



**REBUILDING IRAQ'S PUBLIC WORKS  
INFRASTRUCTURE FOLLOWING  
THE DEFEAT OF ISIS**

Frank R. Gunter





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# Iraq's Perfect Storm

## About the Author

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## Abstract

This report studies the challenges of rebuilding Iraq's public works infrastructure following the "perfect storm" of the ISIS insurgency and low oil prices. The major challenge is that the Government of Iraq's estimate of \$88 billion severely understates total reconstruction costs. In addition, the country's demand for infrastructure to replace that which was destroyed during almost four decades of conflict while expanding the oil industry is distorted by mismanagement, market failure, and corruption. At the same time, the supply of infrastructure investment is constrained not only by insufficient finance, but also by a severe shortage of skilled labor, the inefficiency of the state owned enterprises, and a hostile regulatory environment towards Iraq's private sector. Even assuming that there will not be a successor insurgency to ISIS, the expectation of a decade or more of low oil prices will make rebuilding Iraq's public works infrastructure extremely difficult without extensive institutional change.

*"The chief limiting factor to the success of development in Iraq may prove to be neither the amount of money for investment, nor even the limits of skilled labour and materials available, but the efficiency of the administrative machine." Lord Salter, 1955*

In the decade and a half since the U.S.-led invasion overthrew Saddam Hussein, Iraq has faced brutal insurgencies and sharp drops in oil prices but—until mid-2014—never both at the same time. The combination of the ISIS insurgency and low oil prices produced an economic shock unprecedented in Iraq's troubled history.<sup>1</sup> The conflict required a sharp rise in security expenditures at the same time that oil export revenues were collapsing forcing the government into deficit spending. While ISIS ceased to be a "state" in late 2017, it is likely that insurgent activity will continue for the foreseeable future.<sup>2</sup> At the same time, even with continuing international political disputes, decreased oil demand from the major importers combined with an increased oil supply driven by the fracking revolution in the United States, increased Iraqi production, and new attempts by Saudi Arabia to rein in the world oil market will lead to an extended period of lower oil prices reducing the financing available for Iraq's reconstruction.

According to the Government of Iraq (GoI), the export price of Iraqi oil fell from an average of \$96.50 per barrel in 2014 to \$45.90 per barrel in 2015, and \$35.60 in 2016.<sup>3</sup> Each dollar fall in oil prices results in a \$1.4 billion fall in Iraqi oil export earnings. Even the recovery of international oil prices that began in late 2017 only raised the per-barrel amount

received by Iraq to \$49.20.<sup>4</sup> As can be seen in Figure 1, despite an increase in the volume of oil exports, lower oil prices resulted in a sharp

drop in oil export earnings in 2015 and 2016. After adjusting for inflation, these earnings fell 46% from \$91.6 billion in 2014 to \$49.4 billion in 2016.<sup>5</sup> Although higher oil prices increased the GoI's oil export earnings to about \$68.2 billion in 2017, this figure is still a quarter less than in 2014. While these higher 2017 earnings were good news for Iraq, they are insufficient to pay for the country's current expenditures much less for reconstruction investment.

Amid the chaos of the war with ISIS, there was a great deal of attention paid to the political, military, social, humanitarian, and even religious implications. However, discussions of the economic implications were surprisingly limited. Great attention has been paid to the fiscal impacts of changes in the price and volume of oil exports and estimating the cost of reconstruction; however, there isn't much that foreign entities can do beyond limited stabilization and reconstruction projects. Reconstruction and economic progress is primarily dependent on institutional reform within Iraq. The GoI must develop policies for overcoming the nonfinancial constraints on reconstruction.

<sup>1</sup> Frank R. Gunter, "Iraq's Perfect Storm," *Foreign Policy Research Institute* (2015).

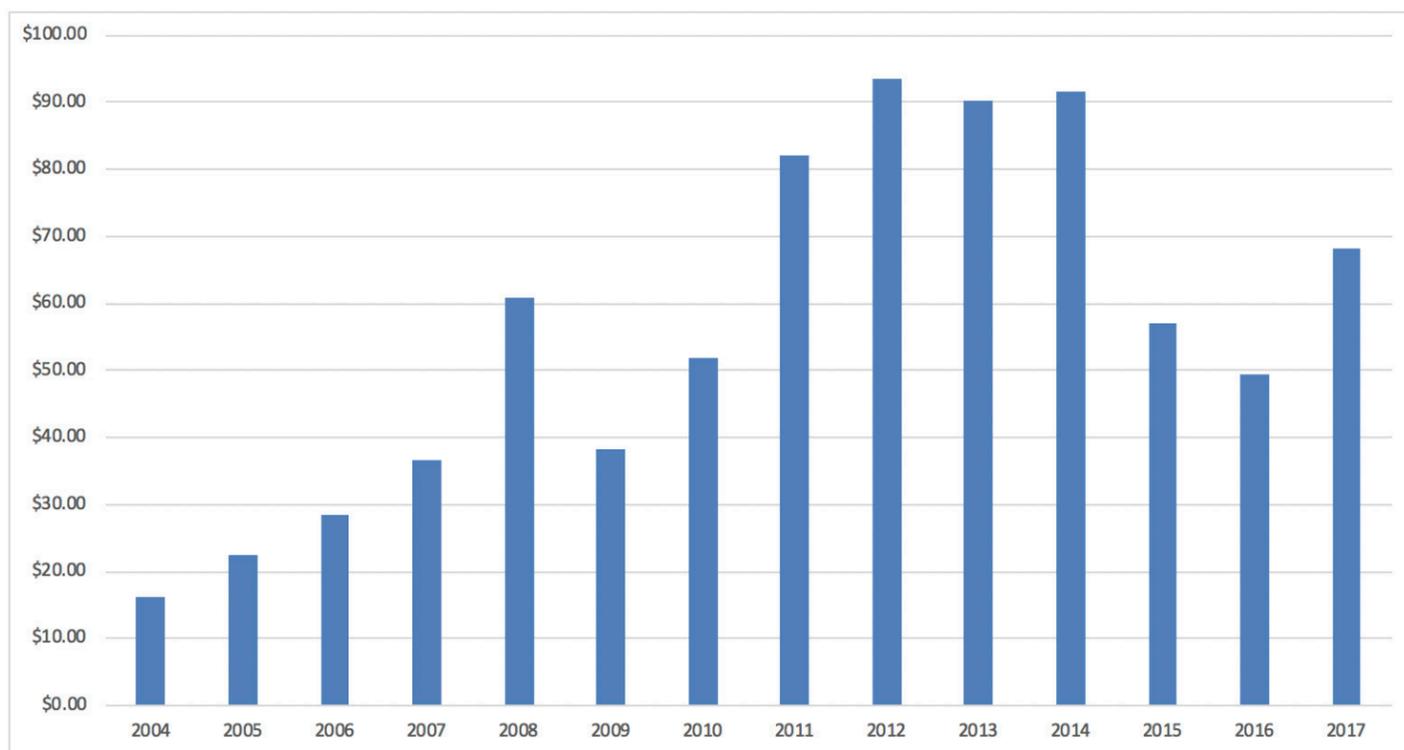
<sup>2</sup> The collapse of ISIS was partly a result of the failure of its revenue streams. See, Frank R. Gunter, "ISIL Revenues: Grow or Die," *Foreign Policy Research Institute* (2015).

<sup>3</sup> International Monetary Fund (IMF), *Iraq: Second Review of the Three-Year Stand-By Arrangement*. (Washington, D.C.: IMF, 2017), Table 1, p. 32.

<sup>4</sup> Ahmed Tabaqchali, "Forget the Donations, Stupid," *Iraq Business News*, June 15, 2018.

<sup>5</sup> IMF, *Iraq: Second Review of the Three-Year Stand-By Arrangement*, Table 6, p. 38; and author's estimates.

Figure 1: 2004-2017 Oil Export Earnings (\$ Millions)



Source: IMF, *Iraq: Second Review of the Three-Year Stand-By Arrangement*, Table 1, p. 32.

## The Scale and Cost of Reconstruction

What are the elements of a country's public works infrastructure? The U.S. National Research Council provides a useful definition. Public works infrastructure is

both specific functional modes – highways, streets, roads, and bridges; mass transit; airports and airways; water supply and water resources; wastewater management; solid-waste treatment and disposal; electric power generation and transmission; telecommunications; and hazardous waste management – and the combined system these modal elements comprise. A comprehension of infrastructure spans not only these public works facilities, but also the operating procedures, management practices, and development policies that interact together with societal demand and the physical world to facilitate the transport of people and goods, provision of water for drinking and a variety of other uses, safe disposal of society's waste products, provision of energy where it is needed, and transmission of information within and between communities.<sup>6</sup>

In other words, a country's public works infrastructure incorporates aspects that are both "hard"—roads, clinics, etc.—and "soft"—policy, management practices, etc. It is the "hard" aspects that have received the most attention in Iraq's reconstruction. The reconstruction of Iraq's public works infrastructure is seen exclusively as a series of daunting budgeting and engineering challenges. While resolving these challenges is necessary, they are not sufficient to guarantee Iraq's reconstruction. Therefore, after considering the financial scale of reconstructing the country's "hard"

infrastructure, the rest of this study will focus on the "soft" demand and supply constraints that burden Iraq's infrastructure reconstruction.

Looking first at the budget issue, how much investment will be required to restore the country's "hard" infrastructure? Prior to the February 2018 international conference on Iraq reconstruction held in Kuwait, the GoI estimated total reconstruction costs at \$88 billion. Presumably, this number was an attempt to aggregate the estimated costs for restoring hundreds of individual infrastructure projects. However, the details of this estimate have not yet been published.

Some initial estimates by the World Bank provide a sense of scale. The destruction caused by the war with ISIS and deferred maintenance have severely damaged Iraq's transportation infrastructure including a substantial deterioration in roads and bridges. Assuming that all of the country's almost 60,000 kilometers of roads require substantial repair and about 1,300 bridges must be rebuilt, we can make rough estimates of the required investment for these key components of transportation infrastructure. According to the World Bank, to repair two lanes of a road in Iraq requires about \$290,000 per kilometer. If this cost seems high, it is because it includes security costs.<sup>7</sup> Therefore, to repair *all* of Iraq's roads—even those outside areas of conflict—will require approximately \$17.4 billion. With respect to bridges, the World Bank estimates that it can repair/replace bridges in Diyala Province for about \$2 million each. If this estimate can be extrapolated to all of the country's bridges,

<sup>6</sup> National Research Council, *Infrastructure for the 21st Century* (Washington, D.C.: National Academy Press, 1987).

