

**Summary of the
Second Global Symposium on Water and Energy:
Towards a Green Economy**

Canal de Isabel II, Madrid, Spain

12-14 June 2024

Acknowledgements

The 2nd Global Symposium on Sustainable Water and Energy Solutions was organized by the United Nations Department of Economic and Social Affairs (UN DESA) in collaboration with the members of the Global Sustainable Water and Energy Solutions Network, and was graciously hosted by Canal de Isabel II in Madrid, Spain. Profound gratitude is extended to Canal de Isabel II and the Government of Madrid for their exceptional hospitality and support. The leadership of Canal de Isabel II was instrumental in guiding the event, while the professionalism, commitment, and hospitality of its staff ensured its success. The Government of Madrid also played a crucial role in facilitating this global event. The strong commitment shown by the members of the Global Sustainable Water and Energy Solutions Network was vital throughout the event. The success of the Global Symposium was significantly enhanced by the insightful and knowledgeable contributions of the panelists from all regions of the world, who shared their valuable experiences and engaged actively with the audience.

Summary Second Global Symposium on Sustainable Water and Energy Solutions: Towards a Green Economy Canal de Isabel II, Madrid, Spain, 12-14 June 2024

The Second Global Symposium on Sustainable Water and Energy Solutions, convened by the United Nations Department for Economic and Social Affairs (UNDESA) in collaboration with members of the Global Sustainable Water and Energy Solutions Network and hosted by Canal de Isabel II in Madrid, included plenary sessions during the 12th and 13th of June 2024. During these two days, this event successfully provided a platform for all stakeholders to discuss and disseminate knowledge, exchange experiences, and showcase best practices on integrated approaches to water and energy.

With around 300 participants attending in person, the symposium brought together representatives from governments, international organizations, businesses, civil society, practitioners, and academia from all world regions. It featured over 60 expert panelists, fostering a truly global dialogue on effective policy, technical, and managerial approaches to water and energy, supporting the global transition towards a green economy and sustainable development.

On the first day, the presentations and discussions centered on water and energy access, highlighting the strong interdependence of these two factors and the development and use of integrated water and energy systems. Experts also discussed models for management and governance, addressing sustainable strategies and means of implementation, including critical issues of cost, investment, and international cooperation. The critical issue of water tariffs was thoroughly analyzed particularly for the case of Spain. The presentations from panelists from different world regions reflected the large variety of challenges faced by policy makers coming from developing countries versus developed countries and from rural and urban areas.

On the second day, the focus shifted to addressing issues related to circular economy, water and terrestrial ecosystems, biodiversity and climate change. Experts also addressed challenges resulting from increasing negative impacts from climate change. Additionally, experts discussed innovative systems and digitalization that tackle the water-energy nexus and the critical role integrated water and energy systems and management play in pursuing social wellbeing, economic prosperity and ultimately sustainable development.

The discussions demonstrated the broad range of challenges and opportunities regarding the water-energy nexus covering potential synergies and negative trade-offs in all aspects of resource management, production and use and its social, economic and environmental impact. Experiences and knowledge shared from a diverse set of countries, including **Belgium, Brazil, Ethiopia, Ghana, Guatemala, India, Kenya, Malaysia, Nepal, Norway, Paraguay, Peru, the Philippines, Portugal, Spain, Sudan and the United States of America** underlined the complexity of the water-energy nexus, but also revealed the many benefits that integrated approaches can bring, ranging from local communities to cross-country and regional cooperation.

The discussions at the Symposium brought to the fore **key messages** including:

- **Sustainable water and energy solutions are key to the attainment of the entire 2030 Agenda for Sustainable Development and the Paris Agreement on climate change and are critical to the transition to a global Green Economy.** Without integrated sustainable water and energy programmes and systems, many of our global objectives - such as poverty eradication, climate change and sustainable development - cannot be realized. We must work towards equitable, efficient and sustainable use and management of water and energy resources for all, in support of human well-being, ecosystem integrity and a robust, inclusive green economy.
- **Addressing water and energy issues remains an immense global challenge with wide-ranging consequences for people, prosperity and the planet.** Today, 2.2 billion people lack access to safely managed drinking water services, and 675 million people lack access to electricity. Notably, the world's most vulnerable communities in the world often lack access to both proper water and energy services.

The discussions at the Global Symposium underlined **the need to:**

1. **Promote water and energy cross-sectoral management,** including institutional arrangements to increase synergies, minimize negative trade-offs and support circular economies. It is important to keep in mind the need for strong and effective management of water and terrestrial ecosystems and biodiversity - coordinated at the global level.
2. **Strengthen enabling environments** by establishing a long-term vision, coherent forward-looking policies and regulations, and improving institutional capacities for planning, implementation and monitoring. Public and private partnerships are critical to ensure the sustainability of water and energy resources.
3. **Catalyze finance and investment** to scale up and accelerate the deployment of solutions through such measures as price reforms, fiscal incentives, and appropriate market-based mechanisms. Defining the appropriate level of tariff represent a major challenge.
4. **Invest in innovative solutions,** including the uptake of proven technological solutions and new technologies that hold significant potential for supporting circular and green economies. In particular, innovative processes to achieve full use of regenerative water and hydroelectric storage are essential to support circular economies.
5. **Address asymmetries in the perception of water and energy in most world regions.** Energy is considered a valuable service that demands investment, data, and innovation. In contrast, water tends to be seen as a fundamental right and is often perceived as a free commodity. This disparity in perception affects their respective market values and influences how resources and efforts are allocated towards their management and distribution.
6. **Strengthen international cooperation and collaboration** in all stages of planning, implementation, and monitoring of sustainable water and energy

solutions building on best practices and processes. Promoting effective dialogue across different sectors and countries at all stages helps to identify synergies, improve management of shared natural resources and maximize benefits in support of the SDGs.

