

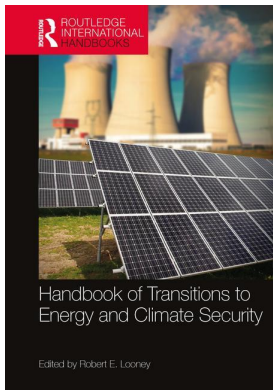
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On: 28 Nov 2023

Access details: *subscription number*

Publisher: *Routledge*

Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered office: 5 Howick Place, London SW1P 1WG, UK



Handbook of Transitions to Energy and Climate Security

Robert E. Looney

Egypt

Publication details

<https://www.routledgehandbooks.com/doi/10.4324/9781315723617-18>

Robert Springborg

Published online on: 29 Nov 2016

How to cite :- Robert Springborg. 29 Nov 2016, *Egypt from: Handbook of Transitions to Energy and Climate Security* Routledge

Accessed on: 28 Nov 2023

<https://www.routledgehandbooks.com/doi/10.4324/9781315723617-18>

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The challenge of squaring the energy–environment–growth triangle

Robert Springborg

Egypt's struggle to square the energy–environment–growth triangle is important in its own right and for its broader implications. The “echo effect,” whereby an increase in fertility rates combined with an unprecedented number of women being of childbearing age, is driving a renewed, rapid population increase. Whereas 2.1 million children were born in 2008, four years later 2.6 million were born.¹ At projected growth rates, Egypt by 2050, having as many as 140 million citizens, will be more populous than either Russia or Japan.² Egypt accounts for more than one-fifth of all oil and two-fifths of all gas consumed in Africa, making it the continent's largest fossil fuel consumer in 2013.³ While Egypt's per capita carbon dioxide emissions are well below the average of OECD countries, they are high by the standards of lower middle income countries and rising at one of the world's fastest rates, doubling between 1990 and 2010.⁴ Egypt's energy efficiency of production has not improved over the past two decades, making it one of the world's least energy efficient producers.⁵ Having been in 2005 the world's ninth largest exporter of natural gas, earning more than half its export income from fossil fuels, its exports and earnings plummeted after 2010, rendering the country a net fuel importer from 2013.⁶ An increasing natural gas shortage has been the major contributor to ever more frequent electric power outages throughout the country, further slowing production in the energy intensive fertilizer, cement, steel, and ceramics industries, while disrupting the daily lives of virtually the entire population. By early 2015 steel factories were operating at about 40% of normal capacity and fertilizer production had dropped by 70% over the preceding year.⁷ Heavily dependent upon energy intensive products for its exports, Egypt's trade deficit increased by almost one-fourth in the year ending March, 2015, as goods exports fell by some 14% in that period.⁸ After 2010 the rate of growth of GDP slumped to an annual average of less than the rate of population increase, resulting in growing impoverishment and unemployment.

Egypt, in sum, has failed to effectively utilize its endowment of fossil fuels or to develop alternative energy supplies in pursuing more rapid, sustained economic growth. Its rising population and carbon emissions, to say nothing of degradation of the nation's water, soil, and air, combined with its ever greater reliance on imported foodstuffs, pose threats both to the country's and the world's well-being. Egypt is, therefore, a country of global importance in that its failure thus far to square the energy–environment–growth triangle poses threats to itself and to others. Moreover,

it serves as an exemplar of the particular challenges posed to achieving beneficial trade-offs between energy, environmental protection and economic growth in other lower middle income countries with at least some endowment of hydrocarbons coupled with growing populations, many of which, like Egypt, suffer from poor governance. Indeed, the number of countries falling into this category is growing particularly rapidly as a result of the technologically driven diversification of energy supplies, which has made numerous African, Asian and Latin American lower middle income countries fossil fuel exporters in recent years. Egypt is historically ahead of this curve, having one of the oldest oil industries in the Middle East, so its management of the energy–environment–growth triangle may be especially indicative of broader trends.

