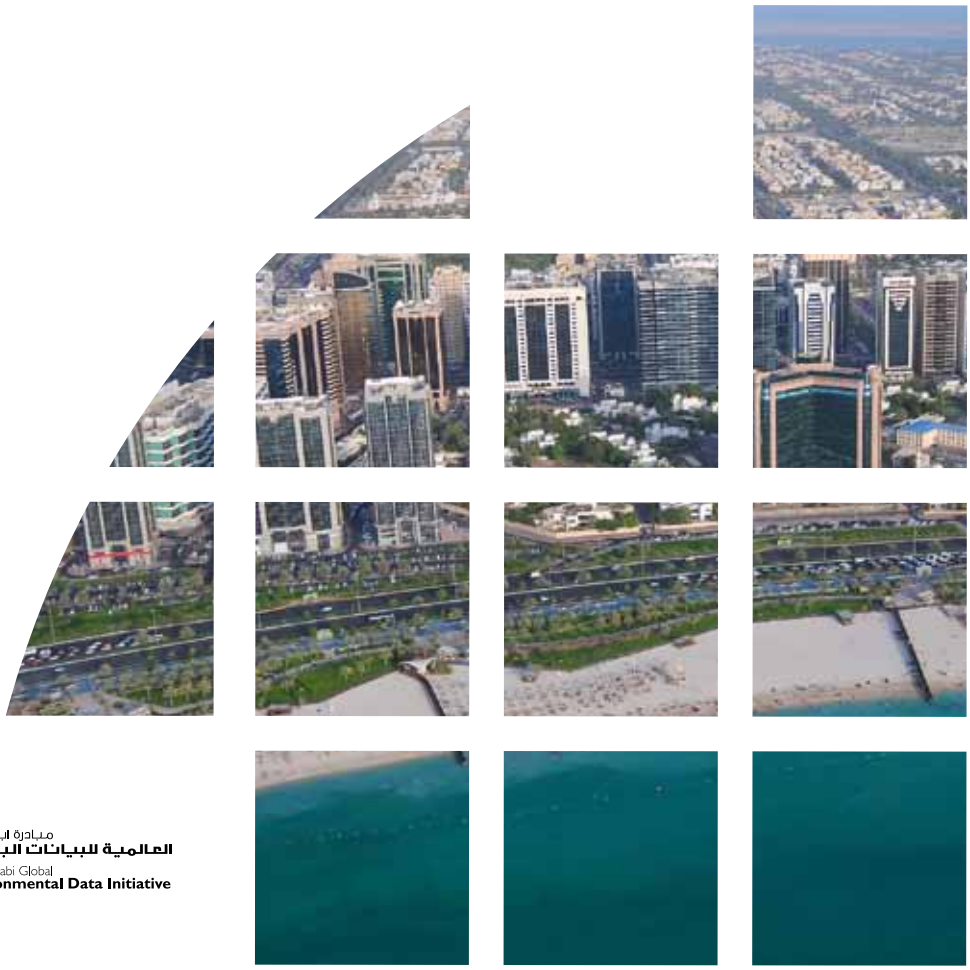
Population, Economy and Development

of Abu Dhabi Emirate, United Arab Emirates



هيئة البيئة-أبوظبي
Environment Agency-ABU DHABI

مبادرة ابوظبي العالمية للبيانات البيئية
Abu Dhabi Global Environmental Data Initiative

Population, Economy and Development

of Abu Dhabi Emirate, United Arab Emirates

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- البيانات
- الأدوات والأساليب
- التوعية
- بناء القدرات
- السياسة

الأوراق القطاعية

خلال السنوات الماضية قامت مختلف القطاعات المعنية بشؤون البيئة بتجميع كم من المعلومات المتنوعة بعدة صور تصف ما هو معروف عن البيئة في إمارة أبوظبي ودولة الإمارات العربية المتحدة والخليج العربي. خلال المرحلة الأولى لمبادرة أبوظبي العالمية للبيانات البيئية، تم تنظيم سلسلة من ورش العمل في عام ٢٠٠٥ لجمع المعنيين من هذه المنظمات ، لتحديد القطاعات ذات الصلة، ووضع إطار العمل لكل ورقة قطاعية، ومعالجة الاحتياجات الاجتماعية والاقتصادية والبيئية الرئيسية في إطار كل القضايا المتعلقة في القطاع . من خلال هذا الورش، تم إعداد ثماني ورقات لقطاعية ونشرها:

- التلوث وإدارة النفايات
- القوانين والسياسات البيئية
- الموارد المائية
- الجغرافيا الطبيعية لإمارة أبوظبي
- البيئة البحرية والساحلية
- التراث التاريخي والأثري والثقافي
- التطور الاقتصادي والسكاني
- التعليم والتوعية البيئية

وتم إعداد قطاع إضافي كجزء من البرنامج الأصلي، ومع ذلك، وسيتم نشرها للمرة الأولى كجزء من المرحلة الثانية:

- البيئات البرية وموارد الأرض

و لأن الأوراق القطاعية هي مجموعة من أفضل المعارف المتاحة المتعلقة بالقطاعات البيئية والاجتماعية-الاقتصادية الرئيسية وتمثل أساس كافة المخرجات التي سيتم إصدارها لاحقا كجزء من المرحلة الثانية للمبادرة، تم مراجعة الأوراق القطاعية الأصلية. وتم خلال ورشة العمل الدولية التي عقدت في عام ٢٠٠٧ تحديد ما يلي:

- بشكل عام، تم إعداد الأوراق القطاعية الأصلية بشكل جديد قدم فيها مجموعة قيمة من المعلومات
- لم تصل مشاركة الشركاء والجهات المعنيين إلى الحد المخطط له
- تم أعداد الأوراق القطاعية بدون دعم كافي من الهيئة أو الشركاء والجهات المعنيين، وبالتالي، كان على مؤلف الورقة القطاعية تحمل عبء إعداد ورقة هذا القطاع في وقت زمني محدود نوعا ما
- في بعض الحالات كانت البيانات المستخدمة قديمة نسبيا
- لم يتم إضفاء الطابع المؤسسي على عملية جمع البيانات وتبادلها

تهدف مراجعة المبادرة في إطار المرحلة الثانية إلى معالجة هذه الثغرات، فضلا عن غيرها من الثغرات التي تم تحديدها كجزء من الأوراق الأصلية. ولأن تنفيذ مهمة فرق العمل تم كجزء من المرحلة الثانية من البرنامج، فقد تم تقديم الدعم على جميع المستويات لمساعدة موظفي هيئة البيئة – أبوظبي والشركاء والجهات المعنية على معالجة وتحديد الثغرات، وجمع البيانات وإجراء التحليلات وتطوير مخرجات البيانات المكانية، وبناء العلاقات مع الشركاء والجهات المعنيين، وفي نهاية المطاف ، إعداد الورقة القطاعية وتنقيحها.

