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DELIVERABLE REPORT

WP1 - Design and preparation of WEN4SDV2 Master

D1.2 - Workshop Report

ABSTRACT

This deliverable reports on WP1/ Task 1.2:
"Identification of the Need for a Master Program on Topics Related to Sustainable Development."

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Partners INCLUDED:

1. Universitat Politècnica de València (Valencia, Spain) (UPV),
2. University of Gabes (Gabes, Tunisia) (UNIVGB),
3. Conservatoire National des Arts et Métiers (Paris, France) (CNAM)

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OUTPUT DOCUMENTS/MATERIALS: D1.2: Identification of the Need for a Master Program on Topics Related to Sustainable Development.

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Executive Summary

The following document, Deliverable D1.2 - Workshop: Identification of the Need for a Master Program on Topics Related to Sustainable Development, aims to accurately define the current needs of the global and Mediterranean regions for a master program that addresses the water and energy nexus as well as issues related to these resources and their impact on economic growth and social development.

Furthermore, the objective of this deliverable is to align the planned activities with the latest developments of the project.

This deliverable provides a report on the online workshop conducted on 02/03/2023, following the procedure outlined in Deliverable D1.1 and the grant agreement document.

1. Introduction

1.1 Overview

The main objective of Work Package 1 (WP1) is to design and develop the WEN4SDV2 master’s program, focusing on the following specific objectives:

Specific Objective 1: Establishing a standardized procedure for student admission requirements and application process through the master's Program Registration Guideline. This includes defining selection criteria, monitoring procedures, performance examinations, and evaluation rules. The detailed admission procedure for the proposed master's program is fully outlined in the master's Program Registration Guideline.

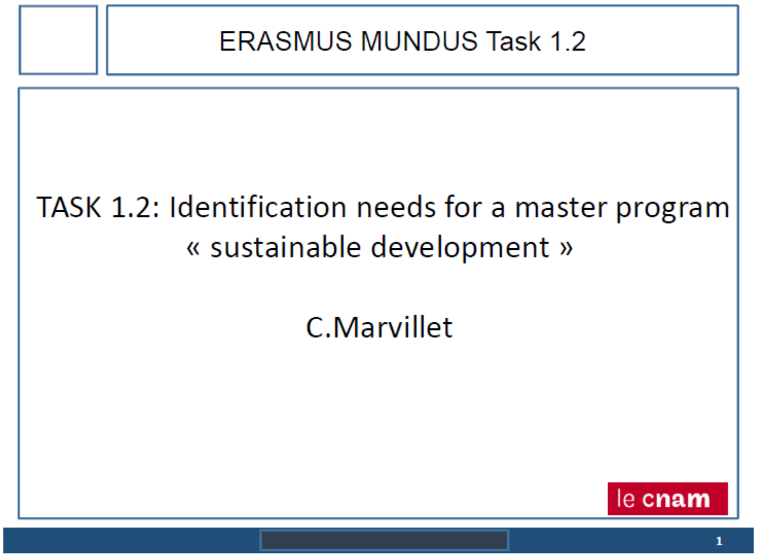
Specific Objective 2: Creating the joint program and developing the study plan. This involves designing integrated courses, activities, and training programs. The joint master's program currently under development adheres to the Standards for Quality Assurance of Joint Programs in the European Higher Education Area.

Specific Objective 3: Formulating a joint degree policy. The three institutions involved in the consortium establish a framework based on European quality standards for higher education and training. This agreement defines the joint administrative and economic management by the consortium. Additionally, common strategies for promotion, awareness-raising, and the identification of shared services for students (such as language courses and visa support) are established.

Specific Objective 4: Preparing draft versions of the partnership agreement involving the three Higher Education Institutions (HEIs) and the joint Student Agreement. The partnership agreement aims to cover all academic, operational, administrative, and financial aspects related to the implementation of the joint master's program.