<sup>7</sup> Ibrahim Dajani, Jocelyne Jabbour, and Nafie Mufid, "Iraq: Emergency Project Rebuilding Bridges, Roads, Water, Wastewater, Municipal Services and Livelihoods," *Voices and Views: Middle East and North Africa*, May 11, 2017.

then the Gol could repair/replace *all* of the approximately 1,300 Iraqi bridges for \$2.6 billion.

Similar estimates have been published concerning the energy industry. Although the main oil fields suffered little damage as a result of ISIS, the Deputy Minister of Oil estimated that the oil industry lost about \$15 billion in assets lost or damaged, of which \$10 billion was at the Baiji Refinery alone.<sup>8</sup> This last number seems excessive since one could build a new refinery capable of producing a greater volume of higher-value fuels for less than \$10 billion. The repair of an existing refinery like Baiji that is still producing product will be expensive, but shouldn't cost as much as building a new refinery from scratch. Similar estimates could be made for the cost of repair/replacement of the electrical grid, drinking water, sanitation, school system, hospitals and clinics, etc. It would be useful if the detailed estimates were published, but based on the partial data provided, one cannot reject the Gol estimate of \$88 billion at least as an initial estimate or down payment. However, it might be useful to consider alternative methods of estimating the total reconstruction costs over the next five years. Each method has its advantages and disadvantages.

**“Although the main oil fields suffered little damage as a result of ISIS, the Deputy Minister of Oil estimated that the oil industry lost about \$15 billion in assets lost or damaged, of which \$10 billion was at the Baiji Refinery alone.”**

Prior to the 2014 rise of ISIS and collapse of oil prices, the Gol had adopted an aggressive plan of government investment. From 2015 through 2019, the Gol planned on investment of IQD 319.8 trillion (\$270 billion).<sup>9</sup> However, the most recent estimate for total government investment during this period is only IQD

126.6 trillion (\$107 billion).<sup>10</sup> The difference, about \$160 billion, is probably substantially less than Iraq's needed infrastructure investment since it does not include all of the cost of rebuilding the infrastructure destroyed by the conflict with ISIS.

An alternative approach to estimating Iraq's needed infrastructure investment is from macroeconomic growth theory. Since 2013, Iraq has suffered an estimated \$42 billion decrease in gross domestic product (GDP).<sup>11</sup> How much infrastructure investment would be required to restore \$42 billion of Iraqi GDP? The Incremental Capital-Output Ratio (ICOR) is the ratio of investment to growth. The higher the ICOR, the lower the efficiency with which capital is used in a country; in most developed countries, the ICOR is about 3.

I know of no attempts to estimate Iraq's ICOR. However, ICOR was estimated for nine developing countries following the 1980s financial crisis and ranged from about 3.5 to 6.5 with an average of about 5. With an ICOR of 3.5, Iraq would require about \$150 billion in infrastructure investment; with an ICOR of 6.5, required investment would be about \$275 billion. Because of the investment inefficiencies discussed at great length below, one would expect Iraq's ICOR to be at the higher end resulting in required investment of between \$210 and \$275 billion to restore Iraq's GDP to pre-ISIS levels. But is the estimate of a \$42 billion decrease in Iraq's GDP plausible?

The devastation in Mosul, Fallujah, and other areas occupied by ISIS was horrific. But it should be noted that while the destruction involved in the wars against al-Qaeda and ISIS was great, it was also geographically limited. During the fight against al-Qaeda, most of the death and destruction occurred in five of Iraq's eighteen provinces (Ninawa, Anbar, Babil, Baghdad, and Basrah).<sup>12</sup> Similarly, ISIS efforts

10 IMF, *Iraq: Second Review of the Three-Year Stand-By Arrangement*, Table 3, p. 34.

11 IMF, *Iraq: Second Review of the Three-Year Stand-By Arrangement*, Table 1, p. 32.

12 Frank R. Gunter, *The Political-Economy of Iraq: Restoring Balance in a Post-Conflict Society* (Northampton, Massachusetts: Edward Elgar, 2013), p. 73.

to overthrow the Gol were mostly limited to six provinces (Ninawa, Anbar, Babil, Salah ad Din, Kirkuk (Ta'mim), and Diyala).<sup>13</sup> It should be noted that almost all of Iraq's oil infrastructure is in areas—the province of Basrah and the Kurdistan Regional Government (KRG)—that suffered relatively little ISIS destruction. During the worst of the ISIS conflict, Iraqi oil production actually increased by about 45%. In view of the limited area of destruction and the fact that oil production accounts for about two-thirds of GDP was not harmed, it seems plausible that the country only experienced a decline of about a fifth, \$42 billion, in the country's production of goods and services, its GDP.

If the needed infrastructure are in the range given by the investment differential estimate of \$160 billion and the ICOR estimates of \$210-\$275 billion, then the total required is roughly equal to Iraq's 2017 GDP (calculated at the official exchange rate) of \$198 billion.<sup>14</sup> Based on these two crude estimates, it appears that the Gol's estimate of \$88 billion severely understates total reconstruction costs. It is possible that the Gol deliberately provided a low estimate of \$88 billion to the international community because of its concern that a higher estimate would be viewed as unrealistic and result in lower commitments. And as great as these crude estimates of \$160-\$275 billion are, they are substantially less than the \$350-\$400 billion investment gap discussed by Gol officials in early 2017.<sup>15</sup> The Gol is planning government investment of about \$103 billion over the next five years. However, this five year investment plan includes funds for increasing oil production as well as reconstruction. Crucially, it should be noted that the above estimates assume reasonably efficient and honest execution of proposed investment in “hard” infrastructure.

As noted, the conflicts of the last four decades have led not only to a substantial

13 Frank R. Gunter, “ISIS Winners and Losers,” *Foreign Policy Research Institute* (2014).

14 Central Intelligence Agency of the U.S., *Iraq Country Statistics*, (2018), <https://www.cia.gov/library/publications/the-world-factbook/geos/iz.html>.

15 “Iraq to Rebuild Infrastructure Through Five Year Plan Post ISIS,” *Rudaw*.

**“The conflicts of the last four decades have led not only to a substantial deterioration of ‘hard’ infrastructure—the physical networks fundamental to the functioning of an industrial state—but also ‘soft’ infrastructure has been severely degraded.”**

deterioration of “hard” infrastructure—the physical networks fundamental to the functioning of an industrial state—but also “soft” infrastructure has been severely degraded. Soft infrastructure includes governance, economic, and social institutions. The degradation of soft infrastructure affects both the demand and supply of public works and their restoration. As a result, in addition to the damage related to war and insurgency, the demand for infrastructure spending is also driven by the continuing maintenance crisis, widespread market failure, and corruption. On the supply side, infrastructure reconstruction is constrained by a shortage of finance, a lack of skilled managers, an extremely inefficient national government, state owned enterprise dominance, and regulatory hostility towards private business. Unless weaknesses in the country's “soft” infrastructure are addressed, there will be little progress in rebuilding post-ISIS Iraq even if Iraq were able somehow to obtain \$160-\$275 billion of new financing over the next five years.

# Determinates of Demand for Infrastructure Investment

In theory, infrastructure investment is carefully planned, coordinated, and executed to accelerate a country's economic development. Of course, the true motivations for public infrastructure investment may be very different. In the case of Iraq, there are at least five determinants of infrastructure of which only two are motivated by accelerating economic development. These determinants of the types and scale of infrastructure investment in Iraq are: (1) replacement of the infrastructure destroyed during the over four decades of conflict; (2) provision of the infrastructure necessary for the Gol's rapid expansion of the oil and gas industry; (3) substitution of investment in new facilities for adequate maintenance in existing facilities; (4) use of government infrastructure investment to deal with the adverse effects of market failure; and (5) infrastructure investment intended primarily to facilitate corruption.

## Massive Destruction

Going back to the 1980-1988 Iran-Iraq war, conflict has devastated Iraq's electrical infrastructure, oil pipelines and fields, irrigation system, communication systems, railroads, bridges, roads, airfields, factories, and ports. As a result, according to the World Bank, businesses in Iraq face one of the worst logistical systems in the world ranking 147 out of 160 nations evaluated.<sup>16</sup> And the restoration of infrastructure to allow essential services for persons and efficient trade for businesses is often more complex and expensive than building new "green field" projects for the same purposes. Expanding facilities for seaborne trade is one example. In addition to the need for deeper channels and improved port facilities, there are over

<sup>16</sup> World Bank, *Connecting to Compete: Iraq*, (2018).

200 vessels sunk in or near Iraq's primary port of Umm Qasr and hundreds more in the channels from Umm Qasr north to Basrah. Not only do these vessels limit access to the port, but also the sunken ships are believed to be leaking hazardous chemicals from munitions, pesticides, refined fuels, and unknown toxins.<sup>17</sup> Removing these wrecks will be a long process.

***"It may be rational to abandon the damaged infrastructure and replace it with more efficient new construction. The experience in Iraq varies from sector to sector, but the bias to restore the past is strong even when conditions have changed dramatically."***

Further complicating the restoration of conflict-ravaged infrastructure is the question of the proper goal of reconstruction. Should the Gol seek to restore damaged oil and gas transmission lines, irrigation, roads, electricity, medical clinics, schools, etc., or should the government recognize that there have been substantial changes in technology, population distribution, trade flows, relative prices, and attitudes since then? It may be rational to abandon the damaged infrastructure and replace it with more efficient new construction. The experience in Iraq varies from sector to sector, but the bias to restore the past is strong even when conditions have changed dramatically.