وتشكل الأوراق القطاعية مصدرا قيما للمعلومات البيئية والاجتماعية والاقتصادية لأبوظبي وتم استخدمها لمراجعة وتنقيح تقرير حالة البيئة لإمارة أبوظبي فضلا عن إعداد الأطلس البيئي لأبوظبي (النسختين المطبوعة والتفاعلية).

ولمزيد من المعلومات حول المبادرة أو للوصول لنسخة الكترونية من الأوراق القطاعية، يرجى زيارة الموقع الإلكتروني في www.agedi.ae.

ما هي مبادرة أبوظبي العالمية للبيانات البيئية ؟

تم إطلاق مبادرة أبوظبي العالمية للبيانات البيئية في الثاني من سبتمبر ٢٠٠٢ خلال مؤتمر القمة العالمي للتنمية المستدامة الذي عقد في مدينة جوهانسبرغ بجنوب إفريقيا من قِبل دولة الإمارات العربية المتحدة، كمبادرة شراكة من الصنف الثاني، لتكون أداة مبتكرة لتنفيذ الأحكام المتعلقة بالبيئة والواردة في الفصل ٤٠ من جدول أعمال القرن ٢١ وفي الأهداف الإنمائية للألفية.

وفي أوائل عام ٢٠٠٧ ، نظمت بأبوظبي ورشة عمل دولية لاستعراض الانجازات التي حققها برنامج المبادرة ووضع خطة إستراتيجية لمدة خمس سنوات. وعلى هذا النحو، بدأت المرحلة الثانية من المبادرة في عام ٢٠٠٨ بناءا على ما تم انجازه في المرحلة الأولى، في حين تم معالجة الفجوات التي تم تحديها من خلال المعلومات التي وفرتها الجهات المعنية خلال ورشة العمل.

ولا تزال الرؤيا التي تعمل وفقها المبادرة في المرحلة الثانية هي "وضع وتنفيذ نماذج عملية يمكن تكرارها وتكييفها من أجل إنشاء هيكل أساسي للبيانات البيئية المكانية عالية الجودة، للمساهمة في توفير القاعدة العلمية لاتخاذ القرارات". وسيتم في المرحلة الثانية استخدم الدروس المستفادة لتحقيق نجاح أفضل في تنفيذ المبادرة في مرحلته الثانية.

وسيركز البرنامج الحالي على وضع سلسلة من المخرجات التي تتناول قضايا محددة في حين يتم تحقيق نتائج مؤسسية معينة، بما في ذلك:

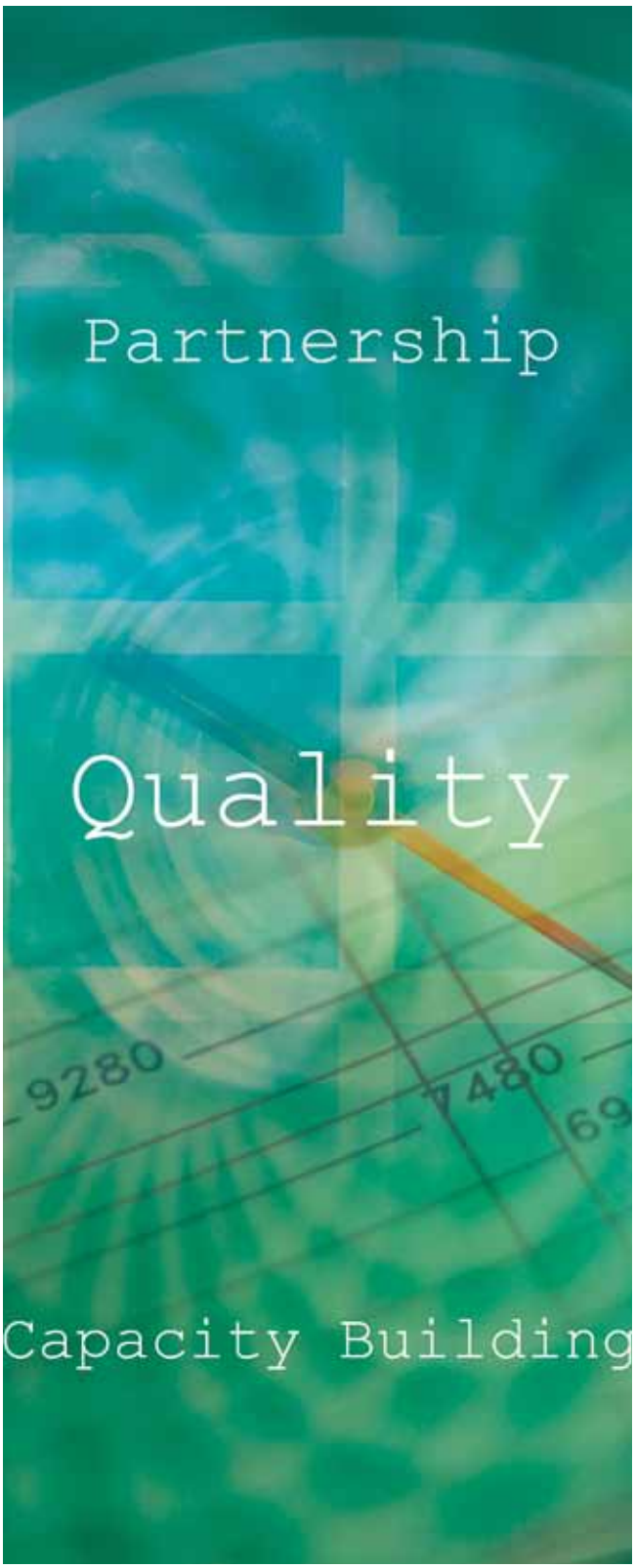
١. توفير بيانات بيئية أكثر جودة
٢. تحديد الثغرات في البيانات والأولويات
٣. تنسيق أقوي وشراكات لتبادل البيانات
٤. أساليب وأدوات أفضل للمعلومات
٥. ربط الإستراتيجية والتشغيل بشكل أفضل
٦. تحسين البنية التحتية البشرية والتقنية
٧. مؤسسة أقوي بشكل عام

