

REGIONAL MAPPING GRANADA

Progress:

- We have a draft version already done
- A more systematic analysis underway

Methodology Draft Version

- Made by the technical team of the project
- A first approximation to the province situation dividing by:
 - Zones
 - Economic sectors

Access to information :

1. Secondary sources: Statistics and Review of specialized/thematic reports
2. Legal Framework
3. Data gathering through meetings and personal interviews with:
 - Members of Academy & Research (Research centres and University of Granada: Business Area, Building, Urbanism, environment ...)
 - Specialist technicians from different sectors (Energy, water, business)
 - Town council technicians
 - Attendance at specialized meetings (Webinars on energy, biomass, waste, legislation ...)
 - Meeting with stakeholders (mainly technicians from town halls and councilors in the area)

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Main conclusions



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Policy Instrument

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DISEÑO E IMPLEMENTACIÓN

PLANES TERRITORIALES

DE DESARROLLO

NUEVA AGENDA URBANA

2020-2021



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Population and Territoy

- Inhabitants 920,000 approx.
- Area 12,148.2 km²
- Fragmentation/Dispersion of the population.
 - 174 municipalities
 - These municipalities have 541 population centres and 460 (87%) <2,000 Inhabitants
- Population distribution:
- Capital -234,000-25%
- Metropolitan area (including capital) -535,000 -58%
- Coastal municipalities (Costa Tropical) - 128,000 - 14%

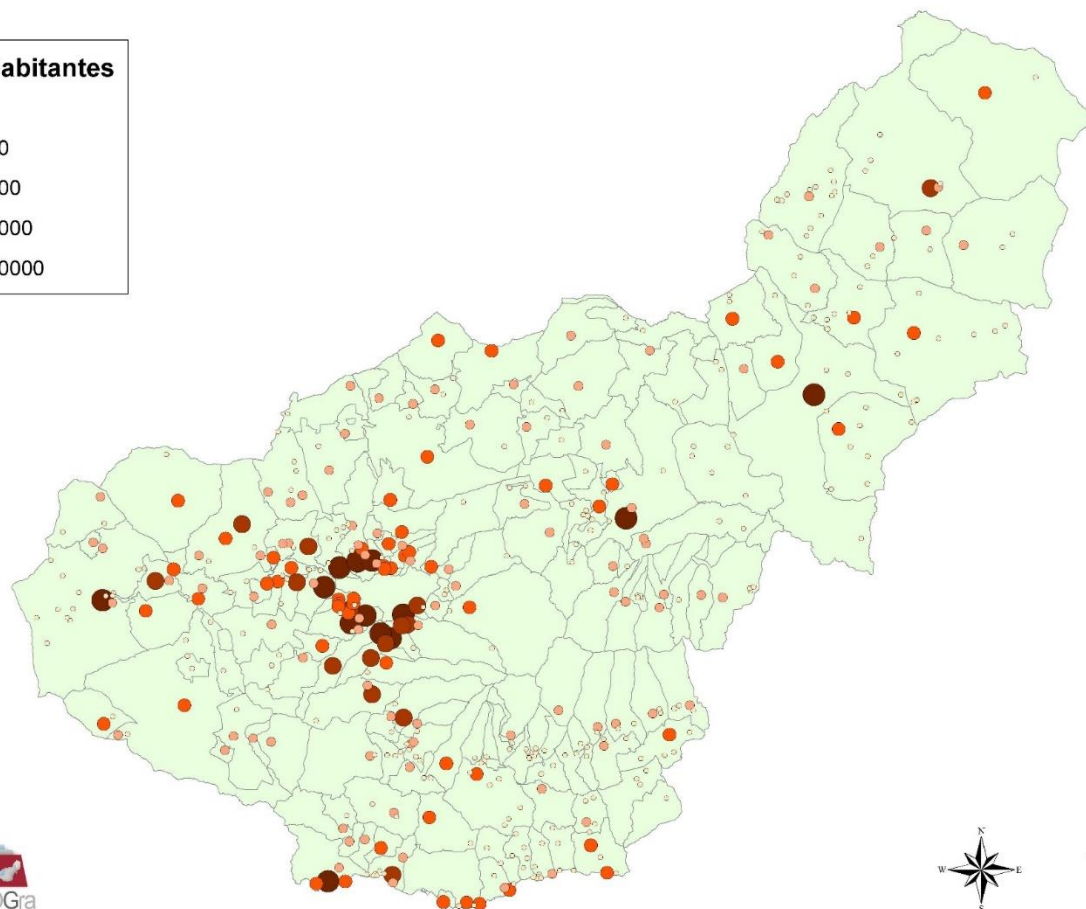
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Population and Territoy