Unfortunately the general impact of Egypt's exploitation of its fossil fuel reserves, coupled with it occupying a substantial role in the partially integrated Middle East and North Africa (MENA) oil economy, has been to confirm the hypothesized "oil curse," claimed by Michael Ross and others to be particularly prevalent in countries with poor governance.⁹ Egypt, like other MENA countries, has suffered for some two generations from the Dutch Disease affliction of an overvalued currency, driven not only by the impact of hydrocarbon exports, but also by the high labor market clearing wage rate resulting from a large and relatively overpaid civil service, and by prevailing wages in the region's labor importing countries, most notably in the Gulf and Libya. One predictable, devastating consequence of Egypt's Dutch Disease has been to slow the growth of manufacturing industry, the only sector of the economy capable of absorbing large numbers of entrants into the labor market.

A more fine grained, political economy analysis of Egypt suggests that additional, largely political factors have reinforced the Dutch Disease or played an altogether independent role in preventing effective utilization of windfalls from exploitation of oil and gas reserves. Those factors result from the Republican state founded by the military in the wake of its 1952 coup being "fierce but brittle," as Nazih Ayubi aptly characterized it.¹⁰ This dualism is reflected in the state's weak extractive capacity, as manifested by low rates of direct taxation, savings and investment, all of which tended to decline from the Nasser through the Sadat and then the Mubarak eras. The Republican state has been mired in a more or less permanent fiscal crisis, with temporary relief provided by windfalls from geo-strategic or hydrocarbon rents, such as those that accrued from regaining oil fields in the Sinai and Gulf of Suez after the 1979 peace treaty with Israel, from joining the anti-Iraq U.S.-led coalition in 1991, or from the gas boom that lasted some half a dozen years from 2002–3. Fierce but brittle and weak, the state lacked the administrative capacity and legitimacy required to impose reasonable and equitable personal and corporate income taxes. It also feared the consequences of seeking to impose hardship on its potentially restive population by directing revenue into savings and investments rather than consumption. Revenue was thus deployed disproportionately to prop up the oversized state and its sprawling civilian and military bureaucracies; to provide food and energy subsidies from which ultimately over 90% of the population benefitted; to be channeled into illegal capital flight which amounted to some 2% of GDP from 2003 until after the fall of the Mubarak regime; and increasingly under Sadat and Mubarak, to cultivate crony capitalists with whom the president and his entourage shared rents.¹¹ Those rents were allocated to personal consumption and to bolstering the political machine through which the regime could sustain its hybrid authoritarianism, for which liberal trappings, such as elections, required ever greater patronage resources.¹² Allocated to regime maintenance rather than human, physical or other developmental purposes, hydrocarbon rents reinforced the Dutch Disease caused in significant measure by Egypt being caught up in the MENA oil economy.

In addition, extraction of those rents and their allocation to political purposes, to say nothing of elite corruption, required that the financial and even technical management of the oil and gas

sectors be opaque. Control of those sectors by the presidency and the military, which competed for the rents they generated, was hidden from public view. The nationalized companies involved in Egypt's upstream and downstream oil and gas industries could not be substantially upgraded as their role was primarily that of extraction of rents rather than development of capacities. Having first commenced production of oil well before World War II, Egypt remained more heavily dependent upon foreign oil and gas companies than most other Arab states in which fossil fuel extraction began much later.¹³