والمخرجات التي تم تحديدها في إطار عملية التنمية هي أمور مترابطة ومتعاقبة مع المخرجات الأولية لدعم المعلومات والتفاهمات التي تصب في الأنشطة اللاحقة. وهي تشمل ما يلي :

- مراجعة الأوراق القطاعية وقاعدة المعرفة
- مراجعة وتنقيح تقرير حالة البيئة
- الأطلس البيئي التفاعلي
- تعزيز بوابة البيانات المكانية
- تحسين الموقع الالكتروني
- مؤشر الأداء الحكومي لابوظبي
- برامج وضع الإستراتيجية

ولضمان تحقيق نتائج ايجابية وتوفير الموارد التقنية الكافية للقيام بتطوير المخرجات، تم إنشاء مجموعة من فرق العمل بهدف تجميع الموارد لدعم فرق كل مخرج من المخرجات المبادرة. وتشمل هذه ما يلي :

WHAT IS AGEDI ?



The Abu Dhabi Global Environmental Data Initiative (AGEDI) program was fashioned around the United Nations World Summit for Sustainable Development (WSSD) Type II Partnership in 2002 as a tool to support the environmental provisions of Chapter 40 of Agenda 21 and the Millennium Development Goals.

In early 2007, an international workshop was conducted in Abu Dhabi to review the accomplishments of the AGEDI program and develop the next five year strategic plan. As such, AGEDI Phase II began in 2008 building off the accomplishments of the initial phase, while addressing gaps identified through stakeholder input during the workshop.

The vision of AGEDI Phase II remains to be a "replaceable, networked, adaptive and working model for the development and use of high quality spatial environmental data by all users within the Emirate of Abu Dhabi that will support sustainable decision and policy making." Phase II will use lessons learned to better guide the successful implementation of AGEDI in its second phase.

The focus of the current program is to develop a series of interrelated products that address specific issues while achieving certain institutional outcomes, including:

1. Better current and quality environmental data
2. Identification of data gaps and priorities
3. Stronger coordination and data sharing partnerships
4. Better information methods and tools
5. Better links between strategy and operation
6. Improved human and technical infrastructure
7. Stronger organization overall

The specific products under development are interdependent and sequential, with early products yielding information and understandings that feed into subsequent activities. These include the following:

- Sector Paper Review and Knowledgebase
- SoE Review and Refinement
- Environmental Atlas
- Interactive Environmental Atlas
- Geospatial Portal Enhancement
- Website Refinement
- EPI for Abu Dhabi
- Programs Alignment Strategy

To ensure positive outcomes and adequate technical resources for carrying out the product development, a series of task forces were established as pooled resources to support each product team. These include:

- Data
- Tools and Methods
- Outreach
- Capacity Building
- Policy

SECTOR PAPERS

Over the years, different organizations compiled a variety of information in many forms that describe what is known about Abu Dhabi, the UAE and the Arabian Gulf Region. Through the initial AGEDI phase, a series of workshops were developed in 2005 to bring together stakeholders from all these organizations, identify the sectors that were relevant, design a framework for each Sector Paper, and address the key environmental and socioeconomic issues relevant under each sector. Through this effort, eight Sector Papers were completed and published:

- Waste Management and Pollution
- Environmental Policy and Regulation
- Water Resources
- Physical Geography
- Marine and Coastal Environment
- Paleontological and Archaeological Resources
- Population, Development and Economy
- Environmental Education and Awareness

One additional sector was scoped as part of the original program, however, will be published for its first time as part of AGEDI Phase II:

- Terrestrial Environment

Because the Sector Papers are a collection of the best available knowledge pertaining to key environmental and socioeconomic sectors and serve as the basis for all subsequent products to be developed as part of AGEDI Phase II, a review of the original Sector Papers was conducted. Already known through the international workshop held in 2007 was:

- Overall, the original papers were done well and provided a wealth of information
- Stakeholder participation did not reach the level originally intended
- Sector Papers were developed without much agency or stakeholder support, and therefore, became the burden of the Sector Paper authors under a fairly limited timeframe
- Data used was outdated in some cases
- Data collection and sharing did not get institutionalized

The review under AGEDI Phase II sought to address these gaps, as well as the other gaps already identified as part of the original papers. Because the Task Forces were implemented as part of the Phase II program, support was provided at all levels to assist EAD staff and stakeholders in addressing and identifying gaps, collecting data, conducting analyses and developing spatial products, building stakeholder relationships, and ultimately, developing a refined Sector Paper.

The Sector Papers are a source of valuable environmental and socioeconomic information for Abu Dhabi and were used to review and refine the State of the Environment (SoE) report for Abu Dhabi as well as develop the Abu Dhabi Environmental Atlas (both hard-copy and interactive versions).

For more information and online versions

For more information about AGEDI or to access online versions of the Sector Papers, please visit the AGEDI website at www.agedi.ae

POPULATION, ECONOMY AND DEVELOPMENT

1. EXECUTIVE SUMMARY

1.1 The Sector Paper

This Sector Paper provides an account of Abu Dhabi Emirate's demographic and social profile, recent economic performance and physical development. The purpose of this paper is to compile the best available information, identify temporal and geographical trends and trajectories, highlight key issues and facilitate inter-departmental collaboration to support the EAD's policy and research agenda and provide a key source of information for wider audiences.