Diputación
de Granada

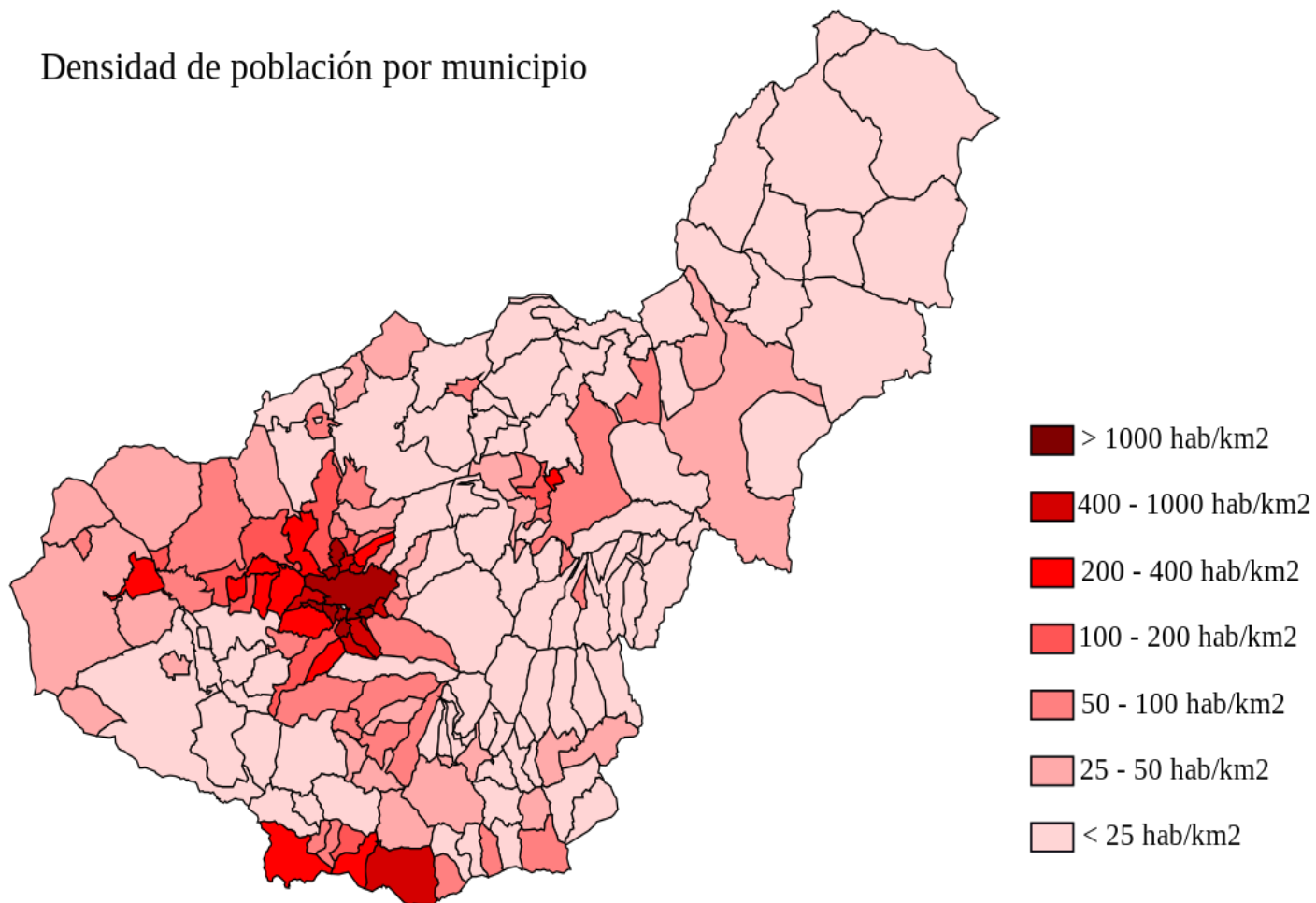
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