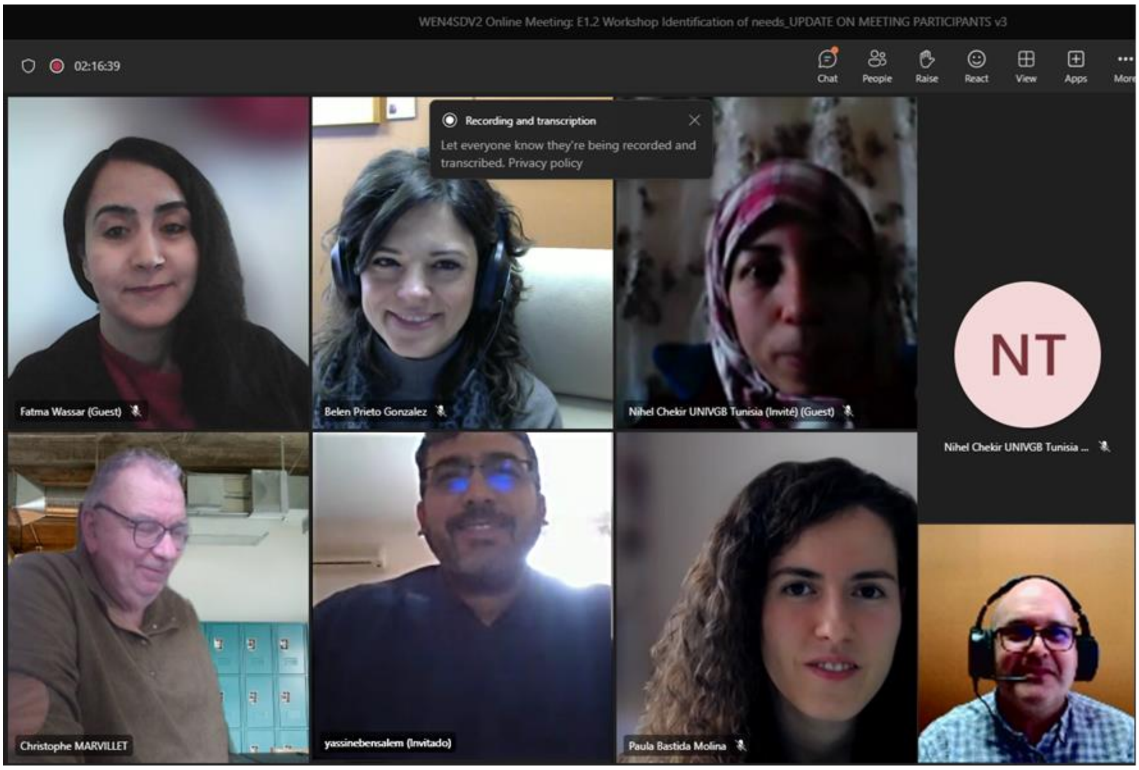
1.2 E1.2 Workshop: Identification of needs

During the workshop held online on 02/03/2023, each partner delivered a presentation focusing on the identification of needs.



1.3 List of presence

Partner	Name
University of Gabes	Yassine Bensalem Nihel Chekir Fatma Wassar
Universitat Politècnica de València	Paula Bastida Molina Belén Prieto González David Alfonso Solar
CNAM Paris	Christophen Marvillet Mothanna Salama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Chat
People
Raise
React
View
Apps
Recording and transcription
Let everyone know they're being recorded and transcribed. Privacy policy
Fatma Wassar (Guest)
Belen Prieto Gonzalez
Nihel Chekir UNIVGB Tunisia (Invité) (Guest)
NT
Nihel Chekir UNIVGB Tunisia ...
Christophe MARVILLET
yassinebensalem (Invitado)
Paula Bastida Molina

2. The Nexus approaches

According to Millennium Ecosystem Assessment, a study conducted by the United Nations, our planet has witnessed a doubling of the human population and a shift towards more resource-dependent consumption patterns in less than 50 years. This has resulted in significant challenges, such as 1.1 billion people lacking access to clean water and 1.3 billion people living without electricity[1]. Unfortunately, these issues are expected to worsen due to factor like climate change, population growth, economic development, urbanization, changing lifestyles, pandemics, governance and policies, technology, and innovation. As a result, the availability and management of resources like water, energy, land, and food, particularly because of climate change[2].

By 2050, the global population is projected to surpass 2 billion, accompanied. By an expanding middle class and growing demand for improved water and energy services[3].

Recognizing the interconnected risks to water and energy security, research and policy communities have emphasized the need for an integrated approach to resource planning and management. The security of each resource involves trade-offs that impact the security of others. The interdependencies and trade-offs between water and energy systems, as well as their interactions with land, climate change, and livelihoods, have become increasingly evident due to mounting pressures on natural resources. Understanding these complex interactions is crucial for effectively addressing sustainability challenges.

Furthermore, managing water and energy systems is essential for achieving the UN Sustainable Development Goals (SDGs)[4], specifically for Goal 2 on food security, Goal 6 for water and Goal 7 for energy. To promote social equity, human well-being, and ecological integrity, it is important to comprehend the interactions between these goals at various scales and seize opportunities to enhance synergies while minimizing trade-offs. Providing decision- makers with comprehensive knowledge to navigate these complexities is a significant objective of

[1] Millennium Ecosystem Assessment (2005). Ecosystems and Human Well-being: Synthesis.Island Press, Washington, DC

[2] Floor Brouwer, Handbook on the Water-Energy-Food Nexus, Chapter 1: Introduction to the water-energy-food nexus, Page Range: 1–14, Aug 2022, DOI: https://doi.org/10.4337/9781839100550.00005

[3] De Laurentiis, V., D.V.L. Hunt and C.D.F. Rogers (2016), 'Overcoming food security challenges within an energy/water/food nexus (EWFN) approach', Sustainability, 8, 95

[4] The Sustainable Development Goals Report (2018). United Nations, New York.

