

2014
OVERARCHING
CONCLUSIONS

**WORLD
WATER
WEEK**
in Stockholm,
August 31-September 5, 2014

Key collaborating partners



SUSTAINABLE
ENERGY FOR ALL

World Water Week is organised by



STOCKHOLM INTERNATIONAL
WATER INSTITUTE



World Water Week
in Stockholm

ENERGY AND WATER

Energy and Water for Development

We are closing the books on a hugely successful World Water Week in Stockholm. During the week, we welcomed over 3,000 participants from more than 140 countries.

With increased income levels in many countries, a growing world population, and intensified competition for our finite water resources, it has become ever more urgent to understand the links between energy and water so that we can fully develop synergies, strengthen much needed partnerships, and develop smarter solutions for using water more efficiently in the future. The results of our work will have consequences for all humanity. With this we strongly feel that 2014 World Water Week managed to take a few steps in the right direction.

During the Week four teams, each consisting of two lead and five junior rapporteurs, covered all workshops and seminars, over 100 in all, and in these pages you will read about the messages and recommendations that were distilled from the presentations and discussions. The reporting from the week has been divided into four themes: *Equitably Balancing Competing Demands*; *Managing Energy and Waters across Borders*; *Integrating Water and Energy Policy*; and *Responding to Global Change*. The rapporteurs' findings are preceded by SIWI's own conclusions.

Exploring this year's theme of energy and water has equipped us very well for next year, when we will focus on water for development. Access to modern energy and clean water is fundamental for human development, and we hope that new insights and collaborations will prove useful when we move



Photo: Thomas Henrikson

into 2015. It is a year of tremendously important decisions – on a new development agenda as well as on climate – that will steer our global future.

Herewith I present you with the *Overarching Conclusions* from the 2014 World Water Week. Enjoy the read!

Mr. Torgny Holmgren
Executive Director
Stockholm International Water Institute

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CONVENING ORGANISATIONS

2030 WRG	2030 Water Resources Group	The Coca-Cola Company	
3GF Secretariat	Global Green Growth Forum Secretariat	CONAGUA	National Water Commission, Mexico
7th World Water Forum Secretariat		Conrad N. Hilton Foundation	
A, B, C, D		CRS	Catholic Relief Services
A4A	Aqua for All	CSD Engineers	
AA	Federal Foreign Office, Germany	CWC	Columbia Water Center at Columbia University
ABDIB	Brazilian Association of Infrastructure and Basic Industries	Delta Alliance	
ADB	Asian Development Bank	DFID	Department for International Development, UK
adelphi		DGIS	Directorate-General for International Cooperation, The Netherlands
AEii	The Applied Energy Innovation Institute	DHI	
AFD	French Development Agency	DIE	Deutsches Institut für Entwicklungspolitik
AFEID-ICID	Agence Francaise pour l'Eau, l'Irrigation et le Drainage	DWA	German Association for Water, Wastewater and Waste
Africa AHEAD		DWFI	Daugherty Water for Food Institute
Agualimpia-Suizagua		E, F, G, H	
AGWA	Alliance for Global Water Adaptation	E.ON	
Alstom		Earthwatch	
AMCOW	African Ministers' Council On Water	Eawag	
ANEAS	Asociación Nacional de Empresas de Agua y Saneamiento	EC	European Commission
ANU	Australia's National University	EDF	Electricité de France
ASI	Adam Smith International	eFlowNet	Global Environmental Flows Network
AUC	African Union Commission	Elsevier	
AUSA	Association of the U.S. Army	EPM	Empresas Públicas de Medellín
AWF	African Water Facility	ESA	European Space Agency
AWS	Alliance for Water Stewardship	Eskom	Eskom Holdings SOC Limited
BCC	Benguela Current Commission	ETH Zürich	Swiss Federal Institute of Technology Zürich
BEF	Bonneville Environmental Foundation	EWRI	Environmental and Water Resources Institute
BGR	Federal Institute for Geosciences and Natural Resources, Germany	FAO	Food and Agriculture Organization of the United Nations
BMUB	Federal Ministry for the Environment, Nature Conservation, Building and Nuclear, Germany	FDFA	Federal Department of Foreign Affairs, Germany
BMZ	Federal Ministry for Economic Cooperation and Development, Germany	FEMSA Foundation	
BORDA	Bremen Overseas Research & Development Association	First Climate Markets AG	
Botswana DWA	Department of Water Affairs, Botswana	Forest Trends	
BPD	Building Partnerships for Development in Water and Sanitation and Sanitation and Hygiene Applied Research for Equity	Fortum	
BuZa	Ministry of Foreign Affairs, The Netherlands	FWF	Finnish Water Forum
CAALCA	Water Center for Latin America and the Caribbean	FWP	French Water Partnership
CAF	Development Bank of Latin America	GSMA	GSM Association
Cap-Net UNDP		Gates Foundation	Bill & Melinda Gates Foundation
CARE	CARE International	GDF SUEZ	
CAREC	Regional Environmental Center for Central Asia	GE	General Electric
CEDARE	Center for Environment and Development for the Arab Region and Europe	German WASH Network	
CEDREN	Centre for Environmental Design of Renewable Energy	GETF	Global Environment and Technology Foundation
Ceres		GIWEH	Global Institute for Water, Environment and Health
cewas	International Centre for Water Management Services	GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
China Europe Water Platform		GlashusEtt	
China Water Risk		Government of Hungary	
CI	Conservation International	Government of the Netherlands	
CIRAD	French Agricultural Research Centre for International Development	GPOBA	Global Partnership on Output-Based Aid
Circle of Blue		Green Cross International	
CNSS	China Node for Sustainable Sanitation	Group E	
		Growing Blue	
		GSF	The Gold Standard Foundation
		GTO	German Toilet Organization