For example, over the last several decades, there has been a sharp increase in energy demand combined with a substantial

<sup>17</sup> Farhad Nadim, Amvrossios C. Bagtzoglou, and Jamshid Iranmah-boob, "Coastal Management in the Persian Gulf Region Within the Framework of the ROPME Programme of Action," *Ocean and Coastal Management* 51, (2008): pp. 560-1.

decrease in the volume and quality of water in the Euphrates and Tigris Rivers. The latter is primarily a result of the upstream diversion of water by Turkey, Syria, and Iran. The reduction in available water has reduced hydroelectricity generation—which accounts for about 7% of Iraq's energy production—from the dams in Haditha and Mosul. In addition, the reduction in water flow has reduced the competitiveness of steam-electric power stations, which dominated electricity generation in Iraq in the past, since these stations use large quantities of water. As recently as 1986, such stations produced an estimated 53% of all the country's electricity. However, the decreasing availability of clean water has substantially shifted economic advantage to gas turbine (combined cycle) systems. Rather than restore conflict-damaged steam-electric stations, it might make more sense in the medium/long term to shutter the steam-electric plants and build gas turbine power stations instead.<sup>18</sup>

Oil and gas infrastructure provides another example. Decades ago, large quantities of natural gas were exported through Syria to earn additional revenues for the Gol, while energy-intensive industries such as electrical generation and cement production in Iraq were often fueled with costly refined fuel. Currently, in the absence of an export market, most of the natural gas associated with Iraqi oil production is wastefully burnt—flared—rather than being used to fuel the country's energy-intensive industries.<sup>19</sup> As an extreme example, in Anbar, I saw a cement plant using refined fuel delivered by tanker trucks, while, across the road, natural gas was wastefully flared.

Similar issues of failing to adapt reconstruction plans to changes in the Iraqi economy are apparent in the restoration of bridges and investment in agriculture. Some bridges no longer have an economic justification as a result of changing trade and population patterns, yet the Gol plans to rebuild them. In agriculture, Iraqi dates formerly dominated

<sup>18</sup> Karim W. Hassan, *The Construction of Future Electric Power Plants in Iraq with Data of Current and Future Water Resources* (Baghdad, Iraq: al Bayan Center for Planning and Studies, 2016): pp. 7-15.

<sup>19</sup> Energy Information Administration, *Country Analysis Brief: Iraq* (Washington, D.C.: EIA, April 2016): p. 12.

the world market in both quantity and quality. However, over the last decades, Iraqi dates have lost competitiveness, and it is very unlikely that they will be able to win back former market share. However, prior to the beginning of the ISIS war in 2014, the Gol was involved in major investment expenditures to restore the orchards to their antebellum levels of production.

***"Iraq is believed to have about 143 billion barrels—giving it the fifth largest proven reserves in the world right behind Iran."***

There are some exceptions to the tendency to repair rather than to replace or abandon damaged infrastructure. In the communications sector, there has been no attempt to restore phone landlines; Iraqis tend to use cell phone services purchased from licensed private providers. However, in many cases, the restoration of war-ravaged infrastructure is blind to changes inside and outside Iraq.

## Rapid Expansion of the Oil Industry

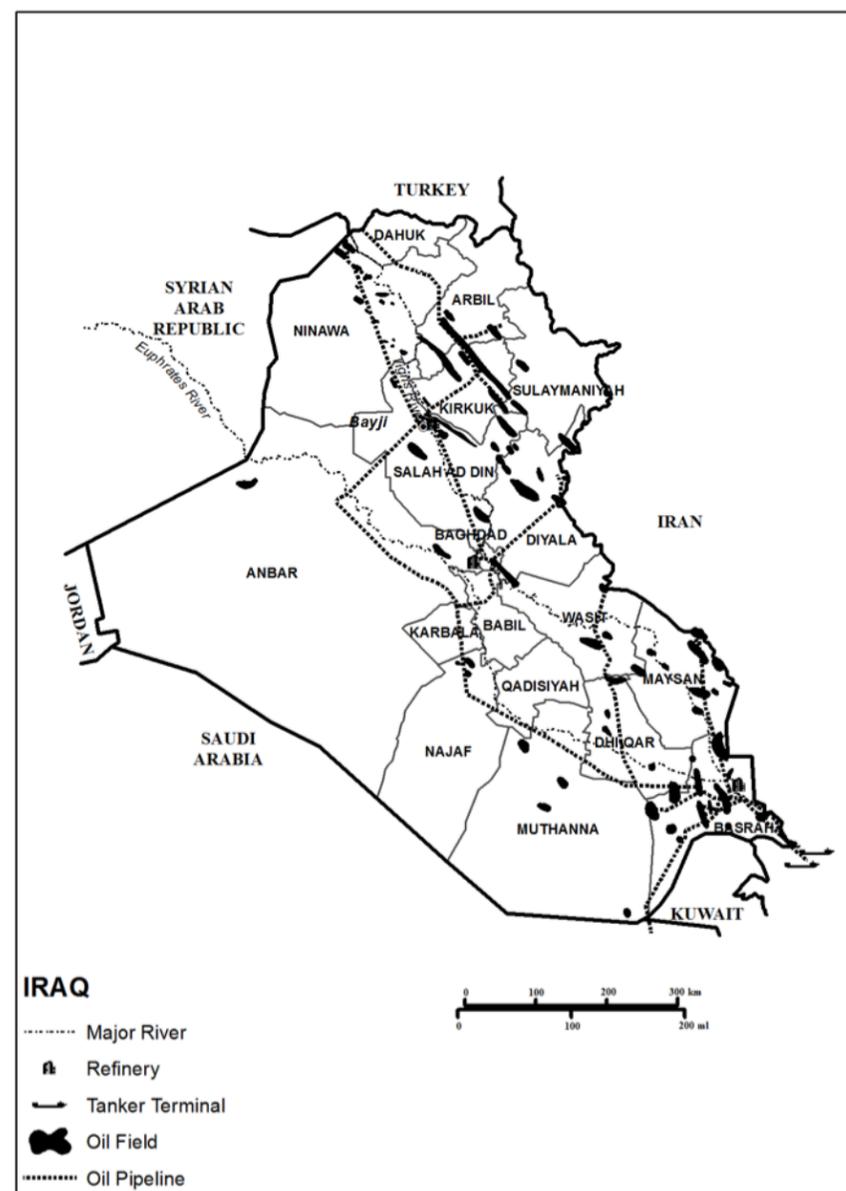
Despite large-scale production beginning in 1927, Iraq's proven reserves are still huge. Although there is an ongoing controversy over the best metric to estimate Iraq's proven reserves,<sup>20</sup> Iraq is believed to have about 143 billion barrels—giving it the fifth largest proven reserves in the world right behind Iran.<sup>21</sup> In 2017, Iraq was the seventh largest oil producer in the world and the third largest oil producer in the Organization of the Petroleum Exporting Countries (OPEC) after Saudi Arabia and Iran.<sup>22</sup> At current rates of production, its oil will last for more than a century.

<sup>20</sup> Anthony H. Cordesman and Khalid R. al-Rodhan, *The Changing Dynamics of Energy in the Middle East Volume 2* (Westport, CT: Praeger Security International, 2006): p. 229.

<sup>21</sup> Energy Information Administration, *Crude Oil Proven Reserves, 2017* (Washington, D.C.: EIA, 2018).

<sup>22</sup> Energy Information Administration, *Total Petroleum and Other Liquids Production, 2017* (Washington, D.C.: EIA, 2018).

Figure 2: Oil Map of Iraq



Source: Professional Maps of Houston, Texas (2016).

Iraq's crude is relatively inexpensive to get out of the ground. It is not only near the surface, but also generally concentrated in large fields. Iraq has nine "supergiant" (over 5 billion barrels) fields and twenty-two "giant" (between 1 and 5 billion barrels) fields. As a result, along with Saudi Arabia, Iraq has some of the lowest production costs in the world. With reasonable efficiency, Iraq can cover its extraction and transport costs at a world price of only \$12 per barrel.

Only about 10% of the country has been explored for oil and gas using modern

techniques resulting in outdated estimates of oil and gas reserves. Ongoing attempts to more accurately estimate Iraq's reserves may result in a 50 to 250 billion barrels increase in the country's proven reserves. If the adjustment adds over 150 billion barrels to the country's proven reserves, then Iraq will supplant Venezuela as the country with the largest proven petroleum reserves. While current production is primarily from two provinces, Kirkuk in the north and Basrah in the south, undeveloped reserves are much more widely distributed (See, Figure 2). There are

substantial undeveloped reserves in Maysan province (estimated 8.5 billion barrels), Baghdad province (6.5 billion barrels), and Dhi Qar province (5.1 billion barrels). In fact, only six provinces have less than 100 million barrels each of undeveloped reserves.<sup>23</sup>

In addition to oil, Iraq also has the twelfth largest natural gas reserves in the world. About 12% of Iraq's gas (5.6 trillion cubic feet, or tcf) is found in four major fields, while the remaining 88% (42.2 tcf) is associated gas mixed with crude oil. Since this associated gas is explosive, it must be either captured or flared off. An estimated 60% of all associated gas is flared with much of the remainder re-injected into oil wells to maintain the pressure needed to force oil to the surface.<sup>24</sup>

Despite the war with ISIS and the collapse of oil prices, Iraq attempted a sharp increase in oil production and exports. In 2017, oil exports reached an estimated 3.8 million barrels per day (mbpd) out of a total production of 4.5 mbpd. This reflects an almost 60% increase in oil exports since 2013.<sup>25</sup> However, Iraq's plans for the next five years have been scaled back dramatically.

When Iraq signed service contracts with the major international oil companies (IOC) in 2009-2010, it planned on increasing production capacity to 13 mbpd by 2020.<sup>26</sup> Since then, the target has been revised downwards to 7.5 mbpd by 2022. And this target may still be overly optimistic. Even a more modest increase of oil production to 5 mbpd by 2022 will require a massive expansion of the existing petroleum infrastructure.<sup>27</sup>

Extracting and processing oil for either export or domestic refining requires a complex infrastructure. After the crude oil is extracted from the wells, it is pumped to a gas-oil separating plant to remove any associated gas, water, and salts from the crude. The

<sup>23</sup> Gunter, *The Political-Economy of Iraq*, pp. 90-91.

<sup>24</sup> Energy Information Administration, *Country Analysis Brief: Iraq*, p. 12.

<sup>25</sup> IMF, *Iraq: Second Review of the Three-Year Stand-By Arrangement*, Table 1, p. 32.

<sup>26</sup> IMF, *Iraq: Second Review of the Three-Year Stand-By Arrangement*, pp. 10-11.

