

reclaim reclaim

With the contribution of the LIFE
financial instrument of the European Union
Total budget: €1.377.004,00
EU Contribution: 50%





The Project



Project code: LIFE12 ENV/GR/000427

The Project

Background

Preliminary Actions

Landfill Inventory

Plot Unit

Communication

Conclusions

Next Steps

Project Title:

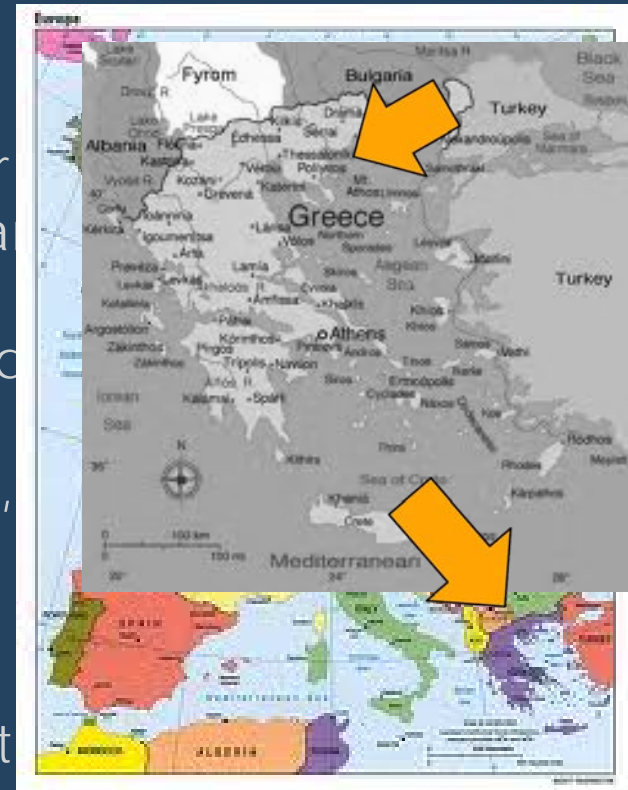
“Landfill mining pilot application for invaluable metals, materials, land a

Project Location: Polygyros (Chalkid

Beneficiaries: ENVECO , HELECTOR,

Start – End: 01/07/2013 – 30/6/2016

Budget: €1.377.004,00 (50% EU cont



Municipality of Polygyros



NTUA School of Mining & Metallurgical Engineering



The Project



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LandFill Mining definition (generic):

“the extraction of resources from landfills”

→ Definition varies according to:

Who (*issues of ownership & needs*)

(public vs private bodies)

What (*issues of technology & methods*)

(in situ vs ex situ, direct vs indirect, materials vs other)

Where (*issues of legislation*)

(EU vs everywhere else)

Why (*issues of motivation & efficiency*)

(for profit or social benefit)



Background



The Project

>> increasing interest in municipal solid waste (MSW) **valorisation** (hierarchy of WFD 2008/98/EC)

Background

>> growing inquisitiveness on the **fate of existing landfills** (especially closed ones)

Preliminary Actions

>> **abandoned landfills & dumpsites** (considered environmental and health threats, occupy valuable land close to settlements)

Landfill Inventory

Plot Unit

>> conceived as **unintentional storage** for raw and soil material

Communication

>> countries like Greece still continue to **bury more than 80%** of their MSW (despite the EU trend of 35% reduction on landfilled waste)

Conclusions

Old landfills and dump-sites occupy:
space, land, soil, raw materials and metals, energy content
that can be **RECLAIMed** when technologies mature