GU	Georgetown University	KAU	University of Karlstad
GWC	Global Water Challenge	KfW	KfW Development Bank
GWOPA	Global Water Operators' Partnerships Alliance at UN-Habitat	KVA	Royal Swedish Academy of Science
GWP	Global Water Partnership	K-water	Korea Water Resources Corporation
HKR	Kristianstad University	LI	Lahmeyer International GmbH
HSBC		M, N, O, P	
I, J, K, L		MAE	French Ministry of Foreign Affairs
IADB	Inter-American Development Bank	MDBA	Murray-Darling Basin Authority
IASS	Institute for Advanced Sustainability Studies	Ministry for Foreign Affairs, Finland	
ICA	The Infrastructure Consortium for Africa	Ministry of Energy and Water Resources, Republic of Tajikistan	
ICIMOD	International Centre for Integrated Mountain Development	Ministry of the Environment, Sweden	
ICMM	International Council on Mining and Metals	Ministry of Environment, Water and Forests, Ivory Coast	
ICPDR	International Commission for the Protection of the Danube River	Ministry of Water Resources, China	
ICRAF	The World Agroforestry Centre	Ministry of Water Resources of the Republic of Iraq	
iDE	International Development Enterprises	MRC	Mekong River Commission for Sustainable Development
IEC	International Energy Centre	MUK	Makerere University
IenM	Ministry of Infrastructure and the Environment, The Netherlands	NamWater	Namibia Water Corporation
IFAD	International Fund for Agricultural Development	NDU	National Defense University
IFRC	International Federation of Red Cross and Red Crescent Societies	Nestlé	
IHA	International Hydropower Association	NGS	National Geographic Society
IIASA	International Institute for Applied Systems Analysis	NMBU	Norwegian University of Life Sciences
IIED	International Institute for Environment and Development	NRDC	National Resources Defense Council
IISD	International Institute for Sustainable Development	NWP	Netherlands Water Partnership
Imperial	Imperial College London	OECD	Organisation for Economic Cooperation and Development
IMTA	Mexican Institute of Water Technology	Oxfam	
IPIECA	The Global Oil and Gas Industry Association for Environmental and Social Issues	Pacific Institute	
IRC	IRC International Water and Sanitation Centre	PepsiCo	
IRD	Institut de Recherche pour le Developpement	PHG	The Palestinian Hydrology Group
IRENA	International Renewable Energy Agency	PISCES Foundation	
ISSA	International Strategic Studies Association	Plan International	
ITAIPU	Itaipu Binacional	Q, R, S, T	
ITC		Quantis	
ITESM	Tecnológico de Monterrey	Rebel	Rebel Group
IUCN	International Union for Conservation of Nature	RIHN	Research Institute for Humanity and Nature
IWA	International Water Association	Rockefeller Foundation	
IWC	International Water Centre	RTI	RTI International
IWMI	International Water Management Institute	RWSN	Rural Water Supply Network
Jain Irrigation	Jain Irrigation Systems Ltd	Sabesp	
JMP	World Health Organization/United Nations Children's Fund Joint Monitoring Programme	SABMiller	
JRC	European Commission – Joint Research Centre	Safe Water Network	
Justicia Hidrica		Sandec	
		Sanergy	
		SDC	Swiss Agency for Development and Cooperation
		SE4All	Sustainable Energy for All
		SEA	Swedish Energy Agency
		SEI	Stockholm Environment Institute
		SHARE	Sanitation and Hygiene Applied Research for Equity
		Sida	Swedish International Development Cooperation Agency

SIWI	Stockholm International Water Institute	UNU	United Nations University
Skat		UNU-EHS	United Nations University Institute for Environment and Human Security
SLU	Swedish University of Agricultural Sciences	UNU-FLORES	United Nations University – Institute for Integrated Management of Material Fluxes and of Resources
SoPAS		UNU-INWEH	United Nations University-Institute for Water, Environment and Health
SRC	Stockholm Resilience Centre	UN-Water	
STWI	Sweden Textile Water Initiative	UNW-DPAC	UN-Water Decade Programme on Advocacy and Communication
SUEN	Turkish Water Institute	UNW-DPC	UN-Water Decade Programme on Capacity Development
SuSanA	Sustainable Sanitation Alliance	US Department of State	
SWA	Sanitation and Water for All	USAID	United States Agency for International Development
SwAM	Swedish Agency for Marine and Water Management	USIP	U.S. Institute of Peace
Swedish Red Cross		USSC	United States Studies Centre at the University of Sydney
SWH at SIWI	Swedish Water House at SIWI	USWP	US Water Partnership
Swiss TPH	Swiss Tropical and Public Health Institute	WASTE	
SWP	Swiss Water Partnership	Water for People	
TAMU	Texas A&M University	WaterAid	
TED-Lesotho	Technologies for Economic Development	WaterLex	
The Stimson Center		Vattenfall	
TNC	The Nature Conservancy	WB	World Bank Group
U, V, W, X, Y, Z		WBCSD	World Business Council for Sustainable Development
UAE	The Abdel Malik Al Saadi University	VEI	Vitens Evides International
UKZN	University KwaZulu-Natal	Veolia	
UMU	University of Umeå	Wetsus	
UN DESA	United Nations Department of Economic and Social Affairs	WFN	Water Footprint Network
UN-ESCWA	United Nations Economic and Social Commission for West Africa	WfW	Women for Water Partnership
UNC	The Water Institute at University of North Carolina	WGF at SIWI	UNDP Water Governance Facility at SIWI
UNDP	United Nations Development Programme	WHO	World Health Organization
UNDP GAIN	UNDP Global Anti-corruption Initiative	Wilson Center	Woodrow Wilson Center International Center for Scholars
UNECE	United Nations Economic Commission for Europe	WIN	Water Integrity Network
UNEP	United Nations Environment Programme	WLE	CGIAR Research Program on Water, Land and Ecosystems led by IWMI
UNEP-DHI	UNEP-DHI Centre for Water and Environment	WRC	Water Reserach Commission
UNESCO	United Nations Educational, Scientific and Cultural Organization	WRI	World Resources Institute
UNESCO-IHE	UNESCO – Institute for Water Education	WSP	Water and Sanitation Program
UNESCO-IHP	UNESCO International Hydrological Programme	WSSCC	Water Supply and Sanitation Collaborative Council
UNFCCC	United Nations Framework Convention on Climate Change	WULCA	
UNGC CEO Water Mandate	United Nations Global Compact CEO Water Mandate	WUR	Wageningen University
UN-Habitat	United Nations Human Settlements Programme	WWAP	World Water Assessment Programme
UNICEF	United Nations Children’s Fund	WWC	World Water Council
UNIDO	United Nations Industrial Development Organization	WWF	World Wide Fund for Nature
UNIGE	University of Geneva	WWFKNC	The National Committee for the 2015 World Water Forum Korea
UNIOESTE	Universidade Estadual do Oeste do Parana	WYN	Water Youth Network
University of Dundee		XMU	Xiamen University
UNOSD	United Nations Office for Sustainable Development	Xylem	
UNSGAB	United Nations Secretary General’s Advisory Board on Water and Sanitation		



