

International Conference on the Management of Energy, Climate and Air for a Sustainable Society MECAS2018

A. Clappier



Who Are We?

70 participants from 17 countries





Who Are our Sponsors?







The EPFL (Swiss Federal Institute of Technology of Lausanne) and Cubaenergia are partner in a **"Research for Development project (R4D)"** financed by the SDC (Swiss Agency for Development and Cooperation) and the FNS (Swiss National Science Foundation):

Such "R4D" projects aim to promote:

□ The use of scientific research for cooperation purpose

The set up a network of suitable foreign and local partners

□ The exchange of students and scientific staff



Wednesday





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R4D project between Swiss and Cuba

This project is about:

Effective Methodology for the Assessment of Integrated Energy Strategies

It aims at designing a novel integrated assessment methodology for energy strategies, combining process system design methods with emission and air quality models.





Wednesday

Thursday



Wed	nesday July 4th	Thur	day July 5 00:00	Tápapos D	Friday July 6th							
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09:00	Welcome: Odalys Goicochea, Director of environmental policy of the ministry of science, technology and environment											
		09:20	Guevara M.		09:20	Curbelo A. Soluciones energéticas para la adap	tación al cambio climático					
09:15	Conference introduction: Alain Clappier		A CrD model									
		09:40	Villaroel J.		09:40	Pérez D.						
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10.00	Impact of roof top solar panel on the urban climate, meteorology and building energy consumption: the case of Bologna (Italy)	10:20	Coffee break		10:20	Coffeebreak an	Scenario of energy transition fo					
		11:00	Molina E.		11:00	Cappier A.						
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11/10	resilience in the city of Santo Domingo						Energyscope: modeling a nativ					
11:10	Managing Caribbean urban development using climate change adaptation strategies, green infrastructure and urban form				11:40	Noret S.						
		11:40	Topic 4: Impact of climate change	on Caribbean and tropical societies								
11:30	McDermott Hughes D.	11.40	Spatial and temporal evaluation of	air quality variations with data from Modis and PM10: Colombia 2000-2015 period	12:00	Lunch break						
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	Topic 3: Abatement strategies for air pollution and energy usage	13:45	Robock A. (key speaker)				Can a country become indepen					
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12:10	Lunch break	14:05	Taylor M. The Caribbean 1.5 Project: Making	the case for urgency	14:35	Coffee break						
12.45	Orean M. (Inc. secondari)											
15:45	Electric vehicles in urban environments: energy demand, climate change and technological challenges	14:25	Glenn S.		15:00	Round tables (discussion and debat	e) : Powering your country only with wind, water and solar: utopia or better sustainable solution for the					
			Expanding partnerships for integra to meet the United Nations sustain	ted and sustained ocean observing in the Caribbean and Mesoamerican corridor: Promoting ocean health sable development goals		future of the world?						
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15:35	Coffee break		Tonic 2: Energy demands in the M	ero. American and the Caribbean (MAC) in a changing climate								
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10.05	Global climate change economic impacts and abatement strategies for greenhouse gas emissions using the U.S. Environmental Protection		Impacts of climate change on build	ing energy demands in the intra-Americas region								
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16:25	Rincón E. A. Design and environmental impact assessment of an improved CPC for Solar-Photo-Fenton processes	16:55	Wind resources assessment of Cub	a in future climate scenarios								
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Why "Energy, Climate and Air"?

Energy is a key global issue:

The global energy supply is a big part of our economy: US\$ 15'000 billion per year representing 20-27% of the GWP in comparison, agriculture accounts for only 3% (US\$ 2'300 billion per year)

Source World bank IAEA, 2013

Since 85% of the world energy consumption is supply by fossil fuels combustions it has serious consequences for the environment:

Air Pollution Deaths Cost Global Economy US\$ 225 billion per year

Source World bank, 2013

Since 2008, **21.5 million people** have been forcibly displaced each year by weather-related sudden onset hazards Source UNHCR, 2016



