European Centre of Excellence, with the Institute for Fiscal Studies represented in the organizing committee. We wish you an enjoyable stay.

Welcome to the GCET19, welcome to Madrid!



Professor Dr. Ms. Marta Villar, GCET19 Conference Chair,
Faculty of Law, CEU San Pablo University

General Information

About GCET

The GCET has been held every year since 2000 as an international meeting of specialists and a forum for the exchange of ideas and research findings on environmental taxation and other market based instruments designed to protect the environment and foster sustainability.

The annual conferences provide an international and interdisciplinary setting to explore issues concerning the design and implementation of environmental taxes and opportunities for creating networks to expand and explore various theoretical and practical issues.

The conferences are not intended to advance any particular environmental agenda but seek to advance knowledge and foster understanding and debate. The GCET has brought experts from more than 50 countries together, representing a wide range of disciplines (legal, economic, financial, environmental and political science), sectors (academic, Government and non-governmental institutions and the private sector) and international organizations (UN, OECD and EU).

The main emphasis of GCET is to provide insights and analysis on how enlightened tax policy can promote sustainable environmental goals. By discussing environmental taxation issues that exist around the world, effective approaches used in one country can be considered and implemented by governmental authorities in other countries.

Annual GCET conferences have been held in Cleveland, Ohio U.S.A. (2000), Vancouver, Canada (2001), Woodstock, Vermont USA (2002), Sydney, Australia (2003), Pavia, Italy (2004), Leuven, Belgium (2005), Ottawa, Canada (2006), Munich, Germany (2007), Singapore (2008), Lisbon, Portugal (2009), Bangkok, Thailand (2010), Madrid, Spain (2011), Vancouver, Canada (2012), Kyoto, Japan (2013), Copenhagen, Denmark (2014), Sydney, Australia (2015), Groningen, The Netherlands (2016) and Tucson, USA (2017).

About CEU San Pablo University

CEU San Pablo University is committed to an academic model geared towards excellence and the integral education of our students. From the practical training and thanks to the best means and teachers, our graduates get the best preparation nationally and internationally and have, from the beginning, a direct contact with the professional demands. Moreover, CEU San Pablo is the first and the oldest private University in Spain according to the Spanish Law of Private Universities.

We are a global university, modern and connected with the main university networks and researchers of the world. CEU San Pablo University has several international programs in conjunction with other prestigious Universities in Europe and the USA All this makes up our commitment to provide our professors and students with an international experience.

The Faculty of Law of the CEU San Pablo University represents the solvency of the tradition of a Catholic university and the energy of innovation in the formation of jurists. Since its inception, which was the oldest private law school in Spain, has developed a creative vision of teaching law and other scientific fields that are integrated into the Faculty, such as Political Science, Criminology and Security and International Relations.

Moreover, we count with our prestigious **University Institute for European Studies**, a Jean Monnet European Centre of Excellence. Created in November of 1999, it is a Centre for university research, specialising in the study and analysis of European Union affairs and other aspects of international relations. The University Institute for European Studies is presided by Dr. Marcelino Oreja Aguirre (Former Ministry of Foreign Affairs and European Commissioner).

Social Programme

26 September 2018.

Welcome reception 19.30 - 21.00

Terrace of the Cibeles Palace (Madrid Townhall), Plaza de Cibeles, Madrid



27 September 2018.

Optional tour 19.00 - 20:00

Royal Palace / Plaza Mayor

Conference dinner 20:00 - 23:30

Teatro Real (Carlos III door)



29 September 2018.

Optional Saturday excursion 09.00 (duration of 9 hours aprox)

For Saturday we would like to offer a very special tour in **Segovia** (famous for its magnificent Roman aqueduct and for its cathedral, one of the last Gothic temples to be built in Europe, and his Alcazar, a fortress but has served as a royal palace, a state prison, a Royal Artillery College and a military academy since then) and **The Royal Site of San Lorenzo de El Escorial** (one of the Spanish royal sites which have functioned as a monastery, basilica, royal palace, pantheon, library, museum, university and hospital). Total price depends on total number of participants.

Additional information is available on the GCET19 website.



Registration and other information

The registration desk will be open on Thursday 27 September 8.00 - 8.45
CEU San Pablo University - Julián Romea, 23

WIFI - ID: Invitados ceu PD: inveritatelibertas

HASTAG - The official hastag is #GCET19

Presenters Instructions

If you are a parallel session presenter or moderator PLEASE read the relevant information below regarding technology, timing, and the timekeeper role:

Presentation Technology

A computer and projector will be available in each room for presentations. Please use PowerPoint (pptx) or Portable Document Format (pdf) as presentation formats. Prezi is also available if it is already fully downloaded. Presenters are requested to bring their presentations on a USB stick under all circumstances. Connecting personal laptops is discouraged to avoid excessive loss of time.

Presenters/Moderators

Presenters are invited to come to the room at least 10 minutes prior to the start of the session to upload their presentation and check functionality - all parallel sessions have a break immediately preceding them so that you will have time. We recommend using your name in the file name and avoiding file names such as GCET19 or PRESENTATION to avoid confusion. If you need technical assistance and cannot spot an assistant, kindly call +34 699 979 565 (Carlos Moreno) and request it indicating your conference room name. Moderators will introduce the presenters and their topics and their role is also moderate the debates. Please be aware of your duties as timekeeper, if applicable.

Duration

The time available for each parallel session is one hour and forty-five minutes. Therefore, parallel sessions with 5 presenters will have 21 minutes for each to present and take questions, and parallel sessions with 4 presenters will have 26 minutes for each to present and take questions. The timekeepers can give you a gentle 5 minute warning when your time is almost up and then will inform you when your time is up. The presenter will be in charge of deciding when to transition from presenting to taking questions, and will themselves take questions from the audience.

Timekeeper

Timekeepers are always the last presenters in the parallel session. Timekeepers, like the other presenters, are invited to come to the room 10 minutes prior to the start of the session and check in with each presenter. Their responsibilities include ensuring that the time is equally divided across all presentations. It is recommended that the timekeepers use a timer or a timer function on their phone to keep track of the time, and then to provide 5-minute and time's up reminders to the presenters preceding them. It will be in everyone's interest to start on time and remain respectful of others' time.

Programme Information

GCET19 General Programme

Wednesday 26th September	
19.30 - 21:00	Welcome reception at The CIBELES PALACE (Madrid Townhall) Plaza de Cibeles, Madrid
Thursday 27th September	
<i>The registration desk will be open 8.00-8.45</i>	
08:45 - 09:05	Welcome speech and official opening of the conference Marcelino Oreja (President of the CEU San Pablo University Institute for European Studies, Spain), Marta Villar (GCET19 Chair, Spain), Alain Cuenca (Director of the Spanish Institute for Fiscal Studies), Marta Martínez (Energy Policies and Climate Change, Iberdrola).
09:05 - 09:35	Valvanera Ulargui (Director General of the Spanish Climate Change Office, Spain) <i>Climate change policies in Spain</i>
09:35 - 10:05	Hernan Kraviez (Norman Foster Foundation, Spain) <i>Environmental design cities: A holistic approach in an area of climate change policies</i>
10:05 - 10:35	Qin Tianbao (Wuhan University, China) <i>Environmental taxation and big cities in China: A global vision</i>
10:35 - 11:00	Tea & coffee break
11:00 - 12:40	Parallel sessions I. The wide range of perspectives (A) SAL. I. – <i>The diversity of fiscal perspectives</i> SAL. II. – <i>Fiscal climate policy in comparative perspective</i> Room 1. – <i>Fiscal environmental policy in comparative perspective</i> Room 2. – <i>Climate change and addressing circular economy related issues</i> Room 3. – <i>Smart cities and urban perspectives</i>
12:40 - 13:40	Lunch (buffet)
13:40 - 15:20	Parallel sessions II. Mitigation strategies (B) SAL. I. – <i>Carbon pricing design</i> SAL. II. – <i>Governance issues</i> Room 1. – <i>The role of tax incentives and subsidies</i> Room 2. – <i>Air transport taxes</i>
15:20 - 16:00	Tea & coffee break
16:00 - 16:30	Pilar Jurado (Spanish Ministry of Finance, Spain) <i>An analysis of Spanish green taxes, present and future</i>
16:30 - 17:00	Vicente Hurtado (European Commission, Belgium) <i>Taxation of transport from an EU perspective</i>
17:00 - 17:30	Íñigo Losada (Cantabria University, Spain) <i>Is ocean energy ramping up in our future sustainable energy mix?</i>
19:00 - 20:00	Optional tour (Royal Palace / Plaza Mayor)
20:00 - 23:30	Conference dinner at Royal Theatre
23:30	Drinks in the downtown (optional)

Friday 28th September	
08:45 - 10:30	Parallel sessions III. Sector specific policies (C) SAL. I. – Vehicles and congestion charges SAL. II. – Renewables Room 1. – Road transport Room 2. – Solid waste pollution I Side-event Green Fiscal Policy Network <i>Delivering the Paris Climate Agreement – The role of green fiscal reforms in the transport sector</i>
10:30 - 11:00	Tea & coffee break
11:00 - 11:45	Nils Axel Braathen (OECD, France) <i>Road transport, environmental protection and fiscal instruments</i>
11:45 - 12:15	Larry Kreiser Award
12:15 - 13:30	Buffet lunch
13:30 - 15:15	Parallel sessions IV. Challenging issues (D) SAL. I. – Energy demand SAL. II. – Energy efficiency and energy transition Room 1. – Economic instruments for environmental protection I Room 2. – Economic instruments for environmental protection II Room 3. – Use of land, biodiversity and protection areas Room 4. – Solid waste pollution II
15:15 - 15:45	Tea & coffee break
15:45 - 16:25	Xavier Labandeira (University of Vigo, Spain) <i>Crisis and reform of road transport taxation in the 21st century</i>
16:25 - 17:00	Prof. Janet Milne (Vermont Law School, USA) <i>Innovation: From Pigou to the Digital World</i>
17:00 - 17:20	Next year's conference GCET20 Host
17:20 - 17:30	Closing remarks Prof. emeritus Larry Kreiser (Cleveland State University, USA)
Firewell drink	

Keynote Speakers



Director General Ms. Valvanera Ulargui, Spanish Climate Change Office, Spain

BIO: Since 2015 she is the Director General of the Spanish Climate Change Office. Her responsibilities are to put forward the national policy, according to the international and UE regulations about the climate change, in related matters with the emission's commerce and flexibility mechanisms, so as the adaptation for the mitigation of the climate change. Before that, she worked at the Ministry of Economy and Competitiveness in the ICEX España Importación e Inversiones as external advisor for Infrastructure, Environment and TICs. From 2001 to 2013 she was external advisor as coordinator of international negotiations on climate change to the Ministry of Agriculture, Food and Environment: General Directorate of the Spanish Climate Change Office.

KEYNOTE: Climate change policies in Spain

ABSTRACT: Valvanera Ulargui, Director General of the Spanish Climate Change Office will give an overview of the new Spanish policies to tackle climate change in particular in the context of the process to prepare a national climate change and energy transition law. The Spanish Government is in the process of developing a law which aims to become the main regulatory tool in Spain to ensure that the country play its part in the international efforts to tackle climate change, aligning its actions with the Paris Agreement goals. This law will also set the framework which will allow Spain to be prepared to adapt to the impacts of climate change that it is already suffering, while making sure that the most vulnerable sectors and work forces in Spain are not left behind.



Mr. Hernan Kraviez, Head of Architecture, Design and Technology, Norman Foster Foundation, Spain

BIO: Hernan studied architecture at the School of Architecture, Design and Urbanism of the University of Buenos Aires, Argentina graduating with honours in 1996. In 1998 he took Professional Development courses at Harvard University's Graduate School of Design and in 2003 received an MSc in Construction Economics and Management from the Bartlett School of Architecture, UCL, London. He joined Foster & Partners in 2004 where he worked for 14 years. As a Partner in the practice he was involved in a diverse range of projects and buildings types, from small scale interventions to large infrastructure projects. Since 2018 he is the Head of Architecture, Design and Technology of the Norman Foster Foundation in Madrid, leading a young team of architects in the design of innovative and experimental projects and prototypes that actively engage in interdisciplinary thinking in the built environment.

KEYNOTE: Environmental design cities: A holistic approach in an area of climate change policies

ABSTRACT: Cities are the future. Today, over 50% of the population lives in cities and by 2050 in excess of 70% will be urbanised. They consume over two-thirds of the world's energy and account for more than 70% of global CO2 emissions. With over 75% of cities situated on coastlines, they are at high risk from the devastating impacts of climate change. They can also be the solution.

The Norman Foster Foundation focuses on promoting interdisciplinary thinking to help new generations of architects, designers, urbanists, engineers and civic leaders to anticipate and address the problems of the future. True collaboration between seemingly disconnected fields of design and thought is at the heart of a holistic approach to design that we believe is the key to the future of cities.

The Foundation seeks to promote two main streams of activities, one with a focus on research and education, and another with the goal of implementing practical and experimental projects around the world. This keynote address will share some of the knowledge that we are gaining through the development of innovative projects in association with other like-minded institutions, universities, and research centres.



Prof. Dr. Mr. QIN Tianbao, Professor of Law,
Wuhan University, China

BIO: Prof. QIN Tianbao is the LuoJia Professor of Law, and serves as the Director of the Research Institute of Environmental Law (RIEL) and the Associate Dean for the School of Law, Professor of China Institute of Boundary and Ocean Studies, Wuhan University, China; he is the Secretary-General of Chinese Society of Environment and Resources Law (CSERL); and a Lead Author and Review Expert of the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES). He is a Legislative Expert for China's Ministry of Environmental Protection and Ministry of Agriculture, and Hubei Provincial Parliament, and headed or participated in drafting of several major environmental bills. He is an Advisor for Chinese negotiations on biodiversity, ocean and climate change issues, and an Environmental Law Expert for several projects of International Financial Institutions in China.

KEYNOTE: Environmental taxation and big cities in China: A global vision

ABSTRACT: In China, environmental taxation, also known as eco taxation or green taxation is not clearly defined yet. However, it is well accepted by the government that the environmental taxation internalizes the social cost of ecological destruction and environmental pollution into the production cost, affects the producers' and the consumers' behaviors and the distribution of environmental resources through the market mechanism. Therefore, for the purpose of promoting eco-civilization and green development in China, among others, environmental taxation is strengthened and more frequently employed, especially in promotion the development of low-carbon cities.

Chinese government has set out its ambitious intensity reduction target; namely, by 2030 carbon emissions per unit of GDP would reduce by 60%-65% compared to 2005 which has been put it into national economic and social development plan as a binding goal. Since the cities gather major population and economy, the emissions in cities accounted for about 80% of the total (local emissions and indirect emissions caused by consumptions). Therefore, how to achieve "low carbon" cities has become the main content of actions when China addresses climate change with essence to reduce carbon emissions while developing the economy.

Chinese government has released many strategies, regulations and policies on low-carbon cities' development. Correspondingly, China has established a basis system of environmental taxation with environmental protection tax and resources tax as the core body, with vehicle and vessel tax and other taxes, and tax reduction and exemption policy as supplementary body.

Specifically, from January 1st 2018 on, China imposes its Environmental Protection Tax (replacing “Pollution Discharge Fee, PDF”) and the new regime made distinction between light and heavy polluters, meaning that firms have more incentives to cut down on their emissions. And before that, China has started comprehensive its national resources tax reform since beginning of 2016. The main feature of the reform is to fully implement the ad valorem taxation method which is extended to most mineral products, such as crude oil, coal, natural gas, rare earth, molybdenum, and tungsten, though clay and sandstone will still be taxed by volume. Meanwhile, the *Vehicles and Vessels Tax of 2012* reduced taxes on energy-saving and clean energy-powered vehicles, while imposing higher taxes on cars with big engines; what’s more, the State Council stated that buyers of new energy vehicles – fully electric, hybrid and fuel cell cars – would not have to pay the levy from September to the end of 2017. On the other hand, an environmental friendly and resources conserving firms could enjoy many tax reduction and exemption policies. For example, firms can enjoy tax benefits by comprehensively utilizing resources and purchasing equipments for environmental protection or energy saving and water saving.

Such a green tax system has been applied widely and comprehensively in industry, transportation, building, lifestyle and other key fields of low-carbon cities development, which eventually facilitate the adjustment of the economic structure and promote the transformation of the development mode of China. However, there are still different voices in this process. For instance, the fact that the environmental protection tax rates are decided at the provincial level could result in the migration of polluting agents to the more tax friendly regions of the country. Ad valorem taxation method has caused special burden on industries. And without gas tax, a person with a small car that frequently drives will discharge more air pollutant than a person with a large car that is driven infrequently. All these factors, if unidentified and unsolved properly, might undermine role of environmental taxation in promoting low-carbon cities in China.

In such circumstance, China shall revise and refine its environmental taxation system through learning by doing on one hand and successful experiences from other countries on the other hand. Perhaps, law and practice of China could contribute a lot to the globe in near future.



Director General Ms. Pilar Jurado, Department of Customs and Special Taxes at the State Agency for Tax Administration, Spain

BIO: State tax inspector since 1992. She has worked in various positions in the area of customs and special taxes, both in central and territorial services. She has participated in multiple international meetings in the field of European Union, Latin America and the World Customs Organization. She currently holds the position of Director of the Department of Customs and special taxes at the State Agency for Tax Administration, a department composed of 3,600 employees. She manages functions of facilitation and control of foreign trade operations and management of special taxes, as well as the pursuit of contraband and economic crimes.

KEYNOTE: An analysis of Spanish green taxes, present and future

ABSTRACT: The effects of the polluting behaviour of our society, both by individuals and by companies, are currently an important topic in daily media (internet, social networks or blogs). Pieces of news related to the increase of forest fires, the decrease of water supplies, the rise of average global temperature, all this information could be encompassed under the label of “climate change” that is considered to be mainly produced by the impact of human actions on the environment.

The general political aim is achieving more environmentally friendly behaviors. However depending on the specific objectives pursued, fiscal authorities need to analyze the different available instruments and which ones of them are the most suitable for each objective. Their range goes from coercive measures to taxes and other instruments of joint responsibility such as subsidies, deductions or tax incentives.

It should not be forgotten that in order to protect the environment, alongside other measures, there are two basic requirements: general awareness of citizens and public and private efforts to achieve it. The protection of natural resources (such as water), the management of different types of waste, the avoidance of natural resources over-exploitation, all of them need financial resources and this is where public policies should be in balance with private action.

If, as a result of such analysis, taxation is considered a suitable instrument to achieve the goals of environmental policy, then it should be defined in a coherent manner, with long-term planning and taking into account all the effects that any fiscal measure may produce. There must be a clear identification of the taxable events, the actions and the products affected and how the tax administration can manage and apply these taxes.

Another important issue that must be addressed is the territorial jurisdiction. Speaking of Spain, for example, should the environmental taxation be established by the central government, the regions or the local governments? Double taxation must be avoided.

Furthermore, belonging to the European Union, another aspect to be considered is related to the internal market. Does a specific tax measure affect the free circulation of goods, persons and capital or the freedom of establishment?

Spain has already some taxes with environmental components, is there space and need for new ones?



Mr. Vicente Hurtado, Head of the Energy Taxation and other Indirect Taxes Unit, European Commission, Belgium

BIO: Vicente Hurtado Roa is the Head of the Unit in the European Commission responsible for Energy Taxation and other indirect taxes. His first steps in the Directorate General for Taxation started in 2006 when he was responsible for drafting the review of the Savings Directive before becoming the assistant to two previous Director Generals responsible for taxation. His experience in the European Commission also covers seven years in the Secretary General, working first on the European Semester and then in the relations with the European Council. Previously to join the European Commission, Vicente had been a tax consultant in Garrigues for ten years with an expertise in international taxation.

KEYNOTE: Taxation of transport from a EU perspective

ABSTRACT: Energy and vehicle (registration and circulation) taxes are two instruments that aim at both generating revenues for public budgets and at influencing technology and behaviour. They are typically embedded in a policy mix consisting of taxation, regulation, fiscal incentives and information campaigns targeting objectives such as reducing GHG emissions and promoting energy efficiency.

While energy taxation is harmonised at EU level, vehicle taxation is not. Council Directive 2003/96/EC sets in particular the minimum levels of taxation for products used as motor fuel and for electricity. Above the minima, Member States are free to set their national rates. The objective is to ensure that the internal market operates smoothly and to avoid double taxation or major distortions of trade and competition between energy sources and energy consumers and suppliers which could result from considerable differences in national tax rates. The directive also defines what exemptions and reductions are allowed and under which conditions. Some exemptions are mandatory, such as those on products supplied for use as fuel in air navigation or for navigation within EU waters. Optional exemptions or reductions also apply, for instance in favour of commercial gas oil, natural gas and LPG used as propellant or biofuels.

After Member States could not agree on a Commission's proposal of 2011 to turn this directive into an instrument that would be better adapted to contribute towards achieving the EU climate change, energy and environmental goals, the Commission has recently engaged in a new evaluation of the directive to be finalised by the end of 2018. Recent commitments under the Paris Climate Agreement and under the 2030 Climate and Energy EU framework that for example set a cut of CO² emissions in the non-ETS sector by 30% (compared to 2005) and a binding target of at least 27% of EU energy consumption from renewables, justify a fresh look at the role of energy taxation. Besides this, developments in the energy market and technology maturity levels (e.g. with alternative fuels or with more sophisticated models of tax differentiation) evidence the limits of the current legislative framework.

Issues such as a different minimum rate for diesel and petrol or the introduction of a reduced rate for electricity used as propellant should be addressed. In the future, the potential for fuel taxes and distance-based taxes to raise revenues and to mitigate other externalities than carbon emissions such as pollution from other gases and congestion should be explored.



Prof. Dr. Mr. Iñigo Losada, Coastal and Ocean Engineering Professor, University of Cantabria, Spain

BIO: Iñigo Losada is a Coastal and Ocean Engineering Professor affiliated with the School of Civil Engineering of the University of Cantabria in Spain. Currently he is also Director of Research of the Environmental Hydraulics Institute “IH Cantabria” where he served as founding Director from 2007-2011. Prof. Losada holds a PhD from the University of Cantabria and a PhD from the University of Delaware where he held a Research Assistant position in the Center for Applied Coastal Research. His research interests have been mostly devoted to coastal dynamics, wave and structure interaction modelling, met-ocean climate and over the last decade climate change and marine renewable energy. Losada has co-authored over 150 publications and is one of the most cited authors in his field. From 2010-2014 he served as Coordinating Leading Author of the IPCC 5th Assessment Report on Climate Change and is currently contributing to the new report on Oceans. He is co-founder of the spin-off IDERMAR, S.L. (Research and Development for Marine Renewable Energy) and co-author of 7 patents of different technologies for both wave and wind energy, especially for deep water and has coordinated many projects for national and international corporations, administrations and development banks. He is a member of the American Society of Civil Engineering (ASCE) Coastal Engineering Research Council and Editor-in-Chief of Coastal Engineering (ELSEVIER). He has received several national and international awards including the 2017 *John G. Moffat-Frank E. Nichol Harbor and Coastal Engineering Award* of (ASCE).

KEYNOTE: Is Ocean energy ramping up in our future sustainable energy mix?

ABSTRACT: During the talk the different stages of technical and commercial development of the various ocean energy technologies (tidal, wave, ocean thermal conversion, salinity gradient) and offshore wind will be discussed. It will be shown that while offshore wind is becoming an essential part of the energy mix in many countries, ocean energy technologies are still facing a series of bottlenecks hindering their development including: technology development, financing of projects, legal and financial barriers, the lack of specific feed in tariffs or taxation policies and concerns regarding environmental impacts or social acceptance.

Offshore wind is an abundant and clean energy solution for many coastal areas where high concentrations of population and energy demand is located. Recent numbers show that an estimated 3.3 GW of new offshore has been installed in 2017, bringing the cumulative total installed offshore wind power to almost 17 GW. While the onshore wind market is still larger in terms of total megawatt installed capacity added annually, offshore wind is ramping up and growing more quickly. During the talk technological developments, related policies, incentives, and regulatory environments contributing to this rapid implementation will be discussed.

In Europe ocean energy has been identified as a key technological area within the Strategic Energy Technology Plan of the European Union. However, the installation of ocean energy devices is taking place at a slower pace than expected. While the installed capacity in offshore wind power is in the order of tens of GW, Europe only accounts for a dozen of MW of ocean energy installed capacity at the end of 2016.

Within ocean energy, tidal and wave energy technologies poised to become the most relevant contributors to the European energy mix in the short term. However, reliability and survivability are still some of the issues that need to be addressed by wave energy developers to ensure the long-term uptake and viability of this technology. Several demonstrator projects have shown that the tidal technology is viable. In order to move forward and deploy the first fully commercial projects, the tidal sector requires the development of innovative financial instruments able to attract private investments. However, ocean thermal energy conversion and salinity gradient technology are still at early stage of development, requiring research and development to progress further in terms of technology.

If ocean energy technologies are to become essential players in the potential decarbonisation pathways of our energy systems, new instruments need to be created to overcome specific barriers hindering future commercial deployment analogous to that expected for offshore wind.



Mr. Nils Axel Braathen. Principal Administrator in the Environment Performance and Indicators Division in OECD's Environment Directorate, OECD, France

BIO: Nils Axel Braathen is a Principal Administrator in the Environment Performance and Indicators Division in OECD's Environment Directorate. He has been with OECD since 1996, working i.a. on a database on instruments used for environmental policy, on environmental taxation, on economic valuation of environmental externalities regarding air pollution and chemicals, and has also taken part in some of OECD's Environmental Performance Reviews. Prior to joining OECD, Braathen was a Deputy Director General in the Department for Long-term Planning and Policy Analysis in the Ministry of Finance, Norway. He holds a Master's Degree in Economics from the University of Oslo, Norway.

KEYNOTE: Road transport, environmental protection and fiscal instruments

ABSTRACT: This presentation will discuss the drivers and magnitudes of externalities caused by road transport, such as the contribution to climate change, air pollution, noise and congestion. It will also give an overview of different fiscal instruments that affect road transport, focusing in particular on the current use of taxes on petrol and diesel, as well as on environmentally differentiated motor vehicle taxes. The fiscal challenges caused by a decarbonisation of the road transport sector will also be presented.



