



The 6th Saudi Water & Power forum Session
Summaries and Outcomes
Jeddah, Saudi Arabia
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2010



أكاديمية البشناق
دار التقنية
Bushnak Academy



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As a catalyst for change and innovation, SWPF plays a key role in uniting Saudi and international stakeholders to discuss the policies and strategies which will determine the future of the power and water sector in the Kingdom. In 2010 the program will focus on how we can achieve sustainable prosperity through knowledge, innovation and cooperation.

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Inauguration Ceremony

Under the patronage of H.R.H. Prince Khaled Al Faisal bin Abdulaziz, Governor of Makkah, the Saudi Water and Power Forum was inaugurated on Sunday 3rd of October 2010 under the theme «Sustainable Prosperity through Knowledge, Innovation and Cooperation». The forum, discussion sessions lasted for three days, where a number of experts and specialists in policies and strategies determining future of water and power in the Kingdom articulated these issues.

The opening ceremony included speeches by H.E. Eng. Abdullah Al- Hussayen Minister of Water & Electricity and H.E. Dr Hashim A Yamani, President, King Abdullah City for Atomic & Renewable Energy. As well as an opening note by Dr. Adil Bushnak, Chairman of the Bushnak Group and Head of the forum.



H.E. Eng. Abdullah Al-Hussayen, Minister of Water & Electricity

Your Royal Highness Prince Khalid Al-Faisal bin Abdul Aziz, Governor of Makkah Province Your Excellency Dr. Hashim bin Abdullah Yamani President of King Abdullah City for Atomic & Renewable Energy Their Excellency participants and Attendees.



It is my great pleasure and honor to welcome you, Your Royal Highness. Allow me to show my gratitude for your kind inauguration and patronization of this Forum as your valued participation has made the holding of this Forum for the sixth year in Jeddah a significant event, expressing concern for water and electricity issues. It has become the focus of attention of consumers, contractors, manufacturers and service providers in these two industries. It is also my pleasure to shed light on the most important achievements in the water and electricity industries and their trends in our beloved country since the convention of the Fifth Forum a year ago, and what we aspire to achieve in the future, God Willing.

Your Royal Highness, Our Honorable Audience,

As a continuation of the kind patronage paid by the Government of the Custodian of the Two Holy Mosques, and its continuous support for water and electricity services, more and more new projects are being implemented this year and, thanks to God, more funds are being allocated, making this year truly a year of achievements and developments.

In the field of Water and Sanitary Drainage, work is in progress for the expansion and improvement of the infrastructure. The costs of the projects currently in progress amounted to nearly SAR 102 Billion. The total number of water connections exceeded 1.69 million, and the overall length of water pipe work amounted to 65,000 km. The total number of sanitary drainage connections exceeded 830,000 and the overall length of the sanitary drainage network amounted to 17,000 km. The total number of dams constructed, or under construction, is 452 dams with a total storage capacity of 2.4 Billion cubic meters.

Perhaps, the most significant event this year, with regard to dams, is the Ministry's tendency to provide a regular supply of potable water from some of the largest and most productive dams in the Kingdom, particularly those located in the South West areas, to serve as an affluent source supporting other sources of desalinated and ground water, in order to meet the growing demand for water throughout the kingdom. One of these dams is Baysh Dam in Jizan Region, which is considered as one of the largest water reservoirs in the Kingdom, as it is located in an affluent valley, with a storage capacity of 194 million cubic meters. The dam's water storage this year has exceeded 160 million cubic meters, despite the fact that the dam releases 50 million cubic meters of water in Baysh Valley to maintain natural and agricultural environments. One can say that the water storage in one single year has exceeded 200 million cubic meters, equivalent to the production of five years at the desalination plant in Shuqaiq (Phase I). The daily flow rate of the valley is 200,000 cubic meters and the total cost of such a flow rate at a desalination plant amounts to SAR 300 million approximately. This means that Baysh Dam and its purification plant can recover their financing costs in eight months only, when compared with the costs of the last desalination project i.e. Shuqaiq Plant (Phase III), besides the privilege of being located at 300 meters above the sea level, which enables it to supply water to the whole Jizan area and the second pumping plant in Assir, using gravity only and without the need for pumping equipment.

I do believe that, with God's help and assistance, if

we properly exploit these surface water resources, we will be able to meet the needs of Al-Baha, Assir and Jizan provinces for water at least in the near future, and will dispense with the construction of more desalination plants.

This would form huge savings of water, effort and power. The Ministry has also emphasized its position by focusing on the management of water demand, particularly by reducing leakages in the public network. The funds allocated for this purpose have exceeded SAR one billion. The Ministry managed to reduce the leakage quantities in the cities covered by this project, from 25% to 7%, which is a considerable saving of water, money and effort, when compared to the increase in production.

With regard to the privatization of the water and sanitary drainage industries, the National Water Company «NWC», despite being recently established, could achieve the strategic targeted results set in its plans for the cities in which it carried out the management of water and sanitary drainage. NWC proceeded to complete and develop the infrastructure and enhance the services provided in both quantity and quality. This has had a positive impact on the real status of water and sanitary drainage services, as per the standards of service in developed countries, resulting in an outstanding improvement in the quality of these services.

Moreover, the company succeeded in implementing its strategic projects in accordance with the set priorities and programs, and

contributed to an acceleration in carrying out vital projects and supporting and developing water resources, as well as investing in treated water in order to enhance the Company's earnings. NWC has entered into contracts in this field exceeding SAR 2 Billion during the year 2009. The Company started applying the international FIDIC contracts for the first time on Water and Sanitary Drainage Projects «WSDP». This is expected to attract many international and local companies which are qualified to participate in these projects. NWC has also applied state-of-the-art SCADA technology and software for the management of water distribution networks. Furthermore, it applied the Leakage Detection System using Helium. The Company signed a contract for the management of Water and Sanitary Drainage services in Makkah and Taif, and entered into contracts with a number of consultancy firms to handle the requirements of contracts for the management of water and sanitary drainage services and operations in Medina, Dammam and Khobar, in order to invite tenders or bids for the same. Tenders and bids for other cities will follow in succession. When the above-mentioned cities are included in the Company's scope of work, NWC will be in charge of 60% of the whole water and sanitary drainage industry in the Kingdom. The Company will keep on carrying out its job for the development and improvement of water and sanitary drainage services. Alongside this Forum, NWC is holding a workshop on Wednesday this week to review the opportunities of investment in water and sanitary drainage projects. With regard to the water desalination industry, the

Saline Water Conversion Corporation (SWCC) has completed Phase II of its privatization plan, and all the documents needed to set up the Holding Company have been finalized and submitted to the competent authorities.

Moreover, SWCC has started in Phase III of the plan and restructuring. As for the large water and electricity joint projects that will be implemented by the Private Sector, thanks to God, this year the Shoaiba Desalination Plant (Phase III) has been in full production, and has expanded its production capacity to be one million and thirty thousand cubic meter per day.

Likewise, the Desalination Plant of Marafiq Company has reached a capacity of 800 thousand meter per day, and Shuqaiq Desalination Plant Phase II has started its production, and is now producing 70% of its full capacity, and construction works are expected to be completed next year to reach its full production capacity of 212 thousand cubic meter per day by the beginning of next year. All of these projects produce two million and forty two thousand cubic meter of desalinated water per day, and 3,500 MW of electric power. This is equivalent to 85% of the total production of desalinated water by SWCC, and nearly its full production of electric power. This is a clear evidence of the huge scale of contribution of the Private Sector to this industry. SWCC has also invited tenders for Ras Al-Zour Power and Desalination Plant Project with total production capacity of one million cubic meter of water and 2,400 MW of electric power per day. The contract has been

2,400 MW of electric power per day. The contract has been awarded by the end of Ramadan to a consortium of companies, with a total cost of approximately SAR 25 billion, including the extension of water lines to beneficiary cities. It is expected that this project will be completed in early 2014 AD. SWCC is currently engaged in the preparation of tender documents needed to award a contract for Yanbu Project Phase III. The production capacity of this project will be improved to meet the needs the Royal Commission in Yanbu, to become 550 thousand cubic meter of water and 1,700 MW of electric power per day.

Your Royal Highness, Our Honorable Audience The electric power industry in the Kingdom is currently facing a huge increase in demand, as growing demand for electricity has been this year 8% more than the peak power load of last year, i.e. around 3300 MW. The combined capacity in the Kingdom increased to around 50,000 MW, including the contributions of desalination plants and large participants. The total number of customers of Saudi Electricity Company (SEC) has become six million. In order to meet the increasing demand for electric power, all estimates of the electric power expansion plan indicate that there will be a need for implementing electric power projects in the coming ten years, with a total cost of more than SAR 300 Billion. The private sector is expected to contribute to around 30% of the cost of these projects, i.e around SAR 90 Billion.

An agreement for one of the largest of these projects has been signed this year with the private sector for the construction of Rabigh Power plant, with a generation capacity of 1,200 MW, on the basis of building, ownership and operation, and

the implementation of the project has just started. Another project in Riyadh has been awarded to a winning bidder on the same basis. It is called «The Eleventh Generating Power Station», with a generation capacity of 1,800 MW. The Steam Village project with a generation capacity of 2,000 MW will be awarded under the same scheme. SEC is currently implementing many power generation projects, with a total cost of more than SAR 85 billion, including but not limited to the significant Village Plant Expansion Project in the Eastern Province with a generation capacity of 3,160 MW, Shoaiba Plant Expansion Project, in the Western Region with a generation capacity of 1,200 MW, the Tenth Power Plant in Riyadh with a generation capacity of 2,000 MW, and Rabigh Steam Generating Power Plant (with a generation capacity of 2,500 MW) whose contract has been awarded last month. The total generation capacity of all projects under execution by SEC is more than 12,000 MW.

Preparations are now under way to invite bidders for power generation projects during the next three years, with a total generation capacity exceeding 6,000 MW, in addition to power transmission projects, transformer stations, and power distribution networks. With regard to the network inter-connection inside the Kingdom, SEC has with God's help connected about 95% of all electricity networks operating in the Kingdom, and they became one composite network after completion of most electricity transmission lines by SEC. The most recent line completed was that connecting the southern region with the western region. SEC has also connected the transmission network of the western region with the transmission network of the central region and the eastern

province, by completing the power transmission line between Medina and Qassim, and it was electrified during the month of Ramadan. This has been one of the most important achievements made under the leadership of the Custodian of the Two Holy Mosques, King Abdullah bin Abdul Aziz, God Bless him, under the long-term development plan of the electric power industry, which aims to enhance the reliability of service in the Kingdom, so as to be in line with the best international performance standards. Such achievements could not be made without God's help and the gracious and continuous support of our prudent government to the electric power industry, and the sincere efforts made by executives of the industry. One of the most important power transmission projects is the Power Grid Project between Saudi Arabia and Egypt, which is also one of the most important power linkage axes in the Arab World. On that regard, a consultancy firm is carrying on the detailed studies of this project and preparing its tender documentation which are in the final stages, and it is expected to invite tenders for this project in the near future, God Willing. Upon its implementation, this project will not only make the two countries share their electric power reserves, but will make them also interchange electric power at peak times which are different in both countries every day.