7. **Enhance knowledge-sharing and capacity building** by identifying, collecting and disseminating best practices, engaging experts and a broad range of stakeholders involved in water and energy solutions. The collection, compatibility and accessibility of data on the water-energy nexus needs to be enhanced. Global events like this symposium represent an opportunity for participants to learn and adapt proven and successful experiences in other regions as appropriate.

From the discussions, it is clear that the **Global Sustainable Water and Energy Solutions Network contributes significantly to addressing some of these needs by providing a global platform for all stakeholders to enhance capacities, share experiences and increase commitment to integrated approaches on SDG 6 and SDG 7, thereby supporting the achievement of the SDGs. The Network should be further strengthened and expanded to continue:**

1. **Supporting the increase of capacities** of subnational and national governmental institutions and relevant stakeholders to effectively manage the water-energy nexus and interlinkages with other SDGs.
2. **Facilitating access to and sharing of** evidence-based knowledge, quality data and objective analysis.
3. **Conducting global outreach and advocacy activities** on integrated water and energy solutions.

The **cooperation between UNDESA and Canal de Isabel II** has provided a strong support for the continued success and worldwide recognition of the Global Sustainable Water and Energy Solutions Network and this cooperation should be continued and enhanced in the future.

To maintain and accelerate the momentum created by the Global Symposium on Sustainable Water and Energy Solutions, there is a need for continued engagement and cooperation of all stakeholders in implementing capacity development events, including convening the **Third Global Symposium on Sustainable Water and Energy Solutions in 2026.**

On behalf of UNDESA and the Global Sustainable Water and Energy Solutions Network, We would like to express our **sincere gratitude to Canal de Isabel II** for its generous support and for kindly hosting this second Global Symposium, which was excellently organized and successfully implemented.

Thank you.

INSTITUTIONAL OPENING SESSION

Master of Ceremony: Mr. Roberto Brasero

Overview and Key Messages:

The opening session of the symposium served as a high-level introduction to the event's objectives. Mr. Mariano González, CEO of Canal de Isabel II, provided welcome remarks, followed by Mr. Minoru Takada, Team Leader of Climate and Energy at UNDESA. An informational video by Canal de Isabel II highlighted the remarkable journey of managing water resources for Madrid and its surrounding municipalities. The keynote remarks were delivered by Dr. Mario Alonso Puig, a renowned surgeon and motivational speaker. The session emphasized the strong potential of adopting a nexus approach to water and energy issues to advance the 2030 sustainable development goals.

Speaker Notes:

Mr. Mariano González, CEO, Canal de Isabel II, welcomed participants and acknowledged the presence of various dignitaries including government officials and multistakeholders across the water and energy sectors. González emphasized the historical and strategic importance of Canal de Isabel II, which has been serving the region for 173 years, and highlighted its commitment to sustainable water management. He introduced the critical role of transparent tariffs in ensuring financial stability and promoting responsible water usage. González also underscored the significance of educating the public on the value of water, integrating the water cycle into ecosystems, and advancing digitalization and innovation in water management. He concluded by stressing the importance of collective responsibility and collaboration to ensure that water and energy resources remain abundant and accessible, reinforcing the need for sustainable and efficient management practices to meet future challenges.

Mr. Minoru Takada, Team Leader of Climate and Energy, UNDESA, welcomed participants and expressed gratitude to Canal de Isabel II and the Comunidad de Madrid for their leadership and support. He highlighted the challenges in meeting the 2030 Agenda and the Paris Agreement objectives. Takada emphasized the strong interlinkage between water and energy and their connection to environmental issues, including climate change and biodiversity. He praised Canal de Isabel II's leadership in managing water resources efficiently and generating clean energy, aligning with global sustainable development goals. Takada acknowledged the strengthened Global Network on Sustainable Water and Energy Solutions, now recognized globally for promoting integrated approaches to water and energy. He highlighted the partnership's role in advancing SDGs on water and energy, facilitating access to knowledge, and building capacities at various governance levels.

A video presentation by Canal de Isabel II highlighted the remarkable journey of Canal de Isabel II in managing water resources for Madrid and its surrounding municipalities. It recounted the history from the 19th century to today's extensive network of 18,000 kilometers of pipelines. The video illustrated the process of ensuring clean water for nearly 7 million people, emphasizing the work of over 3,000 professionals committed to sustainability and efficiency. It showcased the comprehensive water cycle management from collection to purification and recycling, and the use of technology to monitor and maintain water quality. The video concluded with a reminder that every glass of water symbolizes progress and sustainability in the community.

SESSION 1: SUSTAINABLE WATER ACCESS AND WATER-ENERGY INTEGRATED SYSTEMS

SUB-SESSION 1.1: WATER ACCESS/AVAILABILITY WORLDWIDE

Overview and Key Messages:

The moderator of this session was Ms. **Soledad Llamas, Deputy Director of Internal Audit, Canal de Isabel II**. This session addressed the global challenges and innovative solutions for ensuring sustainable access to water and the generation of energy associated with water systems. Experts shared their insights on the efficiency and sustainability of water management practices and the integration of water and energy resources. The discussions highlighted the need for continuous innovation, technological advancements, and international cooperation to ensure sustainable water and energy systems for future generations. Key messages emphasized the importance of stakeholder engagement and the sharing of best practices to tackle global water and energy challenges effectively.

Speaker Notes:

Ms. Belén Benito, COO, Canal de Isabel II, Spain, presented the water management model of Canal de Isabel II, emphasizing strategic planning, hydraulic efficiency, and the integration of complementary resources. She highlighted the organization's success in reducing water consumption despite a growing population through advanced technologies and efficient management practices. Benito also showcased initiatives aimed at improving water quality and ensuring long-term sustainability.

Mr. Rubén Fernandes, CEO, Águas e Energia do Porto, Portugal, discussed the strategic initiatives implemented in Porto to minimize unbilled water and promote the use of recycled water. He outlined the significant improvements in water management and sustainability achieved through these strategies, including a pilot project for water recycling used in cleaning public spaces. Fernandes stressed the importance of public awareness and community involvement in achieving water conservation goals.