Next Steps



Preliminary Actions



The Project

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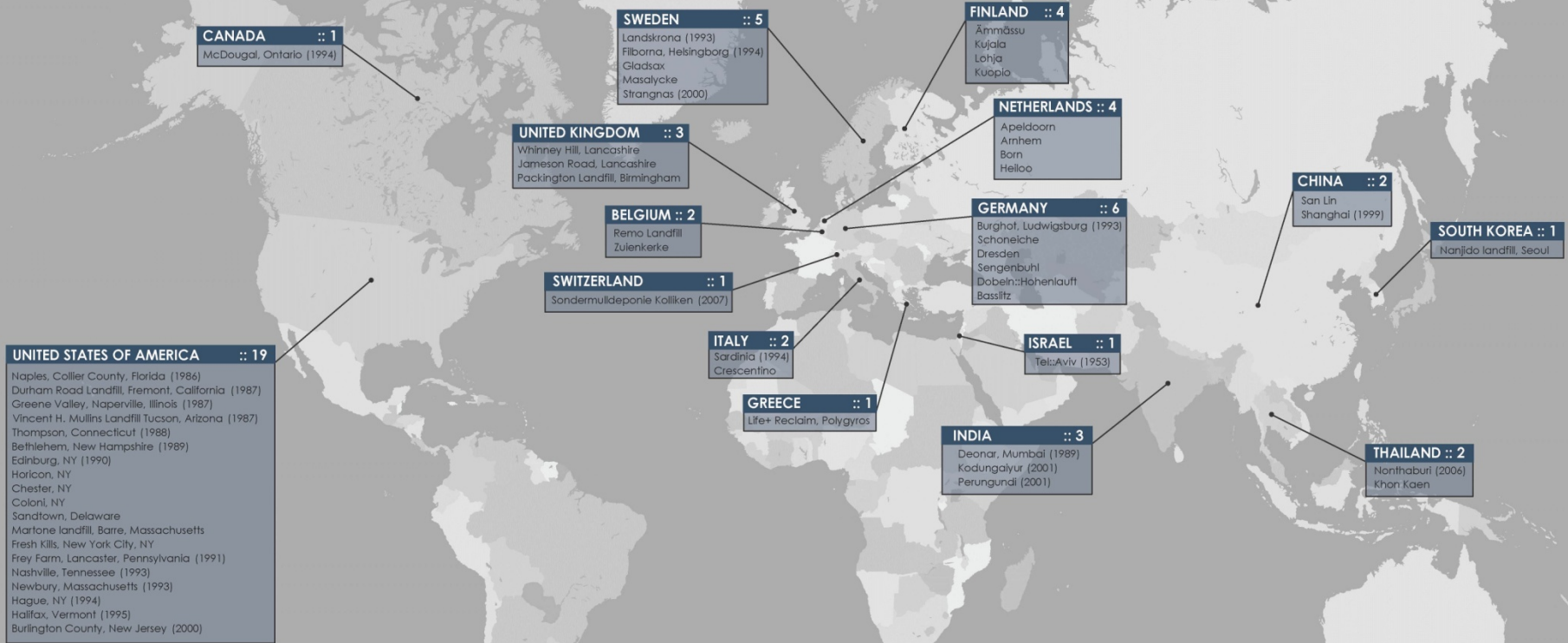
Next Steps

Action A1: Investigation of LFM state-of-play in the EU

- Literature review (*congresses, sci papers, monographs, studies*)
- Waste legislation review (*EU, greek*)
- LFM types and techniques
- Worldwide LFM mapping
- Stakeholder meetings (*Belgium, Spain, Netherlands*)
- National meetings (*Kozani, Athens, Crete*)

Result: consolidated knowledge transfer on LFM

LFM applications around the World



Landfill mining projects map: designed for Life reclaim LIFE12\ENV\GR\000427 (2013)





Preliminary Actions



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Action A2: Permitting of LFM activity in Polygyros LF

- Description of current activity of the PL
- Presentation of existing monitoring results
- Preliminary description of LFM activity
- Submission of permit modification dossier
- Maintain contact with the authorities during permitting

Result: Permit signed 27/3/2014 and issued 2/4/2014

Action A3: Environmental & social baseline for Polygyros area

- Environmental data collection
- Social data collection
- Initial visits & meetings

Result: Technical Report on the Baseline environmental and social conditions



Landfill Inventory



The Project

ACTION B1: Creating a landfill inventory to explore the LFM potential of Greece and selected EU countries

Background

- EU Countries: **Cyprus**, Belgium (**Flanders**), Spain (**Catalonia**), **Netherlands**

Preliminary Actions

- Construction of **questionnaire** for landfill characteristics
- Communications with **national authorities** responsible for waste management and with individual facilities (when needed)

Landfill Inventory

- Additional data from national **studies**
- Data assessment and preparation
- Web-GIS creation: **over 22,000 landfill sites were recorded**

Plot Unit

Communication

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Result:

Data processed and published online: web-GIS application
Report on the methodology used and findings

Next Steps



"Our Waste...
...Our treasure"