Heavy pollution of air, water and soil has resulted from state policies driven by rent seeking and populist motives, coupled with weak regulatory capacities. The concentrations of heavy particulate matter and other toxins in Cairo's air are among the highest in the world, resulting primarily from the use of subsidized diesel fuel for transport and the siting of polluting industries, including cement and steel plants, in the metropolitan area. Modern sewerage systems do not exist in most rural areas, despite high population concentrations. As a result contaminated wastewater commonly intermixes with irrigation water, creating dangerously high levels of bacterial pollution in soils and the crops grown in them, frequently rendering those crops unacceptable in export markets. Contamination and cessation of delivery of drinking water in both urban and rural areas are regular occurrences resulting from inadequate treatment and distribution facilities and poor maintenance of them. The Environmental Protection Agency is essentially toothless. Although Egyptians are well aware of pollution and its dangers, over-centralized government ensures that they have no access channels through which to register their discontent or impact policies.¹⁴ Egypt's marine environments on the Mediterranean, Gulfs of Suez and Aqaba, and Red Sea coasts have been degraded by the destruction of coral reefs, overfishing, and introduction of irrigation run off and sewerage water. The country is facing a range of profound environmental challenges that would require both effective governance and billions of dollars of expenditure to address. Neither is presently available.

These then in broad outlines are the outcomes of Egypt's essentially unsuccessful efforts to resolve its energy–environment–development trilemma. That the country faces economic, energy and environmental crises is not an overstatement, as is suggested by the rhetoric and actions of the military government that seized power in the summer of 2013. Confronting a collapsing economy with attendant fiscal and foreign exchange crises, aggravated by increasingly severe shortages of oil, gas and electricity, the new regime has gathered virtually all political and economic powers into the hands of the military as if the nation were facing a decisive battle, which indeed it may well be. But this raises the question of whether the military is the appropriate institution to lead efforts to resolve the economic and energy crises. As for the environmental one, the military has clearly signaled that environmental protection will have to be sacrificed to save the nation's economy, as for example by authorizing coal burning power generation in close proximity to both urban and touristic areas, and by excessive exploitation of fossil water reservoirs for military-led land reclamation projects. The military sees the nation facing a dilemma, not a trilemma. The remainder of this chapter will discuss how it is confronting the economic and energy challenges, provide a preliminary assessment of the prospects for success, and draw some tentative conclusions about the consequences of military rule for effectively addressing the economic, energy, environmental trilemma.

Economic challenge and responses

Following his election as President in May, 2014, President Sisi mandated a set of macro-economic policy reforms seemingly taken from the IMF playbook and probably intended to prepare the ground for a new standby agreement with that institution in order to open up

desperately needed new lines of credit. By the time he assumed the presidency almost a year after the military's coup, Egypt's benefactors in the Gulf, key of which were Saudi Arabia, the UAE and Kuwait, were already suffering from donor fatigue after having provided some \$20 billion to Egypt largely for the purpose of saving it from the Muslim Brotherhood. Having accomplished that with the coup led by General Sisi against the Brotherhood government in June–July 2013, these Gulf Arabs obviously wanted Egypt to stabilize its economy to entice new donors and lenders to share the financial burden. The resulting macroeconomic reforms, including reduction of energy subsidies, better targeting of food subsidies, efforts to reduce the fiscal deficit by imposing new taxes, gradual depreciation of the currency, and inducements to Mubarak era cronies to repatriate flight capital and personally return to Egypt, had within a year reduced the magnitude of the economic crisis, but not resolved it. In February, 2015, following Article IV consultations in Cairo, the IMF delegation stated that “Egypt’s structural and monetary reforms were starting to produce a turnaround in the economy.”¹⁵ It predicted that GDP growth would rise from 2.2% in 2013/14 to almost 4% in 2014/15 and 5% in “the medium term.” The rather measured tone of the IMF report was further emphasized by its estimate that the fiscal deficit, which was 14% of GDP in 2013–14, would not drop below 8% of GDP prior to 2019, with inflation remaining above 7% “over the medium term.” The IMF added that the tax base remained narrow, that the current account balance continued to depend too heavily on transfers from the Gulf, that foreign currency reserves of \$15 billion were inadequate, and that the civil service and public sector wage bill of LE178 billion in 2014, a 24% increase over the previous year, was too high.¹⁶ In the 2015 budget that figure increased yet further, to LE218 billion, or a full quarter of all budgetary expenditures. The large fiscal deficit, government debt amounting to more than 100% of GDP, and continuing heavy borrowing needs coupled with the declining willingness of domestic financial institutions to buy government bonds and treasury bills, prevented Sisi’s reforms from lifting Egypt’s low bond rating, which Moody’s Investors Services retained at Caa1.¹⁷ Egypt’s poverty and unemployment rates continued the steady climb that had commenced in earnest in 2010/11.