<sup>27</sup> See, "Iraq to Rebuild Infrastructure Through Five Year Plan Post ISIS," *Rudaw*; and Gunter, *The Political-Economy of Iraq*, pp. 101-108.

next step depends on whether the oil has measurable amounts of the very corrosive and poisonous gas hydrogen sulfide (H<sub>2</sub>S). If the oil contains this dangerous gas, it must be sent to a stabilization plant to remove the H<sub>2</sub>S before it can be delivered to a pipeline. Finally, the crude will be pumped either to an Iraqi refinery, exported through pipelines through Turkey, or loaded onto oil tankers in the Persian Gulf.<sup>28</sup>

**"In the short term, the binding infrastructure constraint on increasing Iraqi oil exports is the limited capacity of oil pipelines, storage facilities, and moorings for oil tankers in the Persian Gulf south of Basrah."**

The major links in oil production, refining, and exports can be seen in Figure 2. Most of Iraq's current oil exports, about 85% in 2017, come from the fields in the southeast of the country and are pumped aboard crude carriers in the ports south of Basrah to be shipped through the Persian Gulf. The second highest export capacity is through the Kirkuk-Ceyhan pipeline from the Kirkuk supergiant field to Turkey. Both of these routes have little excess capacity.

In the short term, the binding infrastructure constraint on increasing Iraqi oil exports is the limited capacity of oil pipelines, storage facilities, and moorings for oil tankers in the Persian Gulf south of Basrah. In addition, there are political and technological issues that limit the throughput volume of oil pipelines from Kirkuk. Prior to the oil price collapse in 2014, the GoI proposed a \$8.4 billion project to build new storage facilities on the Faw Peninsula south of Basrah, three new pipelines to the water's edge, and four floating terminals in the Gulf to speed the filling of

<sup>28</sup> Norman J. Hyne, *Nontechnical Guide to Petroleum Geology, Exploration, Drilling, and Production* (Tulsa, OK: Penn Well Corporation, 2001): pp. 10-11 and 409-10; Special Inspector General for Iraq Reconstruction, *Hard Lessons: the Iraq Reconstruction Experience*. (Washington, D.C.: US Government Printing Office, 2009): pp. 1-2; and Energy Information Administration, *Country Analysis Brief: Iraq*, pp. 5-8.

large oil tankers.<sup>29</sup> As expected, this attempt to rapidly expand the oil infrastructure in the south led to severe bottlenecks as sharply increased imports of equipment and supplies overwhelmed existing port facilities.

**“One of the legacies of Iraq’s four and a half decades experiment with socialism is that managers give maintenance a very low priority.”**

The delays that plague many of the oil-related infrastructure projects are exemplified by the recent Common Seawater Supply Project. In the long term, the most serious challenge to expanding oil production is the water shortage. In the southern oil fields, the viscosity of the oil and the nature of the oil reservoirs mean that about 1.5 barrels of water must be injected for every barrel of oil produced.<sup>30</sup> The falling water levels in the Euphrates and Tigris Rivers led to a 2009 proposal to treat seawater from the Persian Gulf and transport it by pipeline to six southern oil fields. However, constant plan revisions and ultimately failed negotiations between the state-run Basrah Oil Company and Exxon-Mobil have resulted in little progress. As a result, the first phase of the project, that was supposed to be completed this year, has been delayed until 2022.<sup>31</sup> And this revised completion date is probably overly optimistic since there will have to be new negotiations with another international oil company and a search for new financing for the more than \$10 billion project.

A related issue is the disposal of contaminated water. Water used in oil recovery is often severely contaminated and will pollute river or ground water if it is dumped. This is a public health problem that may become another humanitarian crisis unless mitigated. However, mitigation will require the creation of expensive new facilities to

29 Hassan Hafidh, “Iraq Tackles Its Next Oil Bottleneck,” *Wall Street Journal*, April 25, 2011.

30 Energy Information Administration, *Country Analysis Brief: Iraq*, p. 5.

31 Ahmad Ghaddar and Aref Mohammed, “Exxon Faces Setback in Iraq as Oil and Water Mix,” *Reuters*, April 19, 2018.

deal with wastewater disposal, a problem that is generally ignored at lower levels of oil production.

### Investment as a Substitutive for Mismanagement

One of the legacies of Iraq’s four and a half decades experiment with socialism is that managers give maintenance a very low priority. The Soviet Union heavily influenced Saddam’s management of the Iraqi economy.<sup>32</sup> As a result, estimates of national income and budget policy reflected the emphasis of Adam Smith and Karl Marx on encouraging “productive labor”—primarily the production of surplus value in the form of goods—and discouraging “unproductive labor”—primarily the production of services.<sup>33</sup> Consistent with these beliefs, the Baghdad bureaucracy has a strong preference for investment in new facilities at the cost of maintaining older facilities. In addition, the compensation system for government management and workers provides little incentive to engage in long-term maintenance. In fact, in some cases, the incentives are perverse. When a water treatment plant outside Baghdad was closed for repairs caused by the failure to perform basic maintenance, the workers received full pay without having to come to work. Probably the best example of new investment to compensate for maintenance failings is the electric industry.

Providing reliable quality around-the-clock electricity is the most critical infrastructure challenge facing Iraq. Despite government expenditures of an estimated \$36 billion since 2003 as well as the hard work of many Iraqis, the gap between the demand and supply of electricity is greater than ever. The average Iraqi can only depend on the grid for 6-8 hours of electricity per day, while some households receive only a few hours of state-provided

32 James D. Savage, *Reconstructing Iraq’s Budgetary Institutions: Coalition State Building After Saddam*. (New York: Cambridge University Press, 2013): pp. 34-40.

33 Joseph A. Schumpeter, *History of Economic Analysis* (New York: Oxford University Press, 1954): pp. 628-31; and Mark Blaug, *Economic Theory in Retrospect*, 3<sup>rd</sup> ed. (New York: Cambridge University Press, 1978): pp. 288-9.

electricity per day.<sup>34</sup> This has resulted in outages that not only have stalled economic development, but also have worked a genuine hardship on the population. Without air-conditioning, summer temperatures in Central Iraq of 110°F (43°C) are almost unbearable and constitute a public health hazard for the very young, the very old, and the sick.

However, the potential electricity supply has been greater than estimated demand since at least 2010. In 2016, it was estimated that domestic production of electricity reached 84 billion kilowatt hours (kWh), while 12 billion kWh were imported for a total of 96 billion kWh. Total consumption that year was 66 billion kWh.<sup>35</sup>

Because it is necessary to balance the supply and demand of electricity at almost the speed of light, there is always necessary waste, i.e., the actual amount of electricity received by the consumers will be less than the amount produced. However, in Iraq, unexpected drops in production and distribution losses are excessive. According to Iraq’s Ministry of Electricity, summer electricity demand has reached 23,000 megawatts, but the country can only deliver 15,900 megawatts—a 30% gap.<sup>36</sup> One study showed that while planned outages for maintenance accounted for only 5% of the reduced capacity, unplanned maintenance outages accounted for another 13%. Shortages of fuel or attempts to use sub-standard fuel combined with low water at the hydroelectric dams accounted for an additional 10% loss in electricity production. Finally, there are a variety of miscellaneous factors that cost another 11% of feasible capacity.<sup>37</sup> And after the electricity leaves the generation plant, there are substantial losses in distribution driven by physics.

Electricity cannot be directed to take a particular path. Rather, it travels over all available paths between generators and

34 Isabel Coles and Ali Nabhan, “Despite Its Oil Wealth, Iraq Can’t Keep the Lights On,” *Wall Street Journal*, July 23, 2018; and “Iraq to Rebuild Infrastructure Through Five Year Plan Post ISIS,” *Rudaw*.

35 Central Intelligence Agency, *Iraq Country Statistics: Energy*.

36 Coles and Nabhan, “Despite Its Oil Wealth.”

37 Special Inspector General for Iraq Reconstruction, *Quarterly Report to the US Congress*. (Washington, D.C.: Special Inspector General for Iraq Reconstruction, June, 2010) Figure 2.29; see, also, IMF, *Iraq: Selected Issues* (Washington, D.C.: IMF, August 2015): pp. 20-22.

consumers with the power flow on each path being in inverse proportion to the impedance of each line (Ohm’s Law). As the output of different generators change to match changes in consumption demand, flows on different transmission lines are constantly increasing or decreasing. And if any of the transmission lines lacks sufficient capacity for the increased volume, then grid operators have no choice but to drop load—cease providing electricity—to as many consumers as necessary until demand equals the supply that can be safely transmitted.<sup>38</sup> Due in part to the ISIS destruction of substantial portions of the grid, as much as 40% of electricity produced during a hot summer day in Iraq may be dumped because of insufficient capacity on the transmission grid. Consumers are forced to either stifle in the dark or buy electricity at a premium from a local entrepreneur with a generator.

**“If the Gol were able to increase the efficiency of existing generation, then a substantial increase in usable electrical supply would be possible without the massive investment under consideration.”**

In addition to increasing grid transmission capacity, there are three options for reducing the gap between the demand and supply of electricity: investing in more nameplate generation capacity (more power plants), increasing the efficiency of existing power plants, or increasing the price of electricity. Increasing nameplate capacity is by far the most popular option among politicians and bureaucrats. Massive construction projects especially with a large imported component provide much greater opportunities for graft and favoritism than efforts to improve efficiency of existing capacity. However, adding substantial capacity not only is fraught with engineering challenges, but it also is expensive. The Gol favors the first option: building new power plants. To this end, the Ministry of Electricity has proposed spending \$25 billion over the next five

38 Gunter, *The Political-Economy of Iraq*, pp. 213-214.

years—approximately 7% of total government expenditures.<sup>39</sup>

The most controversial option is to accept that Iraq does not have a shortage of capacity, but rather is incredibly inefficient in its use of existing capacity. If the Gol were able to increase the efficiency of existing generation, then a substantial increase in usable electrical supply would be possible without the massive investment under consideration. For example, if grid operators were able to minimize unscheduled maintenance outages and—with the cooperation of the Ministry of Oil—ensure that the correct standard fuel was available in sufficient quantities for existing generators, then the existing electrical infrastructure could produce an additional 20-30% megawatts closing most of the gap between demand and supply without the addition of more electricity generation capacity.

**“Generally, increasing the efficiency of electrical generation in Iraq is treated as an engineering challenge. But a more productive approach might be to focus on incentives.”**

Generally, increasing the efficiency of electrical generation in Iraq is treated as an engineering challenge. But a more productive approach might be to focus on incentives. Currently, managers and workers at electrical generation plants are not rewarded for long-term increases in efficiency, nor are they financially punished for unnecessary drops in the quality or quantity of electricity. In the absence of such incentives, politically motivated efficiency drives can be expected to have only a short-term impact on electrical production often paid for with a long-term degradation of equipment. Politics also explains the unwillingness to increase the price of electricity, which leads to market failure in the electricity market.