Mr. Rubén Ruiz, COO, Agbar, Spain, emphasized the importance of continuous innovation and efficiency in water management to ensure a sustainable supply. He presented successful case studies where innovative technologies and efficient practices have positively impacted water availability and quality. Ruiz also discussed the role of public-private partnerships in advancing water management solutions.

Ms. Anita Bohara, Environmental Engineer, Godawari Municipality, Nepal, highlighted the challenges faced by Godawari Municipality in Nepal, such as urbanization and water quality issues. She discussed the local practices and policies adopted to improve water access, including community-based initiatives and sustainable water management practices. Bohara emphasized the need for education and capacity-building programs to empower local communities.

Mr. Luis Luque, Production Manager, EMASESA, Spain, presented the water management practices in Seville, focusing on sustainability and climate adaptation. He highlighted the measures taken to ensure a reliable water supply in response to changing climatic conditions, including the development of robust infrastructure and efficient resource management. Luque also discussed the importance of integrating climate resilience into water management strategies.

Mr. Guillermo Maisch Molina, Director, SEDAPAL, Peru, discussed the water management strategies in Lima, Peru, one of the driest cities globally. He emphasized the development of infrastructure for water storage and distribution during drought periods and the ongoing challenges due to population growth and water stress. Maisch Molina also highlighted the importance of community engagement and sustainable practices in ensuring water security, and shared innovative approaches to water conservation and efficiency.

Mr. Marcelo Medeiros, Director, ANA, Brazil, provided insights into Brazil's policies and regulations for sustainable water and energy management. He emphasized the integration of water and energy resources to address Brazil's diverse climatic and geographical challenges, focusing on innovative policies and strategic planning to ensure sustainability. Medeiros also shared examples of successful water management projects and the role of regulatory frameworks in promoting sustainability.

Q&A Session:

The Q&A began with a discussion on the use of non-conventional resources to manage water scarcity, with active participation from both the audience and panelists. The moderator posed questions that initiated an interactive dialogue. Audience members shared innovative approaches, such as treated wastewater and desalination technologies. Panelists elaborated on the technical and economic feasibility of these solutions, emphasizing the importance of tailored approaches based on local contexts. Further questions covered strategies for engaging local communities in water management. Audience members highlighted the success of participatory approaches and local leadership, while panelists stressed the need for education, capacity-building programs, and community involvement. Discussions also addressed ensuring the sustainability of water and energy projects in the face of climate change, with a focus on integrating climate resilience into water management plans, robust infrastructure, and continuous monitoring. Panelists provided examples of projects that have successfully incorporated climate resilience measures, highlighting innovative technologies and strategic planning as key factors.

SUB-SESSION 1.2: ENERGY GENERATION ASSOCIATED WITH WATER

Overview and Key Messages:

Moderated by **Ms. Lourdes Vega, Full Professor at Khalifa University in Abu Dhabi, United Arab Emirates,** this session focused on the integration of energy generation with water systems as a crucial solution for enhancing the efficiency and sustainability of energy and water supply systems. Experts from various regions discussed technologies and methods for generating energy by optimizing water resources, sharing experiences, and best practices on renewable energies related to water management. Presentations highlighted strategic planning, technological advancements, public awareness, and the importance of international cooperation to address these challenges. Key messages emphasized the importance of integrating renewable energy sources, enhancing energy efficiency, community-based approaches, local manufacturing, climate resilience, and robust data and predictive tools to inform policy and decision-making.

Speaker Notes:

Mr. Gregorio Arias, Energy Deputy Director, Canal de Isabel II, emphasized the long-standing commitment of Canal de Isabel II to the integration of water and energy management.

He discussed the historical development of hydroelectric power within the company and the current strategies to enhance energy efficiency and digitalization. Arias highlighted the company's goal to achieve 100% self-generated energy by 2030 through increased use of renewable sources such as solar power and biogas.

Mr. Miguel Aritio, Energy Resources Director, Acciona Agua, Spain, discussed the integration of renewable energy in water treatment plants operated by Acciona Agua. He emphasized the importance of using photovoltaic panels to reduce energy costs and improve efficiency in water treatment processes. Aritio highlighted the potential for significant energy savings and environmental benefits by integrating renewable energy sources in water infrastructure.

Ms. Dipti Vaghela, Manager, Hydro Empowerment Network, HPNET, Asia, shared insights into rural electrification through small-scale hydropower projects in Asia. She discussed the importance of community-based approaches and local manufacturing in the development of these projects. Vaghela emphasized the need for integrating water and energy solutions to enhance rural livelihoods and promote sustainable development.

Ms. Hazir Farouk Elhaj, Associate Professor, University of Science & Technology, Sudan, presented the challenges and solutions for optimizing water and energy resources in Sudan. She highlighted the use of solar-powered irrigation systems and hybrid desalination technologies to improve water access in remote areas. Elhaj also discussed the importance of community involvement and the development of local solutions to ensure sustainability.

Mr. Peter Burek, Senior Research Scholar, IIASA, International, discussed the role of modeling and simulation in understanding the future impacts of climate change on water and energy resources. He highlighted the importance of integrated water and energy management strategies and the need for robust data and predictive tools to inform policy and decision-making. Burek emphasized the increasing frequency of extreme weather events and their implications for water and energy systems.

Mr. Julio Paredes, Coordinator Director, ITAIPU, Paraguay, highlighted the significant achievements of ITAIPU in integrating water and energy management. He discussed the strategic partnership between Paraguay and Brazil and the role of ITAIPU in providing clean and renewable energy. Paredes emphasized the importance of environmental and social responsibility in the company's operations and the ongoing efforts to protect biodiversity and support local communities.