reclaim



LIFE12 ENV/GR/000427
A project co-funded by
the EU-LIFE program

Map Files Help About

Options

General Search

Map Layers Tree

Greek Quick Search to visible layers

Add Remove

Layers Source Services

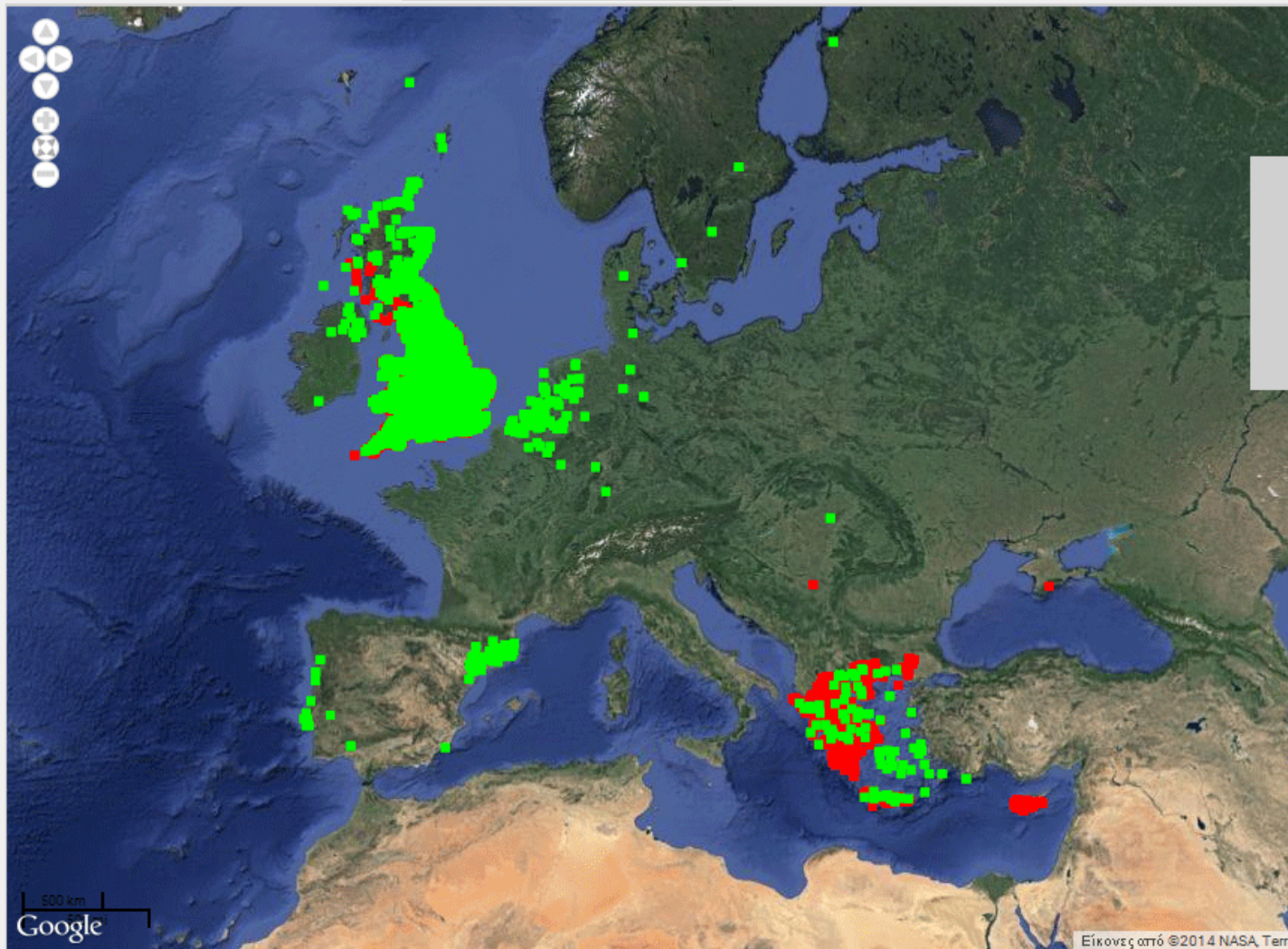
Layers

Base Layers

- OpenStreetMap
- Google Physical
- Google Hybrid
- Google Streets
- Google Satellite

WMS Services

- World Vector Data
 - Countries boundaries
- Reclaim Data
 - Dominant land use
 - Dominant slope class
 - European river catchments
 - Full Soil Code 1985 FAO
 - Full Soil Code 1990 FAO
 - Maximum elevation above sea
 - Minimum elevation above sea
 - River basin districts
 - Sanitary Landfills
 - Uncontrolled Landfills



Legend

Google Geocoding

Selected (0)

Settings

Zoom to scale: Current Scale: 1:34942572 | Basemap Projection System: EPSG:900913 | Mouse Position Coordinates (EPSG:4326): -26.41, 36.95 | GET SDI Port

Είκοτες από ©2014 NASA Terra



Pilot Demonstration Unit Design



The Project

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Next Steps

ACTION B2: Exploitation Plan development

- Description of available **technologies & methods**
- Visits to Polygyros Landfill
- Identification of **target areas** (waste age & content)
- Mining **scheme** – resources - operation details
- **Environmental Monitoring** system proposal

ACTION B3: Design of waste treatment process

- Waste **sampling missions** (2)
- Waste treatment methods **review**
- Adaptation of the proposed methods to sampling findings
- **Design of the Pilot Demonstration Unit**: type of machinery to be used, calculation of productivity and procedure of processing.
- Reporting





Pilot Demonstration Unit Installation



The Project

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ACTION B4: Sub-contracting procedures for Demonstration Unit