<sup>39</sup> IMF, *Iraq: Selected Issues*, p. 24.

## Investment to Compensate for Market Failure

In Iraq, the public has grown to expect free or heavily subsidized electricity, water, fuel, medical care, education, and a large variety of other goods and services. The massive scale of these subsidies constrains infrastructure reconstruction in at least three ways. First, large-scale government subsidies reduce the funds available for reconstruction. The International Monetary Fund (IMF) estimates that direct subsidies of food, electricity, and fuels amounted to almost 9% of Iraq’s GDP.<sup>40</sup> Including indirect subsidies, the cost may reach 12% of Iraq’s GDP! After salaries and pensions for government employees, subsidies are the Gol’s largest expenditure, exceeding, since 2015, total government investment.

Second, subsidies are a wedge between the official cost of a good or service and its true or opportunity cost. Government planners as well as the small private sector are forced to make decisions based not on the true costs of goods and services, but rather on official prices that conceal the true level of scarcity. As expected, this leads to great inefficiency as scarce resources are used for the production of low-value goods or services that are only “profitable” because the true costs are understated.

Third, heavy subsidies lead to great waste in consumption since if something is “free,” then the consumer treats the good or service as if it has zero cost. If an Iraqi store can obtain power from the grid at a low/zero tariff, then the storeowner will run his air conditioner at maximum cooling while keeping the door open to encourage customers to enter. With near-zero prices, the demand for public services is not constrained by prices as much as by consumer incomes and the availability of complements in consumption. In the absence of a realistic market price for electricity, Gol estimates of demand are almost meaningless. For example, since the marginal cost to the user of additional electricity consumption is near zero, any increase in the supply of

<sup>40</sup> Koba Gvenetadze and Amgad Hegazy, *Iraq: Selected Issues* (Washington, D.C.: IMF, August 2015): pp. 15-29.

electricity leads to the purchase of more electricity-using goods and services. And more electricity-using products lead to increased government estimates of demand. As a result, the gap between the amount of electricity demanded and the amount supplied never closes.

This problem with artificially low electrical prices was recognized fairly early in the post-2003 reconstruction process by both military and civilian authorities.<sup>41</sup> But inertia and leadership overload prevented any serious attempt to charge reasonable electrical charges until late 2010.

In October 2010, the Ministry of Electricity introduced, for the first time, a tiered system of charges for electricity. However, in response to widespread protests, the pricing system was modified to reduce the tariff for the first 1000 kWh used by residential, industrial, commercial, government, and agriculture consumers to about 11.1 IQD (\$0.009 or less than one penny) per kWh. The tariff rises in steps for greater usage, but it is only for consumption above 3,000 kWh that the tariff—122.6 IQD (\$0.103) per kWh—exceeds the estimated cost (108 IQD (\$0.09)) of producing one kWh.<sup>42</sup> In other words, the electricity tariffs paid by most Iraqis are a fraction of the cost of the electricity they consume. As a result, the Ministry of Electricity only collects enough revenue to cover about 12% of its costs.<sup>43</sup> While a small step in the direction of rationalizing demand, electricity pricing in Iraq faces at least two unresolved issues.

First, metering is not available in many areas and is considered unreliable. In fact, an estimated two-thirds of electricity is used by people who either are not metered or illegally tap into the grid.<sup>44</sup> Second, and more importantly, the decision to make the

<sup>41</sup> See, for example, Linda Robinson, *Tell Me How This Ends: General David Petraeus and the Search for a Way Out of Iraq* (New York: Public Affairs, 2008): p. 173.

<sup>42</sup> Hashim al-Rikabi, *An Assessment of Electricity Reforms in Iraq* (Baghdad, Iraq: Al-Bayan Center for Planning and Studies, 2017), Table 1, p. 7.

<sup>43</sup> Cezley Sampson, *Development of a Reform Roadmap for the Electricity Distribution Sector in Iraq* (Washington, D.C.: CPCS Transcom International Limited, 2015) Figure 3.1, pp. 3-66.

<sup>44</sup> Coles and Nabhan, “Despite Its Oil Wealth.”

first 1,000 kWh almost free, while popular, eliminates most of the efficiency benefit that the pricing was intended to achieve in the first place. The Gol stated that the purpose of the change was to help the poorest 8 million Iraqis obtain the electricity they need. But a 1,000 kWh is a lot of electricity, which means that the Gol has committed itself to providing almost-free power to more than half the population.

**“The International Monetary Fund (IMF) estimates that direct subsidies of food, electricity, and fuels amounted to almost 9% of Iraq’s GDP.”**

Providing heavily subsidized utilities such as electricity and water also produces perverse incentives for the government ministries and state owned enterprises (SOE). Since the consumer pays little or nothing for electricity, water, medical care, etc., his or her needs can be ignored. The only exceptions to the terrible service from government agencies are if the consumer has political connections or is willing to offer a bribe. The bureaucracy has little incentive to provide services to anyone who lacks political or other connections since they will not receive increased funds for providing service to a particular customer.

Prior to the oil price collapse in 2014, reducing subsidies and allowing prices to rise enough to balance demand and supply was political suicide in Iraq. The Gol leadership responded to public protests over shortages of electricity, water, fuel, education, medical care, etc. by promising further infrastructure investment to increase the supply of almost-free essential services. If, as expected, low oil prices continue for the next decade, then Baghdad may be more willing to pay the political price of charging a price for public utilities that covers the marginal cost—if not the average cost—of providing electricity, water, sewage disposal, etc. And more rational pricing of utilities will have an additional

favorable effect by reducing the incentives for corruption.

### Investment to Facilitate Corruption

Corruption is the abuse of public power for private benefit. Corruption occurs if a government official has the power to grant or withhold something of value and—contrary to laws and publicized procedures—trades this something of value for a gift or reward. Corruption is a form of rent seeking. Among corrupt acts, bribery gets the most attention, but corruption can also include nepotism, official theft, fraud, certain patron-client relationships, or extortion.<sup>45</sup>

**“Unfortunately, in Iraq, infrastructure investment is riddled with corruption resulting in both higher costs and poor performance.”**

Corruption extends from the top to the bottom of official Iraq. Iraqi politician Ali Allawi in his excellent discussion of Iraqi corruption went as far as to state that corruption had turned the GoI into a “Potemkin State.”<sup>46</sup> Ministers responsible for trade, electricity, and oil have been investigated for corruption, and several have fled the country with hundreds of millions of dollars. At the other extreme, there is evidence that the official village grain merchants who are responsible for distributing the monthly food baskets (Public Distribution System) are substituting lower quality items in the baskets and selling the higher quality products.

Iraq is tied with Venezuela as the seventh most corrupt country in the world.<sup>47</sup> While

<sup>45</sup> Frank R. Gunter, “Immunizing Iraq Against al Qaeda 3.0,” *Orbis*, vol. 62, no. 3, (Summer 2018); *The Political-Economy of Iraq*, Chap. 4, pp. 46-66; Frank R. Gunter, “Corruption” in *Encyclopedia of Social Problems*, ed. Vincent N. Parrillo (New York: Sage Publications, 2008): pp. 173-6; and Pranab Bardhan, “Corruption and Development: A Review of Issues,” *Journal of Economic Literature*, vol. 35, no. 3, (1997): pp. 1320-22.

<sup>46</sup> Ali A. Allawi. *The Occupation of Iraq: Winning the War, Losing the Peace* (New Haven, CT: Yale University Press, 2007) Chap. 12, pp. 348-68.

<sup>47</sup> Transparency International, *Corruption Perceptions Index, 2017* (Berlin, Germany: Transparency International, 2018).

academics may argue that small amounts of corruption act as a “lubricant” for government activities, the large-scale corruption in Iraq undermines private and public attempts to achieve a better life for the average Iraqi.

Unfortunately, in Iraq, infrastructure investment is riddled with corruption resulting in both higher costs and poor performance. As a result, electrical blackouts continue, pipelines leak, school buildings collapse, roads rapidly deteriorate, and households must boil tap water to prevent infection.

The ubiquitous corruption affects reconstruction in two ways. First, massive oil smuggling and the diversion of oil export earnings into private accounts reduce the funds available for infrastructure investment. Second, there is a tendency to spend scarce reconstruction funds on projects that facilitate corruption rather than on projects that are most needed on the grounds of essential services or economic development.

It has been estimated that a third or more of some agencies’ budgets are lost to corruption.<sup>48</sup> With respect to earnings from oil exports, the amount of oil that enters the black market to be either sold in Iraq or smuggled across one of its borders is, of course, unknown. Based on estimates that reflect no more than educated guesses and that became even more unreliable with the rise of ISIS, maybe \$1 billion worth of crude oil and refined fuel went missing every month in 2017—\$12 billion in the whole year. As a matter of scale, if this corrupt divergence had not occurred, then 2017 GoI oil export earnings would have been almost 20% higher reaching \$80 billion.

And remaining government investment is often diverted to facilitate corruption. In Iraq, as in many developing countries, corruption reinforces socialist thinking to produce a bias in favor of building new infrastructure facilities

<sup>48</sup> Omer Sattar, “Integrity Committee to Investigate Corruption in Iraqi Ministries,” *Al-Monitor*, July 7, 2012; Rahdi Hamza al-Radhi, “Testimony to the House Committee on Oversight and Government Reform on the Status of Corruption in the Iraqi Government,” October 4, 2007; and Alissa J. Rubin, “Iraqi Trade Officials Ousted in Corruption Sweep,” *New York Times*, September 24, 2008.

as opposed to spending on the maintenance of existing facilities. Road construction and maintenance illustrate this tendency.

Road construction and maintenance should be relatively inexpensive in Iraq. In the lower two-thirds of the nation, temperatures rarely, if ever, fall below freezing, which excludes a major cause of road deterioration. Also, in the lower two-thirds of the nation, the land is relatively flat, which simplifies roadway engineering—although there are almost 1,300 bridges required not only for the two rivers, but also for the large number of irrigation canals. However, failure to limit overweight trucks has led to rapid deterioration of major trucking routes.

While it is widely accepted that Iraq would greatly benefit from better maintenance of existing roads, incentives make this difficult to achieve. Most roads are public goods—neither rival in consumption nor excludable at reasonable cost. Therefore, most roads in Iraq are financed by the national government. However, they are built and maintained by contractors chosen by provincial or local governments.