Given the magnitude of economic challenges facing the country, the Sisi government’s reforms of 2014–15 were tepid. They were aimed at gradual macroeconomic stabilization rather than at resolving the maladies responsible for longstanding economic underperformance. Indeed, the government seemed to care relatively little about addressing structural obstacles to improved economic investment and growth, which are probably best summed up in the indicators reported in the World Bank’s annual *Doing Business Report*. In the 2015 edition, Egypt ranked 112th out of 189 countries on the Ease of Doing Business Index, an improvement of just one place over the previous year. On the critical measure of “enforcing contracts,” its performance remained unchanged at 152nd place.¹⁸ This measure is embedded in a broader cluster of indicators that constitute the core of the Fragile State Index, which provides a ranked comparison of the stability of overall political economies. That stability is in turn both a result of and contributing factor to economic growth. On that Index Egypt’s standing deteriorated steadily from 2011 to 2014, with the worst performance being on the indicator “human rights and the rule of law.” Egypt’s score deteriorated dramatically over that period, reaching 9.7 out of the worst possible score of 10 on that indicator by 2014. Of the 178 countries ranked in 2014, Egypt was the 31st most fragile, with its ranking on human rights and the rule of law the most discrepant from the global average of the dozen indicators from which the Fragile State Index is constructed.¹⁹ Egypt’s business climate cannot be improved substantially unless and until progress is made on establishing the rule of law, the foundation upon which not just dispute resolution, but overall governmental effectiveness, hence economic performance, rests. The Sisi government’s disinterest in substantive reform reflects its choice for political repression

rather than inclusion, coupled with its rejection of a free market economy in favor of a military dominated command economy.²⁰

“Sisinomics” is a reversion to Nasserist “Arab Socialism,” with three variations.²¹ First, Sisi’s military has been put in charge not just of the state administration and much of the public sector, as Nasser’s was, but through its three major holding companies and other economic enterprises it has come to be the country’s single largest provider of economic goods and services. Second, Nasser’s import substitution industrialization has been modified by a search for external partners, most successfully so far with government owned enterprises from the key GCC states, to team with military owned or dominated enterprises to produce goods or provide services primarily for domestic markets. These partnerships are obviously intended by the Gulf participants as means to strengthen their emerging geo-strategic ties with the Egyptian military while supporting its repression of the various forces, whether jihadi, peaceful Islamist, or liberal reformist, that are also challenging the Gulf states. The Sisi government clearly hopes that other authoritarian states, most notably China and Russia, will follow the GCC example of responding to the mix of geo-strategic and economic blandishments, most especially in the strategically vital Suez Canal Zone. Finally, Sisinomics is providing rather more space for crony capitalists than did the Nasser prototype, especially for cronies with direct dealings with the military.

Excluded from Sisinomics are concerns with and support for small and medium enterprises, or for opening markets more generally. The intent is not to liberalize the political economy, but to reconfigure and expand the limited access order the military inherited. It is to be the new gate keeper, deciding national economic priorities and who shall implement them. The military is also to be the guarantor of the social contract, directly providing subsidized goods from its own food, fuel and service companies. Egyptians are to be made aware of their personal and their country’s material and security dependence on the military. Sisinomics promises a command economy similar to that of Nasser’s ill-named Arab Socialism, which in effect was Arab Statism. Like its predecessor, Sisinomics is replete with extravagant showcase projects, bebies of fawning ministers at ribbon cutting ceremonies, and tawdry deals with cronies presented as mobilization of national capital, with the new addition of providing “opportunities” for Egyptians to combine their nationalist sentiments with personal financial interests by extending credit to the military.²² As was the case under Nasser, the showcase projects are announced out of the blue, preceded by few if any economic feasibility studies and no public discussion. The model as a whole is presented in nationalist, indeed militant rhetoric, including claims that military production will double to \$8.5 billion by 2019 and that Egypt’s assertion of economic and political independence has thwarted “international forces” that “thought they could establish a new regional system to give them more influence.”²³