With regard to the rationalization of electric power consumption and improving its efficiency, the Ministry is carrying on with the awareness programs, in collaboration with the relevant authorities, and is conducting a number of programs under the national plan for reducing the consumption of electric power and enhancing its efficiency, in order to attain the targeted results which include, but are not limited to, reducing the

consumers' cost of electricity, lowering the growth in the peak load, and achieving what is known as load displacement. Among the most important Decrees that have been recently issued is the Royal Decree that thermal insulation should be compulsory in all buildings, and the approval of the Council of Ministers of changing the voltage of electric transmission lines to the international standard of 230400- Volts. It is expected, in the near future, to approve of setting up the National Centre for the Rationalization of Electricity Consumption. In view of the challenges facing the water and power industries, the most significant of which being the increase in growth rates, rationalization of electricity consumption has become an urgent national need/concern. The surveys conducted about the prospects of rationalization confirm the promising opportunities for the investment in water and power consumption programs, and enhancing the management of demand for water and power. I see that it is now a good opportunity to invite the private sector to increase its contribution to these matters.

Your Royal Highness, Our Honorable Audience, Keeping in line with the Saudi Governments policy to encourage the private sector and enhance its role in participating and investing in electric power projects, to set up a convenient environment that promotes competition in this industry, and to provide the regulatory, funding and operational requirements needed, the Council of Ministers has authorized the Board of Directors of the Electricity & Co-Generation Regulatory Authority (ECRA) to review the electricity tariff to all non residential consumer categories (governmental, commercial and industrial), and to enter and adopt any amendments thereon, provided that

such amendments do not exceed (26 Halalas) per kilowatt-hour. Pursuant to this prudent decree, ECRA has compiled a proposal for amending the electricity tariff based on clearly stated scientific standards, using state-of-the-art world applications in this regard, seeking to enhance the efficiency of the electric power system, to support the stability of electric power service and its delivery to consumers, to encourage rationalization and control of loads, and to displace loads by using the variable tariff that depends on the time of consumption (i.e. according to the peak hour of the day or the peak season of the year).

ECRA's Board has adopted the proposed tariff and SEC has started applying this new tariff at the beginning of July, this year. ECRA, in collaboration with the Ministry, continues to follow up all matters pertaining to SEC in order to carry out its part within the national plan for restructuring the electric power industry in the Kingdom, including the establishment of an independent company for Power Transmission that would be called the "National Power Transmission Company (NPTC)", power generation companies, and other power transmission companies to be owned provisionally by SEC which will be changed into a Holding Company. Your Highness ... Our Honorable Guests The points mentioned above illustrate the growth and exuberant environment of investment in the water

and power industries for the years to come, and the immensity of projects needed by the Kingdom and the promising opportunities for the participation of the national and foreign private sectors in the investment in these services. It is expected that the funding requirements for the expansion in the water and power industries will exceed SAR 500 Billion (five hundred billion Riyals) in the next ten (10) years. According to these estimations, the investment opportunities will not only be limited to these services, but will enhance the role of the private sector in various investments needed by these industries, including the participation in the management, operation and maintenance of their projects as well as the development and repatriation of their supporting industries and services.

Finally, I would like to extend again my sincere thanks to Your Highness for your honorable sponsorship of this Forum, and to the all the honorable audience for their attendance and participation. I am also thankful to the organizing committee and the agencies that contributed to the preparation, organization and sponsorship, and to the participants in the associated Exhibition. I invoke Allah the Almighty to bestow upon us honesty in our words and deeds, grant us success and guide us in the right path.

H.E. Dr Hashim A Yamani, President, King Abdullah City for Atomic & Renewable Energy, « KA-CARE»

Your Royal Highness, Prince Khalid Al-Faisal bin Abdul Aziz, Governor of Makkah,

Your Highnesses, Excellencies and Eminences,

Dear Brothers and Sisters

I have the pleasure of being with you tonight for the inauguration ceremony of the Saudi Water and Power Forum. I would like to brief you on the progress made at King Abdullah City for Atomic and Renewable Energy since the Royal Decree that established the City. I will also share with you the details of its vision, namely, to be the driving force for the integration of atomic and renewable energy with the national sustainable energy system.

The importance of energy stems from its being the main driving force of both the local and world economies. It is expected that such importance will increase in the foreseeable future, and will retain its pole position thereafter.

The Kingdom of Saudi Arabia's leading role in the global energy landscape, together with the Kingdom's energy policy, which has always played a key role in the stability and growth of the world economy, should qualify the Kingdom to retain its leading position in the international energy arena.

Therefore, and as a natural and logical progression, it is expected that the Kingdom will develop a national sustainable energy system, where atomic and renewable energies will effectively and efficiently contribute to the economy.

The establishment of King Abdullah City for Atomic and Renewable Energy embodied the Royal Vision of contributing to the sustainable development in the Kingdom utilizing science, research and industries in the fields of atomic and renewable



energy, facilitating the growth of a new energy ecosystem that would enable the Kingdom's transition from a country depending totally on oil and gas in meeting its energy needs, to a country with an efficient and effective energy system in which atomic and renewable energies play an effective developmental role.

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This is a long-term national initiative that will have positive impacts, God willing, on the local, regional and international levels. It is an initiative based on accurate analysis of the current status, coupled with scientific forecasts of the favorable future that may result implementing this initiative.

The growing local demand on energy will result in tripling the electricity needed by the year 2032.



This is due to the growth in local energy consumption and the accelerating growth of the national economy. Obviously, this translates into an ever increasing demand on oil products.

This is evident from the remarkable acceleration in the local consumption of oil products during the past four years. This acceleration is higher than that of other countries that have witnessed a similar notable economic growth.

With no positive change affecting the national energy system the expected increase in the demand on energy may have a negative impact on the Kingdom's ability to meet the global demand for energy in the next two decades. This will undoubtedly have a serious effect on the local and world economies, and may adversely affect the Kingdom's leading position in the global energy landscape.

Therefore, this initiative affirms the Kingdom's readiness in dealing with new developments in the future global energy landscape in such a way that would maintain its position and enhance the strength of its national economy.

This initiative suggests using mechanisms that proved their effectiveness. The world is gradually moving towards substituting oil and gas energy with renewable and atomic energies. It is expected that the share of atomic and renewable energy will reach 19% of the overall installed energy capacity by the year 2030.

Notwithstanding the fact that deploying alternative energy is not economically competitive

at the time being, continuous investment will make alternative energy economically viable in the foreseeable future.

This begs the question: How can this initiative meet the country's substantial growing need for energy in the future, which, in the absence of a national sustainable energy system, will require enormous reserve commitments of oil and gas?

The Royal Vision has delineated the tasks and identified the mechanisms for King Abdullah City for Atomic and Renewable Energy to carry out the responsibilities with which it was entrusted. This includes the following:

1. Policies and strategies.
2. Necessary regulations and legislations.
3. Research and development.
4. Developing human capacity.
5. Set up and manage projects in order to carry out its assignments, either independently or in collaboration with other entities in order to build an economic framework for the atomic and renewable energy resources.
6. Representing the Kingdom before the relevant international institutions.
7. Meeting the national obligations in all agreements that have been signed, or will be signed, in relation to atomic and renewable energies.
8. The Royal Order has assigned a permanent location for the City that should include research and development centers and laboratories, in addition to all other facilities needed to enable the City to fully perform the tasks assigned to it.

The first assignment that the City has carried out was to conduct in-depth studies of the anticipated structure and content of the national energy strategy, the methodology of work and the operational business model for King Abdullah City for Atomic and Renewable Energy. This strategy has a great importance in establishing the firm foundations of the targeted sustainable national energy system.

The strategy and operating model were based on studies of a number of tracks, which resulted in formulating a Kingdom-suitable energy system and the value chain needed to serve this system.

The said studies have identified four major tracks:

First Track: Benchmarking relevant international expertise, and starting from where others have ended, by analyzing the experience of a number of countries in devising their energy systems.

Second Track: Identifying the vision and objectives, and prescribing the targeted energy mix.

Third Track: Building up the national economy sector that serves the targeted energy mix, including industry, research and development, as well as building up human capacity and specialized expertise.

Fourth Track: Proposing the organizational structure and bylaws of the City as well as its operating model.

All these studies have clearly indicated that the move of the Kingdom towards an energy mix based on atomic and renewable energies while

maintaining sustainable growth of the national economy will only be achieved through building competitive features of the national economy, based on the value chain of atomic and renewable energies. This entails:

1. Drafting and implementing effective policies and regulations.
2. Sponsoring internationally competitive research, development and innovation.
3. Entering into partnerships with national and international institutions, in addition to collaboration with specialized technology providers.

It is also clear that atomic energy has many technical, operational and investment merits, including the following:

1. The capacity factor of nuclear energy is one of the highest in energy generation plants.
2. The operational life of one cycle of nuclear fuel is long and stable.
3. In terms of world prices, the economics of electricity generation from nuclear power stations is competitive at the moment, when compared with fossil fuel power stations.
4. Nuclear safety standards have improved significantly, and do not necessarily depend on human intervention.
5. Preliminary capital investment is very high, but it is counter-balanced with low operational and maintenance costs.
6. Nuclear power stations provide attractive and high value added employment opportunities.

Likewise, renewable energy has technical, operational and investment merits, such as:

1. Generation of electricity from renewable energy is not accompanied with undesirable emissions or waste. It is very safe.
2. The Kingdom is blessed with abundant solar radiation that makes solar electricity generation more efficient than most countries.
3. Renewable energy requires no fuel, and therefore its operational costs are very low.
4. Renewable energy can be used for utility-scale generation, and it can also be used for domestic, public and commercial roof-top generation, as well as in remote areas.
5. It is expected that production costs will fall substantially and over a long period of time due to the international trend towards dependence on renewable energy.
6. The Value Chain of renewable energy, from industry to power stations, provides much more job opportunities than traditional energy system.
7. Renewable energy has a promising future for both individual and institutional investors, and it represents a fertile environment for research, development and innovation.
8. Capital investment is high, but operation and maintenance expenses are very low.

Having said that, the national energy mix cannot, however, exclude nuclear energy, because dependence on renewable energy only will have the following disadvantages:

1. The capacity factor of renewable energy is substantially low, which makes it inappropriate for basic load generation.
2. The renewable energy system operates only at the time of availability of its resources, such as

the sun and the wind. This means that, at the time of unavailability, electric power can be supplied only if some surplus power is stored at time of availability.

3. Renewable energy efficiency is substantially less than nuclear energy efficiency. Hence, it is inappropriate for heavy power consumers, such as manufacturing.
4. The renewable energy system is affected by environmental factors, such as humidity, dust, and sun blocking, which may result in supply disruption.

Similarly, it is clear that the national energy system cannot exclude renewable energy, because dependence on nuclear energy only will have the following disadvantages:

1. The operation of nuclear power stations should maximize the capacity factor, to recoup the investment in a meaningful timeframe. Therefore, nuclear power stations are most suited for base load generation, but are not suitable for seasonal or daily peak load variations.
2. Nuclear power stations with low capacity (less than 100 MW) are not commercially available. Therefore, they are largely oversized for small consumers or remote areas.
3. The prices and supplies of nuclear fuel are, at times, uncertain.
4. The construction of nuclear power stations takes as much as 10 years. Nuclear energy cannot, therefore, be relied on for short-term demand on electric power.
5. The Value Chain of the nuclear energy system can only be developed nationally by leveraging very long-term investments, and contributes to the national economy, therefore, in the medium to far future.

This again begs the question: How can we determine the best national energy mix?

