



Ministry of Planning
Kurdistan Regional Government



BUILDING THE KURDISTAN REGION OF IRAQ

The Socio-Economic
Infrastructure

The Ministry of Planning of the Kurdistan Regional Government (KRG) oversees a dynamic portfolio of activities crucial for the development of the KRG and the future of the Kurdistan Region of Iraq.

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A Joint Report by the KRG
Ministry of Planning and UNDP

December 2012



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Kurdistan Regional Government



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Building the Kurdistan Region of Iraq

The Socio-Economic Infrastructure

A Joint Report by the KRG Ministry of Planning and UNDP
December 2012



FOREWORD

As the principle body tasked with providing coordination and oversight of the Kurdistan Regional Government investment budget, we in the Ministry of Planning realize that a strong regional infrastructure network is an essential driver of sustainable growth, and improved delivery of services. Therefore, in cooperation with UNDP, we have undertaken the Socio-Economic Infrastructure Needs Assessment (SEINA) to identify the Region's key Infrastructure gaps and to provide a detailed and realistic evaluation of the investment needed to remedy these deficiencies.

SEINA has highlighted that although we have made significant progress in many areas, there is still much to be done, especially in the sectors of sanitation, water, and electricity. The study will therefore allow the MOP and other KRG ministries to better prioritize infrastructure investment and to implement the policy changes needed to narrow the gap in the quality of service provision in relation to other sectors. Thus it is my sincere belief that this study will serve as an invaluable roadmap on our path to achieving our development vision by 2020.

We would like to acknowledge the strong collaboration we have with the various UN specialized agencies, funds and programmes and particularly the partnership with the United Nations Development Programme (UNDP) that led this exercise and produced this clear technical analysis of the infrastructure situation in Kurdistan region of Iraq; as illustrated in this report. We also acknowledge the serious commitment of the KRG Ministers and senior officials who responded to our call by effectively collaborating with the team of International consultants and facilitating access to information, field visits and data collection as needed.


Dr. Ali Sindi
Minister of Planning
Kurdistan regional Government

ACKNOWLEDGEMENTS

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UNDP acknowledges the important contribution made to the study by United Nations Human Settlements Programme (UN-Habitat) whose staff and consultants were responsible for the sectoral studies on Urban Planning, Housing, and Transport.

Finally, UNDP acknowledges the generous financial contribution of the Kurdistan Regional Government towards this study in the spirit of cost-sharing and partnership.



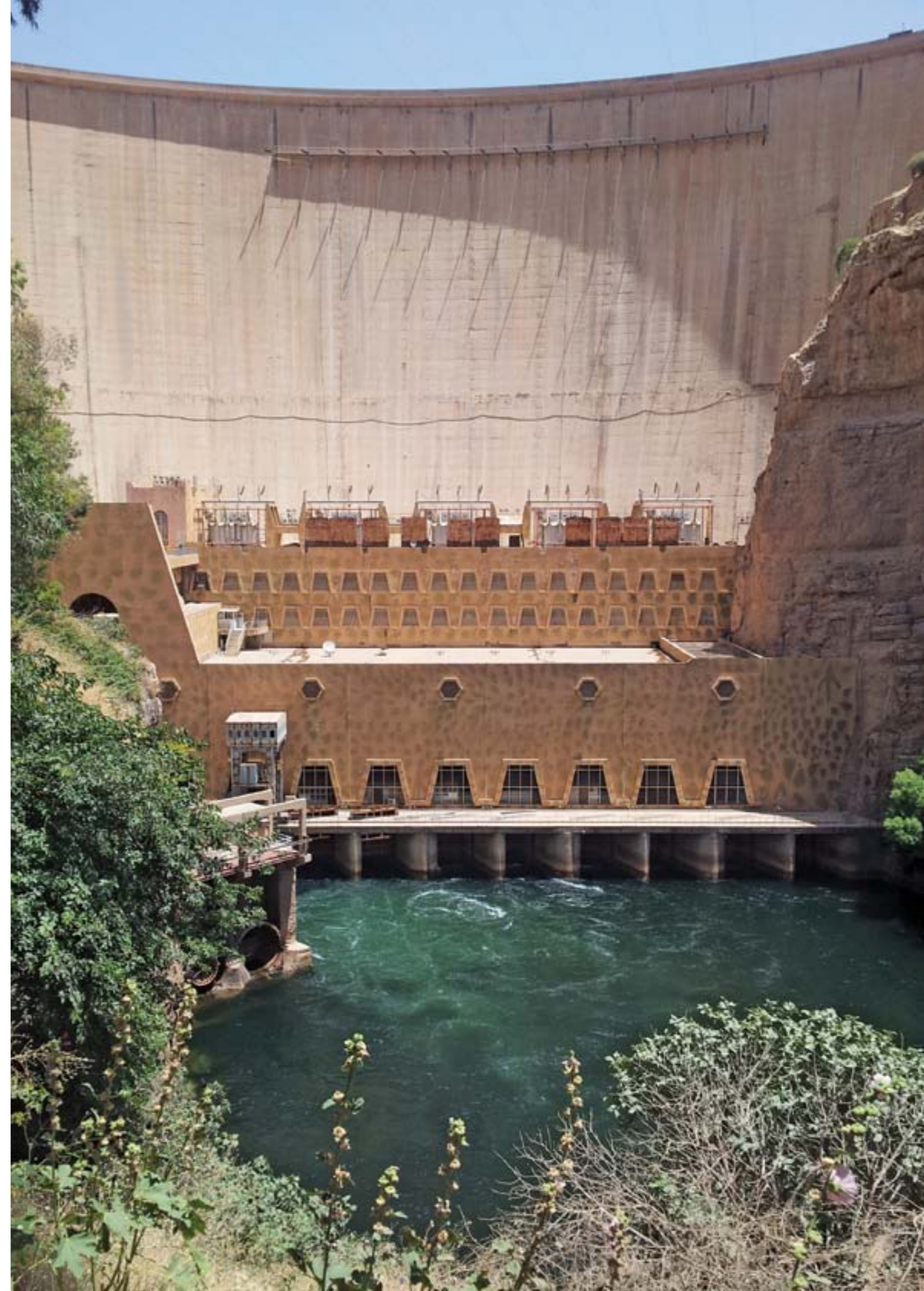
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ANNEX I. SECTORAL INVESTMENT TABLES

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LIST OF ABBREVIATIONS

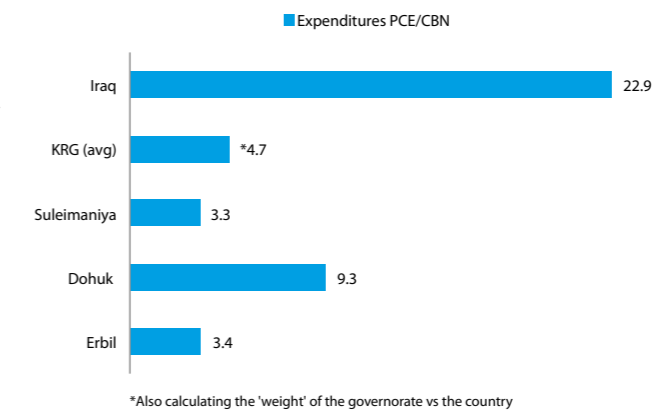
BoE	Board of Environment
Bol	Board of Investment
CoC	Chambers of Commerce
DG	Director General
DSM	Demand Side Management
EDI	Electronic Data Interchange
GD	General Directorate
GTSC	Gas Turbine Simple Cycle
Ha	Hectare
IPP	Independent Power Producers
KIB	Kurdistan International Bank
KR-I	Kurdistan Region of Iraq
KRSO	Kurdistan Regional Statistics Office
kV	Kilovolts
kWh	Kilowatt per hour
lpcd	litres per capita per day
MOAW	Ministry of Agriculture and Water resources
MOE	Ministry of Electricity
MOEd	Ministry of Education
MOF	Ministry of Finance
MOHC	Ministry of Housing and Construction
MOHE	Ministry of Higher Education and Scientific Research
MOH	Ministry of Health
MOI	Ministry of Interior
MOIT	Ministry of Industry and Trade
MOLSA	Ministry of Labour and Social Affairs
MOMT	Ministry of Municipalities and Tourism
MOP	Ministry of Planning of KRG
MOTC	Ministry of Transport and Communications
MW	Megawatts
PE	population equivalent
PPA	Power Purchase Agreements
RE	Reciprocating Engine
SEINA	Socio-Economic Infrastructure Needs Assessment
UNDP	United Nations Development Programme in Iraq
UNICEF	United Nations Children's Fund
UTC	Urban Traffic Control

INTRODUCTION

By any measure, the Kurdistan Region of Iraq (KR-I) has achieved service standards that are superior to the rest of Iraq and that in many cases compare favourably with better-off neighbours (Turkey, Iran, Jordan). These achievements, including security, education, health care, and access to water and electricity are undeniable and a source of pride and well-being for the inhabitants and leadership of the Region.

Higher living standards coupled with stable security environments and more recently legislation favouring international (and domestic) private investment has attracted a large volume of investment in many fields, but principally in trade, housing, industry, and agriculture. The Region's ability to harness some of the private sector's resources and abilities has contributed to lowering the need for publicly-financed plant/facilities, especially in electricity and oil refining.

Figure 1. Population living below the poverty line (%) Per Capita Expenditures vs. Cost of Basic Needs



*Also calculating the 'weight' of the governorate vs the country
Source: Kurdistan Regional Statistics Office

In order to sustain and expand on the impressive gains made thus far, in mid-2011, the Ministry of Planning of Kurdistan Regional Government (KRG) requested UNDP to conduct an economic and social assessment of infrastructure gaps in KR-I. For the implementation of the project, KRG allocated US\$ 750,000 in 2011, and UNDP provided an additional US\$ 100,000 and jointly managed the project, which started in February 2012.

Objectives

The objectives of the Study were: (i) to carry out a rapid and broad-based Socio-Economic Infrastructure Needs Assessment (SEINA) of specific sectors and (ii) to recommend the priority investments and policy changes that are needed to address present gaps and constraints and to meet future requirements in line with the KRG Vision 2020 to support economic expansion, social development, and sustainable delivery of services that meet the highest quality standards. Further, the Study also identifies opportunities for attracting private, foreign, and domestic capital to the leading productive sectors of Agriculture, Industry, and Tourism.

Scope

The scope of SEINA covers Electricity, Water and Sanitation, Transportation, Housing, Urban Development, Agriculture, Industry, Environment, Health, and Education. Quick assessments of the Tourism and Vocational and Technical Education sectors were also conducted. The Study also covered institutional aspects of infrastructure provision and service delivery, including issues relating to laws, regulations, and policies. Further cross-cutting issues related to both financial and environmental sustainability were studied. The Study, while focusing on a five-year horizon 2013-17, also gives some indication of needs until 2020 (especially the completion of projects started in the five-year period and those large projects that perhaps would be better justified later on).

The OECD definition of infrastructure is:

The OECD definition of infrastructure is: "The means for ensuring the delivery of goods and services that promote prosperity and growth and contribute to quality of life including the social well-being, health and safety of citizens, and the quality of their environments."

This study covers physical facilities¹, together with the operating procedures, management practices, and development policies that interact together with societal demand and the physical world. «Hard» infrastructure refers to the large physical networks necessary for the functioning of a

modern industrial nation; whereas «soft» infrastructure refers to all the institutions that are required to maintain the economic, health, cultural and social standards of a country. The Study covers essentially all hard infrastructure and almost all soft infrastructures.

Methodology

In the Kurdistan Region of Iraq (KR-I), economic and social infrastructure has been damaged by years of turmoil and neglect. However, as a result of remarkable economic growth and government determination in the last few years, the Kurdistan Region has enjoyed considerable development in many areas. Additional infrastructure is needed to meet current unsatisfied demand and support continued growth.

This Study is also meant to support the Ministry's efforts to maximize the impact of public investment and to attract private, foreign, and domestic capital to the leading productive sectors of Agriculture, Industry, and Tourism, as well as appropriate areas of infrastructure.

Under the overall guidance of the Ministry of Planning (MoP), the Study included desk reviews as well as field visits and consultations. UNDP undertook initial consultations with MoP and conducted scouting missions, which determined the nature of expertise required for this Study. Subsequently, a team of international experts fielded by UNDP and UN-Habitat and supported by several local specialists toured the Region and conducted extensive meetings with relevant officials of concerned authorities. Periodic meetings were also held with the MoP officials to ensure that the Study was responding to the stated objectives. All the data used in this Study have either been sourced from the relevant authorities or from recent surveys and studies carried out by specialized agencies, and detailed descriptions of data and sources, assumptions, and methodologies (including calculations) can be found in the Sectoral Reports attached to this overall summary Report.

His Excellency the Minister of Planning of the KRG, Dr. Ali Sindi, took a great interest in the Study and spent numerous hours with UNDP to prepare for it. The Minister himself received and briefed the Joint Team at length at the start of the main fact-finding mission on

May 25th 2012 as well as at the end of the mission to debrief the team in late June 2012. A preliminary draft of this Report was presented to Dr. Ali Sindi and Senior Staff of the Ministry by UNDP Experts on August 5th and 6th 2012.

This final version of the Report reflects the comments received then, written comments that the Ministry of Planning forwarded in October, as well as further analysis on the part of Joint Team Experts.

[1] Highways, streets, roads, and bridges; mass transit; airports and airways; water supply, water resources, and irrigation; wastewater management; solid-waste treatment and disposal; electric power generation, transmission, and distribution; telecommunications; and hazardous waste management – and the combined system these modal elements comprise.

Key Issues: Water and Environment

Water resources, sanitation, and water supply

Water is the most important element threatened by the current situation and visible trends in Kurdistan Region. The Kurdistan Region is the best watered part of Iraq² both because it receives more rainfall than other parts of Iraq and because it sits upstream of the rest of Iraq on international rivers. But it still very water-poor: the reality is that the Kurdistan Region has a semi-arid climate, and water is scarce. In spite of this, water use is extremely inefficient in the Region and water consumption and associated waste are huge, exceeding the levels of much wealthier countries. Data shows that in 2011, water usage for domestic use reached³ 375-400 litres/capita/day.⁴

Protective measures should be taken immediately including much stricter regulation of well-drilling, including possibly a temporary moratorium, an increase in domestic and industrial water tariffs to reduce excessive, wasteful uses, and the introduction of irrigation charges. Similarly, protection of surface water requires urgent major investments in building sewage collection systems and waste water treatment plants for cities, towns, and villages, whose sewage pollutes soil, shallow aquifers, rivers, and lakes. Large investments are still necessary to complete water supply coverage.

Environment

The environment has suffered from the informal disposal of solid waste, which pollutes land, water, and air and from the flow of untreated sewage. The general neglect or avoidance of Environmental Impact Assessments (IAEs) for most projects, even large public and private ones, has resulted in uncontrolled destruction of natural habitats, landscape, and cultural values. Irresponsible behaviour patterns, wasteful and polluting lifestyles, as well as excessive consumption of subsidized water, electricity, and fuels are causing rapid attrition of the natural environment in the Region.

Further, though legislation appears adequate, institutions responsible for environmental management, protection, and monitoring remain weak. Investments are necessary to strengthen the Environment Board, so as to improve the environmental management system, and to build sanitary landfills, recycling plants (possibly through Public-Private-Partnerships), and incinerators for hazardous waste.

Summary of Sectoral Findings

Major findings on the current socio-economic infrastructure situation in Kurdistan Region are as follows:

- The management of water resources will play a key role in the future of the Kurdistan Region. In particular the pollution of surface water and the rapid exhaustion of groundwater present an existential threat to the Region.
- Basic services (especially electricity, water supply, irrigation, health care, and education), having reached large shares of population in few years, are still uneven in quality and availability, with the countryside underserved, and the cities needing continued investment as their population grows.

[2] Annual rainfall varies between 375mm and 724mm; data averaged over a period of 37 years, Global Agro-Ecological Zones Study, FAO, Land and Water Development Division (AGL), with the collaboration of the International Institute for Applied Systems Analysis (IIASA), 2000.

[3] World Bank standard for low-income developing countries is 120 liters/capita/day with in-house connection.

[4] Estimates based on Ministry of Municipalities data. This quantity is approximately the water produced in Kurdistan Region for use as drinking water because it includes system losses but excludes irrigation. In rural areas, consumption of potable water is 240-300 liters/capita/day.

First priority in both policies and investments (2012-20) should be given to water: water pricing, waste water collection and treatment, solid waste recycling/proper disposal, and water supply.

- Improved supply of basic and infrastructure services has come at very high cost to the public budget without cost recovery mechanisms in place. Further, the fact that users do not pay for services may weaken the social contract, and it also possibly disempowers citizens from holding the state accountable for quality service delivery.
- More precisely, in the absence of an appropriate policy framework, the unconstrained consumption of publicly-supplied goods and services, especially water and electricity (but also health care and irrigation), could threaten the environmental (pollution, emissions) and economic/budget equilibria of the Kurdistan Region as all costs are met through the budget, with little or no contribution by consumers and consequently no incentive to conserve energy and water, or to use health services more responsibly.
- Economic subsidies (calculated at economic costs for electricity) total about US\$ 2,650 million and financial subsidies (calculated at financial/accounting costs) total US\$ 2,350 million. In short, one might say the financial subsidies represent the loss to the KRG budget, while economic subsidies represent the losses to the KR-I's economy.⁵



Subsidies and sustainability

The KRG budget spends each year about US\$ 2.35 billion⁶ to subsidize electricity, water supply, and agriculture, where almost all costs of supplying electricity, water, and some agricultural inputs fall entirely on the budget. This sum approaches 75% of the annual investment expenditure of the

Region or about the 20% of the annual transfer from the Federal budget. This significant amount is likely to become unsustainable in time. Further, it subtracts resources that could be much better employed in expanding services and productive infrastructure. Moreover, the high, unconstrained consumption of

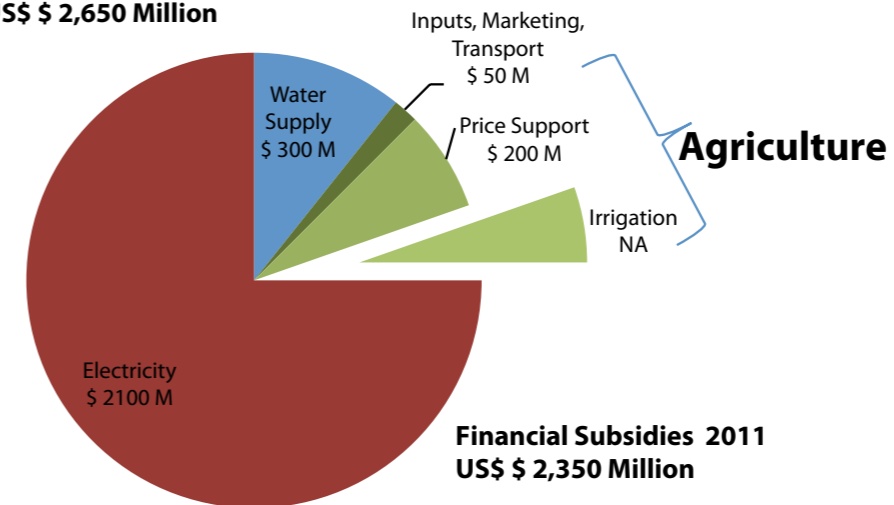
water and electricity due to negligible tariffs seriously harms the environment. Hence, the reduction of these subsidies is expressly recommended and represents an effective way to reduce environmental damage and increase the flow of resources out of consumption and into investment.

[5] A simple example will show the difference between financial and economic costs: If the KRG buys a barrel of oil from a local private producer at US\$ 60 and gives it to an electricity generator to make electricity, this is a financial cost (what one party paid for a barrel). Considering that the same barrel the KRG paid US\$ 60 can be sold to Turkey or Jordan—exported—for US\$ 100, then this is the economic cost (this is what the Kurdistan region and its people, collectively lost). So, estimating the subsidy at the prices the KRG actually paid gives us the financial cost; estimating the subsidy using the opportunity cost (in this case, world market value) gives us the economic cost of the subsidies.

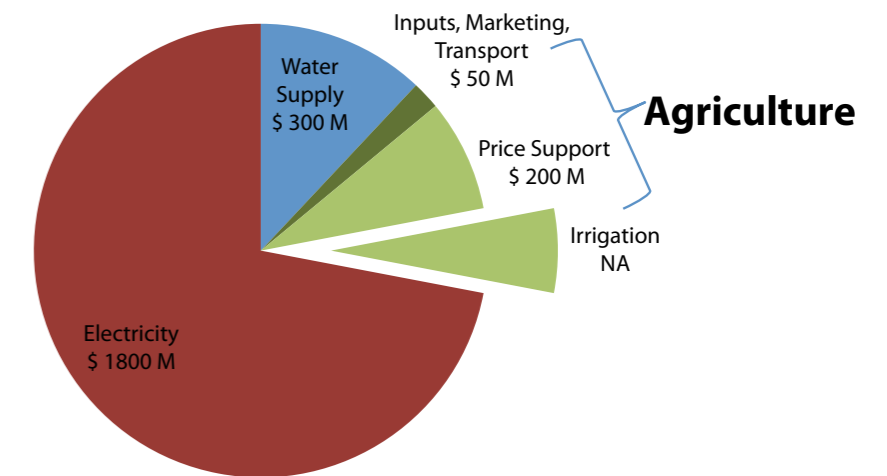
[6] This is the financial subsidy with the cost of electricity generation fuels evaluated at costs actually paid by KRG when it supplies them to generators.

Figure 2. Economic and Financial Subsidies

**Economic Subsidies 2011
US\$ \$ 2,650 Million**



**Financial Subsidies 2011
US\$ \$ 2,350 Million**



Subsidies in Economic Theory

A general note on subsidies: In economic theory, under the conditions of existence of a perfectly competitive market equilibrium, subsidies are necessarily suboptimal because they would expand production and demand beyond the socially optimal level (guaranteed by competitive equilibrium). In other situations, such as market imperfections or failure (externalities), the use of subsidies (and taxes) is the main instrument of intervention to correct such failures. Environmental economics largely entail the determination of appropriate tax-subsidy schemes to correct what is a market failure: e.g. the market fails to price the effluents, emissions, or other non-priced effects of a plant; or fails to price congestion caused by excessive traffic caused by cheap fuels (whose price does not consider/include/internalize all consequences of its consumption); or fails to reward a firm whose training expenditures on workers also profit other firms. Excessive poverty among a certain group of citizens could be considered a market failure (e.g. the credit market is imperfect and does not provide credit to "informal" workers who therefore may be unable to purchase a house in the open market). Therefore, an intervention with a subsidy of some sort could be justified. Furthermore, what economists call the Theorem of Second Best states that if there is a departure from perfectly competitive equilibrium in one aspect or point, then the optimal solution may require the introduction of such a distortion in other aspects. Still, when subsidies are economically justified, it is better to keep them small (or to seek perhaps a non-subsidy way of resolving the problem) because financing the subsidies requires the raising of public revenue through distortive taxes. (Economists also intervene with non-distortive taxes, but perhaps those exist only in the mind of economists: All taxes are distortive, some more, some less.) The subsidies discussed below are certainly not economically justified in the manner just described. They are not small, and they introduce enormous distortions in production and demand. In fact, they have arisen obviously by accident, they are not there by design, and they really serve no useful purpose—and yet make plenty of damage in the form of overconsumption (read: waste of water, electricity, irrigation water, agricultural inputs). That is the reason this Study recommends to remove these subsidies and perhaps replace them with appropriately targeted ones, much more economically/socially justified, whose sum is likely to be much smaller than the numbers above.

Projected investment in infrastructure over the period 2013 to 2020 is estimated at US\$ 30,500 million with an average annual investment volume between US\$ 350 and US\$ 400 million

Recommendations

Investments recommended in this Study over the period 2013 to 2020 amount to US\$ 30,551 million. These investments should also be accompanied by pricing measures to encourage conservation and rationalize subsidies. This would mean that, in addition to infrastructure investments, the KRG should also assign resources to the analysis and design of a complete institutional and policy framework as well as to staff development and capacity building. Ensuring a satisfactory level of financial resources for operation, management, and maintenance will be easier if beneficiaries of the services contribute to the costs of supply, alongside the budget.

Thus, looking ahead, it is recommended that the KRG consider the following two aspects for defining its infrastructure programmes:

- Enact actions and policy changes, such as urgent tariff/price increases.
- Strengthen/design/create a legal, institutional, and regulatory framework.
- Programme and prioritize public investment more systematically.

The Region must take immediate action on the pricing of publicly supplied goods/services to cut unconstrained consumption of water and electricity. At the same time, systematic investments will need to be made on the institutional aspects such as laws, policies, management systems, and regulatory frameworks of infrastructure development and service delivery.

The Region also must protect the environment, while continuing to invest and grow selectively by pursuing competitive economic activities. The main analytical results indicate that investments must be directed toward supporting the economic/financial and environmental sustainability of the Region, which is threatened. Greater and more systematic attention to protecting the environment now requires the creation of appropriate functioning institutions, the setting of appropriate policies, and their enforcement, such as systematic Environmental Impact Assessment studies for all recently completed, ongoing, and future large projects including infrastructure.

The next phase of the Region's development efforts should be underpinned by the following underlying principles:

- Establish appropriate institutional and policy frameworks (including legal and regulatory) to modernize public delivery systems that are citizen-centric and encourage private investments to complement public efforts.
- Adopt general pricing principles for publicly-supplied goods/services that reflect the economic costs of supply. Prices should then be set to ensure that consumers make a substantial contribution to these costs of supply and eventually cover them fully.
- Continue to invest in infrastructure taking into account long-term inclusive growth and social and environmental implications. Consider rehabilitating existing infrastructures instead of automatically opting for new ones, especially in irrigation. Give more importance to maintenance.
- A multi-pronged approach to demand management must be put in place, consisting of more realistic cost recovery, public education, and enforcement of regulatory measures to curb unlawful practices.
- Reducing excess consumption will improve both finances and the environment, contributing to both economic and environmental sustainability.
- Future investment planning for infrastructure must be based on strategic objectives so that new ideas for investment and are not crowded out by the automatic priority currently granted to ongoing projects.
- Continuous and strategic investments should be made toward sustainable development of human capital and strengthening of qualified manpower resources without which economic development and diversification are not possible.

More specifically, a series of immediate measures should include the following:

- Next to raising electricity and drinking water tariffs, charges for irrigation water should also be introduced.
- Next to these urgent pricing measures, the protection of the Region's aquifers (groundwater) also should be strengthened. An initial step will be to undertake an in-depth study of the behaviour of these aquifers. Furthermore, the KRG might want to consider a temporary moratorium on well-drilling while conducting the study in order to fully understand the long-term implications of current abstraction practices.