Prof. Dr. Mr. Xavier Labandeira, Professor of Applied Economics at the University of Vigo, Spain

BIO: Professor in the Department of Applied Economics at the University of Vigo, he belongs to Rede, a research group that deals with the economic aspects of innovation, energy and the environment. He teaches public and environmental economics and he coordinates the Master's degree in Management of Sustainable Development until 2014. He is also a director of Economics for Energy, a private research center that specializes in the analysis of energy issues and aims to create and transmit rigorous, neutral and useful knowledge to the different agents of Spanish society. Between 2014 and 2017 he was the director of the Florence School of Regulation-Climate at the European University Institute in Florence. Moreover, he was a lead author of the UN Intergovernmental Panel on Climate Change (IPCC) for the elaboration of its Fifth Assessment Report (released in April 2014). His research lies in the boundaries between public, energy and environmental economics: Prof. Labandeira also regularly participates in conferences and workshops, in many cases as the organizing host. He has led many research projects, both public and privately funded, and enjoyed several research stays at different universities abroad.

KEYNOTE: Crisis and reform of road transport taxation in the 21st century

ABSTRACT: Road transport has been traditionally subject to a number of fuel and vehicle taxes with revenue, infrastructure cost-coverage, or externality (environment and congestion) correction purposes. Yet, over the last few years, several factors have been undermining the operation and effectiveness of such taxes: i) pervasive local pollution and congestion problems that are only indirectly related to type of vehicle and fuel consumption, ii) trend towards a more energy efficient fleet, reducing the revenue capabilities of the system, and iii) increasing changes in mobility options (car sharing, etc.) In this paper we provide evidence of those factors and suggest a new approach towards transport taxation that is based on both the characteristics of the vehicle and its actual (time and location) use. Taxing the real use of a vehicle is now technologically feasible and can tackle the externalities associated to road transport in a more effective way (including local pollution, climate mitigation and congestion) while maintaining revenue-raising capabilities and providing sizeable tax revenues to different levels of government. Given the difficulties associated with an immediate tax transition to the new system, the paper also considers several alternatives to move from the current tax situation.



Prof. Ms. Janet Milne, Professor of Law
and Director, Environmental Tax Policy Institute.
Vermont Law School, USA

BIO: Janet E. Milne is Professor of Law and Director of the Environmental Tax Policy Institute at Vermont Law School, USA, where she has taught environmental taxation since 1994. She has written extensively about environmental taxation, including carbon taxes. Recent publications include J. Milne, ed., *Environmental Taxation and the Law* (Edward Elgar 2017) and J. Milne and M.S. Andersen, *Handbook of Research on Environmental Taxation* (Edward Elgar 2012). Before joining the law faculty, she was tax legislative assistant to US Senator Lloyd Bentsen, Chairman of the US Senate Committee on Finance, an attorney at Covington & Burling in Washington, D.C., and worked in the land conservation field. She is a graduate of Georgetown University Law Center and Williams College and clerked for Frank M. Coffin, Chief Judge of the US Court of Appeals for the First Circuit.

KEYNOTE: Innovation: From Pigou to the Digital World

ABSTRACT: Technological innovation has changed economies over the past three centuries from the Industrial Revolution to the new digital revolution. Each phase of change has generated benefits to society but also new threats to the environment. Since the mid-twentieth century environmental protection policies have been trying to keep pace, innovating to address the ever-emerging challenges as economies move forward. This paper looks back at how environmental taxation has responded to the consequences of technological innovation by engaging in its own innovation. The paper then turns forward to look at the emerging digital economy, which is the product of extraordinarily fast-moving and significant technological advances. It explores the role of environmental taxation in addressing the environmental challenges of the 21st century digital world. How might those environmental challenges intersect with environmental taxation? Does the nature of the digital economy affect the design of environmental taxes? Do the theories underlying environmental taxation need to evolve or do traditional theories stand stalwart?

Although much remains to be known about the future shape of the digital economy and its environmental consequences, the time seems right to consider about how governmental pricing policies might avoid or minimize the adverse consequences of a new economic revolution from its start—rather than waiting until patterns of behavior have been formed. This paper does not attempt to provide full answers to such a complex and multifaceted topic, nor could it. Selecting examples from the transportation and urban settings, it instead strives to highlight the question whether environmental taxation needs to innovate alongside the technological changes that increasingly drive economies and society around the world.

Parallel Sessions Overview

Room	Parallel Sessions I 27th Sept. 11:00 – 12:40	Parallel Sessions II 27th Sept. 13:40 – 15:20	Parallel Sessions III 28th Sept. 8:45 – 10:30	Parallel Sessions IV 28th Sept. 13:30 – 15:15
SAL. I.	The diversity of fiscal perspectives	Carbon pricing design	Vehicles and congestion charges	Energy demand
SAL. II.	Fiscal Climate Policy in comparative perspective	Governance issues	Renewables	Energy efficiency and energy transition
Room 1	Fiscal environmental policy in comparative perspective	The role of tax incentives and subsidies	Road transport	Economic instruments for environmental protection I
Room 2	Climate change and addressing circular economy related issues	Air transport taxes	Solid waste pollution I	Economic instruments for environmental protection II
Room 3	Smart cities and urban perspectives			Use of land, biodiversity and protection areas
Room 4				Solid waste pollution II

Detailed Programme of Parallel Sessions

Thursday 27th September

(A) Parallel Session I - 11:00 – 12:40 (5) The wide range of perspectives

(B) Parallel Session II- 13:40 – 15:20 (4) Mitigation strategies

Friday 28th September

(C) Parallel Session III - 08:45 – 10:30 (4) Sector specific policies

(D) Parallel Session IV - 13:30–15:15 (6) Challenging issues

(*) The underlined name means the person is the presenter, and the asterisk indicates timekeeper

(A) Parallel Session I - 11:00 – 12:40. The wide range of perspectives

1.1. SAL I. - The diversity of fiscal perspectives (A)

Moderator: Stefan Weishaar, University of Groningen (NL)

Fiscal policy for decarbonisation of energy in Europe, with a focus on urban transport: case study and proposal for Spain (ID: 01) - David Robinson, Oxford Institute for Energy Studies (UK)

The status of climate policy integration and coherence – progress in the EU and in Austria (ID: 02) - Daniela Kletzan-Slamanig, Claudia Kettner, Austrian Institute of Economic Research (AT)

Is the low level of taxes for the electronic commerce contributing to an environmentally unfriendly growth of transport? (ID: 03) - Marta Villar, CEU San Pablo University (ES)

(*) **How do corporate tax rates affect corporate environmental social responsibility? A comparison of Australia and the U.S.** (ID: 04) - Roberta Mann, University of Oregon School of Law (US), Bill Butcher, UNSW Sydney (AU), Fiona Martin, UNSW Sydney (AU)

1.2. SAL II. - Fiscal climate policy in comparative perspective (A)

Moderator: Jerónimo Maillo, CEU San Pablo University (ES)

External costs and environmental taxation: the role of transport sectors within the Italian economy (ID: 05) - Andrea Molocchi, Italian Ministry of Environment – Sogesid TA (IT)

The important role of environmental taxation in renewable energy production and energy consumption in Spain and in the English electricity sectors (ID: 06) - Nuria Encinar Arroyo, Barrister in Energy Law. Phd. LL.M. (ES)

Modelling of the environmental assistance composed of donor countries, recipient countries and third countries (ID: 07) - Bishwa Raj Kandel, Kaetsu University (JP)

(*) **The development of an international environmental tax agenda in the United Nations Committee of Experts in international tax cooperation** (ID: 08) - Tatiana Falcão, European University Institute (BR)

1.3. Room 1. - Fiscal environmental policy in comparative perspective (A)

Moderator: José Andrés Rozas, University of Barcelona (ES)

Current situation and issues of environmental taxes in Japan (ID: 09) - Shoko Sakai, Katsuo University (JP)

Fiscal policies for green growth: a case study of Brazilian manufacturing industries (ID: 10) - Camila Gramkow, University of East Anglia (UK)

The utilization fee in the Russian Federation and its impact on environmental protection (ID: 11) - Nikolay Kichigin, Institute of Legislation and Comparative Law under the Government of the Russian Federation (RU)

(* **Italian experiences of local taxation to protect the environment: a comparative analysis** (ID: 12) - Roberta Alfano, University of Naples (IT), Alessia Tomo, University of Naples (IT)

1.4. Room 2. - Climate change and addressing circular economy related issues (A)

Moderator: Larry Kreiser, Cleveland State University (US)

The use of social cost of carbon dioxide values in climate policy (ID: 13) - Elena Aydos, University of Newcastle (AU)

The G20 Peer Review of FFS (ID: 14) - Aldo Ravazzi Douvan, Italian Ministry of Environment - Sogesid TA (IT), Gionata Castaldi, Italian Ministry of Environment - Sogesid TA (IT)

Internet of things, environmental protection and taxation (ID: 15) - Iñaki Bilbao Estrada, CEU Cardenal Herrera University (ES), Álvaro Antón Antón, CEU Cardenal Herrera University (ES)

Tax exemption, green and circular economy and local taxes (ID: 16) - Carlo Soncini, University of Parma (IT)

(* **Tax reliefs for housing and collaborative transportation in relation to the objectives of climate change** (ID: 17) - Juan Ignacio Gorospe Oviedo, CEU San Pablo University (ES)

1.5. Room 3. - Smart cities and urban perspectives (A)

Moderator: Carmen Cámara, Madrid Open University (MOU) – UDIMA (ES)

Smart city: the synergy among citizens, authorities and corporations through the environmental taxation (ID: 18) - Simone Ariatti, University of Trento (IT) Virginia List, Legance avvocati associati (IT), Alessandra Magliaro, University of Trento (IT)

The tax regime of historical gardens in a perspective of cultural and environmental valorisation (ID: 19) - Caterina Verrigni, University of Chieti-Pescara (IT)

Smart cities: can business improvement districts reduce the environmental footprint of commerce logistics? (ID: 20) - Helena Villarejo, University of Valladolid (ES), Maria Luisa Esteve Pardo, University of Girona (ES), Clara Peiret (City University of London (UK)

(* **Creative districts and sustainable growth. A tax law perspective** (ID: 21) - Silvia Giorgi, University of Chieti-Pescara (IT)

(B) Parallel Session II- 13:40 – 15:20. Mitigation strategies

2.1. SAL I. - Carbon pricing desing (B)

Moderator: Janet Milne, Vermont Law School (US)

Canada's carbon price floor (ID: 22) - Ian W.H. Parry, IMF (US)

The fluctuating fortunes of carbon pricing in resource rich nations – a review of recent developments in Canada and Australia (ID: 23) - Wayne Gumley, Monash University, (AU), Deborah Jarvie, University of Lethbridge (CA)

New pathways for carbon pricing – the Dutch experience (ID: 24) - Stefan Weishaar, University of Groningen (NL)

(* **The use of the Effective Carbon Rate (ECR) as an indicator for climate mitigation policy** (ID: 25) - Kris Bachus, University of Leuven (BE)

2.2. SAL II. - Governance issues (B)

Moderator: Nils Axel Braathen, OECD (FR)

Tax incentives to green investments: limits to state's cuts back (ID: 26) - Jerónimo Maillo, CEU San Pablo University (ES)

Environmental tax regulations in the light of the “indirect expropriation” doctrine: the threat of state liability (ID: 27) - Begoña Pérez Bernabeu, University of Alicante (ES)

Ex-post appraisal of environmentally related tax policies: building on programme evaluation studies (ID: 28) - Nils Axel Braathen, OECD (FR), Jonas Teusch, OECD (FR)

(* **Preventing cases of chronic obstructive pulmonary disease: an estimate of monetary benefits of reductions in air pollution** (ID: 29) - Mikael Skou Andersen, Aarhus University (DK)

2.3. Room 1. - The role of tax incentives and subsidies (B)

Moderator: Roberta Mann, University of Oregon School of Law (US)

Tax incentives for energy in Turkey: increasing fiscal transparency in energy policy (ID: 30) - Leyla Ates, Altimbaz University (TR), Sevil Acar, Altimbaz University (TR)

Driven by subsidies: government support to use of fossil fuels in the transport sector in Europe (ID: 31) - Ipek Gençsü, Overseas Development Institute (UK)

Urban concentration as a way of sustainable development of Brazilian Amazon region: a case study of zona franca of Manaus – a free-trade zone amidst the forest (ID: 32) - Weber Busgaib Gonçalves, Federal University of Ceará (BR), Renan Cavalcante Araújo, Federal University of Ceará (BR), Pedro Felipe de Oliveira Rocha, Catholic Pontificia University of San Paulo (BR)

(* **Tax measures to incentive environmentally friendly cities** (ID: 33) - José María Cobos Gómez, Comillas Pontificia University / Garrigues (ES)

2.4. Room 2. - Air transport taxes (B)

Moderator: Justo Corti, CEU San Pablo University (NL)

Aviation; to tax or not to tax? (ID: 34) - Bill Hemmings, Transport and Environment (NL)

Implementing CORSIA – challenges and opportunities (ID: 35) - Laurel Besco, University of Toronto-Mississauga (CA)

The Swedish aviation tax – an example to follow? (ID: 36) - Yvette Lind, University of Gävle (SE)

(* **International aviation and climate change: carbon pricing beyond CORSIA** (ID: 37) - Beatriz Martinez Romera, University of Copenhagen (DK), Dirk Heine, GMTMD (DE), Goran Dominioni, Erasmus University Rotterdam (DK)

(C) Parallel Session III - 08:45 – 10:30. Sector-specific policies

3.1. SAL I. – Vehicles and congestion charges (B)

Moderator: Violeta Ruiz Almendral, Spanish Constitutional Court (ES)

The Geneva congestion charge: rationale, design, and acceptability (ID: 38) - Linda Tesauro, Haute École de Gestion Genève (CH)

Is road pricing the key to sustainable low-carbon road transport in Australia? (ID: 39) - Vanessa Johnston, Monash University (AU)

Policies for a low-carbon transition in passenger vehicles in East Asia (ID: 40) - Aileen Lam, University of Macao (CN), Soocheol Lee, Jean-François Mercure, Yongsung Cho, Chun-Hsu Lin, Hector Pollitt, Unnada Chewprecha, Sophie Billington, Cambridge Econometrics (UK)

Sharing cars: a legal and economic analysis of the taxation of B2C carsharing models (ID: 79) - Fanny Vanrykel, Bruno De Borger, Marc Bourgeois, Liège University (BE)

(* **Taxation of vehicles without emissions** (ID: 41) - Francisco José Cañal García, University of Barcelona (ES)

3.2. SAL II. – Renewables (C)

Moderator: Marta Martinez, Iberdrola (ES)

The experience of Eolic power in beach's environment in Brazil's northeast region (ID: 42) - Elizabeth Alice Barbosa Silva de Araujo, Eulália Emília Pinho Camurça, Eveline Barbosa Silva Varvalho, Luis Henrique Barbosa de Araujo, The Federal University of Ceará (BR)

Solar power in Brazil: current overview and fiscal challenges for the next five years (ID: 43) - Adriana Reis de Albuquerque, Federal University of Sao Paulo (BR)

Instruments to promote solar energy development in Brazil: possibilities to urban deconcentration induction (ID: 44) - Denise Lucena Cavalcante, The Federal University of Ceará / PGFN Ministério da Fazenda, Eric de Moraes e Dantas, The Federal University of Ceará (BR)

(* **Promotion of renewable energy for a sustainable city: taxes on electric self-consumption of households?** (ID: 45) - Gemma Patón, University of Castilla La Mancha (UCLM) (ES)

3.3. Room 1. - Road Transport (C)

Moderator: Gonzalo Sáenz de Miera, Iberdrola (ES)

The problem about transport in Mexico and the lack of tax elements in the energy reform to encourage a sustainable transport (ID: 46) - Diana Gabriela Pinzón Ortiz, Morelos State University (MX)

Fuel price elasticities of car transport in EU member states (ID: 47) - Claudia Kettner, Austrian Institute of Economic Research (AT)

Incentive proposals for the electric vehicle in the Spanish tax system (ID: 48) - Ángel Moreno Inocencio, International University of La Rioja (ES)

Cap-and-trade possibilities for the transportation sector of the Northeast and Mid-Atlantic states (ID: 49) - Jeffrey Paul Sokolik, Vermont Law School (US)

(*) Road test of Australia's Luxury Car Tax Concession - will it influence demand for low carbon vehicles? (ID: 50) - Anna Mortimore, Griffith University (AU)

3.4. Room 2. - Solid waste pollution I (C)

Moderator: Álvaro Antón Antón, CEU Cardenal Herrera University (ES)

Plastic and green bag taxes: Italian recent trends (ID: 51) - Marina Bisogno, University of Naples and University of Paris Panthéon-Sorbonne (IT), Nora Libertad Rodríguez, University of Salamanca (ES).

Could environmental tax help to tackle plastic pellets leakage? (ID: 52) - Joana Pedroso, Gothenburg University (SE)

Potential impacts of adjustments to the New Zealand waste disposal levy (ID: 53) - Tanzir Chowdhury, Eunomia Research & Consulting Ltd (UK)

(*) Disposable packaging waste and the polluter pays principle: the introduction of a charge on disposable coffee (ID: 54) - Carmen Cámara Barroso, Madrid Open University (MOU) – UDIMA (ES)

(D) Parallel Session IV - 13:30–15:15. Challenging issues

4.1. SAL I. - Energy demand (D)

Moderator: Hope Ashiabor, Macquarie University (AU)

Dynamic pricing and consumers' adaptive behavior: energy demand-supply balance when consumers update their lifestyles in the long-run (ID: 55) - Eiji Sawada, Kyushu Sangyo University (JP)

Household energy demand and demographic transition: what role for environmental taxation? (ID: 56) - Rosella Bardazzi, University of Florence (IT), Maria Grazia Pazienza, University of Florence (IT)

Old taxes and new challenges: fuel excises and the shifting sands of our dependence on fossil fuels (ID: 57) - Hope Ashiabor, Macquarie University (AU)

(*) Taxing energy or funding roads? Australia's fuel tax system at the crossroads (ID: 58) - Celeste M Black, Sydney Law School (AU)

4.2. SAL II. - Energy efficiency and energy transition (D)

Moderator: Mikael Skou Andersen, Aarhus University (DK)

Public funds for energy efficiency programs (ID: 59) - José A. Rozas, University of Barcelona (ES)

Promoting energy efficiency in residential and commercial properties: can property assessed clean energy (pace) programs be implemented in Spain? (ID: 60) - M^a Luisa Esteve Pardo, University of Girona (ES)

Regulating behind the meter: embedding protections for energy consumers in modern energy environments (ID: 81) - Rowena Cantley-Smith, Monash University (AU)

The role of tax law in the French energy transition (ID: 61) - Vladimir Marchenko, University Paris II Panthéon-Assas (FR)

(*) **Nuclear energy for city transport during the energetic transition** (ID: 62) - María de los Angeles Díez Moreno, Madrid Open University (MOU) – UDIMA (ES)

4.3. Room 1. - Economic instruments for environmental protection (I) (D)

Moderator: Stefan Speck, European Environmental Agency (DK)

The Italian catalogue of EHS and EFS (ID: 63) - Aldo Ravazzi Douvan, Cecilia Camporeale, Gionata Castaldi, Luca Grassi, Mario Iannotti, Greti Lucaroni, Andrea Molocchi, Italian Ministry of Environment – Sogesid TA (IT)

Taxes on air pollution in Spain (ID: 64) - Ignasi Puig Ventosa, ENT Foundation (ES)

Paris agreements and international shipping: a second opportunity for market-based measures? (ID: 65) - Justo Corti Varela, CEU San Pablo University (ES)

(*) **A green tax reform for Cyprus and its co-benefits for urban sustainability** (ID: 66) - Theodoros Zachariadis, Cyprus University of Technology (CY)

4.4. Room 2. - Economic instruments for environmental protection II (D)

Moderator: Javier Porras, CEU San Pablo University (ES)

Efficient tax incentives for buildings' better environmental performance (ID: 67) - María Amparo Grau Ruiz, The Complutense University of Madrid (ES)

Applying environmental taxes to supply chain management (Examining intermodal transportation in interconnecting systems) (ID: 68) - Deborah Jarvie, University of Lethbridge (CA)

Study on the relationship between provincial tax rates of EPT and selected parameters (ID: 69) - Chazhong Ge, Chinese Academy for Environmental Planning (CN), Yidan Zhang, Hangzhou University of Electronic Sciences and Technologies (CN), Feng Long, and Qijia Yang, Chinese Academy for Environmental Planning (CN)

China's new emissions trading scheme and the prospects for linking (ID 80) - Joseph Dellatte, Sven Rudolph – Kyoto University (JP)

(*) **Analysis of the granting of credit and subsidies in innovative technologies in renewable energy: assessing the implementation and effectiveness of a Brazilian case** (ID: 70) - Carlos Araujo Leonetti, Federal University of Santa Catarina (BR), Rafaela Cristina, Federal University of Santa Catarina (BR), Elena Aydos, University of Newcastle (AU)

4.5. Room 3. - Use of land, biodiversity and protection areas (D)

Moderator: Kris Bachus, University of Leuven (BE)

How much does it cost to conserve the nature space in China? (ID: 71) - Wu Jian, Renmin University of China (CN), Yang Zhe, Renmin University of China (CN)

Inventory and analysis of the effectiveness of landfill taxation of non-hazardous waste in Europe (ID: 72) - Tom Huppertz, RDC Environment (BE)

Common pool resources and green taxation: is there a way to convergence? (ID: 73) - Lia Carolina Vasconcelos Camurça, Federal University of Ceará (BR)

(*) The agricultural conundrum: encouraging climate-friendly agriculture through economic instruments in North America (ID: 74) - Emma Akrawi, Vermont Law School (US)

4.6. Room 4. - Solid waste pollution II (D)

Moderator: Iñaki Bilbao, CEU Cardenal Herrera University (ES)

The costs and benefits of extended producer responsibility: an evaluation of the Italian waste electrical and electronic equipment (WEEE) management system (ID: 75) - Edoardo Croci, University of Bocconi (IT), Francesco Colelli, University of Bocconi (IT)

Optimal charge rate for the waste disposal charge system in Korea: a comparative static analysis within the framework of consecutive waste treatment service markets (ID: 76) - Taek-Whan Han, SeoKyeong University (KR)

Taxation as a preventive measure for environmental protection (ID: 77) - Nazlı Nilay Dayanç, Bilkent University (TR)

(*) Payment for urban ecosystem services and the waste pickers: a tool to overcome environmental and social challenges in Brazil (ID: 78) - Ana Paula Rengel Gonçalves, Federal University of Santa Catarina (BR)


GCET19
 26-28 SEP 2018


 CEU | Universidad
 San Pablo


giz
 German Green Investment
 Association e.V. (GGI GmbH)


GREEN FISCAL POLICY NETWORK
 UNEP

Sponsored by

 German Ministry of Economic Affairs and Energy
 based on a resolution of the German Bundestag

EVENT SUMMARY

Almost 90 countries have included some form of fiscal policies in their nationally determined contributions (NDCs) to the Paris Climate Agreement. This includes a number of fiscal policy measures in the transport sector such as vehicle taxes, incentives for hybrid and electric vehicles, fuel taxes, subsidies for clean energy and tax exemptions for public transport among others. Such measures will be a key part of countries' efforts to achieve their NDCs, for example by promoting the substitution of polluting fuels with cleaner fuels and encouraging the use of low-emission vehicles, while generating revenues that can be used for climate related investments. At the same time, fiscal measures such as subsidies to transport fuels and the preferential tax treatment of company cars, can undermine the achievement of countries' climate commitments. The reform of such measures will thus be an important part of a comprehensive policy package to deliver countries' NDCs.

During the 19th Global Conference on Environmental Taxation (GCET19), the **Green Fiscal Policy Network** will organize a side-event to examine how green fiscal reforms in the transport sector can support countries' efforts to mitigate GHG emissions and mobilize climate financing to meet their commitments under the Paris Agreement. Experts will discuss the role and potential contribution of green fiscal policies in the transport sector to implementing countries' NDCs, explore lessons from best practices in the use of such policies, social and economic impacts of reform, and political and other challenges to further action. The Green Fiscal Policy Network and this side-event are supported by the International Climate Initiative (IKI) of the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB).

INVITED SPEAKERS AND PANELLISTS

- Jesús Gascón Catalán**
Director of the Spanish Tax Agency
- Ian Parry**
Principal Green Fiscal Policy Expert, Fiscal Affairs Department, International Monetary Fund (IMF)
- Joy Kim**
Senior Economist, Resources and Markets Branch, UN Environment
- Philip Gass**
Senior Policy Advisor, Energy Programme, Global Subsidies Initiative (GSI)
- Jacqueline Cottrell**
Senior Policy Advisory, Green Budget Europe (GBE)
- Rob de Jong**
Head of Air Quality and Mobility Unit, Economy Division, UN Environment
- Kurt Van Dender**
Head of the Tax and Environment Unit, Centre for Tax Policy and Administration, Organisation for Economic Co-operation and Development (OECD)
- Chair: Eike Meyer**, Advisor, Climate, Environment, and Infrastructure Division, GIZ

Participation at this side-event is open to registered participants at the [GCET19](http://gcet19.uspceu.es/)
 For further information, contact: greenfiscalpolicy@gmail.com

[www.greenfiscalpolicy.org](http://gcet19.uspceu.es/)

<http://gcet19.uspceu.es/>


GCET19
 26-28 SEP 2018


 CEU | Universidad
 San Pablo


giz
 German Green Investment
 Association e.V. (GGI GmbH)


GREEN FISCAL POLICY NETWORK
 UNEP

Sponsored by

 German Ministry of Economic Affairs and Energy
 based on a resolution of the German Bundestag

Delivering the Paris Climate Agreement – The role of green fiscal reforms in the transport sector

Side-event at the 19th Global Conference on Environmental Taxation

Friday 28 September 2018, 08:45-10:30am (CET)
 CEU San Pablo University
 Julian Romea 23, 28003 Madrid



Fiscal policy for decarbonisation of energy in Europe, with a focus on urban transport: case study and proposal for Spain

David Robinson,
Oxford Institute for Energy Studies (UK)

This paper argues that fiscal policy may act as a barrier to the decarbonisation of transport and buildings in Europe, and often does not address related issues of local contamination and congestion. The paper has three parts: Conceptual framework, Modelling of energy sector fiscal policy reforms in Spain and Fiscal policy recommendations for urban transport in Spain. (I) Conceptual framework: The first part introduces the analytical framework. It describes how environmental and other taxes are charged differently on electricity compared to fossil fuels in the transport and building sectors in many European countries. This is inconsistent with the objective of decarbonising these energy end markets, for instance through the electrification of transport. It suggests a fiscal policy framework to support decarbonisation as well as reduced local pollution and congestion. The framework needs to be fine-tuned for specific countries and end markets. (II) Modelling of energy sector fiscal policy reforms in Spain: The second part summarises a modelling exercise undertaken by the authors to analyse the impact of Spanish fiscal reforms on: demand and prices for different energy sources (electricity, natural gas, gasoline and gasoil); the mix of electricity production (coal, natural gas, nuclear, etc.); environmental emissions (CO₂, NO_x and SO₂); GDP; and distribution (i.e. consumer energy costs by income groups). It introduces the models and the reform scenarios and summarizes the key results. It also identifies limitations of the models and implications for the interpretation of the results, in particular as they apply to investment decisions. (III) Fiscal policy recommendations for urban transport in Spain: The third part makes fiscal policy recommendations for urban transport in Spain, with a focus on reducing emissions and containing congestion. It draws on our analytical framework and modelling results, and addresses a number of the specific political and economic challenges that need to be resolved for the reforms to be effective. In particular, the proposals aim to provide signals for efficient investment decisions related to vehicles, while smoothing the political economy frictions of the transition away from diesel and gasoline vehicles.