There is no doubt that the targeted mix will include a combination of atomic and renewable energies such that it meets the following criteria:

1. Maximizing the oil saved.
2. Selecting an energy source having a high load factor and stable generation for stable winter.
3. Selecting a dynamic source that is capable of responding to the electric power needs in the summer.
4. Maximizing the amount and efficiency of the national power production system.
5. Maximizing the participation in the development of national manpower specialized in atomic and renewable energies.
6. Maintaining a leading global position in targeted technologies.
7. Optimizing the development of the Value Chain in both atomic and renewable energies.

A close inspection of the annual pattern of electricity demand in the Kingdom reveals that the average daily loads in winter are 40% less than the average daily loads in summer. In addition, the peak daily loads in the winter or the summer vary only slightly during the day.

Accordingly, electricity generation from atomic energy is ideal to meet the basic load in winter, because the cost of construction of nuclear power stations is much higher than their operating costs, and therefore the stations should be operated with the maximum possible capacity to ensure their economic viability. Given that the peak loads in winter occurs after sunset, it is inappropriate to use solar energy to meet the needs of peak loads as long as energy storage technology is not yet

mature. The difference between the peak load and the basic load, in winter, should be provided by fossil fuel power stations.

The situation is different in summer as the demand increases and the peak hour is different. This means that it is economically viable to use renewable energy to meet the needs during daytime hours, in addition to the power generated by nuclear energy. Fossil fuel power stations will still be required in order to meet peak load needs. Renewable energy can be used more efficiently when energy storage technology becomes mature. It is also clear that no matter what structure the energy mix assumes, there are promising opportunities for the Kingdom in targeting certain technologies, such as:

- Concentrated solar thermal
- Desalination using atomic and renewable energy
- Cooling technologies
- Energy storage technologies

The success of the selected national energy mix, which is based on atomic and renewable energy in addition to traditional energy and energy conservation, will be based on four main tenets:

1. Providing appropriate funding mechanisms for all types of energy, in a dynamic structure that responds to time-related changes.
2. Qualifying the human capacity needed to manage and develop the energy mix.
3. Qualifying, building, supporting and enabling providing the industrial infrastructure and support facilities.
4. Completing the regulatory framework to make the proposed system sustainable.

The preparation of the energy mix will require ongoing studies as well as full and constructive consultation with the competent authorities in order to agree on alternatives that can be submitted to the Supreme Council of King Abdullah City for Atomic and Renewable Energy to enable the Council to take the appropriate steps to adopt the suitable alternative that puts the sustainable national energy mix in the core of the national strategy.

Day 1: Sunday, 3 October 2010

Day 1 - Session 1/A : Policies, Projects & Prospects for a Sustainable Future

Chairman: **Dr Adil Bushnak**, Chairman, Bushnak Group & Past President, IDA

Keynote Presentations:

H.E. Dr Mahmoud Abu-Zeid, Former Minister of Water Resources & Irrigation, Egypt & President, Arab Water Council

Dr Hussain Sindi, Project Manager, Al-Aghar Group

Dr Adil Bushnak, Chairman, Bushnak Group & Past President, IDA

On behalf of the Advisory committee I would like to extend a warm welcome to distinguished Ministers, speakers, sponsors and guests of SWPF.



SWPF plays a key role in laying down the policies and strategies that will determine the future of power and water on the one hand and in guiding investors in accomplishing their objectives on the other. This year's forum, under the theme "Sustainable Prosperity through Knowledge, Innovation and Cooperation", will serve as a catalyst for change in the power and water sectors in the Kingdom.

I am pleased to announce a new partnership between SWPF and Al-Aghar Group, an independent non-profit think-tank in the Kingdom. The partnership is working on a study and recommendations on how Saudi Arabia can become a leader in knowledge and innovator in power, water and renewable energy.

I would like to take this opportunity to thank H.R.H. Prince Khalid Bin Faisal Bin Abdulaziz, Governor of the Makkah Region for his continued endorsement and H.E. Eng. Abdullah Al-Hussayen, Minister of Water & Electricity, for his ongoing support and commitment to the success of SWPF.

I hope you enjoy the forum and make the most of the opportunity to network, join the debate and develop your business. I look forward to meeting you and to receiving your feedback.

Yours faithfully , On behalf of the SWPF Advisory Committee



H.E. Dr Mahmoud Abu-Zeid Former Minister of Water Resources & Irrigation, Egypt & President, Arab Water Council

H.E. spoke about the Arab Council with its various disciplines in all matter relating to water, and invited attendees to attend the coming forum convened every two years, which states basic tasks performed by Council, including counting and assessment of water resources in Arab world every two years.



Consequently, he historically shed light upon civilizations built on water, special conditions of renewable water source scarcity in Arab world, and presents an accurate statistics in this regard. He also mentioned the mean challenges facing Arab world, including water scarcity, food security, hardship to get water, exposure of sources to unsafe environmental conditions, and inability of body responsible for water sources governance. In addition to, he noted some facts about Arab world, including that 65% of Arab world water came from outside sources, and drawdown rate from groundwater in KSA exceeds by fourfold than the rate of annually refill of groundwater tank.

As for foods, he mentioned a statistics, contains that 80% of food production depends on irregular rain, and irrigated agriculture share is estimated by 90% of available water resources. Regarding drink water and sanitation, the water is not provided to one million people, and sanitation networks are not available to 77 million person.

He also spoke about the concept of integral management system aiming at increasing utilization from all water resources through maximizing use efficiency. Furthermore, he noted the necessity of balancing between supply and demand, through water use conservation and it reuse.

Concerning water demand management means, he mentioned investment in technologies minimizing water demand and improving water connection services, participation of users at all levels as to planning, management and provision of irrigation water, as well as, provision of home uses water, industrial activities and number of means to achieve them.

As for speaking on executive steps to increase water management, he mentioned minimizing water losses in irrigation system, minimizing consumption through better management of crops, water reuse, controlling floods and inundation, education and scientific research, decentralization, participation of water users, and expanding extent of farmers participation.

Concerning innovation in institutional management, he numerated some of adopted systems in different Arab countries, including one institutional structure for water resources management, and other decentralized systems. Then he mentioned some types of untraditional water that may be used to decrease the existing gap between supply and demand, such as disentailed water and wastewater treatment.

Finally, he emphasized on the necessity of increasing general investments, costs recovery, participation of private sector in sanitation, and consequently he concluded with underlining on the importance of governance in water management, transparency and spreading decentralization in water sector management.

Dr Hussain Sindi, Project Manager, Al-Aghar Group, Project manager of Water and Power study through Al-Aghar group and a professor of computer science in King Abdul-Aziz University

After giving a brief overview of Al-Aghar – an independent, not-for-profit think-tank, Dr. Sindi started by talking briefly about the importance of water, the universal water shortage and he continued saying , when looking at the accelerated pace of growth of domestic demand versus the Kingdoms plan to expand both parts of this sector, one realizes that supply does not match the potential increase in demand, keeping in mind that the rate of increase in demand for electricity during the period from 1998 to 2008, amounted to 85% compared to only 70% in growth of the Kingdoms ability to generate electricity during the same period. Also the increase in the proportion of agricultural consumption exhausted 88% of the kingdom's total water consumption, which in turn led to the depletion of non-renewable groundwater resources. It is shown here that the transformation of the water and electricity sectors in the kingdom require not only the financing of large projects to expand the productive capacity but also a comprehensive plan for reform and development



From that perspective, Al-Aghar group in collaboration and agreement with Al-Bushnak Academy, have prepared a report as a preliminary step for the initial study which is expected to be released at the end of 2010. The report covers a detailed study of the water and energy sectors in the kingdom, based on clear foundations that are associated with an assessment of the current situation and future visions for the needs of the kingdom, in light of available resources on the one hand and constraints that influence them on the other.

He then explained the methodology Al-Aghar has followed to develop the study, by conducting a workshop in King Abdullah Economic City. The format of the workshop included brainstorming sessions and engaging 65 experts, professionals, stakeholders, decision-makers and intellectuals from across the Kingdom, to be contributors to this study. The outcome of this was the vision, mission, a long range plan and quick wins focusing on different aspects – the human development, the financial, technical, legislative and legal aspects; and the private sectors contribution to the development of these sectors in the Kingdom.

The study also proposed a strategic framework which is based on three pillars or thrusts: enablers, production and consumption that will be detailed in the study and presented to the decision makers.

Dr.Sindi addressed the first and most important issue Al-Aghar had to deal with, which was the current situation that was found to be more complex with many conflicting interests were at play Here, around 15 important elements were specified – some of which are the current tariff regime, the gap between government or water and power strategic direction and the public vision or response,

the unclear priorities for water and power consumption in the absence of a comprehensive national plan, the lack of clear legislation and absence of government bodies tasked with monitoring consumption, the weakness of renewable sources for drinking water, the poor sewage treatment and not taking advantage of it in agriculture. Wasting non-renewable water resources in agriculture production and aging desalination plants.

Dr. Sindi also addressed the problem of the culture of the individual interest overriding the culture of public interest with regard to the serious problem the kingdom will face in the next 10 years if no serious measures were taken. Here he quoted Dr. Adil Bushnak in saying "If we don't take it personal, we take it home to our children we tell them just a minute, this running tap here is really life running to waste."

Dr. Sindi concluded by mentioning that the report has been distributed to all the forum attendees and invited them to be part of this initiative and enrich the report with their valuable input and feedback.

SWPF2010 Press Conference: From Left, Dr.Sindi, Dr.Adil Bushnak, H.E. Dr Abu-Zeid , and Mr.Fahad Abulnaser CEO of Al-Aghar Group



Day 1 - Session 1/B : Policies, Projects & Prospects for a Sustainable Future

Moderator : [Dr Adil Bushnak](#), Chairman, Bushnak Group & SWPF

Panel:

[H.E. Dr Abdullah M Al-Shehri](#), Governor, Electricity & Co-Generation Regulatory Authority (ECRA)

[Dr Mohammed Al Saud](#), Deputy Minister for Water, Ministry of Water & Electricity

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[Dr Abdullah M Al-Shehri](#), Governor, Electricity & Co-Generation Regulatory Authority (ECRA)

H.E. Dr. Abdullah Al- Shehri, Governor of Electricity & Co-Generation Regulatory Authority (ECRA) started with a retrospective look at the history of the Saudi electricity Sector which started as a private sector until the tremendous economic growth in the early 70's which called for the government to intervene in order to sustain the development through financing and managing. The growth and expansion in services continued ever since. Upon a review of the status of the electricity sector in 2000, a decision was made to allow the private sector to participate more actively and to establish an entity which can be restructured to allow the private sector participation on plain field bases and finally to establish a regulator. And the first mission was to lay down the rules and regulations that will assure sustainability of the electricity supply.



He shed some light on the high and increasing demand growth of the kingdom since 2000 and the level of government support without which the tariff wouldn't have provided sufficient funding to meet the expansion.

The electricity regulatory authority since its establishment worked on establishing and issuing the electricity law which indentifies the responsibilities of each party involved the government, the private sector, the regulator, and others. The duties of ECRA are great but will create a long-term fruitful result.

Finally, he emphasized on his wish for the development in renewable energy to be not only development of usage, but also of production which will justify any support that the government can provide.

Dr Mohammed Al Saud, Deputy Minister for Water, Ministry of Water & Electricity

Dr. Mohammed Al-Saud, Deputy Minister for Water, Ministry of Water & Electricity, talked about the climate change and how if it continued, the temperature increase in the kingdom will put more pressure on the ground water used for agriculture and domestic water use.