Access to socio-economic data and analysis is extremely important to effectively manage the significant changes in population and society occurring in the Emirate alongside its sustained economic growth and urban and industrial development. In order to achieve these aims, the Sector Paper has sought to draw on the expertise and resources of a number of government departments, through expert contributions, provision of data and key stakeholder interviews (See Acknowledgements).

The 2010 Sector Paper is the first update to the original paper produced in 2006.

1.2 Structure of the Report

The Sector Paper is divided in to the following Sections according to the three title themes of Population, Economy and Development:

Section 2 – Population: a demographic profile of Abu Dhabi Emirate and an overview of the development of society in terms of its health and education.

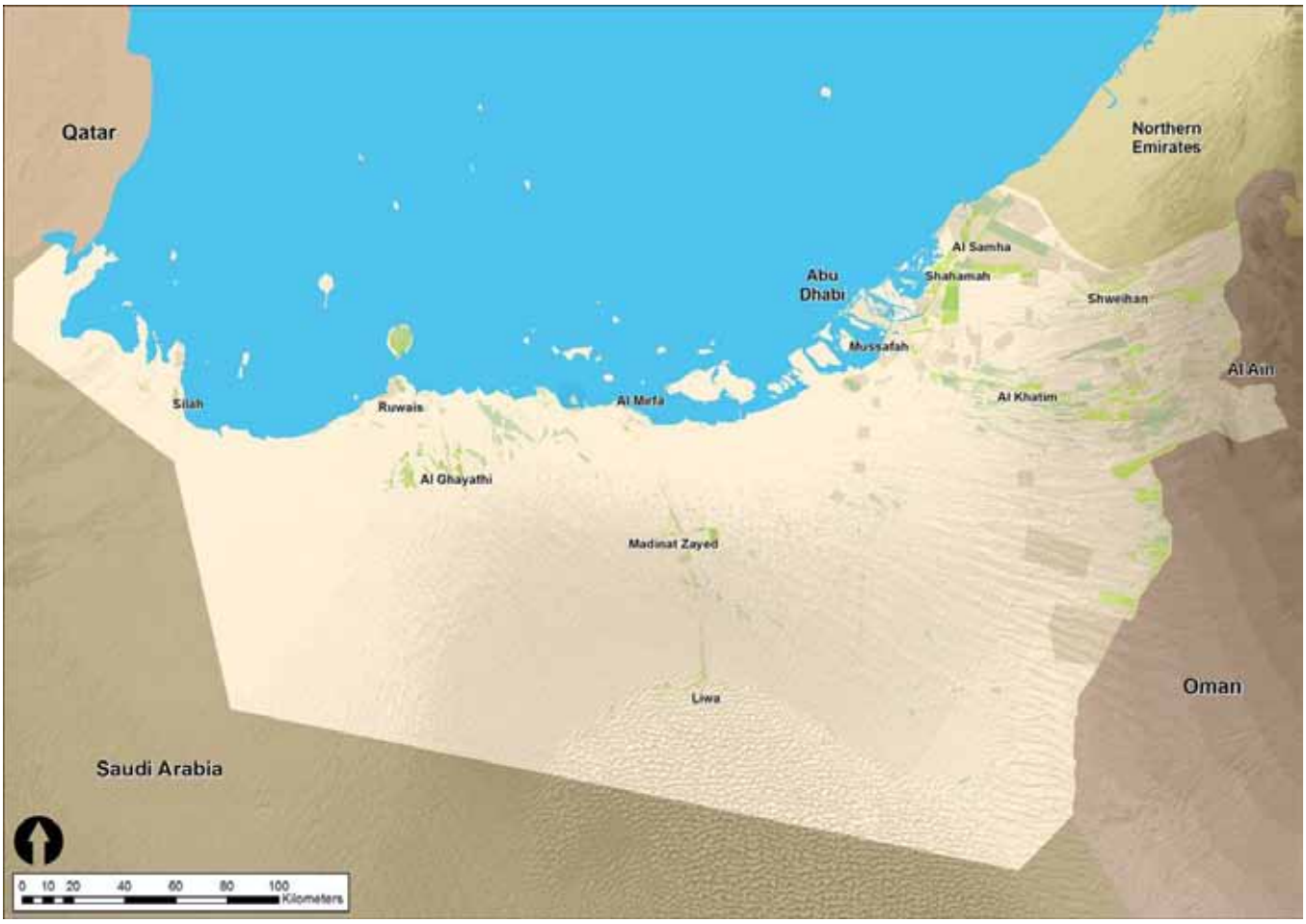
Section 3 – Economy: Abu Dhabi Emirate's Economic Vision 2030 and snapshot of its macro-economic performance between 2003 and 2008 based on the social and economic indicators collected by the Abu Dhabi Department for Economic Development (DED).

Section 4 – Development: an overview of the Emirate's rapid urban, coastal, tourism, infrastructure and industrial development and the institutions and planning framework that are shaping it.

1.3 Context

Abu Dhabi is the largest Emirate in the United Arab Emirates (UAE) and contains the national Capital, Abu Dhabi City. The Emirate shares borders with Oman and Saudi Arabia and the Emirate of Dubai, and has an extensive coastline on the Arabian Gulf (see Figure 1.1).

Abu Dhabi Emirate



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2. POPULATION

2.1 Overview

Significant changes in population have occurred in the Middle East region in recent times, in terms of size, structure and distribution. Such dynamics have become particularly pronounced in the oil rich Gulf economies, including Abu Dhabi, mainly as a result of economic development trends and policies. Understanding the dynamics of population in such circumstances is extremely important in order to achieve effective planning and policy formation.

This Section aims to provide a demographic profile of Abu Dhabi Emirate based on the total population, its structure and geographical distribution and how this is changing over time. The Abu Dhabi Government strongly believes that sustainable development can only be achieved through continuous investment in education and health.1 In recognition of this, the Section goes on to outline the social development of the population in terms of its health and education.