Topics

Wednesday





Wedr	nesday July 4th		Thurs	day July 5th	Frida	y July 6th
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08:30	Registration		09:00	Tápanes D.	09:00	Berriz L.
				Inventario de emisiones de las principales fuentes fijas industriales de La Habana. Estrategias para su reducción.		Transición energética hacia el desarrollo sostenible, retos y perspectivas en Cuba
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	Topic I. Dunung chergy und				10.00	Distribución espacial del índice de afectación por fenómenos meteorológicos aplicado a las energías solar y eólica
				Tallegies in Cuba		
10:00	Martilli A. (key speaker)		40.00	E-M-shareh and an atomic in	10:20	Coffee break and noster session
	Impact of roof top solar panel on the urban climate, meteorology and building energy consumption: the case of Bologna (Italy)		10:20	Cojjee break dna poster session		
			11:00	Molina E.	11:00	Clappier A.
10:30	Coffee break			La contaminación del aire y su impacto sanitario: contexto global, algunos resultados nacionales y retos para su enfrentamiento.		Scenario of energy transition for Cuba
10:50	Bonita S.		11-20	Suarez I	11:20	Antuña-Marrero J. C.
	Development and use of the i-tree tool to explore the potential for urban green infrastructure as regiliance in the city of Santo Demingo					ar experience.
11:10	Managing Caribbase urban development using climate change adaptation strategies, graph infra	m	nr	ict of climate change on Carinh	ραι	n and tronical societies
				ier of ennare enange on earlos	L MI	n and tropical societies
11:30	McDermott Hughes D.	ГТ		Spatial and temporal evaluation of air quality variations with data from Modis and PM10: Colombia 2000-2015 period	12:00	Lunch break
	Latifundios of energy: Enclosing the wind after tossil tuels					
-			12-10	Lunsh break	13:45	Maréchal F. (key speaker)
						Can a country become independent of tossil resources ?
11:50	Topic 2. Abortomout strategies	[.		in a climitica and concrements		North Jack
11.50	TODIC 3: Abatement strateales t	Ο	~ ()	ir pollution and energy usage	14:15	Aristizadal U. E. Implementación de tecnologías de execusivamiente de energía fetavoltaise en instituciones prestadores de conjuiste educativos: Caso de
		•				implementacion de tecnologías de aprovechamiento de energia introvoltaica en instituciones prestadoras de servicios educativos, caso de estudio TIM camous Robledo.
12.10	Lunch break	<u> </u>			14.25	attauto min dan tabaled
				The Caribbean 1.5 Project: Making the case for urgency	14.55	Cojjee breuk
13:45	Osses M. (key speaker)		14-25	Glass S	15:00	
	Electric vehicles in urban environments: energy demand, climate change and technological challenges		14:20	orem 3. Expanding partnerships for integrated and sustained ocean observing in the Caribbean and Mesoamerican corridor: Promoting ocean health		Round tables (discussion and debate) : Powering your country only with wind, water and solar: utopia or better sustainable solution for the
				to meet the United Nations sustainable development poals		future of the world?
14:15	Hernández-Garcés A.		14:45	Hernández Mansilla A A	17:00	
	Importancia de la modelación de la calidad del aire para evaluar las estrategias de reducción de la contaminación del aire y el uso de la			Escenarios bioclimáticos de la fenología de la papa (solanium tuberosum) en Cuba		
	energia			· · · · · · · · · · · · · · · · · · ·		
14:35	Thunis P.		15:05	MrRae I		
	SHERPA: A tool to support the design of regional and urban air quality plans		20100	Bridging WUDAPT, urbanized WRF and ENVI-met research platforms to study the effects of urban morphology and meteorology on building-		
				scale urban design.		
14:55	Imbert Landri C.		15:25	Coffee break and poster session		
	impacto dei suzz por el transporte y dispersion de contaminantes a la atmósfera en diferentes asentamientos poblacionales en el municipio Santiano de cuba					
15-15	Institute A	1	16:05	Carrera Doral W.		
12:12	Partinyan A.	-	_	Research Representation of the second structure of the second sec		
15-25	Tonic 7. Energy domands in th	0	Λ	loca Amaricas and the Caribboa	n /	MAC in a changing climato
10.55	TODICZ: ENERGY GEMGNOS IN LN	P	IV	ieso-Americas and the Cambbed		MACI III a chandina climale
16:05					1	
	unuoar climate change economic impacts and auatement strategies for greenhouse gas emissions using the U.S. christonmental Protection	— –	-			
	Anonex/c residential carbon factoriat calculator					