Nexus research.

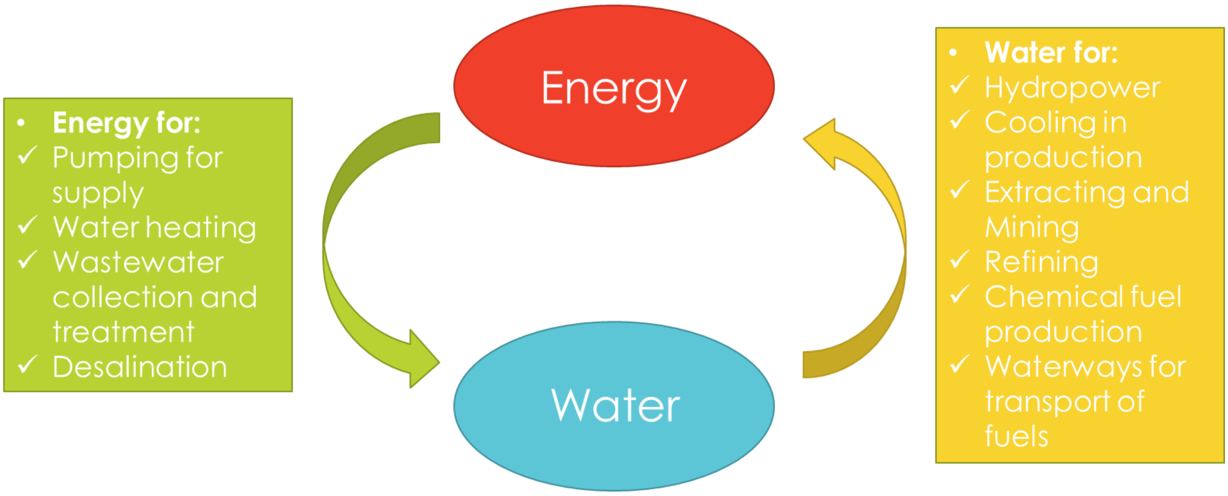

Figure 1: Water/Energy nexus

In response to these challenges, the concept of the Water-Energy (WE) Nexus has emerged, as depicted in Figure 1, to highlight the interconnectedness of these systems and shed light on the cross-sectoral implications of single-sector strategies. It is evident that addressing this global issue within the current environmental context without compromising prosperity requires more than sector-specific approaches. A holistic and integrated approach is necessary to effectively manage our natural resources sustainably[5].

The term "nexus" originates from the Latin verb "nectar," meaning "to connect." It signifies the interconnected and complex nature of the water and energy resources, forming a coherent system. Pressures on one aspect of the nexus can lead to compromises in the other. Recognizing the existence of this nexus has gained acknowledgment not only within the research community but also in public management. International organizations such as the United Nations, the European Commission, and the Food and Agriculture Organization (FAO) have emphasized the importance of addressing resource interdependencies in an integrated manner[6].

The emergence of the Nexus concept can be traced back to 2008 when business leaders, influenced by the World Economic Forum, expressed their interest in the interplay between economic growth and water, energy, and food resource systems. Subsequently, a report on water

[5] Rockström, J., W. Steffen, K. Noone, Å. Persson, F.S. Chapin, E.F. Lambin et al. (2009), 'A safe operating space for humanity', Nature, 461, 472–475.
[6] Wiegleb, V. and A. Bruns (2018), 'What is driving the water-energy-food nexus? Discourses, knowledge, and politics of an emerging resource governance concept,' Frontiers in Environmental Science, 6 (128), 1–15.

security was published, further highlighting the Nexus issues. Since then, various approaches have been developed, including the water-soil-waste Nexus, water-energy-ecosystems Nexus, water-energy-food-land use-climate Nexus, among others[7].

The growing recognition of the Nexus concept is evident from its presence at major global events like the World Water Forum and the Rio+20 Conference in 2012. In a short span of time, the number of books, academic articles, and policy reports addressing the analysis and management of the Nexus has exponentially increased[8.]

A recent literature review by Galaitsi et al.[10] revealed that the WE Nexus is closely intertwined with economic forces, governance, and socio-physical factors. Economic considerations play a significant role in shaping and strengthening the interlinkages within the Nexus. This includes economic incentives for resource management and innovation promotion, variable pricing schemes to manage demand, and the implementation of fossil fuel taxation, among others.