Key elements of the Emirate's vision for the development of social and human resources describe a society characterized by the provision of world-class healthcare, education and other services, where individuals (both national citizens and non-citizens) are valued and their unique skills contribute toward achieving a better quality of life for all.[2]

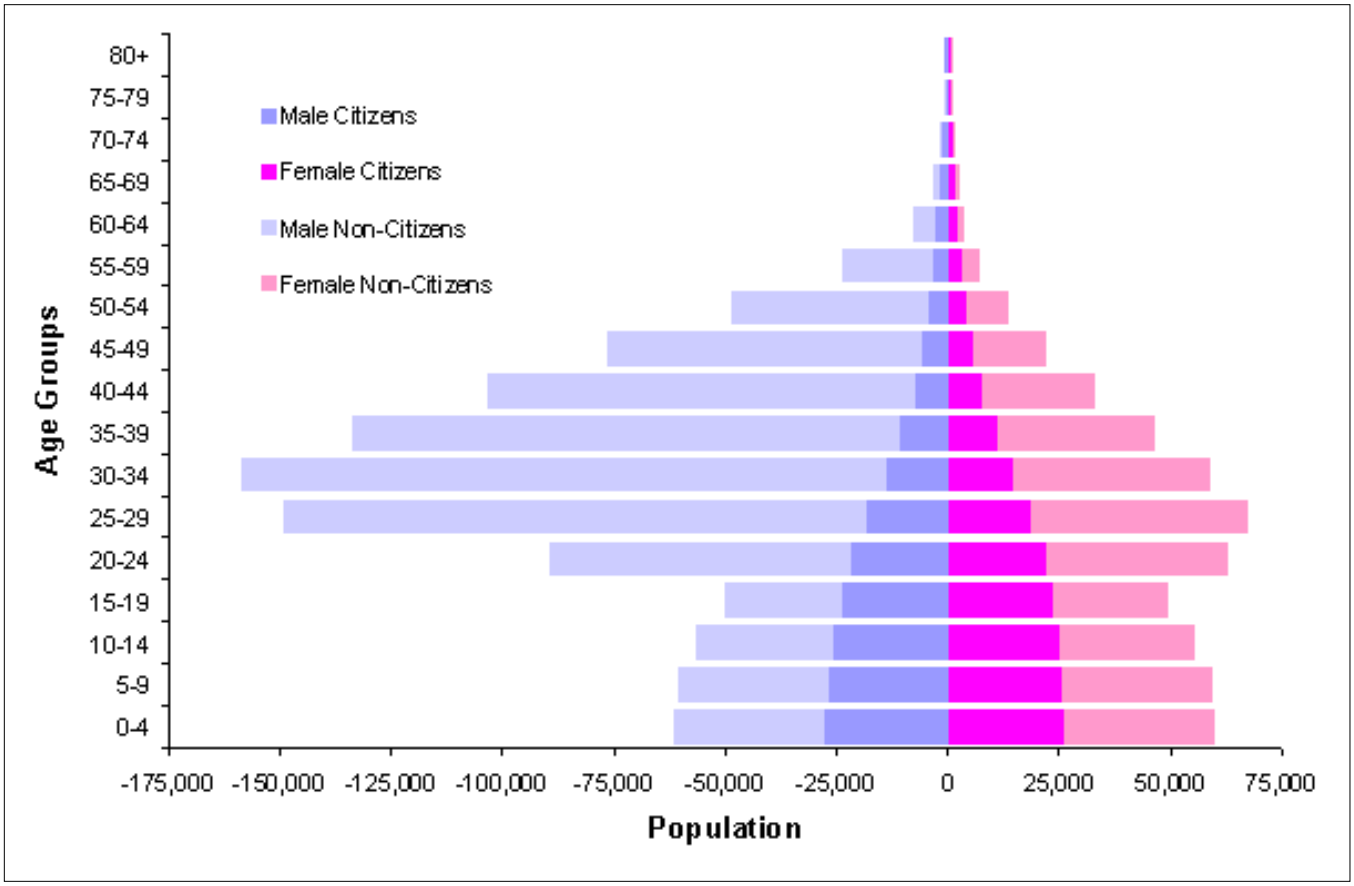
Much of the evidence on population presented in this section for Abu Dhabi Emirate is derived from the last survey of population, which was the 2005 Census, carried out at five yearly intervals, and more recent official estimates and projections based on this data made by the Statistical Center Abu Dhabi (SCAD) and the Urban Planning Council (UPC).[3]

2.2 Population Structure

Abu Dhabi Emirate's total population was estimated to be 1.57 million in 2008, which represents more than a third of the total population of the UAE.[4] However, this estimate does not include tourists and illegal workers. Population has been growing rapidly in recent years and this is projected to continue beyond 2030 as illustrated in the UPC's Urban and Regional Structure Framework Plans (refer to Section 4.2).

1. Emirate of Abu Dhabi Executive Council, General Secretariat: Social and Human Resources Policy
2. Ibid.
3. The National Census will be carried out in 2010. Therefore more accurate data will be likely to be reflected within the next update to this Sector Paper. However, data may not be directly comparable as a result of likely changes being introduced at the Federal and GCC level.
4. SCAD 2008 population projections

Figure 2.1: Population Pyramid for Abu Dhabi Emirate, by Gender and Residential Status, 2008 (estimated)



Source: SCAD, 2009

Despite Abu Dhabi's economy remaining more stable than other parts of the region, the Emirate's expansion in population was interrupted in 2009 due to the effects of the global economic downturn and is likely to have seen a significant slowing of population growth during this period. Population trends in the Emirate are strongly linked to global externalities, particularly long term economic fluctuations. Although the current economic climate is expected to be temporary, population projections presented in the 2030 Structure Plans may require adjustments. Nevertheless it is clear that a significant long-term increase in the Emirate's population is likely to occur, with associated implications for social, economic and environmental development and sustainability.

2.2.1 Age and Gender Patterns

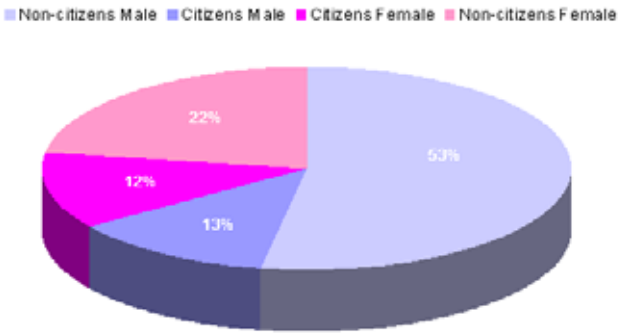
Abu Dhabi has a relatively young population, particularly amongst national citizens, where half of the population is under 20 and more than 40% are under the age of 15. The median age for Abu Dhabi citizens is 25, which is slightly below the global median of 28, and well below that of most developed economies such as Japan (42.9), the United States (36) and the EU (38.8).[5] The median age for non-citizens is slightly higher than the global average at 33 years of age.