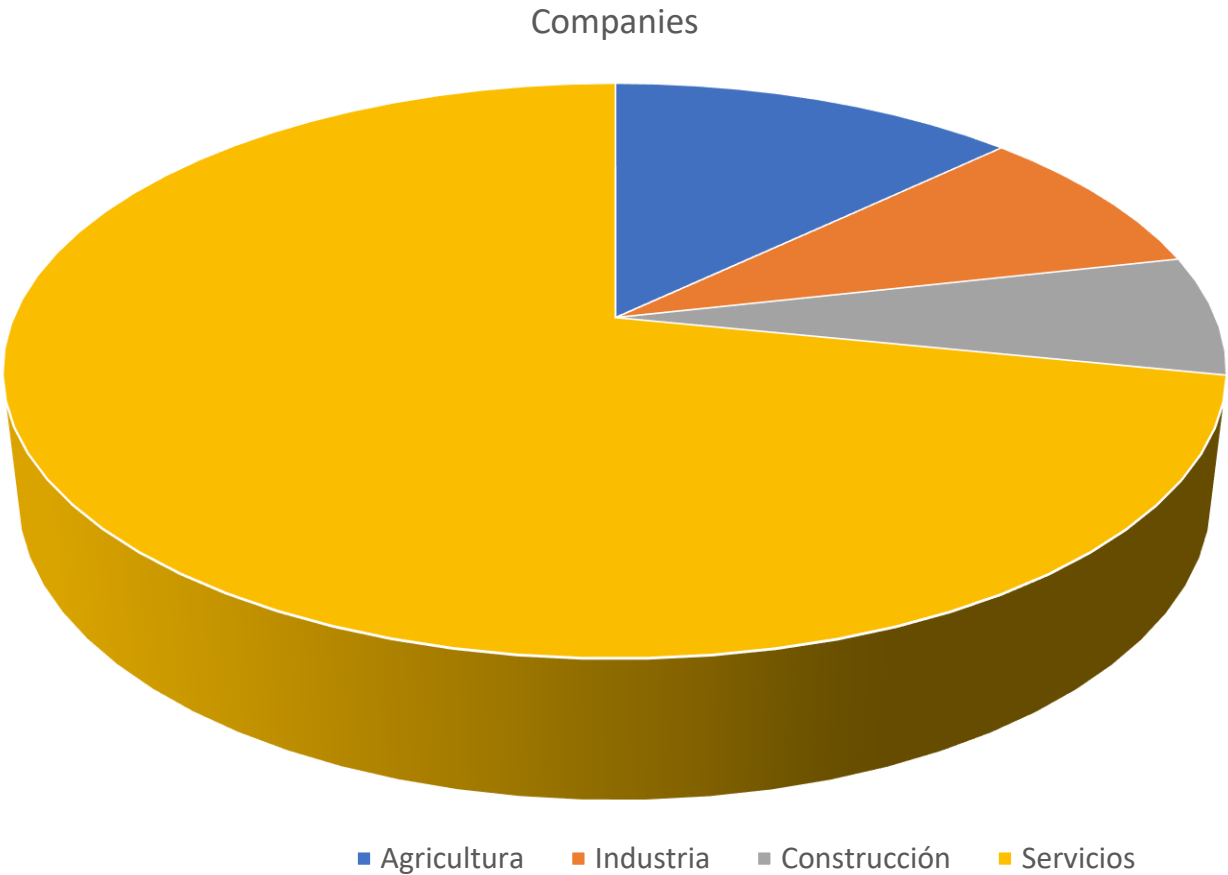
Population and Territoy