The status of climate policy integration and coherence – progress in the EU and in Austria

[Daniela Kletzan-Slamanig, Claudia Kettner](#)
Austrian Institute of Economic Research (AT)

The Paris Agreement's key target is to limit global warming to well below 2°C compared to pre-industrial levels which implies a thorough reorganization of production and consumption patterns with net zero emissions by mid-century. Successful climate policy requires that the objective of reducing greenhouse gas emissions as unintended side effects non-climate policy interventions has to be integrated in decision-making and legislative processes in all policy areas and levels of government. The recognition of the cross-cutting nature of climate policy and the consideration of emission impacts in other policy areas are termed climate policy integration (CPI) and constitutes a key prerequisite for successful climate protection. We develop seven criteria (political commitment, actors, functional overlap, time perspective, weighting/resources, policy instruments and emission impact) to evaluate the development of CPI in the EU as well as in Austria. At EU level we assess strategic and energy policy documents and compare the legislation in force to the policy proposals of the 2016 Winter Package regarding the degree of CPI. Overall, the energy policy objectives regarding renewable energy and energy efficiency are synergetic with climate policy. But other energy policy documents still contain conflicting issues. This refers e.g. to the Energy Security Strategy that emphasizes the role of fossil fuels for security of supply. Furthermore, some aspects in the Winter Package (e.g. ending the preferential grid access for electricity from renewable) are conflicting with the objective of accelerating the deployment of renewables. For the assessment of the status of CPI in Austria we conduct a survey among representatives of administration, social partners, other special interest groups and stakeholders. We find widely diverging views on whether climate policy in Austria is too ambitious or too weak. Especially, potential negative impacts on competitiveness or employment are seen to hamper ambitious mitigation policies and dominate decision making in case of conflicting objectives. Regarding current developments it remains to be seen whether the formal integration of climate and energy policy in one ministry helps resolve some perceived barriers. The national climate and energy strategy published in spring 2018 largely lacks ambitious approaches and especially fiscal instruments are completely absent, although they could play a key role in improving Austria's unsatisfactory climate performance.

Is the low level of taxes for the electronic commerce contributing to an environmentally unfriendly growth of transport?

Marta Villar
CEU San Pablo University (ES)

Digital companies have an average effective tax rate half that of the traditional economy. In particular, the state of taxation of certain activities in the electronic commerce – especially, those related to tangible goods – is a source of concern at global level. In recent years, policymakers and legislators have taken a number of actions for moving towards a model on which digital business activities are taxed in a fair, efficient and growth-friendly way. Courts are also taking a stance on this issue: On June 21, 2018, the Supreme Court of the US decided in *South Dakota v. Wayfair* that the US states can collect sales taxes from most online retailers and will impact the taxation on digital economy. The tax landscape is evolving very quickly on the assumption that digital economy provides positive effects for the environment. Nevertheless, there is the question whether potential environmental adverse effects can be found, such as the increase in long-distance freight transport to the detriment of local productions. The question is whether such a difference in tax treatment is creating an imperfect competition that makes it possible for some entities to assume transport costs which are impossible for others with a higher tax burden and to compete favourably with local production. European statistics seem to confirm this analysis, because transport charges are a major obstacle to its activity. Although the majority (59 per cent) of EU enterprises having received orders via website or via apps during 2016 reported no difficulties for their web sales to other EU Members, almost four in ten (38 per cent) reported hampering factors, being the main impediment to cross-border web sales within the EU transport charges. All in all, digital businesses in the current tax model also raise the issue of to what extent the minimum burden corporate taxation for these activities and for other productive factors – especially, tax burden for labour –, leaves companies to the assumption of costs and structures distribution channels which are environmentally harmful. Our paper analyses this topic and specifically raises the question of whether environmentally unfriendly increasing transport caused by the electronic commerce is the natural result of this international tax framework and what kind of mitigation strategies should be implemented to improve the protection of the environment.

How do corporate tax rates affect corporate environmental social responsibility? A comparison of Australia and the U.S.

[Roberta Mann, University of Oregon School of Law \(US\)](#)

[Bill Butcher, UNSW Sydney \(AU\)](#)

[Fiona Martin, UNSW Sydney \(AU\)](#)

A growing literature has developed on the topic of enforcement crowding out altruism. This literature may apply to the idea of corporate environmental social responsibility. Corporate social responsibility is also pertinent to issues of energy use and transportation congestion. If the government requires social responsibility, by imposing a carbon price or by otherwise increasing tax liabilities to pay for social goods, does that reduce the corporate social response? Similarly, would reducing regulations and corporate tax liability increase the social response? The U.S. and Australia have significant differences in corporate taxation under 2017 law. Post-2017, the U.S. is moving closer to Australia in its corporate tax rate and also in its international tax system. Australia is also considering reducing its corporate tax rate. In both the U.S. and Australia, corporations use tax strategies to reduce their effective tax rates (ETRs). The U.S. and Australia both face environmental challenges and government response to those challenges may be lacking. Investors increasingly expect corporations to perform on environmental, social and governance metrics. Using a case study approach, we examine whether low corporate tax rates appear to encourage firms' investment in sustainability. We compare selected U.S. and Australian multinational corporations (MNCs) on ETR and CSR. As companies in different industries face different ETRs, we select companies in different industries. According to analysis by the New York University Stern School of Business, multinational corporations in the retail industry face a relatively high ETR (34%) while enterprises in the coal (5%) and information technologies sectors (16%) face lower ETRs. We will examine corporate sustainability reports and data on ETRs of selected companies and attempt to draw conclusions on characteristics of companies that score well on environmental CSR and how these companies are affected by the legal and tax systems under which they operate. We will compare the U.S. and Australian systems, identify best practices, and offer recommendations for reform.

External costs and environmental taxation: the role of transport sectors within the Italian economy

Andrea Molocchi
Italian Ministry of Environment – Sogesid TA (IT)

Aim of the paper is to verify the coherence of the framework of environmental taxes paid by sectors of activity in Italy with the polluters pays principle, by applying the external costs of air emissions approach, with a particular focus on transport sectors as classified in integrated environmental - economic accounts (NACE rev.2 classification: road and rail transport services, aviation and shipping, household transport). The analysis will provide suggestions for policy options to reform current environmental taxation paid by transport sectors in the wider context of the whole economy. The methodology used could be further developed for an EU wide country comparison. A preliminary description and analysis of environmental taxes (Eurostat definition) paid by different economy sectors and by households in Italy will be made, allowing a preliminary comparison of taxes paid by transport sectors with environmental taxes paid by all other economy sectors. As a second step, the paper will present an estimation of the external costs generated by Italian sectors in the same framework (sixty-four NACE rev.2 sectors). The NAMEA (National Accounts Matrix including Environmental Accounts) account on air emissions published by Istat provides annual emissions data on green-house gases, major air pollutants and heavy metals related to NACE sectors. To evaluate the external costs related to these emissions, this paper applies the newly Government released Italian Guidelines for the external costs evaluation of public infrastructures (June 2017), that recommends a parameterized evaluation approach applicable to all sectors of activity, based on the impact-pathway methodology originally conceived for the EU level (Ricardo – AEA, 2014; ExternE 2005, NEEDS 2008, Exiopol 2010). The results of the external costs estimation in the NACE rev 2 sectors will be compared with the level of environmental taxes paid by the same sectors, thus allowing a consistency analysis with the polluter pays principle and of the potential revenue related to a tax neutral reform of environmental taxes aimed at covering the external costs of economy sectors. After a discussion of the boundaries and limits of the methodological approach, the final section of the paper will put forward some proposals for an environmental taxation reform in transport sectors, conceived in the context of a wider fiscal policy reform in Italy.

The important role of environmental taxation in renewable energy production and energy consumption in the Spanish and in the English electricity sectors

Nuria Encinar Arroyo
Barrister in Energy Law. Phd. LL.M. (ES)

A revision of Directive 2003/96/EC was carried out in 2011, but finally the proposal was withdrawn. Currently a new draft is under discussion or at least the European Commission has launched a new public consultation in March 2018 that aims to consider whether the current levels of taxation are sufficient to guarantee the appropriate functioning of the internal energy market. To this end, the aim is to identify the options to decrease the regulatory burdens and to look for the better way to compute the regulatory benefits and savings with the new regulation achieving thereby the objectives set out by 2030. Among them, renewable energy and energy efficiency. “Energy efficiency first” principle, has been established by the Europeans institutions under the Clean Energy for all Europeans package in 2016. Energy efficiency must assume a key role in the transition towards a carbon-free energy system, since it is the appropriate instrument, i) to benefit the environment; ii) to reduce greenhouse gas emissions; iii) to reinforce security of supply by reducing the dependence on energy imports; iv) to reduce energy costs and; v) to mitigate energy poverty. For that reason, environmental taxation must play a key role and its implementation should be made by approving tax incentives or deductions on the investment in the construction of renewable power plants but never on its production, tax incentives or deductions must be addressed on those measures in maintenance, upgrades, renovations and new construction projects. Fortunately, by improving building energy efficiency not solely achieves the transition to a low carbon society but could also tackle fuel poverty. This paper is a comparative study of the environmental taxation in renewable energy in Spain and in England and Wales in respect of the European regulatory framework. The UK’s withdrawal from the EU, will take place when the internal electricity market has not been completed. A leading player eventually abandons. A player that has worked for nearly forty years implementing the European regulatory framework with a view to achieving the long-awaited single market. The European Union loses a Member State that has been at the forefront in the liberalization process. Bearing all this in mind I will see the important role of the environmental taxation in renewable energy in those markets with the target to compare them and to see how it does work in a Brexit world.

Modelling of the environmental assistance composed of donor countries, recipient countries and third countries.

Bishwa Raj Kandel
Kaetsu University (JP)

The purpose of the current study is to develop the economic model which could examine the various effects over the foreign assistance in the field of economic development and environment protection. First, we found two major types of assistance. One is the financial assistance and other is the technical assistance. Financial assistance could be implemented by the systematic planning and governance control with the both donor and recipient countries, while technical assistance is very difficult to find out what kind of technology is suitable for the developing countries. Most of donor agencies provide the high-quality technology but it often cannot affordable for the developing countries because of significant running cost including well-trained personnel. Second, we newly examine the spillover effects of the environmental assistance against the third countries. The environmental assistance to one developing country could affect the terms of trade for all neighboring developing countries in the open economy. Furthermore, it could also affect the terms of trade for all developed countries which are in trade relations with those developing countries. By the developed model, we showed that 1) the spillover effects of the environmental assistance could worsen the environmental protection level in the neighboring developing countries, 2) could reduce the total amount of assistance from the developed countries, and 3) the financial assistance and the technical assistance differently affects the third countries. Our analysis shows that, it is the only the risk of catching problem of donor and receipt countries. Even if we succeed in improving the environment in a specific country or region unless we have to promote aid plan globally considering Spillover effects. It will lead to further environmental degradation in the third countries.

The development of an international environmental tax agenda in the United Nations Committee of Experts in international tax cooperation.

Tatiana Falcão
European University Institute (BR)

In October 2017 the United Nations Committee of Experts in International Tax Cooperation (Committee of Experts) met in Geneva for the 15th time. Traditionally, the first meeting of a new membership sets the agenda for the coming term and, as noted above, this time was no different. Putting aside the expected tax treaty matters, this proposed article will draw attention to one particular topic that was approved for consideration by the committee over the coming years. It is a tax topic that is likely to intersect with several other public policy issues and affect decisions about the allocation of resources at the U.N. level and around the world - environmental taxation. The topic of environmental taxation was first discussed by the 12th session of the Committee of Experts in 2016. It was briefly discussed again in the 13th session. A conference paper presented at the 14th session considered environmental taxation in the context of the Paris Agreement and other commitments made under the U.N. Framework Convention on Climate

Change (UNFCCC). However, because the 14th session was the final meeting of the last membership of the Committee of Experts, the members thought it best to leave the topic for consideration by the next membership. In this context, environmental taxation was brought to the new membership's attention during the 15th session, and no one opposed taking up the topic for consideration during the next four years. This decision was based on the history of international environmental agreements, an understanding that there is a need to correct the theoretical framework behind some of the existing policies in the field of environmental taxation, and the admirable success that Sweden has had imposing a carbon tax while continuing to sustain a reasonable level of economic development. I personally brought these points to the attention of the Committee of Experts during the 15th session. My intention is to present the expected work-flow of the Subcommittee on Environmental Taxation during the GCET, and subsequently present a paper highlighting some of the issues which are being put to consideration by the Subcommittee. One of the main issues that is intended to be analysed by the Subcommittee, is a clear-cut definition for environmental taxes, as opposed to the more generic notion of environmentally related taxation currently widely disseminated by international organizations, in particular by the OECD and the EU. Environmental taxation, sometimes framed as part of green economics, has long been overlooked by the tax community. It is a field in desperate need of development and leadership. The limited legal framework that exists involves the fields of international environmental law and international trade law. An environmental tax policy will need to tie into these two fields to succeed. The Paris Agreement has provided momentum for the movement to design new environmental taxes, and it is conducive to environmental tax reforms at the country level. It is incredibly significant that the Committee of Experts has taken on this topic. Countries that wish to fulfill the objectives of the Paris Agreement will need guidance and leadership to help them design the right tools to prevent irreversible environmental harm. As policy guidance becomes available, the U.N. can develop the capacity needed to draft suitable policies. Capacity development can (and should) occur at the policymaking level rather than at the implementation stage when ill-devised legislation is more difficult to correct. As a larger body that reaches well beyond the tax field, the United Nations is the only intergovernmental organization that contains an inclusive framework capable of creating synergies between the different facets of a comprehensive environmental policy — social, legal, economic, and environmental considerations — that have to come together to create sound and long-lasting policies on climate change. Tax instruments have proven to be important instruments for behavioral change, but it is important to go beyond national solutions and avoid solutions that work to the detriment of less developed countries. Through its work shaping international environmental tax regulation, the Committee of Experts can play an important and determinative role in the much larger environmental debate that is essential to fulfilling the international commitments assumed under the Paris Agreement.

Current situation and issues of environmental taxes in Japan.

Shoko Sakai
Katsu University (JP)

Traditionally, in Japan, there had been no tax called the environmental tax, and as for the tax related to energy, consumption tax for energy has existed. Such as volatile oil tax, local volatile oil tax, aircraft fuel tax, oil gas tax, oil coal tax etc. These taxing standards are based on the quantities of energy consumptions, and the tax rate applied to the calculation of tax amounts was a target tax rate based on consumption quantity. However, focusing on fossil fuel CO₂ emissions in 2011, the basic policy of “Global Warming Countermeasure Tax” that aims at a 30% reduction in CO₂ emissions compared to the 1990 level by 2030 was shown. And as a result, in the reform of the tax system in 2012, “Global Warming Countermeasure Tax “ was realized and enforced. It also realized taxation according to CO₂ emissions by adding a tax rate added to the existing oil coal tax rate. Thus, after nearly 25 years of introduction of first carbon tax in the world as Finland’s 1990 carbon tax, Japan also introduced the tax system that takes CO₂ emissions into consideration. But this carbon tax rate is very light. So, it remains at the same level as the developing country as it is. On the other hand, “Forest Environment Tax” will be created in 2019 tax reform. This was founded to create a new system to manage municipalities themselves and procure necessary resources for forest maintenance etc. to be implemented by municipalities, for forests that are bad for natural conditions and not on profitable base. The purpose of the system is to enhance forest maintenance, not only to prevent global warming, but also to preserve the national land, cultivate water sources, create local district and create a comfortable living environment. Currently, in Japan, various problems are involved in maintaining forests, such as lower management desire of forest owners, increased forests unknown owner, existence of forest with undetermined boundary, lack of forest industry success. In this study, the situation and problems of the “Global Warming Countermeasure Tax” in Japan will be discussed and the contents and importance of the new tax “Forest Environment Tax” will also be emphasized.

Fiscal policies for green growth: a case study of Brazilian manufacturing industries.

Camila Gramkow
University of East Anglia (UK)

The twin challenge of pursuing socioeconomic development while reducing greenhouse gas emissions in developing countries is often recognized. In spite of this, much of the literature focuses on mitigation measures and policies that result in net economic losses. The aim of this study is to explore and identify realistic mitigation measures and policies that can both reduce CO₂ emissions and trigger a more virtuous cycle of economic development, using the Brazilian manufacturing sectors as a case study. An ex ante assessment of the impact of green fiscal reforms is conducted. Different green fiscal reform scenarios are developed, which simulate the introduction of a portfolio of fiscal incentives (i.e. tax exemptions and concessional finance) for green investments and environmental taxation (i.e. introduction of a carbon tax, which avoids increasing government's primary deficit) from 2018. Employing a large-scale macroeconometric model, E3ME, projections for Brazil's futures with and without the reforms are produced up to 2030, following Brazil's Nationally Determined Contribution timeframe. The results show that investments grow faster and trade balance is improved compared to the baseline in most green fiscal reform scenarios. Direct, indirect and induced macroeconomic interactions and feedbacks further accelerate GDP growth (by up to 0.42%), boost investments (by up to 1.2%) and improve trade (by up to 0.84%). Critically, qualitative changes to the trade balance are produced by green fiscal reforms. These reforms reduce Brazil's external vulnerability, by reducing imports of fossil fuels that can be highly price-volatile and subject to supply disruptions. Moreover, the reforms enhance Brazilian exports of medium and high-technology manufacture, thereby reducing concentration of exports on primary products and natural-resource-intensive manufacture. Led by its enhanced economic performance, Brazil's per capita GDP becomes slightly closer to per capita GDP of OECD countries by 2030. A carbon tax of up to 7.4 EUR/tCO₂ is sufficient to avoid deterioration of governments' primary balance. Emissions of CO₂ are significantly reduced (by up to 14.5%) from the introduction of green fiscal reforms led by manufacturing sectors and, to a lesser extent, by other sectors, which shows that green fiscal reforms can induce emissions mitigation throughout the economy. These results substantiate that green fiscal reforms can contribute to reduce Brazil's external constraints to long-term economic growth and thus reduce the development gap with OECD member countries while reducing CO₂ emissions relative to the reference scenario. Brazil can lead the way for developing countries to explore the opportunities of mitigation.

The utilization fee in the Russian Federation and its impact on environmental protection.

Nikolay Kichigin

Institute of Legislation and Comparative Law under the Government of the Russian Federation (RU)

In the Russian Federation since September 1, 2012 the utilization fee is introduced which is levied for the purpose of ensuring ecological safety, including for protection of health of the person and environment from harmful influence of operation of vehicles from each vehicle imported to the Russian Federation or made in the Russian Federation. The utilization fee is a non-tax revenue of the Federal budget. The introduction of the utilization fee led to the appeal of the European Commission in the WTO with the requirement of equalization of the conditions of payment of the utilization fee for foreign and Russian automakers. As a result of changes in Federal legislation, this requirement was met, and the imbalance was eliminated. The study will consider the mechanism of payment of the utilization fee, the procedure for setting rates for recycling, the procedure for compensating specialized enterprises for the costs of recycling vehicles. It is expected to analyze the impact of the recycling mechanism on the formation of infrastructure for the disposal of vehicles.

Italian experiences of local taxation to protect the environment: a comparative analysis.

Roberta Alfano, [Alessia Tomo](#)
University of Naples (IT)

The problems related to transport in medium-large cities are the subject of increasing attention from both the public opinion and Governments: air pollution, congestion, noise pollution, are some of the most significant negative effects produced by traffic. Until now, solutions adopted to limit these negative externalities are quite varied, from the point of view of the instruments they use and the objectives they pursue. Among the various approaches, the taxation plays a crucial role at international and European level, as supported by the OECD and the European Commission. In view of the achievement of the international targets to prevent/reduce pollution, given the numerous constraints on national fiscal policies, the local and regional dimension results to be the most fertile ground for the realization of environmental taxes, due to its particular and functional link with the territory. Local authorities, in compliance with the national and international context, through the use of taxation intervene in the economy and try to guide citizen and businesses' conducts towards sustainable development by encouraging the creation of a green culture. Among the tax instruments adopted in the Italian experience, this paper will analyze two measures that operate at different local levels. At regional level, the IRESA (Regional Tax for Sound Emissions of Aircraft) is currently in force in Italy, with the aim of improving conditions in the areas affected by airport operations. This is an environmental tax in the strict sense, able to internalize the cost of noise pollution, by making it lays on the polluter, in accordance with the European principle "polluter pays". At municipal level this work will examine the Ecopass, established in Milan in an experimental form starting from January 2008. It is an access tax to a metropolitan area conceived as a carbon charge, based on the experience of other European cities, in order to decongest the city centers and reduce air pollution. Although his tax nature is

debated, it's an interesting instrument from a financial point of view because of its significant revenue that could be used by local government for environmental protection. The aim of this paper is to draw up a legal analysis of the Italian experiences in a comparative perspective, in order to evaluate their admissibility, effectiveness and efficiency in consideration of constitutional and European limits.

ID: 13

The use of social cost of carbon dioxide values in climate policy.

Elena Aydos
University of Newcastle (AU)

From an economics perspective, global warming is a result of market failure, which can be corrected by internalisation of externalities, but requires knowledge about the extent of external costs. Cost efficiency pricing could also be much improved by approximating external costs. One estimate of the cost of greenhouse gas emissions is the Social Cost of Carbon Dioxide (SC-CO₂). In this paper we analyse how the disciplines of law, economics, and climate science might collaborate to better address the emerging challenges posed by global warming. We start by describing the legal and policy history of the SC-CO₂ in the regulatory framework of the United States and the recent termination by the Trump government of a uniform approach for the estimation of the SC-CO₂ at the Federal level. We then analyse current trends on the use of SC-CO₂ in the context of cap-and-trade schemes. We demonstrate that SC-CO₂ calculations are an extremely valuable means not only for estimating the external costs of global warming but also for concrete policy design such as carbon markets in the US. As carbon markets have been spreading across the globe and all governance levels, improving estimates of the SC-CO₂ could also greatly benefit carbon market design and reform in other jurisdictions.

The G20 Peer Review of FFS.

[Aldo Ravazzi Douvan](#), [Gionata Castaldi](#)
Italian Ministry of Environment – Sogesid TA (IT)

Fossil Fuel Subsidies (FFSs) encourage directly and indirectly congestion in urban areas and unsustainable modes of transport while increasing GHG emissions leading to global warming and climate change. For this reason the international community is trying to cope with the issue since several years. The adoption of the Paris Agreement and of UN 2030 Agenda with its SDGs in 2015 represents a turning point: since then, different policy changes around the world took place heavily involving fossil fuel subsidies (FFS). As reported in OECD (2018) “India and Indonesia have made great strides in phasing-out their consumer price supports [...], a number of fuel tax exemptions have been phased-out in OECD countries, and carbon taxes have been introduced in Mexico and France to internalize the external costs of fossil fuel consumption”. G20 countries are contributing with self-reports on FFS: the peer review mechanism highlights the importance of transparency and accountability in this domain, where environmental, climate and economic issues are at stake. As in traditional OECD Peer Reviews, best practices are shared, progress is reported to G20 partners and the global community, critical issues are discussed and receive feedbacks from partners. Indeed, FFS cause excessive consumption of fossil fuels, exacerbate environmental pollution, result in loss of government income and have serious health damages. Moreover FFS are inefficient from an environmental and an economic point of view. They may be efficient on a social ground; but experience and analysis have shown that direct subsidies to poor and vulnerable groups are more efficient and avoid to underprice carbon, giving the wrong price signal in the short- and long-run to the economic system. This is why, in 2009, G20 partners decided to start phasing out FFSs “over the medium term” while emphasizing a major consequence of such fiscal measures, i.e. to undermine “efforts to deal with the threat of climate change”. G20 Peer Reviews have started in 2016: the first countries, just after their ratification of the Paris Agreement, were China and USA. Mexico and Germany followed in 2017; in 2018, it is the turn of Indonesia and Italy. Heterogeneity of approaches among different countries on the definition of “subsidy” may arise, as well as the attempt to limit the analysis of FFSs with ambiguous definitions like “inefficient FFS”. Common and parallel action by G20 countries may mutually reinforce climate and economic policies. The paper analyses the process of G20 Peer Reviews on FFSs for the 6 Countries reviewed so far, the commitments by G7 and G20 countries, the contributions by research to the debate.

Internet of things, environmental protection and taxation.

Iñaki Bilbao Estrada, [Álvaro Antón Antón](#)
CEU Cardenal Herrera University (ES)

The tax system has been used with an extra fiscal function in environmental matters, pursuing the incentive or disincentive of harmful or protective behaviors of the environment. However, the design of these economic instruments has been based on environmental estimations, taking into account the difficulties of real measurements. However, the emergence of new disruptive technologies such as the Internet of Things can be of great help in the field of environmental taxation. In this regard, it should be noted how the aforementioned technology allows the measurement of different parameters related to environmental protection (CO₂ emission, energy consumption, etc.), making possible the subsequent transmission, even in real time, of the data collected by the cited sensors to the corresponding Administrations. Consequently, both for the purpose of encumbering pernicious behavior against the environment, and in terms of environmental tax benefits, we could have an important instrument to validate and activate the measures adopted, depending on compliance with the environmental parameters defined, through the information received through the aforementioned technology.

Tax exemption, green and circular economy and local taxes.