Photo: Cecilia Österberg, Exray

PRIZES AND AWARDS

STOCKHOLM WATER PRIZE

Professor John Briscoe of South Africa received the 2014 Stockholm Water Prize for his unparalleled contributions to global and local water management, and for his unwavering commitment to improving the lives of people on the ground. Prof. Briscoe gave numerous thought-provoking lectures during the Week and discussed critical issues with journalists and fellow water experts. On September 4, H.M. King Carl XVI Gustaf of Sweden presented the prize to Prof. Briscoe during a Royal Award Ceremony at Stockholm's City Hall, followed by the Royal Banquet.

Stockholm Water Prize is the world's most prestigious water prize and is awarded annually to individuals and organisations who contribute to conserving the world's water resources and improving the health of humans and ecosystems.

www.siwi.org/prizes/stockholmwaterprize

STOCKHOLM JUNIOR WATER PRIZE

Ms. Hayley Todesco from Canada won the 2014 Stockholm Junior Water Prize for inventing a method that uses sand filters to treat oil contaminated water. Ms. Todesco accepted the prize from H.R.H. Crown Princess Victoria of Sweden during an award ceremony at Stockholm's Grand Hôtel on September 3. A Diploma of Excellence was awarded to Orawan Thasanabenjakul, Pannawat Peanjad and Natthanicha Jairungsr from Thailand. National teams from 29 countries took part in this year's international final.

Stockholm Junior Water Prize gathers the world's brightest young minds for an outstanding competition in the capital of Sweden.

www.siwi.org/prizes/stockholmjuniorwaterprize

STOCKHOLM INDUSTRY WATER AWARD

eThekwini Water and Sanitation, serving the Durban metropolitan area, received the Stockholm Industry Water Award at a ceremony on September 2, for its transformative and inclusive approach to providing water and sanitation. The jury stated that "the methods used and results achieved by eThekwini Water and Sanitation serve as a sterling example for the many communities worldwide facing similar challenges."

Stockholm Industry Water Award honours business sector contributions to wise use and management of water.

www.siwi.org/prizes/stockholmindustrywateraward



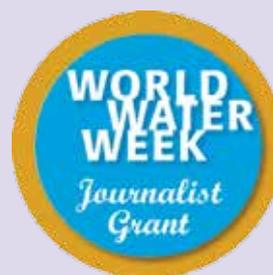
BEST POSTER AWARD

Mr. Dimitris Mentis from the Royal Institute of Technology, Sweden, received the 2014 Best Poster Award during the Closing Plenary session for his poster “Desalination Units using Renewable Energy Sources on the Arid Islands of Greece”. The jury highlighted that the poster was well suited to this year’s theme of Energy and Water and that the research performed has great practical applicability in other arid island situations.

World Water Week workshop abstracts are presented as posters on digital screens in the exhibition area. The most informative, innovative and well-designed poster is awarded with the Best Poster Award.

WORLD WATER WEEK JOURNALIST GRANT

Five journalists from as many countries were awarded the 2014 World Water Week Journalist Grant. They travelled to Stockholm to network with leading water and energy experts and report on the critical issues discussed during the Week.



The grant winners were:

- **Ms. Ugochi Anyaka**, Nigeria
- **Mr. Shiba Nanda Basu**, India
- **Ms. Doreen Chilumbu**, Zambia
- **Mr. Amantha Perera**, Sri Lanka
- **Mr. Martin Ssebuyira**, Uganda

www.siwi.org/media/world-water-week-journalist-grant



WASH MEDIA AWARDS

During the Closing Plenary session, seven journalists received the 2014 WASH Media Awards for their excellence in reporting on the often neglected issues of drinking water, sanitation and hygiene.

The journalists are:

- **Mr. Marcelo Leite**, Brazil: “The Battle of Belo Monte”
- **Mr. Seun Aikoye**, Nigeria: “Lagosians Shun Public Toilets as Open Defecation Continues”
- **Mr. Umaru Sanda Amadu**, Ghana: “Water Wahala”
- **Ms. Mbali Chiya**, South Africa: “Human Rights to Water and Sanitation”

- **Ms. Ketaki Gokhale**, USA and **Ms. Natasha Khan**, Canada: “No Menstrual Hygiene For Indian Women Holds Economy Back”
- **Ms. Dilrukshi Handunnetti**, Sri Lanka: “Sri Lankan Girls Miss out on Sanitation Gains”

The biannual WASH Media Awards competition is sponsored by Stockholm International Water Institute (SIWI) and the Water Supply and Sanitation Collaborative Council (WSSCC).

www.siwi.org/media/wash-media-awards

OVERARCHING CONCLUSIONS

ENERGY AND WATER

Understanding of linkages is central

Water and energy are closely interdependent. At the same time they rely on vastly different institutional frameworks, policy settings and governance structures. The energy sector is to a large extent market-based, run by private companies acting on global and national markets. The water sector on the other hand is dominated by public, small utilities acting within regulated markets at the local, municipal level.

While water is needed for almost all forms of energy production, such as cooling, biofuels and hydropower, energy is an important component in the extraction, treatment and transportation of water. Restraints in one of the resources will often affect the other. Therefore, there is an increasing recognition of the importance to understand the energy-water linkages and strengthen collaboration between the two communities. Without sustainable energy and water management we cannot satisfy basic human needs, produce food for a growing population and achieve sustainable growth.

To successfully develop the water-energy synergies to their full potential, we must take action on several fronts. There is no silver bullet. We need to build an understanding of the overarching water and energy picture and make the effort of better understanding the critical linkages, in order to efficiently address the multitude of challenges we face. Unintended consequences of energy development for water, and vice versa, often have their roots in fragmented policies, e.g. energy subsidies contributing to unsustainable groundwater overdraft through excessive pumping.