Densidad de población por municipio



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Economic Sectors



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Northern Altiplano Area (Huéscar and Baza Region)

- Very large area and low population density
- Continental climate with intense cold and heat
- Very rural character and far from large centres
- With an attractive mix of semi-desert areas and areas of abundant water
 - Landscapes and nature reserves
 - Great archaeological and cultural heritage
 - These values make it possible to develop an integrated development strategy such as the Granada Geopark, with a highly sustainable tourism approach
- Area of a great production of Wind and solar thermal energy
 - This issue can cause problems in the management of the development strategy that is currently developing.
 - Investment by large companies, so much of the profits does not stay in the area.
 - It is necessary to develop business models that allow a more inclusive return of benefits and in the logic of last-mile power lines.

Granada coast (Tropical Coast)

- Area with a higher population density
- 2 large productive sectors:
 - Sun and beach tourism
 - Intensive agricultural production of subtropical products (high and low specialization)
- A highly developed sector with large technical cooperatives
- With very good examples of Circular Economy (eg Grupo La Caña)
- Synergies with companies from Almería and with the UGR, also the University of Córdoba and Almería
- Potential for the development of companies with high innovation dedicated to this sector

Main problems detected:

- Extension of greenhouses in illegal areas
- Badly integration with the landscape,
- Much of the plastics are not being recycled

Northern Altiplano Area (Huéscar and Baza Region)

Necessary actions in the area: (Most relevant)

- The transition of the services and tourism sector to the circular economy
- Need for a change in the fertilization model (Biochar) and waste management
- Promote a supra-municipal by-product market to encourage the development of the productive fabric around this segment. Great potential.
- Innovation in irrigation systems, from sludge utilization to change in drip systems.
- Take advantage of existing technology with sensorization, positive economic and environmental consequences.
- Assessment of the impact of monocultures. Planning of the capacity to extend the model and its relationship with water.
- Promote other forms of sustainable production, ecology and not intensive in the use of resources
- Integration of the Academy to identify in which phases of the production process there would be a greater potential for circularity.
- A profound transformation of the production model, two of which are mainly highlighted:
 - plastic waste
 - food waste

Vega Area

- The area around the capital whose plain space has been progressively reduced
- Close to the capital is a functional area with a medium-high population density and with a high degree of commuters in private vehicles
- It has a key regulatory environmental regulatory function, especially considering air quality.

Necessary actions

- Plan for the valorization Co-products and biomass
- Rational and sustainable urban development
- Sustainable peri-urban planning to:
 - Preserve intrinsic values of La Vega
 - Integration between municipalities with slow ways for alternative mobility
 - Green corridors and regeneration of peri-urban spaces
 - Discourage private vehicle

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Granada Capital

- Very focused on the service sector and the university
- By orographic conditions, it has the third position in air quality in Spain
- Before the pandemic, it showed symptoms of tourist tension

Necessary actions

- Diversification of the tourist offer
- Plan for the transition to the circularity of HORECA companies
- Integrate it with the rest of the metropolitan area promoting non-polluting means of transport
- Consolidate your peri-urban area to provide more green areas
- Naturalize certain areas such as riverbanks and bordering parcels

Eastern mountains, Loja and Alhama

Very rural area

- Necessary actions: Energy recovery plan for a considerable biomass potential
- Strategies to combat depopulation in some areas
- Training in sustainability with social inclusion logic. Pilot Action

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Alpujarra

- Very picturesque mountainous area of special tourist interest, with a fairly sustainable tourism model
- Great potential for organic farming, grazing and maintenance of natural ecosystems
- Extense livestock farming
- It can be an experimental space for socially inclusive sustainable development models

MUNICIPALITIES

- Complex competence framework
- Bad budget allocation
- Responsible for waste management that generates many costs
- Difficulty adapting to the new regulations, especially in waste management.

3 possible lines of action in local authorities.