He mentioned that the ministry tried to narrow the gap by raising the level of dependence on nonrenewable resources to the level of renewable resources.

He also talked about the possibility of rain problems which calls for a need to put a strategy to protect the cities from flush floods and make use of it as an additional water resource.

Finally he spoke about the initiative between KACST and the ministry and its effort to build a desalination plan in Al-Khafji to produce desalted water using solar energy with the production of about 30,000 cubic meters per day.

During the audience questions and comments session, HE Minister of water Al-Hussaini stressed the importance of raising Tariff to achieving sustainability. After which, Dr. Adil acknowledged the great effort the minister is putting on convincing the decision makers to restructure the water tariff and urged him to continue.

Day 1 - Session 2 : Saudi Initiatives to Support Innovation

Moderator : **Dr Abdullah Al-AIshaikh**, Deputy Governor for Planning & Development, SWCC & Director, IDA

Panel:

Dr.Omar Al-Harbi, Director , National Center for Water Research, King Abdullah City for Science & Technology (KACST)

Dr. Raed Bkayrat, Manager, Industry Collaboration, King Abdullah University of Science & Technology (KAUST)

Dr Faleh Al-Sulaiman, Vice Rector Technology Development & Industrial Relations, King Fahd University of Petroleum and Minerals (KFUPM)



After thanking the organizers for their excellent work, **Dr. Abdullah Al- Shaikh**, Deputy Governor for Planning and Development and the moderator of the session started it by giving an introduction about innovation through defining it as not only the invention of a new idea but also exploiting it in a manner that results in an added value and bringing it to the market. He then pointed out the main elements necessary for creating an environment of innovation which are atmosphere, communication, challenges and processes.

Later he introduced the audience to the global innovation index and stated that the Kingdom, being in the middle of the index, has a challenge of climbing up the ladder through initiatives that contribute to creating the right environment for innovation.

Finally, as one of the main initiative supporting innovation, he pointed to King Abdul-Aziz and his companions Foundation for the giftedness and creativity (Mawhiba) and presented its goals of offering necessary sponsorship to gifted students and inventors, encouraging citizens to generate creative ideas and producing a new generation of creative youth in all fields of science and technology.



Dr.Omar Al-Harbi, Director, National Center for Water Research, Dr. Al-Harbi highlighted the initiative for solar water desalination, which is the first of its kinds in the Kingdom. It is the best strategic choice to provide drinking water for the Kingdom. While the Kingdom is already producing more than 18% of global desalinated water, the major problem is cost of production driven by high energy consumption.

The Kingdom is, however, advantaged with a high level of sunshine. KACST has more than 30 years of experience in promoting the use of solar power. In this vein, KACST has started the initiative of a joint research cooperation with IBM. Together, they have developed many technologies in the field of solar energy and desalination. The cooperation's efforts have produced technology that reduces the cost of solar power and desalination. One of the major targets of the initiative is to have all water desalination conducted by solar energy. This initiative will be implemented in three phases. Before detailing the initiative, Dr. Al-Harbi discussed the objective of desalination in KSA and the committee established for this initiative. The objectives are:

1. To desalinate seawater by solar energy at low cost to contribute to the Kingdom's water security and support the economy.



- To make use of nanotechnology techniques developed in the field of solar energy
- To build advanced industry in KSA supported by the industrial strategy of ministry of commerce
- 2. and industry
- 3. To develop a clean energy and protect the environment

Dr. Al-Harbi then highlighted the IBM-KACST cooperation and the projects involved. He explained that the KACST-IBM's joint cooperation through the center of nanotechnology has developed many technologies in the field of solar energy and membrane.

Dr. Al-Harbi concluded by saying that the above initiative will result in knowledge-based economy products. The Ministry of Commerce and Industry have a national industry strategy where R&D results (such as these of KACST) establish production companies and develop industrial clusters that will ultimately distribute these products in local and international markets.

Dr. Raed B'kayrat, Manager, Industry Collaboration KAUST.

Dr. B'kayrat started by defining KAUST as not merely a university but rather a much more wider scope institution built upon many pillars one of which is economic development. He then listed and briefly explained the following main initiatives and programs under economic development: An active industry collaboration program with two sides one focusing on business and one on R&D which insures that industry advises research on the topics they would like to see them operate on and opens the path for commercialization on the back-end, a Research park where companies can build their centers in conjunction with KAUST, an Innovation Cluster dedicated for clean technology companies to come in, demonstrate and prove their technologies such as New energy oasis on which one current initiative is solar PV, Technology transfer office and innovation group, an Early stage fund initiative, an Entrepreneurship Program, and an Active Seed Fund Program on phase two with over two million dollars dedicated funding.

He concluded by saying that the word university doesn't do KAUST justice as it is a massive project that's still taking off and has elements that go across the board from education, advanced R&D as well as economic development he stated how it is very important for KAUST to link with the industry as they develop this project.



Dr. Faleh Al-Sulaiman, Vice Rector Technology Development & Industrial Relations, King Fahd University of Petroleum and Minerals (KFUPM)

Dr. Faleh Al-Sulaiman, Vice Rector Technology Development & Industrial Relations KFUPM, Started by stating the vital importance of technology development and knowledge based economy to Saudi Arabia as no country in the world can depend on one commodity. He then talked about Dhahran Technology Valley role in this aspect starting with the first tenant of King Abdullah Science park Shlumbergere, who in two years doubled their business and created a winning experience for Shlumbergere, Aramco and KFUPM as lots of the professors and students got to deal with a new cutting edge technology.



He then talked about the creation of Dhahran techno-valley and expressed KFUPM's gladness at this being taken by other universities in Riyadh and Jeddah and hoped for many others to come. He also listed the main activities in Dhahran techno-valley starting with King Abdullah Science Park (KASP) with the goal of having the technology partners to establish their own R&D programs and R&D centers in the university and focus the research of the university on the needs of the kingdom. KFUPM's ambition is to follow MIT model who has the size of KFUPM and has established throughout the history companies that have a total GDP which would place them if they were a country as number 27.

He then mentioned that KFUPM is targeting mainly two technologies petroleum gas and chemicals and secondly water in which they have not yet been successful to work with a partner and hope to have NWC or the ministry as a partner. He then talked about the technologies produced by KFUPM including 52 patents, five more under registration, 188 applied patents and 83 not yet filed. And the university's target is to match MIT with 150 patents per year, the business incubator and its national business plan competition, alliance of their base and consulting services to help national small and medium businesses and finally SciTech state of art science museum which helps in implanting the love of technology and science in the kids and disseminating innovation.



Day 1 - Session 3 : Realizing the Potential of Technology in Power & Water

Moderator: [Leon Awerbuch](#), President, LET & Past President, IDA

Panel:

[Dr Gary Amy](#), Director, Water Desalination & Reuse Centre, King Abdullah University of Science & Technology (KAUST)

[Dr Ahmed Al-Arifi](#), Director General of Research & Technology Department, SWCC

[Dr Tomás Michel](#), Director R&D Development, AGBAR

[Paddy Padmanathan](#), President & CEO, ACWA Power International

Starting on the panel was Professor [Gary Amy](#), Director, Water Desalination & Reuse Centre (KAUST), who presented a rich speech that focused on water desalination.

He talked about many areas of interest to current research for making sea water desalination a greener technology through lots of approaches in terms of creative intakes, outfall design, the use of green chemicals, inorganic and organic composite membrane that are lower falling and higher permeability, and exploring new processes like forward osmosis, a new process that can operate under much lower energy requirements, membrane distillation which is a thermal membrane hybrid, a technology which KAUST has been very active in developing, partial desalination which can be used for aquaculture and could be operated in a much more cost effective bases, optimization of integrated membrane systems and minimizing the chemical use.



Then he talked about the issue of renewable energy driven desalination and listed many components that can be used like lower green house gas emissions, lower chemical utilization, but stated that it isn't the components but rather the integration of all those components through an incremental improvements process that matters, presenting as an example a concept developed by the Singapor PUB in developing a technology road map for new desalination technologies.

Recommendations:

Dr. Amy then called for joining forces as we go forward so as to avoid research redundancy and the worst scenario of all operating in secret and doing the same thing. He stressed on the importance of synergy, joint research and win-win collaborations an example of which is a collaboration initiated by SWCC on desalination that involved KACST and all the major universities in the kingdom in developing a strategic research strategy for several projects in desalination.

He also called for doing research that is industrially driven, industrially sponsored and leads down a pathway to product commercialization. And although shared IP is a challenge for such research, it can certainly be negotiated.

Finally, he talked about moving research into the market place through technology incubators. He mentioned KFUPM's technology park as an example and stated that this practice is being adopted by universities in and out of the kingdom acting as vehicles for a new startup companies and potential spin offs.



Dr. Ahmed Al-Arifi, Director General of Research & Technology Department, SWCC talked about research programs in saline water Conversion Corporation and how it is related to the technology.

SWCC saline water desalination research institute (SWDRI) offers services for national and international organizations with the main objective of transferring and developing saline water desalination technologies.

In its research institute in Jubail, SWCC has a pilot plant for different technologies through which they work with others like Armco and SASAKURA in joint research.

He then listed some of SWCC achievements which include patents applied on their plants in Umluj and others to be applied in Hagl/Duba, research collaboration with different organizations like: Saudi Armco, the Water Reuse and Promotion centre, SASAKURA, PUB, King Abdul-Aziz City for science and technology (KACST), Al-Faisal University, and European desalination society.

This is in addition to working with the private sector in joint research aiming at commercializing the product as is being currently done with META water in a project for ceramic membrane.

He then listed several current research programs on modeling for thermal, desalination and beach well test, a business with other organizations.

In addition SWCC has a national plan program for five years to work on a project entitled "Centre of Excellence for Research and Studies of Desalination Technology". The project will be carried out by SWCC, KAUST and the private sector

SWCC is putting an effort to bring together all people interested in desalination in a meeting called unifying research which is already in its round. The outcome of these meetings is a draft proposal which needs to be funded and is to be implemented by all those who are interested in this project. About their future plans, Dr. Al-Arifi said that SWCC is planning to develop various desalination technologies specific to KSA and called for others to join hands with SWCC saying that they have the facilities, the experience in operation maintenance, yet they need to collaborate with universities or private sector in working together to develop the technology.

They are also looking for non-renewable energy resources in desalination, solar energy, in a current project with KAUST, developing alternative desalination anti-scale and are looking hard for either manufactures or a university to work with them, developing various membrane types, improving the quality of currently used desalination materials, and enhancing technical collaboration with other establishments.

He concluded by stressing on the fact that SWCC is willing to provide others its services and welcomed anyone who has a project he wants to test his material or wants to work with them in joint research.



Dr. Tomás Michel Director R&D Development, AGBAR, gave a perspective from an international operator which operates mainly in Spain, a country who has many similarities to KSA in terms of great water stress, relative high temperatures and other problems. He mentioned two areas which have of a special importance for technology and related R&D. The desalination of sea and brackish water and the use of regenerated waste water.



In desalination, Agbar has an interest in pre-treatment optimization. They are looking for operation protocols on the side to decrease fouling, coupling renewal energy resources to desalination, working with new materials like oxidant resistant membranes and Nano engineered membranes stating that he believes Nano technologies will be one of the major breakthrough in the water industry in general, and finally the validation at a demonstration scale of the different pre-treatment options before desalination.

