

Recuperación de Energía y Materiales – WTERT Chile
2016 Bi-annual Meeting of the Global WTERT Council

Columbia University, New York City, Octubre 2016

Facultad de Ingeniería

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REM Chile / WTERT CHILE www.wtert.cl

- REM Chile born in 2014 supported by Prof. Themelis and Prof. Bourtsalas
- Host until 2016 – School of Engineering, Universidad del Desarrollo
- WTERT Chile (REM) is an initiative into CiSGER - www.wtert.cl





RECUPERACIÓN DE ENERGÍA & MATERIALES
*Avanzando hacia una Gestión Sustentable de Residuos
y una Economía Circular*

PRINCIPAL SOBRE NOSOTROS TEMAS PUBLICACIONES PREGUNTAS FRECUENTES CONTACTANOS

LA NECESIDAD

"Para los residuos que no se pueden prevenir, reutilizar o reciclar, energía a partir de las tecnologías de desecho puede proporcionar un recurso valioso a través de combustibles de calor, electricidad y transporte. La energía puede ser generada a partir de residuos a través de una variedad de ambos establecidos y las tecnologías emergentes, como la combustión con producción combinada de calor y electricidad, la digestión anaeróbica, la gasificación y pirólisis".

Chapter Six of the Government's March 2011 Carbon Plan - Cutting Emissions from Waste
The Government's Carbon Plan > Carbon Plan .

Objective

- Promote Sustainable Waste Management Systems... in Spanish
- Promote waste treatment technologies with potential to contribute to recovery of materials and energy generation in Chile for a sustainable waste management... in spanish
- Bring support to public policies related to wastes
- Create network in Latam supported by WTERT Columbia





Research

LCA and MFA on WTE Techs supported by
President's Innovation Funds of Prof. Bourtsalas
WTE Potential Chilean Map
Matrix WTE Techs impacts, Climate Change
and local Law

- Teaching

Thermodynamics

Industrial Operations & Sustainability

- Outreach





Network

- PhD. Edmundo Muñoz, Academic Director, Environmental Engineering Program
- LCA and MFA applied to Materials & Energy Recovery



Network

- Dean, Rodrigo Navia, School of Engineering, Universidad de la Frontera
- Center of Waste Management and Bioenergy
- Associate Editor, Waste Management & Research, revista ISI publicada por SAGE Publications, London, UK, con el auspicio de la International Solid Waste Association (ISWA)