Q&A Session:

The Q&A began with a discussion on integrating water and energy resources to enhance sustainability and efficiency. Both the audience and panelists participated actively, sharing innovative approaches and successful implementations from their regions. Panelists elaborated on the technical and economic feasibility of different solutions and emphasized tailored approaches based on local contexts and continuous innovation. Further discussions covered engaging local communities and integrating climate resilience into water management plans. Panelists and audience members highlighted the importance of robust infrastructure, continuous monitoring, adaptation, and strategic planning.

SESSION 2: GOVERNANCE, MANAGEMENT MODELS AND INTERNATIONAL COOPERATION

SUB-SESSION 2.1: MODELS OF MANAGEMENT AND GOVERNANCE, INTERNATIONAL COOPERATION

Overview and Key Messages:

The moderator of this session was **Mr. Fernando Arlandis, Deputy Managing Director at Canal de Isabel II**. This session focused on different models of governance and international cooperation in water management. Experts from various regions and organizations shared their experiences and best practices, emphasizing the importance of effective governance, stakeholder participation, and international collaboration to address global water challenges. Presentations covered diverse aspects of water governance, including regulatory frameworks, financial sustainability, public-private partnerships, and the integration of innovative technologies. Key messages underscored the need for transparent governance, robust regulatory bodies, community engagement, and leveraging technology to improve water management systems. The discussion highlighted water tariffs in Spain, the public's awareness of the real cost of water, and the international perspectives on water governance.

Speaker Notes:

Ms. Macamen Tejera, General Secretary, Canal de Isabel II, highlighted the governance model of Canal de Isabel II, focusing on the integration of public policies and corporate strategies to ensure sustainable water management. She discussed the importance of transparency, stakeholder engagement, and regulatory compliance in achieving effective governance. Tejera presented several best practices of Canal, including a transparent tariff structure that promotes public trust and financial stability, stakeholder engagement through regular consultations and participatory decision-making processes, strict regulatory compliance to ensure high-quality services and environmental protection, and leveraging advanced technologies like digital water meters and real-time monitoring systems for enhanced efficiency.

Mr. Mariano Blanco, Executive Committee member and General Assembly Representative of Spain, EurEau, Belgium, emphasized the need for a national regulatory body in Spain to ensure consistency and quality in water services. He presented examples from European countries where national regulators have successfully harmonized tariffs and service standards, contributing to better investment and innovation in the sector. Blanco highlighted Belgium's national water regulator as a model, which has led to improved service delivery and customer satisfaction.

Mr. Guillermo Cao, CFO, EMASA, Spain, discussed the governance structure of EMASA, the municipal water company of Málaga. He highlighted the benefits of having a council that includes representatives from all political parties, which enhances transparency and accountability. Cao also addressed the challenges of inter-municipal cooperation and the importance of adapting governance models to local contexts. He cited EMASA's collaborative projects with neighboring municipalities as a successful example of regional water management.

Mr. Manuel Menéndez, Former Water Director in the Spanish Ministry for Ecological Transition, Spain, provided insights into the complexities of managing droughts in Spain. He explained the different indicators used to monitor drought conditions and the various plans

implemented at the basin, municipal, and national levels to mitigate the impacts of water scarcity. Menéndez emphasized the need for coordinated governance across different levels of authority. He illustrated this with the example of Spain's National Drought Plan, which has improved water allocation during drought periods.

Ms. Sofía Tirado, Research Fellow, Elcano Royal Institute, shared findings from a recent survey on Spanish citizens' perceptions of climate change and water conservation. She discussed the factors influencing people's willingness to adopt water-saving behaviors and the importance of public awareness and education in promoting sustainable water management practices. Tirado highlighted the success of public awareness campaigns in increasing water-saving behaviors, particularly in urban areas. She also mentioned the public's lack of awareness regarding water tariffs and how this affects their perception of the true value of water and its conservation efforts.

Ms. Julie Perkins, Programme Management Officer, GWOPA, UN-HABITAT, discussed the principles of good water governance as outlined by the OECD. She emphasized the importance of integrity, transparency, and innovative governance practices to ensure effective water management. Perkins also highlighted the role of international cooperation and partnerships in addressing global water challenges. She cited GWOPA's Water Operators' Partnerships (WOPs) as a successful initiative, fostering peer-to-peer learning and capacity building among water operators worldwide.

Ms. Peter Støa, Vice President Research, SINTEF Energy, Norway, provided an overview of SINTEF's research on the integration of water and energy systems. He discussed the potential for using digital technologies and data analytics to enhance the efficiency and resilience of water and energy infrastructure. Støa emphasized the importance of cross-sectoral collaboration and innovation in addressing the interlinked challenges of water and energy management. He presented SINTEF's Smart Water project, which uses real-time data to optimize water distribution and energy use.

Q&A Session:

The Q&A session began with discussions on enhancing governance models to improve water management efficiency. Panelists elaborated on the challenges and opportunities of implementing effective governance practices, emphasizing the need for tailored approaches and continuous innovation. Questions covered topics such as the role of national regulators, the integration of digital technologies, and strategies for engaging local communities in governance processes. Panelists highlighted the importance of transparency, stakeholder participation, and robust regulatory frameworks in achieving sustainable water management. Discussions also touched on the need for international cooperation and the sharing of best practices to address global water challenges. The issue of low water tariffs in Spain was discussed, with emphasis on public awareness of the real cost of water and the financial implications for infrastructure investment.

SUB-SESSION 2.2: PRICE AND VALUE: TARIFFS, SERVICE FINANCING AND INVESTMENTS

Overview and Key Messages:

The moderator of this session was **Mr. Salvador Marín, European Federation of Accountants and Auditors for SMEs (EFAA), Spain**. This session explored the economic

aspects of water and energy services, focusing on tariffs, service financing, and investments. It emphasized the role of appropriate tariffs in achieving economic efficiency, environmental sustainability, and social equity. Presentations highlighted various strategies for financing water services and the importance of investment in sustainable management. Key messages included the necessity of transparent pricing, investment in infrastructure, and the need for international cooperation to support sustainable water management practices.