Further it is essential to translate local knowledge into global policy. The 2014 Stockholm Water Prize laureate Professor John Briscoe argues that policy must be formed by practice. And the same is valid for the other direction: global policy must be formulated in a way that allows it to be applied on the local level.

There are, however, substantial differences between the energy and water sectors, not only in how they are structured, but in how they are perceived. And here the water community finds room for development: to counter the challenge of increasing water demand we must manage it in a far smarter way. There is a need to create a raised general awareness of water efficiency and sustainability.

How to use less water smarter

Water efficiency was brought forward during World Water Week as one of the most useful tools to combat poverty and hunger worldwide. The discussion started with a call from a number of leading water, environment and resilience experts, urging the United Nations not to miss a chance to eradicate hunger and poverty for billions of people living in regions with variable and scarce rainfall. They said that without better management of rainwater, the Sustainable Development Goals currently being discussed are unrealistic.

Some concrete suggestions on more effective water use were put forward during the week:

- Biofuel crops could be grown in areas that rely on rain rather than irrigation. It would not only reduce pressure on water resources, but there would be less need for energy to pump water for irrigation.
- Encourage more water reuse. Today more than 80 per cent of wastewater globally is discharged untreated, polluting rivers, lakes and coastal areas.
- Move away from flushing toilets. A dry toilet would cut average household water consumption by 30 per cent.
- Extract energy from sludge. Rapidly growing cities depend on reliable energy and water supply, but must try to reduce demands, manage trade-offs and optimise resource use by re-use, recycling and generation of energy from waste, all in an integrated urban management context:
- In water scarce areas, desalinate.

Better water efficiency in the energy sector would also free up water for other uses such as manufacturing industry, agriculture and domestic withdrawals.

As a logical continuation of the discussion about the need for efficiency, comes the debate on water valuation. The starting point is a recognition of the human rights to access to safe and affordable drinking water and adequate sanitation. However, since water used by households accounts for only some ten per cent of total water withdrawals, universal access to safe water and proper sanitation is a matter of resources, governance and priority rather than a consequence of water scarcity. Especially for the remaining 90 per cent (energy, industry, and agriculture) it is necessary to increase the incentives for using the water resource more wisely and productively. And here is an

opportunity to learn from the energy community: while the tools for energy appreciation is understood by most – it is monetarised – the same is not true for water. The discussion is starting if and how water pricing could be one of many tools for stimulating more effective use of water.

A water goal

During World Water Week, SIWI launched the Stockholm Statement in a new form. Five films accompanied by thematic papers show how a dedicated Sustainable Development Goal (SDG) on water and clear links to water in other SDGs is a unique opportunity to holistically address our world's water related challenges. This would also avoid potentially fragmented and unsustainable solutions which can increase competition between different water users.

Though there seems to be a strong support for a water goal by member states in the United Nations, nothing is set until the final decision in 2015, and the message from the water community must be clear: we will finish what we started.

Special attention must also be put on the implementation of the future SDGs. We must ensure that goals and targets are deliverable, that they can translate into action on the ground, and that indicators and measures are sufficiently fine-tuned.

Deals for our future

2015 will be a year of decisions that will steer our future. The UN General Assembly will decide on sustainable development goals within the Post-2015 Agenda.

With the 21st Conference of the Parties to the UN Climate Convention (COP 21) in Paris we hope to see a new climate deal take shape. Another related meeting is the UN World Conference on Disaster Risk Reduction that will take place in Sendai, Japan in March 2015.

Those events and conferences all underscore the strong connection between energy and water management, resilience and climate change.

Increasing water scarcity and variability pose great risks to energy production. Water resource management is key to climate adaptation and sustainable water use is a prerequisite for building resilience and developing climate friendly energy solutions.

Water, or the lack of it, such as floods and droughts have helped form a growing recognition of the need for urgent action on climate change. As a key component both for the success of mitigation and adaptation efforts, water should be integrated in the Sendai and Paris agreements and the knowledge of water practitioners should inform the policy making.

Climate change and disaster risk reduction must be addressed in the context of sustainable development and the need for building long term resilience. Therefore the negotiations on a new set of SDGs and a new climate agreement must be carried forward in a coherent manner.

In both processes, we will need leadership, on a global and national levels, that is courageous and bold enough to do the job. And once and for all, we need to break out of silos.

Meet, think and act together

The urgent need for a closer relationship between the energy and water communities was discussed and encouraged during World Water Week. The global view must be paired with the local. We must create and facilitate interaction, let the science, policy and practice communities meet and draw knowledge from each other. It is an issue going well beyond the water and energy communities. It is central to our common efforts to eradicate extreme poverty and our concern for all of humanity.



Photo: Mikael Ullén

EQUITABLY BALANCING COMPETING DEMANDS

Lead Rapporteurs

- ▶ Prof. Gustaf Olsson, Lund University, Sweden
- ▶ Ms. Dawn McGregor, China Water Risk, Hong Kong

Junior Rapporteurs

- ▶ Mr. Godwin Chinemerem, Safe Water & Sanitation Embassy, Nigeria
- ▶ Mr. Luca Di Mario, University of Cambridge, UK
- ▶ Mr. Elwain Edgardo Fiallos Lopez, Zamorano Panamerican Agricultural School, Honduras
- ▶ Ms. Sachiko Ishihara, Uppsala University, Sweden
- ▶ Mr. Jonas Torrens, Stockholm Resilience Centre



Energy and Water: For what and by whom?

Resource constraints, be it due to water scarcity or water quality issues, are already impacting the functioning of water and energy systems. Moreover, with the global demand for water expected to increase by 55 per cent between 2000 and 2050, and electricity demand expected to increase by 50 per cent by 2030, there is an urgent need to achieve an equitable balance between the competing demands for water and energy.

The consensus among delegates and speakers was that the energy community holds sway in current discussions with governments and other stakeholders but that leaders from the energy sector are beginning to realise the need to balance their demands with those of the water sector. The results of a survey of CEOs by the Global Electricity Initiative, revealed during World Water Week, showed that 60 per cent of energy industry leaders now consider water availability as their number one challenge.

