DR AMER ALADHADH
IRAQI Institute for Economic Reform

Transforming the Middle East

Countries in the Middle East have an opportunity to leap-frog economic development by using advanced and proven technologies. These tested technologies can deliver infrastructure services significantly lower the costs. These lower costs can make sustainable what otherwise would be difficult to deliver given the current economic challenges.

The list of challenges facing Middle Eastern economies is long. Fiscal pressures, dearth of economic diversification, population growth, and access to affordable power and fresh water, is just a short summary of priorities. These priorities are exceedingly more difficult to deliver sustainably and at affordable rates given the current budget constraints that are exacerbated by growing population and reduction in the prices of hydrocarbons.

Hydrocarbon prices, the economic barometer in the region, have entered a long-term, secular, and possibly permanent low-price environment (relative to pricing necessary to significantly contribute to regional economic growth). China's slow-down as a maturing domestic economy, fuel efficiency gains in vehicle fleets and power generation systems are crimping demand, while shale oil and Iran and Iraqi production systems have the effect of generating persistent excess supply, creating a structural long term decline in hydrocarbon revenues.

Over supply and a reduction in demand growth cast doubts on the short and perhaps intermediate ability of economies in the Middle East to sustain stable states given the dearth of diversification of revenue sources. Under the weight of rapidly growing population requiring the security provided by water, food and electricity, the focus turns back to energy generation. Many countries in the region subsidize gasoline, electricity, water, and sometimes a food ration system even in affluent countries such as Qatar, and Iraq.

Some countries like Jordan, without any hydrocarbon production, may benefit from lower costs of energy commodities. However, decline the level and growth in tourism, GCC aid and support, real estate, and banking may offset these gains. Even without these pressures, Jordan has had a long term challenges to its budgets.

Moving to new, but necessary, economic platforms has in the past been associated with deploying expensive programs that have very long term, and uncertain, outcomes. This is observable whether it is embarking on nuclear energy programs, building massive water desalination systems, or creating exportable medical and pharmaceutical industries. Today's technologies being deployed are based on

minor upgrades to what worked 20 years ago. Many countries have long accepted the fact that more of the same solutions are not feasible within budget. Nevertheless, decision makers with the exception of a few innovators like the governments have been relying on technologies from the last century.

The Middle East has not pursued proven new technologies unlike other countries around the world; Examples include: New nuclear power systems that cost a fraction of "modern" systems and are much safer. Fresh water generation that can deliver continuous water for entire populations with minimal hydrocarbon power. Efficient medicine production systems that can meet global demand at minimal expense while creating valuable export revenues and domestic jobs. These are just some examples of areas that could significantly assist in propelling Middle Eastern economies.

Positive World Experiences

In the US, the department of defense has tested a more advanced version of nuclear power generation. In the state of Tennessee, the US government tested a more efficient, safer, and more environmentally friendly nuclear technology. A simple but ingenious design based on a working reactor and upgraded for modern specifications. The US has already tested Liquid Fluoride Thorium Reactors (LFTR) as a clear strategic energy source. LFTR is a uniquely efficient U.S. based proven design with world-leading industry expertise and experience. The US government tested it between 1964 and 1969 and found LFTR to be a safer nuclear power alternative, at par-to-lower per/kw cost than natural gas combined cycle power plants, and zero emissions and negligible waste.

LFTR requires less total mining waste (40x), and 1,000-10,000 times less nuclear waste than LWR. LFTR burns all it's fuel and about 85% of the waste is safe within 10 years. LFTR is also safer because meltdown or runaway reaction impossible due to the physics of low-temperature reaction. LFTR is proliferation-resistant and therefore less of a security risk, but also abundant fuel via existing stockpile. LFTR is more than 300 times the energy efficiency of conventional nuclear solutions.