Carlo Soncini
University of Parma (IT)

1. Introduction. “SOMETHING NEW UNDER THE SUN” is an Italian way of saying, not only the title of a book about environmental history written by McNeil. New laws are now in force in Italian legislation. A wide range of tax exemption and reduction connected with “green economy” and, in particular “green building”. In accordance with EU legislation has been introduced Italian law about “circular economy”. In Italy, on 2 February 2016, with the 2016 Stability Law, the Environmental Member entered into force (Law 28 December 2015, n.221) containing provisions on environmental legislation to promote the green economy and sustainable development. It has allowed the principles of the circular economy to become part of the Italian legal system. It acts with a wide range on everything related to the environment, from waste management to sustainable mobility. 2. Tax Exemptions and “Green Building”. Most important tax exemptions are in Italy those regarding “green building”. We have to point out that those have regard to old buildings that have to be renewed. Those exemptions are not accorded to new green building. So as to improve energy efficiency in older buildings. Is central in this perspective the new “Ecobonus”. A great difference is the fact that documentation has to be sent to Enea and not to Tax Agency. Enea is the Italian national agency for new technologies, energy and sustainable economic development. We have to point out that these reductions have been extended also in 2018 for private housing and until 2021 for common parts of the condominiums. 3. Circular Economy, Taxation, Tax Reduction and Exemption. Circular economy was introduced a few years ago in the Italian legislation as told. No particular tax regimes have been introduced so as exemption or reduction. As stated in the Communication dated 2.12.2015 – COM (2015) 614 final - COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS - Closing the loop - An EU action plan for the Circular Economy, “The action plan focusses on action at EU level with high added value. Making the circular economy a reality will however require long-term involvement at all levels, from Member States, regions and cities, to businesses and citizens. Member States are invited to play their full part in EU action, integrating and complementing it with national action. The circular economy will also need to develop globally. Increased policy coherence in internal and external EU action in this field will be mutually reinforcing and essential for the implementation of global commitments taken by the Union and by EU Member States, notably the U.N. 2030 Agenda for Sustainable Development and the G7 Alliance on Resource Efficiency. This action plan will be instrumental in reaching the Sustainable Development Goals (SDGs) by 2030, in particular Goal 12 of ensuring sustainable consumption and production patterns.” This is a long term program that involves also in tax matter. With the Law n. 221 of 28 December 2015, the so-called “Environmental Connection”, and the enactment of some regulatory provisions, the Italian government has implemented some actions aimed at promoting the circular economy. These are the main measures.

- Ministerial Decree of 24 May 2016 which determined the awarding points for the assignment of design and construction services for the new construction, renovation and maintenance of buildings and for the management of public administration sites.
- Ministerial Decree of May 26, 2016 with which the guidelines for the calculation of the percentage of separate collection of municipal waste were approved;

- Ministerial Decree of 10 June 2016, no. 140, with which the criteria for the design and ecological production of electrical and electronic equipment were dictated.
- Law n. 166 of 19 August 2016 with which an intervention was carried out aimed at favoring the recovery and donation of food, pharmaceutical and other products in favor of non-profit-making individuals.
- Ministerial Decree n. 264 of 13 October 2016 which contains the indicative criteria to facilitate the demonstration of the existence of the requirements for the qualification of production residues as by-products and not as waste.
- Ministerial Decree n. 266 of 29 December 2016 with which the operating criteria and simplified authorization procedures for the community composting of organic waste were approved.
- Ministerial Decree of 15 February 2017 with which the minimum environmental criteria were adopted to be included in the technical specifications of tenders for the execution of plant health treatments along the railway lines and along the roads.
- Ministerial Decree of 20 April 2017 with which the criteria were adopted for the implementation by the municipalities of systems for the timely measurement of the amount of waste conveyed to the public service or of management systems characterized by the use of corrections to the distribution criteria the cost of the service, aimed at implementing an effective tariff model commensurate with the service rendered to cover the full costs of the service for the management of urban waste and similar waste. Furthermore, the Council of State has expressed a favorable opinion on the draft regulation of the Ministry of the Environment which regulates the experimentation of the system for the restitution of packaging for beer or mineral water, served to the public, whose duration will be equal to one year.

With the favorable opinion of the Council of State (No. 257, January 27, 2017), the Ministry of Environment has aligned the draft Regulations (7 articles and 3 attachments) to the findings formulated in the first interim opinion formulated by the same judge (n 2405, published November 17, 2016). See: <http://www.minambiente.it/pagina/leconomia-circolare-italia>. 4. Environmental Taxation in Local Taxes. Nothing new in Italy as regard the local taxes having regards to environmental taxation. We have to point out only the new measures introduced by the Italian General Director for pollution of the Italian environmental ministry dated first February 2018 as to simplify the transport and recycle of the ferrous and on ferrous waste that are not dangerous. Furthermore, in according to this and in connection with circular economy Italian Ministry of Environment has introduced a Multi Annual Work Program called “LIFE” 2014-2020. Under another point of view it is important to report a judgment from the Italian Supreme Court in 2016 regarding TIA. At the end we can say that environmental taxation in Italy is an important laboratory, still work in progress. Its importance is still increasing and the impact is more and more relevant also under the economical prospective.

Tax reliefs for housing and collaborative transportation in relation to the objectives of climate change.

Juan Ignacio Gorospe Oviedo
CEU San Pablo University (ES)

This paper is based on the premise that it is necessary to promote models that guarantee environmental protection, and the rational use of available resources, based on communities that collaborate for the mutual and collective benefit, as it is in the sharing economy. The recent crisis, technological developments and the absence of a regulatory framework have generated an increase in economic transactions worldwide that a few years ago would have been unthinkable. The globalization and simplification of operations has transformed the business framework into becoming an economy between individuals, the so-called sharing economy, where they use a digital platform for the temporary use of goods or services, with or without profit. The collaborative economy has a special influence over two areas that affect urban concentration and increased transport, through technological platforms that allow the sharing of two basic elements of our lives, and also of great economic relevance, such as housing and transport. In addition, the information obtained through the collaborative platforms could be very useful for planning the urban design and traffic in the cities. Our proposal is to promote fiscal measures for the efficient use of resources in housing and transportation in cities, through collaborative consumption to mitigate climate change. To achieve this, it will be necessary to distinguish, within the sectors of tourist accommodation and transport, under what conditions a service is not a business, due to the fact that it is infrequent, or merely a community service. It will also be necessary to identify whether and how these services contribute to sustainable development goals as an effective way of tackling climate change, through non-polluting energies, adequate urban planning, and sustainable consumption patterns. This will allow, on one hand, the enhancement of community-based models that collaborate for the mutual and collective benefit, and, on the other, more efficient use of resources, for the benefit of the environment. Thus, we can draw as a conclusion that professional activities carried out through the so-called “collaborative platforms” will follow the general established taxation for this type of activity. Conversely, the collaborative economy, in the strictest sense, should be encouraged fiscally, in order to benefit the community and environmental improvement.

Smart city: the synergy among citizens, authorities and corporations through the environmental taxation.

[Simone Ariatti](#), University of Trento (IT)
[Virginia List](#), Legance Avvocati Associati (IT)
[Alessandra Magliaro](#), University of Trento (IT)

1. Peculiarities of a city that could be defined as “smart”. The aim of this paper is to analyze what “smart city” stands for, and what could be the role of environmental taxation in order to enrich its meaning and its utility in the future. First of all there is not just one definition or an international rule that defines the essential elements or requisites of a city that could be recognized as smart, whereas we could find many sources of soft law that emphasize different aspect of a smart city. Thus, the focus should be to find what the core of a smart city is, and in our opinion is the strength and the final aim of it should be the collaboration between citizens, authorities and corporations based around the city. The connections among these three subjects should be strong and proactive, so as the improvement of the environment of the city and a sustainable development could be the result of their efforts. 2. The synergy between the stakeholders (Simone Ariatti). Along with collaboration, environmental taxation can play a key role to create a better and stronger synergy between the stakeholders. In fact citizens could be more incentivized taking care of the environment of the city, as a common good, if they will have a fiscal incentive as an award of their green lifestyle and active participation. Furthermore, the same incentives, deductions or even exemptions could be provided to all the corporations that prove to act ethically, to respect the citizens who live and work in the city, and to prefer the green way of doing business. In addition, the authorities of the city could provide guidelines and policies addressed both to citizens and to corporations indicating what type of actions are rewarded with deductions, incentives or exemptions. In order to design the perfect instrument mix to use in each city, there should be a previous study of the current situation and the problems that the city under consideration should face. Therefore, the expert of environmental taxation could plan a tailor made fiscal system for each city. Moreover, the theory would be strengthened by case studies of Italian public administrations that have shown a special commitment to protect, preserve and improve the environment of the city.

The tax regime of historical gardens in a perspective of cultural and environmental valorisation.

Caterina Verrigni,
University of Chieti-Pescara (IT)

The historic garden is a natural open space designed by man with aesthetic purposes to which a public interest is recognized for artistic or historical relevance. Italy has about 5,000 villas and gardens protected by the Ministry of Cultural Heritage, most of which are private, others state-owned and open to the public; among these some have been declared a World Heritage Site (Royal Palace of Caserta, Villa d'Este in Tivoli, Botanical Garden in Padova) and are part of the UNESCO World Heritage List. These are very special properties, which does not correspond to a specific consideration by the Legislator: the Code of cultural heritage (Legislative Decree No. 42/2004) after introducing the protection provision says nothing about the protection, conservation and enhancement. In fact, the gardens and parks of historical and artistic interest require considerable maintenance and conservation costs also linked to climate events. From the fiscal point of view, the discipline of favor reserved for cultural heritage does not contain any specific provision for historic gardens. Even the fiscal Legislator while idealizing to want to encourage the possession of buildings of historical interest and their destination for cultural use, does not adequately enhance the high conservation costs of historic gardens, through the provision of an appropriate system of facilities. Limiting, the brief reflections to the field of income taxes, we can remember the art. 15, TUIR, which provides for a tax deduction of 19% for the expenses incurred by the subjects obliged to the maintenance, protection or restoration of all "constrained items", to the extent actually remained to them. The art. 5 bis, D.P.R. n. 601/1973, on the basis of which the cadastral income of parks and gardens open to the public does not contribute to the formation of the income of individuals and companies, the conservation of which is recognized by the Ministry of Cultural Heritage on condition that the owner does not draw any income from its use. At present, the fiscal discipline reserved for historic gardens does not represent a valid support tool for the protection of these cultural assets, even if in the national context there are gradually developing initiatives aimed at enhancing the themes of "urban green" in the context of environmental protection, redevelopment of urban areas in terms of economic development of the territory and a new form of cultural tourism related to the rediscovery of the historic green.

Smart cities: can business improvement districts reduce the environmental footprint of commerce logistics?

[Helena Villarejo](#), University of Valladolid (ES)
[Maria Luisa Esteve Pardo](#), University of Girona (ES)
[Clara Peiret](#), City University of London (UK)

E-commerce is reshaping the retail sector. One of the most significant new trends is to reduce “physical” stores and increase digital purchase channels. This implies a “distribution revolution” in order to provide fast, convenient and secure package-delivery. Commerce logistics are becoming increasingly complicated and their environmental impact cannot be ignored. Business Improvement Districts (BIDs) can be considered as a paradigm of the evolution of urban policies in recent years. BIDs are organizations of a private nature or are public-private partnerships with local authorities, created when a majority of the business owners or business premises owners in a delimited area agree, by means of a ballot process, to manage the zone to offer more supplementary services funded by a mandatory charge with the aim of boosting the economy and regenerating the area. BIDs have proved to be a creative and very efficient mechanism of urban governance, capable of satisfactorily combining the public and private interests at play. This means that they can also be able to play a significant role in the field of urban freight flows and the way in which deliveries are made. BIDs can develop smart city projects that will help reducing environmental footprint of commercial logistics and in addition meeting other corporate social responsibility goals. Introducing the BID model in Spain could serve not only to boost urban commercial areas, but also to contribute to deal with the new challenges of retail evolution and even more to address environmental issues. The aim of this communication is to analyse how BIDs can have a role in reducing the increasingly impact of freight volumes due to the development of e-commerce and to examine, from a legal point of view, which measures and legal reforms would be required to transfer this public-private partnership formula to the Spanish legal system.

Creative districts and sustainable growth. A tax law perspective.

Silvia Giorgi,
University of Chieti-Pescara (IT)

European Institution noted the link between, on the other hand, the role of cultural and creative sectors (see the “Europe 2020 Strategy”). In particular, in 2013, two European Creative Districts (Creative Wallonia in Belgium and CREATE in Tuscany, Italy) were launched with the aim of demonstrating the transformative power of the creative industries for the rejuvenation of traditional industrial regions. They were conceived to test support to sustainable tourism and business, but no specific tax incentives have been mentioned so far. The US experience on cultural districts, instead, shows that they can be financed through a mix of private and public investments: on the public side, tourism taxes or other cultural-targeted levies could be charged to raise revenues and combined with incentives for businesses in the area; on the private side, charitable contributions could play a fundamental role, but they should still be promoted by virtue of deductibility regimes or tax credits so as to attract the donors. The aim of this paper is to analyze the hypothetical role of taxation in promoting sustainable cultural districts within the European context. The main sections of the research will focus on the different model of cultural districts, designing the main features of each, also considering the economic literature in the field. The strategy for successful district will be explored, identifying some “virtuous” experiences both in Europe and in the US, especially where creative districts have led to a higher level of sustainability and landscape protection. This will be the premise for facing the topic from the tax law perspective. The need for a public intervention will be addressed, also explaining the tax levy role, the way in which the incentivized districts should be selected, the most suitable tax incentives, the coordination with other instruments (also private ones) of support to the creative sector.

Canada’s carbon price floor.

Ian W.H. Parry, Victor Mylonas,
IMF (US)

The pan-Canadian approach to carbon pricing, announced in October 2016, ensures that carbon pricing applies throughout Canada in 2018, with increasing stringency over time to reduce emissions. Canadian provinces and territories have the flexibility to either implement an explicit price-based system –with a minimum price of CAN \$10 per tonne of carbon dioxide equivalent in 2018, increasing to CAN \$50 per tonne by 2022– or an equivalently scaled emissions trading system. This paper discusses the rationale for, and design of, the price floor requirement; its (provincial-level) environmental, fiscal, and economic welfare impacts; monitoring issues; and (national-level) incidence. The general conclusion is that the welfare costs and implementation issues are manageable, and pricing provides significant new revenues. A challenge is that the floor price by itself appears well short of what will be needed by 2030 for Canada’s Paris Agreement pledge.

The fluctuating fortunes of carbon pricing in resource rich nations – a review of recent developments in Canada and Australia.

Wayne Gumley, Monash University (AU)
Deborah Jarvie, University of Lethbridge (CA)

The taxation of urban energy and transport related activities is of growing importance for all major economies. Resource rich nations of the New World such as Canada and Australia have mixed blessings in this area, as on the one hand they have access to vast fossil fuel reserves which should keep prices down, whilst on the other they both have geographically dispersed populations, highly variable weather conditions and resource intensive lifestyles which puts them amongst the highest global per capita consumers of fossil fuels. In both countries, energy and transport related expenditures are a relatively large proportion of total expenditures for all sectors including households, businesses and government. Equally significant is the high proportion of GDP derived from development of fossil fuel resources in these countries, including extensive activity by multi-national corporations. Accordingly, there is acute political sensitivity concerning any taxation measures connected with energy or transport in these countries, which provides a substantial barrier to traditional arguments in favour of fossil fuel levies and environmental taxation. Despite these obstacles, environmental taxes and carbon pricing measures have gained significant traction, albeit in a staccato fashion. In Australia a comprehensive national carbon price scheme was introduced in 2011 but dismantled after only two years after a withering political assault from the fossil fuel sector. Within that leadership vacuum several State Governments and the private sector have led more recent initiatives to reduce carbon emissions. In Canada, successful carbon pricing schemes have emerged firstly in the resource rich provinces of British Columbia (from 2008) and Alberta (2017). The Canadian Government has now followed with its own national scheme to commence in 2018. This paper will review these promising developments to gain insights for future application of carbon pricing in the energy and transport sectors

New pathways for carbon pricing – the Dutch experience.

Stefan Weishaar,
University of Groningen (NL)

In its coalition agreement the Dutch government vowed to introduce a minimum price for CO₂ in the electricity sector and to significantly reduce CO₂ emissions. The Dutch objective is to reduce emissions by 49% in 2030 and thereby dwarfs the EU's target. The Dutch target is to be achieved by a national Climate change agreement which is currently being shaped and engages companies, stakeholders and policy makers. It should enter into force in the beginning of 2019. This paper analyses the challenges and pitfalls in shepherding carbon prices through the policy process and contrast it to the experience in other EU countries, especially the Nordic countries. This paper is based on interviews (businesses, trade associations and civil servants), Law and Economics and tax literature, and draws on earlier research conducted within the 'Carbon Taxes in Austria: Implementation Issues and Impacts' project (WIFO/RUG).

The use of the Effective Carbon Rate (ECR) as an indicator for climate mitigation policy.

Kris Bachus,
University of Leuven (BE)

In 2016, the OECD introduced the new indicator *Effective Carbon Rate* (ECR). This innovative indicator measures the combined price put on carbon emissions by energy taxes (ET) and emissions trading schemes (ETS). Interestingly, the OECD found that countries with a high ECR tend to have a low overall carbon intensity, which suggests that recommending countries to increase their ECR may be a valuable climate mitigation strategy. Calculation of the new indicator demonstrates that carbon pricing is still at a very low level considering the need to stay below the 2° warming target: 60% of CO₂ emissions from energy use face a zero effective carbon rate, and only 10% are priced at 30 (\$ 33) or higher. The OECD provides calculations on a national and sector level in a relatively detailed manner. However, the creation of this new indicator leaves room for additional questions which this paper aims to answer. First, we will calculate the national weighted average ECR for a selection of case countries (a single figure per country in EUR/tonne CO₂ emission, this is not provided by the OECD), including China, US, Japan, UK, France, Germany and Belgium. Second, a comparative case study will be carried out for Belgium and China, including the provision of explanations for the differences. Third, specific country recommendations will be formulated focussing on the low-priced types of emissions that will come out of the previous analysis. Fourth, the link between ECR and other indicators will be discussed, such as the *Implicit Tax Rate on Energy* (ITE). Fifth, we will look forward to future changes in the ECR for Belgium and China, answering questions like ‘What is the expected impact of the start of the nationwide ETS (announced but not in operation yet) on China’s ECR?’, or ‘What is the expected impact of recent environmental tax decisions in Belgium on its ECR?’ Finally, the paper will draw conclusions on two levels. First, lessons from the comparative analysis will be transformed into policy recommendations. And second, we will discuss the potential of the ECR as an indicator to measure both the use of economic instruments for the environment and the ambition level for countries with regard to climate mitigation policy.

Tax incentives to green investments: limits to state's cuts back.

Jerónimo Maillo,
CEU San Pablo University (ES)

Can a State strongly incentivize long-term Green investments and, after some years, change the framework, cutting back the benefits for the investors? Can this cut backs be also applied to already pre-existing and operative energy plants or should they be limited to future plants? Would this qualify as a retroactive application of the Law? Would this violate the principle of legitimate expectations and be considered an unfair or non-equitable treatment for the investment? Which are the limits to cutting back previous Green tax incentives according to the Energy Charter? These are some of the very interesting questions put forward by the more than 30 cases opened against Spain for the Law reform of 2010 and 2013 which reduced the incentives launched for renewable energies in 2007. This contribution will explore these issues in the case law of the Spanish Supreme Court and above all the arbitration awards already issued by different arbitration bodies such as that of the Stockholm Chamber of Commerce or the ICSID of the World Bank. It will mainly focus on the limits to State's cuts back according to the Energy Charter, in particular the need of a "fairly and equitable treatment for the investment" and related aspects such as the concept of legitimate expectations and irretroactivity in this field. However, it would also collaterally tackle, to the extent that is necessary, other correlated issues such as the need to notify as State Aid to the European Commission any new payment due as a result of an arbitration award or how to deal with the possible consequence of different treatment for national and foreign investments after the recent arbitration awards against Spain.

Environmental tax regulations in the light of the “indirect expropriation” doctrine: the threat of state liability.

Begoña Pérez Bernabeu,
University of Alicante (ES)

Cases related to environmental tax measures raise complex questions about the relationship between international investment law and government regulation of the environment. Our planet is plagued by environmental problems that deplete natural resources and strain livelihoods, many of which are exacerbated by poor industrial practices. For this reason it is critical that governments implement policies in order to effectively revert this environmental crisis. Notwithstanding, international investment law is not of great assistance, to the contrary, it sometimes constitutes an obstacle by creating a threat of government liability -when adopting legitimate regulatory actions regarding environmental protection- due to noncompliance with their investment treaty obligations. International law has long protected foreign property from expropriation by giving the foreign investor a right to compensation for the value of the lost property. Recently, the old pattern characterized by typically formal expropriations has changed towards a broader concept which includes the notion of “indirect expropriation”. The concept of “indirect expropriation” applies to a broad range of government actions, including not only regulatory measures but taxation as well. This includes cases where environmental tax regulations pursuing sustainable development goals affect the viability of an investment project. In this context a clear conflict arises between the regulatory interest of States and the interest in the protection of investments. The main problem consists in the difficulty in drawing a distinction between an act constituting “indirect expropriation” and one exercised in the State regulatory autonomy. But this is not an easy task, given that no clear dividing line is established. The analysis of whether a regulatory measure results in an “indirect expropriation” comprises not only the study of the provisions included in international investment agreements regarding (direct but specially indirect) expropriation; but also the “fair and equitable treatment” standard of treatment, which has been interpreted to grant similar protection from regulatory measures, in the sense that it confers a right to a “stable and predictable regulatory environment”. This lack of legal certainty about the boundaries of the concept of “indirect expropriation”, jointly with the possibility to resort to international arbitration (offered by investment agreements enabling foreign investors to claim for substantial compensations) leads to concerns over governmental liability for public interest regulations. Consequently the ability of governments to protect the environment by means of ruling new environmental regulation is severely constrained, emerging a sort of potential “chilling effect” on the state normative power concerning environmental matters.

Ex-post appraisal of environmentally related tax policies: building on programme evaluation studies.

Nils-Axel Braathen, [Jonas Teusch](#)
OECD (FR)

This paper aims to provide guidance on how policy analysts can fruitfully tap into the large number of academic studies that credibly identify causal effects of environmentally related tax policies, but do not necessarily provide the kind of information needed to feed into the policy-making process. The paper argues that cost-benefit analysis (CBA) could enrich ex-post appraisals of environmentally related tax policies, given that CBA provides decision makers with a broader perspective of social costs and benefits and allows the identification of potential trade-offs among policy objectives. These points are developed and illustrated by reference to the initial effects caused by the French feebate programme for motor vehicles after its introduction in 2008.

Preventing cases of chronic obstructive pulmonary disease: an estimate of monetary benefits of reductions in air pollution.

Mikael Skou Andersen,
Aarhus University (DK)

Denmark has a mortality rate for chronic obstructive pulmonary disease (COPD) more than twice as high as the average for the European Union and implying that one of fifteen Danes die from the disease. Although smoking causes COPD, air pollution is a contributing factor. COPD patients account for about 10 per cent of total hospitalizations. Besides direct costs for emergency room visits, primary care and hospitalizations there are significant indirect costs related to sick days and the associated productivity loss, as well as to the years of life lost. The course of disease progresses only slowly, and symptom occurrence (cough, short breath, mucus) is gradual, so that many COPD patients will receive their diagnosis only after having suffered a substantial loss in lung function. The gradual progression adds to overall costs, as patients live for many years with the disease. Considerable medical support is required and patients become eventually invalidated, as the lung function reaches a minimum, limiting mobility. Never smokers account for about 10 per cent of COPD victims (Kriegbaum et al. 2013; Shavelle, 2009), reflecting the significance of passive smoking, air pollution and other factors. COPD prevention necessitates restrictions on smokers as well as on other sources of exposure such as air pollution in urban centers. The monetary value of preventing a case of COPD can be useful when decision makers consider what regulations to introduce, as these will come only at a cost (smoking zoning; restrictions on diesel cars etc.). Rather than presenting aggregate figures for the total societal costs of COPD, as has been reported elsewhere, the aim of this research has been to investigate the monetary value per case of COPD prevention. This is useful for analysis of measures that will reduce occurrence. The aim has been to explore mortality and morbidity costs, including the cost of years lived with disabilities (DALY's). Previous contributions have largely ignored temporal aspects in accounting for costs related to COPD. Under our economic perspective it is nevertheless essential to factor in the point in time when COPD inflicted costs are expected. Conventionally costs are subject to a discount rate, whereby expenditures that arise into the future must undergo adjustment to a net present value. Computation hence necessitates a good understanding of the timing of the four COPD phases, as well as of the principles and practices of discounting.

Tax incentives for energy in Turkey: increasing fiscal transparency in energy policy.

Leyla Ates
Altınbaş University (TR)

Tax expenditures are laws, rules or regulations that lead to loss of revenue through the state's non-taxation by allowing certain taxpayers to pay lower taxes or to pay no taxes at all, in order to achieve certain social and economic goals. Tax concessions such as tax deductions, exceptions or exemptions that cause deviations from normal tax liabilities are called "tax expenditures" in the literature. These expenditures have direct influences, such as reducing public revenues, as well as other indirect effects. The main focus of this paper is tax incentives for energy in Turkey, which can be grouped under three headings as fossil fuel, renewable energy and energy efficiency tax expenditures (Sherlock & Stupak 2015). Just like direct transfers, tax expenditures for energy can have a significant restraining role for state budgets (OECD 2015) via their public revenue reducing effects. Reporting on tax expenditures and foregone tax revenues to the public started in Turkey in 2003 with the Public Fiscal Management and Control Law No. 5018. However, work done in this regard has not been sufficient to meet the need for transparency in energy tax incentives in two respects: First, when examining the sectors where tax expenditures are applied, it is unclear how much tax expenditure is made on the energy sector and its subcomponents (based on the energy source). Second, it is not known how much revenue loss the tax expenditures for the energy sector lead to. This study aims to contribute to the debate on tax reform by emphasizing the need for transparency and accountability in energy tax policies and ultimately to make fiscal policies more "green" or "environmentally friendly". The first objective of our work is to examine how and to what extent the energy sector is supported by tax incentives from the state budget. In other words, we attempt to construct an inventory by exploring various tax expenditures for energy in Turkey. The second goal is to determine how energy tax incentives are used and how that support is distributed among different energy sources. Finally, the third objective is to calculate the cost to the state budget by finding out how much revenue loss is caused by the tax expenditures in the energy sector.

Driven by subsidies: government support to use of fossil fuels in the transport sector in Europe.