Priorities for investment programmes:

- Waste water collection and treatment
- Solid waste recycling/proper disposal
- Water supply

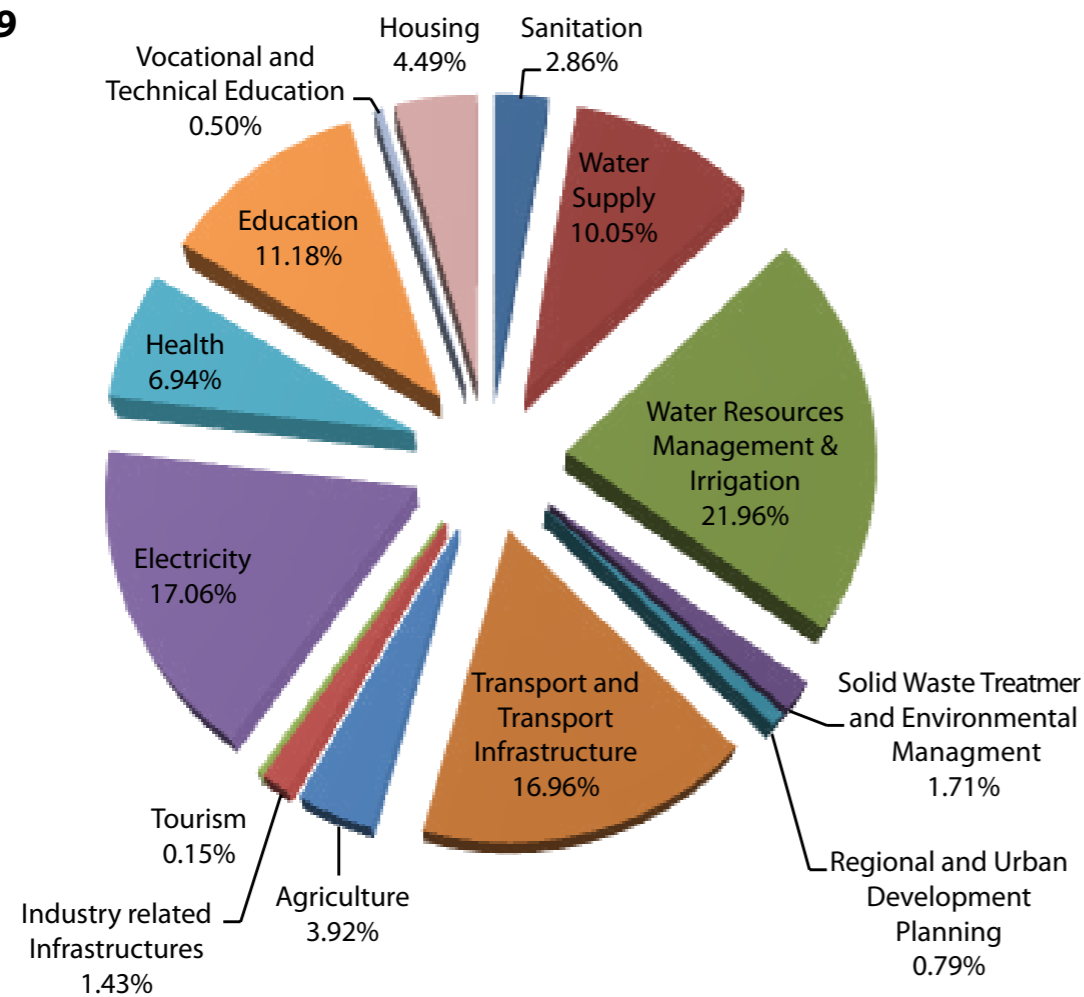
Recommended Investments across all sectors

The total investment recommended for the entire period 2013-2020 amounts to US\$ 30,550.9 million, of which US\$ 18,614.2 million falls within in the five-year period 2013-2017. Furthermore, it is estimated that up to 20% of this amount could be potentially secured through the private sector in the form of PPPs covering power generation, buses/trams for urban transport, and solid waste recycling/disposal. Potential for private investment also exists in tourism and health care, but staff and time constraints prevented the estimation of credible amounts of investment.



Figure 3. Total investments proposed by sector

Total US\$ 30,550.9



Source: Study Estimates

The table below summarizes investments recommended for 2013-2020 by specific sector:

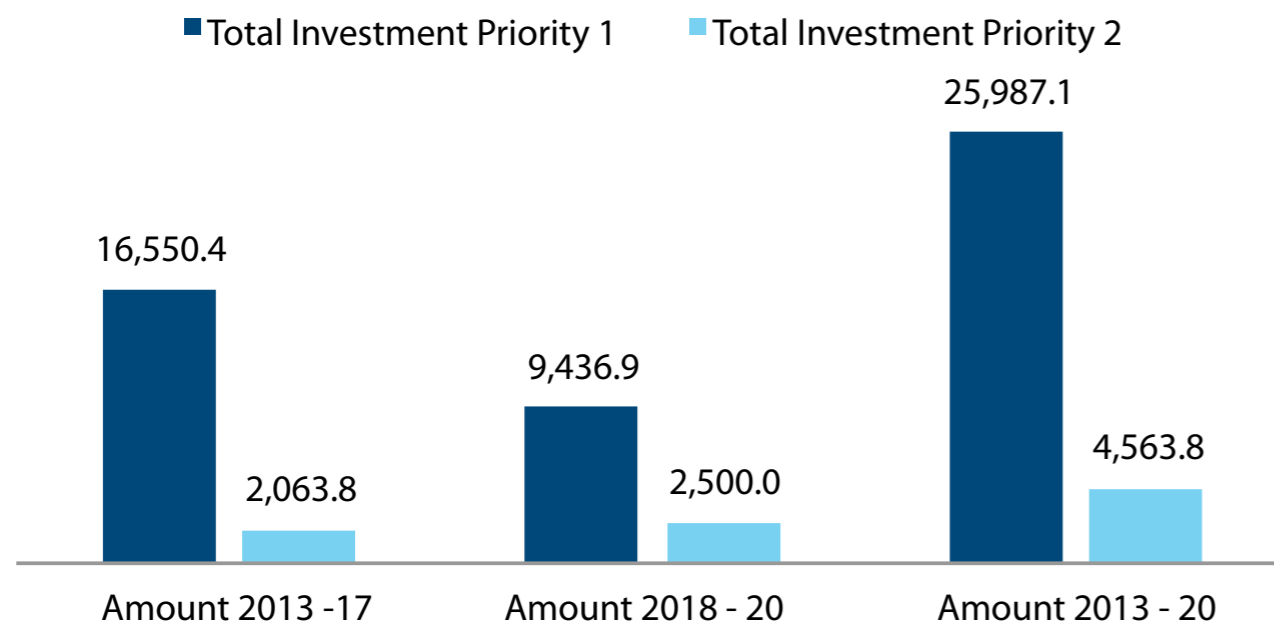
ACTIVITY	AMOUNT '13-'17	AMOUNT '18-'20	TOTAL '13-'20
Water Supply	1,302.9	1,768.9	3,071.5
Sanitation	684.6	189.5	874.1
Solid Waste Treatment and Environmental Management	419.0	103.0	522.0
Regional and Urban Development Planning	199.2	41.5	240.7
Transport and Transport Infrastructure	2,569.0	2,613.0	5,182.0
Agriculture	1,055.0	142.0	1,197.0
Water Resources & Irrigation	3,383.0	3,325.0	6,708.0
Industry related Infrastructures	407.7	28.0	435.7
Electricity	3,456.8	1,755.0	5,211.8
Health	1,320.0	801.0	2,121.0
Education	2,760.0	656.0	3,416.0
Vocational and Technical Education	142.0	11.0	153.0
Housing	881.0	490.0	1,371.0
Tourism	34.0	13.0	47.0
Total	18,614.2	11,936.9	30,550.9
Public Investment	14,349.2	9,696.9	24,045.9
Private Investment	4,265.0	2,240.0	6,505.0
1 st Priority	16,550.4	9,436.9	25,987.1
2 nd Priority	2,063.8	2,500.0	4,563.8
Average annual investment expenditure	3,723.0	3,979.0	3,819.0

Total investments recommended for 2013-2020 - US\$ million, 2012

The essential, priority investments recommended on Water & Sanitation and Environment are estimated at US\$ 4,500 million over eight years (US\$ 500 million could be private). The full investment programme recommended is approximately US\$ 3,000 million/year (total US\$ 24,046 million over eight years from KRG budget) and can be easily realized as it barely exceeds the current annual investment budget allocations. Therefore, this investment programme can be implemented through more effective prioritizing of public investment projects over the next few years and by using some of the revenues from higher tariffs.

The annual investment volume recommended for the period⁷ 2013-2020 averages between US\$ 350 and US\$ 400 million (slightly less in 2013-2017) and should not impose a much larger burden on line ministries than the present level. Further, since most projects are not completed within one year, annual investment figures are probably not very meaningful and a multi-year total is more indicative of actual magnitudes. However, for comparison purposes, average annual investment figures are shown in the last row of the table above and actual detailed annual investment by sector is shown in Sectoral Investment tables annexed to this Report.

Figure 4. Proposed Investment by Priority
Total US\$ 30,550.9 million (2013-2020)



Source: Study Estimates

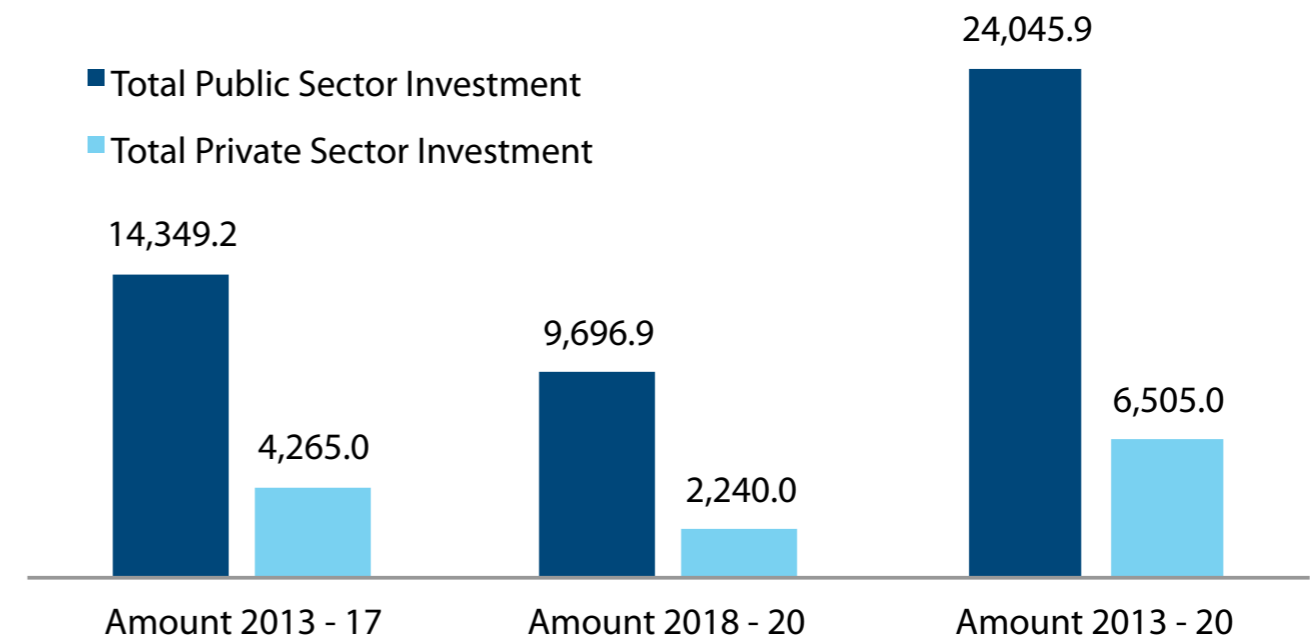
[7] Investment figures for years 2018-2020 represent the continuation of projects started in earlier years together with major projects (being considered by Ministries in the KRG), which were deliberately postponed by the Study because of high costs and the need for further justification and analysis. In fact, some of them have been given second priority.

Investments given second priority are basically, a share of the dam-building programme, which suffers from insufficient analysis and justification, and the 400kV electricity grid, which appears to be weakly justified at present.

Private investments are essentially:

- Public transportation (buses, trams, air cargo facilities, studies for future airport)
- Electricity generating plant
- Solid waste recycling and disposal

Figure 5. Proposed Investment - Public vs. Private
Total \$US 30,350.9 million (2013-2013)



Source: Study Estimates

SUMMARY OF FINDINGS BY SECTOR

WATER, SANITATION AND ENVIRONMENT



Water, Sanitation, and Environment

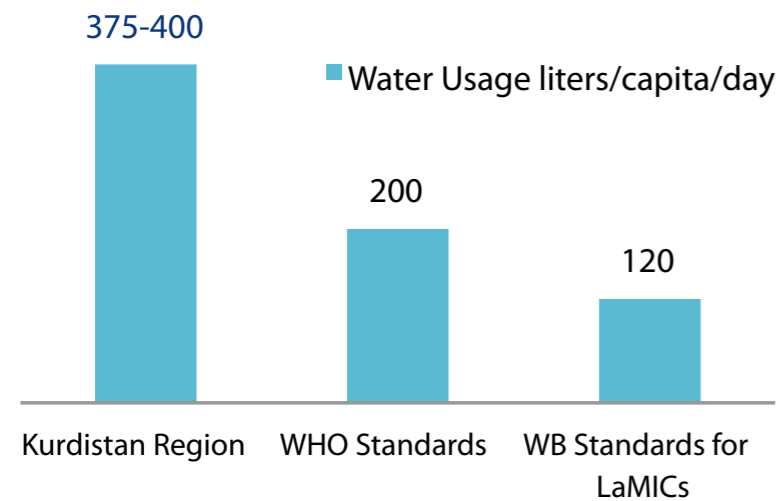
Water use is extremely inefficient in the Region and water consumption and associated waste are huge

Situation at a glance

The Kurdistan Region of Iraq (KR-I) benefits from relatively abundant water resources in comparison with the rest of Iraq, but it remains very much a water-poor region in a semi-arid ecology. There are three types of water resources: surface water (river flows and springs), groundwater, and (treated) wastewater (the latter is currently unavailable in KR-I). However, availability of water resources in KR-I is subject to two negative trends: climate change and increased water use by the upstream neighbours (Turkey and Iran) that are likely to reduce the quantity of surface water available to the Region.

In KR-I the proportion of population using improved water sources is on average 85%; however, the quality of service (continuity of service, water pressure) is poor and the existing infrastructure is in poor condition with very high leakage. The supply of water is intermittent. At present, water tariffs (about US\$ 1 per month by dwelling unit) are not based on volume actually consumed since connections are not metered, nor do they reflect the actual cost of supply. It results that: (i) revenues covered only 3% of operation and maintenance expenses in 2011, and (ii) per capita water consumption water ranges from 373 to 400 litres per capita per day (lpcd) in urban areas and 237 to 292 lpcd in rural areas. This is too high per international standards while customers receive no signals that they need to conserve water. Levels of aquifers are dropping because of excessive extraction (in some areas the water level has dropped by about 40 m over the last ten years).

Figure 6. Water usage - comparison with international standards



Source: Study Estimates based on MinMunicipalities, WHO, WB.data

The lack of central wastewater treatment facilities in the Region and the discharge of large amounts of untreated wastewater into surface water through the storm water canalization system (in Sulaymaniyah, especially) results in a high incidence of waterborne diseases thus leading to high levels of morbidity and infant mortality both due to direct consumption of polluted water (e.g. Lakes Dokan and Darbandikhan) and contamination of agricultural produce from polluted irrigation water. The situation is exacerbated by poor hygienic sanitary awareness and practices.

The growing population and economy in addition to vulnerability to climate change impacts will accentuate the pressure on natural resources. Also, a fast growing young population is adopting irresponsible behaviour patterns, such as wasteful and polluting lifestyles, causing rapid attrition of the natural environment. Moreover, both surface and groundwater sources are exposed to contamination by nitrate heavy fertilizers and pesticides, uncontrolled waste dumps and landfill sites, and the use of unsealed cesspits. High nitrate levels cause potentially fatal blood disorders in infants, pregnant women, and individuals with reduced gastric acidity.

Gaps

Gaps in the water supply sector relate to: (i) incomplete coverage (for example, the population lacking access to water supply networks is estimated at 15%); (ii) poor quality of service (e.g. unpredictability of supply, low pressure, and potability); (iii) lack of incentive for water conservation because of absence of metering and very low tariffs; (iv) the lack of planning and management systems regulating the abstraction of water, the polluting of water sources, and longer-term environmental impacts as well as for maintenance management of the existing infrastructure assets.

The present institutional structure of the sector has many flaws that affect its performance. Staffing levels are high with 12 to 16 employees/1000 connections compared to a normal international standard of five employees/1000 connections. The management of the sector is also lacking performance measures and standards, administrative skills, and systems to enforce accountability.

The major gaps for the sewerage sector are that: (1) there are no sewage collectors except in the capital city Sulaymaniyah; (2) few towns have storm water networks that are being used for sewage collection; and (3) there are not any wastewater treatment plants.

There are no regulations that specify the characteristics of non-domestic wastewater that should not be discharged in municipal sewerage and no specific charges for non-residential users that emit water with worse characteristics than domestic wastewater. There is a lack of legislation and regulation for recovering the cost of treating wastewater, which will become necessary as soon as sewers are installed.

The Environmental Law (no. 8/2008) is not enforced. There is a general neglect or avoidance of Environmental Impact Assessments (IAEs) for most public and private projects, making it difficult to palliate, manage, or ameliorate the environmental impacts of large projects. There are hardly any attempts (except for an experimental PPP in Dohuk) to recycle solid waste or dispose of it under conditions that do not harm the soil, air, and water.

Recommendations

For the sector to deliver high-quality services in a sustainable manner, both policy and investment changes are required and should include inter alia the following: (i) Water institutional and pricing reform (including a major rise in tariffs, eventually introducing pricing by volume of consumption); (ii) Investment in sewers and wastewater treatment plants (WWTPs) to collect and treat sewage; (iii) Water loss and leakage reduction programmes; (iv) The implementation of permanent water saving measures to minimize wastage; (v) Community education programmes to inform and sensitize the population to the real scarcity of water and the promotion of an ethic of responsible water use, including by farmers in irrigated areas.

Tariff and Cost Recovery

Immediate operationalization of the new water tariff structure, as recently proposed by the Water Supply and Sanitation General Directorate, is required. When water consumption is metered, the monthly volumetric rates will range from 1,000 to 5,000 ID/m³ for consumption ranging from 30 to over 120 m³/month, with special rates

Figure 7. Cost Recovery of Operational and Maintenance Expenses in KRG



(for institutions, trade, commerce, industry, and tourism) ranging from 2,000 to 3,000 ID/m3.

Progressive tariff rationalization will need to be undertaken to recover operation and maintenance costs and eventually lead to full cost recovery. In the meantime, measures can be taken to reduce water consumption such as bans on car washing with hose water and watering gardens with potable water.

Protective measures should be taken immediately including a halt to all well-drilling

While plans should be made to ensure full coverage of metering once the new tariffs proposal is approved by Parliament, it is recommended that the metering programme currently underway initially target bulk consumers and distribution districts.

Investments in institutional development

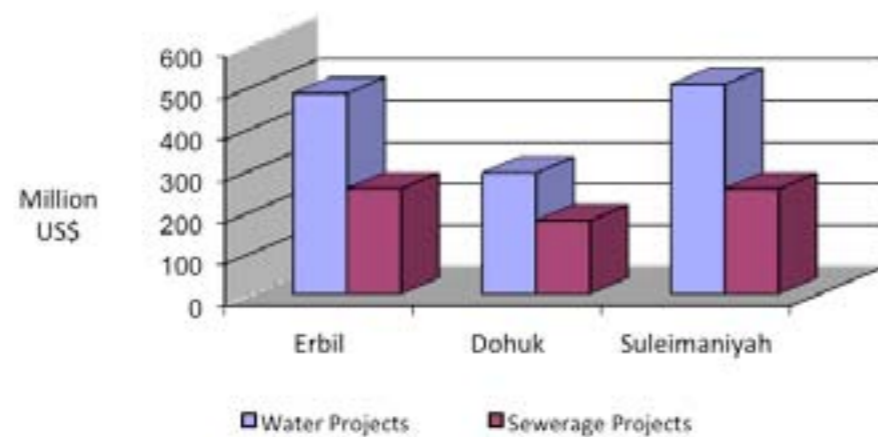
In order to ensure efficient and sustainable service delivery and accountability and also to tackle the chronic environmental challenges facing the water and sanitation sector in KRG, proper management systems need to be established. A moratorium on well-drilling in the entire Region should also be considered as a temporary protective measure.

Operation and Maintenance Management plans should be formulated taking into account preventive maintenance. A modern maintenance management system of this type, normally computerized, is a great aid to developing maintenance schedules and understanding maintenance personnel, spare parts, and transportation requirements.

Infrastructure required

Many ongoing water supply projects and new projects - both on capacity upgrading and network rehabilitation - are being included in the 2012 requested budget for investments. The following chart illustrates the estimated investments between the years 2013 and 2017 in the Kurdistan Region totalling US\$ 1,303 million for water supply projects (and US\$ 684.5 million for sewerage projects, in addition to US\$ 22 million needed for the institutional and human resources development of the sector in the region; see more detailed tables below and opposite).

Figure 8. Total Estimated Investments in Water and Sanitation Projects between 2013 and 2017



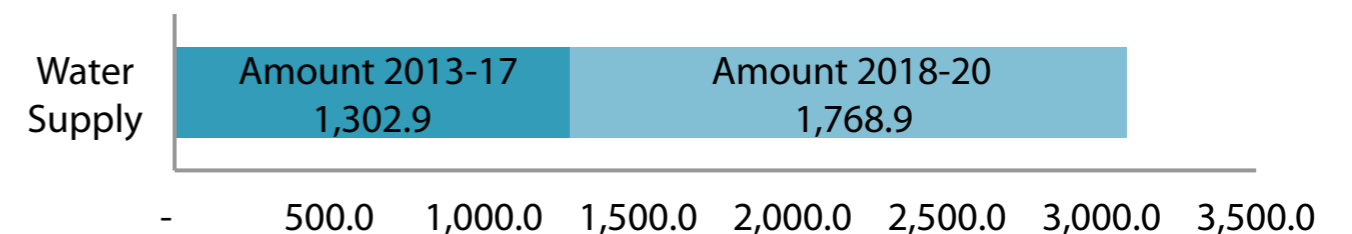
While providing for population growth, investments in water supply as proposed below until 2020 will fill the gap on institutional and management systems and increase service coverage from 73% now, to 84% in 2017, and to near 100% in 2020.

INVESTMENT ACTIVITY	2013-2017	2018-2020	2013-2020
Water Supply	\$M	\$M	\$M
Erbil Governorate: Investment Programme	484.4	669.0	1153.1
Dohuk Governorate: Investment Programme	291.5	402.5	694.0
Sulaymaniyah Governorate: Investment Programme	505.0	697.4	1202.4
Institutional and Human Resources Development	22.0	-	22.0
TOTAL	1302.9	1768.9	3071.5

Details of investment projects are given in the Sectoral Investment tables annexed to this Report.

Figure 9. Proposed Investment in Water Supply 2013-2020

Total US\$ 3,071.5 Million



Future investments in the production of potable water are paralleled by commensurate investments in waste water treatment, but given the time it takes to build sewage collectors and WWTPs, there will still be a long period where all produced sewage cannot be collected and treated.

Future tariffs must not only recover the cost of producing potable water but must also take into account the subsequently generated cost of waste water treatment. To this end, it recommended to introduce a sanitation surcharge on the water bill of institutions, e.g., offices and commercial establishments, which discharge waste water with different characteristics than domestic waste water. The Sector Report on Water and Sanitation provides a formula for computing this surcharge, which depends on content of certain pollutants and total suspended solids.

Sewerage Priority projects:

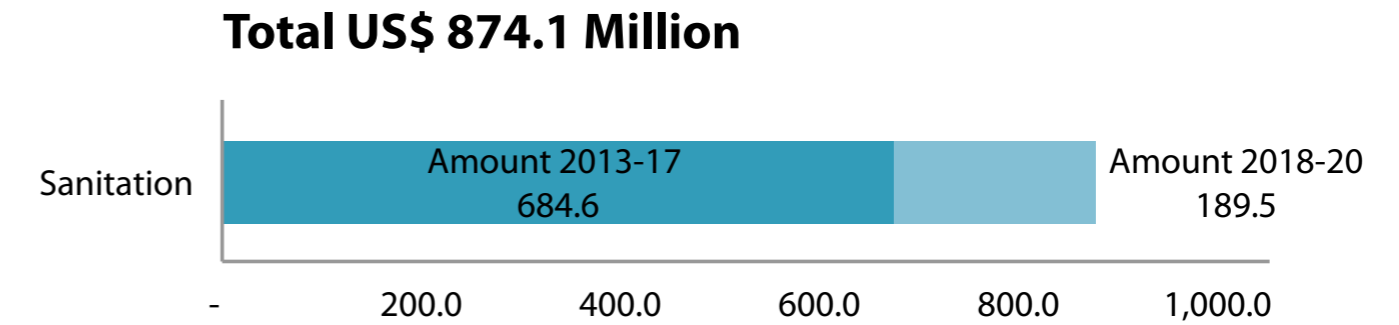
- A sewage collection network should be built in parallel with a WWTP in Erbil with only the first phase for 600,000 population equivalent (PE) being constructed during the 2013-2017 year period considering the long construction period needed for construction of the total collection network (more than 15 years).
- A sewerage system covering Dohuk city with Tanahi and Dileb areas would be constructed during the 2013-2017 period with a WWTP of about 320,000PE.
- In Sulaymaniyah the storm water collection system could be used for collecting sewage and a WWTP for one million PE needs to be built and connected to the many network outlets presently discharging raw sewage in wadis.
- WWTPs for the centres around Lake Dokan (Ranya, Dokan, Chwarqurna, Hajiawa, and Pshdar) and Lake Darbandikhan (Halabja, SaidSadiq) should be constructed during the 2013-2017 period to avoid polluting the surface waters that will increasingly need to be used as sources of drinking water.

The investment programme for the sewerage projects proposed above is summarized in the table below.

INVESTMENT ACTIVITY	2013-2017	2018-2020	2013-2020
Sanitation Investments	\$M	\$M	\$M
Erbil	254	147	401
Dohouk	177	42.5	219.5
Sulaymaniyah	121.4	0	121.4
Ranya	18.4	0	18.4
Dokan	32.3	0	32.3
Chwarqurna	14.3	0	14.3
Hajiawa	17.4	0	17.4
Psdar	17.3	0	17.3
Halabja	16.3	0	16.3
SaidSadiq	16.2	0	16.2
TOTAL	684.6	189.5	874.1

Total WWTPs around Lake Dokan and Darbandikhan: M\$ 132,2

Figure 10. Proposed Investment in Sanitation 2013-2020



Source: Study Estimates

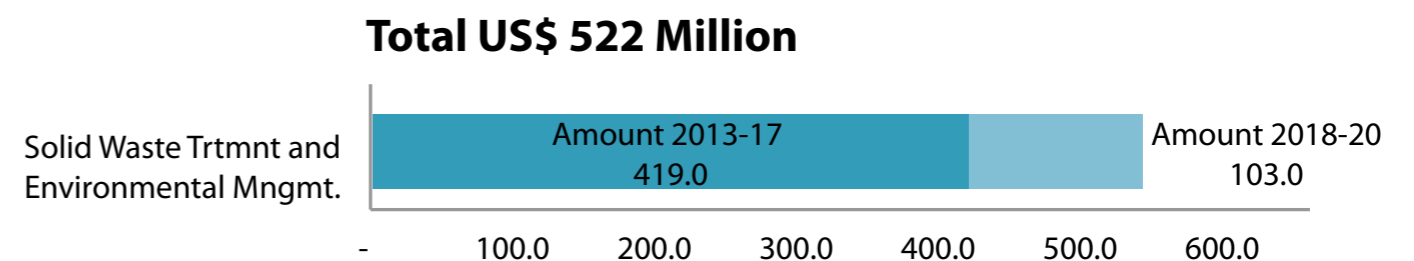
Public Education

A public awareness programme should be undertaken to enhance public acceptance and support of the various reform measures in order to ensure long-term gains both in terms of water conservation as well as higher standards of public health.

This Study also recommends investing some resources to improve environmental management and monitoring by strengthening the Environment Board and to seek private partnership funding for recycling and proper disposal of solid waste, along the lines of an experimental project carried out recently in Dohuk.

INVESTMENT ACTIVITY	2013-2017	2018-2020	2013-2020
Environmental Management and Solid waste Treatment	\$M	\$M	\$M
Environmental Management	67	13	80
Solid Waste Treatment and Disposal	352	90	442
TOTAL	419	103	522

Figure 11. Proposed Investment in Solid Waste Treatment and Environmental Management 2013-2020



Source: Study Estimates

URBAN PLANNING



Urban Planning

Situation at a glance

Regional Level

The urban population of the Kurdistan Region accounts for 79%⁸ of the total population. The three capital cities of Erbil, Sulaymaniyah, and Dohuk accommodate 41%⁹ of the Region's population. The structure of rural settlements is widely dispersed, comprised of 5,308 villages¹⁰, half of which have 100 inhabitants or less. This rural structure is continuously evolving. It suffers from low growth rates, specifically in Dohuk and Sulaymaniyah. The very large number and dispersed structure of rural settlements in the Region implies a costly provision of infrastructure. It poses a huge pressure on the KRG resources and causes a clear discrepancy in the services provided between rural and urban areas. The region witnessed high population growth rates (4%)¹¹, and urban areas are witnessing significant growth resulting from not only from rural areas in the KRG but also migration into the KRG.

Urban planning and development in the KRG is highly centralized where the Ministry of Municipalities and Tourism plays the leading role in the urban planning process while line ministries are responsible for the planning and implementation of social and infrastructure services. The Governorates and the Governors have a parallel role in overseeing and implementing urban plans and services, while Municipalities have limited power and role as they act as administrative units under the Ministry of Municipalities and the governors' authorities.

Within this setup, urban development and urban management suffer from fragmentation, weak coordination, and overlapping responsibilities. The planning and decision-making processes are divided between the urban planning directorates on the central level controlled by the Ministry of Municipalities and the governorates on the local level. Consequently, there isn't much clarity about the hierarchy of planning, decision-making, and approvals. Moreover, the process does not allow for community engagement or representation due to the weak municipal system.