Sisinomics is thus a model that has already been tried and failed, not just in Egypt but elsewhere. Command economies are inherently incapable of dealing with the complexities of globalized markets and competition, even if the commanders really know economics, finance, and business management. Alas, Egypt’s military, tasked now with running much of the economy, has little such expertise. Moreover, this mission creep into the economy comes at a time when the military is already over tasked with trying to counter a domestic quasi-insurgency; to support and even supplant the Ministry of Interior’s efforts to control restive crowds of demonstrators; to defend its borders against a host of challenges arising in Gaza, Libya and the Sudan; to construct civilian political window dressing to cover but not undermine its dominant role; and to devise and manage the country’s foreign policy. Already doing too much with too little capacity, but wary of sharing its powers and authority with civilian actors, especially those autonomous from the state, the military simply cannot make or implement effective economic

policy. Among its most difficult challenges is fashioning a policy that provides sufficient energy to the domestic economy at costs affordable at the micro and macro levels, strikes a reasonable balance between different economic interests, and which does not jeopardize other sectors or the broader environment.

Energy policy

The most serious domestic challenge facing the military upon its seizure of power in 2013, other than imposing security, was resolving the energy crisis that it inherited from the Mubarak era and which had intensified in the interregnum. From 2010 Egypt became a net importer of fossil fuels as gas production failed to keep pace even with domestic demand, to say nothing of meeting export commitments contracted for with Israel in 2008 and with the international oil/gas companies that had developed Egypt's gas fields. Domestic oil consumption had overtaken production some years earlier, despite rising figures for proven reserves. Egypt's two LNG plants, owned and operated by BG and the Spanish-Italian Union Fenosa Gas (UFG), were intended to liquefy gas for export, but fell idle in 2012 due largely to declining production from fields that were not adequately maintained as a result of non-payment to their operators.²⁴ Egypt's energy intensive industries, including steel, cement, fertilizer and ceramics, were forced to restrict output and commence a search for new energy sources, key to which was coal, amidst declining profits.²⁵ Electricity generating plants, intended to burn natural gas, turned increasingly to heavy fuel oils. Electricity supply nevertheless fell increasingly behind demand, which rose at 7.5% annually in the last six years of the Mubarak era, resulting in intensifying outages.²⁶ The policy commitment of 2008 to produce 20% of electricity by renewables (8% hydro, 12% solar and wind) by 2020 had not been acted upon.²⁷

The energy situation, in sum, had increasingly come to resemble that in the early and mid-1970s, when electricity blackouts were assessed by Washington to be posing a political threat to their new ally, President Sadat. As a result, USAID committed more than \$1 billion to constructing generating plants and overhauling the much degraded distribution network. After that extensive upgrade, which ended in the early 1990s, generating capacity was not substantially increased during the remainder of the Mubarak era. The new Sisi regime thus faced the threat of a political backlash similar to that which had confronted Sadat some forty years earlier. In Sisi's case, however, he did not have the support of a US ready, willing and able to overhaul the country's electrical power system. Cash transfers and emergency fossil fuel shipments from his main Gulf backers could and did provide only temporary solutions.