- 1. Apply the circular economy in the development of their competencies.**
- 2. Promote circular consumption models in the social sector**
- 3. promote the circular economy in the productive sector**

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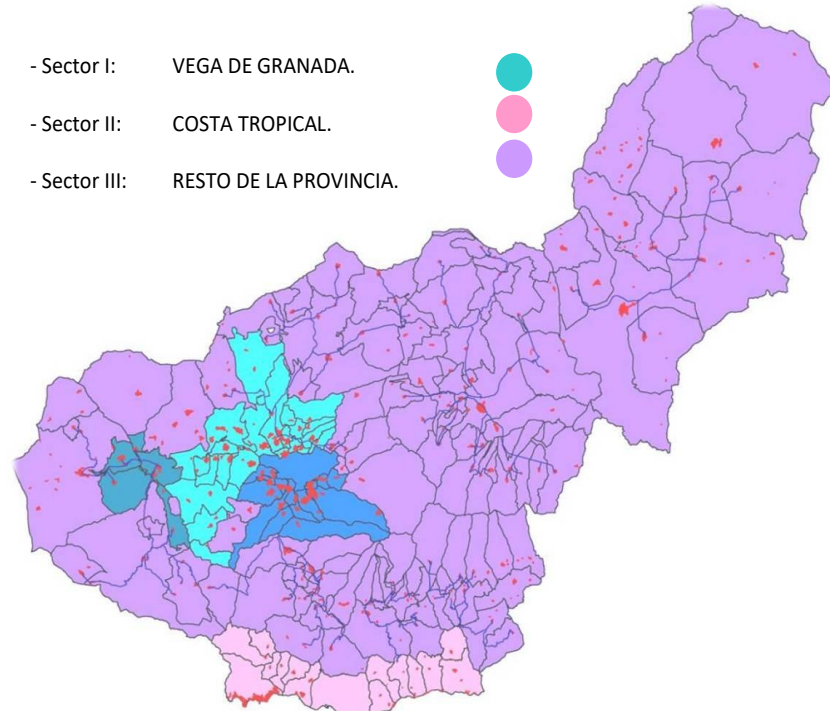
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WATER

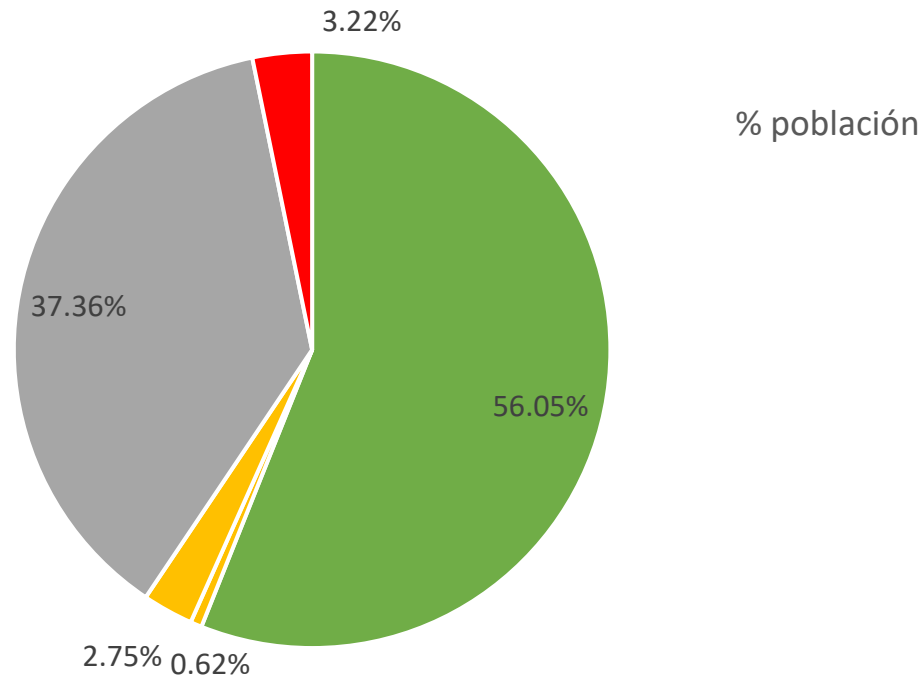
- Source of water resources: mainly groundwater
- Very "decentralized" supply infrastructures
- There are usually no shortage problems (Except in zone 3)
- Good water quality
- Poor performance of the supply network
- Lack of maintenance and poor condition of infrastructures.