City Level

Erbil City: Erbil City has a population of around 675,500¹² inhabitants and occupies 125 Km². The city is built on a system of concentric rings radiating from its historic citadel. Development densities within Ring Five are low; ranging between 100 and 200 persons/hectare¹³. The existing urban fabric up to Ring Five has the capacity to accommodate population growth until 2015. Despite this capacity, the city is expanding beyond Ring Five due to many new developments and private investments. As a result, infrastructure implementation is not able to match the dispersed development speed.

Sulaymaniyah City: Sulaymaniyah City has a population of around 559,600¹⁴ inhabitants and occupies 5,858 hectares. The city has a historic centre accommodating a mix of uses, and until 2003 the city was bounded within a 60m ring road. Development densities within the ring road range between 120 and 180 persons/hectare, and residential units are mainly low-rise¹⁵. Since 2003 there has been significant residential development outside the ring road, but without the overall coordination of a master plan as this was not endorsed until 2010. In this area, technical infrastructure provision is

[8] Source: Kurdistan regional Statistics Office (KRSO)

[9] Source: KRSO

[10] Source: KRSO. This figure exclude the villages of Makhmoor, Shixan, and Semel districts

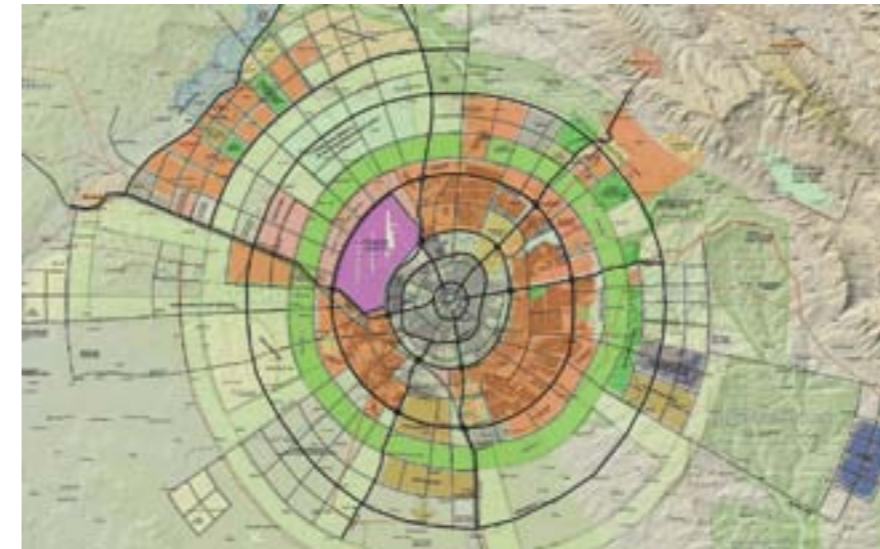
[11] Source: KRSO

[12] Source: KRSO

[13] Source: KR Social Housing Strategy 2012, UN-Habitat

[14] Source: KRSO

[15] Source: KR Social Housing Strategy 2012, UN-Habitat



incomplete and distribution of social infrastructure appears to be more limited than within the ring road. Planned residential areas outside the ring road are low density, ranging between 75 and 180 persons/hectare¹⁶, due to a number of undeveloped pockets of land. Sulaymaniyah City has the capacity to accommodate projected population growth over the next five years without the need to expand the city's footprint. The Sulaymaniyah master plan is well conceived in improving functionality while supporting projected population growth.

Dohuk City: Dohuk City has a population of around 280,400¹⁷ inhabitants and occupies 67.2 square km. The city's expansion to the west is rapid and nearly connecting with the adjacent district of Sumel. The urban fabric of Dohuk is predominantly low-rise and population density varies largely among the different parts of the city between (< 50 - > 250) persons/hectare depending on the different age of each neighbourhood. The existing residential vacant and developed land in Dohuk and its region has a capacity to accommodate population growth beyond 2020. The city has a comprehensive master plan that will guide its development until 2032. It has adopted a planning concept focused on one main city, with the potential of forming a strong sub-centre and additional settlement expansion with smaller sub-centres. The master plan rightfully addresses many of the existing and growth issues that face the city development, including the need for urban rehabilitation and infrastructure upgrading. It also adopts a phasing plan for the city development; however, this appears to provide for a large share of residential use that is beyond the projected population growth.



[16] KR Social Housing Strategy 2012, UN-Habitat

[17] KRSO

Gaps

Regional Level

The KRG needs comprehensive regional planning in order to guide its urban and population growth. The key objectives for such regional planning should focus on achieving synergy between urban growth centres and more feasible investment in infrastructure provision.

The KRG also needs to strengthen local governments and enable them to assume stronger roles and powers in managing their cities, possibly leading to the creation of city-based governments. The current urban management through Directorates of the MoMT is cumbersome and makes coordinating work difficult, as many aspects of city management require coordination between three to four ministries and other bodies.

Recommendations

Regional Level:

- Policy actions to be initiated by two recommended studies are proposed (while these studies can be completed within one or two years, carrying out any recommended reforms may require much longer).
- A study of options to restructure rural settlements that consolidates rural growth into a less dispersed pattern and, if possible, also minimizes disruption of rural population.
- A study on guiding urban growth to create urban development corridors and development hubs in key strategic locations. Four locations are proposed: the Erbil, Rania, and Sulaymaniyah triangle; the Dohuk, Sumel, Zakho Corridor; the Erbil Shaqlawa, Soran, and Haj Omran Corridor; and the Sulaymaniyah, Sadeq Penjwin Corridor.
- Urban governance should be improved by establishing a legal framework that allows municipalities to enjoy more authority and representation in the planning process. In addition, strengthening municipal bodies' technical, administrative, and financial capacities is also recommended.

City Level

Erbil City:

- Revision of the master plan to consider a more compact development pattern, higher target densities, and less residential land use designations.
- Preparation of a phasing plan to combat sprawl and programme infrastructure investment.
- Assessment of ongoing and planned developments in terms of infrastructure availability, capacity and additional needs.
- Prioritization of development towards already serviced areas before opening new locations for development.
- Priority investment projects to improve the urban and pedestrian environment in the city and to upgrade some of its old and informal neighbourhoods (refer to table).

Innovative method of consolidating rural settlements must be sought

Sulaymaniyah City:

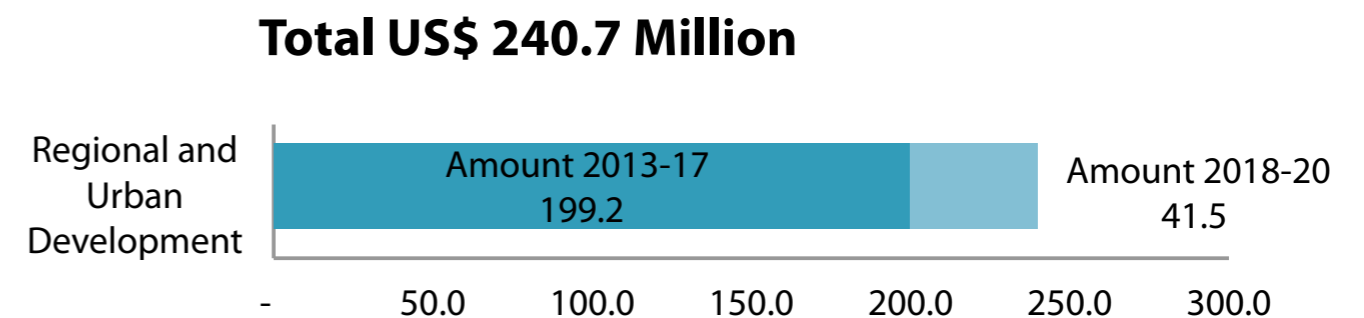
- A detailed survey and investment plan should be put into action to prioritize the provision of roads, water, drainage, green areas, and social infrastructure within the existing urban footprint in the short term, before city expansion follows in line with the Sulaymaniyah Master Plan.
- Investment within the ring road should be focused on improving car parking in the historic centre in order to alleviate congestion, improving green areas in residential neighbourhoods, and improving pedestrian pathways. Outside the ring road, investment is required on social and technical infrastructure.

Dohuk City:

- A phasing plan for urban development based on realistic growth projections.
- An infrastructure assessment of the existing built up areas to identify gaps in service provision and potential infill capacities.
- Two priority investment projects: the urban upgrading of the informal Gejabara area and the urban rehabilitation of the Dohuk city centre.

INVESTMENT PROGRAMME	2013-2017	2018-2020	2013-2020
Urban Planning	\$M	\$M	\$M
Planning and Programming Studies	7.8	0	7.8
City Planning - ERBIL CITY	57	25	82
City Planning - DOHUK CITY	27.7	6	33.7
City Planning - SulaymaniyahCITY	106.7	10.5	117.2
TOTAL	199.2	41.5	240.7

Figure 12. Proposed Investment in Regional and Urban Development Planning 2013-2020



Source: Study Estimates

TRANSPORT



Private vehicle ownership in capital cities, at almost 1 vehicle per household, approaches US levels

Transport

Situation at a glance

The Kurdistan Region occupies a strategic location between Iran, Turkey, and Syria. Due to continued instability in the rest of Iraq, the economy has been developing its own path in recent years and, being landlocked, now relies heavily on its transport links with Turkey and Iran, as well as on its airports.

The rapidly growing vehicle fleet coupled with rapid urbanization also has implications for the transport networks of urban areas. Despite major investments in road infrastructure—both within and between cities—traffic congestion, urban pollution, and deterioration in the environment of city centres have occurred as a result.

The Region has thus become over-dependent on road transport and private vehicles, and the road network is showing the strain.¹⁸ The inter-urban road network is being adapted to regional needs, and significant investment in the internal network is under way. There are signs that the pace of road development is exceeding the capacity of the road construction industry. Road maintenance budgets—at historically low levels—will have difficulty coping. Car parking in the cities remains to be organized effectively, and adequate traffic management measures are lacking.

To meet these challenges some bold schemes have been proposed, such as a regional railway network, urban tramway networks in the three main cities, express bus routes, and a new airport to serve Dohuk. Not all of these projects, however, may turn out to be economically justified. For this reason, this study has delayed the costliest projects toward the end of the five-year period or beyond when it will be easier to see whether they are economically justified.

Gaps

The international market: Erbil and Sulaymaniyah have international airports that have seen a rapid rise in the number of flights and destinations served. Dohuk, although a smaller city, is now apparently planning for a new international airport. However, there remains a weak link in the area of regional air cargo capability; neither of the existing airports have adequate air cargo facilities, and bureaucratic procedures for cargo imports and exports are heavily criticized by users. A move towards an electronic data interchange (EDI) for cargo movements and customs formalities is long overdue. Additionally, there is an apparent lack of a cold chain for fruit, vegetables, flowers, or other potential exports.

The domestic regional market: The vehicle fleet is expanding rapidly, yet the ambitious roads programme is falling behind schedule. Late approval of annual budgets effectively shortens the construction season and adversely affects the productivity and development of the local contracting industry. Even so, bottlenecks are being overcome, and the links between the three major cities are being shortened and improved.

While there is a consensus (among MOTC, City Directorates of MOMT) that tramways are needed, planning for the tramways appears to be directed from the centre in Erbil. There is no clear consensus at the local level that the plans and

[18] While there is no standard by which a region or city can be defined as “over-dependent” on road transport, the fact that there are no other means/mode of transportation should be sufficient to justify this affirmation.

priorities are correct. Nor are tramways accepted as “the” solution for urban mass transit. Road and traffic management proposals are being prepared separately from the tramway and other public transport proposals. The proposed car parking policy offers opportunities to earn income that can be reinvested in the transport system and will improve the flow of traffic. However, the policy is ill defined, and there is very little enforcement of those regulations that currently exist.

Intra-city transport: Cities currently depend excessively on cars; thus, city centres have become congested and polluted (see footnote 18). Poor public transport, lack of parking control, and modern traffic management compound problems. In response, plans for major urban transport investment have been prepared, largely centred on the proposed tramway networks in the three main cities. These plans are well advanced and investors are being sought.

Recommendations

Public Transport

Public transport with its own right-of-way offers quicker journeys and provides significant time savings compared to driving in congested conditions. It offers lower costs to users than owning and operating a car or second car. A competitive high-capacity service that attracts car users will reduce pollution and improve air quality, particularly if the infrastructure is electrified. Public transport would lower the need for car parking space in city centres, which would then become much more pleasant places to live and work.

The highest priority should go to high-quality bus transport in cities. However, the existing mini-bus system should be monitored and improved, particularly for peripheral destinations, for which ridership or road conditions may not justify the use of full-sized buses. Given limited resources, the most prudent thing may be to start with the air-conditioned bus network and see how that works. Buses can also provide services on additional corridors not currently proposed to be on the tram network as well as provide feeder routes to the tram system.

It thus seems sensible to invest in a high-quality air-conditioned bus service network as an intermediate solution. Buses can use the existing street network, supplemented by high-quality bus shelters at stops and real-time bus service information (showing when the next bus will come) generated by a GPS system. City buses normally have an economic service life of 10–12 years. A service could be developed in perhaps 18 months, so a 2014 start can be imagined.

Although worldwide experience suggests that trams attract more passengers than buses, the investments are much heavier. Trams are expensive, and they sometimes do not live up to cost, revenue, and ridership expectations. Though capital costs for trams are higher than for buses, running costs are lower, and their life is longer than buses. So, total levelized costs may not be exceedingly higher than for buses.¹⁹ Therefore, the Region should experiment with trams (light rail). It may be useful to experiment by building one important priority tram route in each city within the 2013 to 2017 period and explore some cost-reducing specification variants before committing to the whole system.

Priority would be given to the tram network over other traffic at congestion points in any case. Trams could be introduced earlier while buses are used as an intermediate solution.

The capital cities should consider high quality bus services

[19] Design studies show costs per km vary from US\$ 31 million for Erbil to US\$ 17 million for Dohuk. This suggests overall capital cost could be lowered by re-examining the trade-off between specifications and costs.

Planning and Management

There is a serious issue that needs to be solved before proceeding with major investments in urban transport.

There are three main bodies responsible for transport and traffic planning and management in the cities: Traffic Police, Ministry of Transport and Communications (MOTC), and city municipal councils.

Coordination between the bodies is weak, and there is no clear process by which plans are jointly developed. Also, the Ministry of Construction and Housing is responsible for the roads outside the cities that link them with the rest of the road network.

In the present uncoordinated framework, Public Private Partnership investments in the public transport development are perceived as unnecessarily risky, and the risks seem likely to deter potential private investors. The creation of a more effective administration at the city level (for the three capital cities) that comes out of urban/regional development analysis is required to deal with these complex problems of coordination.

Without a city-level administration, each of the three cities needs a unified transport and traffic planning, management, and enforcement body. This can be achieved by creating unified offices staffed by officials from the three institutions mainly concerned (MOMT, MOTC, Traffic Police) working under a common management, responsible to the Governor (this looks like an embryonic city government but under the Governor). Such city transport units will need public transport officers to help develop and monitor the new bus and eventually, tram systems, as well as officers in charge of the needs of pedestrians. The bodies will need to cooperate with central government in financial planning and preparation of tenders for the concessions or public-private partnerships that will be needed for the investment and operation for new systems. They will need to plan and invest in urban traffic control (UTC) systems.



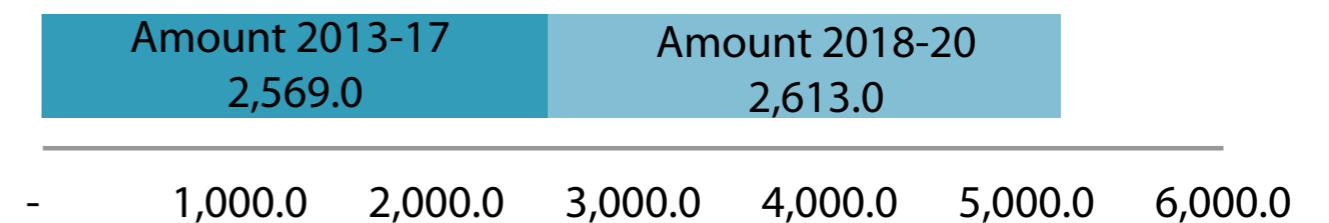
A holistic approach is needed, based on the main pillars of urban mobility:

- Traffic management measures, such as the improvement of traffic flows by urban traffic control systems, traffic engineering measures, intelligent transport systems, one-way streets, etc.;
- Public transport provision, to provide an attractive alternative to the use of the car;
- Road safety measures;
- A clear car parking policy, both for those car users who will continue to need access to the centre, and for providing 'park and ride' stations at outer points of the tram or bus routes for those who are able and willing to use public transport to access the centre;
- Consideration of the needs of pedestrians and the advantages of city centre pedestrianisation;²⁰
- Enforcement of traffic and parking rules so that the measures taken can have a permanent beneficial result.

INVESTMENT ACTIVITY	2013-2017	2018-2020	2013-2020
<i>Transport</i>	<i>\$M</i>	<i>\$M</i>	<i>\$M</i>
International and Inter-Regional Transport	189	1100	1289
Inter-Urban Transport Within the Region	872	348	1220
Intra-City Urban Transport	1508	1165	2673
TOTAL	2569	2613	5182

Figure 13. Proposed Investment in Transport and Infrastructure 2013-2020

Total US\$ 5,182.0 Million



Source: Study Estimates

[20] A recent attempt to pedestrianize the old centre of Sulaymaniyah failed when all these elements were not in place.

AGRICULTURE & IRRIGATION



Agriculture & Irrigation

Situation at a glance

The agricultural sector in KR-I possesses a significant potential that could play a leading part in supporting and diversifying the national economy. This potential is based on the availability of: about 1,5²¹ million hectares of irrigated and rainfed land;²² a large basic diversified population of livestock; a diversity of environmental and natural conditions, which allows for diversifying the vegetable and animal production and exploiting these conditions to develop competitive varieties of products; and some human capital that can be invested in agricultural activities. The contribution of the agricultural sector to GDP is only about 10%. However, agriculture was the source of livelihood for 35% of the Region's population in 2000, having declined gradually to 23% in 2007 (IHSES), and may have dropped further in the last five years. Agriculture employs about 9% of the KR-I labour force (IKN). The Study Team's mandate concerns the gaps and needs for infrastructure rather than agriculture per se, but a summary review of the sector was carried out to give a firmer basis to infrastructure investment proposals. Agriculture in the Kurdistan Region is practiced mainly on arid and semi-arid lands, so irrigation is vital. Therefore, given its importance in the KRG's agricultural development strategy, most of this section focuses on irrigation infrastructure, though other aspects are also touched upon.

While the scope of this study concerns infrastructure gaps and needs more than agriculture, per se, some aspects of the agriculture sector need to be analyzed because agriculture-specific infrastructure, mostly irrigation (hard) and technical assistance/extension support to farmers (soft) is intimately linked to agricultural production. Both hard and soft aspects are emphasized by the Regional authorities and both are necessary. And strictly speaking, the soft ones are considered infrastructure, too.

This agricultural potential, if properly developed through investment, will be an essential building block of the economic structure of the Region as a whole. It will also lead to an unprecedented development of the agricultural sector itself, in addition to strengthening food security, creating new job opportunities (perhaps also through the supply of processable agricultural commodities), developing the rural areas, reducing poverty, and making an effective contribution to economic diversification.

Recently, KR-I has moved from the concept of food self-sufficiency, mentioned in earlier versions of agricultural planning documents, to food security as presented in the current Draft Rural Strategy (RDS).²³ This is an excellent change in policy as achieving food self-sufficiency is impossible for a small region like KR-I. It is much better to focus on the competitiveness and comparative advantage of some parts of its agriculture.

Available statistics for 2010 indicate that the total number of livestock was 4,086,500 heads, distributed as follows: 345,594 heads of cattle, 2,564,615 heads of sheep, and 1,176,291 heads of goats. While the total quantity of fish pounds was 195, poultry farms reached 753 in 2010²⁴.

[21] Source: KRISO. This figure also includes Garmiyan Administration.

[22] Of which 1,368,388 ha (87.6%) are rainfed and 167,406 ha (12.4%) are irrigated. Source: KRISO.

[23] However, the Agriculture and Water Resources Strategic plans still advocate food self-sufficiency; presumably they have not yet been updated.

[24] Source: KRISO.

Cultivable Area in KR-I (ha)

	Total Area/ Governorate	Rain-fed Land	Irrigated Land	Total Cultivable Land	Uncultivable Land
Sulaymaniyah	1,514,120	580,645	59,299	626,280	887,840
Dohuk	931,398	254,892	46,650	301,542	629,856
Erbil	1,042,808	232,700	45,635	291,999	750,809
Total	3,488,326	1,068,237	151,584	1,219,821²⁵	2,268,505
	%	30.62	4.34	34.96	65.04

Source: MAWR/KRG

Apart from other sub-sectors such as animal production and fish production, crop production is the main source of livelihood for many rural families. Wheat and barley are the two main crops under cultivation, occupying about 567,625 ha for wheat (producing 381,284 tons) and 10,806 ha for barley (producing 4382 tons). These two crops account for around 50% and 48% of all cultivated land, though acreage and yields vary greatly according to rainfall. Since wheat and barley are winter crops, some of the same area can be used for other crops in the summer, especially if under irrigation. Other major crops are chickpeas, lentils, and sunflowers, but they are grown on relatively small surfaces, as are fruits and vegetables.

The KRG continues to invest heavily in agriculture and particularly on irrigation within agriculture. The idea, mentioned at MOAW, of wanting to irrigate the entire cultivable area (over 700,000 ha) is unrealistic. However, the implications of irrigating 100,000 ha, representing a 70% increase in irrigated area, over a five-year period could be estimated and may be feasible if implemented over a much longer period, perhaps over 10 years. Irrigating an area of this size would require the storage of 1.5 to 1.7 billion cubic meters of water. This already implies a reduction in per hectare water utilization (of 33%) due to imposition of water charges for irrigation and the concurrent (and perhaps consequent) gradual adoption of water-saving irrigation techniques. The plans of the MOAW call for larger investments because, they apparently intend to store a much larger volume of water than is necessary to irrigate 250,000 ha (150,000 ha existing, 100,000 ha new). This Study has therefore accepted as priority a part of the investment in water storage (US\$ 2.88 billion), but has given a lower priority to the rest (US\$ 3.8 billion), though it is still retained as part of the proposed investment programme (see Figure 14).

Due to many interrelated factors, efficiency and productivity levels of the agricultural sector remain below the required levels. Improvement and modernization of agricultural infrastructure, including irrigation networks, is essential for improved agriculture productivity. The investments required are huge and present practical challenges to effective short-term implementation as a result of limited capacities. The estimated total investment required is in the range of more than a billion dollars as illustrated in Figure 14.

[25] Excluding Garmiyan Administration, which is 15,822 ha irrigated and 300,151 ha rainfed.

Gaps

The major gaps and issues identified in this Report include, but are not limited to, the following:

- Poor and/or lack of proper evidence-based strategic long-term planning of the sector. MAWR in KRG has ambitious plans to increase agricultural production and expand irrigation from 150,000 ha to 250,000 ha.
- Insufficient or outdated regulations that do not keep pace with the developing sector.
- Poor or insufficient agriculture infrastructure such as irrigation networks and systems.

There is no updated hydrological study for the region, and there are no reliable estimates for groundwater resources, which should guide the use and limit extraction of this important and valuable resource. In the meantime, groundwater supply has undergone severe depletion as illustrated by the serious drop in the groundwater table (20-40 m in some of the KR-I's aquifers) and by the increase in soil salinity. Nevertheless, drilling (legal and illegal) continues in KR-I, which poses serious problems to groundwater resources.

The sector is heavily subsidized by the KRG. Current subsidies exceed US\$ 250 million and include: a subsidy for crop production (50-60% of the all the inputs) in excess of US\$ 200 million of which subsidy for wheat production (about US\$ 300/ton for production of 500,000 tons in 2011) amounts to US\$ 150.00 million; a subsidy for transport of products (40% of the costs incurred, which is estimated at US\$ 20 million); and a subsidy for agricultural inputs (seeds, fertilizers, pesticides, etc.) estimated at US\$ 30 million.²⁶ There are also other subsidies that include the operation, maintenance, and running costs of irrigation areas including employee salaries. These subsidies are not sustainable and will continue having an impact on the budget.

The decline in the agricultural population mentioned above may also have an influence on how much irrigation is ultimately feasible in the KRG. However, modernization and the use of more capital intensive (and labour- and water-saving) technologies will permit higher output with fewer people. Regardless, a declining rural and agricultural population will constrain sector growth, and hence, reduce the need for infrastructure (and storage of water).



Farmers training

[26] Based on MOAW data and budgets.

Dependency on Agriculture for livelihoods is continuously declining; agriculture was the source of livelihood for 35% of the Region's population in 2000" and in 2007

Recommendations

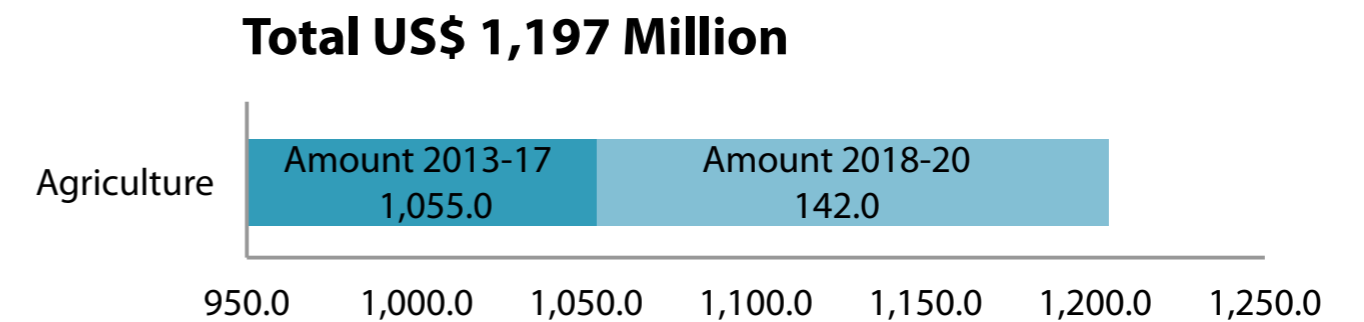
Policy: KRG should move from subsidized agriculture to competitive agriculture. The main challenge facing the agriculture sector in the Kurdistan Region of Iraq is a lack of adequate policies, rules, and regulations. Such policies merge the needs for achieving food security and sector development through investments with the demands of the overall economic and social development of the region and environmental sustainability. This requires long-term strategic planning of the sector, which merges smoothly with the Regional Development Plan of Kurdistan, but also complements the National Development Plan of Iraq, particularly on safeguarding the quality of shared water resources such as rivers. The strategic planning should address not only the investment requirements of the sector, but also the drought mitigation policies and strategies, land tenure issues, subsidies of the sector, agricultural water usage, and marketing and extension services.

Investments: While large investments are required, they must be part of long-term development plans, particularly, the required investments on:

- Training and capacity building
- Research and extension
- Support to improved agricultural technologies and practices including irrigation

Competitive products and value chains have to be considered and major investments are required to introduce new agricultural and irrigation methods

Figure 14. Proposed Investment in Agriculture 2013-2020



Source: Study Estimates

Priority Investments in Agriculture – Yearly Investment (US\$ Million)

INVESTMENT ACTIVITY	2013-2017	2018-2020	2013-2020
Agriculture	\$M	\$M	\$M
Policies/Laws Studies	30	7	37
Projects Implementation	1,025	135	1,160
TOTAL	1,055	142	1,197

Modernization of agriculture infrastructure including irrigation networks are essential for improved agriculture productivity

The investments for the abovementioned three areas should be strengthened substantially in the proposed plan to develop skilled human resources and the infrastructure for a modern agriculture sector. Investments are especially critical since future agriculture in KR-I will have to become more labour economical, given the declining share of rural and agricultural populations.

The plans for sector development prepared by the Ministry of Agriculture and Water Resources (MAWR) have very ambitious targets and require significant financial resources, significant technical skills, effective water sector reform, and reasonable time to achieve. It is clear that implementation of the ongoing plan (2009-2013) faces some difficulties and constraints including the timely availability of budget, which resulted in the implementation of only 25% of the 2009-2013 plan so far. The estimated cost of the proposed investment during the period 2013-2018 is huge and would require significant technical input and a lot of coordination (especially between the two branches of the Ministry, i.e. Agriculture and Water, during design, contracting, and construction. In addition, the time needed for dam design and construction is underestimated. A reasonable estimate is that KRG needs at least 10 years to implement the planned 1,700 mcm (million cubic meters) storage, i.e. up to 2020 or beyond.