Understanding the water interdependencies of the energy sector, particularly in relation to water resource availability, is crucial within the Nexus approach. Timely adaptation to the challenges posed by climate change and its impact on water resources is essential[9] for ensuring sustainable water and energy management.

Overall, the Nexus approach provides a comprehensive framework to address the interconnections and trade-offs between water and energy systems, as well as their interactions with economic, governance, and socio-physical factors. By adopting an integrated approach, we can effectively tackle the challenges and seize opportunities to achieve sustainable development goals.

[7] Oxford Dictionary (2018), 'Nexus', https:// en .oxforddictionaries .com/ definition/ nexus (accessed 15 April 2021).
[8] Flammini, A., Puri, M., Pluschke, L. and Dubois, O. (2014). Walking the Nexus Talk: Assessing the Water-Energy-Food Nexus in the Context of the Sustainable Energy for All Initiatives, Environment and Natural Resources Working Paper No. 58-FAO, Rome.
[9] De Roo A, Trichakis I, Bisselink B, Gelati E, Pistocchi A and Gawlik B (2021) The Water-Energy-Food-Ecosystem Nexus in the Mediterranean: Current Issues and Future Challenges. Front. Clim. 3:782553. doi: 10.3389/fclim.2021.782553

3. Water resources in the Mediterranean

The countries within the Mediterranean Basin possess renewable freshwater resources estimated to range between 1,212 km³/yr. and 1,452 km³/yr.[10]. However, these resources are unevenly distributed among the countries. Northern Mediterranean countries hold 72% to 74% of the resources[11], while the eastern Mediterranean (including Turkey) and the southern Mediterranean countries (including Egypt and the Nile) share the remaining 26% to 28%. Furthermore, the distribution of surface water and groundwater varies across regions. In northern Mediterranean countries, 96% of renewable water is surface water, with 25% contributing as base flow to river discharges after percolating to the aquifer. Only 4% recharges the groundwater. In the southern Mediterranean, renewable groundwater resources account for 11% of the total renewable freshwater, while in eastern Mediterranean countries, it amounts to 20%. Notably, non-renewable "fossil" groundwater resources constitute almost 66% of the total groundwater[12] in southern and eastern Mediterranean countries.

The population of Mediterranean countries is increasing and is projected to rise from 466 million people in 2010 to 529 million people by 2025[13]. Despite covering only 2.6% of the world's freshwater resources, the Mediterranean region needs to supply water to 7.4% of the global population[14]. However, certain single-country projections indicate a decrease in population for some countries by 2025 and even more so by 2100. The northern Mediterranean region, except for Lebanon, is primarily affected by negative population growth rates. Comparing available freshwater resources to the population, the northern part of the Mediterranean has 36% of the population and 72% to 74% of renewable freshwater, the eastern part has 24% of the population and 19.5% to 21% of freshwater resources, and the southern Mediterranean has 40% of the population but only 5% to 8.5% of freshwater resources[15].

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[10] Ferragina E 2010 The Water Issue in the Mediterranean. https://www.iemed.org/observatori-es/arees-danalisi/arxius-adjunts/10-papers-for-barcelona-2010/8-environmental-and-sustainable-development-in-the-mediterranean/ferragina_8.pdf

[11] FAO 2016a AQUASTAT Main Database, Food and Agriculture Organization of the United Nations (FAO). http://www.fao.org/nr/water/aquastat/data/query/ index.html?lang=en [Accessed July 23, 2019]

[12] Lezzaik K, Milewski A 2018 A quantitative assessment of groundwater resources in the Middle East and North Africa region. Hydrogeol. J. 26, 251–266. doi: 10.1007/s10040-017-1646-5

[13] UNEP/MAP 2016 Mediterranean Strategy for Sustainable Development 2016-2025. Valbonne.

[14] MED-EUWI 2007 Mediterranean Groundwater Report - Technical report on groundwater management in the Mediterranean and the Water Framework Directive.

[15] UN 2019 World Population Prospects 2019, Online Edition. https://population.un.org/wpp/DefinitionOf-ProjectionVariants [Accessed August 1, 2019]

Consequently, approximately 180 million people in the southern and eastern Mediterranean face water scarcity (less than 1,000 m³ capita-1/yr.), and 80 million people experience extreme water shortage (less than 500 m³ capita-1/yr.). In contrast, the northern Mediterranean region enjoys an average water availability of 1,700 m³ capita-1/yr., and some Balkan states have even higher supplies, reaching 10,000 m³ capita^{-1}/yr.[16].

In terms of water usage, agriculture is the primary consumer of water in the Mediterranean regions. In the southern Mediterranean countries, agriculture accounts for 76% of abstracted water, while industrial consumption and public usage constitute only 4% and 20%, respectively. In the eastern part, agriculture utilizes 79% of abstracted water, while industrial and public sectors have smaller shares of 6% and 13%, respectively. The northern Mediterranean countries also have significant agricultural water usage (36%), but industrial (including cooling, 48%) and public (16%) consumption are higher compared to other regions. There are exceptions to this trend, such as Slovenia and France, where industrial water demand is predominant[17].