	Agency's residential carbon footprint calculator					
16:25	Rincón E. A.	1	1	6:55	Yoandy A.	
	Design and environmental impact assessment of an improved CPC for Solar-Photo-Fenton processes	1			Wind resources assessment of Cuba in future climate scenarios	
16:45	Alonso D.		1	7:35	Clarens A. F.	1
	Evaluación integral de la contaminacion atmosferica en instalaciones del sector energetico	1			Integration of supercritical CO2-power cycles to improve grid resilience and sustainability	
17:05	Jura Ouma J.	1				
	Urban Air Pollution: Re-Engineering the cities with green technologies and integrated solutions					
			1	9:15	Gala diner	
17:25	Cuesta-Santos O.					-
	Inventory of emissions from stationary sources in Cuba: tool to reduce air pollution.	1				_
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Technical Measures

Most of the time, the strategies being considered by the authorities to reduce our environmental footprint is to **improve technologies**:





Key Speakers

Thursday

Wednesday

Wed	nesday July 4	1th 👘										
08:30	Registration											
09:00	Welcome: Odaly	Welcome: Odalys Goicochea, Director of environmental policy of the ministry of science, technology and environment										
09:15	Conference intro	Conference introduction: Alain Clappier										
		09:30 Bornstein R (key sneaker)										
	Tene 1. Building	Analysis and modeling of urban we										
09-30	Bornstein P. (ka		- 1	Analysis and modeling of urban we								
05.50	Analysis and mo	project in Beijing										
			_									
10:00	Magnilli A. (key s	10:00		Martilli A. (key speaker) Impact of roof top solar papel op the								
10:30	Coffee break	1										
10:50	Bonilla S.	_										
	Development an resilience in the	d use of the i- city of Santo I	tree to Doming	ol to explore the potential for urban green infrastructure as an adaption strategy to climate change								
11:10	Mycop M.											
	Managing Caribl	bean urban de	velopm	ent using climate change adaptation strategies, green infrastructure and urban form								
11:30	McDermott Hug	hes D.										
	Latifundios of er	ergy: Enclosin	ng the v	ind after fossil fuels								
		0,										
	Topic 3: Abatem	ent strategie	s for air	pollution and energy usage								
11:50	Borrajero Monte	ejo I.										
	Determinación o	le la iluminaci	ón natu	ral en Cuba a partir de la información satelital								
12:10	Lunch break											
		13:45		Osses M. (key speaker)								
13:45	Electric vehicles			Electric vehicles in urban environn ^{lenges}								
14:15	Hernández-Gard											
	Importancia de	amoderacion	ue la co	nuau der arre para evaluar las escrategias de reducción de la contaminación del aire y el uso de la								
	energia											
14:35	Thums P. Full DNA: A heal to summark the design of regional and when als evaluate plane.											
	SMERMA: A tool to support the design of regional and urban air quality plans											
14:55	Imbert Lamoriu C.											
	Impacto del 502 por el transporte y dispersion de contaminantes a la atmósfera en diferentes asentamientos poblacionales en el municipio Santiago de Cuba											
15.15	Sandago de Coo	u .										
12:12	Jazcilevich A.	ro to air pollu	tion: No	w methods, technologies and applications								
	reisonai exposu	re to air poliu	cion. ree	w methous, technologies and applications								
15:35	Coffee break											
16:05	Vorbach J. F.											
	Global climate c	hange econor	nic impa	cts and abatement strategies for greenhouse gas emissions using the U.S. Environmental Protection								
	Agency's resider	ntial carbon fo	otprint	calculator								
16:25	Rincón E. A.											
	Design and environmental impact assessment of an improved CPC for Solar-Photo-Fenton processes											
16:45	Alonso D.											
	Evaluación integral de la contaminacion atmosferica en instalaciones del sector energetico											
17:05	Jura Ouma J.											
	Urban Air Pollut	ion: Re-Engine	ering t	e cities with green technologies and integrated solutions								
17:25	Cuesta-Santos C											
	Inventory of emi	issions from st	tationar	y sources in Cuba: tool to reduce air pollution.								