LFTR technology can create many other industries around energy generation because it does not produce weapons grade nuclear waste. Instead it produces nuclear medicines. Global production and distribution of radioisotopes essential for medical diagnosis and treatment. Finding and fighting cancer and others diseases with targeted alpha and other radiopharmaceutical therapies.

DR AMER ALADHADH
IRAQI Institute for Economic Reform

Current global production plagued by inefficient and uneven supply. A unique, safe, reliable, and inexpensive LFTR production system to meet near-unlimited current and future global demand. Producing materials for life saving medicine. Over 40 million nuclear medicine tests per year – finding and imaging cancers and other ailments, 8% annual growth rate. The ability to deliver – uninterrupted - the essential material to meet diagnosis demand. This is within Jordanian government goal for Medical tourism.

Medical tourism can benefit because about 5 million nuclear medicine treatments are used per year, double-digit growth (only constrained by lack of secure supply). The technology and ability to produce and deliver materials needed to treat patients: attack cancer and help cure other ailments. This would significantly reduce the burden of energy production, but food production remains a challenge given the arid climate and therefore lower yields.

Sweden and the Netherlands has already tested a unique Seed and Soil enhancers for more input efficient production of food. A transformational agenda for agriculture, particularly in arid climates is boosting production, while significantly reducing water, fertilizer, and pesticide requirements. Unique know-how in seed vitalization– nearly 200 grain, grasses, vegetable, fruit varieties field tested. Yields improved 20% (e.g., wheat) to 250% (e.g., alfalfa) over best in class primed seeds. A world first. All-natural without chemicals or polymer matrix. Stress tolerance (e.g., dry climates), quick germination and robustness results in lower water, pesticide, and fertilizer requirements. Average savings in these costs range between 30-50%. Total farming cost savings of about 15-20%. Unique soil enhancers. Production of Organic Mineral Compounds (OMC). OMCs can be "programmed" to absorb and release water, nutrients, other compounds tailored for each growing environment (desert, semi-arid, altitude) and purpose (crops, land reclaim, leisure, community development). A demonstrated 80% reduction in water and more than 50% reduction in fertilizer requirements for crops in desert/arid environments. OMCs are entirely organic, and can also act as absorbent for polluted areas (land and sea) with simple disposal. Combining Seed and OMC: a powerful tool strategically important for long term security in agriculture and population development. This agriculture and potentially livestock business requires a great quantity of water.

Water desalination technologies that can reduce the burden of the state have emerged such as aqua tower. The aqua tower is 5 times more efficient, cheaper to build/operate, providing energy security. Average Annual Output of the aqua tower is 3.2 Bn m3 of desalinated water enough for 16 million residents 25 TWh of electricity enough for 2 million residents 500,000 refrigeration tons of air conditioning can be used for food storage the size of10 large shopping malls. This would reduce the total demand of Jordan for crude oil by nearly one half.

It is costly to build a 1200 meter structure that is 400 meters in diameter and it would take three years. Yet Middle Eastern countries are increasingly building more behemoth towers for aesthetic reasons alone and as tourist attraction, or iconic buildings. To build this tower it would cost $3.4 Bn. Annualized capitalized and operational costs over a 20 year life is around $150m.

In return it would deliver $2.5 Bn p.a. Revenue Yield: A mixed Power ($0.05/KWh) Water ($0.5/m3) and Refrigeration ($300/Ton) Purchase Agreement yields annual revenues (80% capacity) of about $1.6bn (desalinated water), $800m (electricity), and $150m (refrigeration). The implied Return is 7-year IRR of 30%, and 10-year IRR of 38%. With all that energy created, electricity still has to be generated.