Speaker Notes:

Ms. Humbelina Vallejo, Commercial Services Deputy Director, Canal de Isabel II, discussed the tariff structure of Canal de Isabel II and its impact on service financing and sustainability. She highlighted the importance of transparent tariffs that reflect the real cost of water services, which helps in achieving financial stability and encourages responsible water usage. Vallejo also presented Canal de Isabel II's approach to customer engagement and the use of technology to enhance billing accuracy and efficiency.

Mr. Kepa Odriozola, President, Consorcio Aguas de Bilbao – CABB, Spain, emphasized the evolution of water tariffs in Spain and their impact on water service sustainability. He noted that while tariffs in Spain have increased significantly over the years, they are still lower compared to other European countries. Odriozola highlighted the need for continuous investment in infrastructure and the importance of setting tariffs that cover the full cost of water services, including maintenance and future upgrades.

Mr. Pablo Sánchez, Senior Loan Officer, European Investment Bank, Luxembourg, provided insights into the role of the European Investment Bank (EIB) in financing water projects. He discussed the criteria for EIB funding, which include sustainability, innovation, and social impact. Sánchez presented examples of successful EIB-funded projects that have improved water infrastructure and service delivery in various regions. He emphasized the importance of aligning financial strategies with environmental and social goals.

Ms. Irene Ngunjiri, Director, Water Governance and Innovation Hub, Strathmore University, Kenya, focused on the water-energy nexus in Kenya and the challenges of financing water services in developing countries. She highlighted the role of tariffs in promoting economic efficiency and sustainability and discussed various innovative financing mechanisms. Ngunjiri presented case studies from Kenya where effective tariff structures and investment strategies have led to improved water service delivery and sustainability.

Ms. Rosse Dubón, Institutional Strategic Planning Director, EMPAGUA, Guatemala, shared the challenges and strategies of EMPAGUA in managing water services in Guatemala. She discussed the tariff structure and its role in financing water services, emphasizing the need for regular tariff adjustments to cover operational costs. Dubón presented EMPAGUA's efforts to secure both national and international funding for infrastructure projects and highlighted the importance of transparent and fair pricing for water services.

Mr. Pascual Fernández, Professor, Rey Juan Carlos University (URJC), Spain, provided an academic perspective on the value and pricing of water. He discussed the economic principles underlying water tariffs and the importance of setting prices that reflect the true cost of water provision. Fernández highlighted the disparity between the low tariffs in Spain and the actual cost of water services, advocating for a regulatory framework that ensures fair and sustainable pricing.

Mr. Ramiro Angulo, Water Director, Junta de Andalucía, Spain, discussed the water management strategies of the Junta de Andalucía, focusing on the integration of conventional and non-conventional water resources. He emphasized the need for comprehensive planning and investment in infrastructure to ensure water availability and sustainability. Angulo highlighted the role of tariffs in funding these investments and ensuring the long-term sustainability of water services.

Q&A Session:

The Q&A session began with discussions on the necessity of setting appropriate water tariffs to ensure financial sustainability and service quality. Audience members and panelists actively participated, sharing insights and experiences from different regions. Topics included the challenges of implementing tariff adjustments, the role of regulatory frameworks, and strategies for engaging stakeholders in the tariff-setting process. Panelists emphasized the importance of transparent pricing, investment in infrastructure, and the need for innovative financing mechanisms to support sustainable water management. The discussion also touched on the impact of low tariffs on service quality and the need for international cooperation to address these challenges.

SESSION 3: CIRCULAR ECONOMY, ECOSYSTEMS AND CLIMATE CHANGE

SUB-SESSION 3.1: CIRCULAR ECONOMY: USE OF BYPRODUCTS, REGENERATED WATER, ENERGY GENERATION, AND OTHERS

Overview and Key Messages

This session, moderated by **Mr. Mariano Oliveros, Deputy Director General, Strategy and Air Quality, Community of Madrid**, delved into the principles of the circular economy and how they can be applied within the water sector. Discussions centered on the innovative use of byproducts, the regeneration of water, and energy generation. Panelists emphasized the importance of reducing waste, reusing resources, and recycling materials to achieve sustainable development. They shared examples from their respective fields, illustrating successful implementations of circular economy practices. Key messages highlighted the necessity of integrating these principles into policy frameworks and the potential economic benefits of adopting a circular economy approach.

Speaker Notes

Mr. Miguel A. Gálvez, Wastewater Treatment Deputy Director, Canal de Isabel II, highlighted the importance of integrating circular economy principles in wastewater treatment. He discussed the innovative approaches Canal de Isabel II has adopted to reduce waste and recycle materials. Specific examples included the use of biogas from wastewater treatment processes and the production of fertilizers from recovered phosphorus. He also emphasized the role of advanced technology in enhancing the efficiency and sustainability of these processes, noting significant reductions in operational costs and environmental impact.

Mr. Enrique Hernández, Sustainability, Risks, and Management Systems Director, Aqualia, presented on Aqualia's commitment to sustainability through the implementation of circular economy practices. He emphasized the company's efforts in recycling wastewater for agricultural use and reducing the environmental impact of their operations. Hernandez also discussed the importance of public-private partnerships in advancing these initiatives. He

provided insights into ongoing projects that have successfully integrated circular economy principles, resulting in improved resource efficiency and resilience against climate change.

Ms. Doris Agbevivi, Energy Analyst, Energy Commission, Ghana, shared insights into how Ghana is incorporating circular economy principles into its energy sector. She focused on the country's strategies for using wastewater in energy generation and the development of renewable energy sources. Agbevivi highlighted specific projects where waste-to-energy technologies are being implemented successfully. She also underscored the importance of community engagement and education in promoting the adoption of sustainable practices and ensuring long-term project success.