0900 Inventer D. 0910 Inventer D. 0920 Guivera M. A CPD modeling of particulate matter PM2.5 inside BRT public transport buses 0920 Guivera M. A CPD modeling of particulate matter PM2.5 inside BRT public transport buses 0920 Madrazo J. 10300 Madrazo J. 10301 Coffee breek on dporter session 1040 Madrazo J. 1050 Coffee breek ond porter session 1050 Madrazo J. 1050 Coffee breek ond porter session 1050 Madrazo J. 1050 Supret J. 1050 Supret J. 1050 Supret J. 1050 Taylor A. E. 1050 Taylor A. E. 1050 Taylor M. 1050 Taylor M. 1050 Taylor M. 1051 Geoengineering is not a solur 1052 Geten S. 1053 Geten K. A. (key speaker.) 1054 Taylor M. 1055 Taylor M. 1056 Taylor M. 1056 <th></th> <th></th> <th>-</th> <th></th> <th></th> <th></th>			-										
0:20 Guevara M. 0:20 A CD modeling of particulate matter PM2.5 inside BRT public transport buses 0:40 Vilancei J. 0:41 Diminución de a contaminación emitida a la atmosfera por transporte público en Cuba 0:40 Vilancei J. 0:41 Diminución de la contaminación emitida a la atmosfera por transporte público en Cuba 0:42 Coffee break and poster session 0:40 Materiazo J. 0:41 Materiazo J. 0:42 Coffee break and poster session 0:42 La contaminación del aire y su impacto sanitario: contexto global, algunos resultados nacionales y retos para su enfinentamiento. 0:41 Discretización espacial y temporal de las emisiones de compuestos contaminantes generados por el sector transporte en Chile 0:42 Discretización espacial y temporal de las quilty variations with data from Modis and PM10: Colombia 2000-2015 period 1:43 Exact L. C. 5:5 Sapatal and temporal evaluation of air quality variations with data from Modis and PM10: Colombia 2000-2015 period 1:44 Herindine Huminia Colo en fautare dang sustained ocean observing in the Caribbean and Mesoamerican corridor: Promoting ocean health to meet the Uniter Nationa Sustainable development guals 1:45 Expanding partnerships for inintegrated and sustained ocean observing in th	09:00		Tápanes D.			· · · · · · · · · · · · · · · · · · ·							
09:20 General M. 09:40 A CPD modeling of particulate matter PM2.5 inside BRT public transport buses 09:40 Villanceli J. 0100 Madriaso J. 0100 Madriaso J. 0100 Coffee breek and poster session 0100 Coffee breek and poster session 0100 Surger J. 01			inventario de emi	siones de las pri	ncipales	fuentes fijas industriales de La Habana. Estrategias para su reducción.							
03000 A CPO modeling of particulate matter PM2.5 inside BRT public transport buses 04401 Villancei J. 05400 Diminución de la contaminación emitida a la atmosfera por transporte público en Cuba 04401 Madrazo J. 10400 Madrazo J. 10401 Madrazo J. 10401 Molina E. 10401 Coffee breek and porter session 10401 Molina E. 1041 Molina E. 1042 Molina E. 1043 Molina T. A. 1044 Molina E. 1044 Molina	00-20		Comment M										
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11:20 Surret I. Discretización espacial y temporal de las emisiones de compuestos contaminantes generados por el sector transporte en Chile 11:40 Rajeć 2 import of dimete change on Carlabean and respond sucketive Belaicazar L C. Spatial and temporal evaluation of air quality variations with data from Modis and PM10: Colombia 2000-2015 period 12:10 Lunch breek 13:45 Robock A. (key speaker) 14:05 Hord A. (key speaker) Geoengineering is not a solut 14:05 Taylor M. Discretización de sustanabi develonment quality variations with data from Modis and PM10: Colombia 2000-2015 period 14:05 Hord A. (key speaker) Geoengineering is not a solut 14:05 Cleens S. Espanding partnerships for integreted and sustained ocean observing in the Carlibbean and Mesoamerican corridor: Promoting ocean health to metamoticos de la fenología de la papa (solanium tuberosum) en Cuba 14:05 McRae I. 15:05 McRae I. 16:05 Cartere Doral W. 16:25 Gonzales J. (key speaker) 16:25 Gonzales J. (key speaker) 17:36 Cartere Doral W. 17:37 Taree Vida. Politica de país para el enfrentamiento al Cambio Climático 16:25 Conge breeak and poster session <tr< td=""><td></td><td></td><td>La contaminación</td><td>del aire y su imp</td><td>acto sa</td><td>nitario: contexto global, algunos resultados nacionales y retos para su enfrentamiento.</td></tr<>			La contaminación	del aire y su imp	acto sa	nitario: contexto global, algunos resultados nacionales y retos para su enfrentamiento.							
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20.00	Decesia I									
19:00	Transición energética hacia el desar	rollo sostenible, retos y perspectivas en Cuba								
09:20	Curbelo A.									
	Soluciones energéticas para la adap	tación al cambio climático								
09:40	Pérez D.	hasha al 2050								
	Estrategia de desarrono energetico	nasta el 2000								
10:00	Alvarez L.									
	Distribución espacial del índice de a	fectación por fenómenos meteorológicos aplicado a las energías solar y eólica								
10:20	Coffee break and poster session									
11:00	Classier A									
	Scenario of energy transition for Cu	ba								
11:20	Antuña-Marrero J. C.		1							
	Long-term strategy for sustainable	Long-term strategy for sustainable scientific research on atmospheric radiative transfer in Cuba: GOAC's 30 year experience.								
11:40	Moret S.	Moret S.								
	Energyscope: modeling a national e	nergy system to support decision-maxing.								
12:00	Lunch break		1							
	12.45	Manéahal E. (law anagluan)								
13:45	Marichal F. (key 13:45	Marechal F. (key speaker)								
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14:15	Aristizabal C. E.	ras de servicios adurativos: Case de								
	estudio ITM campus Robledo	as de servicios educativos: caso de								
14:35	Coffee break		1							
15:00										
	Round tables (discussion and deba	te): Powering your country only with wind, water and solar: utopia or better sustainable solution for the								
	rature of the world?									
17:00										