Unfortunately, in Iraq, the road construction and maintenance businesses are riddled with corruption. The construction firms are generally chosen on the basis of political or family connections as well as willingness to pay bribes to the official awarding the contract. This leads to a bias in favor of building new roads instead of maintaining old ones since the greater complexity involved with building new roads provides more corruption opportunities as well as photo opportunities for government officials. And the quality of road construction is often low because of the substitution of lower quality materials for those specified in contracts. This results in more rapid roadway deterioration and additional contracts for more new roads.

The roots of corruption in Iraq are many. There is little that can be done about causes that are geographic, historical, or are deeply imbedded in Iraqi culture. However, corruption also is motivated and facilitated by policies; some are recent and others date back to the Saddam

era.<sup>49</sup> Beginning with the first post-invasion *National Development Strategy* released in June 2005, the GoI developed a series of anti-corruption strategies, most recently in 2010. However, a fair evaluation is that the multiple anti-corruption strategies have failed. Assuming that Iraq is not *sui generis*, it should be possible to compare Iraq’s anti-corruption strategy to those of other countries and to identify possible causes of failure.

**“In Iraq, corruption reinforces socialist thinking to produce a bias in favor of building new infrastructure facilities as opposed to spending on the maintenance of existing facilities.”**

No country has succeeded in eradicating corruption although several countries have succeeded in reducing it to manageable levels. Since the causes of corruption differ among countries, it is not surprising that anti-corruption strategies differ as well. However, one important insight is that it is simplistic to view anti-corruption efforts as solely a law enforcement problem. Unless one is willing to tolerate a totalitarian state, arresting a succession of corrupt officials without changing the financial and other incentives that motivated their corruption will be an unending process. The few successful and many failed anti-corruption efforts around the world point to the need for a coordinated and multi-faceted strategy—of which improved law enforcement is one component—that is specifically crafted to meet the characteristics of each country.<sup>50</sup> The few successful anti-corruption strategies also include improved governance, a robust independent anti-corruption agency, intense efforts to change the culture of corruption in Iraq, reasonable compensation for officials, and reducing the economic incentives for corruption.<sup>51</sup>

<sup>49</sup> Gunter, *The Political-Economy of Iraq*, Chap. 4, pp. 46-66.

<sup>50</sup> Gunter “Immunizing Iraq Against al Qaeda 3.0,” p. 396.

<sup>51</sup> Marie Chêne, *Successful Anti-Corruption Reforms* (Berlin, Germany: Transparency International, April 30, 2015); Jackson Oldfield, *Overview of National Approaches to Anti-Corruption Packages* (Berlin, Germany: Transparency International, May 23, 2017); and Jon S.T. Quah, “Different Paths to Curbing Corruption: A Comparative Analysis,” in *Different Paths to Curbing Corruption: Lessons from Denmark, Finland, Hong Kong, New Zealand, and Singapore* (Bingley, United Kingdom: Emerald Publishing, 2013): pp. 219-255.

# Determinates of Supply of Infrastructure Investment

Of course, the demand for infrastructure investment to rebuild the country after the destruction that resulted from four decades of conflict, to rapidly expand the oil and gas industry, to substitute for foregone maintenance, to compensate for market failure, and to facilitate corruption is only one blade of the scissors. It is also important to consider the determinants of the supply of infrastructure investment in Iraq. In most developing countries, the binding constraint on the supply of infrastructure is shortage of finance. Until 2014, Iraq was the exception to this general rule. It was not finance but institutional weakness that most seriously constrained infrastructure investment. However, in a future of \$60 per barrel oil prices, Iraq must struggle with both its institutional weaknesses as well as shortage of finance from oil exports.

In addition to the difficulty of financing the construction of needed “hard” infrastructure, there are at least four other institutional weaknesses that will make it difficult to supply the resources necessary to rebuild Iraq. These include: lack of skilled managers, limited ministerial capability, ubiquitous corruption, and regulatory hostility towards the country’s private sector. In other words, the “soft” infrastructure of Iraq is limited when it is not entirely absent. And unless these critical components of “soft” infrastructure can be developed, Gol efforts to efficiently rebuild Iraq’s public works infrastructure will fail.

## Available Finance

For decades, almost 90% of Iraq’s infrastructure investment has been planned, financed, and executed by the Gol either directly or through state owned enterprises. Due to the dominance of public sector investment, each

year’s infrastructure investment is a function of both the country’s oil export earnings—a one dollar increase in the price of oil will increase annual Gol revenues by about \$1.4 billion—and the degree of efficiency in budget execution.

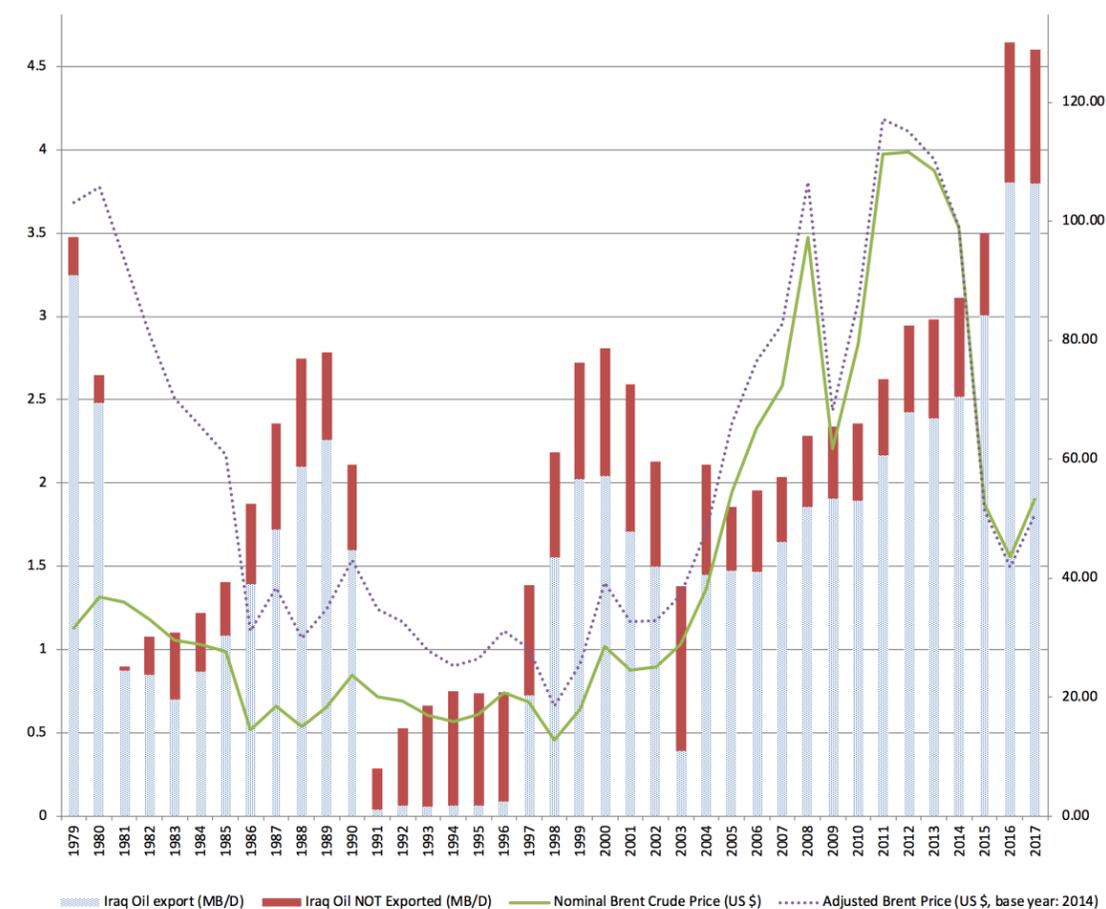
Figure 3 illustrates the determinates of Gol oil export revenues from 1979-2017. These revenues are a function, of course, of both the volume of oil exports and the world price of oil. While the volume of oil production and exports has increased almost every year since the 2003 invasion by the U.S.-led coalition, there have been dramatic year-to-year changes in world oil prices. And changes in total oil export revenues have a multiplied impact on Gol infrastructure investment because investment spending is the budget “shock-absorber” since the Gol has very limited capacity to borrow either domestically or internationally. When oil export revenues decline, or security expenditures increase, the Gol maintains its budgeted spending levels on wages, pensions, and subsidies financed by sharp cuts in government infrastructure investment.

For example, between 2014 and 2017, actual Gol investment expenditures fell by almost 50% to 24 trillion IQD (\$20.3 billion) in response to the country’s perfect storm. However, during these years of severely constrained revenues, salaries and pensions expenditures actually *increased* by 16%.<sup>52</sup>

Unexpected changes in government investment not only have a substantial impact on long-term capital accumulation, but also lead to great inefficiency in investment. When, in response to unexpectedly low oil prices in 2009, the Gol sharply cut investment expenditures, most infrastructure investment in roads, electricity, schools, clinics, water supply, etc. slowed or stopped.

<sup>52</sup> IMF, *Iraq: Second Review of the Three-Year Stand-By Arrangement*, Table 3, p. 34.

Figure 3: Oil Prices and Iraqi Production and Export Volumes



Source: OPEC 2017, *Annual Statistical Bulletin*.

Partially completed multi-year building projects were abandoned for months until investment spending was restored when oil prices recovered to pre-collapse levels in 2011. When projects were restarted, it was discovered that much previous work had to be completely redone due to looting, vandalism, environmental damage, or plan revisions.

Using government investment as the shock absorber continues today. In 2017, oil export revenues rose almost 40% to \$68.2 billion in 2017 as a result of higher oil prices combined with a large increase in Gol borrowing. Despite the increased revenues from oil sales and borrowing, government infrastructure investment only totaled an estimated 24 trillion IQD (\$20.3 billion), which was substantially below planned investment. Much of the increase in revenues went for substantial increases in salary, pension,

and social safety net expenditures. And the impact on investment was uneven with most of the cuts occurring in non-oil investment expenditures. Oil-related investment that only accounted for about a third of total investment in 2013 reached almost 60% of total Gol investment expenditures in 2017.<sup>53</sup>

The next decade of oil prices will be determined—as always—by a combination of economic (demand and supply) and political factors.<sup>54</sup> And any long-run prediction may be disrupted in the short run by the effects of conflict or international disputes short of conflict. However, in the long run, demand growth is slowing as three of the world’s five largest oil importers—China, India, and South Korea—appear to be entering a period of real

<sup>53</sup> IMF, *Iraq: Second Review of the Three-Year Stand-By Arrangement*, Table 3, p. 34.