After winning the presidential election in May, 2014, President Sisi immediately turned his attention to both the demand and supply sides of the energy crisis. On the demand side subsidies for transport fuels and for gas and electricity supplied to industry were reduced, causing the price of some grades of transport fuels to rise by 70% overnight. But introduction of the long promised smart card system for subsidized methane, the primary source of energy for the poor, was delayed yet again. Almost a year later no further subsidy reform had occurred. An informed source noted that the limited subsidy reform "would only have a marginal effect on narrowing the deficit."²⁸ And indeed, in the 2015 budget energy subsidies of 27% of total government expenditures were only exceeded by the cost of debt servicing (28%), so despite the steep decline in global oil and gas prices, the fiscal drag exerted by energy subsidies remains unabated.²⁹

Resolution of the immediate supply crisis was sought through leasing from Norway a ship-based regasification unit to process LNG imported from Algeria, the Gulf, and elsewhere.³⁰ The law banning the use of coal for electricity generation was voided by executive action in April,

2014, accompanied by announcements that some seven coal-fired generating plants were being purchased from China and that the military as well as private investors would be building several more.³¹ A year later Tharwa Investments, a firm with strong links to the military, announced that it had signed an MOU with the Minister of Electricity to build an \$11 billion, 6 gigawatt coal-fired power plant, which it claimed would be the world's largest.³² Discussions were commenced with Israel to reverse the flow in the Egypt–Israel pipeline so that instead of the former supplying the latter, Israel would draw upon its newly developed offshore fields to supply Egypt, with possible subsequent use of the two idle LNG plants on Egypt's Mediterranean Coast to liquefy Israeli gas for export to Europe.³³ In May, 2015, the government granted permission to private Egyptian companies to import Israeli gas.³⁴ In the first half of 2015 Egypt paid about one-half of the more than \$6 billion owed to foreign companies involved in exploiting its gas reserves and commenced negotiations for revisions of prices for gas from existing fields and to establish those for new ones. This resulted in across the board price rises of some 40% on average and still higher for gas from offshore fields, thus almost overnight converting Egypt's gas price from being below global averages at less than \$3 per million BTUs, to an average of about \$5, thus higher than the prevailing \$3 price in North America and not much below that for new European gas delivery contracts. All of the gas to be produced under these renegotiated and new contracts was to be purchased by Egypt for domestic consumption, so the era of cheap energy and gas exports has clearly come to an end.³⁵ In February, 2015, during a visit to Cairo by Russian President Putin, it was announced that the long delayed construction of a nuclear power plant west of Alexandria would be commenced under a joint venture between Russia and the Egyptian military. In order to stimulate investment in electricity generation, most notably in BOOT (build, own, operate, transfer) and other forms of public/private partnerships to construct generating facilities, including those from renewable sources, the cabinet approved a draft law in February, 2015, that would in theory permit private companies to transmit and sell electricity directly to consumers, thus bypassing the state owned Egyptian Electric Holding Company. This was coupled with a stated commitment to increase electricity prices, a further incentive to attract investors. Yet whereas negotiations over gas extraction and sales resulted in firm, contractual commitments, those over electricity remained as preliminary agreements, with the private parties concerned obviously wary of the Government's pledges, most notably that regarding the feed-in tariff to the grid. Since some government representatives were speaking of increases being phased in over five years and then being capped at 80% of nominal costs, it was clear that considerable policy ambiguities remained in the electricity sector, ambiguities resulting primarily from the government's wariness in raising electricity prices for consumers.³⁶

Environmental and associated political issues were swept aside in the rush to overcome energy shortfalls. When the Minister for the Environment objected to burning coal, particularly if adjacent to residential and touristic areas, she was replaced. The new minister argued that coal was a clean fuel posing no environmental threat and, in any case, China used a lot of it.³⁷ Protests against construction of the nuclear power plant by local tribesmen and owners of touristic facilities were met with strong responses by security forces, coupled with offers of financial compensation. Protests against importation of gas from Israel were brushed aside. No specific mention was made of the commitment made under Mubarak to produce one-fifth of the nation's electricity by renewables in 2020. In March, 2015, preliminary agreements were signed with Siemens to produce parts for wind generators and with Saudi and Emirati firms to build solar and wind generating facilities, but no contracts had been forthcoming by the time of this writing (August, 2015). The contribution made by solar and wind power to the nation's electrical grid was registered as less than 1% in 2014–15.³⁸