Non Technical Measures

Will technological changes be **able to sufficiently reduce** our environmental footprint?





Why Cuba?

Cuba is an Island under Embargo

1959: Cuban socialist revolution succeed.

American trade embargo and support of Soviet Union are set up.

1991: Soviet subsidies and trade links are withdrawn.

Energy consumption drops for more than **40%** in **4 years**.

Energy supply by Cuban resources becomes an essential issue for the country.







On the One Hand....

Energy use per capita 70% 90% 30% 10% .985 Combustible renewables and waste Fossil fuels

Stronger and stronger dependency to fossil fuels (90%)

Low technological renewal rate



Obsolete technologies generate environmental problems: example of air quality



From 2006 to 2013 the percentage of **Solar and Wind energy** remained around **0.1%**



...on the Other Hand.



TABLE 1. KEY DEVELOPMENT AND SUSTAINABILITY FOR CUBA AND THE USA

	Cuba	US
Life expectancy	77.7	77.9
Literacy rate	99.8	99
Infant mortality rate (per 1000 live births)	6	6
% children with low birth rate	5	8
% of children enrolled in primary school	97	92
Public expenditure on education (% GDP)	9.8	5.9
Electricity consumption per capita (kWh)	1,380	14,240
CO ₂ emissions per capita	2.1	20.1
SOURCE: DATA FROM THE UNITED NATIONS HUMAN		
DEVELOPMENT INDEX REPORT 2007/2008		

Source World bank and United Nations, 2013



Wednesday

Wed	ne	sday July 4th	
08:30		Registration	
09:00		Welcome: Odalys Goicochea, Director of environmental policy of the ministry of science, technology and environment	
09:15		Conference introduction: Alain Clappier	
		Topic 1: Building energy and climate architecture	
09:30		Bornstein R. (key spanker)	-
		Analysis and modeling of urban weather and climate, with examples from the IUM-SURF project in Beijing	
10:00		Martilli A. (key speaker) Impact of roof top solar panel on the urban climate, meteorology and building energy consumption: the case of Bologna (Italy)	
10:30		Coffee break	
10:50	_	Bonilla S.	-
		Development and use of the i-tree tool to explore the potential for urban green infrastructure as an adaption strategy to climate change resilience in the city of Santo Domingo	
11:10		Mycoo M.	
		Managing Caribbean urban development using climate change adaptation strategies, green infrastructure and urban form	
11:30		McDermott Hugnes D.	
		Latrunnios of energy: Enclosing the wind after fossil tuels	_
		Tanis 3. Abstrangel statement of a nin antibuling and an annu sugar	-
11-50		Topic J. Autement strategies for an ponation and energy usage	-
11:50		borrajero wontejo I.	
		Determinación de la lluminación natural en Cuba a partir de la información satelital	_
12:10		Lunch break	
13.45		Electric vehicles in urban environments: energy demand, climate change and technological challenges	
14-15		Hernández-Garrás A	
		Importancia de la modelación de la calidad del aire para evaluar las estrategias de reducción de la contaminación del aire y el uso de la energía	
14:35		Thunis P.	
		SHERPA: A tool to support the design of regional and urban air quality plans	
14:55		Imbert Lamonú C.	
		Impacto del SO2 por el transporte y dispersión de contaminantes a la atmósfera en diferentes asentamientos poblacionales en el municipio Santiago de Cuba.	
15:15		Jazcilevich A.	
		Personal exposure to air pollution: New methods, technologies and applications	
15:35		Coffee break	
16:05		Vorbach J. F.	
		Global climate change economic impacts and abatement strategies for greenhouse gas emissions using the U.S. Environmental Protection Agency's residential carbon footprint calculator	
16:25		Rincón E. A.	
		Design and environmental impact assessment of an improved CPC for Solar-Photo-Fenton processes	
16:45		Alonso D.	
		Evaluación integral de la contaminacion atmosferica en instalaciones del sector energetico	
17:05		Jura Ouma J.	
		Urban Air Pollution: Re-Engineering the cities with green technologies and integrated solutions	
17:25		Cuesta-Santos O.	
		inventory or emissions from stationary sources in Cuba: tool to reduce air pollution.	