Transforming energy into electricity has also had tremendous advances. For the past 30 years, Tribology technologies frictionless surfaces is transforming energy production, and any mission-critical mechanical components, into near maintenance-free effectiveness. Boosting production, energy output, while significantly reducing costs. Tribology delivers custom parts with a lasting atomic/molecular-level process which can be scaled to any volume for any size components (e.g., J-class turbines). Lifetime guarantees – "install and walk away" Then lifetime maintenance costs slashed. Component output increased. A material impact to greater return on capital investment. For equipment OEMs, enhanced product value-add and capability, improved sales and product margins

Focusing on what's important priorities

International success in several technologies have the potential to substantially enhance the economic plan for the Middle East and create a more stable environment in the region by providing a higher living standard for its peoples.

Middle East economies continue to heavily depend on the oil sector even in non-oil countries such as Jordan, Syria, and Lebanon. These economies do depend on oil revenues that make it easier to gain support and tourism dollars from the regional hydrocarbon economies.

Fiscal pressures in the Middle East, especially larger countries such as Iraq, and KSA are lower rates government input efficiency and exacerbated under the weight of lower oil prices. Crude oil revenues have little prospect in recovering after the massive increase in world oil supply that resulted primarily from US shale oil production. US production totaling 10 Million barrels of shale oil, in addition to Iran entering the market with large reserves, has created a glut of oil in an environment where total demand growth continues to slow due to modest global growth post the mortgage backed security crisis of 2008.

DR AMER ALADHADH
IRAQI Institute for Economic Reform

The slowdown in the growth of oil demand coupled with the fact that shale oil may return to production as soon as producers can make profit by reentering. Shale oil producers reentering when prices surpass their breakeven price, which is on average $65 pb, should keep oil prices between $50 and $70, barring supply shocks or demand growth that could bridge the excess of supply.

Over supply and modest demand growth cast doubts on the short and perhaps medium term ability of the Middle Eastern economies to maintain stability given the dearth of revenue diversification. Under the weight of rapidly growing population requiring water, food and electricity, the focus turns back to energy generation. Many countries in the region subside gasoline, electricity, water, and sometimes a food ration system even in affluent countries such as Qatar, and Iraq.

There has been very little innovation in the way ME economies, which are largely government lead, to meet the challenges of food, water and electricity generation, the non-sustainable nature of hydrocarbon based solutions, and the increase in the efficiency of renewable technologies.

Several technologies have the potential to change the economic future for the Middle East and create a more stable regional environment by providing higher living standards for its people. Using cost efficient sustainable technologies to generate water for ecample. Water can be used for agriculture and livestock, but all of this depends on sustainable cost efficient energy generation. This is why nuclear energy has been the focus of KSA, UAE, and Jordan.

Food Security

There are solutions that can help solve the challenges of domestic food production. The ability to create agricultural industries at affordable costs. Seed vitalization to significantly increase crop yields across all foods. Soil enhancements that can transform depleted or barren soil (e.g., the desert) into fertile and abundant agricultural lands that use a fraction of the water normally required. Proven in northern Europe and North Africa.

Fresh Water

A single-site solution that can produce enough continuous fresh water to support over 10 million citizens and deliver electricity to over 2 million households, at a fraction of the cost using normal systems. An ingeniously designed “Aquatower”

that uses ordinary physics and a small footprint to produce water and power at massive, but very affordable, scale. Proven in laboratory conditions.

Energy Saver

New composite materials using additive (3D) and other manufacturing processes, to reduce (and potentially eliminate) the costs of maintaining equipment in power generation, pumping, and in virtually all situations where wear and tear exists. Proven in space, defense, racing, power generation in the U.S. and Europe.

Clean Power

A Liquid Fluoride Thorium Reactor design that can generate continuous power at costs and rates lower than conventional natural gas and with zero emissions. Originally built and run by the U.S. Government, an upgraded solution frees up reliance on oil and gas for power generation. A game-changer in power generation.

Life-Saving Medicine

An extremely cost-effective and efficient means to produce cancer fighting and life-saving cardiology medicine for all current and future global demand. These medicines are vital to public health – essential in radiology (e.g., PET scans) and in radiotherapies (e.g., cancer treatment). Proven in the U.S. and Europe.