Overall, these statistics demonstrate the varying distribution of freshwater resources and water usage patterns across the Mediterranean Basin, highlighting the challenges of water scarcity and the need for sustainable water management strategies[18].

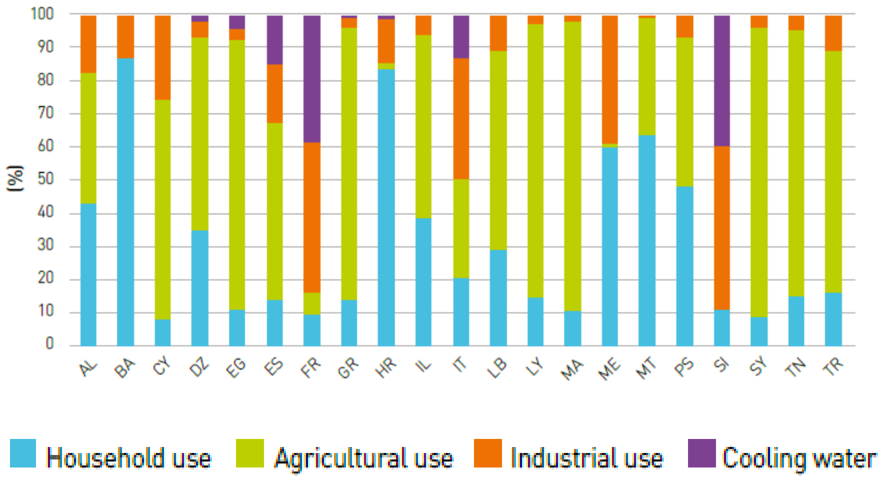

Figure 2: Water demand per sectoral use as percentage of total water demand (Country codes are: FR France, TR Turkey, IT Italy, ES Spain, HR Croatia, GR Greece, EG Egypt, SI Slovenia, AL Albania, MA Morocco, SY Syria, DZ Algeria; TN Tunisia, LB Lebanon, IL Israel, JO Jordan, PS Palestine, CY Cyprus, LY Libya, MT Malta).

[16] Milano M, Ruelland D, Fernandez S, Dezetter A, Fabre J et al. 2013 Current state of Mediterranean water resources and future trends under climatic and anthropogenic changes. Hydrol. Sci. J. 58, 498–518. doi: 10.1080/02626667.2013.774458

[17] FAO 2016a AQUASTAT Main Database, Food and Agriculture Organization of the United Nations (FAO). http://www.fao.org/nr/water/aquastat/data/query/ index.html?lang=en [Accessed July 23, 2019]

[18] Burak S, Margat J 2016 Water Management in the Mediterranean Region: Concepts and Policies. Water Resour. Manag. 30, 5779–5797.

The proportion of overall water abstraction from surface water and groundwater for different uses varies across countries in the Mediterranean Basin. For instance, in Malta, 100% of water abstraction comes from groundwater, while in France, approximately 20% is sourced from groundwater, with the rest from surface water[19]. However, in northern Africa, a sizeable portion of water demand is met by non-renewable water resources, particularly fossil groundwater, estimated at 16 km^3/yr. Over 60% of the non-renewable water resources in the region are sourced from fossil groundwater, and more than 30% is a result of overexploitation of renewable groundwater[20]. In terms of industrial water use in the Mediterranean, it is estimated to be around 59.6 km^3/yr. An additional 38 km^3/yr. is used for the cooling of thermal power plants. Combined, these figures represent approximately 30% of water use in the Mediterranean Basin. Most of the industrial water consumption occurs in large, developed countries of the North, such as France, Italy, and Spain. These countries account for 80% of water used in the industrial sector and 87.5% of water used for cooling purposes. France alone uses more than 60% of water for cooling.

Overall, these statistics shed light on the variations in water abstraction sources and usage patterns across Mediterranean countries, with some regions relying heavily on non-renewable water resources and significant industrial water consumption concentrated in certain developed countries.

4. Energy context in the Mediterranean

The Mediterranean region contributes to a low level of global greenhouse gas emissions, accounting for approximately 6% of the total emissions, which is proportionate to its share of the world population (7.4%). However, the expected impacts of climate change and environmental changes necessitate an accelerated energy transition in the region to ensure secure, sustainable, and inclusive development.