Definition of policies, rules, and regulations for the sector will pay dividends in the long-term, but only if coordinated and implemented properly with other important actors, such as the Ministry of Environment and the water section of the Ministry of Agriculture and Water Resources at the KRG and central government levels.

KRG should improve agricultural infrastructure through the rehabilitation of irrigation networks and building and expanding of marketing chain infrastructure (including cold storage facilities, cold chain transport, and packing and grading centres) to ensure the competitiveness of agriculture in KR-I.

These investments are extremely important to sustain the level of development envisaged for the sector in the future, but will require proper implementation, monitoring, and follow-up.

The estimated total investment needed to start building competitive and economically viable agriculture amounts to US\$ 1,197 million while US\$ 6,708 million is needed for water management and irrigation investments.

Environmental impacts:

- Agriculture investments should be sized and decided upon with due regard to the need to avoid the depletion of groundwater for irrigation.
- Irrigation drainage water needs to be treated properly before releasing it to water sources.
- Local crop seeds and animal breeds should be protected and improved instead of replacing them with high yielding (hybrid) crop varieties and foreign animal breeds. This will contribute to environmental sustainability.

Unsustainable Subsidies: Sector subsidies are huge and unsustainable. The subsidies should be discontinued in a phased manner.

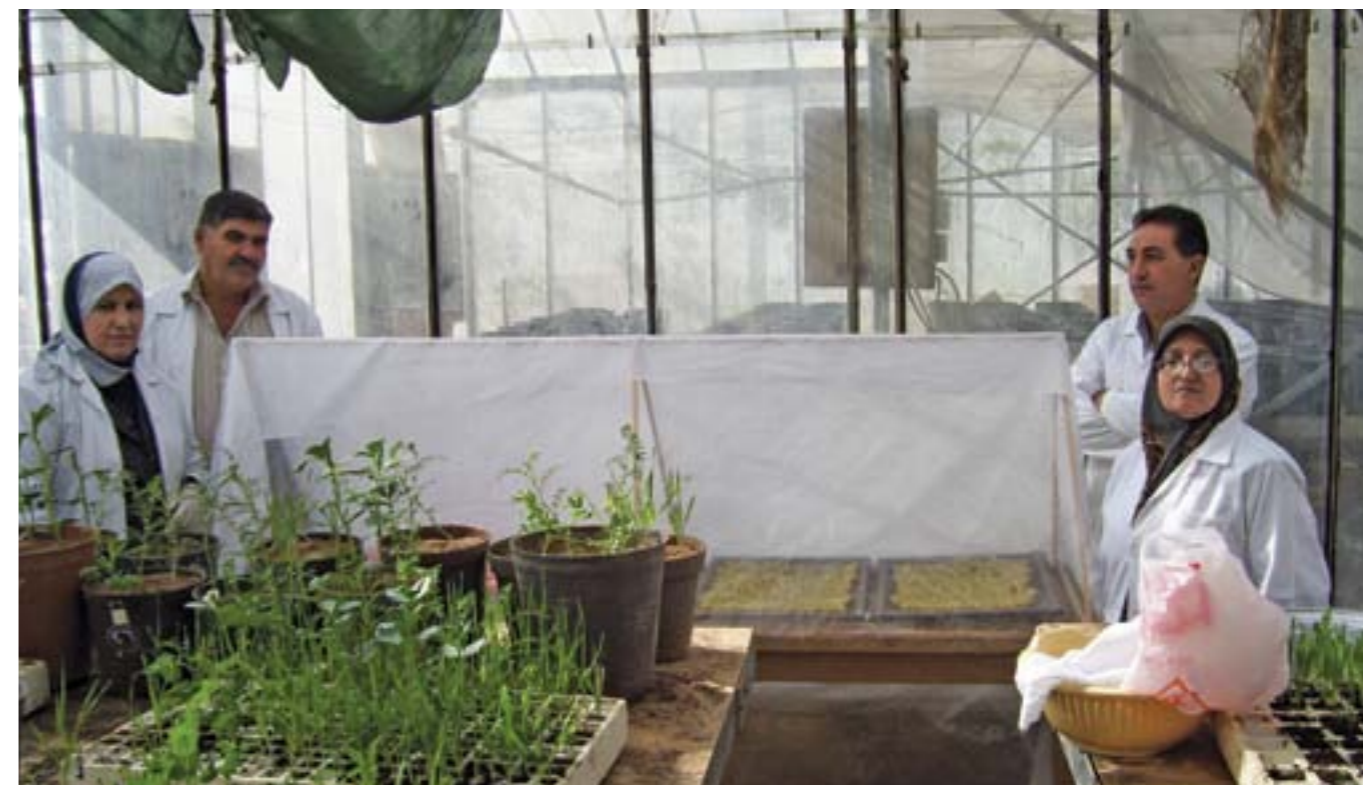
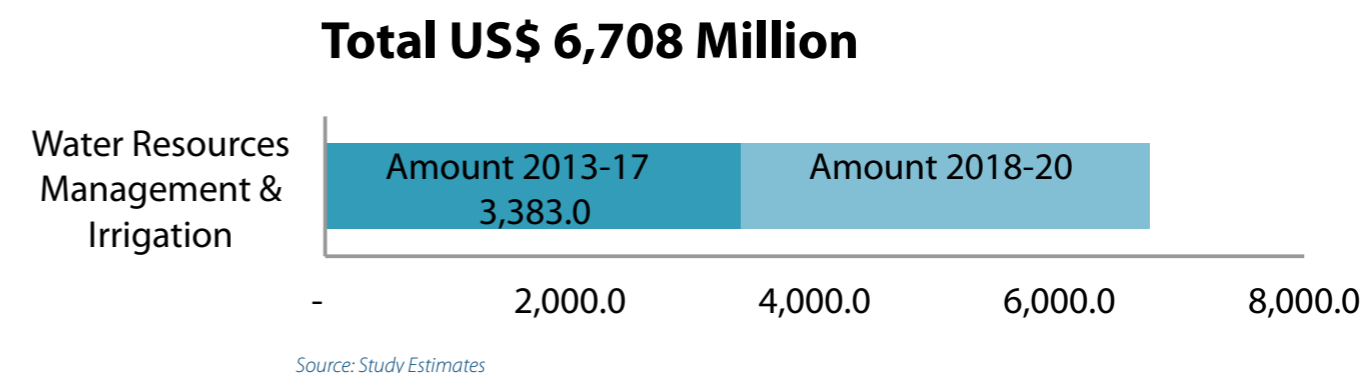


Figure 15. Proposed Investment in Water Resources and Irrigation 2013-2020



Priority Investments in Water Resources and Irrigation – Yearly Investment (US\$ Million)

INVESTMENT ACTIVITY	2013-2017	2018-2020	2013-2020
<i>Water Resources and Irrigation</i>	<i>\$M</i>	<i>\$M</i>	<i>\$M</i>
Policies, Strategies, Laws	8	0	8
Assessments and Studies	20	0	20
Implementation Priority 1	1,755	1,125	2,880
Implementation Priority 2	1,600	2,200	3,800
TOTAL	3,383	3,325	6,708

INDUSTRY



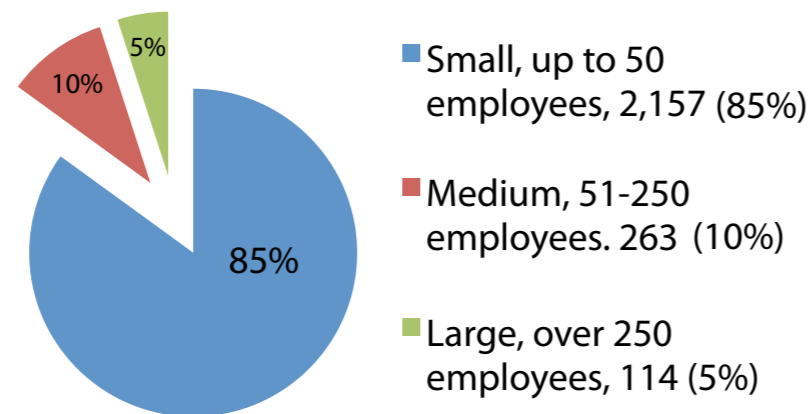
Industrial Sector

Industry in KRG is almost entirely private; the few state-owned enterprises having been closed or lay dormant for several years. State support to industry (and also other productive sectors in which private capital is invested) is conveyed mainly through the process of licensing whereby the state (through the Board of Investment) commits to provide infrastructure up to the property line of the project or asks the project to locate in one of the Industrial Development Zones, which will have been already provided with basic infrastructure. Again, the Team's mandate centred on infrastructure, but a summary review of the situation of the industrial sector was carried out and some suggestions emerge, even though they cannot be considered a full treatment.

Situation at a glance

The Kurdistan Region has the potential for industrial growth; it has the potential for a stable labour force supply by its high rate of population growth (which ranges between 3% and 4.5% annually) and a quickly developing oil and gas industry that can spur the growth of the wider industrial sector with its demand for high-quality goods and services.

Figure 16. SMEs breakdown in KR, 2011



The Kurdistan Regional Government (KRG) has recognized the importance of industrial development. In 2011 there were 2,534 licensed privately owned industrial enterprises. There are about another 1,500 plants under construction or waiting for funds before starting construction²⁷.

While only 114 of the enterprises are categorized as large, 10% (263) are medium-sized, and the majority 85% (2,157) are small. Territorially, 53% of the enterprises are in Erbil Governorate, 31% are in Sulaymaniyah, and 16% are in Dohuk Governorate²⁸.

The Kurdistan Federation of Chambers of Commerce and Industry has over 8,000 active members from 2,700 companies across the region, operates Chambers in all major cities, and actively participates in the representation of its members²⁹.

The Board of Investment (BoI) was set up in 2006 by virtue of the Investment Law no. 4/2006, which provides assistance to investments in Kurdistan Region in most sectors (excluding oil and gas) including industry. The Board of Investment set up a unified and fast track project licensing scheme, which became operational during 2007, to

[27] Source: Ministry of Trade and Industry.

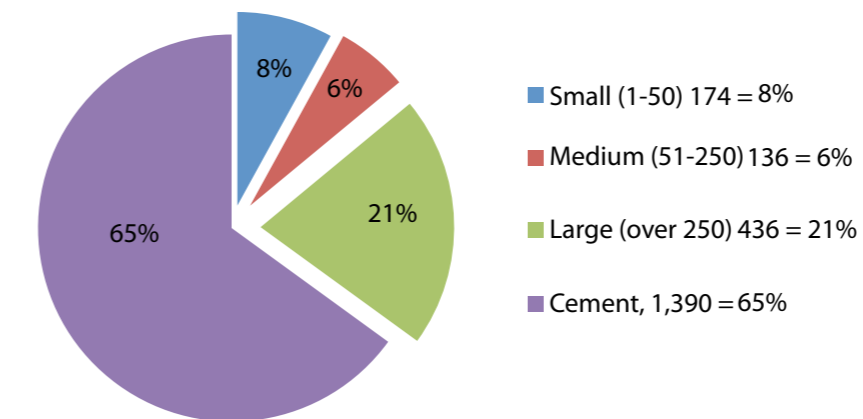
[28] Source: Ministry of Trade and Industry.

[29] <http://www.rudaw.net/english/kurds/4928.html>

facilitate the implementation of the Investment Law. The Board of Investment licensed 482 projects by end of September 2012. Approx US\$ 21.9 billion was committed, of which 17.17% for industrial development, and 52.16% for real estate development. All other sectors, including agriculture, tourism, commercial enterprises, private health, and education, etc. shared the remaining 30.67%. The KR-I authorities themselves are proposing to invest approximately US\$ 450 million for support to industry over the next five years.

Figure 17. Distribution of Employment by Company Size

Billions of Iraqi Dinars, %



In 2011, ID 1,390 million was invested in building cement production facilities, which represented 87% of the overall capital investments in Sulaymaniyah Governorate or 65% of the capital investments in the whole Region of Kurdistan (dwarfing investments in other large enterprises to 21%, medium size enterprises to 6%, and small businesses to 8%³⁰).

On the other hand, these new cement plants employed only 2,400, or about 11% of the new labour force, while the other large plants employed 4,932 (23%); medium size plants employed 3,264 (15%), and small enterprises employed 10,890 (51%). A breakdown between local and foreign labour was not available, but if other large plants are a good guide, a large share of the technical cadres were probably foreign workers.

Almost 21,500 new industrial jobs created probably twice as many jobs in the service sector; hence, it seems that in 2011 industrial development would have absorbed the annual growth in the labour force had all workers been local.

Industrial zones: The 2012 Government Budget allocated ID 180 billion to Industrial Zone Development projects. Four zones with a combined territory of 5,050 Donums have been allocated in or near the three capital cities of the three governorates following careful urban planning processes resulting in a Land Use Plan and two city Master Plans³¹.

[30] Information provided by Board of Investment and Ministry of Trade and Industry officials during personal meetings in May & June 2012. The list and date of interviewees is attached to the sectoral chapter on Environment.

[31] Dohuk Land Use Plan, Erbil Master Plan, and Sulaymaniyah Master Plan.

*Resource-based industries
have the brightest prospects
(cement, oil, minerals)*

Underdeveloped infrastructure represents a major obstacle for rapid and sustainable industrial development

Gaps

There are major obstacles that hinder the rapid and sustainable development of the industry sector in the Kurdistan Region. On the one hand, there is underdeveloped infrastructure in terms of transport systems, unreliable power and water supply, and shortage of specific facilities such as storage and warehousing for agriculture production. On the other hand, there is a pronounced lack of technical skills and expertise, and private sector companies do not pay social security contributions, which make them less attractive to prospective employees. Furthermore, the economy is overly import-reliant, which makes the local market highly volatile.

Lack of access to institutional finance is the greatest obstacle to development for this sector. Entrepreneurs have to finance any investment from their own resources or loans from family members. Furthermore, investors are deterred by the lack of insurance and credit facilities as well as the difficulties of simple banking transactions.

Inadequate infrastructure:

- Public transport systems are a major obstacle for providing transportation service to the workforce employed in the new industrial parks in Erbil, Dohuk, and Sulaymaniyah. One possible alternative, railway transport, has been neglected in the past decades.
- Coordinated infrastructure services are to be provided in the four integrated industrial zones near the capital cities of the three governorates. They can serve as a basis for setting up and developing different industrial projects and turn into hubs for domestic and foreign industrial investments.

Shortage of necessary skills and expertise: Investors have difficulty finding local skilled workers. Therefore, about 20% of the workforce in foreign owned plants or joint ventures is foreign (Turkish, Arab, Indian, etc.). More vocational training is needed and more public awareness is required to generate public demand for such training, so as to increase the supply of skilled labour to future investors. The MOEd and MOLSA are urged to consider partnering more closely with potential employers and their representative organizations (Chambers of Commerce and Industry, Professional Associations such as Engineers, or Surveyors) in order to contribute to the overall restructuring of the of the Vocational and Technical Education (VTE) system (see chapter on VTE).

Registration of new companies, though relatively simple, remains very lengthy and time consuming.

Statistical data are unreliable and outdated, especially because private companies are not obliged to report their production and consumption data, emission or waste generation, accidents and incidents, etc. A legal framework needs to be developed to cover the need for statistical data collection and the protection of data.

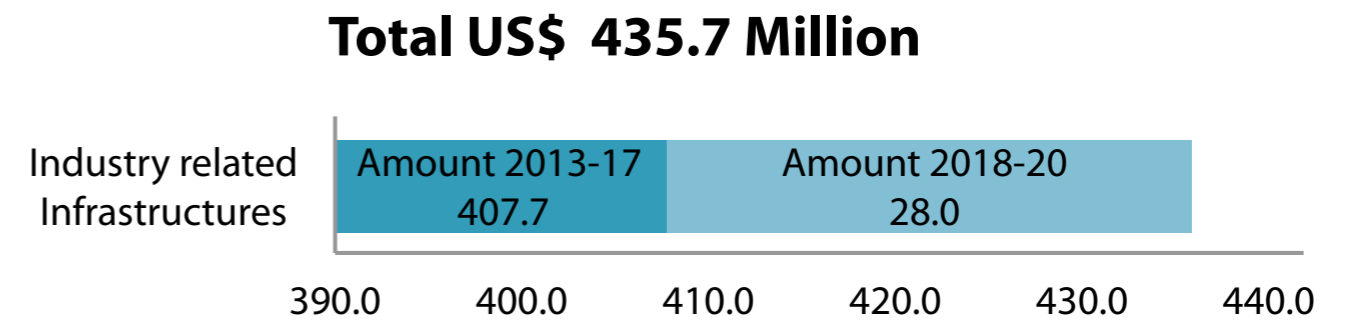
Border trade is unilateral. In 2011 the Ministry of Trade and Industry granted 2,695 import licenses with an approximate total value of US\$ 47 billion. However, only 113 export licenses were issued in the same year. Government support is needed to promote export and other cooperation by helping foreign trade with bilateral agreements and Cross Border Cooperation in the region. Initial support to exports will help establish a competitive set of products and value chains, which can then expand. Support does not necessarily have to mean direct subsidies—it could be assistance in attending fairs and exhibitions abroad, assistance in identifying potential customers abroad, assistance with transport and language barriers, etc.

The three governorates show many occurrences of **mineral resources** other than oil and gas (e.g. copper, chrome, nickel, manganese, iron, zinc, ores, gypsum, limestone, gravel, sand, lead, and dolomite) indicating that the Region may have abundant unexploited mineral resources.

The other obstacle is the **lack of uniform standards** in the areas of technical safety, environmental and quality control standards, and health and safety standards as well as the lack of insurance of production facilities, employees, etc.

Investment Programme	2013-2017	2018-2020	2013-2020
Industry	\$M	\$M	\$M
Studies and Institutional development	58.4	-	58.4
Infrastructure Support for Industry	349.3	28	377.3
Total	407.7	28	435.7

Figure 18. Proposed Investment in Industry-related Infrastructures 2013-2020



Source: Study Estimates



Recommendations

- Conduct a strategic assessment of environmentally and economically sustainable development of extractive industries starting with designing a geological prospecting and exploration programme.
- Support enabling programmes (such as those of the International Labour Organization (ILO) or the United Nations Industrial Development Organization (UNIDO)) that help remove barriers to small business development, thus facilitating creation of small or individual enterprises.
- Conduct a study of the feasibility of Cross Border Cooperation with neighbouring provinces and prepare a programme for the development of CBC.
- Develop the financial sector across the Region. Banks need to be established to provide loans for industrial development. However, until banking supervision becomes more reliable (a responsibility of the Central Bank of Iraq) and systemic risk is reduced, it is difficult to visualize a significant expansion in medium- or long-term credit to enterprises. The creation of a KRG-owned development-style bank could be possible, but would need to resolve issues of resources and qualified staff.
- Develop a legal framework for supporting quality control and enforcement of quality certification on traded products and services.
- Private companies should consider offering social security insurance to their employees, especially when attempting to attract skilled local workers. However, perhaps it should not be made compulsory seeing how difficult it is to introduce labour flexibility in the advanced EU countries once rigid and expensive social security charges are put in place making labour very expensive and immobile.
- Develop downstream processing of oil and gas within the region in order to add value to natural resources before selling it, thus providing employment to the local population.
- Identify potentially competitive products/value-chains (perhaps by looking at what is imported most) and develop support programmes for these also through (micro, small, and medium enterprise (MSME) development.
- Support relevant technical and vocational educational training programmes based on international standards in close collaboration with private sector.

ELECTRICITY



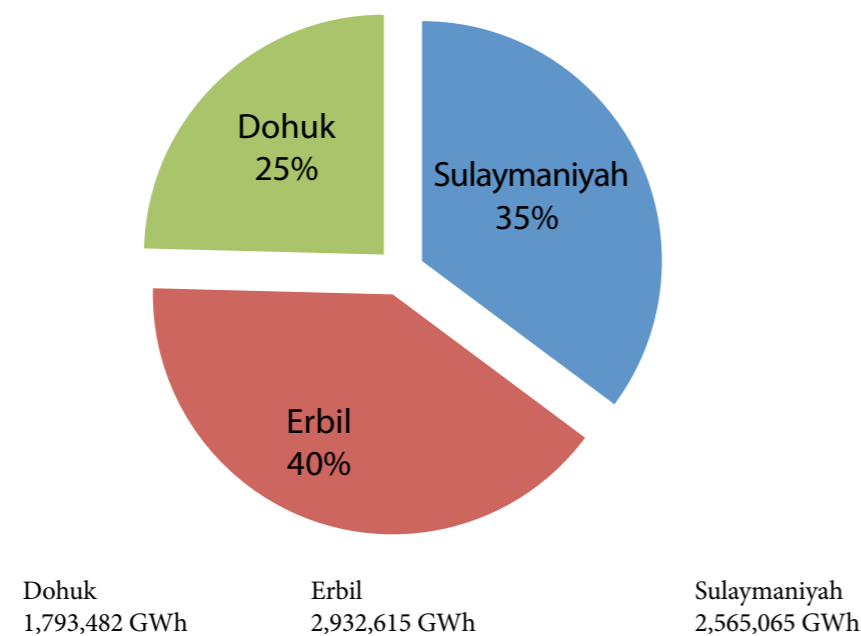
Specific consumption of electricity excessive, exceeding 10,000 kWh/year per connection

Electricity

Situation at a glance

Access to electricity in KR-I is virtually universal, and installed generation capacity is sufficient to cover demand except at the heart of the winter peak when the heating load is very large. Specific consumption is excessive, exceeding 10,000 kWh/year/connection due in part to very low tariffs. Subsidized tariffs and high electricity losses³² are the most critical issues, contributing to the rapid growth of demand, and consequently to the need for rapid system expansion and investments. There are also weaknesses in institutional and commercial aspects (poor billing and collections performance, labour force vastly in excess of norms) that could threaten the sustainability of power supply. The absence of an electricity law and a regulatory framework, along with lack of a strategic plan and a progress monitoring system are major constraints. During the last few years, significant improvement has been achieved in electricity coverage. Currently, electricity is provided for 22 hours per day, and about 98% of households and enterprises are connected to the system. However, shortages still remain, mainly during the winter season, and electricity demand is growing rapidly, in part because of insignificant tariffs, and in part because almost half of generation results in losses.

Figure 19. Electricity Demand in KR



Demand

The assumption of the Electricity Sector Master Plan (2009), an annual projected growth rate of the demand of 7.7% until 2020, has been exceeded and demand currently grows at 15.2%. The peak demand of 2011 was about 2,800 MW and about 3,100 MW in 2012. It could rise to as much as 6,000 MW by 2016 and possibly 10,000 MW by 2020, unless higher tariffs and reduction of losses are able to dent the growth. Household consumption represents about 60% of total.

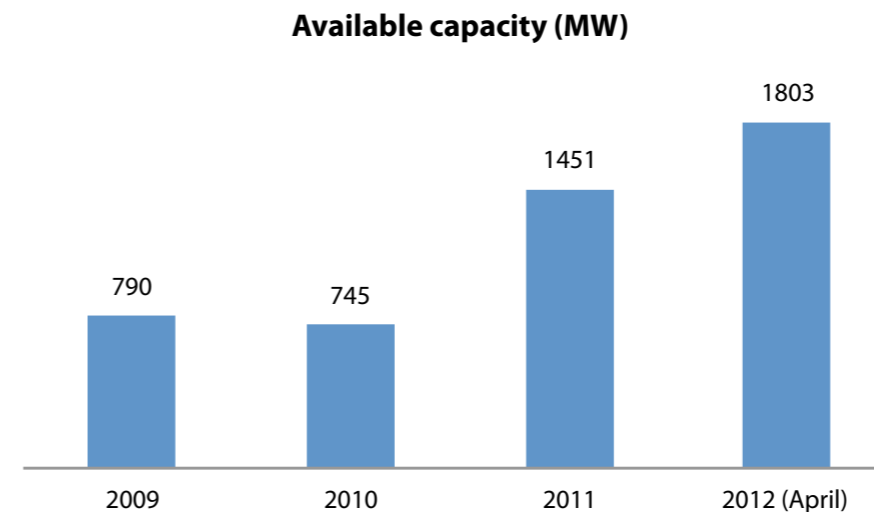
This extraordinarily high electricity generation demand growth is not only a reflection of economic development but also reflects high system technical and non-technical electricity losses. The demand for generation capacity would decelerate appreciably if tariffs were raised and losses reduced.

[32] This discussion based on numerous interviews with MOE staff and officials, as well as MOE publications. About 43% of electricity was lost due to high transmission, distribution, and non-technical losses.

Generation

At present, 80% of generation capacity is privately owned while 20% is government owned, though some of it is licensed to private operators who manage three small diesel-fuelled plants (provided by the UN in the early 2000s). Most generation capacity comes from thermal power plants (GTSC³³ and RE³⁴) while hydroelectric power plants provide a small fraction (about 6-7%). In addition, Independent Power Producers (IPPs) operate on the basis of the “take or pay” provision of the Power Purchase Agreements (PPAs). Under current arrangements, KRG supplies all fuel for electricity generation to the IPPs and IPPs supply electricity at US cents 3.59 per kWh.

Figure 20. Evolution of available capacity 2009-2012



Thermal Power Plants: The total installed capacity of MOE-owned thermal power plants is 203 MW, but the net available capacity is only 48 MW. Most of the thermal plants are more than 10-15 years old and are in need of total overhaul or retirement (though two of the three diesel-fuelled plants have been refurbished).

Hydroelectric Power Plants: At present there are two hydroelectric plants (Dokan and Darbandikhan) operating in the KRG. The total installed capacity is 649 MW, but the actual capacity is only 140 MW due to various operational and technical problems (e.g. vibration in one unit at Dokan) as well as drought conditions in the region. Furthermore, the plants give priority to irrigation demand, rather than power generation (e.g. the Dokan plant does not operate during the winter peak, instead storing water for irrigation later in the year).

Transmission

In the KRG area, the transmission system consists of two separate networks, one in Dohuk Governorate and the other interconnected between Erbil and Sulaymaniyah Governorates.³⁵ The transmission network consists of 132kV and 33kV lines only with 82 transformation substations.

[33] Gas Turbine Simple Cycle

[34] Reciprocating Engine

[35] Though there is a weak interconnection between Dohuk and Erbil. However, the transmission system being weak is not as big a problem as it appears because the three Governorates all develop generation locally and no Governorate has any surplus capacity it could send elsewhere in the Region, should a plant fail there.

The present load is above the carrying capacity of the transmission and distribution networks. However, work is underway for implementing several projects to extend the lines and establish new substations. This Study recommends further investment in transmission and distribution.

With the increase of generation capacity (perhaps as much as 6,000 MW by 2020), the evacuation of power from the power plants to the load centres is most urgent. The investments in transmission and distribution systems are substantial and fall on the KRG budget, so they should be decided very carefully. Later in the decade, perhaps, the need to wheel large quantities of power between locations in KR-I, the rest of Iraq, or abroad will justify greater investment in extremely high tension transmission (400kV).

Distribution

The distribution network operates at 33kV (55 substations) and 11kV where step-down voltages include 415V and 240V networks. At present the total length of 33kV network is about 2,370 km.

During the period of 2009-2011, billed electricity grew at an annual average rate of about 10% and new customers connected at a rate of about 25,000 per annum. By 2012, the customer base had grown to 947,672 customers. According to IKN survey of 2011, there are about 915,000 households in KRG; therefore, this figure suggests coverage is almost universal. Total electricity sales, as per 2012 KRG budget, were expected to be ID 187 billion, or about US\$ 160 million (approx. US\$ 13/month/connection).

The phenomenal growth in demand has placed the distribution networks under pressure and caused total energy losses (technical³⁶ and non-technical³⁷) to increase to a level of 40% to 45% as of the end-2011.³⁸ A reduction in these losses would correspond to a significant decline in the need for additional generation.

Sector Governance

Legal and Regulatory Status

The absence of an appropriate legal and regulatory regime, along with lack of a strategic plan and a progress monitoring system are major constraints in the sector, which is described as follows:

- The MOE owns, operates, and regulates the electricity sector. Potential conflict of interest with MOE functioning as policy maker, operator, regulator, and supplier. Lacks commercial orientation.
- Electricity sector entities operate without any formal electricity law or regulatory framework.
- Private sector participation in the generation sector is regulated by Build, Own, and Operate (BOO) and Design, Build, and Operate (DBO) Contracts for new privately-financed plants, as well as some Management and Operation agreements for plants owned by the Government.
- There is no interaction with consumers on electricity services, and consumer education on energy (water, environment) matters is almost nonexistent.