Mr. Raúl González, O&M Network Director, Acciona Agua, discussed Acciona Agua's approach to circular economy in the management of water networks. He elaborated on the use of advanced technologies to optimize water reuse and reduce waste. González provided examples of successful projects where regenerated water is used for industrial and agricultural purposes, demonstrating significant environmental and economic benefits. He also highlighted the challenges faced in scaling these initiatives and the strategies employed to overcome them, emphasizing the need for continuous innovation and collaboration.

Ms. Andrea Bolaños, Sustainability Director, ASAZGUA, Guatemala, focused on the role of the circular economy in the sugar industry in Guatemala. She highlighted ASAZGUA's initiatives to recycle byproducts and improve water efficiency in sugar production. Bolaños shared case studies illustrating how these practices not only enhance sustainability but also contribute to economic growth and community development. She emphasized the importance of aligning corporate sustainability goals with community needs and the role of policy support in driving widespread adoption of circular economy practices.

Q&A

During the Q&A session, discussions centered around practical challenges and solutions in implementing circular economy principles in the water sector. Audience members posed questions about specific technologies for waste reduction and water reuse. Panelists and audience members shared insights on successful case studies, highlighting the importance of innovation, collaboration, and public awareness. The session concluded with a consensus on the critical role of circular economy practices in achieving sustainable water management and reducing environmental impact. Panelists also addressed questions on the scalability of these initiatives in different contexts and the potential for replication in other sectors, stressing the importance of tailored approaches and local partnerships.

SUB-SESSION 3.2: WATER AND TERRESTRIAL ECOSYSTEMS: BIODIVERSITY, FOREST, NATURE-BASED SOLUTIONS

Overview and key messages

This session, moderated by **Ms. Irene Aguiló, Biodiversity Managing Director, Community of Madrid Government**, focused on the vital relationship between water and terrestrial ecosystems, including biodiversity, forests, and nature-based solutions. The panel explored how sustainable water management is intertwined with ecosystem health, emphasizing the importance of biodiversity conservation. The discussions underscored the critical role of

protected areas and innovative management practices in maintaining ecosystem services and resilience against climate change impacts.

Speaker Notes

Mr. Pedro Blázquez, Circular Economy Deputy Director, Canal de Isabel II, highlighted Spain's rich biodiversity, with 85,000 species and a significant portion of land covered in forests and protected areas. He detailed Canal de Isabel II's efforts in renaturalizing spaces, controlling invasive species, and improving water quality through advanced wastewater treatment processes. These initiatives support local biodiversity and ecosystem health.

Mr. José Luis Rodríguez Gamo, COIM Dean, Spain, focused on the human-water relationship, discussing historical perspectives on water management and its impact on ecosystems. He emphasized the need for modern strategies to mitigate environmental degradation and promote sustainable practices, drawing on examples from Spain's protected areas and their role in preserving biodiversity.

Ms. Natália Resende, Secretary, SEMIL, Sao Paulo, Brazil, shared São Paulo's comprehensive climate strategy, highlighting mitigation and adaptation efforts. She outlined projects such as the Climate Adaptation and Resilience Plan, emphasizing the integration of nature-based solutions, the expansion of protected areas, and innovative financing mechanisms to support biodiversity and climate resilience.

Mr. Francisco Dallmeier, Senior Scientist, Former CCS Director, Smithsonian Institution, USA, discussed global biodiversity hotspots and the crucial role of integrated water management in sustaining these regions. He provided examples from the Amazon and Mekong basins, illustrating how collaborative efforts and nature-based solutions can enhance biodiversity, mitigate climate impacts, and support sustainable development.

Mr. Enrique Sola, Hydropower Generation Director, Iberdrola, Spain, presented Iberdrola's initiatives in balancing hydropower generation with biodiversity conservation. He highlighted successful projects in Spain and Portugal where environmental monitoring committees ensure the integration of biodiversity considerations into hydropower operations. These efforts include habitat restoration and collaborative programs with local communities and environmental organizations.

Q&A Session

The discussion highlighted advancements in regenerated water use and future plans for expanding its application to support ecosystems and biodiversity. It was noted that public education on the safety and benefits of regenerated water is essential. The effective coordination of water resources in Europe -and the case of Madrid- was mentioned as a potential model for other regions. Emphasis was placed on the need for capacity-building in developing countries through international cooperation and educational exchanges. The session concluded with a call for global collaboration to enhance water and energy management, stressing the importance of integrating management training into environmental sciences education and adopting holistic approaches to sustain ecosystems and biodiversity.

SUB-SESSION 3.3.: CLIMATE CHANGE: IMPACTS, ADAPTATION AND MITIGATION

Overview and Key Messages:

The session, moderated by **Mr. Jaime Flores, Deputy Director of R&D at Canal de Isabel II**, focused on the multifaceted impacts of climate change on water and energy systems. The discussion highlighted the increased frequency and intensity of extreme weather events, the resulting challenges in urban drainage and water management, and the urgent need for adaptive and mitigative strategies to address these impacts. The panelists emphasized the importance of integrating innovative technologies, nature-based solutions, and comprehensive climate resilience plans to safeguard water resources and ensure sustainable energy supplies.

Speaker Notes:

Mr. Antonio Lastra, Innovation Development Head at Canal de Isabel II, discussed the paradox of urban drainage under climate change, explaining that although rainfall is decreasing overall, its intensity is increasing, leading to more frequent and severe urban flooding. He presented data showing how peak rainfall intensity is expected to rise significantly by the end of the century, necessitating both conventional and nature-based drainage solutions to manage increased runoff and pollution.

Mr. Jerónimo Puertas, professor at Universidad de A Coruña, Spain, elaborated on future challenges in urban drainage management. He stressed the importance of high-resolution flood mapping and early warning systems. He also highlighted the need for sustainable urban drainage systems (SUDS) to complement traditional drainage infrastructure, emphasizing that these systems play a crucial role in controlling both flooding and pollution.