The global population is getting thirstier, hungrier and more demanding. An increase in urban populations and migration to cities, in particular, is putting greater competing demands on water and energy than ever before and obliging national governments, business leaders and local community representatives to balance water and energy demands to assure water, energy and food security for all.

Some positive reflections are that there are already some water for energy initiatives in existence, including the World Bank's Thirsty Energy initiative and the use by international energy company Shell of the World Resources Institute's Aqueduct tool. Electricité de France (EdF) is leading an ambitious international

programme, Water for Energy Framework, paving the way for the development of a conceptual framework of energy impacts on water. The results will be launched at the World Water Forum in April 2015. Still more needs to be done to integrate the two sectors.

What is clear is that the future of water and energy is cross-sectoral and a multi-stakeholder approach is vital given that the water-energy nexus affects everyone from rural smallholder farmers to urban dwellers. Novel initiatives revealed during the week showed how solar power is being used to pump water for smallholder farms with revenues being raised from using the solar power to recharge mobile phones to make the system financially viable.

In terms of developing a strategy for the water-energy nexus, a flexible framework is needed as it can reduce the complexity of the nexus by providing global guidelines but allow for local tailoring and requirements, as delegates had heard many times during World Water Week that water is both a national and local issue. National in terms of its effect and importance to energy generation and food security but local in terms of management, challenges of the ecosystem, and availability.

Energy and Water: Roadblocks and bridges

The consensus from 2014 World Water Week is that we are just scratching the surface of the water-energy nexus, both in terms of policy and integration. What we need is more data and more concrete examples of what works and what doesn't work, at different scales and across sectors.



Photo: iStock

Some innovative examples of data gathering were presented including the use of sensors on water pumps to collect data on water management, which removes the need for personal surveys and when there are technical issues, these can be analysed and rectified over the internet. Mobile phones also offer great potential for gathering data.

But case studies are still scarce and not shared sufficiently and while data on water scarcity or risk have become increasingly available, there are still significant gaps in our knowledge on the impacts of energy technologies on water resources.

The role of technological change in the water-energy nexus also needs to be explored more; innovations are still depicted as a “one size fits all”, and little attention is paid to how practices, technologies and business models need to co-evolve in order to effectively change these systems.

Identifying and quantifying the pressures on water and energy resources is critical: we need to know how much we are using and how much there is, before we can determine how we can apply the resources. This can be done internally and at the basin level to determine the competing demands for different users.

A benefit of quantifying the resources in this way is that it assists with education of stakeholders on the water-energy nexus and through this education we can build a common language for all actors across different sectors. This education also needs to trickle down into school education, so that the water-energy nexus is integrated into the education of future generations.

Energy and Water: Way forward

While the sessions stressed the need for cross-sectoral collaboration and the removal of silos, it is important to remember that not all sectors have to be present at all times. Delegates heard how a sectoral approach to tackling corruption, which has worked in the field of energy and mining, could also work in the water sector provided the right actors are brought to the table with a legal means to enforce the standards agreed among stakeholders.

Full life-cycle assessments are a must for any water-energy strategy but we need to be aware that different sectors operate under different time frames. While the private sector may move quickly, the public sector is slower, but on all sides, we need strong leadership.

We need to lead at all levels and across all sectors but in particular, at the intersection between knowledge and action. Many of the decisions regarding the allocation of resources are not simply technical but also political. We should not be afraid of trade-offs and these need to be built into short and long-term strategies and debated at the political level as well as at the practical level. As Prof. Tony Allan, a Stockholm Water Prize laureate, pointed out at during a session at 2014 World Water Week, the work of scientists needs to be politically feasible and political will is the key to establishing a successful strategy for the water-energy nexus.

MANAGING ENERGY AND WATERS ACROSS BORDERS

Lead Rapporteurs

- ▶ Ms. Carol Chouchani Cherfane, UN-ESCWA
- ▶ Dr. Susanne Schmeier, GIZ

Junior Rapporteurs

- ▶ Ms. Kata Molnar, Lund University, Sweden
- ▶ Ms. Shen-Hui Yang, Asia Pacific Youth Parliament for Water
- ▶ Ms. Maja Hemlin-Söderberg, Stockholm University, Sweden
- ▶ Ms. Aamira Fatima, Stockholm University, Sweden
- ▶ Ms. Emma I Lyngedal, Stockholm University, Sweden



Energy and Water: For what and by whom?

Three major challenges face the water-energy nexus in a cross-border context. First, water and energy needs and priorities differ across communities and countries, and their management can thus require trade-offs and compromise across stakeholder groups to achieve mutually beneficial outcomes. For instance, the needs of upstream users for water for irrigation or industry may threaten the availability of water resources further downstream for other user groups. Needs also differ between rural and urban communities, hilltop and ocean ecosystems, as well as mountain and coastal settlements, noting that mountain communities have often been neglected when considering management schemes aimed at balancing development along a watercourse. Addressing these concerns in an international transboundary context is particularly sensitive, as currently evidenced in the Nile River Basin or Central Asia.

Second, water and energy resources endowments are often not located in the same place. Some users have plentiful freshwater resources, while others enjoy energy surpluses. The situation results in significant transaction costs being spent on securing the water needed for cooling, cleaning or use by the energy sector, and securing the energy needed to pump, treat and transfer water. In China, for example, large amounts of electricity are expended to pump water from the south of the country to the north, although most of the country's energy resources are originally extracted from its northern areas. In the Arabian Gulf, energy is needed to ensure water security through desalination. Furthermore, there is a need to be mindful that the energy sector is often the biggest and most influential sector in development circles and that the energy sector is managed as an economic good, while the water sector tends to be viewed as a social good.

Third, it is necessary to recognise that the water-energy nexus must also consider the cross-border effects of other nexus-relevant sectors, such as food security. The development of hydropower, for instance, can have severe effects on food production and food security by affecting fish habitats and fish migration routes along a watercourse. The situation can be further aggravated by climate change.

Energy and Water: Roadblocks and bridges

Due to the large number of actors and interests, a number of challenges arise that affect the management of these resources across borders. These require consideration of technical, developmental and foreign policy perspectives in a more integrated manner.