In water reuse to treat and dispose is an absolute concept, especially in water scarce regions. Because you could save on drinking water quality stocks, make a better more efficient use of water resource and manage water better, increase the amount of available resource, guarantee water supply during drought episodes, reduce or improve the discharge to receiving media, and you can even think about reusing nutrients present in wastewater for agriculture. But in order to reuse water you need to have a legal framework for reused water, which took Spain 10 years of discussions, you should be able to treat according to final use, and gain public acceptance of the reused water.

Another important issue is substantial economic tariff models, which sustains and support this employment and deployment of new technologies.

Finally he talked about international cooperation, presenting Agbar's model for international cooperation and for growth of their R&D and mentioned they are working on a project here in Saudi regarding setting up a water training center including an R&D center to be developed in Jeddah and provide technical training, general training, R&D and management and professional development.

Paddy Padmanathan, President & CEO, ACWA Power International, explained that in order to achieve all its other objectives, Acwapower found it best to focus on reducing the cost of 1 cubic meter and one KW of energy. He shared one example showing how technology and innovation has a direct impact on up to 85% of desalination cost. To show that this is not a mere theory but rather a reality, Mr. Padmanathan presented a live example in Shuqaiya where a reverse osmosis desalination plant was implemented to effect in 30% saving in cost resulting mostly from the new technology.



Day 2: Monday, 4 October 2010

Day 2 - Session 1 : Transformation of Saudi Arabia's Power & Water Sector

Chairman: **Thamer S Al-Sharhan**, President & CEO, Marafiq

Keynote Presentations:

Steve Bolze, President & CEO, Power & Water, GE Energy

Paddy Padmanathan, President & CEO, ACWA Power International

Eng Ali Saleh Al-Barrak, President & CEO, Saudi Electricity Company

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Mr. Thamer Al-Sharhan, President & CEO of Marafiq, welcomed the delegates and spoke about the importance of transforming the water & power sector of the kingdom. He stated that reforming the infrastructure is one of the key priorities of many emerging economies, and the reform efforts in Saudi Arabia is going and the policies are clear, certain irreversible steps have already been taken and many others are scheduled. Today we have electricity & cogeneration sector regulatory in place working closely with the stake holders on the industry restructuring. Setting such market structure and roles insure fast and quicker private sector responds to achieve the overall sector goals.

He also stated that the main reform themes are as follows:

- Encouraging efficient deployment of the fossil fuel
- Protecting the environment
- Encouraging alternate technologies
- Investing in renewable
- Supply diversification
- Network integration
- Encouraging market competition
- Tariff reforms

And at the policy level, the key aims should be:

- Enhancing capital formation outside the governments budget and without sovereign guaranties
- Creating an enabling environment with fosters competition
- Improve sector efficiency through competition, accountability, profit incentives, and managerial economy.
- And above all, ensuring universal access making social desirable subsidies explicit, and traceable with the end user.

No reform efforts will succeed in isolation.. The dialogue and consultation are the keys to progress. Mr. Al-Sharhan commented.

After that Mr. Al-Sharhan introduced each of the speakers starting with Mr. Steve Bolze

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Steve Bolze, President & CEO, Water & Power, GE Energy. He gave a brief introduction about GE vision and their focus areas, after that he spoke about the transformation of Saudi Arabia's water & power sector and its demand stressing on three key messages:

- Advanced technologies are required – Many of these technologies exist but need to be deployed to meet challenges in SA.
- Increasing investment going to be required
- Strong policy for localization should the focus for going forward

After that Mr. Bolze spoke about some important figures and facts for Saudi Arabia as follows:

- * Global environment - He presented The Multi-Speed Recovery world map that showed the position of Saudi Arabia's growth rate (5%) among the global context during 2011-2012.
- * Electricity demand growth in the Middle East in the next 10 years is 159 GW with a very diversing technology mix, which are most impacted by Policy, certain strategic areas of fuel independence, and the long term growth in the given market.
- * Water reuse enablers are technology, economic, and policy
- * Advanced technologies are required for diversification of fuel resources, energy efficiency drive, sophisticated grid connectivity, and water scarcity.

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Paddy Padmanathan, President & CEO, ACWA Power International. He argued that the water and power sector can support the transformation of the Kingdom into a knowledge based economy, and started to give an outlook of what actually took place during the last 5 years:

- * The Private sector investments in the W&P increased from zero to 50 billion
- * The private sector learnt how to co-contribute not only to exist.
- * The policy frame work has matured in parallel to the improvement in the private sector as:
 - Private – public partnership has been a success and working
 - The decision has been taken to diversify the fuel mix beyond oil and gas to renewable and nuclear.
 - Fuel is still priced at a subsidized rate for power generation & desalinated water production, efficiency of fuel utilization is now being recognized as important.



✦ The sector as a creator of social economic value:

- Employment creation – the opportunity to increase Saudi citizen participation
- Marshaling Private Sector Investment
- There is enormous liquidity available. At last the true value of this sector as a safe investment domain is being recognized.
- Spreading profit generated to the citizen via public participation in ownership through (IPO)
- Creation of Knowledge – Research and Development

Mr. Padmanathan went on stating certain recommendations and remarks regarding the reform from business perspective, and regarding the KE transformation.

As for the reform he mentioned that we need to :

- Validate the value that the model of private sector co-ownership & operation is delivering
- Increase the level of private sector participation through PPPs
- Extract value by maintaining fair play in procurement
- And stressed on Keeping the competitive environment – cannot be emphasize enough

And for making the transformation to knowledge based economy :

- Increasing appetite for competitively priced goods and services to support the increasing size of the power and diesel capacity will give the impetus to transform the Saudi economy that used to be based on low energy cost and cheap imported labor to a knowledge based economy.
- Moving towards higher value added manufacturing-more precision engineered product manufacturing
- Higher value services
- Introducing the best available technology in the world into all new projects to provide the kingdom with a platform to feed R&D facilities being provided via KAUST, KACST and others.

At the end Mr. Padmanathan concluded the presentation with asking «How can the Private Sector contribute to the value added growth in the Kingdom?», and he summarized the answer into the following points:

Deliver best available technology (BAT) at each possible opportunity
 Localize manufacturing and utilize the local supply chain
 Develop Saudi Technical capacity particularly at technician and operator level.

Eng Ali Saleh Al-Barrak, President & CEO, Saudi Electricity Company. He highlighted the current situation of the power sector in Saudi Arabia stressing on the solar power system as it is the largest of the region in terms of capacity, market capital and energy sold.

He went on to remark that there are a number of challenges facing the power sector and opportunities to meet these challenges as follows:



Challenges:

- High growth in demand (will continue 78%-).
- Power is most capital-intensive sector.
- High consumption for residential use (55%).
- Low residential tariff (8 hallah /kwh) .
- Low average load factor (55%) seasonal.
- Inefficient old generating units.

Opportunities:

- Replace all the old generation units.
- Promote energy conservation initiatives.
- Load management programs (time of use tariff).
- Introduce smart grid and smart meters.
- Encourage and support renewable energy.
- Regulatory framework should exist.
- Energy efficiency (using efficient appliances)
-

Eng. Al-Barrak concluded by saying «Challenges are great but Opportunities are greater»

Mr. Al-Sharhan closed the session asking the panel «How can we transform our sector to a knowledge based economy?»

«As the kingdom moves to recognizing the true value of fuel and recognize the efficiency naturally, we will move toward the knowledge based economy» . Mr. Padmanathan answered.

Day 2 - Session 2: Renewable Energy Opportunities & Solutions in Saudi Arabia

Moderator: **Ahmad Al-Khowaiter**, Director of New Business Evaluation Department, Saudi Aramco

Keynote Presentation:

Dr Khalid Al-Sulaiman, Vice President for Renewable Energy, King Abdullah City for Atomic & Renewable Energy (KA-CARE)

Panel:

Dr Ghassan Jabbour, Head of Solar Development, KAUST

Roger M Othman, Facilities Planning Department, Saudi Aramco

Hani Zahran, Manager of the National Earthquake & Volcano Centre, Saudi Geological Survey (SGS)

Salman Al-Jishi, Vice Chairman of the Industrial Committee, Council of Saudi Chamber of Chamber of Commerce & Industry

Vahid Fotuhi, Director, BP Solar Middle East

Dr. Khalid Al-Sulaiman, Vice President for Renewable Energy, (KA-CARE), After thanking the organizers and welcomed the speakers and the audience, Dr. Al-sulaiman started the session by giving an introduction about KA-CARE vision, mission, and the strategic goals stressing that the Royal Decree has highlighted and focused on establishing this city to serve the sustainable development of Saudi Arabia in moving toward a sustainable energy mix, and to try to be a global leader in energy sector , and to fulfil that we will need to work on changing the culture, from education up to all segments of the value chain.

KA-CARE was given a large mandate covering different segments:

Setting the policy and the country strategies related to the sector

Being a regulator in both sectors

Responsibility to be involved in technology development

Responsibility to develop the human capacity, whether in R&D or in industry.

He also spoke about the alternative energy applications for the Kingdom's strategy:

Solar: short-term deployment and also suitable for remote locations with limited grid access

If KSA wants to become a leader in CSP technologies, this technology leadership could be extended to CSP desalination

Leadership in PV/CPV-based RO technology could be built on the current experience in KSA

Dr. Al-Sulaiman concluded his presentation by listing the main pillars that lead to the success of the national energy system in renewable energy.

Dr Ghassan Jabbour, Head of Solar Development (KAAUST). Dr. Jabbour spoke about the centre's vision and its strategic goals, also spoke about the reasons of using solar energy in the kingdom , and at the end he concluded saying «...the economics of solar energy may someday look much like the economics of fossil fuels. Energy security ultimately means more than access to energy; it means access to cheap energy. And like it or not, the Sun belt has the cheapest solar energy in the world, in vast quantities.» By William Pentland.

Roger M Othman, Facilities Planning Department, Aramco, Mr.Othman spoke about the wind energy , and stated that the kingdom has a promising wind resources according the wind speed map that has been developed.

Hani Zahran, Manager of the National Earthquake & Volcano Centre, Saudi Geological Survey (SGS). Mr. Zahran spoke about the potential geothermal sources in Saudi Arabia that may be used in energy production. He stressed that Renewable energy resources can include geothermal, solar and wind power, and that the Kingdom has many recent lava fields with possibly significant geothermal resources.

Salman Al-Jishi, Vice Chairman of the Industrial Committee, Council of Saudi Chamber of Chamber of Commerce & Industry. Mr.Al-Jishi introduced some observations on energy sector in kSA , moreover he stated that for SA to embark on renewable energy sector we must plan to ensure from the onset that :

- Saudi builds competencies in terms of manufacturing the infrastructure locally.
- Saudi Builds competencies to operate and maintain the infrastructure.
- Saudi invests in R&D to encourage innovation and technological growth and leadership.
- Saudi encourages real growth in supporting industries.

And concluded by the following suggested structure:

- BOOT (Build Own Operate and Transfer or any of its several variations)
- Public Private Partnership (Foreign Technology Partners)
- Private sector foreign joint ventures

Suggested Regulations:

- National Grid to absorb excess production and credit private producers
- Carbon Credits to be applied
- Minimum local content in manufacture of Infrastructure (eg 40% by value)
- Central Authority to manage and govern all forms of energy generation

Suggested Incentives and Support System:

- Government Subsidy to equate cost of producing all forms of energy
- Special funding to encourage investment in this sector
- R & D for Centers of Excellence
- Educational Institutions to provide courses at all levels to make Saudi employable
- Special Industrial Cluster Program to develop this sector

Mr. Vahid Fotuhi, Director, BP Solar Middle East.