Thursday

hursday July 5th 09:00 Tápanes D. Inventario de emisiones de las principales fuentes fijas industriales de La Habana. Estrategias para su reducción 09:20 Guevara M. A CFD modeling of particulate matter PM2.5 inside BRT public transport buses 09:40 Villaroel J. Disminución de la contaminación emitida a la atmosfera por transporte público en Cuba 10:00 Madrazo J. Implementation of an air quality modeling system to study the impact of futur energy strategies in Cuba 10:20 Coffee break and poster session 11:00 Molina E. La contaminación del aire y su impacto sanitario: contexto global, algunos resultados nacionales y retos para su enfrentamiento. 11:20 Suarez I. Discretización espacial y temporal de las emisiones de compuestos contaminantes generados por el sector transporte en Chile 11:40 Belalcazar L. C. Spatial and temporal evaluation of air quality variations with data from Modis and PM10: Colombia 2000-2015 period 12:10 Lunch break 13:45 Robock A. (key speaker) Geoengineering is not a solution to global warming for the Caribbean and tropical societies 14:05 Taylor M. The Caribbean 1.5 Project: Making the case for urgency 14:25 Glenn S. Expanding partnerships for integrated and sustained ocean observing in the Caribbean and Mesoamerican corridor: Promoting ocean health to meet the United Nations sustainable development goals 14:45 Hernández Mansilla A. A. Escenarios bioclimáticos de la fenología de la papa (solanium tuberosum) en Cuba 15:05 McRae L Bridging WUDAPT, urbanized WRF and ENVI-met research platforms to study the effects of urban morphology and meteorology on buildingscale urban design. 15:25 Coffee break and poster session 16:05 Carrera Doral W. Tarea Vida. Politicas de país para el enfrentamiento al Cambio Climático Topic 2: Energy demands in the Meso-Americas and the Caribbean (MAC) in a changing climate 16:25 Gonzales J. (key speaker) Impacts of climate change on building energy demands in the intra-Americas region Yoandy A. Wind resources assessment of Cuba in future climate scenarios 16:55 17:35 Clarens A. F. Integration of supercritical CO2-power cycles to improve grid resilience and sustainability 19:15 Gala diner



riday	July 6th	09:00	Berriz L.	
			Transición energética hacia	i
9:00	Berriz L.			ĺ
	Transición ene			
9-20	Cushele A	09:20	Curbelo A.	
0.20	Soluciones ene		Soluciones energéticas para	i
9:40	Pérez D.			
	Estrategia de o	09:40	Pérez D.	
0:00	Aluaraz I		Estrategia de desarrollo ene	ł
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.0:20	Coffee break a	10:00	Alvarez L.	
1:00	Clannier A		Distribución espacial del ínc	ł
1.00	Scenario of en			i
1:20	Antuña-Marrei	ro J. C.		l
	Long-term stra	11:20	Antuña-Marrero J. C. ransfer in Cuba: GOAC's 30 year experience.	
1-40	Moret S		Long-term strategy for sust	i
	Energyscope: n			ĺ
2:00	Lunch break			
3:45	Maréchal F. (k	ev speaker)		ł
	Can a country	become indeper	ident of fossil resources ?	
4:15	Aristizábal C. E			ł
	Implementacio estudio ITM ca	n de tecnologia mout Pobledo	s de aprovechamiento de energia fotovoltaica en instituciones prestadoras de servicios educativos: Caso de	
4-35	Coffee breek	Inpus Nobiedo		i
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5:00				ĺ
	Round tables (discussion and	debate) : Powering your country only with wind, water and solar: utopia or better sustainable solution for the	
7.00	ruture of the w	onar		ł
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I wish you a good conference

Les deseo una buena conferencia