It remains to be seen whether these varied and dramatic steps to increase the country's supplies of energy will succeed. The precipitate global drop in oil and gas prices from June, 2014, in theory at least works in Egypt's favor as it almost overnight has become a substantial net energy importer. Negotiations over a long term commitment to Israel to utilize the two LNG plants are suggestive of the fact that neither the government, nor Israel, nor the gas companies concerned, anticipate that Egypt will again become a gas exporter for many years, if ever. Egypt thus squandered in a decade a significant endowment of that fossil fuel, leaving in place neither fixed nor liquid capital nor appropriate expertise with which it could meet the energy challenge it now faces. That challenge is particularly severe in the 2015–17 period. The availability of substantial Israeli gas does not commence prior to the last year of that period, which is also the earliest date upon which completion is expected of construction of the initial new power generating capacity already contracted.³⁹ The nuclear power facility will not be ready before 2020. The government has yet to make firm contractual commitments to increase the supply of renewable energy, a hope that can only be realized if it commits to substantially higher prices to consumers or an increase in targeted subsidies that would then attract private investors.⁴⁰ For the next two to three years, therefore, Egypt is facing severe power shortages and heavy demands for financing fuel imports and construction of generating facilities. Competition between industrial and public users of electricity and gas is already intense, with both feeling the pain from shortages and price increases. Finding a balance between them that sustains production in the economically vital energy intensive industries, but does not cause other hardships and possibly mass demonstrations due to outages or high prices, will be a major challenge. Since 70% of petrol and 60% of natural gas subsidies presently go to the wealthiest 10% of the population, with the three bottom income deciles receiving only one-quarter of even "their" subsidies, which are for the butane gas cylinders that provide their primary energy source, there clearly are socio-political reasons to shift the benefit of subsidies down the social ladder.⁴¹ But the poor have little voice in a regime which rests far more heavily on the upper middle class and the wealthy, the latter of which dominate the energy intensive industries upon which the country has depended heavily since the onset of the gas boom in 2002–3. As presently constituted, the government and political system more generally do not have the capacities to fine tune energy policy to try to meet contending objectives of growth, equity, and political stability.

Conclusion

Egypt is caught between slow growth, rapidly expanding energy needs and an environment under increasing stress. The Sisi government's resolution of this trilemma has been to ignore environmental consequences, whether of release of carbon into the world's air or of more pollution of Egypt's air, land, and water, in a rush to accelerate economic growth and energy supply. The model it has chosen to meet both objectives is what one might expect from a military run government. It is a modified version of the very same model that the military adopted on seizing power more than sixty years ago. Its prospects for achieving a sustained rate of growth in per capita GDP seem dim, in part because of the inherent frailties of a militarized, quasi-command economy, and in part because of rapid population growth coupled with declining hydrocarbon extraction. Unable to grow sufficiently rapidly to substantially increase per capita wealth when it was a net energy exporter, Egypt will have far more difficulty doing so when it is a net importer with what in a decade will be more than 20 million more mouths to feed. As for meeting its energy needs, that is basically impossible in the short term, so the economy and population will suffer from energy deficits for two to three years as a result. Over

the medium and long hauls the situation is likely to improve, but the cost of expanding energy production and consumption will have to be borne by an economy that is already struggling and a population of which almost half is now living on less than \$2 daily.⁴² So the question of who is going to pay for increased energy supplies will become ever more pressing. Governmental resources cannot sustain simultaneously even the now reduced energy subsidies and a semblance of fiscal balance. Much of the population cannot afford electricity, diesel, gas or methane at true market prices. Energy intensive processing, formerly the most profitable, export oriented sector of the economy, is losing its competitiveness as the prices it pays for energy inputs are rising to prevailing global levels. Since the military, through its command economy and the docile civilian polity it has installed, is clearly responsible for making these choices, it will reap the benefits if they work well enough for enough of the population, and pay the price if they do not. Whatever that outcome proves to be, in the meantime Egypt will contribute a growing share to global carbon emissions as it fails to take adequate advantage of its potential to produce wind and solar energy.