Ms. Ivonne Lobos, Senior Expert at SEI Latin America, presented three key strategies for adapting to climate change: securing financing for climate adaptation, developing projects that go beyond infrastructure, and adopting multisectoral approaches. She shared examples of successful initiatives in Colombia, emphasizing the importance of community involvement and context-specific solutions.

Mr. Luis Miguel Paiz, Board Member at ICC, Guatemala, discussed the heightened vulnerability of Central America to climate change. He highlighted the role of the Institute for Climate Change in developing adaptation strategies, focusing on water management, forest conservation, and building community resilience. He stressed the importance of measuring and reducing carbon and water footprints to mitigate climate impacts.

Ms. Karen García, Water Supply Operations Officer at Maynilad Water Services, the Philippines, detailed the severe impacts of climate change on water utilities, such as increased turbidity and reduced water availability. She outlined Maynilad's adaptation and mitigation measures, including diversifying water sources, improving treatment processes, and aiming for carbon neutrality by 2037 through reforestation and renewable energy initiatives.

Q&A Summary:

The Q&A session revolved around the challenges and strategies for managing water resources and ecosystems in the face of climate change. Panelists discussed the integration of climate resilience into water management plans, emphasizing the necessity for robust infrastructure and continuous adaptation. The importance of public education on climate change impacts and the role of international cooperation in building capacity and sharing best practices were also highlighted. The session concluded with a call for global collaboration to enhance water and energy management, stressing the need for innovative and sustainable approaches to protect ecosystems and ensure water security.

SESSION 4: WATER AND ENERGY FOR SUSTAINABLE DEVELOPMENT

SUB-SESSION 4.1: INNOVATIVE SYSTEMS AND DIGITALIZATION (14:30 – 15:45)

Overview and key messages

This session, moderated by **Mr. Javier Fernández, Telemetry Deputy Director, Canal de Isabel II**, explored the intersection of digitalization and sustainability within the water-energy nexus. The panel featured industry leaders who shared insights on innovative systems and the role of digital transformation in enhancing efficiency and sustainability in water management. Discussions highlighted the importance of integrating advanced technologies such as AI, telemetry, and digital twins to optimize operations and reduce environmental impact. The session underscored the potential of digital solutions to drive sustainable development and improve resource management.

Speaker Notes

Mr. Juan Sánchez, Innovation and Engineering Director, Canal de Isabel II, emphasized the integration of digital technologies within Canal de Isabel II. He highlighted the implementation of strategic plans to reduce non-revenue water and energy consumption. Sánchez shared success stories of reducing water losses from 20% in 2010 to 4% in 2023 through digitalization and innovative monitoring systems. He also discussed the company's commitment to energy savings, not just for cost reduction but for environmental sustainability, through comprehensive digital monitoring of energy consumption.

Mr. Carlos Carazo, Chief Product and Technology Officer, Telefónica, Spain, discussed the application of digital technologies in water management. Carazo provided examples of how Telefónica leverages IoT and AI to optimize water usage and enhance operational efficiency. He emphasized the role of connectivity and data integration in creating smarter water systems that can respond dynamically to changing conditions. Carazo highlighted Telefónica's initiatives in developing sustainable telecommunication networks and reducing the environmental footprint of their operations.

Mr. David Pozo, CEO Process Automation & Director Digital Enterprise, SIEMENS Digital Industries, Spain, presented on the transformative potential of digital twins in the water sector. He explained how these virtual models can simulate and optimize real-world operations, leading to significant improvements in efficiency and sustainability. Pozo shared case studies of digital twin implementations that have resulted in enhanced performance and reduced environmental impact. He also highlighted Siemens' role in enabling technological solutions across various sectors, emphasizing the importance of partnerships in driving innovation.

Mr. Anshuman, Director, Water Resources Division, TERI, India, focused on the challenges and opportunities of digitalization in water resource management in developing countries. He highlighted TERI's initiatives in using digital tools to improve water governance and distribution efficiency. Anshuman stressed the importance of technology transfer and capacity building to ensure that digital innovations benefit all stakeholders, especially in resource-constrained settings. He provided examples of successful projects that have leveraged ICT and sensor technologies to enhance water management practices.

Mr. Hal Turton, Energy Economist, IAEA (International), discussed the interplay between digital technologies and energy efficiency in water management. Turton highlighted the role of digital solutions in optimizing energy use in water systems, thereby reducing operational costs and environmental footprint. He provided examples of international best practices where digitalization has led to significant improvements in energy efficiency and resource management. Turton emphasized the importance of international cooperation and shared learning in advancing sustainable water and energy solutions.

Q&A Session

The Q&A session addressed various aspects of digitalization in water management. Panelists and the audience discussed the integration of AI and machine learning in predicting water demand and detecting leaks. Questions from the audience focused on the scalability of digital solutions in different geographic and economic contexts, and the potential barriers to implementing these technologies. Panelists highlighted the need for robust data infrastructure, investment in technology, and collaboration between public and private sectors to overcome these challenges. The session concluded with a consensus on the critical role of digital innovation in achieving sustainable water management and the importance of continuous learning and adaptation in this rapidly evolving field.

SUB-SESSION 4.2: SUSTAINABLE DEVELOPMENT: SOCIAL AND ECONOMIC DIMENSIONS

Overview and key messages

This session, moderated by **Mr. Javier Cordero, Independent Director of the Board and Member of the Sustainability Committee at Canal de Isabel II**, focused on the critical role that sustainable and integrated water and energy management plays in promoting social development and economic prosperity. Participants shared their insights from various geographical and professional perspectives, emphasizing the importance of sustainable practices for long-term benefits. The session underscored the necessity of public-private partnerships, community involvement, and technological innovation to achieve sustainable development goals.