Ipek Gençsü,
Overseas Development Institute (UK)

To achieve the Paris Agreement climate targets, fight air pollution and protect health, and support a rapid transition to low-carbon energy systems, governments need to phase out their support to fossil fuels. In the EU, however, despite significant commitments to address climate change, and a pledge by Member States to end all environmentally harmful subsidies by 2020, countries still subsidise the production and the consumption of fossil fuels. This paper reviews subsidies to the production and consumption of fossil fuels in 11 countries that produce 83% of Europe's energy-related greenhouse gas emissions: France, the Czech Republic, Germany, Greece, Italy, Hungary, the Netherlands, Poland, Spain, Sweden and the United Kingdom (UK). It includes fiscal support provided by governments (in the form of budgetary expenditure and tax exemptions), financing by public finance institutions and investments by state-owned enterprises. It finds that these 11 countries provided at least 112 billion of subsidies to fossil fuels per year between 2014-16. 44% of this amount (49 billion per year) was for the consumption of fossil fuels in the transport sector, provided entirely through fiscal support. Tax breaks on diesel, which were introduced to encourage its use over petrol, accounted for 43% of support to transport identified. That such a large proportion of government support goes to transport and diesel helps explain the political challenges faced in reforming these subsidies. With regard to the relative levels of support in the countries analysed, Germany provided 38% of the identified subsidies to fossil fuel consumption in the transport sector – 19 billion. However, this is likely a reflection of Germany's high level of transparency in reporting on fossil fuel subsidies. The UK, Italy, and France provided the next highest shares of fiscal support towards transport, at 19%, 18%, and 15%, respectively. Very little support was identified in Hungary and Greece, and values for subsidies identified in Poland and the Czech Republic were not available. Aviation benefited from 29% of the total transport support, including fuel tax breaks towards airlines. Passenger transport (mostly international) made up 12%, and company car allowances (provided in Germany) 6%. The tax breaks identified for petroleum and other fuels were 4% of the total support. Transport subsidies that were targeted for public transport, and towards a specific use or group of people (e.g. for taxis, ambulances, armed forces and use in disability vehicles) made up only 1.4% of the total support provided.

Urban concentration as a way of sustainable development of Brazilian Amazon region: a case study of zona franca of Manaus - a free-trade zone amidst the forest.

Weber Busgaib Gonçalves, Federal University of Ceará (BR)

Renan Cavalcante Araújo, Federal University of Ceará (BR)

Pedro Felipe de Oliveira Rocha, Catholic Pontificia University of San Paulo (BR)

Until the mid-20th century, once located in Amazon Rainforest area, a large portion of Brazil's Northern Region was inhospitable and underdeveloped, being difficult for the Government to stimulate social development and economic growth. In order to soften these consequences in the region, in 1967 the Government created a free-trade zone: the Zona Franca de Manaus (ZFM). As a way to (i) stimulate the establishment of industries, (ii) the creation of job opportunities and (iii) the economic growth in that region of the country, Companies located inside the ZFM may receive many kinds of tax incentives, intensifying national integration. Due to intense emergence of industries and displacement of manpower to ZFM, there was noticed a crescent urban concentration around the industrial center, what may cause serious environmental impacts, a reason to government concerns. After fifty years, not only socioeconomic but also environmental positive consequences were verified, since the ZFM concentrated all the local industrial production in one only urban area, avoiding the spread of environmental devastation on the region. In fact, from an economic point of view, surveys carried out by the Superintendence of Zona Franca de Manaus (SUFRAMA) point out that, despite the tax benefits, the area benefited is responsible for the establishment of hundreds of companies, which generated about 24 billion U.S. dollars just in 2017. From the social point of view, more than 500,000 jobs were created. In addition, new economic options emerged for the local population, resulting in significant increase in the income per capita and in the Human Development Index (HDI) of the region, as well as decrease of child mortality and increase in the percentage of young people enrolled in school. From the environmental point of view, unlike most of the tax breaks granted in Brazil, which prioritize social and economic aspects, the ones granted inside ZFM area were conceived, in a daring strategy, aiming urban concentration, influencing the reduction of environmental impact. This policy made possible the conservation of more than 98% of the vegetation in regions benefited, that is much more than the conservation in other areas, which only experienced economic development at the expense of rainforest deforestation. So, through studies of this concrete case, it was demonstrated that environmental taxation can be an important instrument of urban and migratory modeling, allowing socioeconomic development through planned industrial concentration and intelligent industrial centers, without leaving aside environmental aspects, resulting in a truly sustainable development.

Tax measures to incentive environmentally friendly cities.

José María Cobos Gómez
Comillas Pontificia University / Garrigues (ES)

Taxation, and specifically environmental taxation, can be an interesting instrument to raise awareness of the citizens about the necessity to adopt behaviors oriented to the reduction of polluting emissions and energy saving. Notwithstanding, this kind of instruments are usually aimed to industry and less attention is put on the individuals and possibility of “greening” taxes on personal income and wealth. In the Spanish case, we can find some taxes which take into consideration the emissions of the vehicles at the acquiring and use stage. However, we hardly find environmental variables in the Personal Income Tax or the Wealth Tax. The last reform adopted in 2014 has introduced a new valuation rule for remuneration in kind consisting of the transfer of vehicles to employees, provided that the vehicles, meeting certain requirements, qualify as energy-efficient vehicles. This reform is a first step towards greening the Personal Income Tax, but has not taken the opportunity to address stronger measures that could lead to a real green tax reform. Energy saving in residential buildings is another key issue that was partially considered as an anti-crisis measures, but which requires further developments to become effective. The aim of this paper is to describe the possibilities granted by the Spanish tax legislation to reach objectives oriented to reduce the pollution from vehicles and improve the energy saving of residential buildings, combining subsidies, tax incentives and tax burdens.

Aviation; to tax or not to tax?

Bill Hemmings,
Transport and Environment (NL)

Commercial aviation took off in the late 60's and has grown rapidly. It now accounts for about 2% of annual global CO₂. But flying's impact on the upper atmosphere – cruise NO_x, contrail and cirrus cloud formation, soot etc - means the sector overall is responsible for about 5% of global warming. This figure could rise alarmingly. Flying is the most climate intensive form of transport - the quickest, most potent and cheapest way any of us can help fry the planet. Air traffic continues to grow exponentially generating over \$700bn in revenues annually. Yet it is a major industrial sector almost entirely free of taxation. Governments' failure to properly tax the aviation sector for good revenue let alone climate change reasons is a major weakness of tax policy; testament to political timidity, the ingenuity of ICAO and IATA's ubiquitous lobbying. Fuel used on international flights is virtually untaxed worldwide thanks to an impenetrable web of bilateral mutual exemption agreements built up since WWII – an annual subsidy worth well over \$60billion to a sector which pays nothing for its environmental costs. Few countries exercise their sovereign right to tax domestic aviation fuel – Japan, Brazil, India, Norway, Switzerland and even the US being notable exceptions. The ETS covers intra EU flights. Some countries apply a GST to air tickets at varying rates or levy ticket taxes on departure/arrival. EU member states stubbornly resist giving up the VAT exemption for intra EU flight tickets. Foregone revenues from aviation in the EU alone total over 38bn each year. Instead of moving to dismantle the legal impediments to tax kerosene, ICAO and IATA in cahoots with compliant Transport Ministries devised an offsetting scheme, the CORSIA, which will have no impact on reducing aircraft emissions. The European Commission moves to reform the antiquated “place of supply” rules for calculating VAT on passenger transport while at the same time opening up the possibility for member states to zero rate all forms of transport. Ryanair shifts flights from jurisdictions which dare to introduce ticket taxes while continuing to live off subsidies facilitated by flawed EC state aid guidelines and block exemptions – designed to ease Brussels' workload. But things are changing. CORSIA is increasingly discredited as an instrument to address emissions. Fuel tax within Europe is legally possible. More and more EU governments are working out ways to redress the tax imbalance. Time for tax policy to wake up to its environmental responsibilities.

Implementing CORSIA - challenges and opportunities.

Laurel Besco
University of Toronto-Mississauga (CA)

In 2016 the International Civil Aviation Organization (ICAO) General Assembly adopted a global carbon offsetting measure to mitigate emissions from international aviation. The Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) is the first global attempt to reduce greenhouse gas (GHG) emissions from international aviation and is particularly important because the sector represents approximately 2% of global GHG emissions, a share that is predicted to grow rapidly over the next few decades. CORSIA will be implemented in three phases, the first of which begins in 2021. Initially only States that volunteer to be covered will be required to comply with the offsetting rules, but by 2027 the majority of international aviation routes will be covered by CORSIA. Currently 73 states have volunteered to be part of the initial stages of CORSIA which means they should already be considering how they will comply with its requirements. Implementation of CORSIA ultimately must be done at the domestic level, though the offsetting rules will be determined by ICAO. This paper explores some of the key questions being raised about CORSIA and its implementation, specifically related to the source and quality of offsets that can be used in the program, and its relationship to the broader goals of the Paris Agreement and UNFCCC process.

The Swedish aviation tax - an example to follow?

Yvette Lind
University of Gävle (SE)

The taxation of aviation fuel has been restricted since the introduction of the Chicago Convention in 1944. Other international agreements have later fortified this prohibition. EU Member States are also obliged to refrain from taxing aviation fuel, as the Energy Taxation Directive comprises a prohibition against the taxation of aviation fuel referable to commercial flights. However, reducing air travelling is desirable as it is considered as one of the main contributors to climate change. In light of this, the restraint has been bypassed by some EU Member States through taxes on domestic air travel while leaving international flights (including those flights between Member States) untaxed. Some Member States have also chosen to apply taxes/fees to passengers in order to circumvent the prohibition. A range of taxes can therefore be found within the Member States, e.g. charter taxes, tourism taxes, taxation of commercial flights etc. Sweden recently introduced a new aviation tax with the purpose of disincentivising air travel and/or longer trips (Thailand being particularly popular with Swedes) for the benefit of other transportations, e.g. train. The tax is designed in accordance to the polluter pays principle as it applies a tax calculated in accordance to the final destination of the trip. Three categories of final destinations are applied in order to determine the fee, i.e. (1) 60 SEK (ca 6 Euro) per passenger travelling to a state within Europe. (2) 250 SEK (ca 25 Euro) per passenger travelling to a state outside of Europe. (3) 400 SEK (ca 40 Euro) per passenger travelling to a state not mentioned in the two appendixes listing states for previous two categories. The airlines are obliged to declare and pay the tax in order for the passengers to be directly burdened. The tax has, similar to many other environmental taxes, been widely debated both before and after its implementation. The public debate has primarily been focused on how it will impact the aviation industry and if the tax will have an actual positive impact on the environment. My contribution aims to describe the Swedish aviation tax and while doing so link it to EU state aid law as Member States. Distortions to the internal market are, as a general rule, not allowed and can be seen enforced through competition- and state aid law. State aid rules include taxes, as either a punitive tax or an incentive tax may distort competition between companies or industries. An aviation tax must therefore consider these rules in order for it to comply with EU law. A brief comparison to other aviation taxes within EU Member States will be done as the tax could be utilized as an example to other Member States. An aviation tax could also be discussed as a harmonized EU tax. Such a harmonized tax could contribute to fiscal revenues to the EU in addition to implementing a common environmental policy.

International aviation and climate change: carbon pricing beyond CORSIA.

[Beatriz Martinez Romera](#), University of Copenhagen (DK)

[Dirk Heine](#), GMTMD (DE)

[Goran Dominioni](#), Erasmus University Rotterdam (DK)

Emissions from international aviation account for 2-3% of total anthropogenic CO₂ emissions and are forecasted to grow by a factor of 2-6 by 2050. In 2016, the International Civil Aviation Organization (ICAO) adopted the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) to stabilize the sector's emissions at 2020 levels. The limited ambition of CORSIA could invite additional measures to be taken at the national or regional level to bring necessary emissions reductions for the sector in line with the Paris Agreement. This article shows how sub-global taxation for aviation can work beyond CORSIA. In particular, the article compares different environmental taxes for aviation, specifically in the light of the recently adopted Swedish Aviation Tax, and argues that a feebate mechanism, which can be implemented at the regional and national level, and establish an efficient and environmentally effective price signal on carbon emission while circumventing the main legal, political and economic hurdles.

The Geneva congestion charge: rationale, design, and acceptability.

Linda Tesauro
Haute École de Gestion Genève (CH)

Traffic congestion is a major problem in most urban contexts. Since the 1950s, economists have suggested the use of congestion charges to address the externalities associated with driving. Yet, congestion charges have so far been successfully implemented only in a handful of cities as for example in London, Milan or Singapore. In other cities like in Manchester, New York or Hong Kong, congestion charge projects were developed but never introduced. Public opposition is commonly considered the major obstacle to congestion charges. This paper focuses on Geneva, Switzerland, one of the most congested cities in the world, where policymakers are currently considering the implementation of a congestion charge. After a careful analysis of the existing congestion charges, we identify several designs that could be suitable for Geneva. These are defined along the following attributes: perimeter, price level, price modulation, discounts, and use of revenues. This paper also tests public support for these designs, using a discrete choice experiment on a large sample of individuals from Geneva and the neighbouring regions in both Switzerland and France. A split sample design is applied on top of the standard choice-experiment structure, introducing randomized informational treatments on the effectiveness of existing congestion charges. We find that public support depends substantially on the attributes' levels of the congestion charge. People's acceptability depends on the price level: everything the same, the higher the charge level, the lower and the acceptability. Modulation of the charge level with a higher price depending on pollution or with respect to congestion hours does not decrease acceptability compared with a fixed charge. With respect to a fixed charge, a charge to be paid at congestion hours only increases acceptability, while a charge paid based on the kilometres travelled decreases it. Financing public transport infrastructures is the most accepted use of the generated revenues, followed by spending in environmental measures decreasing air pollution and noise, and financing of transport infrastructures. Those results vary also according to personal characteristics like the residence area. For people living outside the proposed perimeter, charging only at peak hours increases acceptability compared to charging all day long, as residents of the proposed perimeter are indifferent between the two options. On the contrary, taxing according to pollution peaks decreases acceptability significantly for the residents only.

Is road pricing the key to sustainable low-carbon road transport in Australia?

Vanessa Johnston
Monash University (AU)

Road transport plays a vital role in Australia; where the economy relies on moving people and goods not only within sprawling cities and across a vast continent, but where cultural and social identity includes owning and travelling by private vehicles. Unsurprisingly in Australia, the road transport sector makes a substantial contribution to greenhouse gas emissions (18.1%), which not only continues to grow, but is resistant to change. In particular, the transport task is becoming more difficult in major cities due to road congestion, overcrowding, and lack of alternatives for domestic, commercial, and freight transport tasks. There is now a congestion ‘crisis’ in major Australian cities. From traditional infrastructure and economic perspectives, congestion is caused by insufficient road infrastructure, or by users not paying enough to use or access roads. From this starting-point, Australian government and industry bodies have recently undertaken detailed research on traffic congestion: recommending that congestion is managed in the short-term by expanded congestion levies, and in the long-term by developing an ‘integrated system-wide road pricing scheme’ that ensures users pay an appropriate amount to access and use roads. While these traditional approaches may reduce congestion in specific locations or at specific times, this response does not address underlying causes of congestion; including the importance and reliance Australians place on private vehicle transport, and the regulatory framework that sustains this position. Alternatively, congestion can be seen from an environmental perspective, as a symptom of Australia’s unsustainable transport system. Shifting the paradigm from which congestion is viewed can help to break the self-reinforcing relationship between the way that transport activities are currently regulated and the underlying importance and reliance Australians place on private vehicle transport. Considering congestion from an environmental perspective provides fundamental support to re-examine transport regulations, which include road pricing instruments that directly and indirectly affect the cost of transport activities. This paper explores two related aspects of Australia’s traffic congestion crisis in this context. This paper first explores the relationship between congestion and Australia’s commitment to sustainable development goals relating to climate change and sustainable cities. As a matter of sustainability, this paper then explores how literature about pricing of environmental externalities can guide the reform of existing laws and regulations to improve the sustainability of Australia’s road transport system.

Policies for a low-carbon transition in passenger vehicles in East Asia.

Aileen Lam, University of Macao (CN), Soochool Lee (JP),
Jean-François Mercure (NL) Yongsung Cho (KR), Chun-Hsu Lin, (TW),
Hector Pollitt (UK), Unnada Chewpreecha (UK)
Sophie Billington, Cambridge Econometrics (UK)

1. Introduction. East Asian countries, including China, Japan, Korea and Taiwan were responsible for CO₂ emissions totalling approximately 12% in 1980 and 18% in 2013 from consumption of petroleum. The main objective for this research is to use a model of technological diffusion to study the possible future technological transitions in the passenger car sector in East Asia. We perform a series of scenario analysis and find the set of policy incentives that will lead to significant emissions reductions in East Asian countries. 2. Methods of analysis. The FTT framework models technological diffusion by a set of logistic differential equations, of the Lotka-Volterra family, which represents gradual technological substitution processes (Mercure, 2012). The FTT transport model is a sub-model of the E3ME model, a non-equilibrium macroeconomic simulation model based on a demand-led Post-Keynesian structure. The E3ME model involves the use of econometric estimation to identify the effect of Endogenous Technological Change (ETC). 3. Results of analysis. Our initial findings show that in the absence of additional policy incentives, EV will not gain significant market shares. Instead, in countries such as South Korea and Japan, hybrid cars gain market shares at the expense of other vehicle technologies. Different to Japan and South Korea, we find that in China, without further policy measures, CNG cars start to gain market shares from 2020 onwards, due to the extensive use of this technology in taxis and private cars that drive long distances. The scenario analysis including carbon taxes, fuel taxes, subsidies and mandates finds that to cut emissions significantly by more than 80% below the 1990 levels, it is necessary to encourage the penetration of zero emissions vehicles such as electric cars by strengthen the existing policy incentives. During the transitions period, decarbonisation of remaining non-electric cars can be done using biofuel mandates, although the extent to which this is feasible depends on the country's individual biofuel capacity. 4. Conclusion. Overall, our initial results concluded that in the absence new policy incentives, it is not possible to cut emissions significantly beyond 50% below the 2005 emissions level. The continued penetration of hybrid cars and CNG cars are not sufficient to cut emissions significantly in all the four Asian countries in this study. It is necessary to encourage the further penetrations of zero emissions vehicles by strengthen the policy incentives that in favor of Electric vehicles.

Taxation of vehicles without emissions.

Francisco José Cañal García
University of Barcelona (ES)

Air pollution, especially in cities, is one of the most important environmental problems. In view of this growing concern, the possibility of using the vehicle tax as an instrument to limit air pollution produced by land vehicles is considered. In particular, the presence in the market of vehicles that barely produce polluting emissions allows us to raise the question of which is the most appropriate taxation for this type of vehicle. The current atmospheric protection policies initiated by international organizations include this objective in the fight against climate change. Thus the United Nations Framework Convention on Climate Change (1992) and the 2030 Agenda of the United Nations. The European Union has approved numerous regulations for atmospheric protection. They establish air quality standards, emission limitations, control instruments and vehicle characteristics. But today it is not feasible to satisfy the transport need with vehicles without emissions at the lowest possible cost. It is still necessary a technical and economic effort to provide vehicles with sufficient autonomy and for the implementation of necessary infrastructure, especially sufficient supply points. But the objective of reducing atmospheric pollution can be achieved with regulatory measures and economic incentives that favor less polluting behavior. The economic instruments can be subsidies, tax incentives or tax increases that apply well in the purchase of the vehicle or during its use, either directly on the vehicle or on the fuels used. Each of these instruments presents some advantages and disadvantages. The subsidies can serve to balance the total cost between the different types of vehicles. Polluting vehicles produce a negative externality, environmental damage. The market does not make its valuation. The public authorities can do it, but they will have great discretion. This externality can be internalized through taxes. Mainly for the tax on polluting fuels, optimal for influencing the use of the vehicle that is the cause of the contamination. It's possible also for the tax on the possession of vehicles. Currently this vehicle tax has a patrimonial base, but there are opinions in favor of introducing an environmental protection component in this tax. Most of the large Spanish municipalities have established deductions based on the characteristics of the vehicles' engines: electric, plug-in hybrids, non-plug-in hybrids and low emission vehicles.

The experience of Eolic power in beach's environment in Brazil's northeast region.

[Elizabeth Alice Barbosa Silva de Araujo](#), [Eulália Emília Pinho Camurça](#),
[Eveline Barbosa Silva Varvalho](#), [Luis Henrique Barbosa de Araujo](#)
The Federal University of Ceará (BR)

This research aims to study the rules for the use of wind energy in natural landscapes, and the possible need of more specific legislation for beach areas. It will start with a study case in the Brazil's northeast region, in the district of "Icaraizinho de Amontada", located on a beach in the state of Ceará. It will study the positive aspects of this kind of "clean" energy that uses the power of wind, very strong and perennial in this location, and which installation and structure generates jobs and richness for this poor area of the country with only about 6,6 % of the population on formal occupation. Despite all that positive aspects, the presence of huge machines and propellers interfere on the scenery and probably causes a disturbing view in an almost wild beach. So, in one side the wind power does not create negative externalities such as CO₂, toxic gases or smoke emissions but on the other hand it causes visual pollution that could interfere in the natural vocation of the place for the tourism. In that way, it's important to create specific rules for the use of this kind of energy that is increasing in Brazil and in other countries that has the required natural resources and are concerned with the use of more clean kinds of energy. Such legislation would help to preserve the beauty of the landscapes for further generations. The paper will be structured in three parts, the first one will present the study case of "Icaraizinho de Amontada", indicating the levels of energy produced, the impacts in the local economy and the interferences in the landscape. In the second part, will be mapped the international rules and the Brazilian legislation for the use of wind energy, in the end, a proposition will be presented for the enhancement of the legislation itself or of the mechanism of its application to secure clean energy with minimum impact in natural landscapes.

Solar power in Brazil: current overview and fiscal challenges for the next five years.

Adriana Reis de Albuquerque
Federal University of Sao Paulo (BR)

This article aims to discuss the current overview of the development of solar power in Brazil and the challenges, especially in the tax field, that the sector needs to overcome in the next five years. To achieve that, initially, we establish what is understood by solar power, conceptualizing it as a renewable energy source that results from the conversion of the radiation's thermoelectric and photovoltaic effects into electric power. The article shows that, in spite of the high potential for solar energy production in Brazil, especially due to the favorable climate conditions, its production and use in the country are still incipient when compared to the rest of the world. The advantages and disadvantages of promoting solar power in Brazil are analyzed from environmental, social and economic points of view. Then, the article seeks to identify the main obstacles to the development of solar power production and use in Brazil, citing technical studies developed by National Congress, both by the House of Representatives and the Federal Senate, between 2015 and 2017. Based on those documents, the article lists five challenges to be overcome by tax incentive policies intending to effectively boost the production and use of solar power nationally. After expressing the challenges, the article analyzes if Brazil has structured and systematic tax incentive policies regarding the energy sector or, on the other hand, merely a pile of regulations unable to provide adequate solutions to the obstacles identified previously. For this purpose, we mapped the current ongoing proposed bills in Congress that have environmental taxes as a theme. The bills were classified according to topic (greenhouse effect, petroleum, natural gas, biofuel, hydroelectric power, nuclear power, wind power, solar power), making it possible to measure the representativeness of solar power within the larger spectrum of bills related to the environment. Subsequently, all the bills pertaining to solar energy were analyzed separately in order to be individually correlated to the obstacles identified in the article, to indicate if the current legal framework in course in Congress adequately addresses the demands of the energy sector. This study is conducted by means of indirect investigation, through bibliographic and documentary research, being an exploratory, descriptive, explanatory and propositive research. It has a qualitative approach and dialectical method, since it seeks greater understanding of environmental relations by observing legal phenomena.

Instruments to promote solar energy development in Brazil: possibilities to urban deconcentration induction.

[Denise Lucena Cavalcante](#)

The Federal University of Ceará / PGFN Ministério da Fazenda (BR)

[Eric de Moraes e Dantas](#)

The Federal University of Ceará (BR)

This study is contextualized in the Brazilian photovoltaic energy matrix development, addressing possibilities of fostering its use by solar industries, by micro and small enterprises and by farmers as an alternative to stimulate them to settle besides metropolis, in order to show its potential to act as an instrument in the urban deconcentration process. A great environmental challenge in this century is the increasing global population concentration in metropolis. According to the UN, by 2050, about 6.4 billion people will live in urban centers, with an estimated generation of 70% of CO₂ emissions. Brazilian context isn't different. With a huge area of 8,514,876 km², more than 60% of its population is concentrated in coastal zone. In order to make significant changes in our urban scenarios, it's necessary to promote policies of better use of the countryside space, which could enable alternatives: permanence in the countryside or even a well-structured large urban centers exodus. The consolidation of solar power plants in small towns can be of great help in this movement, especially by generating new jobs and new businesses. In addition it's advocated to encourage the use of this energy in countryside small cities in which micro and small companies predominates (bakeries, small shops etc), as well as in rural properties. Such policies should establish differentiated tariffs for the commercialization of the surplus energy generated by these activities, as well as they should create more favorable modalities for the sale of their surplus energy to the general public, including direct sales and fiscal measures as energy sales tax reductions. At first, it is argued that it is possible to use fiscal incentives that aim not only to enable the Brazilian energy matrix transformation, but also to correct a historical problem: growing urban concentration in metropolis at the coast. Secondly, with the progressive reduction of differentiated measures in commercialization of surplus of energy, it is proposed as well that subsidies in the financing rates remain until a third phase: total suppression of fiscal incentives. The proposed model must fit historical particularities of Brazil, such as the deficient settlement of its interior. Thus, given the high concentration of the Brazilian population on the coast and the vast strip of unpopulated land in its territory, it is argued that the solar panels implantation is possible in areas of the national territory whose settlement is still deficient, mainly in the north.

Promotion of renewable energy for a sustainable city: taxes on electric self-consumption of households?

Gemma Patón

University of Castilla La Mancha (UCLM) (ES)

Climate change raises the need for cities around the world to implement sustainable energy solutions. As a consequence, we are moving from the use of fossil fuels to the use of renewable energy sources and strategies to promote the consumption of renewable energy. Probably, Iceland represents an example to follow in that almost 100% of the electricity consumed in this country comes from renewable energy. However, the combination of energy sources and the consumption patterns of a country represent a complex equation depending on factors such as the cost of energy demanded by households, the availability of resources, the efficiency of electricity production and energy policy. They are the key elements to continue on the road towards the design of cities with more responsible and sustainable energy consumption. Our study aims to analyze the variables of the position of the European institutions before the objectives of promoting the consumption of renewable energies. We are particularly interested in studying whether the legal system in Spain offers sufficient legal and fiscal incentives for the promotion of self-consumption of photovoltaic energy that occurs in the homes themselves. For this, we start from the legal treatment offered to the existing charges in Spain on the billing of self-consumed energy and the imposition on electric power. Recent jurisprudential pronouncements have given validity to the model quantifying the charges, without a satisfactory answer regarding the compliance with the European Directive on renewable energy and the role of promoting renewable energy consumption.