- Call for tender and final contract on the provision and installation of necessary machinery and equipment

ACTION B5: Pilot-scale Demonstration Unit installation

- Defining **roles and responsibilities**
- **Preparation** of location of the Unit: landscaping, drainage system, waterproofing and formation of the space
- Delivery and **installation of machinery**
- Adjustments on the **day-to-day activities**
- Creation of a template to **record** production
- Installation of Environmental **Monitoring equipment**





Pilot Demonstration Unit Operation



The Project

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ACTION B6: MSW mining, Operation and Testing of the Pilot Demonstration Unit

- During **May – July 2015**
- Extraction of waste with **excavators** and transportation of waste with tracks to the Unit location
- Regular **weighting** of inputs and outputs of the Unit
- Waste is fed to the Unit assembly using a backhoe loader
- A **Trommel sieve** separates smaller waste and soil from larger waste
- **Hand-sorting** of waste: Hard plastics, plastic bags, aluminum cans, glass, electrical waste
- **Magnetic** separation
- Other features: **Washing Machine, Storage** of waste
- Total amount of processed waste: **more than 1200c.m. (~ 580tn)**
- **Beneficiation** tests: ex situ (laboratory)





Pilot Demonstration Unit

Other Actions



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ACTION B7: Environment Rehabilitation Plan

- **Literature** review (congresses, sci papers, monographs, studies)
- Selection of **alternatives** for the Polygyros LF
- Development of **tools** to ease the selection process of the best option
- Design of a **3D model** of a rehabilitation plan
- Reporting: A generalised **Manual** which can be used in many Landfill Mining cases

ACTION B9: Financial and Socioeconomic Analysis

- Development of a socioeconomic survey **questionnaire**
- Polygyros **local** survey (**286 local residents**)
- **National** survey: April-July 2015 (**392 Greek households**)
- Policy and economics analysis **tool**
- **Socioeconomic** analysis



Pilot Demonstration Unit

Next Actions



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ACTION B8: National Action Plan

- Opportunities, scope and feasibility for Landfill Mining in Greece
- Policy alternatives: description and assessment
- Description of road map for achieving goals
- Assessment of: available means, objective setting, intermediate goals, prioritization, timeline, need for capacity building
- Elaboration of a National Action Plan covering all regions of Greece (excluding islands)

ACTION B10: Strategic Environmental Assessment Study

- Screening phase: Establishing the context of the SEA
- Elaboration of a SEA for the NAP: Scoping phase, Environmental Baseline assessment, consideration of Alternatives, detailed description of the NAP, Impact assessment, Mitigation of Impacts
- Informing Decision Makers



Pilot Demonstration Unit



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Environmental Indicators	Social Indicators
Waste minimization	Economic
Material resources	Socioeconomic
Soil degradation	Social
Climate change	
Energy resources	
Water resources	
Human health	
Land use	



Communication Actions of the project



ACTIONS D1, D2 & D3

The Project

- Notice Boards, Posters, Leaflets

Background

- Press releases, newsletters, scientific newsletter

Preliminary Actions

- Social media accounts (LinkedIn, Facebook)

- **Media** communication (wide impact magazines, online newspapers and blogs, local TV channels)

Landfill Inventory

- Development of the project's website www.reclaim.gr

Pilot Unit

- Development of an **online FORUM** about Landfill Mining

- 1st Local Workshop (15th September 2014)

Communication

- 1st National Conference (16th September 2014)

- Participation in EURELCO consortium (European Enhanced Landfill Mining Consortium)

Conclusions

- Athens 2015 International Landfill Mining Conference (24th-25th September 2015)

Next Steps



Communication Actions of the project



The Project

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Next Steps

2nd National LFM Conference

(Athens, 7th April 2016)

Papers accepted at **life@reclaim.gr**

Reclaim Forum: Join the discussion online!



Municipality
of Polygyros



NTUA
School of
Mining &
Metallurgical
Engineering



Conclusions



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Next Steps

1. Landfill mining is **still evolving** (technology and process advances)
2. Need for **standardisation**; not only individual case applications
3. Preparation of **Action Plans** to solidify the technical and legal framework
4. Involvement of the **public sector** will affect the Solid waste management at a National level



Next Steps of the Project



The Project

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Next Steps

- **Assessment** of the data provided by the Pilot Demonstration Unit
- **Rehabilitation manual** for Landfill Mining projects
- **Financial and Socioeconomic** analysis of LFM
- **National Action Plan** elaboration + SEA study
- Information and **Dissemination** actions



THANK YOU FOR YOUR ATTENTION!

Zoi Gaitanarou

life@reclaim.gr



Municipality
of Polygyros



NTUA
School of
Mining &
Metallurgical
Engineering