Mr. Fotuhi, gave an outlook about the demand growth in SA, continued saying «many people question the ability of solar energy to solve the problem?» And the answer is yes, the solar supply can save up to 35- billion dollars each year, in addition, the solar power will be as cheap as natural gas in 10 years, and the steps that could be taken to promote the solar power generation in KSA can be as follows:

- * Establish solar IPP's
 - Performance-driven, decreasing over time
 - Benefit: Will create jobs and help reduce prices and improve expertise
- * Reform utility prices
 - Expand rate structures (peak/off-peak)
 - Benefit: Will promote energy savings and generate greater private-sector investment in power sector
- * Adopt stricter Green Building standards
 - Enforce policies that make buildings more sustainable and less wasteful
 - Benefit: less energy demand, lower strain on power gen infrastructure

«The stone Age didn't end because people ran out of stones» Mr.Fotuhi quoted Shaikh Ahmed Zaki Yamani , the former Saudi Oil minister

Mr.Ahmad Al-Khowaiter closed the session thanking all the speakers for their remarkable presentation and concluded the Q&A session saying:

The capacity of each renewable resource is different and each of them has certain cons, and the storage system will play a huge role to solve them, on the other hand, the portfolio has to always include different resources

Day 2 - Session 3: Energy Conservation & Demand Management

Moderator: H.E. Dr Saleh Alawaji, Chairman of the Board of Directors, Saudi Electricity Company & Deputy Minister for Electricity, Ministry of Water & Electricity

Panel:

John Young, Director, CRA International

Abdulhameed Al-Nuaim, Customer Services Executive Director, Saudi Electricity Company

Dr Yousef Alyousef, Executive Director of National Energy Efficiency Programme (NEEP), King Abdulaziz City for Science & Technology (KACST)

Lionel Aubert, Director, Water Solutions, Schneider Electric

Paul F Browning, Vice President, Thermal Products, Power & Water, GE

H.E. Dr Saleh Alawaji, Deputy Minister for Electricity, Ministry of Water & Electricity. He started the session asking the panellists a group of questions:

What are the most effective ways of promoting conservation and the efficiency energy use throughout value chain? How can we optimize consumption and cope with peak demand?, What should be the new demand management initiatives to be introduced? What is the latest in tariff policy? How can we maximize efficiency? What energy saving technologies are available? After that he introduced the speakers starting with John Young



John Young, Director, CRA International, he started his presentation with a demand analysis summarized in the following:

- Tariffs have edged up slightly for industrial and commercial customer, but are unlikely to change much for residential customers in the near term
- Population growth shows little sign of slowing
- The economy appears to have weathered the recent downturn reasonably well
- Power use per person is likely to increase as the economy continues to grow and bring more electrical goods into more homes
- So demand is likely to continue on its inexorable –and steep –path
- The GCCI should provide some reserve transfer capacity, but everybody's peak demand periods are at the same time

Mr. Young commented that Introducing DSM programmes and new tariffs will require action from a number of entities with certain roles:

SEC :

- Demand Analysis
- Customer engagement
- Program management and evaluation
- Providing incentives to customers
- Billing

ECRA :

- Tariff
- Approval for programmes
- Cost recovery and incentives for utilities

Ministries:

- Standards
- Regulations
- Funding
- Social Equity

Mr. Young concluded saying that we need to work together with the customer following the win-win bases, and the actual benefits of individual DSM programmes or tariff changes will obviously vary, but they are real.



Abdulhameed Al-Nuaim, Customer Services Executive Director, Saudi Electricity Company, he highlighted the results of project management that have been implemented in SEC, stating that they were concentrating on raising the awareness of the public, and the importance of the demand side management programs for energy efficiency.



Dr Yousef Alyousef, Executive Director of National Energy Efficiency Programme (NEEP), (KACST), he spoke about the NEEP objectives, achievements, the power sector challenges, and the national organizations involved in helping to achieve our energy efficiency goals (visit www.neep.org.sa),



Lionel Aubert, Director, Water Solutions, Schneider Electric, Mr. Aubert gave an outlook about Schneider electric company after that he stated that the issue is the energy management not the power. Also he mentioned some figures:

%5 is the first step we can reach in saving energy consumption
%30 is what should be our target. At last he gave an example of integrated solutions in buildings using integrated technologies.



Paul F Browning, Vice President, Thermal Products, Power & Water, GE. Mr. Browning stated that we need to balance between prosperity and sustainability, and with technology we can bring them together to the world, region, and to Saudi Arabia. After that he outlined the challenges and the opportunities of the sector:



The Challenges:

- Demand growth continues at ~ 7%
- Cleaner, affordable energy needed
- Sharp load curves create high peak demand
- Older generating assets will require replacement
- Increasing high-value crude oil monetization

The opportunities:

- New power generation and T&D investment
- Renewable and fuel efficient thermal
- Smarter grids and flexible power
- More flexible and efficient technologies
- Diverse and efficient generation alternatives

At the end he concluded the presentation stating:

- Over the next decade, flexibility will become a global requirement.
- Technology investment enables higher efficiency.
- Efficiency and diversity equals supply-side conservation

Dr. Saleh Al-Awaji closed the session asking « what is more effective for us to put our efforts in , doing awareness programs and educating people , or working on doing a proper legislation to force people to use energy efficiently ?



The speakers answered:

- The best way is to educate people about their benefit of using the energy efficiently
- We should go in parallel, the awareness and the tariff
- The Policy should support the customer by not allowing the inefficient devices to be imported.

Dr. Al-Awaji concluded saying, awareness is better than enforcement, at the same time there are decisions that have been made by government to enhance the power conservation and tariffs. There are ongoing coordination between ministry of W&E and other agencies in the power supply sector in order to enforce the quality of house appliances.

DAY 3 – Session 1 : Managing Solutions for Water Resources

Moderator: Dr Adil Bushnak, Chairman, Bushnak Group & SWPF

Keynote Presentation:

H.E. Loay Al Musallam, CEO, National Water Company

Discussion Paper: Sustainable water and food security

Prof. Walid Abdulrahman, Managing Director, Miahona

Panel :

Dr Mohammed Al Saud, Deputy Minister for Water, Ministry of Water & Electricity

José Enrique Bofill, Director Middle East, aqualia

Michael Chia, CEO, Keppel Integrated Engineering

Hans Meulenbroek, General Manager, Metito Berlinwasser

H.E. Loay Al Musallam, CEO, National Water Company,

H.E. Al Musallam started his presentation addressing the water sector challenges and the reasons of establishing NWC and its objectives. Then he mentioned the benefit of the reuse concept in industries, commercial, public parks, landscaping agriculture summarized in the as follows:



- Reduction in environment impact, reduces carbon footprint
- Helps in augmenting the potable water supply
- Helps in commercial sustainability of NWC
- Protection of natural ground water resources (non-renewable water resources)



H.E. Al Musallam also stressed that the current water tariff needs to be reformed, and then presented the effect of water pricing policies as:

- Optimal Water tariffs and charges convey a signal to water users on the value of water and bring a change in water usage pattern
- In many countries the study has shown that the revision of tariff has encouraged conservation.
- Further this reduction in demand helps in reducing the growing infrastructure investments in water treatment plants,

At the end of the session Dr. Bushnak asked about tariff, as it is apparently the most important issue and since there is no prospect of changing it soon, he asked about the options and the alternative plans that the NWC has for gaining resources

H.E. Al Musallam answered that there is a general agreement that the subsidy should continue and NWC knows that this is a difficult task and a political issue and trying to continuously communicate the message that without change they can't sustain performance. He added that possible solutions include introducing changes in tariff starting from industrial sector. He also mentioned that they are not depending entirely on tariff and hoping that 50% revenue will come from TSE sales, they are also launching many initiatives to add value to the shareholders and increase and save from production cost.

Another question from the audience was about the solution of leasing the infrastructure to utility companies at a rate that will not influence the tariff, H.E. Al Musallam answered that in an ideal situation this would be the ultimate way to engage the private sector and benefit from the market forces to improve performance and maintain a reasonable tariff, yet in the kingdom there are challenges most important of which is the tariff because if the whole risk is assigned to the private sector, it will invest and recover its cost directly from the customer. He commented that what they offer is a combination where they can give responsibility to the private sector but also share the risk with them. He continued, going for the lease or concession option is the ultimate solution, and this is the plan.

Prof. Walid Abdulrahman, Managing Director, Miahona,

The contents of Prof. Abdulrahman's presentation described the global water and food security, in Arab region, and in Saudi Arabia. He defined the meaning of the food & water security, and then mentioned that presently there are 1.1 billion people are lacking the access to a safe drinking water in the global scale, and 2.2 billion are lacking the access to adequate sanitation, and millennium goal is to slash this ratio by 2015.



He continued, the annual water share per capita has decreased, as it was 15000 liters in 1950 and expected to be 1500 in 2015 and this shows the magnitude of the problem.

Also he explained the alarming rate of increase of the domestic demand from water in Saudi Arabia, which is going to exceed 7 billion m3 per year by 2050 forming a gap between the supply and demand with 4000 billion in the coming 50 years, which is a serious alarming figure.

Prof. Abdulrahman ended the presentation displaying the following Conclusions & Recommendations

- Luxury in water use should be stopped soon
- A new comprehensive legal act have to announce a new water sector regulators, tariffs, community awareness and use should be spread
- More funding and an support to localize water technology, R&D, and for specialized research centers.
- More involvement of the private sector in water services and technology
- Capacity building and training
- We have to deal with each region that has its own agriculture and water sources and population, we cannot generalize a uniform culture and water policy in all regions
- More financing and support to water
- We have to provide for aquifer storage & recovery in case water is cut out for any reason

At the end he suggested to establish a specialized institute for water and food security to be a viable country and to reach sustainable water and food security.

Dr Mohammed Al Saud, Deputy Minister for Water, Ministry of Water & Electricity,

Starting by what he called a sad story that happened in Saudi Arabia in the last 28 years, Dr. Al-Saud showed pictures of Layla lake which in 1980 was full of water compared to its current completely dry situation. In the past it used to get filled by natural flow rain water which although limited, was enough to balance the system as usage was based on necessary needs.

In 1980, development of agriculture started with wheat although the area isn't suitable for wheat crops.

He demonstrated satellite pictures to show the declining levels of underground water and showed what will happen if we continue like that. Ground water will dry up completely in an area like Wady Aldawaser which had high-quality water.

Consequences include declining ground water, degradation of ground water quality and increasing of production cost.

He then talked about the conflict of usage between city and agriculture. He declared that if the case is left as it is, agricultural will go out of business soon because of lack of water and domestic water will be affected.

He called for the need to prioritize use of water, place human usage before agricultural usage and readopt the old model of importing most water-thirsty crops from outside.

He then concluded by a powerful statement saying that food security never means self-production.

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José Enrique Bofill, Director Middle East, aqualia,

Mr. Bofill spoke about the Management Solutions for Water Resources, describing the major areas of action which are:

1. System efficiency
 - New infrastructure based mainly on Lowes Operation and Maintenance cost.
 - Non Revenue Water level set to minimum.
 - Optimization of HR resources and personnel incentivization
2. Tariff policies – Towards cost reflectivity
 - To enforce customer payment is key to obtain public awareness
 - Wide range of alternatives for the tariff structure
 - In any case: Nonpayment should not be tolerated
3. Demand management- Customer focus.



