A Framework for Developing Sustainable Water Utilities in the Coming Decades

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Water utilities will be required to meet escalating water demands to their systems as urban populations in developing cities grow and as urban-centric economies come to predominate national agendas. These growing water demands will compete with natural variability in the hydrologic cycle and the influence of climate change on the water cycle. They will have to be developed through a series of demand management and supply side approaches against a backdrop of previous water development projects that have, in many cases, allocated and diverted the reliable water sources of readily available water sources in rivers, lakes and aquifers. Water quality conditions have further limited the viability of developing traditional water sources for fresh water supplies. In the late 20th century, greater deference was placed on the social, cultural and environmental consequences of water development projects. As a result, many projects that could be technically feasible were deferred and supply was provided through operating reserves from previously constructed projects. That margin is being progressively consumed. Water utilities will have to develop major new capital projects if they are to be able to support growing human and economic needs. This capital investment must be supported within a reasonable cost/ pricing profile and without disrupting the political balance between competing interests that have significantly modified or prevented the recent development of adequate water and sanitation services.

This paper will consider the degree and breadth of forces that are challenging water utilities in the United States, United Kingdom as well as in the Pacific Rim countries of Singapore, Hong Kong, and Australia as they plan to meet their needs of the coming decades. While diverse geographically and in their governance, these utilities face similar challenges and there are common issues that all will have to successfully address. Some of the topics that will be described include:

1. The urban densification and growth of populations and urban-centric economies, especially in Asia and Africa; the water footprints and projected demands of these communities and the need to provide adequate fresh water and sanitation if standards of living and management of poverty levels is possible. Cities present the greatest challenge to meeting Sustainable Goals in the 21st Century *(United Nations)* but they also present the greatest opportunity for achieving a level of sustainability that can support national agendas and human rights.
2. The physical limitations of natural water resource systems and the conflict with previously allocated water resources to agriculture, industry including power production and resource extraction and more recently to environmental and social uses (including sanitation needs).

3. The governance of natural resource systems in areas and times of adequate resources is substantially different to the policies, roles of governing bodies and stakeholder groups and water utilities when resources are scarce or over-allocated. It is suggested that the previous approaches must be changed significantly for all parties if the challenges of the 21st Century are to be reasonably met. A framework of roles and responsibilities and constructive decision making for developing and developed countries will be suggested. That would include the role of regulatory programs, market forces, policy direction and venues for more effectively balancing the competing interests of stakeholder groups. Effective governance that supports sustainable water system management, operations, development and protection should create a balance between preservation of the status quo and the appropriate development of new sources of supply.
4. The role of water utilities vis a vis state and national programs and non-governmental organizations within that framework will be described for various situations. A framework for providing the desired level of service within anticipated time horizons will be suggested. Common elements in successful programs include effective demand management strategies, inclusive and transparent decision processes, flexible but clear governance models, reliable funding programs and supply side programs that are politically supportable.
5. Technological advances are critical to providing a broader spectrum of new sources of water that can supplement traditional sources of water. Desalination, reclamation of marginal quality waters including planned indirect potable reuse projects, new reservoirs and effective demand management programs including leak repairs will provide greater flexibility in meeting needs. They often come at a higher marginal cost that will be reflected in the pricing of water as well as public acceptance and consumption patterns.
6. The pricing of water is critical to supporting the adopted financing strategy, whether it comes from user fees or other sources, if the levels of required capital investment are to be supported, especially with the reinvention of the global financial systems. This will affect methods of project delivery as well as the role of public water agencies working with private entities for operation of water systems, construction of projects, financing and risk management as well as their role in supporting state and national initiatives.

This framework and the projected demands on water utilities suggest that major transformations in governance, business practices and operations will be required of water utilities in the coming decades. There is no common template that can be applied around the world but there are fundamental building blocks that successful water managers will incorporate for their own programs. There is a trend towards inclusive and transparent decision making, a necessity for policy and participation that will require constructive engagement by all stakeholders, operation of water utilities as business enterprises and new approaches to financing and cost recovery. A world that includes 3 billion more people in the next 40 years will require the water industry to make these changes if we are to sustainably provide for their basic water needs, support economic well-being and maintain our natural environment.