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- 22 The largest showcase projects include digging of a second canal parallel to the existing Suez Canal, constructing 1 million low cost housing units, reclaiming 4 million acres of desert and building a nuclear power facility west of Alexandria. The first one is underway; the second, being implemented by the UAE's Arabtec construction company, is due for completion in 2020, but has yet to produce a single unit, having faltered as a result of financial complications arising in the partnership between the military and the UAE company formed to implement the project; the third has yet to commence and probably never will due to major doubts about the availability of either fossil or Nile water; while the fourth was given new momentum by the agreement signed in February 2015 between Presidents Putin and Sisi for the Russians to provide technical assistance. It is interesting to note that Presidents Nasser, Sadat and Mubarak all announced major reclamation schemes, the first two at the very outset of their presidencies. None of these schemes was successful and all were subsequently abandoned in whole or part. That Sisi's reclamation project is likely to meet a similar fate is suggested in commentary in Mona El-Fiqi, "Reclaiming Land," *Al Ahram Weekly*, November 20, 2014, <http://weekly.ahram.org.eg/News/7777/18/Reclaiming-land.aspx>; and in Walaa Hussein, "Sisi's Land Cultivation Plan Ignores Worsening Water Crisis," *al Monitor*, October 27, 2014, www.al-monitor.com/pulse/originals/2014/10/egypt-starts-to-cultivate-land.html. The ceremonial dimension of these and other projects is typically reinforced by the regime's mobilization of ministers and other dignitaries at ribbon cutting and other events. The Prime Minister and nine other ministers, for example, attended a street rehabilitation project in Islamic Cairo in September 2014. Nevine El-Aref, "Al-Muizz Restored," *Al Ahram Weekly*, September 11, 2014, <http://weekly.ahram.org.eg/News/7246/17/Al-Muizz-restored.aspx>. Some twenty military attachés were taken by bus to attend the opening of the Suez Canal dredging project by Admiral Mameesh, head of the Suez Canal Authority. Amirah Ibrahim, "Excitement all the Way," *Al Ahram Weekly*, September 11, 2014, <http://weekly.ahram.org.eg/News/7226/17/Excitement-all-the-way.aspx>. Financing of the \$8 billion Suez Canal expansion was provided by "certificates" purchased primarily by Egyptians who were attracted by the 12% interest rate, a minimum 2% premium over bank savings deposits and government bonds, although the government emphasized the "patriotic" motives of investors. One of the most tawdry of the deals struck between the Sisi government and cronies was that in which Nassef Sawiris, Egypt's richest man and one of the three richest in Africa, "donated" LE2.5 billion to the "Long Live Egypt Fund," established by

- President Sisi and managed by his military colleagues, in return for forgiveness of an equal amount of outstanding tax liabilities and permission for Sawiris's Orascom Construction Industries to build a \$2.5 billion coal fired power station on the Red Sea coast in partnership with the UAE based Petroleum Investment Company. "OCI Donates LE2.5 Billion of Recouped Tax Settlement to Tahya Misr Social Fund," *Ahram Online*, November 13, 2014, <http://english.ahram.org.eg/NewsContent/3/12/115458/Business/Economy/OCI-donates-LE-bn-of-recouped-tax-settlement-to-Ta.aspx>; and Waad Ahmed, "Orascom Construction to Build \$2.5 Billion Coal-fired Power Station," *Ahram Online*, November 5, 2014, <http://english.ahram.org.eg/NewsContent/3/12/114791/Business/Economy/Search.aspx?Text=%20Energy%20crisis>.
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Part IV

Energy transitions in the carbon consuming countries

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