Water and energy resource managers should move away from the planning of individual dams to a more systems-based approach that examines the siting of dams along a watercourse. This requires reflection of a broader set of outcomes via scenario building that could help to determine which option results in the least possible loss of biodiversity, fisheries and flows, while securing the highest possible level of generated power. This would help to achieve a better set of outcomes for the environment and society in terms of resource conservation, cultural preservation, and satisfaction of the needs of upstream and downstream water users.

Different interests and development priorities of upstream and downstream countries complicate the management of transboundary water resources. Bilateral agreements along a transboundary watercourse are often more easily achieved than comprehensive multilateral approaches that require agreement between all riparian countries, or at least a sub-set of riparian countries. At the same time, basin-wide agreements can ensure



Photo: Jerimiah Castro, SXC

more integrated management schemes. For instance, the Mekong River Commission has developed a basin-wide Rapid Sustainability Assessment Tool (RSAT) that allows for assessing the impacts of different developments (including hydropower) on an entire sub-basin or basin, and aims to ensure more beneficial outcomes for all stakeholders while reducing the costs. The International Hydropower Association is also promoting the use of a sustainability assessment tool, which aims to encourage long-term thinking about hydropower development by evaluating social and environmental outcomes of a proposed hydropower project through a set of performance guidelines.

However, investments in large scale technologies have sometimes overshadowed the value of indigenous knowledge and hybrid knowledge that can support the transfer of appropriate technologies. Balanced management schemes cognisant of local conditions are thus needed to operationalise the multipurpose use of a shared resource. This includes consideration of ecosystems in allocation decisions across borders and sectors, as is being pursued through voluntary partnerships fostered by CONAGUA in Mexico.

Ineffective communication and insufficient shared understanding across these sectors is a further roadblock. Similarly, there is the need to translate science more effectively and clearly to the policy community in order to inform decision-making.

Energy and Water: Way forward

Building trust between communities and countries sharing water resources can foster cooperation in transboundary river basins. Governments' foreign policies play a central role in conflict prevention and regional integration. Development activities supported by donors should be coordinated, and through their foreign policy, governments should seek to enhance cooperation

on shared waters, drawing upon science to provide the options and preferred outcomes based on different scenarios.

Joint monitoring and sharing of data and information can build mutual trust. Finland and Russia jointly monitor water quality along a shared surface water resource. Likewise, the Action Plan for Source to Sea Management in the Danube River aims to support policy coherence and dialogue among the riparian countries on a common vision.

Strengthening legal and institutional frameworks can assist. According to the WWF, 60 countries have signed the 1997 UN Watercourses Convention or the 1992 UNECE Water Convention, but there are still 133 countries that have not signed either. These legal instruments can guide the forging of bilateral agreements and the establishment of basin-level commissions. Priority setting and goal setting related to the management of a shared water resource, however, should take into consideration the local context when applying these international conventions. Building the technical skills of foreign policy officials and relevant stakeholders in hydro-diplomacy and international water law can strengthen the capacity to forge mutually beneficial transboundary water agreements.

Achieving consensus on common goals, while respecting each other's interests; building a shared knowledge base; establishing a common legal framework; applying integrated planning and management tools; supporting sustainability and the use of appropriate technologies; improving communication; and adopting supportive hydro-diplomacy frameworks are ways to improve the management of water and energy resources across borders. If disagreement continues after applying these measures, stakeholders need to revert to the beginning and re-identify the benefits of cooperation to mitigate the potential for conflict within the context of our planetary boundaries.

INTEGRATING WATER AND ENERGY POLICIES

Lead Rapporteurs

- ▶ Mr. Stefano Barchiesi, IUCN
- ▶ Ms. Angela Klauschen, Global Water Partnership

Junior Rapporteurs

- ▶ Ms. Katrin Eitrem Holmgren, IWA
- ▶ Ms. Viviane Passos Gomes, University of Sevilla, Spain
- ▶ Ms. Lesley Poires, Water.org
- ▶ Mr. Benjamin Roberts-Pierel, University of East Anglia, UK
- ▶ Ms. Line Maj Thomsen, Wageningen University, The Netherlands



Energy and Water: For what and by whom?

With increasing competing demand for energy and water resources, policymakers are being forced to rethink the ways in which we produce, obtain and use both energy and water. There is now an increased realisation of resource scarcity and the need for better use and efficiencies. Hence, the emerging concept of a ‘circular economy’ where waste is minimised and water and energy consumption is reduced.

There is a need to focus on cross-sectoral planning and design, risk assessment, resource/benefit-sharing, and demand management. The desired outputs will be synergy identification, trade-offs and option optimisation, which take different segments of society into account, to address the uncertainties still embedded in some of the metrics, and understanding of the linkages. Ultimately a regenerative, sustainable economy will be the final outcome of these processes becoming mainstreamed.

A number of presentations at World Water Week looked at the water footprint of energy sources as well as technological advances in the fields of water cleaning, desalination and wastewater reuse coupled with biogas generation. Most of the power generation across the world is water intensive and some “new kids on the block” (for example shale gas and tar sands) seem to be not only dirty, but also thirsty processes.

Consumers are important decision-makers but currently have no accountability for their behaviour. A geographical digression was made on the dilemma for some Middle East and North African countries between using their energy endowments to secure food through importing virtual water or increasing their domestic production through changes in crops and irrigation efficiency gains. This speaks to the need to gauge local benefits with the larger geographical scope of certain solutions and interventions.

Another topic that was covered by fewer presentations but is still relevant for the nexus was the food sector’s perspective. At the intersection with energy was the role of smallholder farmers in influencing penetration of large- vs. small-scale irrigation infrastructure. Farmers are important as they manage huge quantities of water yet are not included in the decision-making and policy-shaping phase. Extension of services, access to capital and guidance on equipment investment will empower farmers and lift them from poverty.

Energy and Water: Roadblocks and bridges

In order to overcome existing barriers to integration in a nexus context, there is a need to build on existing institutions to address the “silo” approach, instead of creating new ones. This is achieved through cross-sectoral cooperation as well as increased communication. Of course, the technical strengths of each sector need to be further developed but it is through both vertical and horizontal integration that the best results will be attained.

More work on footprinting in energy systems and the water footprint of energy sources is needed. Many different stakeholders work on segmented pieces while water is more circular than any other resource. The private sector has an interest in joining governments willing to lead the discussion and prepared to mediate with civil society.