<sup>54</sup> Gunter, “Immunizing Iraq Against al Qaeda 3.0,” pp. 394-395

growth below their long-term trend.<sup>55</sup> This period of slower economic growth is expected to reduce the growth of their energy demand. In addition, the drive for increased efficiency and the shift to sustainable energy is reducing the energy use necessary for a given amount of economic growth. Finally, the United States, which was the world's largest oil importer as recently as 2016, may become a small net oil exporter within the next decade.

On the supply side, despite oil production trending down in Latin America, Asia and the Pacific, and Africa, the world's total oil supply has increased by about 8% over the last six years. This increase is a result of a 27% increase in oil production in the Middle East and a 50% increase in North America. Two countries are primarily responsible for the world's increase in oil production: Iraq had a 97% increase, while the United States had a 62% increase primarily from fracking.<sup>56</sup> And the world oil price that will allow frackers to earn a profit has decreased substantially from about \$80 per barrel in 2013 to about \$40 per barrel in mid-2018.<sup>57</sup> It is interesting to note that this increase in the world oil supply occurred while both Libya and Venezuela experienced substantial production reductions.

As a result of these demand and supply trends, one can expect Brent Blend oil prices of roughly \$60 per barrel for the next decade. As can be seen in Figure 3, \$60 per barrel oil means a return to the inflation adjusted prices that occurred for almost two decades between 1986 and 2005. However, the revival of the nuclear dispute between Iran and the United States has once again raised concerns of a fall in oil exports from Persian Gulf countries including Iraq and Iran. In mid-September 2018, this dispute contributed to higher oil prices than the economic fundamentals seem to predict. Despite a stronger dollar, the Brent Blend price rose to over \$80 per barrel. However, a study of seven previous cases where Iran sought—short of war—to disrupt

55 Henning Gloystein, "Slowdowns in China and India Eat Away at Asian Oil Demand," *Reuters*, August 15, 2018; "Economic and Financial Indicators," *Economist*, April 25, 2018; and World Bank, *World Development Indicators* (Washington, D.C.: World Bank, 2018), Table 4.1.

56 OPEC, *Annual Statistical Bulletin*, Table 3.6.

57 "Energy Journal," *Wall Street Journal*, August 13, 2018.

the movement of oil through the Persian Gulf reveal that the impact of these disruptions has little effect on oil prices and tends to dissipate rapidly.<sup>58</sup> Therefore, if open conflict can be avoided, oil prices can be expected to regress to their long-run price of about \$60 per barrel.

**"There are large numbers of unskilled unemployed and underemployed in Iraq, but electricians, plumbers, and other types of skilled workers are in short supply."**

Of course, the Gol does not earn the Brent Blend price. In normal times, as a result of quality and transportation issues, Iraq earns about 90% of the Brent Blend price. However, if the drivers of higher world oil prices are disputes involving Iran or other countries that ship oil through the Persian Gulf, the effect on Iraq's oil earnings are mixed and may be negative. For example, a dispute involving Iran which threatens oil tankers in the Gulf will lead to an increase in world oil prices. However, a rising risk premium including the increased cost of insuring those tankers will reduce the proportion of the higher world price of oil actually received by the Gol.

### Lack of Managers of Billion Dollar Projects

An equally serious problem for the supply of infrastructure investment is the country's shortage of skilled labor. There are large numbers of unskilled unemployed and underemployed in Iraq, but electricians, plumbers, and other types of skilled workers are in short supply. And since the war with ISIS began in 2014, there has been an acceleration of the brain drain of skilled and educated Iraqis. To compensate, Iraq must either train more skilled workers or hire expatriate electricians, plumbers, etc.

The most serious gap in human capital is the severe shortage of managers capable of

58 Michael Ratner, *Iran's threats, the Strait of Hormuz, and Oil Markets: In Brief* (Washington, D.C.: Congressional Research Service, August 6, 2018), Table 1, p. 7.

handling large complex projects. In particular, Iraq has very few (or no) individuals who are capable of efficiently managing billion dollar projects. To efficiently manage a billion-dollar project requires not only a first-class education—most likely an engineering degree followed by a MBA—but also 12-20 years of "on the job" experience on complex projects with regularly increasing responsibilities. During the thirty years that Saddam's Iraq was substantially cut off from the world, the quality of higher education particularly in the engineering and management fields deteriorated greatly for those who were able to attend. In addition, even those Iraqis who have obtained a good education probably have little chance of obtaining appropriate positions of responsibility. The Baghdad bureaucracy rewards and promotes managers more for their political agility than for their ability to achieve technological or market efficiencies. In the absence of quality management, attempts to plan, coordinate, and execute the large-scale infrastructure reconstruction projects proposed in the Gol development strategy can be expected to result in large-scale waste, delay, and corruption.

**"Unlike many countries, Iraq does not have the option of turning to successful private sector managers to oversee large complex public works infrastructure projects."**

Attempts to overcome the shortage of domestic big-project managers by a "temporary" reliance on expatriate managers will not only be expensive, but also raises other issues. With respect to expanding oil production and export, the Gol has contracted with the major IOCs. But this raises another issue: who will manage the foreign managers of the IOC? There is a principal-agent problem since the motivations of the Gol and the IOCs are different. It is difficult to draft large project management contracts for expatriate managers representing foreign firms without substantial technical and management

capability. But with few exceptions, these capabilities are lacking at the upper levels of the Gol.

Unlike many countries, Iraq does not have the option of turning to successful private sector managers to oversee large complex public works infrastructure projects. The economy of Iraq continues to be dominated by SOEs that tend to be high cost/low quality producers. Therefore, any large-scale infrastructure investment will involve these inefficient SOEs.

### Inefficiency of the Public Sector – Ministries and State-Owned Enterprises

Iraq is not Sweden. The Baghdad bureaucracy is less professional, less well trained, and—to be blunt—less honest than that of any of the Organization for Economic Co-operation and Development (OECD) countries. But in today's Iraq, detailed economic planning, coordination, and execution continue to be the responsibility of dozens of ministries in Baghdad. Reflecting its socialist DNA, Iraq continues to produce detailed five-year plans; the most recent was the *National Development Plan 2013-2017*. These plans suffer from two weaknesses. First, by the time they are published, their political and economic assumptions are often no longer realistic. For example, the rise of ISIS and the collapse of oil prices have vitiated much of the infrastructure proposals in the 2013-2017 plan.<sup>59</sup> Second, although these plans often pay lip service to the private sector, they focus almost entirely on guidance for the ministries in Baghdad. These ministries then determine in exhaustive detail almost all economic activities from fertilizer consumption by farmers to setting the price for imported automobiles. These plans are finally executed by about 176 SOEs. These SOEs, established by Saddam, served several purposes. In addition to their direct political and economic responsibilities, the SOEs provide a means to reward supporters and, by exclusion, punish those who were less than enthusiastic or lack high-level

59 Government of Iraq, *National Development Plan: 2013-2017* (Baghdad, Iraq: Government of Iraq, 2013).

Table 1: Private Sector Regulation: Iraq versus UAE

Category	Indicator	Iraq	UAE
Ease of Doing Business		168	21
Starting a Business	Time (days)	27	9
Dealing with Construction Permits	Time (days)	167	51
Getting Electricity	Time (days)	51	10
Registering Property	Time (days)	51	2
Getting Credit	Legal rights index (0-12 best)	0	2
Protecting Minority Investors	Corporate transparency index (0-10 best)	3	7
Paying Taxes	Time (hours/year)	312	12
Trading Across Borders (Documentary Costs)	Cost to export/import one container	\$1,800/\$500	\$178/\$283
Enforcing Contracts	Time (days)	520	445
Resolving Insolvency	Recovery rate	0%	29%

Source: World Bank, *Doing Business 2018*, pp. 93 and 126.

government protectors. Also, SOEs provide multiple opportunities for government officials to extract bribes and divert funding for their personal benefit.

In Iraq, almost all of the infrastructure construction and maintenance costs throughout the 15 non-KRG provinces are paid for by the national government. For example, with respect to the provision of clean drinking water in urban areas, the national government builds the reservoirs, purification plants, and the system of pumps and pipes that will bring adequate quantities of clean drinking water to each consumer. Then, an SOE takes responsibility for operation and maintenance of the system, charging a small fee—less than

the marginal cost—for the water. This causes several problems.

There is a tendency for a significant portion of the funds dedicated for infrastructure investment to be spent by the ministerial or SOE bureaucracy in Baghdad on salaries and benefits for its employees. When the national ministry makes the decisions on which water system to build and who shall build it, the primary motivation is often not the welfare of the ultimate water consumer, but how building the necessary infrastructure can increase the influence or wealth of the ministry or SOE leadership. When construction material is purchased, it will often be from entities that have relationships with ministerial or SOE

officials. Hiring is driven more by connections than competency. Promotions are based on the ability to successfully navigate a complex web of political relationships rather than engineering or another competency. Maintaining well-paid employment of ministerial employees is usually more important than consumers receiving the promised good such as adequate clean water.

Thus, the national financing of both the fixed and variable costs of Iraqi infrastructure leads to perverse incentives for the bureaucracy. Since Baghdad ministries pay the agencies responsible for providing the “last mile” of public goods from crude oil export earnings (and not from the payments by the customers), these agencies have little incentive to actually meet customer needs. A program is judged “successful” if it expends all of its budgeted funds, not one that actually achieved its goals.

Can SOE efficiency be improved? Current SOE management suffers from ambiguous incentives. The managers are assigned multiple—often contradictory—goals that are evaluated according to bureaucratic—not market—standards. Loyalty tends to be more valued than efficiency. Incentive ambiguity can be reduced in several ways. Large SOEs can be unbundled so that managers are not required either to manage very diverse products lines or to manage product lines that compete with each other. There are currently some limited efforts to unbundle responsibilities of SOEs in the oil sector. SOEs could also be restructured so as to provide factory directors with greater autonomy and to reduce the number of decisions that must be referred to the SOE headquarters or the Ministry in Baghdad.<sup>60</sup> However, efforts to increase the efficiency of ministerial and SOE operations are often opposed by those who profit by the corruption possible under the current system.