As can be seen in Figure 2.1 the high number of child dependents amongst local citizens is offset when non-citizens are considered, as guest-workers create an 'artificial' bulge in the working age population.

5. UN (2006) World Population Prospects: The 2006 Revision

The gender ratio in Abu Dhabi Emirate means that there are around 1.89 males per female. For national citizens, the ratio is roughly equal as would be expected. However, amongst non-citizens, men greatly outnumber women by 2.4 to 1. This ratio is created by the large number of working age male expatriates (see Figure 2.2).

Figure 2.2: Abu Dhabi Emirate: Population Structure, by Gender and Residential Status, 2008



	Male	Female	Total
Citizens	197,803	192,774	390,577
Non-citizens	830,327	352,002	1,182,329
Total	1,028,130	544,776	1,572,906

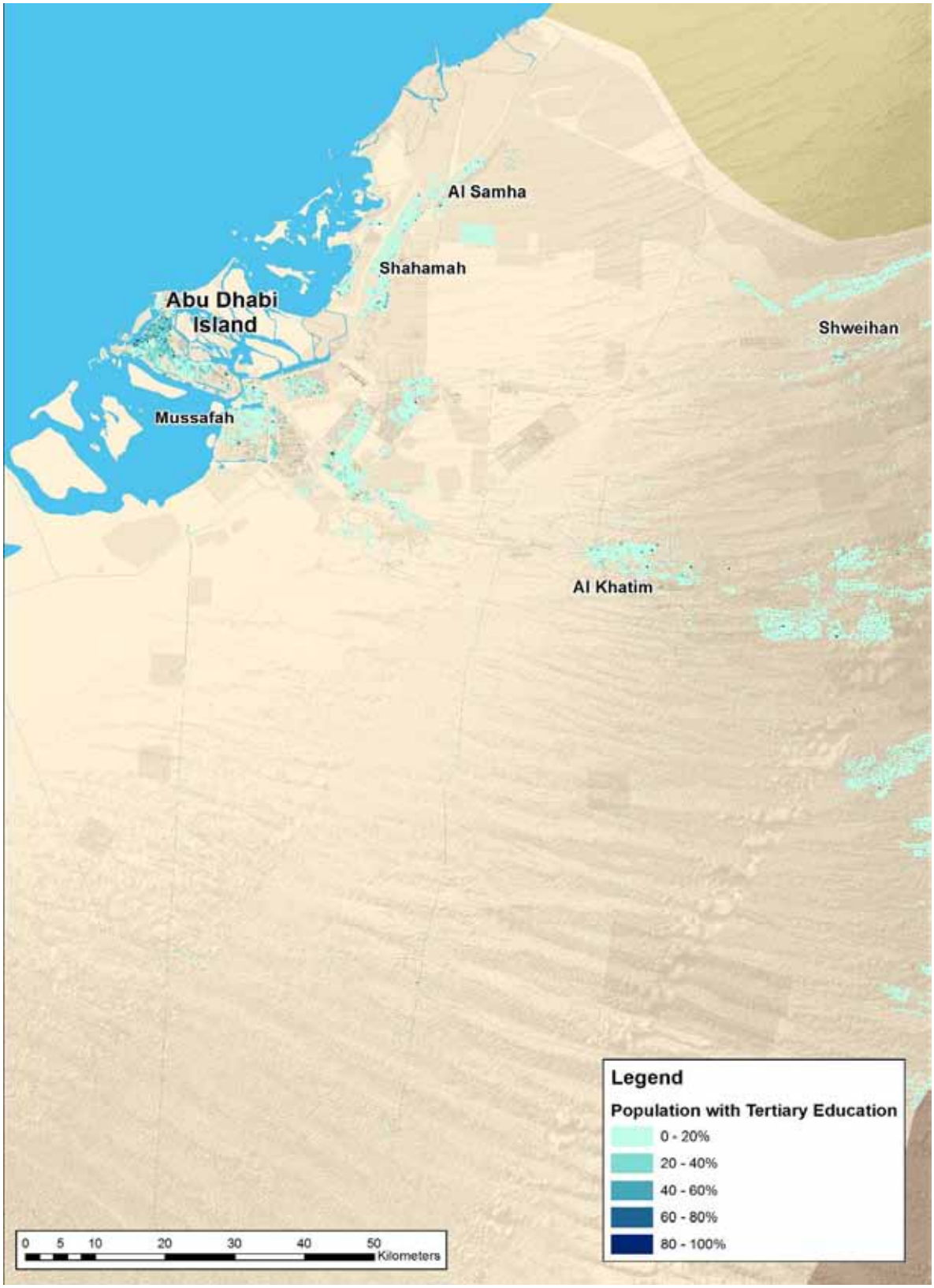
Source: SCAD, 2009

Figure 2.3, Figure 2.4 and Figure 2.5 below show the distribution of gender in Abu Dhabi, Al Ain/Eastern and Al Gharbia Regions.

- Blue areas of the maps represent areas where males predominate,
  - dark blue areas have less than 20% females,
  - light blue have 20 – 40% females,
- yellow areas show a fairly even gender distribution, and
- red / orange areas are predominantly female (<20% and 20-40% males respectively).