Network Objectives

- Strengthen Latin American networks

WTERT

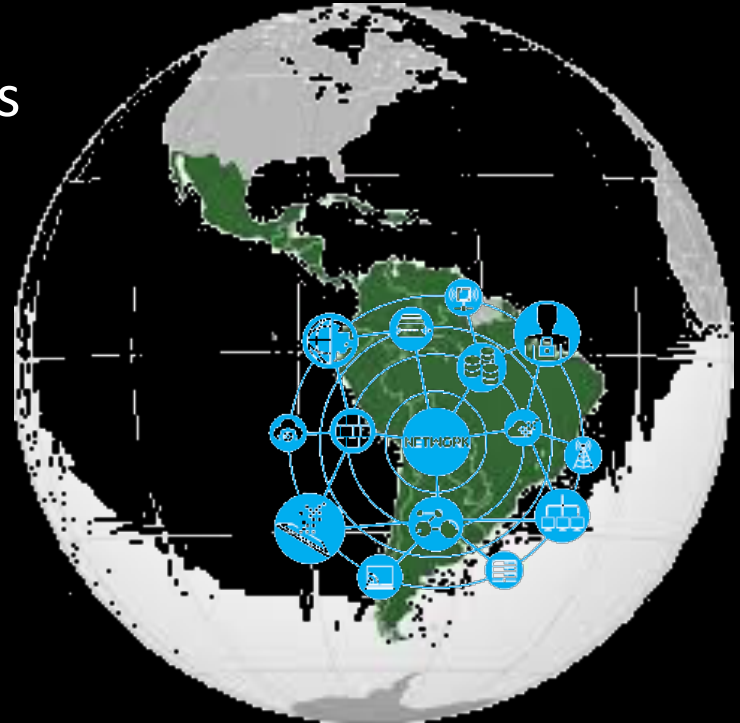
Brasil

Argentina

Colombia

Perú

Cuba



CHILE - Country Facts

- GDP: USD 300 billion
- Population: 17 milion
- GDP pc (PPP): USD 23,200
- Trade Openness: 67% of GDP
- Very good credit rating
- Continous GDP rate growth
- Responsible public sector spending and strong international reserves



Cabañas, F., A.C.(Thanos) Bourtsalas; Themelis, N. & Godoy-Faúndez A.
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Economic growth was coupled with significant amounts of waste, creating environmental and social costs, specially in the regions

- 8



- FOCUS: INCREASE RECICLYNG RATE TO 30%
- NAMA: Natiionally Appropriate Mitigation Actions: Biogas

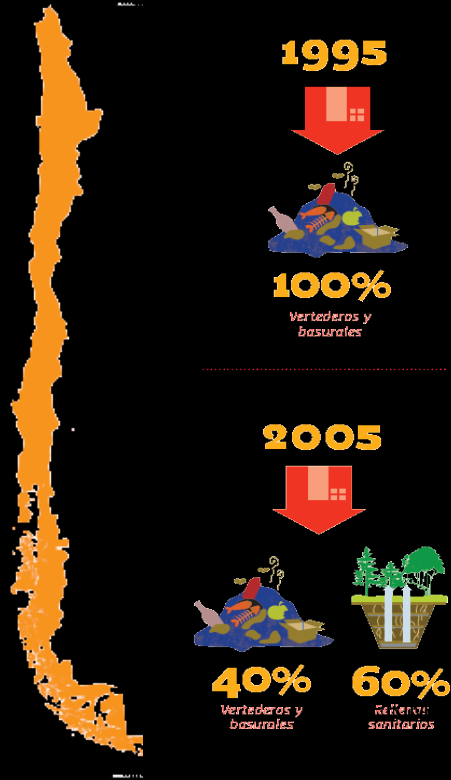


REM
Recuperación de Energía y Materiales
Chile



Sustainable Waste Management in Chile

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Región	2007	2008	2009	2010	2011
Arica	71,4	69,7	66,3	57,6	52,7
Parinacota					
Tarapacá	80,5	85,6	84,6	91,1	97,9
Antofagasta	188,3	192,8	199,3	205,1	212,3
Atacama	89,5	94,2	91,2	91,5	91,8
Coquimbo	240,9	246,1	238,1	229,8	224,5
Valparaíso	591,6	606,7	626,9	637,1	655,1
RM	2.624,30	2.607,90	2.687,70	2.763,40	2.885,30
O'Higgins	252	241,5	252,3	267,1	305
Maule	204,2	241,7	264,4	286,3	282,7
Bío Bío	553,4	596,7	609,2	618,2	637,7
Araucanía	190,5	193,9	198,3	201,6	205,6
Los Ríos	111,3	118,2	120,4	127,7	135
Los Lagos	200,7	218,9	228,5	234,9	227,7
Aysén	32,6	34,8	40,4	45,7	48,7
Magallanes	61,7	59,3	71,9	78,6	80,4
Total	5.492,90	5.608,00	5.779,50	5.935,70	6.142,40