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WATER

- Most of the treatment plants belong to towns with less than 2,000 inhabitants.
- Advance of the Granada County Council - Telemanagement 35 municipalities



■ En Funcionamiento ■ En espera de puesta en marcha ■ En construcción ■ En proyecto o estudio ■ Sin edar

Energy

- Production of electrical energy based on renewable energies and cogeneration.
 - Renewable power (12/31/2018) 745.85 MW
 - has multiplied by more than five in the last fifteen years.
 - Wind power with 399.81 MW represents 53.6% of the province's total renewable power
-
- 21 wind farms connected to the grid in operation with a total production of 402.21 MW
 - 28 hydroelectric plants (normal and mini)
 - 3 thermosolar plants in operation with a capacity of 149.7 MW

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Diputación
de Granada

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Energy

	GRANADA	Andalucía	España
Consumo energía primaria (ktep) ^(*)	1.536,2	19.412,1	128.616,9
Consumo energía final (ktep) ^(*)	1.252,3	12.988,9	88.516,0
Consumo eléctrico final (ktep)	280,1	2.935,6	20.713,6
Consumo primario gas natural (ktep) ^(*)	185,4	4.511,2	27.410,0
Consumo primario energía renovable (ktep)	498,1	3.608,5	15.626,2
Consumo transporte (ktep)	502,3	4.986,4	34.965,6
Consumo industria (ktep) ^(*)	218,9	3.843,2	23.913,0
Consumo otros sectores (ktep)	531,1	4.159,2	26.996,5
Potencia eléctrica instalada (MW)	881,7	15.766,8	104.122,0
Potencia eléctrica no renovable (MW)	137,4	9.642,1	55.913,5
Potencia eléctrica renovable (MW)	744,3	6.124,7	48.208,5
Energía eléctrica generada (producción bruta) (GWh)	2.462,9	38.748,6	262.645,0
Energía eléctrica renovable generada (producción bruta) (GWh)	1.604,8	13.467,5	88.511,4
% Potencia eléctrica renovable frente a la total	84,4%	38,8%	46,3%
% EE generada renovable frente a la total	65,2%	34,8%	33,7%
% EE generada / consumo final EE	75,6%	113,5%	109,0%
% EE generada renovable/ consumo final EE	49,3%	39,5%	36,7%
% Consumo primario energía renovable / consumo energía primaria total para uso energético	33,2%	19,9%	12,5%
% Consumo primario energía renovable / consumo energía final total para uso energético	40,9%	30,5%	18,5%
Calidad de suministro ^(**)	2,04 horas	1,72 horas	1,37 horas

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Energy

Datos generales potencia eléctrica renovable (MW) (31/12/2020)

Tecnología	Granada	Andalucía	% Provincia
Biogás Generación Eléctrica (*)	2,22	33,45	6,64%
Biomasa Generación Eléctrica	0	273,98	0,00%
Eólica (*)	402,21	3.471,97	11,58%
Fotovoltaica (*)	126,21	2.672,10	4,72%
Hidroeléctrica	96,33	650,0	14,82%
Termosolar	149,7	997,4	15,01%
Otras tecnologías renovables	0	4,5	0,00%
TOTAL	776,67	8.103,4	9,58%

(*) Conectada a red + aislada

Fuente: Agencia Andaluza de la Energía

WASTE

Weaknesses

- Treatment centres associated with populated population entities, risk of the service in sparsely populated areas
- Generation rate above the real possibilities of recovery
- Low level of exploitation of biogas in landfills
- Low quality of compost in recovery plants
- Low interest from the sector in organic fertilizer
- Lack of integration of renewable energies in its management? Insufficient repair of devices with the potential useful life