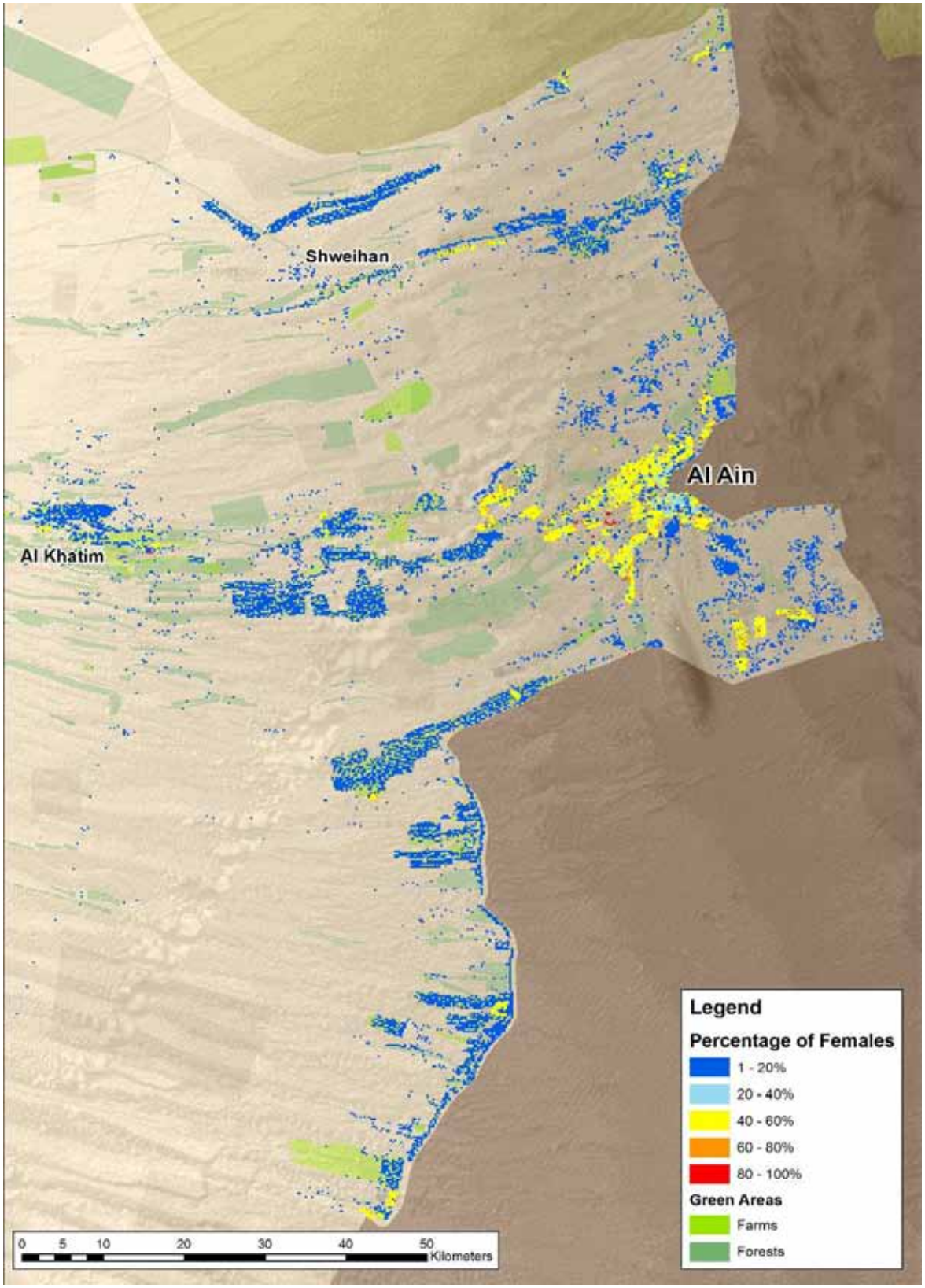
In Abu Dhabi City, most of the Island and off island residential areas contain a roughly equal gender distribution, with isolate pockets of high male or female density. However, large areas of predominantly males exist in industrial and agricultural areas. The situation is similar in Al Ain / Eastern Region and Al Gharbia, where an even distribution occurs in the town centers and certain residential suburbs, contrasted by a high proportion of males in the rural and industrial hinterlands.