Speaker Notes

Mr. Antonio Montoto, Commercial Relationship Deputy Director, Canal de Isabel II, Spain, discussed the social impact of Canal de Isabel II's initiatives in water management, emphasizing the importance of accessibility and affordability of water services. He highlighted successful programs that provide social exemptions and flexible payment plans, benefiting large families and vulnerable populations. Montoto noted that Canal's social assistance program ensures responsible water usage and supports the community in various ways, including educational workshops. He concluded by emphasizing the need for continued efforts to promote water conservation and sustainability through community engagement.

Mr. Samson Tsegaye, Director, Solar Energy Foundation, Ethiopia, presented the progress and future goals of solar energy projects in Ethiopia. He noted that the majority of the rural population lacks access to electricity, and small-scale solar projects could significantly improve living conditions. He stressed the need for governmental support to prioritize renewable energy solutions over internal conflicts, aiming to enhance rural electrification and reduce maternal and infant mortality through solar-powered health facilities. Tsegaye highlighted the success of

solar energy in improving educational outcomes by providing reliable lighting for study and school activities.

Ms. Alice Jipius, Executive Director, Tonibung, Malaysia, focused on the community-based model for renewable energy projects in indigenous communities. She explained how involving the community from the start through training and empowerment ensures the sustainability of these projects. By maintaining their own power systems, communities experience liberation and empowerment, which supports their social and economic development. Jipius shared examples of successful projects that have led to improved livelihoods and increased local capacities for managing energy resources.

Mr. Rodrigo Cupelli, Environmental Education Analyst, ITAIPU, Brazil, shared ITAIPU's initiatives in environmental education and sustainable development. He highlighted the expansion of recycling units and the integration of sustainable practices in municipalities. ITAIPU aims to increase these efforts by 30-40% in the next five years to support vulnerable populations and promote environmental stewardship. Cupelli also emphasized the importance of partnerships with local governments and communities to enhance the impact of these initiatives and ensure long-term sustainability.

Ms. Rocío Aquize Díaz, Director, Perucaña/UNALA, Latin America, outlined the technological advancements in irrigation practices within the agricultural sector in Peru. She emphasized the importance of sustainable water usage in agroindustries and the significant investments required to achieve a 64% technologized irrigation rate. This objective is crucial for enhancing agricultural productivity and ensuring water sustainability. Díaz also discussed the role of international cooperation and funding in supporting these technological advancements and achieving broader sustainability goals.

Mr. Edoard Schaffrath, Mayor, Naranjal Municipality, Paraguay, discussed the goals for water management and infrastructure improvements in Naranjal Municipality. The focus is on providing clean and potable water, adapting municipal infrastructure, and addressing waste treatment challenges. These efforts aim to improve living conditions and promote economic development at the local level. Schaffrath highlighted successful initiatives in public-private partnerships that have enhanced the municipality's capacity to manage water resources and improve service delivery.

Q&A Session:

The Q&A session began with a discussion on the intersection of sustainable development and economic prosperity. Panelists addressed questions about governance, community involvement, and the importance of technological innovations in achieving sustainability goals. Audience members and panelists engaged in a dialogue on the social and environmental impacts of sustainable practices, emphasizing the need for inclusive policies and cross-sectoral cooperation. The discussion also highlighted successful case studies and best practices from different regions, providing practical insights into implementing sustainable solutions. The session underscored the significance of collaborative efforts in advancing sustainable development, particularly through community-based initiatives, public-private partnerships, and technological advancements, and the need for continuous investment and policy support to maintain momentum and achieve long-term sustainability goals.

CLOSING SESSION

SYMPOSIUM SUMMARY

Ms. Nadine Salame, Secretariat Global Sustainable Water and Energy Solutions Network, UNDESA, presented a short draft summary of the Second Global Symposium on Sustainable Water and Energy Solutions, highlighting the event as a valuable platform for stakeholders to exchange knowledge and solutions. She emphasized the complexity of the water-energy nexus and the critical need for integrated systems to support sustainable development. The symposium featured around 300 participants, including representatives from governments, international organizations, businesses, civil society, and academia from over 20 different countries. Over 60 expert panelists shared insights on effective policy, technical, and managerial approaches to water and energy, contributing to a global dialogue aimed at advancing a green economy. Key takeaways included promoting cross-sectoral management, strengthening enabling environments, catalyzing finance and investment, and fostering international cooperation. The summary also proposed continuous engagement and collaboration among stakeholders to achieve the Sustainable Development Goals (SDGs).

2024 CAPACITY DEVELOPMENT EVENT IN GUATEMALA

Mr. Alfredo Vila, President, ASAZGUA, expressed his sincere gratitude to UNDESA, Canal de Isabel II and the Government of Madrid for their support and hospitality. He emphasized the importance of practical actions and shared responsibility in addressing global water and energy issues. Vila highlighted the need for global leaders to instill a sense of responsibility in every individual, emphasizing simple yet impactful actions like conserving water and energy. He also announced that Guatemala will host the next capacity development event on October 16-17, inviting all participants to attend in Antigua, a culturally significant and historic city.

CLOSING

Mr. Carlos Novillo, Minister of Environment, Agriculture and Interior, Community of Madrid and President of Canal de Isabel II, highlighted the historical significance of the Canal de Isabel II theaters where the Symposium took place. He expressed pride in leading the 173-year-old public company that has significantly contributed to Madrid's water management. Novillo emphasized Canal de Isabel II's innovative efforts in ensuring sustainable water supply for nearly seven million residents, underscoring the importance of long-term planning and investment in infrastructure. He discussed the company's strategies to minimize water loss and invest in energy self-sufficiency by 2030. Novillo stressed the need to remain vigilant and proactive in managing water resources, likening each glass of water to the extensive effort behind it. He thanked UNDESA, Canal de Isabel II, and all participants, and expressed support for continuing this global cooperation. He also encouraged attendees to enjoy the following day's technical visits to key water management sites and looked forward to future engagements.