From 1980 to 2016, primary energy consumption in the Mediterranean Basin has steadily increased by approximately 1.7% annually. This growth is primarily driven by changes in demographic, socioeconomic (lifestyle and consumption), and climatic conditions, resulting in

[19] Leduc C, Pulido-Bosch A, Remini B 2017 Anthropization of groundwater resources in the Mediterranean region: processes and challenges. Hydrogeol. J. 25, 1529–1547. doi: 10.1007/s10040-017-1572-6
[20] WWC 2009 World Water Forum Mediterranean Session Regional Document. Istanbul.

an increased consumption of oil, gas, nuclear, and renewable energy sources.

While northern Mediterranean countries have made progress in diversifying their energy mix, improving energy efficiency, and increasing the share of renewable energy sources, Southern and Eastern Mediterranean countries lag in these developments. The Mediterranean Basin, particularly the southern side, has significant potential for renewable energy, including wind, solar, hydro, geothermal, bioenergy, waves, and currents. As the share of renewables increases, the electricity transmission system may face greater exposure to weather variations and specific weather conditions not typically considered extremes.

The projected energy demand trajectories for the coming decades differ significantly between northern and eastern/southern Mediterranean countries. Energy demand in the North has decreased by 4% since 2010 due to moderate population growth and a declining gross domestic product, and it is expected to continue decreasing until 2040. In contrast, southern countries have experienced sustained economic and population growth, resulting in a 6% increase in energy demand since 2010, and this demand is expected to continue rising until 2040. Although fossil fuels are projected to remain the dominant component of the energy mix, renewables are expected to become the second most used energy source in the Mediterranean Basin, with a tripling of their usage by 2040.

A significant gap between energy supply and demand is anticipated, particularly in the southern and eastern regions. Therefore, it is crucial to rapidly move towards restructuring the energy sector, with a focus on integrating renewable energies more prominently. Mitigating greenhouse gas emissions and adapting to climate change will require investments from households, companies, and governments. Regional energy market integration and cooperation are vital for cost-effective climate change mitigation.

The energy transition issue in the South and East Mediterranean countries is closely tied to the sustainability of their development model. These countries face multiple challenges, including rapid population growth (projected to reach 607 to 659 million inhabitants by 2050, depending on the scenario, compared to 534 million in 2015), which will exert additional pressure on energy demand to meet the needs of urbanization and various sectors of the economy. As a result, energy demand in the Southeast Mediterranean countries is expected to rise by 118% by 2040.

4.1 Energy transition scenarios

The Mediterranean Energy Transition Scenario (TS) proposes a different path by implementing measures that are currently the most technically, economically, and politically viable for a large-scale rollout of energy efficiency and renewable energies. This scenario assumes the deployment of existing technologies and effective energy efficiency policies across all Mediterranean countries, without relying on major technological breakthroughs.

On the other hand, the Business-As-Usual or "Conservative" Scenario (CS) paints a critical picture of the next 25 years. It predicts a doubling of energy demand, a tripling of electricity consumption, a substantial increase in infrastructure and import costs (requiring an additional 443 GW of installed capacity and doubling fossil fuel imports), and a significant rise in carbon emissions (+45%). Such a scenario, heavily reliant on fossil fuels, would worsen the strain on the climate and exacerbate geopolitical tensions in the region.

To counter these trends and address the challenges, a shift in the energy trajectory is necessary for all Mediterranean countries. Increasing energy efficiency and deploying renewable energy sources are key elements in curbing the negative impacts. The TS provides a pathway that can help mitigate the rising energy demand, reduce reliance on fossil fuels, and decrease carbon emissions, contributing to a more sustainable and stable future for the Mediterranean region.

4.2 Energy demand

In the Mediterranean region, the energy demand has been on the rise, increasing from 711 Mtoe (megatons of oil equivalent) in 1990 to 978 Mtoe in 2015. This represents an average annual growth rate of 1.3%. It is important to note that the distribution of energy demand is uneven across the region, with the North Mediterranean countries accounting for over 63% of the total energy demand.

The projected trajectories for energy demand in the Mediterranean region vary significantly between the two shores of the Mediterranean. These trajectories highlight contrasting patterns and trends in energy consumption. Factors such as population growth, economic development, and energy policies contribute to these differences.

It is crucial to consider these variations and develop tailored strategies to address the energy demand and transition challenges faced by different countries in the Mediterranean region. This includes implementing energy efficiency measures, promoting renewable energy sources, and adopting sustainable energy policies that align with the specific needs and conditions of each shore.