Key importance should be given to public awareness campaigns. The customer should be the real focus of the management activity. Effective and intelligent dealing with low value uses of water. Enforcement of regulations through creative solutions

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Michael Chia, CEO, Keppel Integrated Engineering,

According to Dr.Chia, achieving water sustainability was particularly important for Singapore considering scarcity in water resources, small area and small space for ground water forcing it to buy water from neighbors. Over the last 40 years Singapore succeeded in building a sustainable water supply.

For achieving a sustainable water supply, it is important to adopt a system approach to water management, create holistic framework and set and implement appropriate strategies.

It is also important to incorporate demands and environmental and water factors into the master plan and land use planning of the city from the start , to execute the plan it is important to have enough resource and budget to build the necessary water and waste water infrastructure.

An integral part is willingness of people to accept social responsibility of keeping water and waste clean, reducing demand, and adopting water recycling practices. Policies and programs are of no use without buy-in from the public. Accordingly, the Singapore agencies have moved from publishing and communicating to getting people to participate in programs so they take ownership of environment and water resource.

Water pollution control and water pricing strategies were two of the main areas emphasized in the strategy.

Water pollution control helps protecting the water sources and making them suitable for treatment with comprehensive sewage treatment for waste water as Singapore is 100% connected through sewage systems.

Policy separate industrial use from domestic use water. Efficient solid waste collection and disposal system prevent the contamination of our water course keeping rivers and drains clean. Regulations also enforce industries onsite treatment.

Measures and the whole system approach managed to achieve sustainable water supply by increasing the two traditional water sources into four with the extra reclaim water and desalinated water sources. The amount of recycled water is about 35% today and is being used by industries to alleviate the use of ground or imported water for portable use.

He concluded by stating that what Singapore has done on the software and hardware side put it on quite a sustainable course to be able to take care of our future development.

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Hans Meulenbroek, General Manager, Metito Berlinwasser

Mr. Meulenbroek presentation was about management solutions for water resources, he started his presentation giving a brief about the water and wastewater cost Management tools , commented that tariff is the main tool for managing the cost and since its low so we need to find alternative. We should reflect the cost of the actual water source either to use a cost formula that consists the cost of the water source (ground / see water) and the cost of transportation, or we can use the water index.



After that Mr. Meulenbroek mentioned a list of integrated management tools, as follows:

- Asset Management System incl. GIS
- Management Information System
- SCADA Monitoring Systems
- Metering, Data Mgmt. & Billing
- Laboratory Info Management System
- Leakage Control (NRW)
- Client Management Systems (Call Centers)
- Water Resource Management (Modelling)
- Energy Management
- Human Capital Management (Training)

DAY 3 – Session 2 : Produced Water : Waste or Resource?

Moderator: Eng Lisa Henthorne, CTO & Senior Vice President, Water Standard & Past President, IDA

Panel :

Eng William Conner, Environmental Engineering Consultant, Saudi Aramco

Dr Samer Adham, Managing Director, Global Water Sustainability Centre

James P Welch, Director Shale Gas Solutions, Siemens Water Technologies

Eng Lisa Henthorne, CTO & Senior Vice President, Water Standard & Past President, IDA

Eng. Lisa started by defining produced water of which the global production is more than 250 million bbl/day and the percentage in some mature crude oil fields can comprise as much as 98% of the production brought to the surface.



Depending on location, regulation, feasibility of options, cost, produced water is either sent to a disposal well, discharged at the surface, re-injected into the reservoir to maintain pressure flooding or reused at the surface.

She then listed some of the challenges of water treatment including high cost, contaminants which can create environmental impacts upon discharge, difficulties of offshore treatment and the largely varied water quality.

She then talked about the environmental drive for zero discharge which is putting a significant impact on oil and gas companies particularly those that are used to discharging the water on surface. This is because treatment before re-injection can be complex and expensive considering the increasingly stringent environmental regulations and the uncertainty of the impact of re-injecting on a reservoir. She concluded by alluding to the changing dynamics of produced water occurring around the world today.



Eng William Conner, Environmental Engineering Consultant, Saudi Aramco



Mr. Conner started by stating that Aramco represents an international example of responsibly handling the produced water as they reuse it entirely without causing any negative environmental impact. Hence, Aramco's focus is on reusing produced water in other more valuable ways and finding out how oil and water industries can help in turning this water into a valuable asset.

Explaining to the audience the nature of Aramco's oil fields, he said that they are blessed with oil reservoirs that are unlike any other in the world with oil that is reasonably easy to produce, very low in water cut and requires very simple oil recovery methods and enhancement technique. Aramco handles produced water by applying a simple oil water separation, removing any additional solids and re-injecting almost all the produced oil back into the oil field for oil field pressure maintenance.

In an effort to become the leader in water conservation, a year ago Aramco took the initiative of forming a Water Conservation Committee to save ground water resources and other water resources in the kingdom through a multiple disciplinary committee across different departments including consulting services department, processes control system department and the environmental protection department all working in synergy to produce maximum results.

Aramco's oil fields being far from the sea give produced water unique importance and causes Aramco to look at all sources of water as a resource so as to reduce its use of nonrenewable resources. For example, Aramco is currently reusing 90% of sanitary water and is working on industrial waste water reuse options. Also, one subject of the first investigated by the group is how they process the oil. In the washing step for example, they are looking into replacing the use of ground water with sea water or produced water.

Mr. Conner provided more details regarding the nature of the oil fields and the process they currently follow regarding their produced water and concluded by stressing again on the fact that they are looking forward to any suggestion or ideas for getting more than one use of their produced water before they re-inject it for oil field pressure maintenance.

Dr Samer Adham, Managing Director, Global Water Sustainability Centre

Dr. Adham gave an introduction about his company explaining that as an international energy company they are also a producer of water in their upstream operations and a consumer of water in their downstream refinery operations clarifying that water touches every segment of the oil and gas industry.



He then explained that there is no one definition for produced water as it comes from different sources and a lot of it is site-specific with characteristics that are very variable. He talked about the treatment challenges including diverse contaminants, extreme conditions and robust process which call for innovative treatment technologies.

He stated that the average barrels of water for every barrel of oil produced but the numbers goes up to 7 or higher depending on the age of the well which globally amount to more than 210 million barrels per day. This water is mainly re-injected for reservoir pressure or disposed off but there are other opportunities coming up like using it for enhanced oil recovery, cooling, steam generation, in agriculture for wetlands, irrigation and livestock watering, in dust control and in aquifer recharge. There is no one standard solution for the reuse option of produced water as it depends on produced water quality, end use and location.

Wide range of technologies used in water treatment. He presented some technologies available for treatment saying that a standard produced water treatment solution does not exist and depends on intended use.

Management of produced water is evolving for many reasons like for example the inability to discharge water back to reservoir due to reservoir pressure and tight regulations. Examine innovative ways for handling the treatment of produced water for recycle.

The mission of Global Water Sustainability Center located at Qatar Science & Technology Park (QSTP) working in collaborating with GE water and power on producing water treatment, developing innovative desalination techniques with lower costs and promoting conservation.

In his final remarks Dr. Adham mentioned that the world is facing serious shortage of water as water demand among all sectors will be increased and regulatory framework is becoming more stringent. This causes major challenge for industries as they have to manage water more effectively and innovatively. Hence, produced water is a potential alternative water source but needs innovative technologies at affordable cost.

James P Welch, Director Shale Gas Solutions, Siemens Water Technologies

He spoke about the water recycle and re-use , and projects need to be evaluated with respect to alternatives and residual values

- Projects need to be evaluated for tangible and intangible benefits. For example, if produced water, flowback for municipal effluent can be recycled to some beneficial reuse, it is potentially backing out the high cost to manufacture municipal desal water. In other countries, cheap sources of surface water are available but in the Kingdom it is likely that expensive desal water is being back out as a supply source to society. This needs to be considered as an intangible cost benefit to the reuse project.
- If a treatment process appears commercially justified, then the waste streams and secondary processes need to be evaluated for inherent value. Is there incremental benefit for treating the product water to a higher standard? Continue to evaluate options until all the value have been extracted from the waste and product steams and the next cheapest alternative for waste steams is disposal.
- Technology and innovation drive the economics to enhance recycle and reuse opportunities and extract additional value from water reuse projects.
- Government, industry and institutional partners like KAUST are all stakeholders that must invest and ultimately benefit from innovation.

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DAY 3 – Session 3 : Consumer Relations – Concluding Open Panel Discussion

Moderator: Jamal Khashoggi, Independent Journalist

Panel :

Dr Abdulrahman Al Ibrahim, Vice Governor for Consumers & Service Providers Affairs, Electricity & Co-Generation Regulatory Authority (ECRA)

Senior Representative, National Water Company

Khalid Agala, Head of customer experience, National Water Company

Dr.As'ad Abu Rizaiza, King Abdulaziz University

Dr. Abdul Rahman bin Mohammed Al Ibrahim – Deputy Governor for subscribers and service providers, Electricity & Co-generation Regulatory Authority (ECRA)



Dr. Al Ibrahim start his presentation by pointing the important relationship between the company and the client, within this relationship delivering electricity to homes is what the client looks for regardless of any obstacles related to the service provider. The citizen wants a reliable service, high quality and affordable price.

Furthermore, Dr Ibrahim explained the main tasks of the (ECRA) which include the evaluating the service provider and trying to narrow the existing gap between production and consumption. He also explained, briefly the process by which (ECRA) receive and deals with customers complaints against the service provider. For (ECRA) is also considered the main arbitrator between the service providers and the customers.



In regards to complains according to the regions in the Kingdom the statistics are as follow: 35% from the Central Region, 29% from the Western Region, 28% from the Southern region and 8% from the Eastern region.

As for complains according to the provided service:

Billing and tariffs 8%, Connectivity 27%, the removal of poles 19%, interruption of electricity service 30%, the removal of sub-stations 2%, other 14% complaints.

(ECRA) also set rules and regulations to make sure that the customers get his rights. for example: No customers should endure interruption of electricity service for more than 18 hours, furthermore, customers should have the services activated to them within 20 days from applying to it.

Mr.Khalid Al Aqala, Head of Customer Experience, The National Water Company

Mr. Al Aqala started by defining the term «Customer Experience», and how the National Water Company took into consideration the latest developments in this area and integrated them into the company strategy. And since the primary objective of the National Water Company is to create a great customer experience to ensure the interaction between the company and the customers, so they began to use the following key aspects to measure the customer satisfactions: sensory & emotional, financial, clarifying that the percentage of customers dealing with the company based on sensory& emotional aspect is 60%, while 40% is based on the financial aspect. He continued saying that the customer experience strategy is linked with all the key strategies of the company, such as the customer service strategy, human resources strategy, information technology strategy, services strategy and the marketing strategy.



Furthermore Mr.Al Aqala pointed out the customer experience approach as follows:

- Directing the focus on the client
- Increasing the customer satisfaction
- Improving the public service, performance and efficiency
- Promoting the image and the competitive position in the water industry market, «the establishment of new standards»
- Reducing the costs and increasing the revenues.

Then he spoke about the progress in raising the number of the satisfied customers, expressing that in the following numbers according to the last referendum results:

The percentage of satisfied customers in March 2009 to August 2009 was 29% versus 25% for the non-satisfied.

And by the end of 2009 the percentage increased to be 89% satisfied customers, versus 3% non-satisfied. Mr. Al Aqala concluded his presentation highlighting the quality improvement in dealing with the customer problems (that take less than 24 hours) that increased from 23% in 2009 to 68% in 2010.