The problem about transport in Mexico and the lack of tax elements in the energy reform to encourage a sustainable transport.

Diana Gabriela Pinzón Ortiz
Morelos State University (MX)

By the end of 2013, Mexico did a series of growing reforms for the well-going work of the State. One of the more important was the Energy Reform, which main objective was let open to a foreign and national private inversion the hydrocarbons market with the goal of bringing it update. Also, one of the Energy Reform objectives was increased use of clean and removable energies, so they might be used as a chance to strengthen several productive or services sections from the country and make them more sustainable. With no doubt, one of those sections is transport, it is remarkable the way of transport at the biggest cities in Mexico. One example is CDMX. Mexico City has high problems in mobility. Just talking about the subway named *Metro*, which moves 5.5 millions of people who goes work, school, receive medical attention, do business activities, etc., and which works in forced marches all the way with a deficient infrastructure and a daily overcrowding. This Mexican Metro is the second subway with the highest using in the world, right after the one in New Delhi, India. The transport in the biggest cities in Mexico is inefficient and contributes to the pollution, even though it daily transports 72% of Mexican people. This is the reason why we must apply an Energy Reform and, through this, Mexico could take the opportunity to put in practice tax instruments so Mexicans that dedicate to offer transport services might introduce new transport which means more efficient and less pollutant. One of the options that would be implemented is to apply environmental taxes to vehicles which go far to the number of particles allowed, or another option would be use electronic vehicles and also to implement a good development in urban areas which prioritizes pedestrians, cyclists, low-cost, high-quality transit service, among others that help at the creation of more sustainable cities. However, the Energy Reform let out a big number of topics, for example: adequate measures of people mobility, quality services, efficiency, and low levels of pollution. From all the countries who applies environmental taxes, Mexico is who receives the lowest takings in these sort of duties, so the transport could be one of the most benefited with the tax measures. However, at past, Mexico leaved the opportunity to implement the Energy Reform and, at the same time, leaving the chance to change the paradigm in the use of the energy in Mexico.

Fuel price elasticities of car transport in EU member states.

Claudia Kettner
Austrian Institute of Economic Research (AT)

The EU has adopted ambitious climate policy targets: Compared to 1990 greenhouse gas emissions should be reduced by 20% by 2020 and by even 40% by 2030. Particularly in the transport sector emissions have, however, increased over the past decades: Overall CO₂ emissions from transport in the EU rose by 17% between 1990 and 2015, from 767 Mt to 895 Mt. A constant share of roughly 60% of these emissions accrues to passenger cars. While in 1990 petrol-driven cars accounted for the bulk of emissions from passenger cars (82%), in 2015 56% of CO₂ emissions stemmed from diesel-driven cars. A comprehensive portfolio of policy instruments is necessary to tackle emissions from transport. One central lever in this context is the development of fiscal measures, especially a more stringent taxation of fossil fuels and/or emissions. By establishing a price signal, climate friendly behaviour is incentivised: Consumers respond to price increases by reducing fuel consumption, e.g. by reducing mobility demand or switching to more energy efficient cars. The shift from petrol to diesel driven cars observed in the EU can to a large part be explained by the price differential between the two fuels, which is i.a. the result of a lower taxation of diesel compared to petrol due to competitiveness concerns for freight transport. Moreover, differences in petrol and diesel prices between EU Member States almost exclusively reflect differences in the Member States energy tax rates. In this paper, we estimate the effects of changes in fuel price on per capita petrol and diesel emissions in the Member States in a panel econometric framework, using car stock, fuel price as well as income data as explanatory variables. For the analysis we compile a novel database including data on gross petrol and diesel prices from the EU's Weekly Oil Bulletin that covers the period 2004 to 2015 and 23 Member States. The income elasticity of CO₂ emissions is 0.23 for petrol and 0.64 for diesel. An increase in fuel prices as expected reduces carbon emissions with price elasticities of -0.31 for petrol and -0.16 for diesel. Shifts in the car stock towards petrol or diesel cars imply an increase in the respective emissions. Overall, these price elasticities are in the range of those reported in the literature and suggest that establishing a price signal via energy or carbon taxation can contribute to reducing greenhouse gas emissions from the transport sector.

Incentive proposals for the electric vehicle in the Spanish tax system.

Ángel Moreno Inocencio
International University of La Rioja (ES)

According to a study on Global Burden of Disease 2017, in which the Global Health Institute of Barcelona participated, the exposure to environmental pollutants causes at least 21,000 deaths per year in Spain. In the city of Madrid, homes cause 50% of pollution, and urban traffic around 13%. In view of these data, it seems that the promotion of the electric vehicle is unstoppable in the European scenario; in Germany, for example, there is a provision of 1,000 million euros allocated to tax incentives for this type of vehicles. In Spain, the Movalt plan allocates 20 million euros for the purchase of alternative energy vehicles and another 15 for the development of charging points. In our view, the Spanish incentives are highly insufficient, so we propose a plan of action to multiply them, reorient them and finance them. This action plan is based on three points: inclusion of environmental elements in the existing taxes, use of the IVMDH (Motor Vehicle Tax) to finance the tax expense generated based on the above, and the implementation of grants linked to research and development in the production of less pollutant batteries. The establishment of a system of tax deductions in Spain, would follow the path started by several European countries, including Germany, France, Holland or Norway, whose regulations provide for the exemption of the Tax on Circulation, and establish significant tax relief in Corporation tax for Companies. These tax deductions change according to whether they are hybrid or 100% electric vehicles. This leads us to affirm that the aforementioned legislations apply authentic “environmental elements” in their taxes, endowing them with an evident extra-fiscal status. The fiscal spending of the aforementioned policies are important. Therefore, we support the use of the IVMDH in Spain, to finance this fiscal expenditure. We know that the CJEU ruling of February 29, 2014, rejected the so-called “health cent”, but we understand that the application of the proceeds of this tax to financing policies to help the electric vehicle, is not only compatible with the UE doctrine in this regard, but also that has a broad support. For this, we are inspired by the Costa Rican FONAFIFO and the Mexican legislation, which provides for the financing of environmental policies based on taxes similar to the IVMDH.

Cap-and-trade possibilities for the transportation sector of the Northeast and Mid-Atlantic states.

Jeffrey Paul Sokolik
Vermont Law School (US)

In recent years, states in New England and the mid-Atlantic region of the United States have made significant progress in reducing climate change-inducing greenhouse gas (GHG) emissions. The Regional Greenhouse Gas Initiative (RGGI), a cooperative effort among nine northeastern and mid-Atlantic states to reduce carbon dioxide (CO₂) emissions from the power sector, has achieved great success through its employment of a market-based cap-and-trade program. Energy economies in the RGGI states have improved under the program, and emissions from the electricity sector have decreased 45% compared to 2005 levels. Even so, deeper emissions reductions are necessary to achieve any meaningful mitigation of the effects of climate change. The current RGGI framework is missing out on a major pressure point. The transportation sector is responsible for over one-third of all U.S. CO₂ emissions. In the Northeast, that number is more than 40%. The decarbonization of transportation is a necessary and achievable element to reducing GHG emissions in the region. Since 2010, the Transportation Climate Initiative (TCI), made up of leaders of transportation, energy and environment agencies from 11 Northeast and Mid-Atlantic states, has been working to develop clean transportation solutions for the region. TCI is investigating how a cap-and-invest system covering transportation and fuel could operate across these 11 states. This paper explores how California's Global Warming Solutions Act (AB 32) interacts with the transportation sector and how that might translate to the issues facing regional emissions programs on the east coast. It examines the state's landmark cap-and-invest program as a comprehensive case study and extrapolates guidance for TCI's own progress towards reducing transportation emissions through a multijurisdictional carbon pricing framework. This paper breaks down California's current collaborative inter-agency approach, as well as its cross-sector GHG reduction program funding structure. It highlights the challenges California has faced in linking cap-and-trade systems with the Québec and Ontario provinces and how TCI translates those experiences to apply across the diverse economies and transportation landscapes throughout New England and the Mid-Atlantic States. Lessons learned from California's challenges and successes over the past 12 years can help TCI establish an effective carbon pricing structure that can successfully decouple economic growth from transportation emissions along the entire east coast.

Road test of Australia's Luxury Car Tax Concession - will it influence demand for low carbon vehicles?

Anna Mortimore
Griffith University (AU)

The Australia Institute, Emissions Audit, reported in June 2017 that the serious absence of policy measures to curb the growth of road transport emissions required urgent action to “decisively increase the efficiency of Australia’s motor vehicle fleet.” The Australian Government is proposing to phase in regulatory fuel-efficient standards between 2020-2025 that will require car manufacturers to increase supply of low carbon vehicles and alternatively fuelled vehicles (AFVs). The success of regulatory standards relies on increasing consumer demand for low carbon vehicles, but consumers are price sensitive to ‘higher priced’ low carbon vehicles and AFVs and are choosing lower priced, internal combustion energy (ICE) vehicles. To influence consumer preference for lower carbon vehicles, demand-side measures are required to reduce the price differential between low carbon and ICE vehicles. According to the Australian Government, the ‘luxury car tax concession’ for fuel-efficient vehicles will encourage the purchase of more of these vehicles. This study analysed whether luxury tax concession (LCT) was effective and efficient in encouraging sales of low carbon vehicles (identified ‘best-in-class emissions’ by the National Transport Commission) in 2016, compared to the top selling ‘best-in-sales’ vehicles, for each vehicle segment. The study also reviewed the impact of the LCT concession for the fuel-efficient vehicle threshold and fuel-efficient standards in influencing consumer behaviour. The study concludes that the LCT concession (i) did not address consumers ‘price sensitivity’ and reduce the high price of low carbon vehicles, and (ii) was an inefficient, and ineffective environmental measure for encouraging consumer demand for low emission vehicles. The study highlights the need for Australia’s policy makers, consultants and car manufacturers to reform the measure to an effective ‘demand-side’ environmental measure required to support the ‘supply-side’ regulatory fuel efficiency standards to reduce CO₂ emissions in road transport.

Plastic and green bag taxes: Italian recent trends.

Marina Bisogno

University of Naples and University of Paris Panthéon-Sorbonne (IT)

Every year we produce tons of plastic waste, including approximately a trillion bags that mainly spill into the environment, while only a small amount of them is recycled. The European Union has approved a directive (UE/2015/720) which obliges Member States to take actions to reduce plastic packaging. Since many years Italy had banned plastic bags from supermarkets, but recently the legislation has become even stricter. Starting from the 1st of January 2018, appealing to the duty to adapt national rules to European legislation, the Italian Government has obliged consumers to buy biodegradable bags for packaging fruit and vegetables. The use of plastic bag tax is not new in the European legal system: Italy used this measure for the first time in 1988, Ireland in 2002, France in 2014. The use for environmental purposes of indirect taxes on the production that we include in the category of excise duties has been highly criticized for what concerns its effectiveness. However, in the current international framework that wants to reverse the tendency “produce, use, throw away” in favor of a circular economy, national Governments return to use the power of excise duties to affect people’s behaviors in terms of incentives to green oriented behaviors. This paper aims to carry out a comparative analysis on the admissibility and efficiency of indirect taxation on the production, with particular reference to the plastic bag tax, focusing the attention on recent regulations that not only prohibit the use of ultra-light plastic bags, but also tax the biodegradable plastic bags as well. This Italian choice is difficult to understand, as it condemns an ecologically correct behavior, without giving consumers the possibility to choose. It is hard to understand why instead of taxing incorrect behavior - the one that waste and throw non-biodegradable plastic in the environment - the legislator has made much expensive the correct behavior of using green bags, with the risk of indirectly promoting products already packed, and increasing plastic packaging in circulation.

Could environmental tax help to tackle plastic pellets leakage?

Joana Pedroso
Gothenburg University (SE)

The production and transportation of plastic pellets have been polluting the environment across the world for decades and, their discharge into the water caused fish and birds to ingest these plastics. Research results indicate that there is a potential risk of contamination of the entire food chain that can cause health issues to humans as well as impact rivers and marine biodiversity. Particularly in the urban area of Stenungsund, in Sweden, there is a designated industrial zone for the plastic production, which is responsible for approximately 5% of the European polyethylene production. Several sources found a high number of plastic pellets in the local waters of this region, consequential of industrial spills, despite all the industry efforts to avoid any leakage into the environment. There is no International or European Union (EU) legal framework that covers specifically the issue of plastic release by industries, but there is, however, environmental legislation in place in both levels that broadly cover the matter. At the national level, the Swedish Environmental Code prescribes full life-cycle handling of plastic pellets. Despite these three different levels of legislation in place, such environmental instruments are not sufficient to cease the release of plastic pellets in the waters near where the activity is performed. In this article, I will explore the issue of plastic pellets leakage as a case reference to discuss a complementary legal possibility to tackle this pollution through the imposition of environmental taxation. The idea of approaching this case through taxation is positive since no other legal instrument was able to provide any kind of remedy. Furthermore, I will discuss the pros and cons of using environmental taxes to tackle the polyethylene spills in Stenungsund under the EU and State aid law perspectives even though the imposition of such tax instrument would be done through a national law from Sweden. However, since Member States are obliged to comply with the EU law, my analysis will provide insights about the legal constraints that environmental taxes may face at the EU level. Therefore, this article will focus on environmental questions (not energy related) of taxes using the plastic pellets leakage as a case-study to provide relevant legal insights within the State aid law field.

Potential impacts of adjustments to the New Zealand waste disposal levy.

Tanzir Chowdhury
Eunomia Research & Consulting Ltd (UK)

1. Background. The Waste Disposal Levy (WDL) was introduced in New Zealand under the Waste Minimisation Act 2008 for all waste sent to landfill. Data from 2015 suggests that, approximately 15.5 million tonnes of waste is generated annually in New Zealand, of which approximately 4.25 million tonnes (28%) is recovered, 3.2 million tonnes (21%) goes to levied disposal facilities, while the remaining 51% goes to non-levied sites. The current levy rate is \$10 per tonne of waste, which is one of lowest compared to similar type of levies in other countries. Evidence suggests that, there are significant environmental and economic benefits to having a higher rate of levy, and to applying the levy more broadly. This study sought to determine how the WDL could be better structured, and what might be the impacts for New Zealand. 2. Methods. An options appraisal model was developed from first principles for comparing the impacts of potential changes to the levy under 4 different policy options. Each modelled option included an increased standard levy rate ranging from \$20 and \$140, as well as introduction of a separate lower rate for inert waste. One option also included an incineration levy alongside the WDL for diverting waste from incineration to recycling. Impacts were estimated in terms of changes to: different types of waste flows; levy revenue; employment associated with waste management activities; gross value added; and material revenue from increased recovery. 3. Findings. The analysis revealed that by 2025, adjustments to the levy rate and structure have the potential to divert 3 million tonnes of waste from landfill, to increase the recycling rate to 60%, to generate over \$200 million additional levy revenue, to create 9,000 additional jobs, and to deliver net additional benefits of \$500 million to the New Zealand economy. 4. Interpretation. The study concluded that there are likely to be significant economic and environmental benefits for New Zealand if key adjustments are made to the levy rate and structure. In addition, a strong regulatory regime of inspection and enforcement activities is needed to minimise the risk of illegal activity at higher levy rates. Finally, changes to the levy should be announced well in advance, and the rate should be adjusted gradually for the industry to plan and make appropriate investment decisions.

Disposable packaging waste and the polluter pays principle: the introduction of a charge on disposable coffee.

Carmen Cámara Barroso
Madrid Open University (MOU) – UDIMA (ES)

The coffee shop industry is growing rapidly. Almost half of all hot drinks are now sold in disposable cups. Almost all disposable cups are not recycled due to their tightly bonded plastic lining which is difficult to remove. Another significant barrier to the widespread recycling of disposable coffee cups is the challenges of recycling packaging that has come into contact with food or drink. Some cup manufacturers and coffee shops have recently made voluntary commitments or provide in-store recycling. However, industry's voluntary commitments have been inconsistent and ineffective. In UK, several coffee shops offer customers a 25p discount for using a reusable cup. However, just 1-2% of sales receive this discount. It could be because discounts are not an effective way to change behaviour. In our opinion, charges are much more effective than discounts. A charge creates an incentive for consumers to find a more financially sustainable alternative, reducing the amount of disposable packaging used. This has been demonstrated by the success of the plastic carrier bag charge that saw an 83% reduction in use of plastic bags in the first year (2015-2016). A disposable cup charge could be a popular environmental policy, particularly following the success of the plastic bag charge. A “latte levy” on disposable coffee cups, based on the “polluter pays principle”, would remove some of the financial burden from local authorities and council taxpayers. The Environmental Audit Committee (a select committee of the House of Commons in the Parliament of the United Kingdom) therefore recommend that the UK Government introduces a minimum 25p levy on disposable cups, to be paid by the consumer on top of the price of the coffee. The revenue from the 25p coffee cup charge should be used to support local councils to provide food packaging recycling bins and waste management. A proportion of the revenue could also be used to support a wide-reaching public communications campaign that would provide easily digestible information on best-practice recycling while on-the-go. In this context, our aim is to examine how changes to the tax system or the introduction of new charges could change the behaviour of companies and consumers to become more sustainable.

Dynamic pricing and consumers' adaptive behavior: energy demand-supply balance when consumers update their lifestyles in the long-run.

Eiji Sawada
Kyushu Sangyo University (JP)

This paper examines how the consumers' lifestyle changes and the learning on the preferences for the electricity consumption affects the dynamic electricity price determination, individual consumers' surplus, consumers' surplus, representative generator's surplus and social welfare in the long-run. In our model, we define the two types of learning algorithms. One is the price distribution-based algorithm which is common to all consumers and the other is the utility distribution-based algorithm which differs among consumers. We showed that 1) the consumers' learning could result in both increases and decreases of the surplus of each economic agent including themselves and social welfare by the numerical calculations and showed 2) the condition of convergence of the dynamics by the mathematical analysis. Our analysis suggests that when consumers' learning could improve only a part of consumers at the sacrifices of the other economic agents, in the worst case, at the sacrifice of social welfare, social planners must re-design the market system where the continuous trading is conducted over the long time such as electricity power market to mitigate the negative impacts of the consumers' learning.

Household energy demand and demographic transition: what role for environmental taxation?

Rosella Bardazzi, [Maria Grazia Paziienza](#)
University of Florence (IT)

The speed at which aging has been progressing in the vast majority of developed countries is bound to have a strong impact on social and economic scenarios, especially if the interaction with overlapping generation effects is considered. Generational values influence different domains in areas as diverse as politics, labour markets, social cohesion. More recently, attention has been devoted to the influence of the so-called *energy culture* in shaping the behaviour of different population cohorts toward energy consumption and environmental protection (Stephenson et al., 2015). Individuals react to the pressure of several factors that define the concept of energy culture among which socio-demographic and economic transformations, changes in lifestyle and in pro-environmental attitudes. When considering only age effects on consumption, we assume that people may show a different pattern of energy use as they age. However, if a cohort effect exists then, for instance, the members of younger generations may start from a higher base level of consumption and continue to demand relatively more at every age in their life. Recent empirical studies have confirmed the relevance of cohort effects in energy use (Bardazzi and Paziienza, 2017; Chancel, 2014) and therefore it can be argued that the future pattern of energy consumption and emissions will be affected by the fact that younger generations will substitute older cohorts in the population. This paper aims at assessing how aging and evolving generational energy culture affects the future path of energy consumption, so interplaying with environmental policy. We analyse the Italian case which is particularly interesting because of significant cohort effects and very fast population ageing. We use a pseudopanel of Italian households to capture the long-run demand behaviour using repeated cross-sectional household data on several energy expenditures. We firstly estimate a demand model for residential energy to measure short and long-run energy price elasticities as well as income elasticity for electricity and natural gas. Then we use the cohort and age effects estimated by Bardazzi and Paziienza (2017) with demographic projections to forecast the potential magnitude of these effects on future energy consumption. We consider different scenarios, emerging from the interplay of demographic forecast scenarios, energy price projections and carbon price hypotheses. We argue that since new generations show a more energy intensive consumption behaviour, carbon price can play a key role in the Italian energy transition pattern.

Old taxes and new challenges: fuel excises and the shifting sands of our dependence on fossil fuels.

Hope Ashiabor
Macquarie University (AU)

Fuel excises have been the mainstay of financing transport infrastructure in most countries across the world. Increasing awareness of the negative environmental externalities of our dependence on fossil fuels, resource security and sustainability concerns, as well as technological advances have seen a decline in revenues from fuel excises. This paper explores the dimensions of some of the issues and challenges that the developments that have been highlighted above present. It then evaluates the relative merits of responses that have been implemented so far in other jurisdictions to address these challenges. The paper concludes by proposing strategies for charting a way forward.

Taxing energy or funding roads? Australia's fuel tax system at the crossroads.

Celeste M Black
Sydney Law School (AU)

The OECD's recent report, *Taxing Energy Use 2018*, reveals patterns in the taxation of energy and concludes that the use of energy taxes as a climate policy instrument continues to fall well short of its potential across the globe. The position in Australia is perhaps even more stark as most energy sources are not taxed directly, the notable exception being fuels and other petroleum products, and Australia no longer has a carbon pricing mechanism. This paper focuses on Australia's taxation of transport fuels (gasoline, diesel and biofuels) and shows that the policy framework underlying the system makes it practically incapable of being used as an environmental instrument. This stems from the fact that the original objective of taxing transport fuels, by way of customs duties and excise, was to fund the construction and maintenance of public roads and, even though formal hypothecation was removed in 1959, fuel tax revenues are still seen as the source of funding for road-related expenditure. Once this historical legacy is appreciated, the various and significant effective exemptions from fuel excise provided by way of fuel tax credits, the largest being for non-transport and non-public road uses by commercial operators, are perhaps understandable. Heavy vehicles used on public roads are not fully exempt but rather are currently subject to 'user charges' by way of a reduced fuel tax credit rate coupled with vehicle registration charges, whilst light vehicles used on public roads are subject to the full rate of excise. A variety of factors have put net fuel excise revenues under pressure and the mechanism that sets the heavy vehicle user charge has been the subject of significant criticism. Australia's Productivity Commission put the road user pricing reforms firmly on the agenda in 2014, and reiterated its calls in 2017, and the Federal Government has now commenced work on a pilot project for a new system of heavy vehicle charging. This paper asks whether the current policy trajectory towards explicitly severing fuel excise from road funding could in fact provide the opportunity to fundamentally reform the fuel excise to align the price signal to the environmental costs of the use of transport fuels.

Public funds for energy efficiency programs.

José A. Rozas
University of Barcelona (ES)

The Spanish Energy Efficiency Fund finances energy efficiency programs for the rehabilitation of buildings. Its main revenues come from a financial contribution paid by certain energy trading companies. A public entity, the Institute for the Diversification and Saving of Energy, manages the Fund.

The contributions to the Fund –probably a hidden tax- and its structure (contributors and quantification), have been questioned before the Courts. On the other hand, the way in which their funds are used seems far from being transparent and efficient.

The purpose of this work is to carry out a critical analysis of its structure and functioning, in order to evaluate how it could become an efficient and equitable energy efficiency financing policy instrument.

Promoting energy efficiency in residential and commercial properties: can property assessed clean energy (pace) programs be implemented in Spain?

M^ª Luisa Esteve Pardo,
University of Girona (ES)

Property Assessed Clean Energy (PACE) is a tool to obtain low-cost, long-term financing for energy efficiency upgrades or renewable energy installations for residential, commercial and industrial property owners, such as adding more attic insulation, installing rooftop solar panels for residential projects and chillers, boilers, LED lighting and roofing for commercial projects. In areas with PACE legislation in place, governments can offer a specific bond to investors or in the case of the open-market model, private lenders provide financing to the building owners to put towards an energy retrofit. The loans are repaid over the selected term -over the course of somewhere between 5 and 25 years- via an annual assessment on their property tax bill. The PACE concept was designed to overcome one of the most significant barriers to solar and costly energy efficiency retrofits: up-front costs. The PACE loans are paid by additional assessments on the property owner's property taxes over an agreed upon term while energy costs are simultaneously lower. This allows property owners to begin saving on energy costs while they are paying for their solar panels. One of the most notable characteristics of PACE programs is that the loan is attached to the property rather than an individual, so the consumer can sell the property leaving the debt to be paid through the property tax assessed on the subsequent owners. This is an opt-in program, so only those property owners who choose to participate are responsible for the costs of PACE financing. PACE programs benefit not only property owners but also cities: PACE can play an important role in reducing local greenhouse gas emissions, promoting energy efficiency improvements in its buildings, making the shift to renewable sources of energy more affordable, and reducing energy costs for residents and businesses. Because PACE is funded through private lending or municipal bonds, it creates no liability to the city's funds. Olot (Girona, Spain) is part in the EuroPACE project -funded by the European Union- that aims, among other goals, to run the first residential EuroPACE pilot in Olot. The aim of this communication is to analyse comparative experiences in the PACE concept and to examine, from a legal point of view, which measures and legal reforms would be required to transfer this model to the Spanish legal system.

The role of tax law in the French energy transition.

Vladmir Marchenko
University Paris II Panthéon-Assas (FR)

On August 17, 2015, the Law n° 2015-992 on the energy transition for green growth was promulgated in France. Following a wide public debate, this law set the objectives of French policy in this area for the next 10 to 15 years. This law was one of the elements put forward by France at the 21st yearly session of the United Nations Climate Change Conference in Paris. The energy transition aims to create a robust and sustainable energy model in the face of the challenges of resource depletion and the imperatives of protecting the environment. The question of the energy transition, generally addressed in the political and legal field, also deserves a tax treatment. In addition to the specific mechanisms (greenhouse gas emissions permit market system) provided for in international treaties, the tax is increasingly becoming an available instrument that allows the public authority to stimulate, limit or correct a development of this or that area of the company's activity, including ecological security. Many European countries have already established a tax on greenhouse gas emissions. Today, the establishment of taxes, including environmental taxes, presents two complementary aspects of analysis: From a public law point of view, there is a need to respect the constitutional limits to ensure the conformity of the "environmental" tax with the principles developed by national courts in the context of a deepening of the judicial review of the tax law. From the point of view of private law (or in other words, economic actors), it is necessary to consider the limits of tax optimization in the context of a progressive increase in the commitments of the modern state in terms of limiting emissions. Pollutants and the control of global warming, that is to say under the sign of an increase in the common tax burden. In the context of this ecological tax, there are a number of tax systems contributing to the energy transition, which may have an incentive nature or conversely, repressive. Some environmental taxes have proven effective. In particular, taxes on the consumption of fossil fuels have made it possible to reduce their consumption. But the energy transition is not confined to the taxation of energy. It applies to other major environmental issues: climate change, pollution and the consumption of natural resources. There are tax instruments in each of these areas. But they remain for one part of them incomplete, little used or perfectible.