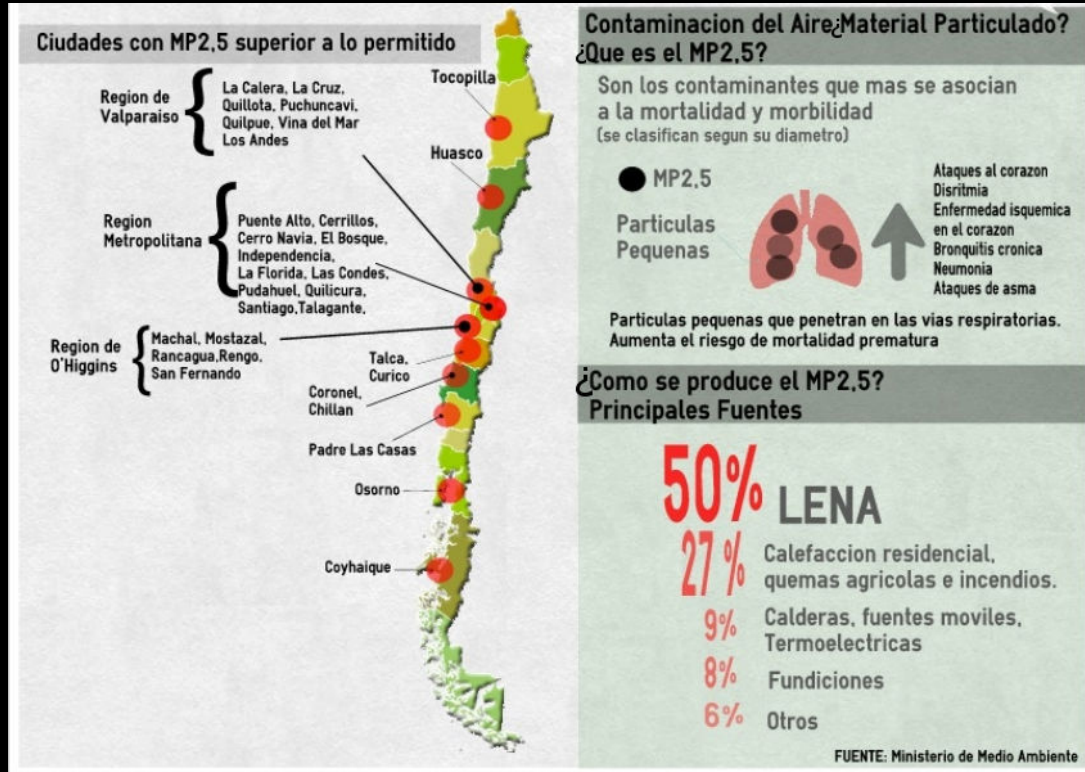
Fracción	2010	2011
Chatarra	499.630	543.269
Plásticos	21.065	26.608
Papeles y cartones	414.758	443.292
Orgánicos	117.412	116.983
Aceite comestible	3.375	3.903
Vidrio	31.580	41.425
Neumáticos	1.983	3.903
Tetrapack	575	682
Aceites lubricantes	6.774	11.274
Co-procesamiento	57.000	71.000
Equipos de informática	1.223	1.340
Batería plomo-ácido	7.867	18.931
Residuos reciclados	1.163.243	1.282.610

- FOCUS: INCREASE RECYCLING RATE TO 30%
- NAMA: Nationally Appropriate Mitigation Actions: Biogas

Wastes (1000tons)

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- Municipalities are responsible for the collection, transport and final disposal of MSW.
- Most use private sector services, contracted by bidding.
- Each acts independently and negotiates its own price – No fixed price (average USD\$ 20/ton to final disposal)
- Charge citizens through a “property tax”
- Ministry of Environment put focus on increase recycling rate – Social Issue
- Main concern is air pollution



- Green or Clean Point (Drop off)