Dr. As'ad Abu Raziza, King Abdul Aziz University in Jeddah

Dr. Abu Raziza started his presentation asking a question "Can we consider water as a commodity that can be traded for profit-taking? Or is it a human right?" which is the state duty to provide any citizen with the minimum amount of water that reserve his life, and if any extra, it can then be returned to the companies use.

He continued saying that the water price in Jeddah (due to the nearness to the distillation plant), shouldn't be compared to Riyadh that is 500 km far from the distillation plant. So, is the price calculation will remain the same?

Dr. As'ad concluded saying that there are many ways we can use to conserve water before turning to raise the water cost, for example:

- Repairing the water distribution network, as the percentage of the water leakage ranging from 10% to 40%, so the savings should come from repairing the network first.
- Reducing the water used in the agriculture sector, as it consumes around 98% while only 2% is for the citizens' consumption in some areas in the kingdom, therefore proportion of the agricultural sector should be reduced for the benefit of the citizen.



Mr. Jamal Khashoggi concluded the meeting by addressing questions to the speakers.

Q: How much transparent the National Water Company is, did the National Water Company announce one of the projects to citizens such as the sewerage network in Jeddah?



A: Mr. Khalid Al Agla, there are several channels in the Water National Company to convey information to the citizen or interested, starting with papers, in the Media Centre belonging to the public relations department, we publish company news including news of sewerage networks and house connections almost every week, in addition, the company has a website on the internet uploaded regularly and hourly updated about the most important news in Water National Company and its latest developments.

Q: Electricity Regulatory Authority is responsible for regulating electricity. Who is responsible for regulating water?

A: Mr. Khalid Al Agla: As you know Water National Company is under the responsibility of the Ministry of Water and Electricity and is headed by His Highness Dr. Abdullah Al Husain the minister of Water and Electricity.

Q: In case of dispute between a citizen and the company who is the judge?

A: Mr. Khalid Al Agla: I knew that Electricity Authority has a future project in regulating water. But at present any decision in this regard is back to The Ministry of Water and Electricity

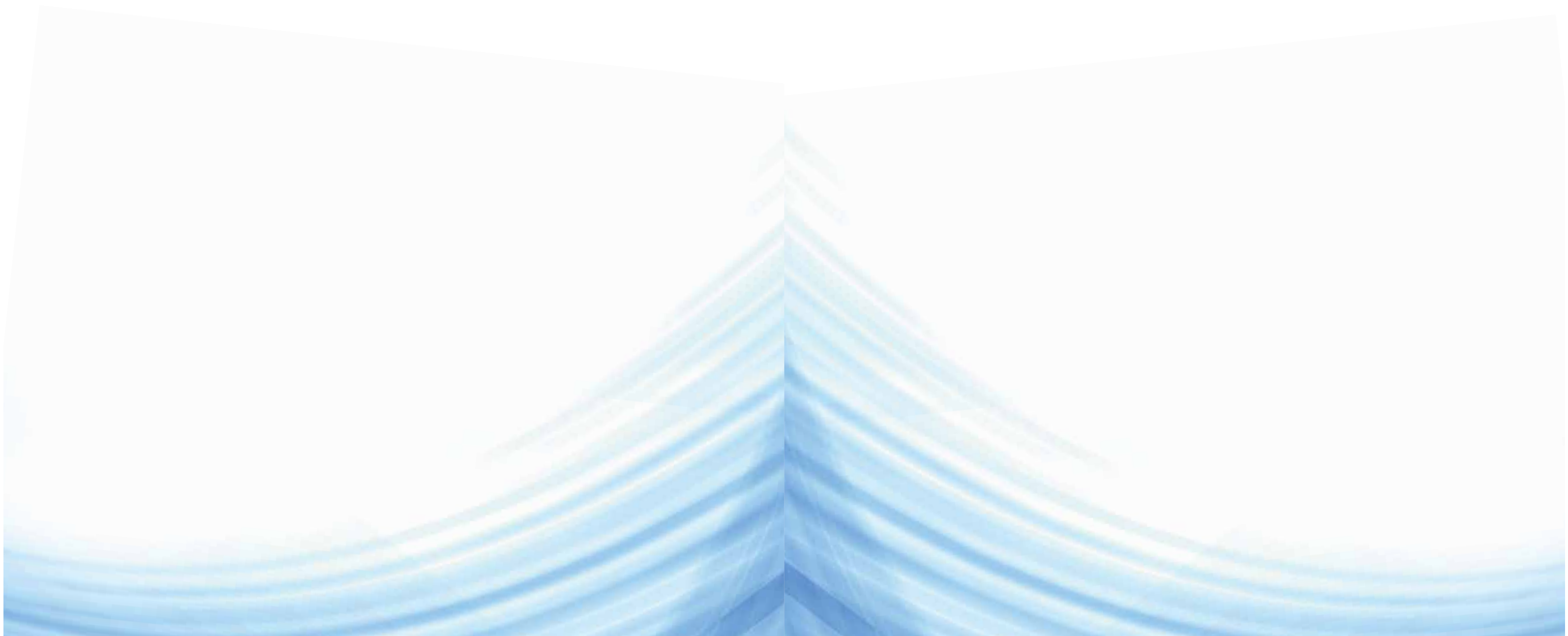
The SWPF 2010 Recommendations

1. Request the Supreme Economic Council to speed up forming a comprehensive national system to move from demand driven policy to demand management through comprehensive planning incentives and public awareness to reduce consumption of all uses of water, electricity and energy locally making it one of the main elements in the preparation of development plans for cities & regional planning. The current high growth rates require increasing water and electricity production by 2032 to 3 times the present level and this will increase the demand on petroleum products to reach 8.3 million barrels equivalent in 2028.
2. MoWE and Ministry of Finance are requested to expedite the development and the implementation of an integrated system to achieve financial sustainability to be able to provide the required investments for water & power services for future generations. They need urgently to apply all mechanisms to ensure providing 500 billion Saudi Riyals required during the coming ten years to meet the local needs for water & electricity. We recommend the solutions to include local community funding mechanisms such as Water Trust Funds and Islamic bonds in addition to government budget allocations. The private sector should be encouraged to participate in this system
3. Encourage water use efficiency for municipal, agricultural and industrial uses to achieve water security and social justice and direct the generous government subsidies to the needy groups in society as well as to farms, and factories that use water as efficiently as possible through restructuring the domestic and industrial tariff and developing a tariffs for the agricultural use.
4. Request Ministry of Petroleum to provide the types of fuel required to achieve higher efficiency of fuel usage and minimum environmental impact as well as to identify and publicize the minimum fuel efficiency when building or updating existing generations & production plants and emphasizing the need to use world prices of fuel used when trading-off between alternatives, regardless of the nature of the contract and to identify incentives provided by the state to increase the efficiency of energy use above the minimum level
5. Request King Abdullah City for Atomic and Renewable Energy (KA-CARE) to accelerate the development and the implementation of a national system for sustainable energy in order to maximize the amount of conserved oil and to maximize the contribution of the national human & industrial capacity in maintaining the global leadership of the targeted national technology sectors and maximize the development of the national value-added chain and to declare the time frame for Saudis to reach the point of producing 25 % of electricity and 50% of the desalinated water using renewable energy to attract investments and establish the industrial base necessary to achieve this.
6. Request The Electricity & Co-Generation Regulatory Authority (ECRA) to approve tariff levels that reflect the true cost to enable the Saudi Electricity Company to expedite the implementation plan for restructuring the electricity sector to be a competitive electricity market, as has been stated in the electricity system and to enable the private sector to invest in the electricity industry. ECRA should also develop and announce a plan to move to a national smart grid to help in the implementation of demand management and to stimulate investment in decentralized multi-sources of electricity
7. Request from the National Water Company to deliver the safe treated reuse water to the industrial and agricultural areas that surround cities. Request Saudi Arabian Agricultural Bank to support farms that use treated water efficiently and determine the minimum production efficiency of each cubic meter of water used that is worthy of government support for the crops that promote food security in order to stimulate the rational use of water in agricultural production
8. Request Ministry of Water and Electricity to expedite the issuance of a comprehensive water law that defines the priorities of use for different purposes and the minimum required efficiency of use and to establish an independent government entity to oversee the implementation and activation of this law and to measure and announce the quantity and quality of the remaining water each year in the underground reservoirs and other water sources
9. Request MoWE and SWCC to provide strategic stockpile of drinking water under ground near desalination plants sufficient to cover the needs of the neighboring cities for a period of 180 days and not less than 90 days , and the need to maintain water in the underground within the Kingdom as a natural reserve for future generations, and the need to stimulate investment to harvest rain water by ensuring its purchase ,and encourage the Ministry of Water and Electricity to develop a water security in all regions of the Kingdom, and examine the water distribution mechanisms in situations of emergencies to identify and announce the allocated quantities for each citizen and resident and the location and method of delivery.
10. Request the Supreme Economic Council to form a body of the concerned governmental bodies to develop a national integrated system for water security while maintaining food security and monitor the implementation of its decisions to ensure achieving a sustainable water & food security for future generations
11. Create a national fund to support water and food security projects, sustainable energy programs, demand management and programs to support small industries based on knowledge, innovation, R&D and training programs to develop national capacity.
12. Request all concerned governmental authorities and water and electricity companies to implement projects in many areas of the Kingdom for producing water and electricity using renewable energy during the next decade, with preference given to national companies and industries in order to establish an industrial and commercial base for the use of renewable energy

13. Request Ministry of Finance and Ministry of Water and Electricity to move from a policy of building and operating power plants and production at low cost to buy the produced electricity and water at the lowest cost corresponding to the higher efficiency of energy use and less impact on the environment and public health , and request the Supreme Economic Council to publish their study results carried out by them to determine the value added to the economy from the national privatization program , with the purpose of consolidating the Kingdoms leadership in this regard and informing the citizens of its benefits.
14. Request the Ministry of Higher Education , King Abdul Aziz City for Science and Technology (KACST) and the research centers in the Saudi universities to declare the specific targets they want to achieve in the future in the strategic national plan for science and technology , and to link the government support to target achievements and promote industrial partnerships for global competitiveness and urge international companies to support national research programs and technology
15. Request Saudi banks and the Council of Saudi Chambers to urge businessmen to establish partnerships and investment funds and partner with local universities & research centers to develop new inventions and national products for global competition
16. Based on the rapid growth of electric loads and the challenge facing the electricity sector to meet the growth , we must accelerate to take all the appropriate procedures to improve the efficiency of electrical devices used (such as air conditioners, washing machines, etc.)
17. Request all related governmental agencies to cooperate with a Al-Aghar group to complete the study prepared about prioritizing the programs needed to establish and to activate a national integrated system that enables the sectors of water , electricity and renewable energy of global leadership and transforms the Kingdom into a knowledge-based economy
18. Request MOWE, Ministry of Agriculture, Ministry of Culture and Ministry of Education to develop TV and Radio clips to promote rational use of water & electricity consistent with Islamic values

At the end, all the forum participants urged the organizers, the Ministry of Water and Electricity, SWCC, KA-CARE, National Water Company and the Saudi Electricity Company to continue their efforts and support for future success of the forum during the coming years to become the source of knowledge, innovation and a global competitiveness in the water, power and renewable energy.

Notes





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SWPF 2010

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SAUDI WATER & POWER FORUM

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