### Corruption and Regulatory Hostility Constrain Private Sector<sup>61</sup>

<sup>60</sup> See, the detailed discussion in World Bank, *Bureaucrats in Business* (New York: Oxford University Press, 1995): pp. 231-57.

<sup>61</sup> This section draws extensively on Gunter, “Immunizing Iraq Against al Qaeda 3.0,” pp. 389-408.

The private sector is severely constrained both by the corruption discussed above as well as by the Gol’s regulatory hostility towards the country’s private sector. According to the 2017 “Ease of Doing Business” survey of the World Bank, Iraq has one of the most hostile regulatory environments in the world ranking 168 out of the 190 countries surveyed, and its ranking has deteriorated over the last several years.<sup>62</sup> Note that this deterioration may not reflect new policies adopted by Baghdad.

*“Much of the private sector is willing to accept the inefficiencies and risks of remaining in the underground economy rather than deal with the rats’ nest of government rules.”*

Of course, a certain amount of regulation is required to prevent fraud, threats to public health, etc., so it is difficult to determine whether a country’s regulation of private businesses is normal or excessive. One approach is to compare a country’s regulations to those of a more business-friendly neighbor in the Middle East and North Africa (MENA) such as the United Arab Emirates (UAE). In Table 1, Iraq is compared to the UAE in the ten ease of doing business characteristics. In each of the ten cases, Iraq’s regulation is more demanding—more hostile to private sector activities—than the UAE. The gap is especially large in the categories of “Registering Property,” “Protecting Minority Shareholders,” “Paying Taxes,” and “Resolving Insolvency.” In fact, for the latter category, Iraq is tied for the worse record of all 190 countries evaluated by the IMF, which—considering the competition—is a damning indictment.

In view of the regulatory hostility towards private business, it should be no surprise that much of the private sector is willing to accept the inefficiencies and risks of remaining in the underground economy rather than deal with the rats’ nest of government rules. While there are no reliable statistics, it is estimated

<sup>62</sup> World Bank, *Doing Business 2018: Reforming to Create Jobs*, (Washington, D.C.: World Bank Group, 2018): p. 93

that while about 50% of Iraq's total labor force is directly or indirectly employed by the government, but only 3% is employed in the legal private sector with almost 20% employed in the illegal or underground economy.<sup>63</sup> Although more recent data is not available, the percentage of employment in the underground economy has probably increased substantially since the ISIS incursion began in 2014.

The lack of a vibrant private sector has several adverse effects on infrastructure investment. Arguing that there are no private sector alternatives, the Gol relies on SOEs or foreign firms to execute its infrastructure plans. Without private sector suppliers, SOEs tend to have higher costs than otherwise. Also, the absence of private sector competitors tends to reduce the incentive of SOE firms to become more efficient.

## What Should Be Done?

The conquest of almost 40% of Iraq's land by ISIS in mid-2014, including several of the country's largest cities, followed by the collapse of oil prices later in the year was a perfect storm for Iraq. Extensive infrastructure reconstruction is critically important both to reduce the hardship of the Iraqi people and to prevent the rise of a successor to ISIS. And the financial difficulties are daunting since not only will reconstruction be more expensive than the Gol's February 2018 estimates, but also because the country can expect a decade or more of low oil prices.

The first reconstruction challenge is to develop a more accurate estimate of the scale of the problem. The Gol's estimate of \$88 billion severely understates the financing required. A more likely estimate is that between \$160 and \$275 billion will be required to simultaneously rebuild the country and expand oil exports. However, obtaining the necessary finance to rebuild the country will be a wasted effort unless something is done about the perverse incentives produced by current institutions that compose the country's soft infrastructure.

In other words, to have any chance of success in the long term, the process of post-conflict reconstruction of public infrastructure must simultaneously rebuild Iraq's soft infrastructure—its institutions—and its hard infrastructure—the actual physical public works. Without reconstruction of the country's soft infrastructure, much of the physical investment will be wasted. This is not a new conclusion. Since the U.S.-led coalition overthrew Saddam's regime in 2003, the International Monetary Fund, the World Bank, and the Gol<sup>64</sup> have proposed radical changes in the nation's development-related

institutions. Unfortunately, after more than a decade, these detailed plans and strategies have resulted in minimal change. Why should the future be any different? There are at least two reasons for measured optimism.

***“To have any chance of success in the long term, the process of post-conflict reconstruction of public infrastructure must simultaneously rebuild Iraq's soft infrastructure—its institutions—and its hard infrastructure—the actual physical public works.”***

First, many Iraqis seemed to think that the primary problem with Saddam's economy was Saddam. With his removal, many politicians were comfortable with a continuation of oil-funded socialism, especially since it provided the opportunity for widespread corruption. However, the collapse of oil prices in 2015 and the expectation that it is unlikely that these prices (adjusted for inflation) will ever return to the \$100 or more per barrel of 2011-2014 shown in Figure 3 have gradually injected an element of realism into Iraqi economic development policy. The Gol that was unwilling to take steps to liberalize the country's economy during the good days of high-oil prices may now be forced into making these changes by the continuing fiscal and unemployment crises brought about by low oil prices.

The other element of cautious optimism is less capable of being quantified but may be more important in determining the future of Iraq's economic development. Young Iraqis seem to have more of a market orientation than their elders. This is due in part to the passage of time. A majority of Iraqis are too young to remember Saddam or his regime's ubiquitous propaganda about the superiority

<sup>63</sup> Gunter, *The Political-Economy of Iraq*, p. 16.

<sup>64</sup> International Monetary Fund, *Iraq – Request for Stand-By Arrangement*, December. (Washington, D.C.: International Monetary Fund, 2005); and the Government of Iraq, *National Development Strategy: 2005-2007*, (Baghdad, Iraq: Government of Iraq, 2005).

of the socialist economic model. Instead, they see the inability of the extremely bureaucratic government to provide basic necessities such as electricity, pure water, health care, etc. as an indictment of the current system. In addition, at the same time that the combined unemployment and underemployment rate of young non-college-educated Iraqis exceeds 80%,<sup>65</sup> the Gol can no longer afford to be “the employer of first resort” guaranteeing government jobs to college graduates. The 2018 Gol budget was the first since 2005 to call for the creation of zero new government jobs.

Since the possibility of obtaining a career in other countries has become increasingly constrained, many young people are seeking opportunities in Iraq’s small private sector. The increasing popularity among young college-educated Iraqis of entrepreneurship efforts, such as “Noah’s Ark” launched in 2017 or the entrepreneurship incubator “The Station” in Baghdad, is evidence of a greater market orientation.

**“Iraq should seek to reduce its economic dependency on oil by reducing regulatory hostility towards private businesses.”**

But whether as a result of the fiscal crisis caused by low oil prices or the realization by young Iraqis that socialism has failed, there may be more genuine motivation for a liberalization of the Iraqi economy than any time since 2005. However, such liberalization will require three interrelated politically difficult steps: reduce corruption, reduce subsidies, and reduce oil dependency.

First, there has been extensive research on which anti-corruption strategies have the greatest chance of success.<sup>66</sup> The challenge is

<sup>65</sup> Gunter, *The Political-Economy of Iraq*, pp. 14-16.

<sup>66</sup> See, Gunter, “Immunizing Iraq Against al Qaeda 3.0,” pp. 396-404; Chêne, “Successful Anti-Corruption Reforms;” Oldfield, “Overview of National Approaches to Anti-Corruption Packages;” and Quah, “Differ-

ent Paths to Curbing Corruption,” pp. 219-255.

not knowing what to do, but the lack of political will to do it. The recent election results will have a mixed impact on the extent and scale of Iraqi corruption. Optimistically, many voters appear to have been motivated by the anti-corruption efforts and rhetoric of the competing parties. This is exemplified by the fact that Muqtada al Sadr’s coalition, which for several years has pushed a strong anti-corruption message, won a plurality in the May 2018 national elections. However, since no party or coalition won a majority of the seats in the national Council of Representatives, forming the next government required intense negotiations and horse trading among the major players. And among the most important incentives that were offered to motivate a party or coalition to join the government will be control of a ministry or SOE. This control will provide opportunities for high-level government jobs and corruption to reward party loyalists.

Second, a rapid reduction in subsidies is necessary. That a reduction in subsidies will free up funds for investment in oil and non-oil infrastructure is important. But what is more important is that the reduction of subsidies will require increasing tariffs for electricity, water, and other essential services. These changes will reduce waste as well as improve the incentives for SOE or private sector firms to actually satisfy the wants of the Iraqi public. Reducing subsidies will be extremely controversial. The 2005 Gol proposal to sharply reduce fuel subsidies led to mass street protests organized by an unholy alliance of groups genuinely concerned about the impact of higher fuel prices on low-income families and criminal groups that profited from fuel smuggling. These protests called for either the restoration of the subsidies or the fall of the government. However, to the surprise of many analysts, the Gol didn’t cave and the black-market premium over official fuel prices fell from 400% in early 2006 to 47% a year later.<sup>67</sup>

Finally, Iraq should seek to reduce its economic dependency on oil by reducing regulatory

<sup>67</sup> David A. Grigorian and Udo Kock, *Inflation and Conflict in Iraq: The Economies of Shortages Revisited*, IMF Working Paper WP/10/159, (Washington, D.C.: International Monetary Fund, 2010): p. 8.

hostility towards private businesses. Instituting a more business-friendly commercial code does not have to be a long, drawn out process. The World Bank has substantial experience in instituting regulatory “best practices.” Or Iraq could adapt the commercial code of the UAE, its neighbor on the Persian Gulf. The UAE is the 51<sup>st</sup> best place to start a business—compared to Iraq’s 154<sup>th</sup> ranking—and its commercial code is consistent with Islamic principles. Another option would be that Iraq could imitate China and establish a special economic zone to experiment with rationalizing regulations before imposing them on the entire country. Regulatory reform should not only diversify the Iraqi economy by reducing its dependency on oil exports, but also a more business-friendly regulatory environment will reduce incentives for corruption.

The collapse of oil prices may provide strong incentives to improve the efficiency of public infrastructure investment by fighting corruption, reducing subsidies, and deregulating private business. But the Gol must act quickly. Iraq should be able to finance most of its 2018 and 2019 budget deficits through a combination of internal and external borrowing. But if, as expected, oil prices stay low for more than two years and the Gol fails to substantially diversify away from oil dependency, then the Gol will be forced to cut its current spending to levels that will be politically destabilizing. 🌐

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