Strengths

- Good state of regional development of the waste management sector
- Well established business sector
- The Sectorial regulatory framework developed

WASTE

Threats

- Little training and public awareness on waste management (especially in minimization and selective collection)
- A slowdown in investment in available improvements due to the economic situation

Opportunities

- Potential for generating employment in the industry related to the sector
- Extensive legislative development recently approved and pending approval. Especially,
 - taxation for the prevention of waste production
 - Application of the waste hierarchy principle
- Extensive pilot experiences in separation at the domestic origin
- Existence of models adaptable to different circumstances
 - Door-to-door collection, container expansion
 - Local composting, joint composting...

Methodology Provider Version

1. Knowledge agents in the Granada region
2. Bibliographic and bibliometric study
 - Comprehensive review of the scientific literature
 - Obtaining indicators to select a set of them to carry out the diagnosis of the province
2. Analysis of the current legal framework
3. Inventory of projects and local development planning
4. University survey research in CE
5. Workshop: Focus group
 - Local Entities
 - Academy & Research Agents
 - Citizenship & Association Agents
6. SWOT - Delphi- AHP
 - Quantitative evaluation (Delphi model application and later AHP)
 - Determine the Priority of implementation factors of the C.E.
7. Roadmap proposal for the adoption of the C.E. by sectors

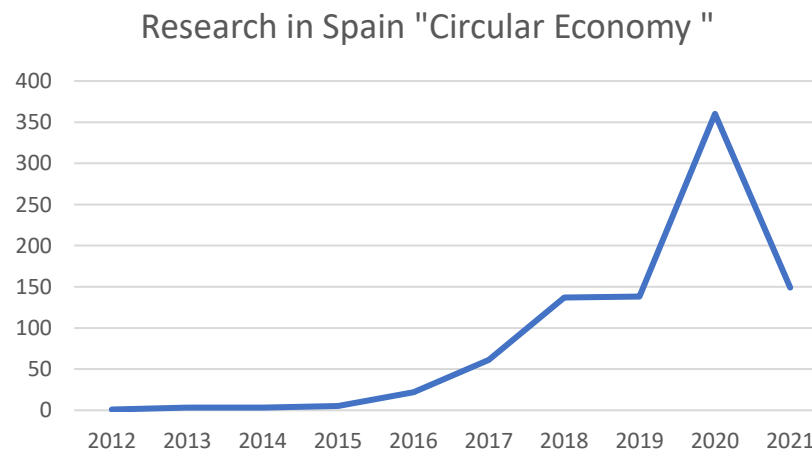
Regional Advance (Provider)

MAP OF CIRCULAR ECONOMY RESEARCH IN GRANADA

- A. Agents of knowledge generation in the province
- B. Research groups and centres belonging to the UGR
- C. Analysis of the State of the Art in Circular Economy: Publications, Trends and Keywords
- D. Survey research groups

C- Analysis of the State of the Art in Circular Economy: Publications, Trends and Keywords

- The database used: SCOPUS
- Search criteria: "Circular Economy"; "Spain"; "2017-2021"
- Articles found: 905 (04/14/2021)
- Analysis program used: VOSViewer



VOSViewer results:

- Analysis Unit - 100 relevant keywords
- Keyword Debugging - Result for EC 89
- Generation of 3 Clusters:
 - 1st cluster-RED (40 items). Oriented to industry and scientific research related to the use of by-products and resources
 - 2nd cluster-Green (30 items). Oriented to the concept of CE and environmental protection, and its economic and political dimension
 - 3rd cluster- Blue (19 items). Oriented to the more urban environment and related to local development

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Top 10 key concepts related to CE in each Cluster