[36] Technical losses occur naturally (laws of physics) and consist mainly of power dissipation in electricity system components, such as transmission and distribution lines (conductors), transformers, and measurement systems.

[37] Non-technical losses are caused by actions external to the power system and consist primarily of electricity theft, non-payment by customers, and errors in meter reading, accounting, and record-keeping.

[38] While technical losses relate to suboptimal network configuration (too few transformation substations, too long medium / low voltage networks and delivery points or bulk substations too far from load centres), non-technical losses occur mostly due to illegal tapping. Meter inspection is limited to only 10% to 15% of all installed meters.

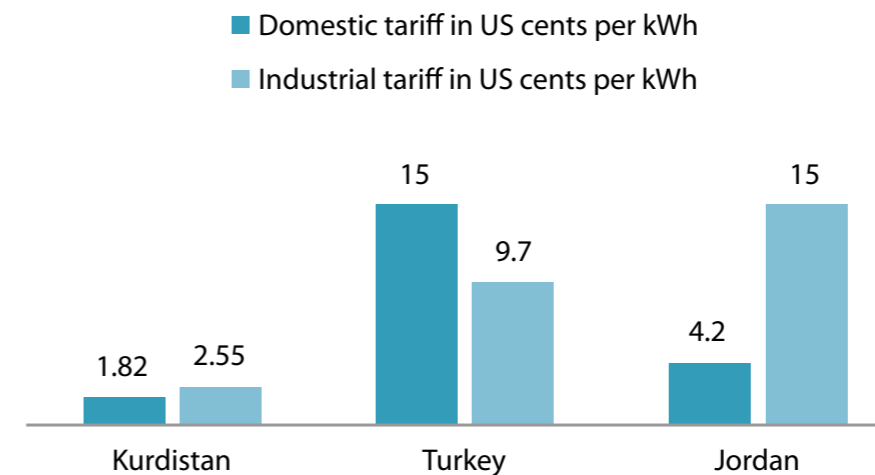
Combined technical and commercial losses total 40% to 45% of electricity generation

Tariff Structure and Rationalization

The collection efficiency of the MoE ranged only between 45% and 75% of sales in 2011. In addition to distribution losses (both technical and non-technical), the low tariff charged to domestic and commercial consumers is one of the reasons for the high consumption per connection. The KRG has been subsidizing electricity substantially: The average tariff for 2011 was about US cents 2.24/kWh, (domestic and industrial rates at US cents 1.82 and 2.55/kWh respectively), while generation cost is about US cents 15.06/kWh.

Subsidized tariffs and high electricity losses are the most critical issues, contributing to the rapid growth of demand, and consequently to the need for rapid system expansion and investments

Figure 21. Electricity consumption tariffs

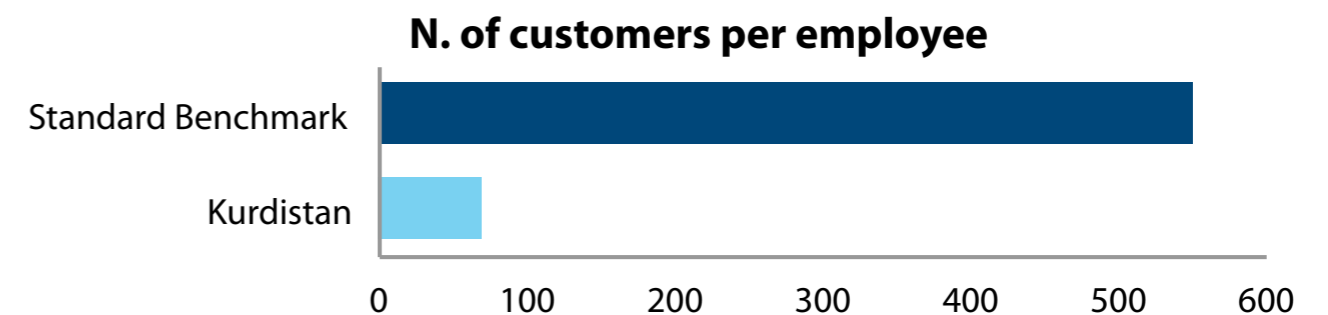


Source: MOE, IEA

Personnel

There are an excessive number of employees in the Ministry of Electricity (about 14,277 along with 2,000 members of security). The high number of employees results in very low levels of sector efficiency. The international benchmark for productivity is 2,200 MW / year / employee, while KRG's electricity sector (even excluding generation which is private) productivity is only 511 MW / year / employee. Alternatively, the international benchmark of number of customers per employee is around 550, while given the current figure, in KRG's electricity sector the number is 66 customers per employee.

Figure 22. Number of customers per employee



Gaps

Tariff Structures and Tariff Rationalization

- Present tariff structures are simplistic and the tariff methodology is not based on any external parameters.
- Present tariff structures and block rates for electricity are not based on any rational study of costs of service (household customers cost more than industrial ones to serve, yet industrial tariffs exceed household ones).
- Financial subsidies³⁹ reached US\$ 1.77 billion in 2011, equivalent to 2.75 times the total spending for ongoing projects in the electricity sector and 55% of total expenditure in 2011 in the ongoing projects of the entire economy.
- Economic subsidies⁴⁰ far outweighed the financial revenues and in 2011 reached the sum of US\$ 2.14 billion.

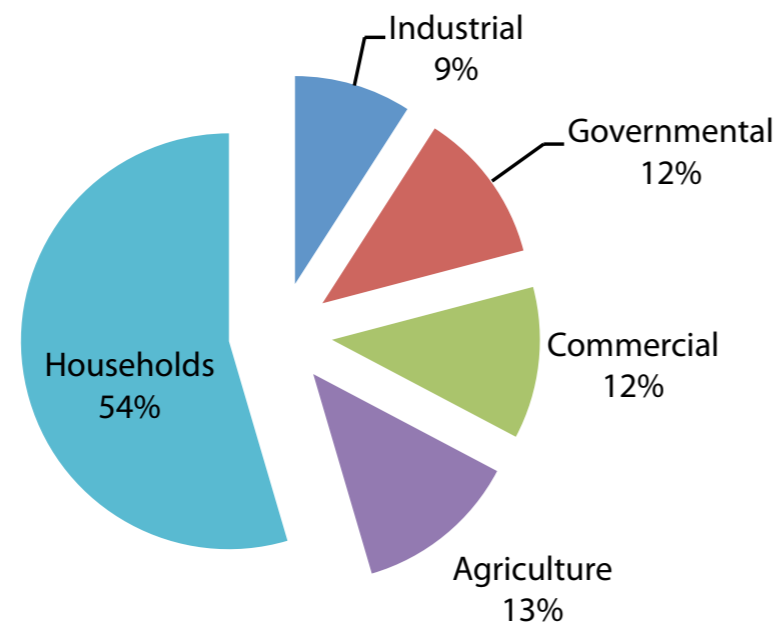
Dispatch and Control Centre

Although, the MOE is in the process of implementing a Supervisory Control and Data Acquisition system (SCADA, which enables managers to monitor control and alarm dispersed plants from a central location), grid management and control is based on telephone communication with power plant operators. The present Dispatch Control Centre will require a total overhaul to incorporate the minimum features of a Control Centre and is being included among investments for 2013.

Transmission and distribution

Overstretched and overloaded transmission and distribution systems (long low-voltage lines, too few substations, unbalanced low voltage transformers, and an overloaded grid) are responsible for high technical losses and will require major investments (financially and time-wise) in the Region as a whole.

Figure 23. Electricity Demand by End-Use Sectors of KRG



[39] Calculated and based on the difference between the average tariff and the direct cost faced by the MOE. It should be noted that the financial subsidies will fall quite substantially if and when natural gas becomes available to fuel the gas turbines (which will by then have become combined cycle and more efficient), but the problem of subsidies will persist as local natural gas is priced at less than one third of economic price, and generation is bound to grow very substantially.

[40] Calculated from the difference between tariffs and economic costs (of fuels).

Recommendations

KRG needs radical and fundamental reforms of the electricity industry, the creation of a real Ministry with responsibilities for policy-strategic management, and a longer term perspective. The priority is to raise electricity tariffs and to start a power loss-reduction programme. Since generation is expected to continue being financed by private investors, the KRG needs to improve the contracting of power from private producers (through the design and enactment of a complete legal and regulatory framework), and the budget will have to finance mainly institutional and policy studies (tariffs, sector organization), together with transmission and distribution. Of course, at present, the budget also finances almost all operating costs.

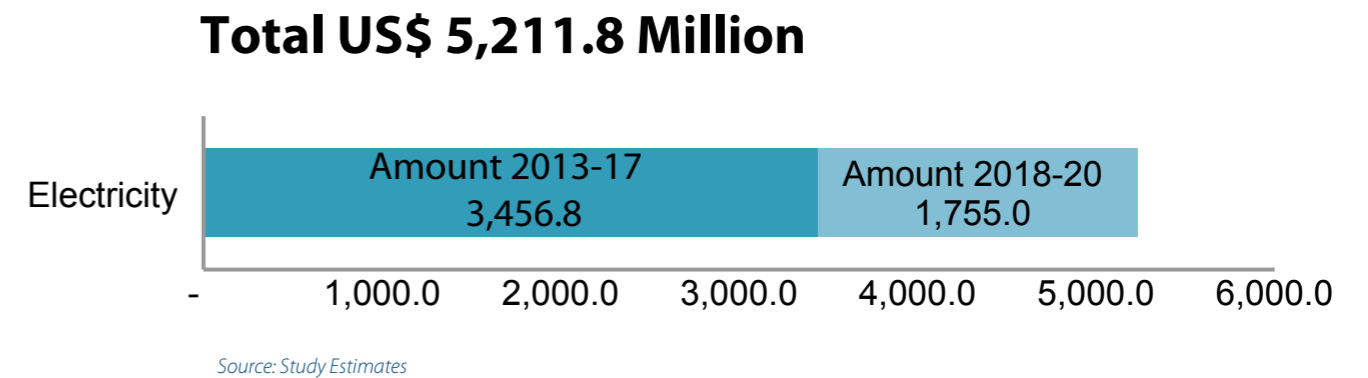
1. Investments

Transmission and distribution networks must be upgraded and expanded in order for generation projects to function efficiently. As a “rule of thumb,” 60% of the generation expansion investment budget must be allocated for transmission and distribution upgrade and expansion.

- This Study estimates total investment requirements for new generating capacity until 2020 at about US\$ 3.5 billion, but they could be higher.
- The estimated investment requirement for the 400kV transmission line is about US\$ 1.12 billion (but this Study considers this project of second priority for the time being; the first priority is evacuation of power from new generating plant).

A complete reform of the electricity business is necessary in the Region, with a new Ministry concentrating on policy and regulatory matters

Figure 24. Proposed Investment in Electricity 2013-2020



2. Implementation of a Legal Framework for:

- Electricity Sector – Primary and Secondary Laws
- Establishment of Regulatory Agency
- IPP Procurement Rules and Regulations
- PPP Rules and Regulations (for the whole economy, including electric power)

3. Demand Control Assessment and Project Implementation

For the short-term (the next five years), the most cost-effective investment for the MOE would be to analyze various demand control options and to implement programmes with tariff pricing signals (immediately) and Frequency Control Demand Management for the industrial and commercial sectors. The MOE needs to carry out a detailed Demand Side Management (DSM) study to prioritize the costs/benefits of various options.

Priority is to raise electricity tariffs and to start a power loss-reduction program

4. Loss Reduction and End-Use Efficiency Improvement

The size of losses in the KR-I electric power system is such that reducing them ranks in priority just below the need to raise tariffs. Thus, it is extremely urgent and will be very fruitful in terms of reducing need for additional generation. The combined technical and commercial losses exceed 40% of electricity production, if some outstanding bad debts are included. In the short-term, technical losses can be reduced by:

- Upgrading overloaded conductors
- Upgrading overloaded distribution transformers
- Improving the power factor of the distribution network
- Replacing old conductors and cable joints

5. Distribution System Upgrade Planning Study for Erbil, Dohuk, and Sulaymaniyah

A least-cost economic optimization study should be carried out to determine an optimal network configuration (including proper location of high voltage transmission lines delivery substations). A sub-transmission system introduced that minimizes the overall cost of the distribution network after taking into account the annual cost of losses.

6. Tariff Restructuring

- Tariff levels should reflect the full costs of service in order to fairly distribute the costs among user classes. In the immediate, tariffs should be increased substantially, while awaiting studies to determine a new and correct structure and levels of tariffs.
- The tariff structure should be reviewed and updated to address the incentives/disincentives for use, corresponding to system load pattern and to costs at specific system nodes.

7. Power Sector Structural Reform Study

The MoE should be reorganized as the Ministry of Energy and tasked with (1) the responsibility for overall energy sector coordination/policy implementation, as well as (2) creating one or more utility companies to take responsibility for power system operations and management.

The future Ministry of Energy should (at minimum) have responsibility for power planning, supervision/management of IPP/projects, energy pricing and taxation, policies with regard to new and renewable sources of energy, energy conservation, efficiency improvement, and analysis of energy demand (including demand-side management).

8. MOE Staff Reduction or Retrenchment

- MOE Retrenchment and Organizational Restructuring Study



9. Improvement of Billing, Metering, and Collection

There is a need to look at developing solutions to metering, billing, and collection problems. Consideration must be given to opportunities and challenges in each of the following areas:

- Updating metering practices and other technologies for application in the field (though meters currently under consideration appear too costly for universal use, at least as long as tariffs remain low; cost of meter is equivalent to about two years of consumption at current household tariff rates).
- Reducing un-metered electricity or electricity theft to improve billing efficiency.

10. Culture and Environment

- Implement a public awareness campaign to advise customers of the implications of electricity waste and illegal tapping and to encourage “whistle blowers” to provide information.
- Commence efforts to have legal recognition of power theft as a crime (it currently is not) so as to be able to secure convictions for electricity theft in future.

INVESTMENT ACTIVITY	2013-2017	2018-2020	2013-2020
<i>Electricity</i>	<i>\$M</i>	<i>\$M</i>	<i>\$M</i>
Public Sector Investment - Priority 1	693	255	948
Public Sector Investment - Priority 2	463.8	300	763.8
Generation (Private Sector) - Priority 1	2,300	1,200	3,500
TOTAL	3,456.8	1,755	5,211.8

HEALTH



Health⁴¹

Situation at a glance

In the recent past, the KRG has made good progress in improving the major quantitative health service supply indicators. However, some of its major health outcome indicators such as Infant Mortality Rate (IMR) are still lagging behind neighbouring countries indicating the need to improve the quality of health services and facilities⁴². The KRG's Health Sector's objective is to provide health care to the entire population of the KRG and also to displaced persons residing in the Region as well as to Kurdish residents in some of the disputed areas who may not have otherwise reasonable access to health care services or who prefer to come to KRG facilities for treatment (e.g. Mosul residents often go to Dohuk Governorate health facilities, as reported by MOH staff to the Team). The Study's mandate is limited to the health sector's physical infrastructure gaps and needs. However, some aspects of the sector beyond this had to be examined, though this is by no means a complete treatment of health sector issues. In fact, some important ones may not be treated adequately or at all. Most assumptions and parameters used in this Study reflect discussions and consensus with sector experts in the KRG MOH and some outside experts.

MOH data (2010) shown in the "Present situation: health infrastructure and key personnel" table gives an overview of the main quantitative indicators of the KR-I health care establishment. The 65 public and 52 private hospitals contain about 7,684 beds and 235 operating rooms⁴³. These indicators show a fairly well developed physical infrastructure and sizeable contingent of human resources, which may not be distributed optimally within the Region.

However, there is still room for improvement focusing on the following shortcomings:

- An infrastructure gap with a need to rehabilitate existing health facilities;
- A need to improve efficiency of health facilities through better management policies and systems;
- Inadequate quality of services of Primary Health Care Centres;
- Sub-optimal nursing standards;
- Outdated medical equipment;
- Disparities in service coverage;
- Inadequate Health Information System;
- Poor service standards in rural areas as a consequence of the inability to attract and retain competent professionals in these locations.

The gaps alluded to in the points listed above are detailed in the next section.



[41] This section has benefited from a Rand study on health care in KR-I which the MOP allowed the Study to use.

[42] IMR for KR-I is 28/1000. Source: KRISO based on MICS IV 2011.

[43] Source: KRISO based on MOH data including Garmiyan administration.

Present situation: health infrastructure and key personnel

INDICATOR	ERBIL	DOHUK	*Sulaymaniyah	TOTAL
No. of Public Hospitals	23	10	32	65
No. of Private Hospitals	23	3	2	52
Number of beds Public/Private Hospitals	3,067	1,489	3,128	7,684
Annual Number of Patients	181,367	103,917	311,459	596,743
Monthly Number of Hospitalized Patients	12,621	8,427	17,201	38,249
Annual Number of Visiting Patients	3,521,055	2,537,445	3,296,082	9,354,582
Number of Physicians	2,534	755	2,297	5,586
Number of Medical Assistants	8,762	4,264	8,122	21,148

* Including Garmiyan Administration.

Source: Kurdistan Regional Statistics Office (KRISO) based on MOH data



The inefficient utilization of health facilities contributes to lower quality health outcomes than expected

Gaps

In order to respect quantitative indicators, this Study suggests that the number of hospital beds needs to be increased to a total of 12,323 by 2017, which requires that around 400 new hospital beds need be added each year. On the other hand, although the number of PHCs meets the Iraqi standards, there are substantial gaps in delivery of primary care services because of inadequate numbers of PHCs in rural and remote areas as well as poor quality of the health care services they supply and the low capacity utilization of public health facilities.

The current level of hospital rehabilitation will result in 21 beds per population of 10,000, which is higher than the national standard and that of some of the neighbouring countries. However, this rate will not keep up with the population growth in the Region (calculated at 4%⁴⁴). As to PHCs, the KR-I has about 1.9 per 10,000 population, easily meeting the Iraqi standard (1.1/10,000 population), but still rural areas are not well served.

The KRG spends about US\$ 117 per capita/year, less than Iraq (US\$ 200) and less than all other countries in the area, except for Syria. KRG spends about US\$ 525 million for health care (based on 2011 data from the KRG Budget), of which US\$ 423 for recurrent costs and US\$ 82 million for investment. This Study suggests increasing capital investment to about US\$ 260 million.

In discussions with sector experts inside and outside the MoH, the Study considers reasonable the estimate that about 15 public hospitals and 200 of PHCs need major renovation during the next five years.

There is a need for creating 30 new rural PHCs at the rate of two per year per governorate. The authorities should try to expand working hours from the current 30 hours to as much as 47 hours, if possible, as public hospitals and PHCs are utilized for only 25% of the time (physicians spend only limited hours in the health facility before moving to their own private practices).

Expenditures for medicines (drugs) and medical equipment are procured under the investment budget. This Study suggests a doubling of expenditures on these two items, to approximately US\$ 55 million/year.⁴⁵

At current levels of supply of qualified medical professionals, the expected situation in 2017 will be 14 physicians, 1.3 dentists, and 0.68 pharmacists respectively per 10,000 population, which will be lower than that of other countries in the region. Even with increased numbers of medical school graduates and influx of medical staff from other regions, the demand resulting from population growth will not be met.

Quality of services of nurses and medical assistants is inadequate.

There is a need to create a Health Information System at an estimated cost of US\$ 20 million for an initial phase.⁴⁶

[44] KRSO

[45] These suggestions were arrived at on an empirical basis since shortages of drugs and equipment were often mentioned. However, actually estimating needs would be a colossal job; therefore, the Study suggests initially doubling expenditures and then perhaps making more precise estimates.

[46] A country Health Information System (HIS) integrates health data for policy making and efficient management of health services. There is general agreement among all health specialists that a Health Information System is a key component of any health system. See Health Care Sectoral Report for more material on proposed HIS. MOH should start with a basic system and then evolve into a more complete and comprehensive one, as it gains experience in operating it (and avoid the problem that happened with the system for e-government, where the hardware has been in place for two years but software and operations/staffing are not functional/available).



Recommendations

The recommendations will cover Quality and Capacity of Health Service in the KRG.

Quality

Improving Quality of Primary Care Services: The overall quality of health services in PHCs is poor, and they often act as referral centres rather than as health centres able to provide preventive and simple curative care services. Perhaps more patients would turn to them if PHCs did more to provide the services they are supposed to provide. The “main” PHCs headed by a physician as well as the “branch” PHCs headed by a paramedic need to transform their role to a more hands-on, proactive health centre that diagnoses, cures, and advises patients on preventive measures. This will not only require a “mind-set” change on the part of the doctors and medical staff, but it will also require additional training and procurement of needed basic diagnostic and curative tools and equipment (e.g. basic labs, dental and medical x-ray machines, functional computers). In addition, the following complementary steps are required:

- In order to improve quality of doctors and nurses in PHCs, in close coordination with the Ministry of Higher Education (MOHE), new medical studies programmes for general physicians and nurses focusing on primary health care need to be developed.

Additional investment in facilities will be necessary to maintain quantitative indicators, and cater to population growth

- Kurdistan Regional Government should consider converting a large number of the PHCs into “Family Care Centres or FCCs,” which play a more direct role in handling patients on a longer-term, personal basis with up-to-date medical records. Within the new FCCs a patient referral system should be developed and implemented to enhance continuity of care.
- Working hours in PHCs should be extended from 2pm to 5pm in order to improve efficiency through better utilization of the primary care facilities. Accordingly, salary levels of physicians, nurses, and other PHC staff need to be increased to compensate them for additional three hours of work.
- Increase numbers of Consultant and 24-hour Clinics. These clinics have proven extremely beneficial to disadvantaged urban and rural patients who cannot afford the high cost of private practices and PHCs are often not open in the afternoon.
- If the MoH succeeds in improving capacity utilization of existing facilities and a modest expansion of 24-hour, consultant clinics and “private wings” at public facilities, then a slowing down of investment in additional physical facilities (as proposed in this Report) could be considered by, say, 2015, so as to swap some investment funds for recurrent expenditures. In any case, per capita expenditure on health is low (see above) and could rise somewhat, especially if some of this increased public funding could be offset by higher fees for services, which will happen through increasing semi-private practice, though public health care fees should also be raised.

Improving Nursing Standards:

- Evaluate the educational institutions that can produce new nurses in the coming five years and determine the number of new facilities needed (e.g. nursing schools) and the number of existing colleges of nursing that need renovation and rehabilitation.
- Revamp the nursing curriculum for general and specialized fields (although the curriculum has been more or less continuously under revision, ministry officials still feel it should be strengthened). Teachers and instructors need to be brought in from abroad temporarily while the existing cohort of nursing instructors in Kurdistan are given re-training and opportunities to go abroad for additional learning in their fields.
- Establish an accreditation programme for nurses, with a registration and continuing education requirement, and develop a programme for bringing in foreign nurses for temporary service and training of KRG’s own nurses.
- Launch robust capacity/skills building programmes of retraining. Continuous learning of nurses at all levels should be developed and implemented. E-learning courses could provide possible supplementary learning platform through which nurses could sign up for online training courses accredited by the KRG MOH.

Policies and Regulatory frameworks for state physicians engaging in private practice: A uniform policy and regulatory framework need to be developed.

- Clear operational guidelines should be established for medical staff and health facilities involving state physicians engaging in private practice by the end of 2013.

- A pilot project should be conducted with incentives-based systems (e.g. rewarding physicians’ good attendance at public facilities with official permission to engage in private practice; allow them to charge fees higher than public ones, but lower than private ones).
- Expand semi-private practice, at higher salaries, as in 24-hour and consultant clinics and similar. Coercive measures (forced duplication of working hours in public facilities) may not result in much improved productivity, especially if coupled with ban on private practice.

Institutional Reforms: Further strengthen MoH capacities in: health regulation, planning and management, monitoring and evaluation, health promotion, social participation in health, promotion of equitable access, quality assurance, human resources training, health surveillance/disease control, research in public health, and control and disaster prevention.

Reform the health services delivery systems by:

- Continuing decentralization and progressive granting of autonomy to public hospitals within a well-defined regulatory framework;
- Creating a strong preventive and primary health care system based on a model of family medicine;
- Establishing an efficient referral system and improving the quality of care in health facilities.

Reform the HR system by introducing: job descriptions for all functions, a monitoring and evaluation system, job grading, and salary scales. All hospitals and PHCs should be required to have job descriptions for all doctors and medical staff.

- Introduce a mix of incentives and mandatory measures to ensure that rural health facilities are adequately staffed.
- Ensure the availability of motivated health personnel (possibly through reform of compensation policy, currently based only on seniority) with adequate information and skills, strengthening education and scientific research institutions to support the health system.
- Develop and implement an integrated Health Information System (HIS) for effective health-sector decision-making.
- Implement measures for quality checks and inspections for quality drugs.
- Improve coordination between Ministries. Since the Graduate Medical Education is in the hands of the Ministry of Higher Education better coordination between the latter and the Ministry of Health is recommended.

Capacities

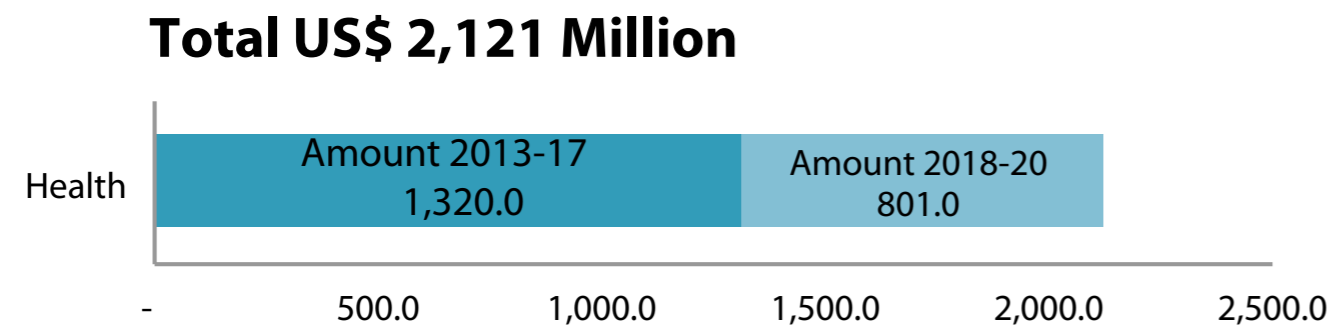
The guiding principles to address capacity shortages should focus on the following:

- Consider population growth as determinant in assessment of infrastructure needs.
- Improve the physical conditions of the existing public hospitals and PHCs.
- Increase the utilization rate for public hospitals and PHC.
- Balance the spatial distribution of public hospitals and PHCs.
- Address external demand (non-resident patients from other parts of Iraq).
- Investment needs are based on trying to maintain a reasonable standard of capacity per 10,000 population (e.g. hospital beds should be at 20-21 beds/10,000 population, just below the average of KR-I's better off neighbours at 22 beds/10,000 population; PHCs should aim to stay at 2.9-2.7/10,000 population above Iraqi standard of 1.1). See annexed Health Care Sectoral Report for more detail on assumptions and standards.
- Medical personnel indicators will remain below international and regional (average of neighbouring countries) standards based on current trends for supply of qualified personnel (doctors, nurses, paramedics). However, this is not an infrastructure issue.

Summary of Proposed Investments in the Health Sector 2013-2020

INVESTMENT ACTIVITY	2013-2017	2018-2020	2013-2020
<i>Health Sector</i>	<i>\$M</i>	<i>\$M</i>	<i>\$M</i>
New Hospitals/PHCs	690	435	1125
Rehab Hospitals/PHCs	360	216	576
Drugs/Med Equip. HIS	270	150	420
TOTAL	1,320	801	2,121

Figure 25. Proposed Investment in Health 2013-2020



Source: Study Estimates

EDUCATION





Education⁴⁷

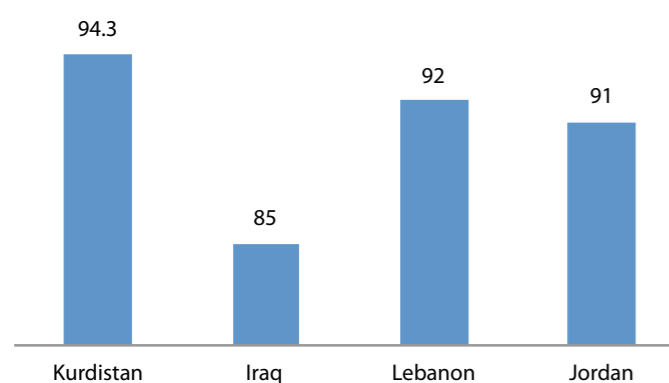
Situation at a glance

Since 2005, the KRG has made remarkable progress in all aspects of its education system, comparing favourably with neighbouring countries. Most notably, since 2009, the net enrolment has improved for basic and secondary education from 91.6% and 20.3%, respectively, in the academic year 2003-2004, to 95.9% and 88.9%, respectively, in the academic year 2010-2011⁴⁸. About 18.4% of the population was illiterate in 2009⁴⁹.