Nuclear energy for city transport during the energetic transition.

María de los Angeles Díez Moreno
Madrid Open University (MOU) – UDIMA (ES)

The Energy Outlook 2017 report confirms the forecast for a world-wide electrified future. In Spain, electricity demand has also increased and as experts say in its Report for the energy transition, the future transport electrification is necessary. Therefore, nuclear power can greatly help to cover this increase in electric demand until the development of renewable energies are completed. Spain has enough nuclear infrastructure to cope with the challenge of transport electrification at this stage of energetic transition. But this requires our government to carry out a fiscal reform that integrates the objectives of energetic policy on the economic and environmental policy. Spain must protect the security electric supply, and favours the competitiveness of the electricity price, correcting the excessive fiscal burden that the nuclear sector supports since the Law 15/2012, of December 27, of fiscal measures for energetic sustainability. This law introduced three new taxes (tax on the value of electric energy production, the tax on the production of used nuclear fuel and radioactive waste from the nuclear energy, and the tax on Storage of used nuclear fuel and radioactive waste in centralized facilities), that under the slogan of energy sustainability, this type of electric energy is especially taxed, and although it is proclaimed to have a protective purpose for the environment, they do not really have an extrafiscal nature. This is the main reason why these three tributes are pending judicial resolution, since, the companies that own the Spanish nuclear power plants, have denounced that their establishment implies a violation of the law of the European Union, as well as our own internal legal system. The implementation of renewable energies in urban environments today is hampered by the differences between supply and demand and its integration into the energetic system. In addition, in the case of Spain, the interconnections necessary to manage the energy supply in an effective way are not fully developed, nor are the energy storage devices. Therefore, nuclear energy is the most efficient alternative to meet the growing demand for electric power that the electrification of our vehicle park requires at this stage of transition to a hypocarbonic economy.

The Italian catalogue of EHS and EFS.

Aldo Ravazzi Douvan, Cecilia Camporeale, [Gionata Castaldi](#),
Luca Grassi, Mario Iannotti, Greti Lucaroni, Andrea Molocchi,
Italian Ministry of Environment – Sogesid TA (IT)

The Italian Parliament asked the Ministry of Environment to prepare annually a national Catalogue of Environmentally Harmful Subsidies and Environmentally Friendly Subsidies (EHSs and EFSs). The definition of subsidies, as approved by the Parliament, is wide including “among others, incentives, tax benefits, preferential financial treatments and exemptions [...]”. Other Countries, like Germany and France, have launched similar inventories. Knowledge of environmental relevant subsidies, both harmful and friendly, represents a necessary effort to design ambitious and efficient environment-climate and economic-fiscal policies. Such policies must answer to the challenges posed by the Paris Agreement on Climate Change and the UN 2030 Agenda for Sustainable Development with its 17 goals. The report is mainly informative and analytical; it represents a useful tool that the policy maker could use to reform or remove EHS as recommended by different IOs (e.g. OECD, World Bank, IMF, UNEP) and think tanks (e.g. Club of Rome, IISD-GSI, IEEP, GBE). The Catalogue of Environmental Subsidies is part of a general effort of the Country aiming to analyse and evaluate fiscal erosion, tax expenditures as well as existing tax breaks and incentives. Moreover, it supports the attempts of reform for a “fairer, transparent and growth-oriented tax system” (2014 fiscal reform). The paper presents the report’s main results: identifying subsidies, understanding their structure and objectives, and review their validity, effectiveness and efficiency, in several cases many years after their introduction. Not rarely, they have no further reasons for existing anymore. Several other subsidies are still justified by valid economic and social reasons; nevertheless, they need to be reconsidered to avoid environmental negative impacts. It is often hardly understandable for the scientific community that public revenue is utilized (by means of direct expenditures) or reduced (by means of tax expenditures i.e. breaks or exemptions) to stimulate environmentally harmful economic activities. The first edition of the Catalogue has been issued in Feb. 2017. It identifies 131 measures for a total financial effect of 41B. First estimates amount to 16,2B of EHSs and 15,7B of EFSs, others deserving further analysis. The report has raised an important policy debate among experts and policy-makers. A second edition is expected by July 2018.

Subsidies are divided into 5 sectors: Agriculture, Energy, Transport, VAT, Other. The paper focuses particularly on Urban and Transport measures.

Taxes on air pollution in Spain.

Ignasi Puig Ventosa
ENT Foundation (ES)

Anthropogenic emissions of air pollutants such as nitrogen oxides, sulphur oxides, ammonia, and non-methane volatile organic compounds have detrimental effects on the environment and on human health. Environmental taxes on air pollution have proved to be an effective instrument to promote the reduction of emissions, and consequently mitigate the previous effects. Taxes on air pollution are currently being implemented in seven Autonomous Communities of Spain, namely: Andalusia, Aragon, Castile-La Mancha, Catalonia, Galicia, the Region of Murcia, and the Valencian Community. This paper performs a comparative analysis of these different taxes, and evaluates their effectiveness. A specific analysis is conducted for the taxes implemented in the Autonomous Communities of Catalonia and Valencian Community. Although the emissions of the majority of pollutants have been reduced during the last years, the analysis provides no clear evidence about which has been the contribution of these taxes, as many other factors have concurred simultaneously. The analysis also explores opportunities for a reform of the studied taxes. Some of the discussed proposals include, inter alia, the implementation of higher tariffs, the wider application of the current taxes at the national level, several forms of harmonisation, or the possible suppression of some the exemptions affecting high-polluting activities.

Paris agreements and international shipping: a second opportunity for market-based measures?

Justo Corti Varela,
CEU San Pablo University (ES)

International shipping carries around 80% of global trade by volume and produces about 2.2% to the global emissions. Hence, a global approach to improve energy efficiency and effective emission control is needed. Since CO₂ from international shipping cannot be attributed to any particular national economy the Kyoto Protocol left measures to reduce emissions to the International Maritime Organization (IMO). Since 2009 the IMO's Marine Environment Protection Committee (MEPC) is grappling with this issue. Emissions from international shipping have been partially regulated by amendments to Annex VI to the *International Convention for the Prevention of Pollution from Ships (MARPOL 73/78)*. These amendments aim to reduce emissions from international shipping by means of technical and operational measures. However, research indicates that the adopted technical and operational measures alone would not achieve absolute emissions reduction. Is it time to consider market-based measures (MBMs) in furthering the reduction of shipping GHG emissions? Quite early, between 2006 and 2009 (MEPC 60 and 61) several proposals have been made: international shipping carbon taxes (to be collected by States and then transferred to an international fund), emission trading systems, or schemes based on the actual ship's efficiency both by design and operation. In 2011 an Inter-sessional Meeting of the Working Group on Green House Gas Emissions from Ships (GHG-WG 3) was held and in MEPC 63 (February/March 2012) an impact assessment of the MBM proposals on consumers and industries in developing countries, in general, and in particular, least developed countries, small islands developing States and remotely located developing countries with long trading distances, was introduced. However, in MEPC 65 (March 2013) it was agreed to suspend discussions to future sessions and the issue has come in an impasse. On the other hand, Paris Agreement says nothing on the subject, not even explicitly deferring responsibility to the IMO to curb the sector's GHG output. Text urging countries to pursue concrete measures to tackle international shipping emissions was withdrawn at a late stage of negotiations. This silence reflects Paris negotiators' desire to avoid derailing the outcome of Paris by trying to tackle the complexities of these potentially toxic subjects. Nevertheless, developments of Paris Agreements on Climate Change constitutes a once in a lifetime opportunity to re-launch these ideas. This paper will analyse proposals made during those intensive sessions of MEPC 60 *a la lumière* of the Paris Agreements' recent Nationally Determined Contributions Plans.

A green tax reform for Cyprus and its co-benefits for urban sustainability.

Theodoros Zachariadis
Cyprus University of Technology (CY)

Cyprus is faced with serious energy and environmental challenges, which may be exacerbated in the future because of climate change. It exhibits high energy intensity, very low share of public transport use, high production of waste per capita, and the most severe water stress in Europe. Moreover, as a member of the European Union, the country has certain commitments to reduce the emissions of greenhouse gases and waste production, and to use and price water more efficiently. This paper formulates a proposal for a fiscally neutral green tax reform, which can significantly contribute towards the transition to a low-carbon and resource-efficient Cypriot economy. We propose the gradual implementation of a carbon tax to those sectors that are not subject to the EU Emissions Trading System, a water scarcity charge and a landfill tax for municipal and industrial waste that is disposed of in landfills. Removal of environmentally harmful subsidies is also included in the reform. We employ an energy and emissions forecast model as well as analyses with the aid of microdata collected from official national economic surveys and are able to demonstrate the environmental benefits and the fiscal effects of these taxes in the medium and long run, and to assess the effect of the reform on the competitiveness of firms and the income distribution of households. We also provide an assessment of the co-benefits of this reform for urban sustainability by calculating the changes in urban emissions of air pollutants and the associated reduction in pollution damage costs, and the corresponding effects on municipal waste production and urban water needs. The aspect of fiscal neutrality is addressed by providing policy recommendations for reducing the tax burden on labour through a decrease in social security contributions of employees and self-employed individuals, as well as by meeting some of the financing needs of the new National Health Scheme through the revenues of the environmental taxes.

Efficient tax incentives for buildings' better environmental performance.

María Amparo Grau Ruiz
The Complutense University of Madrid (ES)

Nowadays, in the European Union, a better environmental performance in the building sector could probably be achieved, especially if some of the current measures to improve efficiency were effectively supported by public funding. This paper will review some useful standards and certificates in this ambit. They are usually offered or asked from the different stakeholders in practice, either for their voluntary acceptance or required mandatory fulfilment. Additionally, the role of smart buildings, counting increasingly on interactive robots, and the environmental savings they may produce should be considered in the future. The costs and benefits derived from different initiatives will lead us to assess their possible relevance in the tax field. This contribution will particularly focus on the proportionality and justification of the tax incentives eventually deserved. If possible, a case study of the current situation in Spain will be presented, based upon the results of a survey that will be conducted in the coming months.

Applying environmental taxes to supply chain management (Examining intermodal transportation in interconnecting systems).

Deborah Jarvie
University of Lethbridge (CA)

As the world's population continues to grow exponentially, the consumption of natural resources, water, food, and both essential and non-essential goods is rising to unsustainable levels. Additionally, the relationships within these complex systems of trade and exchange are highly dependent on an ever increasing supply of energy to move the products to consumers, further compounding the stress on an already vulnerable framework. This paper examines the role of current and potential environmental tax policy at various stages throughout the energy, water, food, and consumer goods supply chains, in line with the theme of the conference - that of transportation in urban growth. The paper examines various supply chain systems which are highly dependent on intermodal transportation. Through a dynamic systems approach, the study conveys both a 'big picture' and 'detailed account' of these systems, citing various examples, and subsequently identifying policy gaps where environmental market instruments may potentially play a role to better facilitate sustainable and resilient growth as global transportation increases. Connections within and between the various systems are explored, identifying the potential for environmental tax policy to leverage positive results. The study is based on corporate, government, and consumer reports, in addition to the bodies of literature examining a) environmental tax policy, b) intermodal transportation, and c) systems analysis within supply chains. The paper aims to shed light on an area where little is known to date; that being the role of environmental tax policy to mitigate negative externalities within a supply chain framework. Traditional supply chain models based on inputs, transformation, outputs, customer expectations, and external influences form the foundation for the model, from which connections are explored, feedback is examined, and leverage points recommended. Issues such as these are often examined in isolation of one another, and as such, an analysis of the system as a whole is not only difficult but incomplete when there is a lack of information regarding the relationships amongst the parts. Thus, this study concludes that comprehensive studies addressing the cumulative effects within and between various systems will allow for a richer understanding to guide the formulation of effective policy to better meet the needs of the economy, society, and the environment.

Study on the relationship between provincial tax rates of EPT and selected parameters.

[Chazhong Ge](#), Chinese Academy for Environmental Planning (CN)

[Yidan Zhang](#), Hangzhou University of Electronic Sciences and Technologies (CN)

[Feng Long](#), Chinese Academy for Environmental Planning (CN)

[Qijia Yang](#), Chinese Academy for Environmental Planning (CN)

China started to implement Environmental Protection Tax (EPT) Law on 1 January 2018, making herself in a lead position in green taxation internationally as the EPT Law is solely one of the 18 taxation law categories in China. According to EPT law, provincial governments have the right to set up their own tax rates and the maximum number of pollutants per pollution outlet subject to be approved by their provincial people congresses (PPC). The EPT law stipulates that the provincial tax rates should be set up in accordance with factors such as regional environmental capacity, the load of pollutants discharged and level of economic development. Right now, all provinces have issued out their rates of EPT. Therefore, it is very interested that whether these rates match their environmental quality, the amount of pollutant discharge and the level of economic development and to what extent they reflect the marginal treatment costs. The paper will collect data on provincial tax rates of EPT and relevant parameters such as environmental quality, the amount of pollutant discharge and GDP, to do comparison, regression and scenario analysis to find out the answers to these above mentioned questions. The paper will first do some overview of EPT and provincial tax rates, conduct comparison between EPT provincial tax rates and selected parameters, select a provincial EPT tax rates to do comparison analysis between them and marginal costs, use scenario analysis to find out the higher tax rates for the province and finally draw out the conclusion and recommendation for improving EPT policy. The recommendations could include those that raise the provincial tax rates in the bad environmental quality and large discharge of pollutants.

Analysis of the granting of credit and subsidies in innovative technologies in renewable energy: assessing the implementation and effectiveness of a Brazilian case.

[Carlos Araujo Leonetti](#), Federal University of Santa Catarina (BR)
[Rafaela Cristina](#), Federal University of Santa Catarina (BR)
[Elena Aydos](#), University of Newcastle (AU)

This paper proposes the analysis of the “Support Plan for Technological Innovation in the Electric Sector (*Inova Energia*)”, a public incentive policy with the aim of encouraging innovation in the renewable energy and energy efficiency sectors in Brazil. The paper will assess the implementation and effectiveness of the policy and will propose improvement measures in the field of public policies that have similar goals. The *Inova Energia* program was launched in 2013 as a coordinated action among three federal public entities: (i) Brazilian Electricity Regulatory Agency (ANEEL), (ii) Brazilian Development Bank (BNDES), and (iii) Funding Authority for Studies and Projects (FINEP). Altogether, one hundred and five business plans were selected, presented by fifty-eight leading companies and thirty-two participating companies. These companies received a total of three billion *reais* (approximately USD 868 million) in credits and subsidies, to be invested in technological development of smart grids, solar and wind energy, hybrid vehicles and vehicular efficiency energy. The paper will evaluate the effectiveness of business plans selected under the *Inova Energia* program, as outlined in the “Economic, Social and Environmental Impact” section of each business plan. The expected industrial and technological impacts from the innovation project on suppliers, clients and other stakeholders will be assessed, as well as the possible economic, social and environmental externalities. The paper will also analyse key implementation aspects related to: (i) the role of government entities in monitoring the business plans, as well as the disclosure and transparency of the information provided by the leading companies, (ii) the compliance with the general goal of the project represented by the development of Brazilian innovative companies and innovative technologies in the areas of smart grids, energy generation through alternative sources and hybrid vehicles and vehicular energy efficiency, and (iii) the proper allocation of financial resources by the public entities in 2013, against effective results in 2018. Based on the above-mentioned criteria, the paper concludes that the *Inova Energia* program was not effective in achieving meaningful innovative technologies in the renewable energy and energy efficiency sectors in Brazil. A number of recommendations for future incentive-based policies in these areas are proposed.

How much does it cost to conserve the nature space in China?

[Wu Jian, Yang Zhe](#)
Renmin University of China (CN)

In-situ conservation is an important measure to protect biodiversity. By the end of 2016, China has established 2,750 nature reserves, accounting for 14.88% of China's land area, which exceeds the world average. However, management failure is still serious. The effective management of nature reserves requires adequate funding. Based on a thorough study of the cost estimation methods for nature reserves and relevant management standards for nature reserves in China, this paper develops conservation cost function of nature reserves, estimates the overall conservation costs of nature reserves across the country, and compares the costs of nature reserves at various locations, levels and types, as well as the influencing factors of management costs. The results show that: (1) In order to meet the management standards, the nature reserves in China require approximately 8.18 billion RMB annually, of which the national and provincial nature reserves' management cost is 5.3 billion yuan. But the actual investment is much lower than the fund request, reflecting large funding gaps. (2) The management costs show obvious geographical differences. The more undeveloped northeast and west regions have bared large proportion of conservation costs. 80% of management costs are for staff salaries and the daily operation, which spread the cost burden on local governments, especially those poor county-level governments. (3) The management cost per unit area is negatively related to the area of nature reserves, positively related to population density, and closely related to the types of nature reserves. This information suggests that the government with limited budget, may rationally plan the protection area and optimize the network of nature reserve, to match the financial capacity and management objectives. (4) The annual opportunity cost of nature reserves in China is approximately 1.67 trillion Yuan, reflecting the huge economic pressure on the local society. Governments need to improve ecological compensation mechanism for nature reserves to solve the contradiction between nature reserves and surrounding communities.

Inventory and analysis of the effectiveness of landfill taxation of non-hazardous waste in Europe.

Tom Huppertz
RDC Environment (BE)

1. Scope and goals. One of the main waste and circular economy objectives set by the Transitional Energy Law for Green Growth (LTECV) of 17th August 2015 is to halve the quantities of landfilled between 2010 and 2025. Landfill taxation, applied in France via the TGAP, is a means of achieving this ambitious objective. Indeed, by increasing the landfill cost, it aims to make this treatment route less attractive than recycling or energy recovery. In this context, ADEME conducted in 2016, in partnership with RDC Environment, a study comparing the French situation with that of nine other European countries. The countries (or regions) selected, in addition to France, are Germany, England, Austria, Catalonia (Spain), Denmark, Finland, the Netherlands, Sweden and Wallonia (Belgium). These countries were selected among European countries because several criteria: high GDP, high performance waste policy and existence of a landfill tax (except Germany for the last criteria). 2. Main results. The landfill price level is a key factor to foster recycling and energy recovery of municipal waste. Indeed, in the countries with less than 25% landfilled municipal waste, the landfill price (tax included) is higher than 100 €/t, and landfill bans exist for certain types of waste. In most countries with a good waste management performance and a high landfill price, the level of the landfill tax often explains this high price. Two complementary factors seem also to play a significant role: the delay of announcement of the implementation of the tax (or its evolution), and the combination of taxation with other instruments such as landfill bans on certain types of waste. Within the group of countries studied, France shows a high landfill rate, as well as a low effective level of landfill taxation (partially due to the landfill tax reduction system). However, this observation must be put into perspective given the panel of countries chosen. The strengthening of landfill taxation, in conjunction with other policies (regulatory restrictions...) in France is certainly a relevant and powerful tool to accelerate the achievement of LTECV's waste objectives.

Common pool resources and green taxation: is there a way to convergence?

Lia Carolina Vasconcelos Camurça
Federal University of Ceará (BR)

After centuries of negligence towards environmental issues, an iconic expression has emerged: sustainable development. This expression is propagated by many and applied by few, so that today it has become commonplace for dubious actions. In the past decades, life in large cities has changed drastically into an urban and globalized way of life. This occurred perhaps because of the structural change that accompanies economic growth, meaning that there is a shift in the composition of economic activity towards sectors of higher pollution activity; or even because of the impact that increased demographic population has on the biosphere. Either way, urban life evolved into an intricate sum of relations between society and environment. However, this relation has become toxic to the biosphere and cannot be maintained the way that it is today. A fact proven by the numerous ecological disasters from the past years is that a free market economy will not deliver the level of environmental quality that humanity needs. However, where is the incentive for going green if no one else is going to? By this, Common Pool Resources (CPR) that everyone has access are often misused and exploited. These CPR have two characteristics: non-exclusion (you cannot exclude people from the usage) and non-rivalry (one person's consumption of the good doesn't ruin it for others). These goods are, perhaps, one of the most difficult market failures to correct. If you can't prevent other people from exploiting the CPR, you are not going to have incentive to save it yourself. So, there's where it is the main role of government's regulation: environment protection, but in a way that also guarantees economic development. The issue narrows in developing countries, where there is an eager to have economic growth at any cost. Green taxation, although existent, does not prevent developing countries, such as Brazil, from serving as a pollution haven for big companies from the developed world, as we can see with the disasters from companies like Chevron (responsible for oil leak at the Bacia de Campos) and Norsk Hydro (responsible for unauthorized discharge of untreated water into the Pará river). So, this is a proposition for a further analysis on how, or if, green taxation could solve these market deregulations, but also in a way to discourage the use of the developing economies as the dumping ground of the world.

The agricultural conundrum: encouraging climate-friendly agriculture through economic instruments in North America.

Emma Akrawi
Vermont Law School (US)

As people migrate from rural to urban areas, sheltering farmland is increasingly important. Maintaining farming as a viable enterprise is crucial in feeding this growing urban population. At the same time, there is a perceived tension between agricultural livelihoods and reducing emissions. Many climate policies excuse agriculture from emissions standards, failing to account for the fact that agriculture contributes significantly to global greenhouse gas emissions through food production, transportation, and land use conversion. These emissions include carbon dioxide (CO₂) from fossil fuel use in on-farm and processing activities, transportation, and land use change; methane (CH₄) from livestock, rice production, and manure management; nitrous oxide (N₂O) from synthetic fertilizer application and manure management; and fluorinated gases for refrigeration. Agricultural techniques exist to both mitigate these emissions and sequester carbon in soils. But do current economic tools encourage climate-friendly agriculture? This paper surveys a number of economic instruments in North America to understand how mechanisms designed with environmental intentions fail or succeed to account for agricultural emissions. Tools examined include: the California cap-and-trade program; the British Columbia carbon tax; the U.S. federal tax incentive for farmland conservation easements; and U.S. state property tax incentives for farmers. Finally, the paper reflects on how the environmental impact of these tools could be strengthened to encourage climate-friendly agricultural practices while maintaining agricultural viability.

The costs and benefits of extended producer responsibility: an evaluation of the Italian waste electrical and electronic equipment (WEEE) management system.

Edoardo Croci, Francesco Colelli
University of Bocconi (IT)

Extended Producer Responsibility (EPR) schemes can provide a new and flexible fiscal approach to improve waste management. The recently revised Circular Economy Package fosters the extension of EPR to new product groups and waste streams. Waste Electrical and Electronic Equipment (WEEE) management in the EU is regulated under the EPR principles (Directives 2002/96/CE and 2012/19/CE). In the Italian EPR system for WEEE management currently operate fifteen National Producer Responsibility Organizations (PROs). The collection rate in 2017 reached 40% of put to market, while from 2018 the target is set to 65%. PROs are non-profit consortia financed by EEE producers, operating under a competitive system. Producers' financial contributions to PROs cover 60% of total industrial costs. In turn, PROs ensure the collection of WEEE from the municipalities' centers and the transport, treatment and recycling of WEEE. A private consortium of PROs acts as Clearing House, ensuring fair competition by monitoring PROs activity and promoting the coordination of operative activities. The paper develops a scenario analysis assessing the sector's market and technological trends. Different macro and microeconomic factors, consumer practices and technological eco-innovations (as dematerialization and refurbishing) are included to estimate three scenarios of EEE production, use and waste generation. Alternative WEEE management practices are then assessed in the scenarios. Industrial costs estimates include collection, logistics, treatment and recycling costs, while operative economies of scale are based on the historical variations in the unitary costs per WEEE category. The environmental benefits are estimated by taking into consideration the emissions avoided from the substitution of primary raw materials and the correct treatment of WEEE components. Results show that in 2020 regulatory compliance will require an increase in operational costs amounting to 220%-270% of financial contributions paid by producers in 2016. Approximately one third of such increase is due to EEE market expansion, depending on the scenario considered, while the remaining share is due to the increase in the collection rate. WEEE recycling will further reduce the consumption of primary raw materials and increase the avoided GHG emissions by 200-260% compared to 2016. The monetary value of such benefits largely outweighs additional WEEE management costs. Thanks to the creation of PROs, producers have accepted significant responsibility, both financial and operational, for the treatment and disposal of their products.

Optimal charge rate for the waste disposal charge system in Korea: a comparative static analysis within the framework of consecutive waste treatment service markets.

Taek-Whan Han
SeoKyeong University (KR)

1. Motivation of the study. Landfill taxes are in operation in Europe and the Industrial Waste Tax is run in Japan. In Korea, the Waste Disposal Charge System will be in operation by 2018. Elasticity, related to tax revenue and visible performances, is often taken into considerations in determining the charge rate. However, the rate determined in this way is not necessarily optimal. This paper attempts to provide a basic principle in determining the optimal waste disposal charge rate considering the unit external cost, elasticity, and others, using a simple comparative statics. 2. Optimal Change Rate in the Two Stage Waste Treatment Service Markets. Waste Disposal Charge System is operated within the two consecutive series of waste treatment services markets: the intermediary waste treatment service market and the final disposal service market. The players in these markets are waste generators (emitters), intermediate processors (intermediaries) and final disposal service providers (disposers). Intermediate processors include recyclers. These markets are either competitive or monopoly. It is our concern whether and how, if any, the market structure and elasticity play in determining the Waste Disposal Charge. Detailed description of these two stage market for waste treatment service is provided. 4. The Comparative Statics and the Results. (The model, described in mathematical equations, is omitted in this abstract) The results from the comparative statics are as follows. As far as the markets are competitive, we need to concern only to the unit external cost, regardless of the shapes of supply and demand curves, and regardless of whether the market is single or two-stage. With monopoly, the optimal charge rate should be lower than the unit external cost. However, even in monopolies, the sensitivity of the optimal charge rate to the external cost is fairly high, implying finding external cost is more important than estimating the elasticity. 5. Conclusion. In Korea, the situation might be considered pretty much close to the competitive case where all players are price takers. In this setting, the priority in determining optimal charge rate should be concentrated on finding the correct external cost, instead of considering elasticity, etc. In other words, the textbook style argument for Pigouvian tax can be safely applied by policy practitioners in many cases.