Cluster 1 (Red)	Cluster 2 (Green)	Cluster 3 (Blue)
Biomass	Circular economy	Waste management
Biogas	Recycling	Wastewater treatment
Carbon dioxide	Sustainability	Waste treatment
Nutrient	Sustainability development	Anaerobic digestion
Wastewater	Life cycle assessment	Waste
Effluent	Environmental impact	Agriculture
Chemistry	Life cycle	Municipal solid waste
Biofuel	Economics	Waste disposal
Phosphorus	Economic aspect	Fertilizers
Procedures	Environmental management	Plastic
TOTAL: 10	TOTAL: 10	TOTAL: 10

D- Survey of research groups:

- List of research lines potentially related to the CE paradigm (37)
- Survey results to research groups responsible:
 - Survey response rate: 57 groups out of 534
 - 74% do declare a relationship with the CI or any of its aspects

Most developed research lines:

- Environmental impact evaluation and environmental protection
- Environmental management and its social and economic effects
- Implementation and study of the SDGs
- Civic environmental engagement
- Rural development and local development
- Socially responsible territorySocial inclusion of workers
- Recovery and disposal of waste
- Sustainable tourism

REGIONAL MAPPING

Next steps

With the information generated (conceptualization and indicators), the university group in charge is preparing the rest of the fieldwork that is currently being carried out:

- Polls
- Focus group (on-call)
- The panel of experts (last step of the fieldwork collection)
- Drafting of the final report (October)

Has the regional mapping already been shared with your local stakeholders?

- Not yet, at the end of this month, we hope to be able to disseminate the current results in the next meeting with RSG

X good practices identified on Granada (5 to 10 lines of presentations)

- ...
- ...
- ...
- ...
- ...
- ...
- ...

X involving researchers & local authorities or more

Main role of public authorities: **Financial Sponsor/Facilitator/Beneficiary/....**

Main sectors



Agriculture



Biomass



Food



Water



Building & Infrastructure



Plastic



Energy



Mobility



Education



Recreation & Tourism

Municipalities around Cluny own some local woods. They get some financial resources from cutting and selling trees. But the ones they own are twisted and consequently can only be sold to make fire wood, which does not make much money. Is there a way to make something else out of his wood, something that could generate more revenue for local municipalities? The question was asked to the Arts et Métiers School. It was found that logs can be rolled out, transformed into thin timber sheets that, assembled, can be used to make high quality carpentry, eg window frames. Consequently, the municipality-owned trees usually sold for 30 euros/m³ for fire wood use, can now be sold 300 euros/m³. Following that first research made by a Master student at the engineering school, a local window-frame company hired a PhD student to keep on studying the possibilities of local wood valorisation.

Wood Lab researchers find way to increase the economical value of twisted trees own by local municipalities.

From PP1 to PP5 and PP6



Sectors: Biomass, Education

Areas: Innovation, Secondary raw materials



Cluny, France



2018. Complete



Master thesis + PhD student w/ subsidy



Photo credit: COLOR CIRCLE, sept 2019



Type of players involved: **Local governments + Researchers**

Role of **local governments**: **Request + Beneficiary**

Role of regional authority: None

Policy feedback: not policy related but that kind of experience **could be easily renewed if the region or local gvts made it a habit to come to researchers with their needs & demands.**

Transferable Good Practice: 1000 PhD students for the territory

Key elements

- Identify research groups, potential research lines to participate in this initiative
- Establish the governance instruments that must be involved in this action. (By both institutions)
- Design a system of internal incentives to motivate the participation of teachers and research groups
- Expand the potential of the Circular Economy in several areas
- Design an incentive system for students
- Create a bank of themes for the End of Degree, End of Master and PhD Projects
- Promote the dissemination of scientific production at a local scale in convenient repositories
- Establish ways to allow the greatest possible participation of the university community. (Marketplace, repositories ...)
- Establish a model agreement agreed between both institutions

Transferable Good Practice: 1000 PhD students for the territory

Has the subject of the action plan already been broached with your regional authority?

- Yes, political commitment is essential for the objectives since we want an official agreement between our Institution and the UGR

With your local stakeholders?

- Meetings with representatives of the university from different disciplines to see the potential viability
- We have already carried out a pilot test, the "Puentes" project.