Additionally, a total of 1,327 new schools were added over the past seven years, an average growth of 5% per year. However, indicators of students per class as well as schools working multiple shifts demonstrate the need for further improvements, especially in both quality and quantity of facilities and the education provided.

In fact, many public schools had no choice but to run additional shifts (two to three shifts) or share buildings with other schools. Consequently, to accommodate multiple shifts, public schools were forced to reduce instructional period from five hours to four hours per session, thus impairing the quality of education.

Figure 26. Net primary* school enrollment ratio (%)



*for KR the % refers to 9 years of basic education
Source: KRG, Ministry of Education, World Bank

[47] This section benefited from a paper on education done for the KRG by Rand, which the MOP kindly allowed to be used by the team of this Study. The Study agreed with some of the Rand numbers, conclusions, and recommendations but not all. Sometimes, the Study reached similar conclusions independently, possibly due to using same data, reading the same earlier reports, and discussing with same officials.

[48] MICS IV Survey

[49] Based on the results of IHSES, 2007.

In general terms, shortages in Education Infrastructure could be stated in the following terms (with more precise definition given below under “Gaps”):

- A shortage in school capacity;
- A shortage of qualified teachers and imbalanced geographical coverage of teachers;
- A need to improve effectiveness of curricula and increase instruction hours (680 hours/year compared to 1,000 hours/year in most developed countries);
- A need to improve the Ministry of Education Human Resources system.

Gaps

The most substantial gap is the school capacity shortage and the number of qualified teachers. However, almost equally important, the current rate of school rehabilitation and construction of new schools does not match population growth and the expected improvement in secondary enrolment.

In the academic year 2011-2012, there were a total of 5,233⁵⁰ students in Kurdistan Region of Iraq divided over 4,350 basic schools, 742 secondary schools, 31 vocational schools, 24 Diploma Institutes, and 76 speedy education schools⁵¹. In comparison, in the academic year 2003-2004, the total number of schools was about 4,000. Additionally, during the academic year of 2003-2004, there were 170 basic and secondary students per school, whereas in the academic year of 2010-2011 this ratio increased by 54% to 261 students per school, indicating substantial capacity shortages in public schools. Considering the low secondary enrolment ratio, it is certain that it will need to continue to rise. This Study projects a rise to about 37% by 2020 from about 27% now. Since enrolment in basic education is already close to 95%, it is expected to rise only slowly, to near 100% asymptotically. Most of the demand for new classrooms, however, is expected to come from growing secondary enrolment, and replacement of multi-shift schools and those which do not meet standards (rented, mud-walled).

Due to weak academic backgrounds, weak retraining programmes, and lack of incentives, teachers lack key skills for effective delivery of the contents of subject matters under the new curriculum. As a result, students have difficulty learning the contents of each subject under various grade levels and perform poorly in their studies.

The gaps in the educational system in Kurdistan Region can be summarized as:⁵²

- A need to build a total of 3,253 new schools for the next five years (with an average of 12 classrooms per school);
- A need to rehabilitate 1,323 schools during the same period;
- A need to reduce the number of overcrowded schools and multi-shift schools and to replace rented schools and dilapidated schools;
- 75% of Basic Education teachers lack key skills, having weak academic background and lack incentives (average salary US\$ 150/month);
- A need to standardize multi-dialect textbooks and a Lack of activity/workbooks;
- Short instructional time (school hours); needs to be increased by 30%;
- A budget gap: need to address appeals to increase budget beyond the current US\$ 124 million (7.8% of KRG budget).

[50] Source: KRISO.

[51] For those older children (between 9 and 15 years) who did not have the chance to get enrolled in schools in the normal ages.

[52] Estimate of classroom needs based on population and enrolment increase in basic and secondary education, and elimination of double-shift, rented, shared, and mud schools. Rehabilitation needs based on MOE 2012 estimate that one quarter of existing schools require rehabilitation (including addition of some missing facilities, library, gym, dining hall, etc.). This Study's estimate of the number of classrooms needed over 2013-20 is 46,460, plus 25,400 rehabilitated, as compared to an external estimate of 36,360, which may have been less comprehensive. More detail is available in the Sectoral Education Report attached as annex to this summary Report.

There is a shortage of schools, some schools are far below standards, and secondary school enrollment must continue to grow

Recommendations

Invest in more school capacity (See investment plan opposite page)

Improve Teacher Quality

- Establish an action-oriented Working Group within the MOE for continuous retraining of teachers and school staff.
- Develop comprehensive Teacher Retraining Programmes focusing on the new curriculum for both existing and new teachers in cooperation with the MOHE, universities, and teacher colleges. Train high-quality trainers for delivering Teacher Retraining Programmes.
- Deliver retraining programmes through various mechanisms such as central and district training centres and e-learning. E-learning is highly beneficial to those teachers who are eager to learn new curricula on their own. Teachers will sign up for online training courses for each new curriculum. In addition, the necessary tools for self-testing and official testing and certification can also be added to the e-learning system.
- Standardize retraining of teachers as part of their career development programme and promotion plan to encourage them to pursue additional training.
- Remove poorly performing teachers from the education system by offering them early retirement.
- Improve salary levels of teachers to elicit better performance and also non-financial rewards for high performing teachers and to encourage university graduates to become more interested in teaching jobs. Like many countries in the world, each year select a number of teachers for the “Teacher of the Year Award.”
- Improve the standard of teaching in Kurdistan by implementing a certification and licensing process.

Improve Effectiveness of the New Curriculum

- Standardize textbooks into one uniform dialect to effectively implement the new education system.
- Develop appropriate activity/workbooks to assist teachers and students in better understanding of difficult subject matters such as science and mathematics.
- Increase instructional time by 30% through increasing number of school days and instructional hours per day.
- Improve the Ministry of Education Human Resources System
- Review all HR management and administrative functions.
- Develop supervisory functions and processes.
- Implement an appropriate monitoring and evaluation system, job descriptions, position grading and salary levels, a performance-based HR system, continuous training, and certification and licensing of teachers.

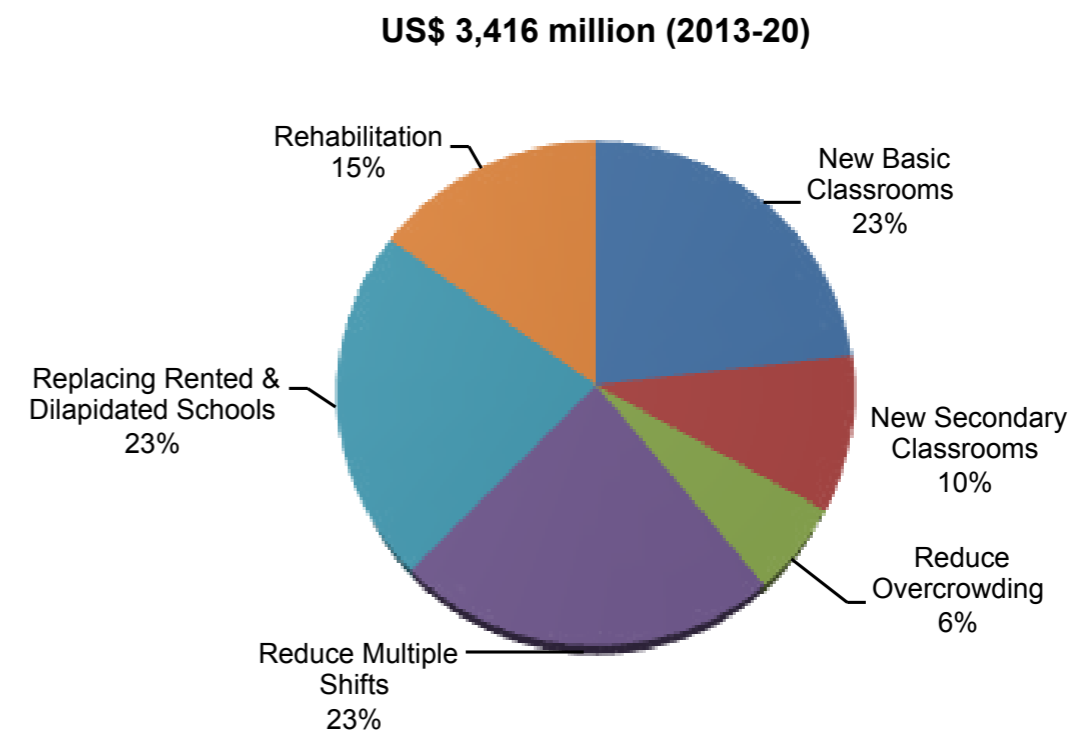
Projected Needs

There is a need to build new schools rapidly to meet the high expected demand from population and enrolment growth and to replace rented, shared, and below-standard schools.

If the investments proposed are carried-out as recommended, all multiple shifts will have been eliminated, all rented and substandard schools will have been replaced

INVESTMENT ACTIVITY		2013-2017	2018-2020	2013-2020
<i>Education</i> ⁵³				
New Basic Classrooms	No.	7,496	5,132	12,628
Cost (US\$M)		468.5	320.8	789.3
New Secondary Classrooms	No.	3,201	2,291	5,492
Cost (US\$M)		200.2	143.2	343.4
Reduce Overcrowding	No.	3235	0	3235
Cost (US\$M)		202.2	0	202.2
Reduce Multiple Shifts	No.	12,660	0	12660
Cost (US\$M)		791	0	791
Replacing Rented & Dilapidated Schools	No.	12,120	0	12,120
Cost (US\$M)		777.8	0	777.8
Total New Classrooms Needed		39,037	7,423	46,460
Total Cost (US\$M)		2,440	464	2904
Rehabilitation No. of Classrooms		15,875	9,525	25,400
Rehabilitation Cost (US\$M)		320	192	512
Grand Total Cost (US\$M)		2,760	656	3,416
Estimated No. of New Schools		3,253	619	3,872

Figure 27. Investments in Education



[53] Assumed costs: US\$ 62,500 per new classroom; US\$ 20,000 per class rehabilitated (figures decided in discussion with staff of MinEd).

VOCATIONAL AND TECHNICAL EDUCATION



Vocational and Technical Education (VTE)

Situation at a glance

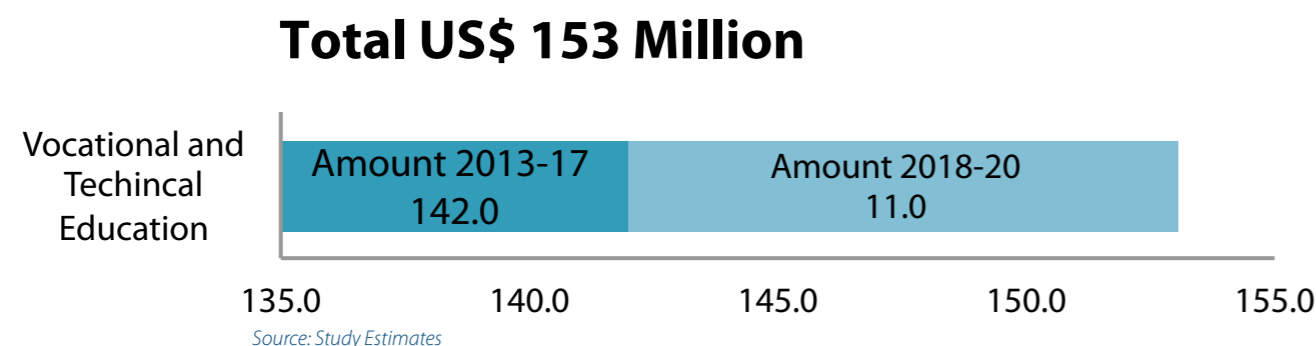
The secondary vocational and technical schooling system in Kurdistan Region is in disarray. Enrolment is dropping, in spite of increasing numbers of schools and teachers (without an increase in budget). The number of students enrolled in vocational secondary education gradually declined from 7,744 in the academic year 2003-2004 to 6,307 in the academic year 2009-2010 in spite of the increase in the number of vocational schools by 10%. During the same period, the number of teachers increased by 46% from 861 to 1,255, which led to a decrease in the average number of students per teacher from nine to five. Several schools seen by the Team were idle as teachers were present, but had no budget for school operation.

There is a direct link between a successful investment strategy and a successful skills supply system that is responsive to market demand for skills in the labour force. Supplying at least part of the labour required by new investments is one of the benefits, and importing labour for these new ventures defeats the purpose. The value of a well-focused and modern vocational and technical education (VTE) programme for Kurdistan may be very high, as it seeks to diversify into agriculture, industry, and tourism.

In 2003, there was only one Vocational and Technical Education (VTE) Centre in the Kurdistan Region, located in Erbil. Today, there are three main Vocational and Technical Education Centres (VTEC), combined with Employment Centres under the Ministry of Labour and Social Affairs (MOLSA) – in Erbil, Dohuk, and Sulaymaniyah.⁵⁴ However, because of a shortage of operating budget none of these Centres is able to offer training at this time. Two additional VTE Centres were built two years ago

Enrollment is dropping, from 7,744 in the academic year 2003-2004 to 6,307 in the academic year 2009-2010

Figure 28. Proposed Investments in VTE 2013-2020



in Garmian and Sorun. These last two Centres have not been able to equip their facilities due to budget constraints and could not offer any training.⁵⁵ Due to these operating constraints very few persons are able to obtain training. In 2010, only 300 people were able to get the needed training and only 19 training courses were offered. In 2010, only 2800 unemployed registered for jobs at the employment centres, and only about 14% (400 people) accepted job offers.

Gaps

A limited number of VTE and Employment Centres: Centres are unable to cater to the large number of unemployed.

Outdated teaching methods and training programmes: Programmes do not integrate more modern technological skills demanded by the labour market.

[54] SIDA website – April 22, 2012 – quote from Minister of Labor and Social Affairs (Kurdistan), Asos Najib.

[55] MOLSA interview, May 29, 2012 – Erbil.

Limited recognition by the government of the importance of VTE to effective economic development and poverty eradication, causing reluctance of potential students to enrol in VTE programmes and chose a technical career in private sector (as opposed to an academic career or public employment).

Recommendations

The KR-I has little choice: A cheap labour strategy is not feasible; therefore, it must opt for knowledge-based development by maximizing the creation of human capital through a highly technically-trained population. In this context, the KRG should facilitate, not restrict access by foreign workers as this could invalidate investment projects that could not find needed skills among KR-I residents.

Start afresh by re-thinking the entire approach to VTE and Employment Centres in Kurdistan and re-evaluating the importance of VTE to the Kurdistan Region. Jordan transformed its education sector to fully integrate its VTE Programme; KRG should seriously consider following a similar path (a summary of Jordan's VTE programme is included in the VTE Sector Report).

Accelerate the completion of the Labour Market Survey under the Ministry of Planning – in order to obtain critical data on how many, who, what, where, and what skills are needed and are available in the labour force so that supply can be planned to match employers' requirements.

Begin a PPP-type approach by bringing together successful private sector employers, VTE and Employment Centres (MOLSA), high schools, and institutes/universities (Ministry of Education) to identify specific job skills and positions needed over the next two years. Then compare it to specific supply of labour entering the job market.⁵⁶

Upgrade the skills of trainers and managers of VTE and Employment Centres and have them work closely with the Ministry of Education and Ministry of Higher Education's vocational and technical skills training of high school and institute/college graduates.

Initiate a major communications programme (via television, internet, newspapers, radio, magazines, advertisements) jointly with the education system to help change the concepts/opinions of the Region's people about the value of working in technical fields and for the private sector.

Start afresh by re-thinking the entire approach to Vocational Training and Employment

INVESTMENT ACTIVITY	2013-2020	2018-2020	2013-2020
<i>Vocational and Educational Training</i>	\$M	\$M	\$M
Reassessment of role and potential VTE	2	1	3
Construction of (30) VTE and Employment Centres	140	10	150
TOTAL	142	11	153

[56] Replicate the approach used with SCANIA, in getting cooperation from leading private employers in operating VTE Centers and train them in advanced technical skills (transport, oil, electronics, communications equipment).

SOCIAL HOUSING



Social Housing⁵⁷

Situation at a glance Housing Demand

There is no accurate census or survey data linking income levels to housing needs; therefore, estimates have to be made using available information. The needs for housing consist of replacing inadequate and sub-standard housing and building houses for new households that result from population growth and migration. The 2012 population of KR-I has been estimated at 5,432,000 people or 1,131,700 households, growing at around between 4% a year.* Spread over the next five years, the annual housing requirement to accommodate population growth in KR-I is 30,390 units across all income levels, assuming each household were to occupy a separate house. The KRG Housing Strategy 2012 estimates that approximately 25% of existing households require new or improved housing in order to replace inadequate or overcrowded housing. This equates to 283,000 houses across all income levels. To address this deficit in 10 years, 28,300 new or improved houses are required. Based on the above, annual housing demand is therefore 58,690 (30,390 + 28,300) housing units, most of which can be achieved through the private sector.

There is also the possibility of getting investors in upmarket housing to construct a certain number of modest, affordable houses, since they obtain land for free, and they receive substantial sums from the house buyers. Depending on how much housing can be provided through this mechanism, the investment needed from the government could be reduced by 15%-25%.

KRG LIMITED-INCOME HOUSING NEEDS

	ERBIL	DOHUK	Sulaymaniyah	TOTAL KRG
Total existing housing units	478,600	179,300	473,800	1,131,700
Total existing limited-income housing units	47,860	17,930	47,380	113,170
Existing houses that need to be replaced annually through government support	1,197	448	1,185	2,829
New housing required annually through government support	1,285	481	1,272	3,039
Total annual provision of government supported housing	2,386	1,091	2,393	* 5,869

* At US\$ 30,000 each (US\$ 25,000 cost of house, US\$ 5,000 for infrastructure) that would mean about US\$ 176 million/year.

Gaps

Some 10% of the households have limited incomes and are unable to meet their housing needs adequately without some form of government support—such as subsidized or social housing. The annual demand for government-supported housing for new households and to replace inadequate and sub-standard housing is estimated at 5,869 units. That means a total of 5,869 houses per year in the three Governorates that need government assistance. All of the people assisted with social housing would pay rent. Only the poorest families would receive a grant from KRG equivalent to the rent they pay (and contrary to existing subsidies for water and electricity, these are very well targeted to people who qualify for them). Also, housing standards for social housing are excessively high in terms of area of building lots and living space.

[57] Affordable housing: housing provision reserved for people that cannot afford housing.
Social housing: state-owned housing and provided at an affordable rent to eligible poor families.
All figures in this section are based on the KR Social Housing Strategy 2012.
* Based on KRSO statistics

Land Development: The current process for allocating land for housing transfers a very valuable public asset at very low prices to selected households with public sector jobs. There is a limited supply to the market through this approach. As a result, land prices are high and unaffordable to many. Consequently, increasingly, families informally occupy government land or agricultural land in peri-urban areas through informal transactions. The large number of plots allocated during 2001 and 2011 has left few options for further development within the city boundaries. The current standards and forms of land development are creating a wasteful, car-dependent urban environment.

Housing Finance: The government is virtually the only source of cheap land and of housing finance, with little or no private sector interest or involvement. This leaves most lower-income households with no access to housing finance.

Social and Technical Infrastructure: Lack of predictable funding makes it difficult to plan the provision of social and technical infrastructure. Off-site technical infrastructure is the responsibility of the Municipality and others. Social infrastructure is the responsibility of various departments and Ministries. The coordination of institutions providing technical and social infrastructure is weak, and there is a possibility that new housing developments may remain without the required infrastructure for years.

Recommendations

This Study proposes that spatial standards be reduced from 120 square metres to about 80 square metres for affordable houses, to lower costs and to introduce cost-efficient construction technology. Currently MOHC builds 120 square metre housing apartments for approximately US\$ 40,000 per unit. Yet under Iraqi minimum urban housing standards (if applied in KRG), the minimum house size could be as small as 48 square metres—costing less than US\$ 15,000. Some may find this unacceptable for a standard family unit, but somewhere in between, for example a unit of 80 square metres at US\$ 25,000 plus US\$ 5000 for infrastructure may be acceptable to the people and the KRG. This amount seems reasonable to the Study Team.

Land

A land development programme should be established for each Municipality that reflects its needs over the next five to ten years, including:

- Land area required/year
- Identification and selection of locations

The planned availability of land will enable the development of affordable housing and reduce the likelihood of informal settlements, as well as control land speculation, and thereby the escalation in land prices.

- A land provision and allocation strategy for all households ensuring full cost recovery;
- Revised land standards, plot sizes, and layouts to facilitate pedestrian-friendly development at more efficient densities;
- Land development incentives and speculation reduction, including the development of alternative tenure and titles to reduce costs for land users and discourage land speculators.

Housing Finance: A “Rent-to-Buy” strategy for houses or an option to buy in instalments. The novelty of this approach is that assistance goes to the people in the houses and not to the houses themselves. Everybody pays rent for these government-built houses, poor people pay themselves (and can eventually become owners through this rent-to-buy programme), and very poor people receive support from government to pay the rent.

- Private Sector Involvement in stages in housing finance. Starting with loan repayment and deposit collection – with government support to offset any additional risks and costs.
- An Incremental House Construction financing strategy.
- Micro-finance loans through NGOs: A strategy for extending to KRG short-to medium-term loans for land and house construction interest-free but with administration charges and inflation-adjustment.

Building Materials: A study should be commissioned to identify the constraints and impediments to the local production and assembly of building materials and components. Recommendations should be made for removing or reversing these constraints. All efforts should be made so that production is at least close to being competitive with imports so that local consumers (including poor people who self-build in stages) are not penalized by local costs being higher than imports. In any case, land transport of building materials is relatively costly, and should provide enough protection without direct subsidies or undue other forms of protection.

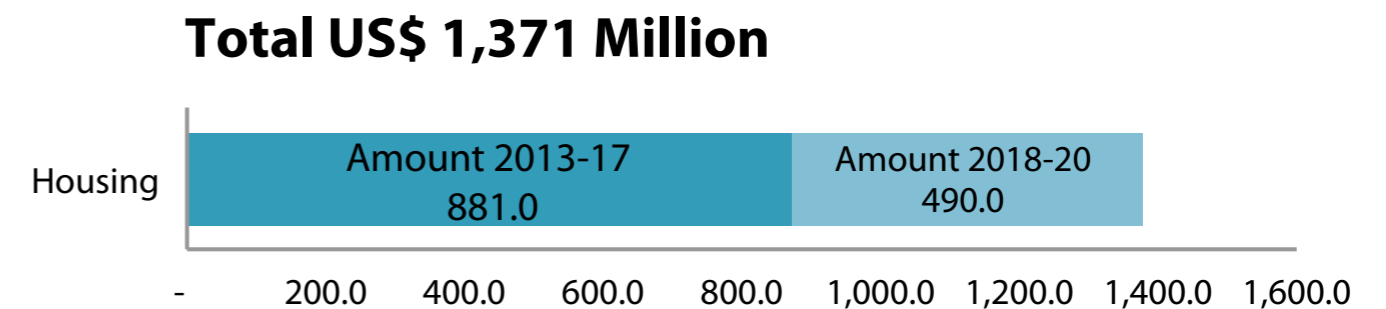
Infrastructure: On-site infrastructure should continue to be the responsibility of the housing developer, while off-site infrastructure provision should be improved through better selection of land for development that takes into account existing infrastructure systems. The land to be developed each year should be discussed with the institutions responsible for infrastructure provision so that it can be coordinated with their respective annual plans and investment budgets.

Environment: In line with current international practices, KRG should update building regulations to improve environmentally-sound housing construction practices and should also encourage the use of environmentally-friendly building materials (particularly insulation and solar water heaters) and components, in order to increase demand for such products (“merit goods”). This should be accompanied by an awareness-raising campaign on environmentally-friendly practices.



INVESTMENT ACTIVITY	HOUSING UNITS	2013-2017	2018-2020	2013-2020
<i>Housing</i>	<i>No.</i>	<i>M\$</i>	<i>M\$</i>	<i>M\$</i>
ERBIL	2386	358	200	558
DOHUK	1091	164	90	254
Sulaymaniyah	2393	359	200	559
TOTAL	5869	881	490	1371

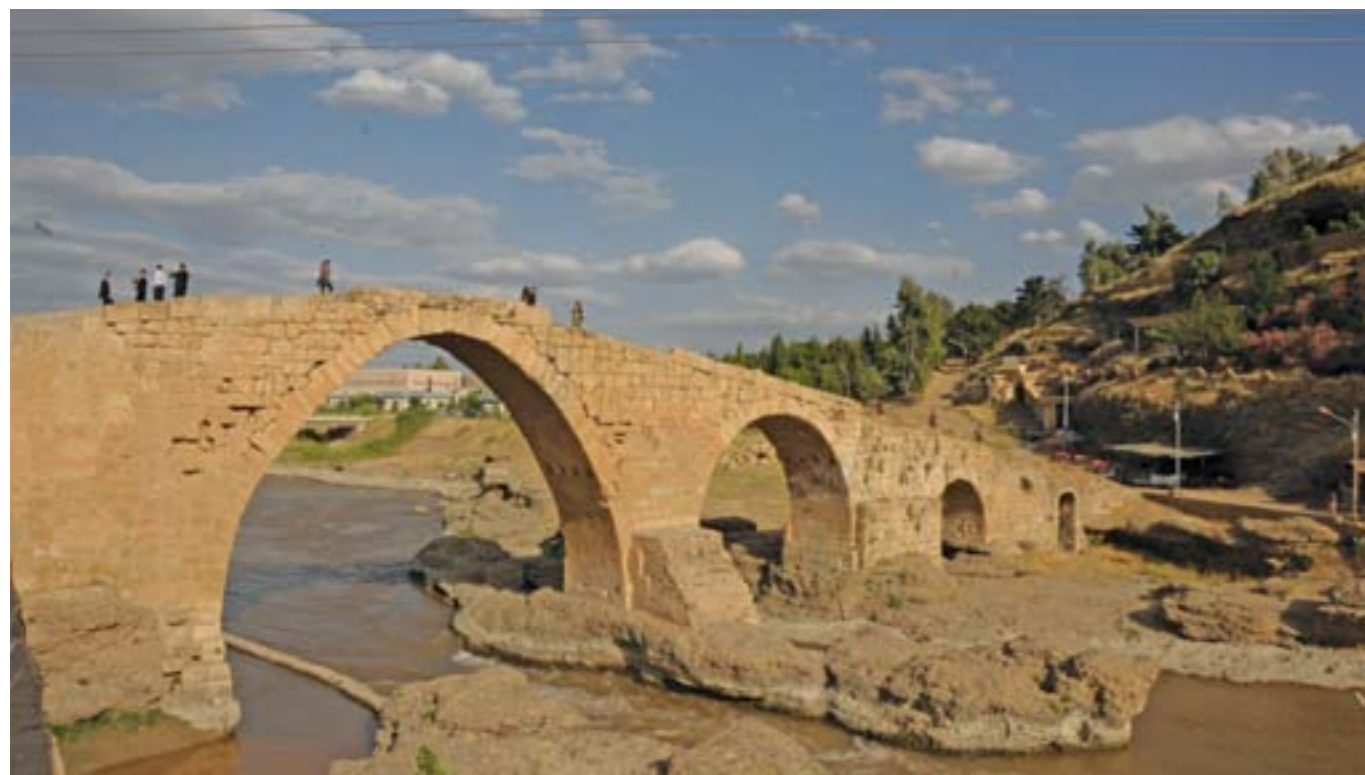
Figure 29. Proposed Investment in Housing 2013-2020



Source: Study Estimates

TOURISM





Tourism

Tourism is still in its infancy in KRG and represents a potential that must be more fully evaluated before strong promotion efforts are made to attract private capital, so as to guide it in the most appropriate and profitable (privately and socially) direction. Certainly, the valorisation of the Region's historical and naturalistic wealth should guide the type and location of investments, but government action, supported by strategic study and planning of sector development, will be required.

Situation at a glance

The Kurdistan Region has a number of important historical and cultural sites as well as mountains and lakes. Travellers to the Region are mainly Iraqis from other governorates as well as businessmen and investors. The region has 370 hotels, 180 motels, 970 restaurants, and 45 tourism villages. The number of newly opening hotels, motels, and restaurants rose 25% in the first half of 2012 in the Region. The Kurdistan Region's Investment Board has announced a 75% rise in tourism in the last six months in comparison to last year from 1.7 million in 2011 to an expected 2.5 million in 2012.