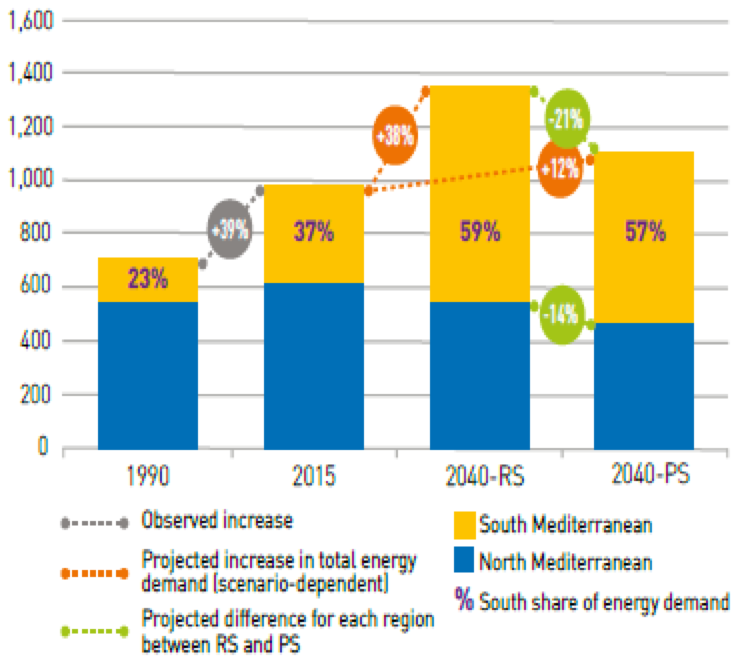

Figure 2: Primary energy demand by region in megatons of oil equivalent (RS: Reference Scenario, PS: Proactive Scenario)

The energy transition in the Mediterranean region exhibits contrasting trends between the northern and southern/eastern countries. The northern countries have made considerable progress in their transition path, with notable achievements in renewable energy adoption and effective demand-side management. As a result, the energy demand in the North Mediterranean has decreased by 8% since 2010.

This decline in energy demand can be attributed not only to energy efficiency efforts but also to factors such as moderate population growth and decelerating gross domestic product growth, particularly following the 2008 monetary crisis. Both scenarios, the Reference Scenario (RS) and Proactive Scenario (PS), project a continuation of this decreasing trend in energy demand for the North Mediterranean region until 2040. By that time, energy demand is expected to be 10% lower in the RS and 23% lower in the PS, compared to the levels recorded in 2015.

On the other hand, the southern and eastern Mediterranean countries have experienced sustained economic and population growth, leading to an increase in energy demand by 6% since 2010. In both the RS and PS, energy demand is projected to continue rising in these regions, with significant growth rates of 118% and 72% from 2015 levels, respectively.

However, it is worth noting that in the Proactive Scenario (PS), which emphasizes proactive energy policies and measures, energy savings of 21% are anticipated compared to the energy demand forecasts in the Reference Scenario. This highlights the importance of adopting proactive measures and implementing energy efficiency and renewable energy initiatives to mitigate the growth in energy demand and promote sustainable development in the southern and eastern Mediterranean countries.

5. Challenges for Sustainable Development in the Mediterranean

The Mediterranean region is currently facing water scarcity and issues related to high water exploitation and regional groundwater depletion. Climate change projections indicate that water availability in the Mediterranean could decrease by 10-30% locally under a 2°C climate scenario.

Regional groundwater depletion is already a concern in the Mediterranean and is also emerging as an issue in other parts of Europe.

In the Mediterranean Basin, indicators for progress towards the Sustainable Development Goals (SDGs) reflect various transformative changes[21]. While there are positive trends in sustainability, particularly in sectors like energy, there are significant imbalances between the northern and southern shores of the basin regarding most SDGs[22]. In the coming decades, the Mediterranean Basin is expected to witness sustained growth in renewable energy investments, accompanied by a shift in regional energy demand patterns. However, the future pathways for development, potential solutions, and feasible system transformations could face constraints

[21] Sachs, J. et al., 2019: Sustainable Development Report 2019. Bertelsmann Stiftung and Sustainable Development Solutions Network (SDSN), New York, NY, USA. Available at: https://sdgindex.org/reports/sustainable-development-report-2019/ (accessed 16/10/2020)
[22] UNEP/MAP, 2016: Mediterranean Strategy for Sustainable Development 2016-2025. Valbonne. Plan Bleu, Regional Activity Centre, 84 pp. Available at: https://planbleu.org/sites/default/files/publications/mssd_2016-2025_final.pdf (accessed 31/10/2020).

due to multiple factors impacting several SDGs. These factors include social conflicts, limited regional governance, insufficient action capacity, and financial constraints.

Achieving sustainable development requires decoupling economic growth from resource depletion, placing the economy at the core of water-energy (WE) Nexus management schemes. It is important to recognize that decision-makers are not always resource managers, thereby highlighting the governance challenges associated with the WE Nexus. To promote an integrated approach that addresses complex trade-offs and challenges related to WE resource security, the global community must engage stakeholders from the Nexus arena, empower them in decision-making processes and analyses, and address power and gender imbalances. Raising awareness of the Nexus among actors in governance systems is critical for achieving adequate governance, which will lead to successful strategic vision and efficient resource management.