Global drivers such as food prices will be affected by attempts to implement and mainstream solutions for more water smart agriculture. A big part of the debate around agriculture and farmers touched upon the junction the world is at between investing in growth and productivity, and more resilient systems that build on quality food and access to markets.



Photo: iStock

The other element is the development of hydropower and pumped storage needs in a nexus context, considering other renewables. Moving from daily and predictable hydropower needs to increasingly variable needs, especially with a mix of other renewables, requires the time to adjust systems, as the need is growing bigger and more precise technology is required.

Finance and financial mechanisms were an important part of discussions, with output-based aid or ‘pay-as-you-go’ options through mobile technology being put forward as examples of possible solutions for addressing the gap between donors and beneficiaries.

Output-based aid aims to provide/allocate funds based on outputs as opposed to inputs. It is basically a performance-based subsidy. It works at the service provider level to transfer risk from the development bank to a third party and increase stakeholder involvement. Output-based aid is helpful for leveraging other financing and getting commercial banks on board to mitigate risk.

It can be hard to get financial institutes to lend because they do not want to take on the risk. Also, service providers are not supported financially for feasibility studies or to find funding. Examples were given from the Philippines, Kenya and Colombia. They showed how output-based aid can work on a number of different projects. Risks include the fact that people need to have a willingness and/or ability to pay.

Energy and Water: Way forward

The underlying message on ways forward was the need for a paradigm shift, due to technological progress proving insufficient when adoption does not follow from innovation. The other main view to be challenged was whether the water sector

needs to move from a hydro-centric to a more holistic approach.

The water sector needs to share the weight and let the energy sector lead the discussion at times. The energy sector has powerful stakeholders with capacities that can help water managers. Through collaboration, the strengths of each sector can be used to achieve better coordination while working practically to solve common problems.

One of the new specific paradigms called upon was to promote an ‘ecosystem of innovation’ helping technologies to cross-fertilise each other and to reach the market and new ways of thinking to emerge. This approach should foster start-ups and smart solutions at local level. It is expected to also tackle the design failures of some field projects and the behavioural change that needs to follow for societal uptake beyond technology development.

To make the nexus a reality, there is a need for projects that bring public and private solutions together, that demystify the notion of nexus, and come up with simple projects for an energy company and a water company to work together. When the right signal is sent from the public sector, the private sector can and will respond. Only by testing and working together can you see if the partnership will work.

Another element seen as important was the fourth dimension of the water-energy-food-nexus, the ecosystems and the services they provide. Nature will be among the many issues that must be included in practical solutions for managing the nexus. It is always a mistake to ignore the role that nature plays, as it is in forests, wetlands and floodplains that water enters our economies, not where it comes out of the tap. But further progress needs to be made to fully value these services and internalise the costs of ecosystem degradation.

RESPONDING TO GLOBAL CHANGE

Lead Rapporteurs

- ▶ Ms. Antonia Sohns, The World Bank Group
- ▶ Dr. Paul T. Yillia, IIASA & SE4ALL

Junior Rapporteurs

- ▶ Mr. Simon Damkjaer, Water Youth Network
- ▶ Ms. Rafaela Flach, Linköping University, Sweden
- ▶ Mr. Jakub Kocanda, SWECO Environment
- ▶ Ms. Silvia Lohfink, Södertörn University, Sweden
- ▶ Mr. Francisco Mieres, KTH, Sweden



Energy and Water: For what and by whom?

With continued global population growth, it is expected that by 2030, three billion people will be rising out of poverty into a middle-income class, placing additional pressure on the world's finite resources as living conditions improve and more people move into urban areas. Furthermore, climate change is causing additional challenges and uncertainties. At current rates of investment, water, energy and food all face a supply-demand gap in the coming decades. While the Millennium Development Goals (MDGs) have given water time in the spotlight, national and local leaders will need to carry the momentum forward for the Post-2015 Development Agenda in order to ensure sustainable water and energy for all.

It must be understood that all economies run on water, and that if the water and energy sectors can identify and coordinate their response to common problems, they will find synergistic solutions. Politicians will need to take the lead and work together with the private sector and research institutions. Local partnerships can also play a role.

As the MDGs draw to a close in less than a year, the Post-2015 Development Agenda should prepare global leaders and governments worldwide for the upcoming challenges they must face. It must stem from the MDGs and must be seen as a continuation of the MDGs, in addition to responding to the future challenges we must address. Therefore, the Sustainable Development Goals (SDGs) should not be developed independently from this context, i.e. the MDG environment. The MDGs have worked well to guide national governments and helped UN bodies to cooperate and keep track of progress. These partnerships must now continue for developing and implementing successful SDGs in the Post-2015 period.

SDG targets need to be universal, integrated, practical and ambitious, yet it is equally important to find valid and reliable indicators to monitor and evaluate progress.

Existing support networks can be utilised and emboldened to assist in this process, and to help fill the gaps in monitoring. Data sharing, and strengthening or building new networks and institutions that are innovative can enhance existing structures and promote good policy and governance.

Gathering public support, through raising awareness and local ownership, is key to increasing capacity, transparency, and ensuring that citizens will recognise the value of integrated energy and water management.

Corporate partnerships are playing a role with farmers and in mitigating climate change. One example from PepsiCo's water stewardship work is helping lower business risk to water variability. The company is building agricultural resilience to protect consumers and PepsiCo's shareholders from high price volatility.

New models of corporate and public engagement in flow restoration is also developing. For example, by trading water permits, the Colorado River basin restored more than 250,000 cubic metres of water to the river. Although currently only focused on farmers, the basin's future challenge will be to scale up similar projects and incorporate other sectors.

Energy and Water: Roadblocks and bridges

The SDGs, as currently proposed, fall short in several critical areas. For example, there are currently no joint (nexus) targets on water, energy, food and health, even though these sectors are closely related. Businesses must increasingly consider water as a risk to their investments or operations and employ solutions that are innovative and economically sound. For this to happen, the



Photo: Joel Forte

right enabling environment must be present, which can be done without necessarily using public funding. Currently, investments in this are not strong enough.

A business case should not be forgotten particularly in regard to sanitation, as donors will not continue to invest forever. A more market-based approach and assessment is desired, as is increased customer focus in order to bring costs down in a low-margin business.