As part of the Ministry of Municipalities and Tourism, the Tourism Board is tasked with overseeing the development of the sector.

Gaps

Although there is a Tourism Development Plan, it is still very basic with little strategic direction to unleash the tourism potential of the region. This is despite the fact that Kurdistan Region was identified as one of the top 20 tourism destinations in 2011 by the National Geographic Magazine. The focus of the plan is tourist villages, while most international travellers, at present, are business tourists that need little beyond hotels, taxis, and fast food.

While tourism already employs a large number of people and creates income through linkages with other sectors (agriculture, transport, entertainment, food and drink), there is a serious lack of trained workers.

In 2012 tourist arrivals was estimated at 2.5 million



There are practically no tourism programmes available at secondary and post-secondary levels. One secondary-level tourism programme exists in Dohuk, and a post-secondary, institute-level programme exists in Erbil. Graduates are few and poorly trained.

The Tourism Board lacks specialized and experienced staff and is overstaffed (1,700-1,900 people) as it also has other duties not really appropriate for a tourism board as conventionally understood.

INVESTMENT ACTIVITY	2013-2017	2018-2020	2013-2020
<i>Tourism</i>	\$M	\$M	\$M
Strategic Study of Tourism	1	0	1
Support to Tourism Board with specialist expertise	7	3	10
Mktg Tourism Study of Iraq, Gulf, and Middle East	1	0	1
Tourism Sites: facilities and information (Visitor Centres, Amenities)	25	10	35
TOTAL	34	13	47

The sector needs investment in infrastructure mainly to ease access, and some investments on making the sites more welcoming to visitors

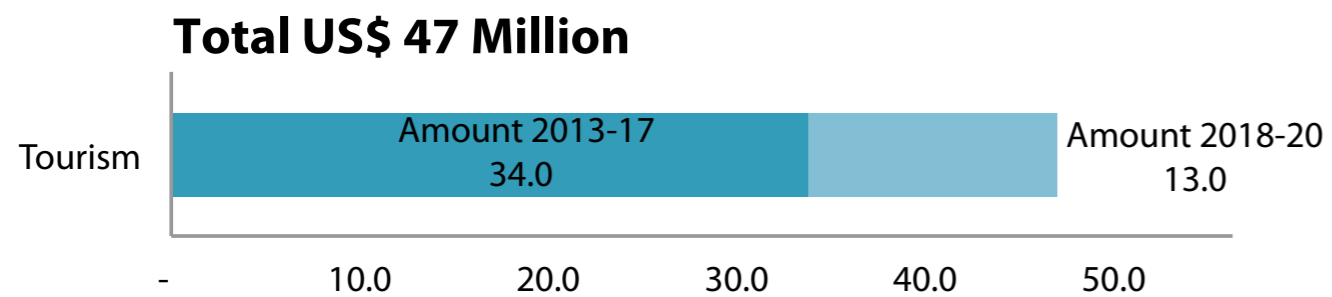
Recommendations

The Kurdistan Regional Government needs to define a clear vision and supporting strategies and policies for the development of tourism and especially eco-tourism where the Region has a natural advantage. Tourism is a sector that relatively easily attracts private sector investments. The role of the state should be that of a facilitator and promoter, extending infrastructure support, which is already being done through Board of Investment licensing process. On the other hand, no incentives beyond those offered by the Investment Law should be necessary except for support given through government marketing abroad, general publicity/promotion of tourism in KR-I, or training of staff in state schools and colleges.

It is further recommended:

- To restructure the Tourism Board and assign it the appropriate tasks, namely to conduct a strategic review of tourism and oversee its implementation. Its other tasks could be assigned to other more appropriate organizations (e.g. Department of Antiquities) together with the staff currently carrying out these duties.
- To review tourism training offered in the Regional education system and expand it as needed, in quantity and quality, jointly with the appropriate Ministries.
- To implement a few urgent investment measures to safeguard sites of interest and make them more welcoming to visitors (access, demarcation/fencing/walling, information kiosks, visitor centres for rest/refreshment, etc.). This again to be carried out by another, more appropriate organization than the Tourism Board.
- To seek private sector participation in devising and implementing the Regional Tourism Strategy.
- To seek expertise in developing a communication and PR strategy to promote tourism.

Figure 30. Proposed Investment in Tourism 2013-2020



References

Between 28 May and 17 June 2012, in addition to the desk reviews of the various sector-related papers, the team of specialists conducted visits and consultations with the various related entities listed below. More than one visit was conducted to the related ministries' department by each specialist as well as by the different specialists for related chapters of this paper.

KRG line ministries

MOP	HE the Minister	MOHE	Director General of relations	
	Director General of Development Cooperation and Coordination	MOEd	HE the Minister	
	Director General Planning of Strategic Projects		Director General of Planning	
	Director General Human Resources Development	MOH	Minister Health Advisor	
	Director General Strategic Planning		Director General of Planning	
	Director General Kurdistan Regional Statistics Office		Director General Health Affairs	
	Chief of Staff			
	Director General of Planning			
MOA&W	Director General of Planning		Assistant Director General of Admin and Finance	
	Director General of Irrigation and Water Resources	MOIT	Advisor to the Minister	
	Director of Dams		Economic Relations Advisor	
	Director of Groundwater		Director General of Planning	
	Director of Large Dams		Director General of Development Industry	
	Director General of Finance	MOLSA	Director General of Labour and Social Insurance	
	Head of Research & Extension		Deputy Director General of Labour and Social Insurance	
Head of Small Dams department	Director of Statistics Unit			
MOE	HE the Minister		Director of Planning	
	Minister Advisor	MOMT	Director General of Water and Sewerage	
	Director General of Generation		Deputy Director General of Water and Sewerage	
	Director General of Transmission		Director General of Finance	
	Director General of Distribution		Director General of Erbil sewage	
	Director General of Sales and Digital Meter		Director General of Planning	
	Director General Planning		Head of NGO department	
	Director General of Dispatch and Transformer		Chief Engineer - NGO Department	
	Director General of Admin and Finance		Director General of Urban Planning	
	Technical Manager- Generation		Director of Erbil Urban Planning	
Planning Manager- Generation	Director General of Tourism			
MOF	Director General of Banking		Deputy Director General of Tourism	
	Director General of Investment Bank		Post and Telecom	
	Director General of Rasheed Bank		Director of GIS	
MOH&C	HE the Minister		Director General of Land Transport and Railways	
	Deputy Minister		(Mateen Express (Freight forwarder	
	Senior Advisor – Head of KRG Housing Committee		(Starlight Airlines (Freight Forwarder	
	Director General of Urban Planning		Architect Eng. - GD of Urban Planning	
	DG of Planning and Technique	MOTC	DG Planning	
	DG of Strategic planning		Land Transport and Railways	
	Consultant Engineer- Representative of Sulaymaniyah Governorate		Bol	DG Research and Studies
	Engineer- Representative of Erbil Governorate		MOI	Director General of Traffic Police
	Architect Engineer- Representative of Dohuk Governorate			Director of Directorate of Traffic Police
	Assistant DG of Admin and Finance			
	Consultant Engineer - Highway Master-plan			
	Director of Roads Repair			

Other KRG Governmental entities

Erbil	Governor of Erbil
	Deputy Governor
	Director of Planning
	Municipal Council
	All General Directorates related to the above Ministries
Sulaymaniyah	Governor of Sulaymaniyah
	Sulaymaniyah Municipality
	All General Directorates and Directorates related to the above Ministries in Sulaymaniyah
Dohuk	Deputy Governor of Dohuk
	Real Estate Bank
	Principal of Dohuk Industrial School
	Head of Teaching Hospital
	Primary Healthcare Center
	All General Directorates and Directorates related to the above Ministries in Dohuk
Board of Investment	Director General Research and Studies - Erbil
	Director General of Legal and Admin Affairs - Erbil
Board of Environment	Head of Environment Board - Erbil
Chambers of Commerce	The Federation of Chambers of Commerce of Kurdistan
	Chambers of Commerce of Erbil
	Chambers of Commerce of Sulaymaniyah
	Chambers of Commerce of Dohuk

Academia and other Institutes

- Dean of Administration and Economic College - Erbil
- Dean of University of Sulaymaniyah- Soil & Water Department, Faculty of Agriculture
- Dean of College of Commerce - Sulaymaniyah
- Dean of Technical Institute - Sulaymaniyah
- Dear of Industrial School - Dohuk

Other entities

- Related UN agencies including UNICEF, FAO, UNESCO
- Director of Green Association - Sulaymaniyah
- Director of Civil Society Initiative Sulaymaniyah
- Head of Kurdistan International Bank (KIB) - Erbil

Field visits

- Dokan Lake Dam
- Erbil Steel Factory - Erbil
- Technical Hospital - Erbil
- Sarsank irrigation scheme - Dohuk
- Dohuk Dam - Dohuk
- Mosul Dam - Dohuk

List of international experts

#	NAME	TITLE
1	Rami Samain	SEINA Project Manager - UNDP Coordinator for KRG
2	Mazin Talat	UN-Habitat Coordinator for KRG
3	Michel Del Buono	Team Leader / Senior Economist
4	Bahram Mahmoudi	Health & Education Specialist
5	Daniel Coyaud	Water & Sanitation Consultant
6	Denes Bulkai	Industrial & Environmental Specialist
7	Usaid El-Hanbali	Irrigation & Agriculture Consultant
8	Tom Tsui	Training & Capacity Building Specialist
9	Inés Mencias	Energy Economist
10	Sudhendu (Shibu) Dhar	Electric Power Specialist
11	Martin Kerridge	Transport Infrastructure Specialist
12	Dyfed Aubrey	Land, Housing, & Urban Development Specialist
13	Abeer Ahmad Al Saheb	Urban Development Consultant

TABLE 1. INVESTMENT IN SANITATION

INVESTMENT IN SANITATION								
(US\$ Million 2012)								
Activity	2013	2014	2015	2016	2017	Cost '13-'17	Cost '18-'20	Grand Total
Erbil								
Erbil Sewerage 1st phase	15.0	30.0	40.0	40.0	50.0	175.0	-	175.0
Erbil WWTP 1st phase	15.0	20.0	20.0	20.0	-	75.0	-	75.0
Erbil Sewerage and WWTP 2nd phase							147.0	147.0
Erbil on-site small WWTPs in middle and northern part of the city	-	1.0	1.0	1.0	1.0	4.0	-	4.0
Sub-total	30.0	51.0	61.0	61.0	51.0	254.0	147.0	401.0
Dohuk								
Dohuk City WWTP	-	-	10.0	20.0	10.0	40.0	-	40.0
Detailed Design Dohuk City Sewerage	12.0	-	-	-	-	12.0	-	12.0
Khanke area Sewerage							29.2	12.0
Faida area Sewerage							13.3	13.3
Construction Dohuk City Sewerage	-	25.0	25.0	35.0	40.0	125.0	-	125.0
Sub-total	12.0	25.0	35.0	55.0	50.0	177.0	42.5	219.5
Sulaymaniyah								
Sulaymaniyah City WWTP	-	20.0	20.0	20.0	20.0	80.0	-	80.0
Design to link outlets to WWTP	1.4	-	-	-	-	1.4	-	1.4
Construction of links from outlets to WWTP	-	10.0	10.0	10.0	10.0	40.0	-	40.0
Sub-total	1.4	30.0	30.0	30.0	30.0	121.4	-	121.4
Ranya								
Ranya WWTP	-	-	-	4.0	4.0	8.0	-	8.0
Design to link outlets to Ranya WWTP	0.4	-	-	-	-	0.4	-	0.4
Construction of links from outlets to Ranya WWTP	-	5.0	5.0	-	-	10.0	-	10.0
Sub-total	0.4	5.0	5.0	4.0	4.0	18.4	-	18.4
Dokan								
Dokan WWTP	-	-	-	1.0	1.0	2.0	-	2.0
Design to link outlets to WWTP	0.3	-	-	-	-	0.3	-	0.3
Construction of links from outlets to WWTP	-	10.0	10.0	10.0	-	30.0	-	30.0
Sub-total	0.3	10.0	10.0	11.0	1.0	32.3	-	32.3
Chwarqurna								
Chwarqurna WWTP	-	-	2.0	2.0	2.0	6.0	-	6.0

INVESTMENT IN SANITATION								
(US\$ Million 2012)								
Activity	2013	2014	2015	2016	2017	Cost '13-'17	Cost '18-'20	Grand Total
Design to link outlets to WWTP	0.3	-	-	-	-	0.3	-	0.3
Construction of links from outlets to WWTP	-	2.0	3.0	3.0	-	8.0	-	8.0
Sub-total	0.3	2.0	5.0	5.0	2.0	14.3	-	14.3
Hajiawa								
Hajiawa WWTP	-	-	-	3.0	4.0	7.0	-	7.0
Design to link outlets to WWTP	0.4	-	-	-	-	0.4	-	0.4
Construction of links from outlets to WWTP	-	3.0	3.0	4.0	-	10.0	-	10.0
Sub-total	0.4	3.0	3.0	7.0	4.0	17.4	-	17.4
Psdar								
Psdar WWTP	-	-	-	4.0	4.0	8.0	-	8.0
Design to link outlets to WWTP	0.3	-	-	-	-	0.3	-	0.3
Construction of links from outlets to WWTP	-	3.0	3.0	3.0	-	9.0	-	9.0
Sub-total	0.3	3.0	3.0	7.0	4.0	17.3	-	17.3
Halabja								
Halabja WWTP	-	-	-	4.0	3.0	7.0	-	7.0
Design to link outlets to WWTP	0.3	-	-	-	-	0.3	-	0.3
Construction of links from outlets to WWTP	-	3.0	3.0	3.0	-	9.0	-	9.0
Sub-total	0.3	3.0	3.0	7.0	3.0	16.3	-	16.3
SaidSadiq								
SaidSadiq WWTP	-	-	-	4.0	3.0	7.0	-	7.0
Design to link outlets to WWTP	0.2	-	-	-	-	0.2	-	0.2
Construction of links from outlets to WWTP	-	3.0	3.0	3.0	-	9.0	-	9.0
Sub-total	0.2	3.0	3.0	7.0	3.0	16.2	-	16.2
Total WWTPs around Lake Dokan and Darbandikhan	2.2	29.0	32.0	48.0	21.0	132.2	-	132.2
Total Sulaymaniyah Governorate	3.6	59.0	62.0	78.0	51.0	253.6	-	253.6
Total 3 Governorates	45.6	135.0	158.0	194.0	152.0	684.6	189.5	874.1

TABLE 2. INVESTMENT IN ENVIRONMENTAL MANAGEMENT AND SOLID WASTE TREATMENT DISPOSAL

INVESTMENT IN ENVIRONMENTAL MANAGEMENT & SOLID WASTE TREATMENT DISPOSAL									
(US\$ Million 2012)									
Responsibility Of	Action	2013	2014	2015	2016	2017	Cost '13-'17	Cost '18-'20	Grand Total
Environmental Management									
Environmental Board	Environmental board offices and laboratories	5.6	5.0	-	-	-	10.6	-	10.6
Environmental Board, and Municipalities	Capacity building through projects for Environmental Board (nature conservation, energy conservation, 10 EIA for public sector, and introduction of environmental (awareness in schools	10.0	20.0	20.0	-	-	50.0	10.0	60.0
	Development of Early Warning System and Watershed Management at Lake Darbandikhan	-	2.0	1.4	-	-	3.4	-	3.4
Environmental Board and International consultants	Studies and capacity building (regional & institutional capacity building, biodiversity conservation & ecological footprint, and climate change (impacts & training	1.5	1.5	-	-	-	3.0	3.0	6.0
Sub-Total Environmental Management		17.1	28.5	21.4	-	-	67.0	13.0	80.0
Solid Waste Treatment and Disposal									
Dohuk Municipality	Completion of landfill for 500,000 ft	12.0	-	-	-	-	12.0	-	12.0
Erbil Municipality	Recycling plant and landfill 1,500 t/d	60.0	60.0	-	-	-	120.0	-	120.0
Environmental Board & Ministry of Health	Hospital waste (incinerators (10X10 t/d	2.0	3.0	-	-	-	5.0	-	5.0
Sulaymaniyah Municipality	Recycling plant and landfill 800 t/d	5.0	25.0	40.0	-	-	70.0	-	70.0
Municipalities	Hazardous waste storage facilities	-	11.5	11.0	11.0	11.5	45.0	-	45.0
Dohuk, Erbil, Sulaymaniyah Municipalities	Future recycling plants and landfills	-	25.0	25.0	25.0	25.0	100.0	90.0	190.0
Sub-Total Solid Waste Treatment Disposal		79.0	124.5	76.0	36.0	36.5	352.0	90.0	442.0
Total		96.1	153.0	97.4	36.0	36.5	419.0	103.0	522.0

TABLE 3. INVESTMENT IN WATER SUPPLY

INVESTMENT IN WATER SUPPLY									
(US\$ Million 2012)									
Erbil Governorate: Investment Programme									
District	2013	2014	2015	2016	2017	Cost '13-'17	Cost '18-'20	Grand Total	
Choman	0.6	1.3	3.5	3.8	4.1	13.2	18.3	31.5	
Dashti Hawler	2.3	4.6	12.6	13.8	14.9	48.2	66.7	114.8	
Erbil	8.1	16.2	44.6	48.7	52.8	170.4	235.4	405.8	
Khabat	1.5	2.9	8.0	8.7	9.5	30.5	42.1	72.7	
Koysinjaq	1.6	3.3	9.0	9.8	10.6	34.4	47.5	81.8	
Makhmur	1.8	3.5	9.7	10.6	11.5	37.2	51.3	88.5	
Mergasur	1.5	3.0	8.2	9.0	9.7	31.4	43.5	74.8	
Rawanduz	0.7	1.3	3.6	3.9	4.3	13.9	19.1	32.9	
Shaklawa	1.8	3.5	9.7	10.6	11.5	37.0	51.1	88.1	
Soran	3.2	6.5	17.8	19.5	21.1	68.1	94.0	162.2	
Sub-total		23.1	46.1	126.8	138.4	149.9	484.4	669.0	1,153.1
Dohuk Governorate: Investment Programme									
Amedi	2.3	4.6	12.5	13.7	14.8	47.8	66.1	113.9	
Duhok	5.2	10.5	28.8	31.5	34.1	110.1	152.0	262.1	
Semel	2.4	4.7	13.0	14.1	15.3	49.5	68.3	117.8	
Zakho	4.0	8.0	22.0	24.0	26.0	84.1	116.1	200.2	
Sub-total		13.9	27.8	76.3	83.3	90.2	291.5	402.5	694.0
Sulaymaniyah Governorate: Investment Programme									
Sub-total		24.0	48.1	132.3	144.3	156.3	505.0	697.4	1,202.4
Sub-total		24.0	48.1	132.3	144.3	156.3	505.0	697.4	1,202.4
Institutional and Human Resources Development									
Sub-total		2.0	4.0	5.0	5.0	6.0	22.0	-	22.0
Sub-total		2.0	4.0	5.0	5.0	6.0	22.0	-	22.0
Total		63.1	126.0	340.5	370.9	402.4	1,302.9	1,768.9	3,071.5

TABLE 4. INVESTMENT IN REGIONAL AND URBAN DEVELOPMENT PLANNING

INVESTMENT IN REGIONAL AND URBAN DEVELOPMENT PLANNING									
(US\$ Million 2012)									
Planning and Programming Studies									
Responsibility Of	Activity	2013	2014	2015	2016	2017	Cost '13-'17	Cost '18-'20	Grand Total
MoP	A restructuring plan of rural settlements that consolidates rural growth into a less dispersed pattern	2.0	2.0	-	-	-	4.0	-	4.0
MoP	Development corridors and development hubs in the region	1.5	1.5	-	-	-	3.0	-	3.0
MoP & MoMT	Restructuring of the municipal system	0.4	0.4	-	-	-	0.8	-	0.8
Sub-total		3.9	3.9	-	-	-	7.8	-	7.8
(City Planning - ERBIL CITY (Planning & Programming)									
MOMT & Investment Board	Assessment of completed an ongoing projects	0.5	-	0.5	-	-	1.0	-	1.0
MoMT, Erbil Governorate	Erbil master plan phasing, review, and revision	1.0	-	-	-	-	1.0	-	1.0
MoMT Studies & Design Directorate	Improving the urban and pedestrian (environment (Priority Projects	8.0	8.0	9.0	5.0	5.0	35.0	15.0	50.0
Erbil Governorate, Municipality, MoE	Informal areas upgrading	4.0	4.0	4.0	4.0	4.0	20.0	10.0	30.0
Sub-total		13.5	12.0	13.5	9.0	9.0	57.0	25.0	82.0
(City Planning - DOHUK CITY (Planning & Programming)									
MoMT	Master Planning) Revision of Dohuk) Master Plan, The Master Plan should be complemented with an implementation program that specifies actions, timeframes, responsibilities and coordination mechanisms	0.2	-	-	-	-	0.2	-	0.2
MoE directorate; Municipality	Priority projects) Infrastructure) assessment of existing built up areas	0.5	-	-	-	-	0.5	-	0.5
Municipality	Priority projects) Informal Areas) Upgrading: The informal area of Gejabara should be addressed. A first phase can be focusing at preparing a master plan for the site and land formalization	3.0	3.0	2.0	2.0	2.0	12.0	6.0	18.0
MoMT urban planning & Design and Studies	Priority projects) City Center) Rehabilitation: Re-planning the center to create a central public space that is more integrated with the surrounding natural landscape Upgrading circulation networks	5.0	5.0	5.0	-	-	15.0	-	15.0
Sub-total		8.7	8.0	7.0	2.0	2.0	27.7	6.0	33.7

INVESTMENT IN REGIONAL AND URBAN DEVELOPMENT PLANNING									
(US\$ Million 2012)									
Planning and Programming Studies									
Responsibility Of	Activity	2013	2014	2015	2016	2017	Cost '13-'17	Cost '18-'20	Grand Total
(City Planning – Sulaymaniyah CITY (Planning & Programming)									
MoMT	Detailed Urban Planning in relation to city expansion, detailed studies and urban planning of the CBD and Industrial Zone, and improvement of the historic city centre	1.0	1.0	-	-	-	2.0	-	2.0
Municipality/ Private Sector	Priority Projects) Historic Centre,) Construction of multi-story car parks strategically located and connected with electronic information system, accompanied by on-road parking restrictions and widening of pavements and planting shading trees	12.0	12.0	12.0	12.0	12.0	60.0	-	60.0
Ministry of Antiquities	Priority Projects) Improved monitoring) of the implementation of conservation orders on historic buildings	0.1	0.1	0.1	0.1	0.1	0.5	0.5	1.0
Municipality Roads directorate and gardens directorate	Priority Projects) Neighbourhoods) between the historic centre and the 60m ring road, Assessment and repair of sidewalks and planting of shading trees	2.0	2.0	2.0	2.0	2.0	10.0	5.0	15.0
Municipality gardens directorate	Priority Projects) Assessment of open) areas to ascertain which are designated for public use	2.0	2.0	2.0	2.0	2.0	10.0	-	10.0
Municipality and Governorate department	Priority Projects) Assessment of) technical and social infrastructure needs (roads, water supply, sewerage, (electricity, Schools, health facilities	1.0	-	-	-	-	1.0	-	1.0
Municipality gardens directorate	Priority Projects) Establishment of green) corridors between main public parks through tree-lining main connecting streets	4.0	3.0	3.0	3.0	3.0	16.0	5.0	21.0
Municipality	Priority Projects) Assessment of social) infrastructure needs (schools, health centres) in line with projected density	-	-	-	-	0.5	0.5	-	0.5
Municipality	Identification and quantification of open spaces allocated for public use in residential areas	-	-	-	-	0.2	0.2	-	0.2
Municipality Gardens Directorate	Investment in greening at least five public open spaces, prioritizing completed neighborhoods and ensuring even distribution	-	2.5	2.5	-	-	5.0	-	5.0
Municipality and Governorate	Priority Projects)Neighborhoods) beyond the 60m ring road, Assessment of technical infrastructure needs (roads, water supply, sewerage, electricity, (schools, health facilities	-	-	-	1.0	0.5	1.5	-	1.5
Sub-total		22.1	22.6	21.6	20.1	20.3	106.7	10.5	117.2
Total		48.2	46.5	42.1	31.1	31.3	199.2	41.5	240.7

TABLE 5. INVESTMENT IN TRANSPORT AND TRANSPORT INFRASTRUCTURE

TRANSPORT AND TRANSPORT INFRASTRUCTURE									
(US\$ Million 2012)									
Project	Remarks	2013	2014	2015	2016	2017	Cost '13-'17	Cost '18-'20	Grand Total
International and Inter-Regional Transport									
Air Cargo Terminals at Erbil and Sulaymaniyah	To be fully-equipped and able to store chilled/refrigerated products	1.0	1.0	20.0	15.0	-	37.0	-	37.0
Electronic Data (Interchange (EDI	To link customs, transport systems, freight forwarders and customers. Training needed	1.0	1.0	12.0	10.0	10.0	34.0	-	34.0
Dohuk Airport	Under design. Possible for substantial PPP component	3.0	3.0	3.0	50.0	50.0	109.0	100.0	209.0
Railway, Erbil Mosul	To be part of future Tabriz Mosul link. Develop in conjunction with Baghdad	1.0	2.0	3.0	1.0	2.0	9.0	1,000.0	1,009.0
Sub-total		6.0	7.0	38.0	76.0	62.0	189.0	1,100.0	1,289.0
Inter-Urban Transport Within the Region									
Ongoing Highway Projects	According to latest estimate of remaining expenditure received from MoCH	150.0	150.0	150.0	150.0	-	600.0	-	600.0
Inter-City Bus Services	For design of terminal improvements and route concessions; also the buses	1.0	15.0	12.0	1.0	1.0	30.0	3.0	33.0
Salahuddin Tunnel and Approach Road	Information from MoCH	1.0	1.0	20.0	25.0	20.0	67.0	-	67.0
Other Road and Highway Projects	Allowance for other new construction and improvement projects	-	-	-	-	100.0	100.0	300.0	400.0
Road Maintenance	Road maintenance	15.0	15.0	15.0	15.0	15.0	75.0	45.0	120.0
Sub-total		167.0	181.0	197.0	191.0	136.0	872.0	348.0	1,220.0
Intra-City Urban Transport									
City Transport Bodies and Traffic Management	Office space, additional salaries and expenses, consultancy support, plans, UTC	8.0	8.0	25.0	10.0	6.0	57.0	15.0	72.0
Bus Depots, Fleets, Shelters, Facilities	Assumes 3 depots of 80-bus capacity (one in each city) and 220 buses; 2nd depots later	1.0	50.0	22.0	22.0	-	95.0	50.0	145.0
Erbil Tramway	Assumes construction line by line in each city. Perhaps PPP needed (construction costs shared)	1.0	1.0	50.0	400.0	200.0	652.0	500.0	1,152.0
Sulaymaniyah Tramway		1.0	1.0	50.0	200.0	100.0	352.0	300.0	652.0
Dohuk Tramway		1.0	1.0	50.0	200.0	100.0	352.0	300.0	652.0
Sub-total		12.0	61.0	197.0	832.0	406.0	1,508.0	1,165.0	2,673.0
Total		185.0	249.0	432.0	1,099.0	604.0	2,569.0	2,613.0	5,182.0
	of which private investment		65	204.00	898.0	461.0	1,628.0	1,150.0	2,778.0