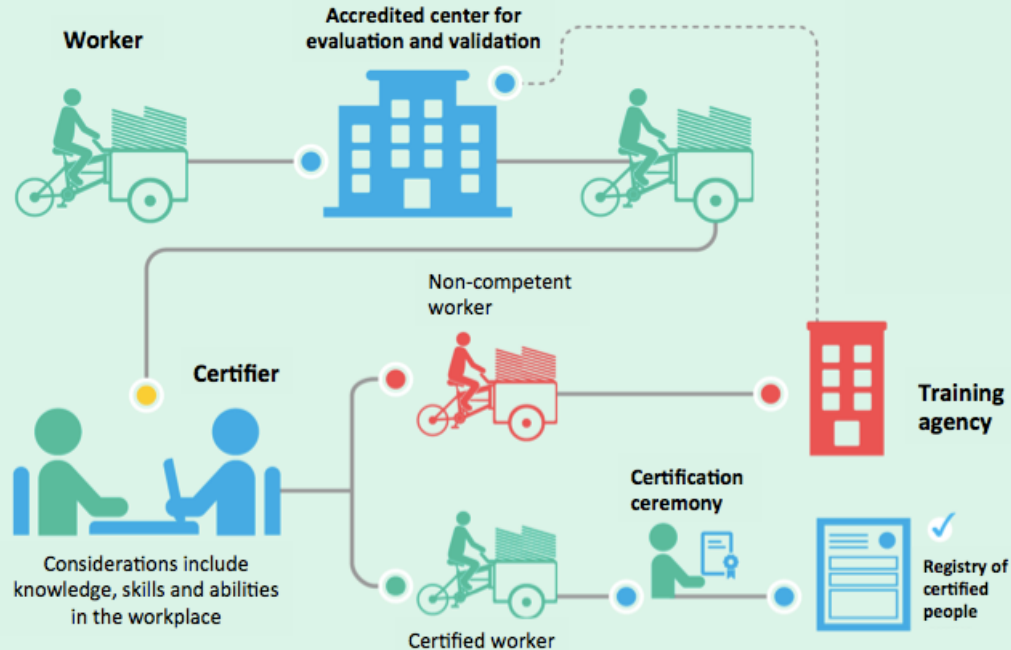


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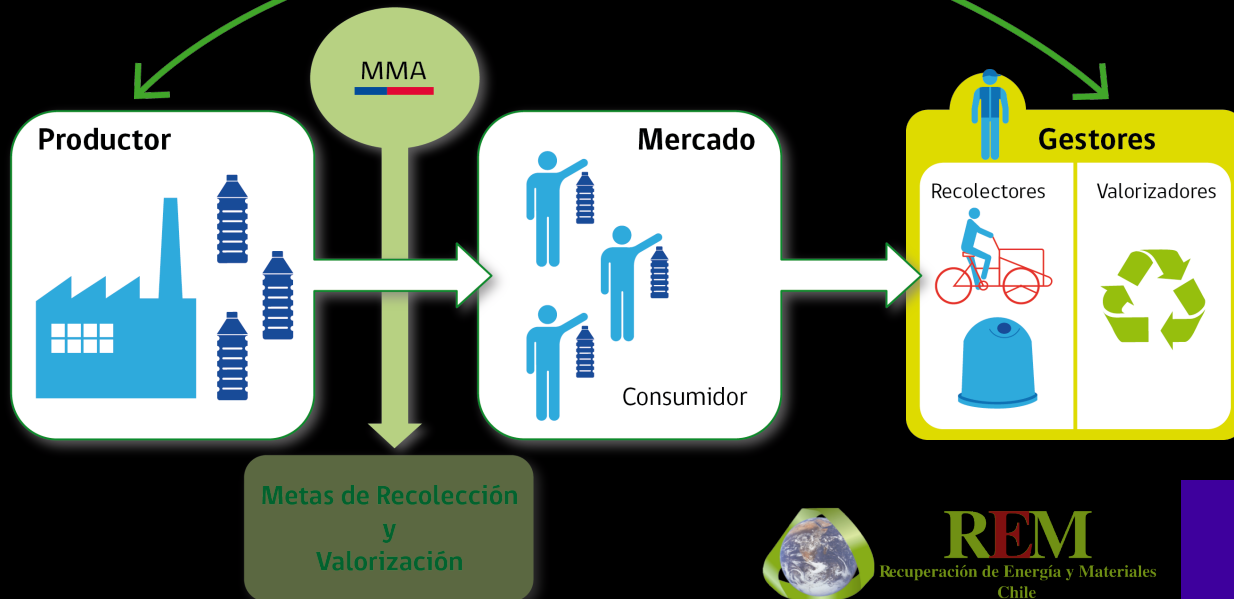