6. Existent master programmes

The HEIs partners in this project have an existent master programme but their aim to create an innovative master WE Nexus.

Partner	Institution		Existing master	Input
UNIVGB	National Engineering school Mechanical Engineering Department	Gabes	Master on Energetic Engineering	• Students with an engineering degree in Electrical Engineering • Students with a bachelor's degree in electrical engineering • Students with a bachelor's degree in Hydro-Electromechanical Engineering
	National Engineering school Electrical Engineering Department	Gabes	Intelligent Systems & Renewable Energies	• Students with an engineering degree in mechanical engineering • Students with a bachelor's degree in mechanical engineering, • Students with a bachelor's degree in energy engineering
	Higher Institute of Water Sciences and Techniques Water resources department	Gabes	Water and environment	• Students with an engineering degree in water engineering • Students with a bachelor's degree in water engineering • Students with a bachelor's degree in drilling engineering •students with a bachelor's degree in hydro-electromechanical engineering
	Higher Institute of Water Sciences and Techniques Water resources Department	Gabes	Aquifer (groundwater) system	• Students with an engineering degree in water engineering

				• Students with a bachelor's degree in water engineering • Students with a bachelor's degree in drilling engineering • Students with a bachelor's degree in hydro-electromechanical engineering
Partner	**Institution**		**Existing master**	**Input**
UPV	Higher Technical School of Industrial Engineers	Valencia	Master's Degree in Energy Technology for Sustainable Development	• Students with Electrical Engineering or Technical Industrial Engineering have direct access • Graduates with similar degrees will have to complete additional training consisting of certain subjects from the electrical engineering department. Each case will be individually analyzed by the master's Academic Committee.
	Higher Technical School of Industrial Engineers	Valencia	Master's degree in industrial engineering	• Direct access to industrial engineering graduates • Students with bachelor's degrees in Energy, Chemistry, Mechanical Engineering, Electrical and Electronic Engineering, and Automation.
	Department of Hydraulic Engineering and Environment	Valencia	Master's Degree in Hydraulic Engineering and Environment.	• Students from Civil, Industrial, Chemical, Hydraulic, and Sanitary Engineering. • Studies in the field

				of Agricultural and Forestry Engineering. • Studies in Environmental Engineering or Environmental Sciences.
Partner	**Institution**		**Existing master**	**Input**
CNAM	National Higher School of Arts and Crafts - Arts and Crafts Campus of Paris.	Paris	Master's degree in Energy.	
	CentraleSupélec - Paris-Saclay Campus.	Paris	Master's degree in Energy.	• Aeronautics and space. • Mechanical, automatic, energetic. • Energy processes. • Thermal sciences
	National Higher School in Industrial Technology Engineering, University of Pau and the Adour Region.	Pau	Master's degree in Energy.	• Control systems and electrical energy. • EUR (European University of Research) energy, fluids, and interfaces. • Energy management.
	Faculty of Basic and Applied Sciences - Futuroscope Site, University of Poitiers.	Poitiers	Master's degree in Energy.	• Control systems and electrical energy. • EUR (European University of Research) energy, fluids, and interfaces. • Energy management.
	Faculty of Science and Engineering, UT3 University of Toulouse III - Paul Sabatier.	Toulouse	Master's degree in Energy.	• Fluid dynamics, energetics, and transfers. • Housing engineering. • Modeling and simulation in mechanical and energy engineering (MSME).
	Faculty of Science and Technology, University of	Nancy	Master's degree in Energy.	• Energy processes. • Mechanical energy.

	Lorraine.			
	Faculty of Science and Technology, Paris-Est Créteil University Val-de-Marne.	Créteil	Master's degree in Energy.	• Building energetics or Building energy. • Sustainable energy engineering. • Energy mediation.
	AgroParisTech - Montpellier Center.	Montpellier	Master's in Water Sciences.	• Water and agriculture. • Water and society.
	Faculty of Science and Technology, University of Limoges.	Limoges	Master's in Water Sciences.	• Water development and engineering. • Water and environmental engineering and management.
	Agro Institute Rennes Angers - Rennes Campus.	Rennes	Master's in Water Sciences.	• Hydrogeology, hydrobiogeochemistry, hydropedology.
	Faculty of Sciences of Montpellier, University of Montpellier.	Montpellier	Master's in Water Sciences.	• Contaminants - water – health. • Water and agriculture. • Water and coastal areas. • Water and society. • Water – resource. • Wise.
	Faculty of Science and Technology, University of Franche-Comté.	Besançon	Master's in Water Sciences.	• Knowledge, management, and development of continental aquatic environments. • Engineering for the restoration of environments and water resources.