The nexus thinking and analysis needs to be applied to the SDGs so that targets are developed in coordination, considering the needs of other sectors and resources. A bridge exists in the guise of the 2015 World Water Day, whose theme is sustainable development and water. This will align with the CEO Water Mandate that subscribes to the Global Compact, providing a special link with the private sector that can outline how this sector can contribute to implementing the SDGs.

For monitoring the Goals, large data gaps still exist in developing nations. Existing data should be shared, capacity and monitoring emboldened, and analytic tools must be implemented for quality control and verification of the data. Two main questions will have to be kept in mind in the context of data requirements for monitoring SDG indicators: What is essential? And what is globally feasible?

Energy and Water: Way forward

The World Development Report 2014 outlines the key focus areas for integrated investments, urban planning and agriculture efficiency, provision of incentives for green industry, and the need to innovate ecosystem valuation.

The media has a role to play to spread messages, best practices, and change attitudes. A more media savvy approach of ‘telling

the story’ can help. However, some key questions remain for this future cooperation with the media: How do we define the most important stories of our era? How do we use the media effectively? Do the people that have to be reached really understand what is being communicated?

Stories need to be told that catch the audience, spread awareness and create impact. These ‘products’ should be based on rigorous scientific evidence, yet remain simple and clear enough to engage a broad audience.

If we are also to promote global health, water, sanitation and hygiene (WASH) must be guaranteed, as hygiene is the missing link in achieving the full benefits of WASH investments. In particular, menstrual hygiene is still a worldwide taboo facing stigma and causing discrimination. Developing a specific target for hygiene will provide better conditions for monitoring and reporting on the results of hygiene improvements.

We have to better connect water with other sectors through which the governance models have to be changed in order to manage the nexus. A holistic approach is necessary to address the multiple and complex issues. This approach must include ecosystems, which are at the center of the nexus perspective. If ecosystems functions are depleted, then the food and energy sectors will suffer significant losses.

Our future is one of shared responsibility – we must all value a future where we govern across sectors, with policies that are more integrated and resilient. Experiences need to be shared so that what works in one community, in one country can be replicated or adapted in another. A water and energy secure future depends on our capacity to turn these resource challenges into opportunities and we have to act now.

SOCIAL MEDIA

At this year's World Water Week, social media activity far exceeded that of previous years.

The interaction between members of our online network of nearly 13,000 people (Facebook and Twitter) meant conversations, ideas and information about water and energy reached over 220,000 people during the Week. The **#wwweek** hashtag also gained significantly more traction compared to last year.

The organic nature of the online conversation clearly demonstrated the opportunities presented by digital platforms, and the enthusiasm of both participants and the wider public. Twitter Q&A's, live chats between experts and the public, films, live-streaming of seminars and social media updates all helped to drive discussions around important topics and increase participation in events.

Videos, photos, news stories and press releases from the Week are still available on www.siwi.org/mediahub and www.worldwaterweek.org and we encourage you to catch up on those sessions that you missed.

Next year is the Silver Jubilee (1991-2015). We look forward to the online discussion reaching a whole new level! Follow us and stay tuned for better ways to engage, inform and share.

2014 Stockholm Statement on Water: Energy

Stockholm International Water Institute (SIWI) has produced five films designed to enhance the understanding of the centrality of water in building resilient societies of the future. The fourth film is about water and energy. Water and energy are interdependent but rely on different institutional frameworks, policy setting and governance structures.

CREO

Giant in global water management receives Stockholm Water Prize

Stockholm (2014-09-04) - Professor John Briscoe of South Africa today received the 2014 Stockholm Water Prize for his unparalleled contributions to global and local water management, inspired by an unwavering commitment to improving the lives of people on the ground. H.M. King Carl XVI Gustaf of Sweden presented the prize to Prof.

WORLDWATERWEEK



John Kujonzioma @JohnKujonzioma

John Briscoe is awarded 2014 Stockholm Water Prize for his life-long commitment to water issues! @www_team @WorldBank

6:00 PM - 4 Sep 2014

6 REWEETS 1 LIKES

2014 Stockholm Statement

SIWI believes that a Sustainable Development Goal (SDG) on Water is essential for our shared future. Launched at the closing session of last year's World Water Week, the 2013 Stockholm Statement made a global call for a dedicated SDG on Water.

CREO

Young Professionals Shaping the Post-2015 Agenda

There is tremendous motivation among young professionals that combines an all hearted and natural understanding of human rights with openness to creative solutions. With no fear to challenge established institutions and mindsets, the young water professionals are making a statement, commitment and contribution to the future.

CREO



WorldWaterWeek 2014 @www_team

And the winner is Hayley Todesco, Canada for new sand filter method to clean oil contaminated water #wwp2014 #wwweek

11:00 PM - 3 Sep 2014

28 REWEETS 10 LIKES



WorldWaterWeek 2014 @www_team

Names: Marcelo Leite, Soum Akroya, Umaru Sanda Amadu, Mooli Chiyu, Ketaki Gokhale, Natasha Khan, Dilukshi Herdummetti

2:58 PM - 6 Sep 2014

7 REWEETS 1 LIKES

Closing Plenary

The aim of the Closing Session is to report on and summarise a week of constructive dialogues, and joint achievements. The closing plenary will also present keynote speakers who will offer insights into the challenges of supplying sustainable energy to all without overexposing out limited water resources.

CREO

in Stockholm,
August 23-28, 2015

WORLD WATER WEEK

2015: **WATER FOR DEVELOPMENT**

2015: 18 JANUARY

Deadline for submission of abstracts and event proposals
Submit abstracts and proposals online at www.worldwaterweek.org.

JANUARY

2015: FEBRUARY-APRIL

Notification of acceptance of abstracts and event proposals
Nominations for 2015 Stockholm Water Prize open

FEB-MARCH

2015: APRIL-MAY

Registration opens and the Programme is released, providing an overview of 2015 World Water Week as well as information on how to register. All information of the events can be found in our online programme at programme.worldwaterweek.org. The online programme will be updated continuously up to the World Water Week.

APRIL-MAY

2015: JUNE 30

Discounted registration (Early Bird) ends

JUNE

2015: AUGUST 23-28

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