How to Certify a Waste Worker?

chile✓alora

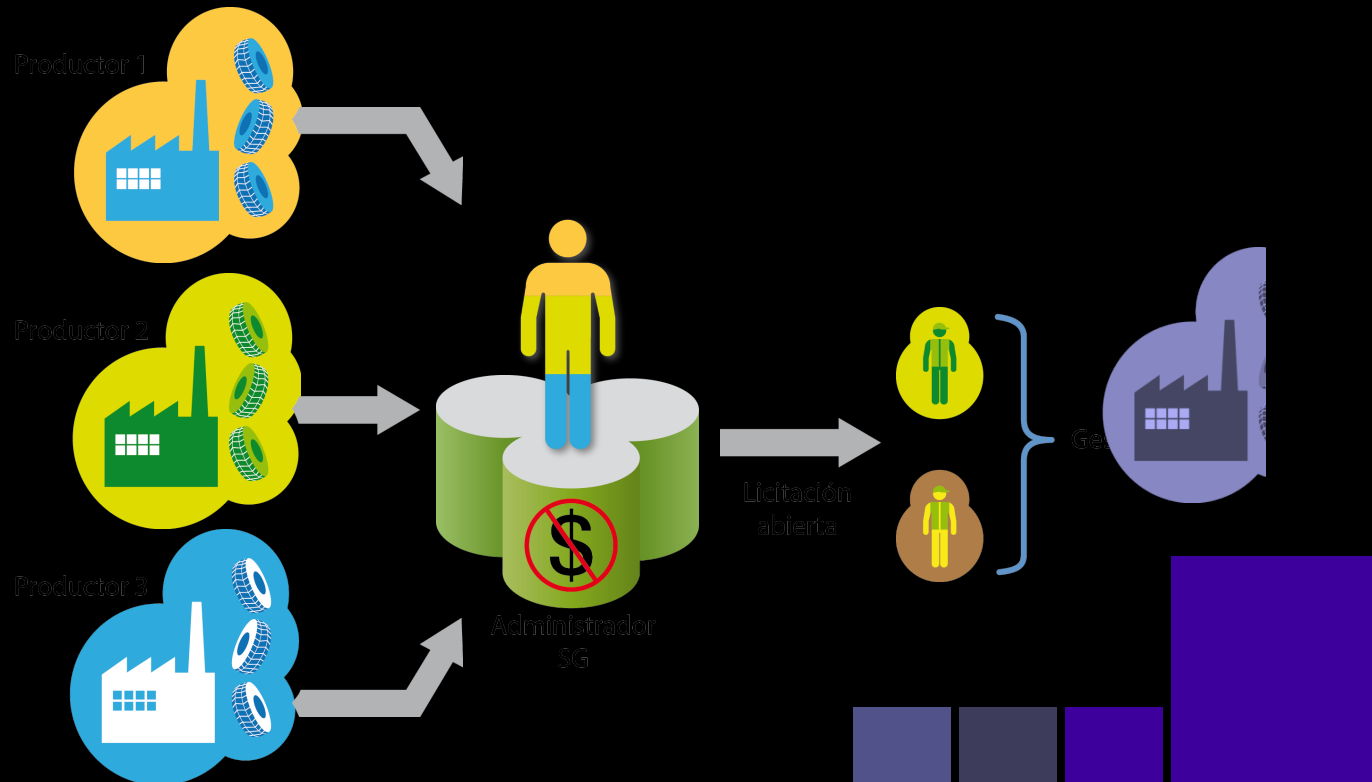


ORGANIZAR Y FINANCIAR



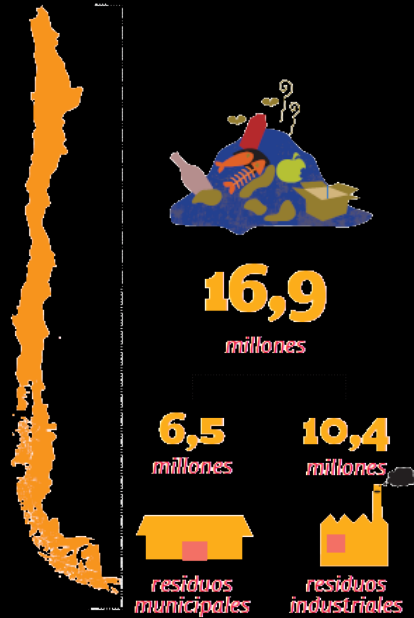
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Wastes

Challenges



WTE and Air Pollution?

- We don't have specific rules of air emission- (e.g. Foundries & Thermoelectric Plants)
- Green Movements talk about zero waste and circular economy without WTE
- WTE's perception = Open Burning

WTE and local energy for smart grid

- Spot price around USD\$47,6MW. Energy is not a business
- WTE like backup system (Ministry of Energy)

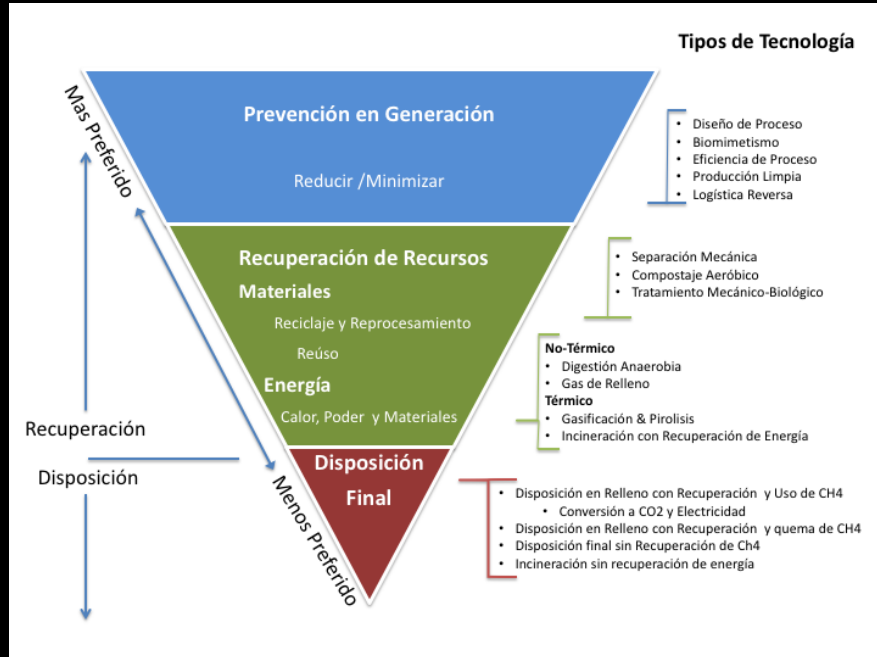
WTE scales

- Big plants, big problems.
- Modular and mobile equipments (recover land – landfills)



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- Need an Integrated Waste Policy including all techs
- Need to investigate new technologies such as waste-to-energy (WTE) to different scales for industrial wastes and co-treatment
- Need to investigate WTE technologies and Air Emissions
- Waste should be regarded as a resource for recovery of materials and energy and not simply as a disposal problem
- We need to move forward proposing public policies according to environmental impacts and local regulation.

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