Taxation as a preventive measure for environmental protection.

Nazlı Nilay Dayanç,
Bilkent University (TR)

In the 21st century environmental challenges are threatening the world and human life increasingly in spite of the fact that the right to safe, healthy and ecologically-balanced environment is accepted as a human right which is a component of right to life. Even some of the environmental problems are confined with local areas, most of them occur at global level and it is not easy to distinguish the cause and effect relationship between the damage and outcome of the damage. Additional to ex post solutions, ex ante remedies i.e. preventive measures, especially using the tool of taxation, play an essential role in environmental protection. Since the environment is a whole and there is “only one earth”, environmental precautions should be at global level and governments should apply them strictly. Another feature of 21st century is that: it is the era of knowledge and technology. We need to combine the knowledge of technology and law to serve environment in a wise way. Technology is the main tool for both developing people-oriented approaches to live in an inhabitable, livable, sustainable and productive living space and protecting the environment and minimizing the side effects of pollution. Policy makers need to steer activities by creating incentives that encourage science-based innovations. Law affects the choices people make and economic theory gives us tools to understand and predict the effect of legal rules. Law and economics doctrine holds that taxation directly affects the human behaviors and reveals straight-forward consequences for the society. Thereby the main and most affective legal institution to induce people to innovate and deter pollution and contribute sustainability is taxation considering its ex ante structure, as a result of the understanding of “protection before pollution”. Environmental taxes will be explained and appropriateness of the taxation as a legal instrument will be discussed comparing with its alternatives in this article. This article also seeks to analyze and evaluate the precautions that should be taken by making decisions in international level and applying them in the national level in order to reduce pollution and promote sustainability.

Payment for urban ecosystem services and the waste pickers: a tool to overcome environmental and social challenges in Brazil.

Ana Paula Rengel Gonçalves
Federal University of Santa Catarina (BR)

This article will explore the payment for urban ecosystem services as a tool to overcome the social and environmental challenges suffered by the waste pickers in Brazil. The National Movement of Pickers of Recyclable Materials (MNCR) is a social movement that has more than fifteen years of history and organises the pickers of waste and recyclable materials in Brazil. The movement aims to guarantee the popular protagonism of the class in relation to their needs and demands. Waste management and social justice are prominent topics in Brazil, especially considering their interconnection through the waste pickers' movement. The environmental issues confronting Brazilian cities are fundamentally the product of human over-exploitation of nature and poor regulation and monitoring of environmental damage, including poor waste management. Brazil's dominant model of urban development –based on degradation of nature, pollution, and social injustice– is not sustainable. Economic and non-economic approaches may assist with improving environmental protection by recognising the value of ecosystems and the services they provide. The payment for ecosystem services (PES) offers a new policy approach to environmental regulation in the context of waste management in Brazil and an instrument of social inclusion. The MNCR itself perceived the correlation between the work of the waste pickers as environmental actors and the potential benefits of PES instrument. The urban services provided by waste pickers include the sequestration, conservation, maintenance and increase of the stock and the reduction of the carbon flow, conservation of biodiversity, conservation of water resources, climate regulation, amongst others. The MNCR lobbied for the development of specific policy designed to properly remunerate the service provided while attending their reality, particularities and demands. One example is a Bill to institute the Municipal Program for Payment for Urban Environmental Services in the City of Florianópolis. The article will assess the social and environmental aspects of the Bill and test whether the proposed scheme can be used as an instrument of social inclusion and participation of the waste pickers in the context of management of solid residues in Brazil.

Car sharing as an alternative to single-occupancy car use: an economic and legal analysis of the taxation of car sharing platforms

[Fanny Vanrykel](#), University of Liège (BE),
[Bruno De Borger](#), University of Antwerp (BE),
[Marc Bourgeois](#), University of Liège (BE)

Recently, shared mobility has become a hot topic in urban mobility discussions. Sharing transportation modes, like Ofo in Paris and Car2go in Madrid, affects people's travel behaviour, generating social, environmental and land use impacts. Notably, this change can reduce car ownership, increase the use of alternative transportation modes, diminish fuel consumption, greenhouse gas emissions and the number of kilometres driven by car, and raise environmental awareness. This paper studies the taxation of car sharing, by exploring how it affects tax instruments and conversely how such taxes impact the development of car sharing. To this end, we use the example of a B2C car sharing platform, which enables users to access vehicles and drive them within a limited (urban) zone, without bearing the costs and responsibilities of ownership.

Our purpose is twofold. First, starting from the basic economic principles of taxation of car ownership and of car use to cope with external costs, we describe why and how these principles cannot be easily applied to car sharing. We do so both in the absence and the presence of particular pricing (e.g. introduction of kilometre charges or road pricing) policies the government may implement to control mobility. The existence of car sharing raises a number of questions. For example, should membership fees users pay to the car sharing firm be taxed? Assuming there is no road pricing, how should the unit price per kilometre or per minute for car sharers be taxed to deal with congestion and pollution? In other words, does it make sense to charge car sharing users for congestion and pollution if other road users do not face road pricing? How should the user tax be adjusted once road pricing is introduced?

Second, we analyse these issues from a legal perspective, moving from “should they be taxed and how” to “can they be/ are they taxed and how”. For this purpose, we study technical rules (taxpayer, tax base, rate) with respect to taxes on car ownership (registration tax, annual circulation tax and VAT), car use (excises), services (VAT) and profits (corporate income tax), and their objective (financing, redistributive, environmental). We conclude that the Belgian tax system proves badly suited to the deployment of car sharing, as it is built on the premise that the car owner personally uses his/her car. Consequently, car sharing both risks to jeopardize tax purposes and to suffer from discriminatory treatment, preventing its expansion.

The way of the dragon China's new emissions trading scheme and the prospect for linking

[Joseph Dellatte, Kyoto University \(JP\)](#),
[Sven Rudolph, Kassel University \(DE\)](#),
[Achim Lerch, Kassel University \(DE\)](#)

In the 1972 Bruce Lee movie, a Chinese Kung Fu martial artist overpowers Karate-trained US and Japanese fighters in a conflict over the dominance over a restaurant. In climate policy, the new national Chinese Emissions Trading System (CN ETS) might also help overcoming the persisting US-American and Japanese resistance to carbon markets at federal levels, if the program turns out to be well designed, performs well, and is open to international linking.

China has long been hesitant in climate policy and particularly in the use of market-based policies. Now the biggest absolute greenhouse gas (GHG) emitter with total emissions surpassing 9.2 billion tons of CO₂ and also increasingly faced with the negative environmental consequences of its still booming economy, China approved seven regional pilot ETS in 2011, which started with largely varying designs in late 2013. After some years of continuous postponements China then launched its national ETS in December 2017. The CN ETS is supposed to become the country's climate policy master tool in its endeavour to reach its Nationally Determined Contribution (NDC) to the Paris Agreement to peak emissions for 2030, to reduce carbon intensity of 40-45% by 2020 (from 2005) and to decrease energy intensity of 15% (from 2015). China also pledged to lower CO₂ emissions of 60-65% per unit of GDP (from 2005 levels), to increase to around 20% the rate of clean energy in primary consumption, and to increase significantly its forest stock volume (UNFCCC 2014)

GHG ETS, on the other hand, is a promising way of substantiating the Paris Agreement and contributing to achieving the 2°C target. Economists have almost unanimously supported the use of ETS due to its economic efficiency and its environmental effectiveness (Endres 2011) and even a sustainable design is possible, which additionally considers social justice criteria (Rudolph et al. 2012). In addition, recently carbon pricing has become more widespread, extending not only across several continents but across all governance levels (ICAP 2018).

Against this background, we ask whether the CN ETS can be called sustainable, which role transparency plays, and what the chances for linking are. In order to answer these questions we describe the design evolution from the sub-national pilots to the national scheme and evaluate them based on sustainability criteria for carbon market design. We also analyse the aspect of transparency and its importance for design and outcome evaluations of GHG ETS. We eventually draw some conclusions that are interesting to take in consideration for a potential future linking of the Chinese ETS with other ETS in other jurisdictions. Methodologically, we use a comprehensive sustainability economics approach and use official Chinese government data as well as, where necessary, information obtained from non-governmental organization surveillance.

Regulating behind the meter: embedding protections for energy consumers in modern energy environments

Rowena Cantley-Smith. Monash University (AU)

Traditional energy markets have been designed to transmit and distribute electricity in a one way direction along the energy chain, with laws designed to support, and regulate where necessary, activities directed towards ensuring consumers have access to reliable, secure, and affordable energy services. With the growing pressure for energy supply to also be sustainable, consumers are increasingly turning to embedded or distributed renewable energy generation as a way of managing demand to meet their current and long-term energy interests. As more and more consumers *embed* renewable energy generation, such as solar and fuel cells, these end-users are changing the way in which established distribution and retail markets operate. Not only are consumers increasingly turning to embedded generation to meet their own energy need, in many countries they are also exporting any excess back into the electricity grid's distribution network. Thus, while the growth in demand for electricity through the traditional grid is declining, the supply of energy into the electricity network (the grid) is increasingly flowing in the opposite direction from embedded generators. As this two-way flow of power increases, questions arise as to whether existing policy, legal and regulatory frameworks are adequate in terms of addressing the potential impacts of these changes on the established grid and its stakeholders. In particular, consumers of some types of embedded generation networks are particularly vulnerable as a result of inadequate regulation of activities behind the meter. Moreover, connecting embedded generation into an established electricity distribution network comes with its own set of problems, including voltage fluctuations, steady state voltage levels, current fault levels, and generator instability.

This paper examines the growth in embedded generation in urban settings and the ways in which consumer-led demand management such as this is challenging the legally entrenched "rules of the game" in stationary energy markets. In addition to considering the benefits of these changes, this paper also examines possible problems often faced by consumers relying on embedded generation. As this paper concludes, when properly supported and regulated, the benefits of this type of demand management can be positive for consumers and also for suppliers that readily embrace connecting embedded generation to the grid.

International Steering Committee

Prof. Larry Kreiser, Cleveland State University, USA

Prof. Janet Milne, Vermont Law School, USA

Assoc/Prof. Hope Ashiabor, Macquarie University, AUSTRALIA

Prof. Mikael Skou Andersen, Aarhus University, DENMARK

Susanne Åkerfeldt, Swedish Ministry of Finance, SWEDEN

Dr. Kris Bachus, University of Leuven, BELGIUM

Dr. Nils-Axel Braathen, OECD, FRANCE

Prof. Bill Butcher, University of New South Wales, AUSTRALIA

Prof. Jacqueline Cottrell, Senior Policy Advisor, Green Budget Europe, GERMANY

Prof. Natalie Chalifour, University of Ottawa, CANADA

Prof. Paul Ekins, University College London, UK

Prof. Mona Hymel, University of Arizona, USA

Prof. Soocheol Lee, Meijo University, JAPAN

Prof. Roberta Mann, University of Oregon, USA

Prof. Pasquale Pistone, Academic Chairman of the IBFD, THE NETHERLANDS

Prof. Natalie Stoianoff, University of Technology Sydney, AUSTRALIA

Prof. Marta Villar, CEU San Pablo University, SPAIN

Assoc/Prof. Marcos André Vinhas Catão, Fundação Getulio Vargas, BRASIL

Prof. Stefan Weishaar, University of Groningen, THE NETHERLANDS

Prof. Ana Yábar, University Complutense of Madrid, SPAIN

Assist/Prof. Yan Xu, The Chinese University of Hong Kong, HONG KONG

Advisory Committee

Prof. Marta Villar, GCET19 Conference Chair, CEU San Pablo University, Madrid, SPAIN

Prof. Iñaki Bilbao, CEU Cardenal Herrera University, Valencia, SPAIN

Prof. Carmen Calderón, CEU San Pablo University, Madrid, SPAIN

Prof. Cristina Garcia-Herrera, Institute for Fiscal Studies, Madrid, SPAIN

Prof. Amparo Grau, University Complutense of Madrid, Madrid, SPAIN

Prof. Pedro Herrera, The National University of Distance Education, Madrid, SPAIN

Prof. Jerónimo Maillo, CEU San Pablo University, Madrid, SPAIN

Prof. José Andrés Rozas, University of Barcelona, Barcelona, SPAIN,

Prof. Stefan Weishaar, University of Groningen, Groningen, THE NETHERLANDS

Assoc/Prof. Javier Porras, CEU San Pablo University, Madrid, SPAIN

Critical Issues in Environmental Taxation Publication

Participants at the 19th Global Conference on Environmental Taxation (Madrid Conference) will have the opportunity to publish their research in Critical Issues in Environmental Taxation. The Call for Papers for Critical Issues will be sent approximately one month after the end of the Madrid Conference.

Critical Issues is published annually by Edward Elgar Publishing Ltd. Edward Elgar has a strong publishing record in the fields of environmental economics, environmental law, and environmental taxation. Additional information on Edward Elgar and Critical Issues can be found at www.e-elgar.com.

Each volume of Critical Issues is limited to approximately 100,000 words (16-19 manuscripts) and has a theme approach. The theme for each volume is determined after the manuscript review process is complete. Readers of Critical Issues include academics, policy makers, accountants, lawyers, and economists.

Manuscripts accepted for publication in Critical Issues deal with insights and analysis for achieving environmental goals through tax policy. Manuscripts submitted for possible publication are reviewed by two external reviewers and should deal with topics that are timely and of regional, national, or international interest. Authors of accepted manuscripts will receive one copy of the publication.

Final versions of manuscripts accepted for publication in Critical Issues should meet the following requirements in addition to any requirements described in a letter of acceptance.

Format. All manuscripts are limited to a maximum of 6,000 words including footnotes, tables, figures, etc. Each table will count as 300 words and each figure will count as 500 words. References are to be placed at the end of the manuscript as endnotes. All manuscripts must be double-spaced, including endnotes, using Microsoft Word format (Times New Roman 11).

English. The manuscript must be written in clear, fluent English so that readers will not be able to distinguish authors who use English as a first language from those who use English as a second language. The editors of Critical Issues encourage any authors who are not fluent in English to engage their own editors who can help them to meet this standard for the final manuscript.

Abstract. If the manuscript starts with an abstract, the abstract should be eliminated from the manuscript prior to submission for possible publication.

Author Credentials. An endnote following the name(s) of author(s) should indicate the author affiliation (without abbreviations) and email address.

Copyright. The author(s) must be the sole owner(s) of the complete copyright and all other rights in the manuscript (apart from copyright material not owned by the author but included in the manuscript with the permission of the copyright holders). The author(s) have the responsibility for obtaining any necessary copyright permissions.

Exclusive Publication. The author(s) of accepted manuscripts must not have published the manuscript previously in another publication and should not publish the manuscript in any other publication without the express permission of the editors of Critical Issues.

Publisher Requirements. The author(s) of accepted manuscripts must respond to the editors promptly when receiving requests to review proofs and sign publication agreements.

However, the Institute for Fiscal Studies of the Spanish Tax Ministry and University Institute for European Studies at CEU San Pablo University will also publish a selection of other quality papers and contributions to the GCET19.

Index of participants

Name	First Name	Institution	Country	Session
Akrawi	Emma	Vermont Law School	USA	4.5
Antón	Álvaro	CEU Cardenal Herrera University	Spain	1.4-3.4
Ariatti	Simone	University of Trento	Italy	1.5
Ashiabor	Hope	Macquarie University	Australia	4.1
Astarloa Ilarduya	Francisco de Borja	CEU Cardenal Herrera University	Spain	-
Ates	Leyla	Altinbas University	Turkey	2.3
Aydos	Elena	University of Newcastle	Australia	1.4
Bachus	Kris	University of Leuven	Belgium	2.1-4.5
Barbosa Silva De Araujo	Elizabeth Alice	The Federal University of Ceará	Brazil	3.2
Bardazzi	Rosella	University of Florence	Italy	-
Bilbao Estrada	Iñaki	CEU Cardenal Herrera University	Spain	4.6
Black	Celeste	Sydney Law School	Australia	4.1
Blazey	Patricia	Macquarie University	Australia	-
Braathen	Nils Axel	OECD	France	2.2, General Programme
Butcher	Bill	UNSW Sydney	Australia	1.1
Calderón	Carmen	CEU San Pablo University	Spain	-
Calleja	Ana Laura	Direccion General Impositiva (DGI)	Uruguay	-
Calleja Mediano	Miguel Francisco	Iberdrola	Spain	-
Cámara Barroso	María del Carmen	Madrid Open University (MOU) – UDIMA (ES)	Spain	1.5-3.4
Cantley-Smith	Rowena	Monash University	Australia	4.2
Cañal García	Francisco José	University of Barcelona	Spain	3.1
Castaldi	Gionata	Italian Ministry of Environment, Land and Sea – Sogesid TA	Italy	4.3
Cavalcante Araujo	Renan	The Federal University of Ceará	Brazil	2.3

Name	First Name	Institution	Country	Session
Chowdhury	Tanzir	Eunomia Research & Consulting Ltd	United Kingdom	3.4
Cobos	Jose María	Comillas Pontificia University / Garrigues	Spain	2.3
Colelli	Francesco	University of Bocconi	Italy	4.6
Corti	Justo	CEU San Pablo University	Spain	2.4-4.3
Corral García	Jorge	Iberdrola	Spain	-
Cottrell	Jacqueline	Green Budget Germany / Europe	Germany	-
Cristina	Rafaela	Federal University of Santa Catarina	Brazil	4.4
Cuenca	Alain	Institute for Fiscal Studies	Spain	General Programme
Damberger	Robin	Institute for Austrian and International Tax Law	Austria	-
Dayanç Kuzeyli	Nazli Nilay	Bilkent University	Turkey	4.6
De Jong	Rob	UN Environment	Germany	GIZ
De Moraes e Dantas	Eric	The Federal University of Cear�	Brazil	3.2
Del Blanco Garc�a	Alvaro Jesus	Institute of Fiscal Studies	Spain	-
Dellatte	Joseph	Kyoto University	Belgium	4.4
Diez Moreno	Maria De Los Angeles	Madrid Open University (MOU) – UDIMA	Spain	4.2
Ravazzi Douvan	Aldo	Italian Ministry of Environment, Land and Sea - Sogesid TA	Italy	1.4
Encinar Arroyo	Nuria	Barrister in Energy Law, General Secretary of AEDEN	Spain	1.2
Esteve Pardo	Maria Luisa	University of Girona	Spain	4.2
Falcao	Tatiana	European University Institute	Brazil	1.2
Fernandes Vieira	Lara	Universidade De Fortaleza - Unifor	Brazil	-
Fern�andez	Guillermo	CEU San Pablo University	Spain	-
Fiddelaers	Sharon	Ministry of Finance	The Netherlands	-
Fonseca	Enrique	Enrique Fonseca Capdevila Abogados	Spain	-
Garc�a Carretero	Bel�n	Institute for Fiscal Studies	Spain	-
Garc�a Herrera	Cristina	Institute for Fiscal Studies	Spain	-

Name	First Name	Institution	Country	Session
Gascón Catalán	Jesús	Spanish Tax Agency	Spain	GIZ
Gass	Philip	LISD	Germany	-
Ge	Chazhong	Chinese Academy for Environmental Planning	China	4.4
Gencsu	Ipek	Overseas Development Institute	United Kingdom	2.3
Geringer	Stefanie	University of Vienna	Austria	-
Giorgi	Silvia	University of Chieti-Pescara	Italy	1.5
Gonçalves	Weber	Federal University of Ceara	Brazil	-
Gorospé	Juan Ignacio	CEU San Pablo University	Spain	1.4
Gramkow	Camila	University of East Anglia	Brazil	1.3
Grau Ruiz	Maria Amparo	The Complutense University of Madrid	Spain	4.4
Gumley	Wayne	Monash University	Australia	2.1
Hemmings	Bill	Transport and Environment	The Netherlands	2.4
Herrera	Pedro	The National University of Distance Education	Spain	-
Huppertz	Tom	RDC Environment S.A.	Belgium	4.5
Hurtado	Vicente	European Commission	Belgium	General Programme
Hyon	Junwon	Korea Legislation Research Institute	Rep. of Korea	-
Jarvie	Deborah	CGA University of Lethbridge, Alberta	Canada	4.4
Jeudy-Hugo	Sirini	UN Environment	Canada	-
Jian	Wu	Renmin University of China	China	4.5
Johnston	Vanessa	Monash University	Australia	3.1
Jurado	Pilar	Spanish Ministry of Finance	Spain	General Programme
Kandel	Biswa Raj	Kaetsu University	Japan	1.2
Kettner	Claudia	Austrian Institute of Economic Research	Austria	3.3
Kichigin	Nikolay	Institute of Legislation and Comparative Law under the Government of the Russian Federation	Russia	1.3

Name	First Name	Institution	Country	Session
Kim	Joy Aeree	UN Environment	Germany	GIZ
Kletzan-Slamanig	Daniela	Austrian Institute of Economic Research	Austria	1.1, General Programme
Kraviez	Hernan	Norman Foster Foundation	Spain	General Programme
Kreiser	Larry	Cleveland State University	USA	1.4
Labandeira	Xavier	University ofVigo	Spain	-
Lam	Aileen	University of Macao	China	3.1
Laurel	Besco	University of Toronto-Mississauga	Canada	2.4
Leonetti	Carlos	Federal University of Santa Catarina	Brazil	4.4
Lind	Yvette	University of Gävle	Sweden	2.4
List	Virginia	Legance Avvocati Associati	Italy	1.5
Long	Feng	Chinese Academy for Environmental Planning (Cn)	China	-
Lonn	Robert	Swedish Enterprise	Sweden	-
Losada	Iñigo	Cantabria University	Spain	General Programme
Lucena	Denise	The Federal University of Cear� / PGFN Minist�rio da Fazenda	Brazil	3.2
Maillo	Jer�nimo	San Pablo Ceu University	Spain	1.2-2.2
Mann	Roberta	University of Oregon School of Law	USA	1.1-2.3
Marchenko	Vladimir	Universite Paris II Panth�on-Assas	France	4.2
Martinez Romera	Beatriz	University of Copenhagen	Denmark	2.4
Martinez Sanchez	Marta	Iberdrola	Spain	3.2
Meyer	Eike	GIZ	Germany	-
Milne	Janet	Vermont Law School	USA	2.1, General Programme
Molocchi	Andrea	Ministry of Environment, Land and Sea - Sogesid TA	Italy	1.2
Moreno	Angel	International University of La Rioja	Spain	3.3
Moreno Moron	Carlos	CEU San Pablo University	Spain	
Mortimore	Anna	Griffith University	Australia	3.3

Name	First Name	Institution	Country	Session
Oliari	Rafaela	UFSC Federal University of Santa Catarina	Brazil	-
Oreja Aguirre	Marcelino	CEU San Pablo University	Spain	General Programme
Parry	Ian	International Monetary Fund	USA	2.1, GIZ
Patón	Gemma	University of Castilla-La Mancha (UCCLM)	Spain	3.2
Paziienza	Maria Grazia	University of Florence	Italy	4.1
Pedroso	Joana	Göteborg University	Sweden	3.4
Pérez	Begoña	University of Alicante	Spain	2.2
Pinho Camurça	Eulália Emilia	The Federal University of Ceará	Brazil	-
Pinzon Ortiz	Diana Gabriela	Morelos State University	Mexico	3.3
Porras Belarra	Javier	CEU San Pablo University	Spain	4.4
Puig Ventosa	Ignasi	ENT Foundation	Spain	4.3
Qin	Tianbao	Wuhan University	China	General Programme
Reis	Adriana	Federal University of Sao Paulo	Brazil	3.2
Rengel Gonçalves	Ana Paula	Federal University of Santa Catarina	Brazil	4.6
Robinson	David	Oxford Institute for Energy Studies	Spain	1.1
Rodríguez Peña	Nora Libertad	University of Salamanca	Spain	3.4
Rozas	Jose Andrés	University of Barcelona	Spain	1.3-4.2
Ruiz Almendral	Violeta	Spanish Constitutional Court	Spain	3.1
Sáenz De Miera	Gonzalo	Iberdrola	Spain	3.3, General Programme
Sakai	Shoko	Katsuo University	Japan	1.3
Salmito	Marcia	Universidade De Fortaleza	Brazil	-
Sawada	Eiji	Kyushu Sangyo University	Japan	4.1
Shirin	Raeder	Ministry of Climate and Environment	Norway	
Skou Andersen	Mikael	Aarhus University	Denmark	2.2-4.2
Sokolik	Jeffrey	Vermont Law School	USA	3.3

Name	First Name	Institution	Country	Session
Soncini	Carlo	University of Parma	Italy	1.4
Soocheol	Lee	Meijo University	Japan	-
Speck	Stefan	European Environment Agency (EEA)	Denmark	-
Steenkamp	Lee-Ann	University of Stellenbosch Business School	South Africa	-
Taek-Whan	Han	SeoKyeong University	Korea	4.6
Tesauro	Linda	Haute École de Gestion Genève	Sweden	3.1
Teusch	Jonas	OECD	France	2.2
Tomo	Alessia	University of Naples	Italy	1.3
Tumpel	Julia	University of Vienna	Austria	-
Ulargui	Valvanera	Spanish Climate Change Office	Spain	General Programme
Van Dender	Kurt	OECD	France	GIZ
Van Kampen	Remco	Ministry of Finance	The Netherlands	-
Van Maris	Daan	Ministry of Finance	The Netherlands	-
Vanrykel	Fanny	Tax Institute, University of Liege	Belgium	3.1
Vasconcelos	Lia Carolina	Federal University of Ceará	Brazil	4.5
Vasconcelos	Luis Felipe		Brazil	-
Verrigni	Caterina	University of Chieti-Pescara	Italy	1.5
Villar Ezcurra	Marta	CEU San Pablo University	Spain	1.1, General Programme
Villarejo Galende	Elena	University of Valladolid	Spain	1.5
Vinhas Catão	Marcos Andre	Brasilian Association of Finance Law	Spain	-
Weishaar	Stefan	University of Groningen	The Netherlands	1.1-2.1
Zachariadis	Theodoros	Cyprus University of Technology	Cyprus	4.3
Zhe	Yang	Qingdao University	China	-
Zunarelli	Carlota	University of Bologna	Italy	-

GCET19

26-28·SEP·2018



Partners:



With the collaboration of:



Ref: DER 2014-58191-P

Original cover photograph by Pedro Expósito

#GCET19