TABLE 6. INVESTMENTS IN AGRICULTURE

(PRIORITY INVESTMENTS IN AGRICULTURE – YEARLY INVESTMENT (US\$ MILLION)									
(US\$ Million 2012)									
Activity	2013	2014	2015	2016	2017	Cost '13-'17	Cost '18-'20	Grand Total	
Policies/Laws Studies	Preparation of Policy Note Agriculture Sector	1.0	-	-	-	-	1.0	-	1.0
	Preparation of laws and regulations	0.8	-	-	-	-	0.8	-	0.8
	Carry out agriculture competitiveness study	1.3	-	-	-	-	1.3	-	1.3
	Carry other studies	0.5	0.5	0.5	0.5	-	2.0	2.0	2.0
	Capacity building programme Training, Scientific Study tours, TA	5.0	5.0	5.0	5.0	5.0	25.0	5.0	30.0
Sub-total	8.5	5.5	5.5	5.5	5.0	30.0	7.0	37.0	
Implementation	Continue construction of Silos	10.0	10.0	10.0	10.0	10.0	50.0	10.0	60.0
	Construction of selected cold stores	10.0	10.0	10.0	10.0	10.0	50.0	20.0	50.0
	Support for crop production	100.0	75.0	50.0	25.0	25.0	275.0	25.0	300.0
	Support for livestock production	30.0	30.0	10.0	10.0	10.0	90.0	10.0	100.0
	Support for Poultry production	10.0	10.0	10.0	10.0	10.0	50.0	-	50.0
	Support for crop transport	4.0	4.0	4.0	4.0	4.0	20.0	-	20.0
	Support for introducing new agriculture techniques and practices	5.0	10.0	5.0	5.0	5.0	30.0	15.0	30.0
	Support for introducing new on-farm irrigation techniques	20.0	10.0	10.0	5.0	5.0	50.0	15.0	50.0
	Facilitate marketing of agriculture products	5.0	5.0	5.0	-	-	15.0	-	15.0
	Other support (including Rural roads)	20.0	20.0	20.0	20.0	20.0	100.0	15.0	115.0
	Strengthening Research and Extension	10.0	10.0	10.0	10.0	5.0	45.0	5.0	50.0
	Range Management	10.0	10.0	10.0	10.0	5.0	45.0	5.0	50.0
	Forestry	4.0	4.0	4.0	4.0	4.0	20.0	-	20.0
Establishment of 5 National Parks	2.0	2.0	2.0	2.0	2.0	10.0	-	10.0	
Drought Mitigation	40.0	40.0	40.0	40.0	15.0	175.0	15.0	190.0	
Sub-total	280.0	250.0	200.0	165.0	130.0	1,025.0	135.0	1,160.0	
Total	288.5	255.5	205.5	170.5	135.0	1,055.0	142.0	1,197.0	

TABLE 7. INVESTMENTS IN WATER RESOURCES MANAGEMENT & IRRIGATION

PRIORITY INVESTMENTS IN WATER RESOURCES MANAGEMENT & IRRIGATION - YEARLY INVESTMENT										
	Activity	Priority	2013	2014	2015	2016	2017	Cost '13-'17	Cost '18-'20	Grand Total
Laws	Preparation of Policy Note for Water Resources Development	1	1.0	-	-	-	-	1.0	-	1.0
	Strategic Planning for Water Resources	1	1.0	0.5	0.5	-	-	2.0	-	2.0
Strategies	Strategic Planning for Dams & Feasibility Studies	1	2.0	2.0	-	-	-	4.0	-	4.0
	Preparation of laws and regulations	1	1.0	-	-	-	-	1.0	-	1.0
Policies	Sub-total		5.0	2.5	0.5	-	-	8.0	-	8.0
Assessments and Studies	Hydrogeological assessment and groundwater assessment and modeling	1	3.0	-	-	-	-	3.0	-	3.0
	Water resources assessment	1	1.0	1.0	-	-	-	2.0	-	2.0
	Prepare feasibility studies for all intervention to ensure technical soundness	1	1.0	3.0	5.0	4.0	2.0	15.0	-	15.0
	Sub-total		5.0	4.0	5.0	4.0	2.0	20.0	-	20.0
Implementation	Rehabilitation and modernization of large scale existing irrigation schemes	1	5.0	10.0	15.0	10.0	10.0	50.0	10.0	60.0
	Expansion of irrigated area	1	25.0	50.0	75.0	100.0	50.0	300.0	200.0	500.0
	Support for rehabilitation and modernization of small scale irrigation schemes	1	10.0	20.0	20.0	20.0	20.0	90.0	10.0	100.0
	Construction of small dams programme	1	10.0	10.0	10.0	10.0	10.0	50.0	10.0	60.0
	Construction of large dams	1	50.0	150.0	250.0	250.0	250.0	950.0	850.0	1,800.0
	Dam Safety	1	10.0	20.0	20.0	20.0	20.0	90.0	10.0	100.0
	Promote the use of modern irrigation systems	1	10.0	20.0	20.0	20.0	20.0	90.0	10.0	100.0
	Establishment of water users associations (WUA)	1	-	10.0	10.0	10.0	10.0	40.0	10.0	50.0
	Procurement of equipment	1	5.0	10.0	10.0	10.0	10.0	45.0	5.0	50.0
	Capacity building programme training, scientific study tours, TA	1	10.0	10.0	10.0	10.0	10.0	50.0	10.0	60.0

PRIORITY INVESTMENTS IN WATER RESOURCES MANAGEMENT & IRRIGATION - YEARLY INVESTMENT										
	Activity	Priority	2013	2014	2015	2016	2017	Cost '13-'17	Cost '18-'20	Grand Total
Sub-total Implementation Priority 1			135.0	310.0	440.0	460.0	410.0	1,755.0	1,125.0	2,880.0
Impl.	Expansion of irrigated area	2	25.0	50.0	75.0	100.0	50.0	300.0	200.0	500.0
	Construction of large dams	2	100.0	200.0	250.0	250.0	500.0	1,300.0	2,000.0	3,300.0
Sub-total Implementation Priority 2			125.0	250.0	325.0	350.0	550.0	1,600.0	2,200.0	3,800.0
Sub-total Priority 1			145.0	316.5	445.5	464.0	412.0	1,783.0	1,125.0	2,908.0
Sub-total Priority 2			125.0	250.0	325.0	350.0	550.0	1,600.0	2,200.0	3,800.0
Total			270.0	566.5	770.5	814.0	962.0	3,383.0	3,325.0	6,708.0

TABLE 8. INVESTMENT IN INDUSTRY AND RELATED INFRASTRUCTURE

INVESTMENT IN INDUSTRY RELATED INFRASTRUCTURE									
(US\$ Million 2012)									
Responsibility	Activity	2013	2014	2015	2016	2017	Cost '13-'17	Cost '18-'20	Grand Total
Ministries of Trade & Industry & Mineral Resources & Planning	Development of a Strategy for Geological Prospecting and Exploration	0.5	-	-	-	-	0.5	-	0.5
Ministries of Trade & Industry & Mineral Resources & Planning	Implementation of the Geological Prospecting and Exploration Strategy	2.0	2.0	2.0	2.0	2.0	10.0	-	10.0
Ministry of Trade & Industry	Development of Cross Border Cooperation Programme	0.2	-	-	-	-	0.2	-	0.2
Ministry of Trade & Industry	Implementation of the Cross Border Cooperation Programme	3.0	3.0	3.0	3.0	3.0	15.0	-	15.0
Ministries of Trade & Industry & Justice & Board of Investment	Adopt appropriate industrial and quality certification standards	0.5	0.5	0.5	-	-	1.5	-	1.5
Natural Resources	Geological Surveys & Laboratories	5.8	-	-	-	-	5.8	0.0	5.8
Natural Resources	Offices + Consultancy Services	0.5	-	-	-	-	0.5	0.0	0.5
Natural Resources	(Other (offices, consultancy	5.0	5.0	5.0	5.0	5.0	25.0	-	25.0
Sub-total	Institutional Development	17.4	10.5	10.5	10.0	10.0	58.4	-	58.4
Infrastructure Support for Industry									
Board of Investment	Power Supply to Licensed Projects	9.3	9.3	9.3	-	-	27.9	10.0	37.9
Board of Investment	Roads to Licensed Projects	6.5	6.5	6.5	6.5	6.5	32.5	10.0	42.5
Board of Investment	Water to Licensed Projects	2.1	2.1	2.1	-	-	6.3	3.0	9.3
Board of Investment	Sewers to Licensed Projects	2.7	2.7	2.7	2.7	2.7	13.5	5.0	18.5
Board of Investment	Office Buildings & Consultation	2.0	2.0	2.0	-	-	6.0	-	6.0
	Strategic Fuel Storage Tanks ((~270,000 m3	9.0	9.0	9.0	-	-	27.0	-	27.0
	Strategic Grain Storage Silos ((~200,000 t	30.7	30.7	30.7	-	-	92.1	-	92.1
	Industrial Parks	28.8	28.8	28.8	28.8	28.8	144.0	-	144.0
Sub-total		91.1	91.1	91.1	38.0	38.0	349.3	28.0	377.3
Total		108.5	101.6	101.6	48.0	48.0	407.7	28.0	435.7

TABLE 9. INVESTMENTS IN ELECTRICITY

INVESTMENTS IN ELECTRICITY									
(US\$ Million 2012)									
Priority	Recommendations	2013	2014	2015	2016	2017	Cost '13-'17	Cost '18-'20	Grand Total
1	Implementation of Legal and Regulatory Framework	0.4	0.3	0.3	-	-	1.0	-	1.0
	Demand Control Assessment and Project Implementation	0.5	1.0	1.0	2.0	-	4.5	-	4.5
	Modern Tools and Diagnostic Equipment for Transmission and Distribution Systems	5.0	5.0	5.0	-	-	15.0	-	15.0
	Improvement of Billing, Metering and Collection + Implementation	0.5	3.0	3.0	3.0	3.0	12.5	5.0	17.5
	Feasibility for Central Dispatch Ctrl Center + Implementation	8.0	8.0	8.0	-	-	24.0	-	24.0
	Power Sector Structural Reform Study	0.5	1.0	0.5	-	-	2.0	-	2.0
	Training Programmes for Institutional Capacity Development	-	0.5	0.5	-	-	1.0	-	1.0
	Tariff Rationalization Study	-	0.5	0.5	-	-	1.0	-	1.0
	Sub Total Studies and Reforms	14.9	19.3	18.8	5.0	3.0	61.0	5.0	66.0
	Loss Reduction and End-Use Efficiency Improvement	25.0	25.0	25.0	25.0	-	100.0	-	100.0
	Distribution System Upgrade Planning Study for Erbil, Duhok, and Sulaymaniyah	31.0	30.0	30.0	30.0	30.0	151.0	50.0	201.0
	Street Lighting Design and Implementation Support Services	-	1.0	10.0	10.0	10.0	31.0	-	31.0
	Transmission Lines, Power Plants connection to load centers	70.0	70.0	70.0	70.0	70.0	350.0	200.0	550.0
	Sub Total Projects	126.0	126.0	135.0	135.0	110.0	632.0	250.0	882.0
Total Priority 1	140.9	145.3	153.8	140.0	113.0	693.0	255.0	948.0	
2	Asset Register and General Ledger + Implementation	-	0.3	1.5	1.5	-	3.3	-	3.3
	Investment for 400 kV Transmission Lines and related Substations, KRG Interconnections; Interconnections with Regional Countries	-	-	150.0	150.0	150.0	450.0	300.0	750.0
	Procurement and Training of PSS Package (Transmission and Distribution Planning Studies Software and Training)	1.0	-	-	-	-	1.0	-	1.0
	Management Information System (MIS) + Implementation	0.5	1.5	1.5	-	-	3.5	-	3.5
	Establishment of Consumers Council for Customers' Representation in Tariff & Quality of Service, etc	1.0	1.0	1.0	1.0	1.0	5.0	-	5.0
	Single Buyer Power Market Rules and Regulations	1.0	-	-	-	-	1.0	-	1.0
Total Priority 2	3.5	2.8	154.0	152.5	151.0	463.8	300.0	763.8	
Generation (Private Sector)	500.0	500.0	500.0	400.0	400.0	2,300.0	1,200.0	3,500.0	
Grand Total	644.4	648.1	807.8	692.5	664.0	3,456.8	1,755.0	5,211.8	

TABLE 10. INVESTMENTS IN HEALTH

HEALTH SECTOR INVESTMENT									
(US\$ Million 2012)									
Hospitals Projects	Unit	2013	2014	2015	2016	2017	2013-2017	2018-2020	Grand Total
No. of New Hospital Beds	No.	400	400	400	400	400	2,000	1,200	3,200
Cost of New Hospitals	\$	120.0	120.0	120.0	120.0	120.0	600.0	360.0	960.0
No. of New PHCs	No.	18	18	18	18	18	90	75	165
Cost of New PHCs	\$	18.0	18.0	18.0	18.0	18.0	90.0	75.0	165.0
No. of Hospitals for Rehabilitation	No.	3	3	3	3	3	15	30	45
Cost of Hospitals Rehabilitation	\$	60.0	60.0	60.0	60.0	60.0	300.0	180.0	480.0
No. of PHCs for Rehabilitation	No.	40	40	40	40	40	200	120	320
Cost of PHCs Rehabilitation	\$	12.0	12.0	12.0	12.0	12.0	60.0	36.0	96.0
Medical Equipment	\$	30.0	30.0	30.0	30.0	30.0	150.0	90.0	240.0
Drug and Medical Supplies	\$	20.0	20.0	20.0	20.0	20.0	100.0	60.0	160.0
Health Information System	\$	1.0	2.0	5.0	6.0	6.0	20.0	-	20.0
Total	\$	261.0	262.0	265.0	266.0	266.0	1,320.0	801.0	2,121.0

TABLE 11. INVESTMENT IN EDUCATION: SCHOOL BUILDING PROGRAMME

EDUCATION SECTOR INVESTMENT								
(US\$ Million 2012)								
Classrooms Projects	2013	2014	2015	2016	2017	2013-2017	2018-2020	2013-2020
No of New Basic Classrooms	1401	1449	1498	1548	1600	7496	5132	12628
Cost \$M	87.6	90.5	93.6	96.8	100.0	468.5	320.8	789.3
No. of New Secondary Classrooms	584	611	639	668	699	3201	2291	5492
Cost \$M	36.5	38.2	40.0	41.8	43.7	200.2	143.2	343.4
No. of Reduce Overcrowded Classrooms	647	647	647	647	647	3235	0	3235
Cost \$M	40.4	40.4	40.4	40.4	40.4	202.2	0.0	202.2
No. of Reduce Multiple Shift Classroom	2532	2532	2532	2532	2532	12660	0	12660
Cost \$M	158.3	158.3	158.3	158.3	158.3	791.3	0.0	791.3
No. of Replacing Rented and Rural Schools	2489	2489	2489	2489	2489	12445	0	12445
Cost \$M	155.6	155.6	155.6	155.6	155.6	777.8	0.0	777.8
Total No. of New Classrooms Needed	7976	8055	8137	8221	8309	40699	7423	48122
(Total Cost (US\$M)	478.0	483.0	488.0	493.0	498.0	2440.0	464.0	2904.0
No. of Rehabilitated Classrooms	3175	3175	3175	3175	3175	15875	9525	25400
(Rehabilitation Cost (US\$M)	64.0	64.0	64.0	64.0	64.0	320.0	192.0	512.0
Estimated No. of New Schools	638	644	650	657	664	3253	619	3872
Grand Total Cost	542.0	547.0	552.0	557.0	562.0	2760.0	656.0	3416.0

new classrooms cost + classrooms rehabilitation cost*

TABLE 12. INVESTMENT IN VOCATIONAL AND TECHNICAL EDUCATION (VTE)

INVESTMENT IN VOCATIONAL AND TECHNICAL EDUCATION (VTE)								
(2012 US\$ Million)								
Activity	2013	2014	2015	2016	2017	Cost '13-'17	Cost '18-'20	Grand Total
Reassessment of role and potential VTE	1	1				2	1	3
Construction of (30) VTE and Employment Centers	28	28	28	28	28	140	10	150
Total	29	29	28	28	28	142	11	153

TABLE 13. INVESTMENT IN AFFORDABLE HOUSING

INVESTMENT IN AFFORDABLE HOUSING *									
(2012 US\$ Million)									
	No. Of Housing Units	2013	2014	2015	2016	2017	Cost '13-'17	Cost '18-'20	Grand Total
ERBIL	2386	71.6	71.6	71.6	71.6	71.6	358.0	200.0	558.0
DOHUK	1091	32.8	32.8	32.8	32.8	32.8	164.0	90.0	254.0
Sulaymaniyah	2393	71.8	71.8	71.8	71.8	71.8	359.0	200.0	559.0
Sub-total									
Total		176.2	176.2	176.2	176.2	176.2	881.0	490.0	1,371.0

* From 2018 it is assumed that 30% of houses provided through government action are built via cross-subsidies from middle- and higher-income housing

TABLE 14. INVESTMENT IN TOURISM

TOURISM									
(2012 US\$ Million)									
Activity	2013	2014	2015	2016	2017	Cost '13-'17	Cost '18-'20	Grand Total	
Public Investment	Strategic Study of Tourism	0.5	0.5	-	-	-	1.0	-	1.0
	Support to Tourism Board with specialist expertise	1.0	2.0	2.0	1.0	1.0	7.0	3.0	10.0
	Mktg Tourism Study of Iraq, Gulf and Middle East	1.0	-	-	-	-	1.0	-	1.0
	Tourism Sites: facilities and information (visitor centres, amenities)	5.0	5.0	5.0	5.0	5.0	25.0	10.0	35.0
Sub-total	7.5	7.5	7.0	6.0	6.0	34.0	13.0	47.0	
Private Investment	Private Investment	tbd	tbd			tbd	-	tbd	
	Sub-total	tbd	tbd			tbd	-	tbd	
Total	7.5	7.5	7.0	6.0	6.0	34.0	13.0	47.0	

TABLE 15. SUMMARY OF PROPOSED INVESTMENTS, 2013-2020

PROPOSED INVESTMENTS, 2013-2017, AND BEYOND									
(2012 US\$ Million)									
Activity	2013	2014	2015	2016	2017	Cost '13-'17	Cost '18-'20	Grand Total	
Investment in Sanitation	Erbil	30.0	51.0	61.0	61.0	51.0	254.0	147.0	401.0
	Dohuk	12.0	25.0	35.0	55.0	50.0	177.0	42.5	219.5
	Sulaymaniyah	1.4	30.0	30.0	30.0	30.0	121.4	-	121.4
	Ranya	0.4	5.0	5.0	4.0	4.0	18.4	-	18.4
	Dokan	0.3	10.0	10.0	11.0	1.0	32.3	-	32.3
	Chwarqurna	0.3	2.0	5.0	5.0	2.0	14.3	-	14.3
	Hajiawa	0.4	3.0	3.0	7.0	4.0	17.4	-	17.4
	Psdar	0.3	3.0	3.0	7.0	4.0	17.3	-	17.3
	Halabja	0.3	3.0	3.0	7.0	3.0	16.3	-	16.3
	SaidSadiq	0.2	3.0	3.0	7.0	3.0	16.2	-	16.2
Sub-total	45.6	135.0	158.0	194.0	152.0	684.6	189.5	874.1	
Investment in Water Supply	Erbil Governorate: Investment Programme	23.1	46.1	126.8	138.4	149.9	484.4	669.0	1,153.1
	Dohuk Governorate: Investment Programme	13.9	27.8	76.3	83.3	90.2	291.5	402.5	694.0
	Sulaymaniyah Governorate: Investment Programme	24.0	48.1	132.3	144.3	156.3	505.0	697.4	1,202.4
	Institutional and Human Resources Development	2.0	4.0	5.0	5.0	6.0	22.0	-	22.0
	Sub-total	63.1	126.0	340.5	370.9	402.4	1,302.9	1,768.9	3,071.5
Water Resources Management & Irrigation	Policies Strategies Laws	5.0	2.5	0.5	-	-	8.0	-	8.0
	Assessments and Studies	5.0	4.0	5.0	4.0	2.0	20.0	-	20.0
	Implementation Priority 1	135.0	310.0	440.0	460.0	410.0	1,755.0	1,125.0	2,880.0
	Implementation Priority 2	125.0	250.0	325.0	350.0	550.0	1,600.0	2,200.0	3,800.0
Sub-total	270.0	566.5	770.5	814.0	962.0	3,383.0	3,325.0	6,708.0	
Investment in Environmental Management	Environmental Management	17.1	28.5	21.4	-	-	67.0	13.0	80.0
	Solid Waste Treatment and Disposal	79.0	124.5	76.0	36.0	36.5	352.0	90.0	442.0
	Sub-total	96.1	153.0	97.4	36.0	36.5	419.0	103.0	522.0

PROPOSED INVESTMENTS, 2013-2017, AND BEYOND									
(2012 US\$ Million)									
Regional and Urban Development Planning	Planning and Programming Studies	3.9	3.9	-	-	-	7.8	-	7.8
	City Planning - ERBIL CITY	13.5	12.0	13.5	9.0	9.0	57.0	25.0	82.0
	City Planning - DOHUK CITY	8.7	8.0	7.0	2.0	2.0	27.7	6.0	33.7
	City Planning - Sulaymaniyah CITY	22.1	22.6	21.6	20.1	20.3	106.7	10.5	117.2
	Sub-total	48.2	46.5	42.1	31.1	31.3	199.2	41.5	240.7
Transport and Transport Infrastructure	International and Inter-Regional Transport	6.0	7.0	38.0	76.0	62.0	189.0	1,100.0	1,289.0
	Inter-Urban Transport Within the Region	167.0	181.0	197.0	191.0	136.0	872.0	348.0	1,220.0
	Intra-City Urban Transport	12.0	61.0	197.0	832.0	406.0	1,508.0	1,165.0	2,673.0
	Sub-total	185.0	249.0	432.0	1,099.0	604.0	2,569.0	2,613.0	5,182.0
Policies/Laws Studies	Policies/Laws Studies	8.5	5.5	5.5	5.5	5.0	30.0	7.0	37.0
	Implementation	280.0	250.0	200.0	165.0	130.0	1,025.0	135.0	1,160.0
	Sub-total	288.5	255.5	205.5	170.5	135.0	1,055.0	142.0	1,197.0
	Studies and Institutional development	17.4	10.5	10.5	10.0	10.0	58.4	-	58.4
Infrastructure Support for Industry	Infrastructure Support for Industry	91.1	91.1	91.1	38.0	38.0	349.3	28.0	377.3
	Sub-total	108.5	101.6	101.6	48.0	48.0	407.7	28.0	435.7
	Public Investments	7.5	7.5	7.0	6.0	6.0	34.0	13.0	47.0
Private Investment	Private Investment	tbd	tbd	-	-	-	tbd	-	tbd
	Sub-total	7.5	7.5	7.0	6.0	6.0	34.0	13.0	47.0
	Public Sector Investment - Priority 1	140.9	145.3	153.8	140.0	113.0	693.0	255.0	948.0
Electricity	Public Sector Investment - Priority 2	3.5	2.8	154.0	152.5	151.0	463.8	300.0	763.8
	Generation (Private Sector)	500.0	500.0	500.0	400.0	400.0	2,300.0	1,200.0	3,500.0
	Sub-total	644.4	648.1	807.8	692.5	664.0	3,456.8	1,755.0	5,211.8
Health	Hospitals Projects	261.0	262.0	265.0	266.0	266.0	1,320.0	801.0	2,121.0
	Sub-total	261.0	262.0	265.0	266.0	266.0	1,320.0	801.0	2,121.0
Classrooms Projects	Classrooms Projects	542.0	547.0	552.0	557.0	562.0	2,760.0	656.0	3,416.0
	Sub-total	542.0	547.0	552.0	557.0	562.0	2,760.0	656.0	3,416.0

PROPOSED INVESTMENTS, 2013-2017, AND BEYOND									
(2012 US\$ Million)									
VTE	Vocational and Technical Education	29.0	29.0	28.0	28.0	28.0	142.0	11.0	153.0
	Sub-total	29.0	29.0	28.0	28.0	28.0	142.0	11.0	153.0
Housing	Erbil, Dohuk, Sulaymaniyah	176.2	176.2	176.2	176.2	176.2	881.0	490.0	1,371.0
	Sub-total	176.2	176.2	176.2	176.2	176.2	881.0	490.0	1,371.0
Total		2,765.1	3,302.9	3,983.6	4,489.2	4,073.4	18,614.2	11,936.9	30,550.9

TABLE 16. TOTAL INVESTMENT BY PRIORITY

PROPOSED INVESTMENTS, 2013-2017, 2018-2020 BY PRIORITY								
(2012 US\$ Million)								
Activity	2013	2014	2015	2016	2017	Cost '13-'17	Cost '18-'20	Grand Total
Sanitation	45.6	135.0	158.0	194.0	152.0	684.6	189.5	874.1
Water Supply	63.1	126.0	340.5	370.9	402.4	1,302.9	1,768.9	3,071.5
Water Resources Management & Irrigation	145.0	316.5	445.5	464.0	412.0	1,783.0	1,125.0	2,908.0
Solid Waste Trtmnt and Environmental Mgmt.	96.1	153.0	97.4	36.0	36.5	419.0	103.0	522.0
Regional and Urban Development Planning	48.2	46.5	42.1	31.1	31.3	199.2	41.5	240.7
Transport and Transport Infrastructure	185.0	249.0	432.0	1,099.0	604.0	2,569.0	2,613.0	5,182.0
Agriculture	288.5	255.5	205.5	170.5	135.0	1,055.0	142.0	1,197.0
Industry related Infrastructures	108.5	101.6	101.6	48.0	48.0	407.7	28.0	435.7
Tourism	7.5	7.5	7.0	6.0	6.0	34.0	13.0	47.0
Electricity	640.9	645.3	653.8	540.0	513.0	2,993.0	1,455.0	4,448.0
Health	261.0	262.0	265.0	266.0	266.0	1,320.0	801.0	2,121.0
Education	542.0	547.0	552.0	557.0	562.0	2,760.0	656.0	3,416.0
Vocational and Technical Education	29.0	29.0	28.0	28.0	28.0	142.0	11.0	153.0
Housing	176.2	176.2	176.2	176.2	176.2	881.0	490.0	1,371.0
Total Investment Priority 1	2,636.6	3,050.1	3,504.6	3,986.7	3,372.4	16,550.4	9,436.9	25,987.1
Water Resources Management & Irrigation	125.0	250.0	325.0	350.0	550.0	1,600.0	2,200.0	3,800.0
Electricity	3.5	2.8	154.0	152.5	151.0	463.8	300.0	763.8
Total Investment Priority 2	128.5	252.8	479.0	502.5	701.0	2,063.8	2,500.0	4,563.8
Grand Total	2,765.1	3,302.9	3,983.6	4,489.2	4,073.4	18,614.2	11,936.9	30,550.9

TABLE 17. TOTAL INVESTMENT - PUBLIC VS. PRIVATE

PROPOSED INVESTMENTS, 2013-2017, 2018-2020 PUBLIC VS. PRIVATE								
(2012 US\$ Million)								
Activity	2013	2014	2015	2016	2017	Cost '13-'17	Cost '18-'20	Grand Total
Sanitation	45.6	135.0	158.0	194.0	152.0	684.6	189.5	874.1
Water Supply	63.1	126.0	340.5	370.9	402.4	1,302.9	1,768.9	3,071.5
Water Resources Management & Irrigation	270.0	566.5	770.5	814.0	962.0	3,383.0	3,325.0	6,708.0
Environmental Management and Solid Waste Treatment and Disposal	19.1	31.5	21.4	-	-	72.0	13.0	85.0
Regional and Urban Development Planning	48.2	46.5	42.1	31.1	31.3	199.2	41.5	240.7
Transport and Transport Infrastructure	185.0	184.0	228.0	201.0	143.0	941.0	1,463.0	2,404.0
Agriculture	288.5	255.5	205.5	170.5	135.0	1,055.0	142.0	1,197.0
Industry related Infrastructures	108.5	101.6	101.6	48.0	48.0	407.7	28.0	435.7
Tourism	7.5	7.5	7.0	6.0	6.0	34.0	13.0	47.0
Electricity	144.4	148.1	307.8	292.5	264.0	1,156.8	555.0	1,711.8
Health	261.0	262.0	265.0	266.0	266.0	1,320.0	801.0	2,121.0
Education	542.0	547.0	552.0	557.0	562.0	2,760.0	656.0	3,416.0
Vocational and Technical Education	29.0	29.0	28.0	28.0	28.0	142.0	11.0	153.0
Housing	176.2	176.2	176.2	176.2	176.2	881.0	490.0	1,371.0
Total Public Sector Investment	2,188.1	2,616.4	3,203.6	3,155.2	3,175.9	14,339.2	9,496.9	23,835.9
Transport and Transport Infrastructure	-	65.0	204.0	898.0	461.0	1,628.0	1,150.0	2,778.0
Electricity (Generation)	500.0	500.0	500.0	400.0	400.0	2,300.0	1,200.0	3,500.0
Solid Waste Treatment and Disposal	77.0	121.5	76.0	36.0	36.5	347.0	90.0	437.0
Health	tbd	tbd				tbd	-	tbd
Tourism	tbd	tbd				tbd	-	tbd
Total Private Sector Investment	577.0	686.5	780.0	1,334.0	897.5	4,275.0	2,440.0	6,715.0
Grand Total	2,765.1	3,302.9	3,983.6	4,489.2	4,073.4	18,614.2	11,936.9	30,550.9