Figure 2.3: Gender Ratio Distribution, Abu Dhabi



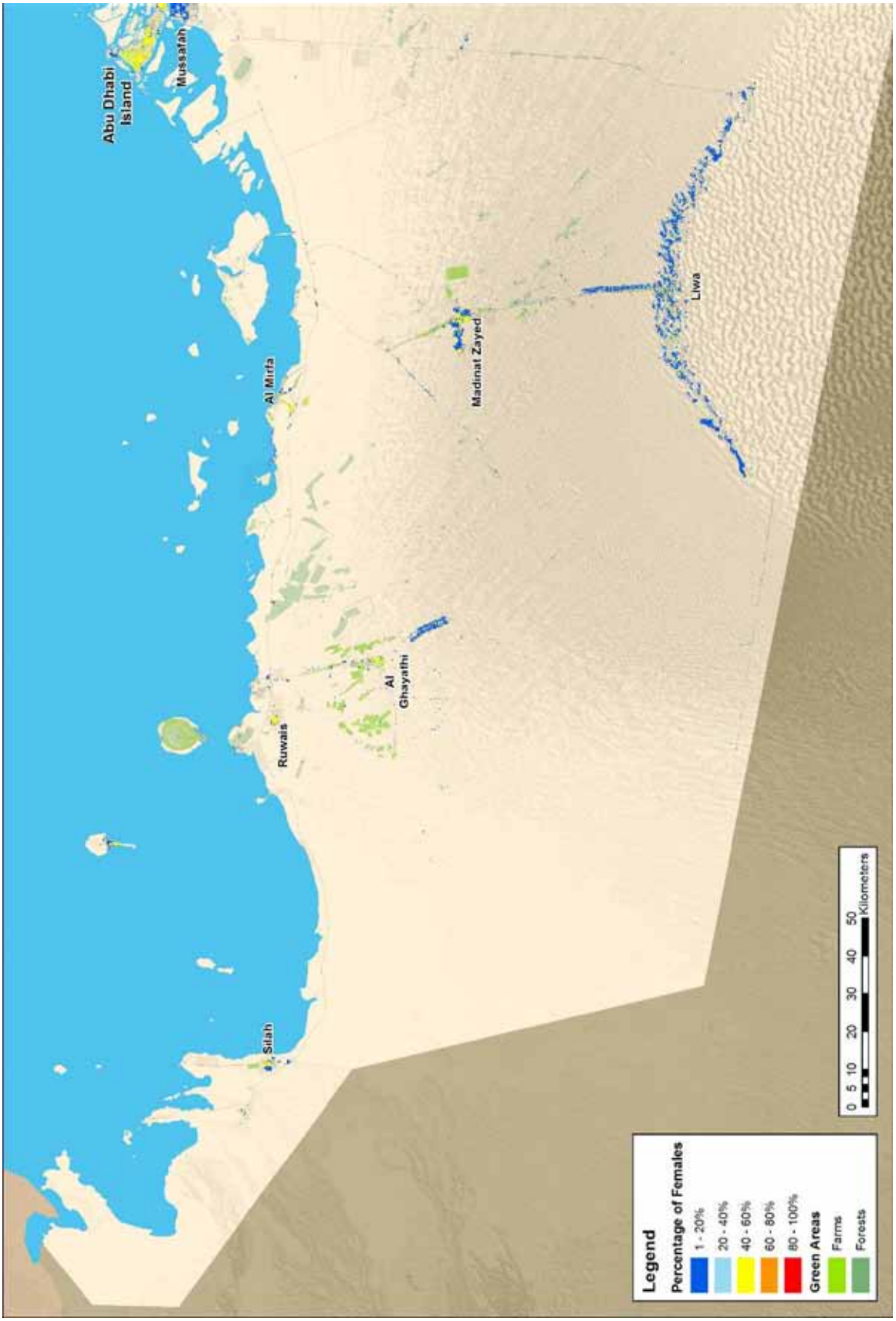
Source: Census, 2005

Figure 2.4: Gender Ratio Distribution, Al Ain and Eastern Region



Source: Census, 2005

Figure 2.5: Gender Ratio Distribution, Al Gharbia



Source: Census, 2005

2.2.2 Fertility

According to the United Nations Population Prospects 2008 Report, the UAE has one of the fastest declining fertility rates in the world.[6] The average number of children born per woman in the UAE fell from 5.23 to 1.95 over the last three decades, which is below the global average of 2.3, and also below the replacement level of 2.1 (0.1 being the adjustment for mortality).[7] This move to replacement-level fertility is part of a wider regional trend, and constitutes a dramatic social change in many Arab countries.

The population of the UAE is likely to rise in the short term, due to the increase in women of child bearing age coupled with increasing life-expectancy and lower mortality. However, it is anticipated that each mother will have fewer children, leading to a smaller average family size in the Emirate.

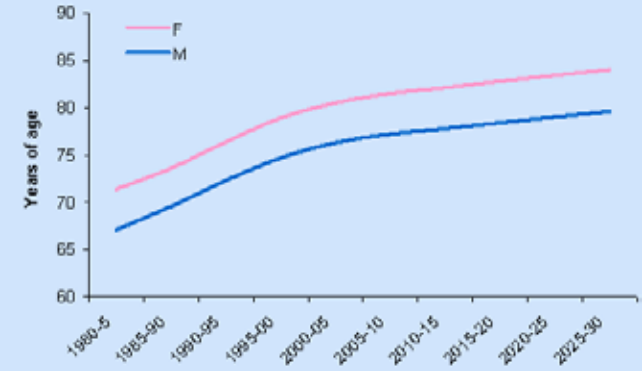
Declining fertility is related to the UAE and Abu Dhabi's enormous economic and social development including advances in education, healthcare and family planning. In particular, rising levels of female education is likely to have contributed to the falling rate, as educated women are more likely to enter employment and use family planning.

According to SCAD, the General Fertility Rate (GFR), i.e. the number of births per thousand women aged 15-49 in each year, in Abu Dhabi Emirate is significantly higher for national citizens (126.9) than for non-citizens (64.9) who are generally less likely to start a family outside their home countries.[8] Consequently, the Emirate's overall fertility is also influenced by its demographic structure.

2.2.3 Life Expectancy and Mortality

In addition to falling fertility, the population of the UAE has experienced a significant increase in life expectancy and fall in mortality over the last three decades, as illustrated in Figure 2.6. The UN Population Division's Population Prospects Report (2008), shows that between 1980 and 2005, average life expectancy in the UAE increased from 67 to 76 years for males and 71 to 81 years for females. SCAD figures on life expectancy in Abu Dhabi Emirate are slightly lower below the UN estimates at 74.4 years for males and 74.8 years for females. According to the UN report, the trend for longer life expectancy is set to continue in the UAE, and average life expectancy is projected to reach 80 for males and 84 for females by 2030.

Figure 2.6: Male and Female Life Expectancy in the UAE 1980 to 2005 and Projections to 2030



Source: UN, 2008

Health Authority Abu Dhabi (HAAD) (2009) estimates the mortality rate in Abu Dhabi Emirate to be relatively low by international standards at 1.9 per 1,000 population. Infant mortality is also fairly low by world standards at around 8.7 per thousand live births. [9]

Falling mortality and increasing life expectancy can be largely attributed to two factors. Firstly, economic growth and associated development, including better health care.[10] Secondly, the high proportion of the population consisting of below retirement age expatriates; the latter category having a significantly lower annual mortality rate than nationals (1.6 compared to 2.5 deaths per thousand).[11] Further information on life expectancy and mortality is presented in Section 2.5.

2.2.4 Demographic Transition

The transition from the state of high fertility and high mortality to low fertility and low mortality witnessed by the UAE and Abu Dhabi is part of a global trend known as the 'demographic transition'. During the initial years of the development of the oil and gas industry in Abu Dhabi the infant mortality rate fell significantly, while fertility remained high, causing a rise in the demographic growth rate, and a high ratio of young age groups (see Figure 2.1: Population Pyramid for Abu Dhabi Emirate, by Gender and Residential Status, 2008 (estimated)2.1). [12]

6. The Fertility Rate represents the number of children the average woman is likely to have during her reproductive lifespan (defined as 15-49 years of age).
7. UN Population Division (2008) World Population Prospects: Population Database. On-line at http://esa.un.org/UNPP/p2k0data.asp
8. SCAD (2010) Demographic and Social Indicators Report
9. HAAD (2009) Statistical Highlights Report 2008
10. UN (2006)
11. SCAD 2010
12. Ibid.

In general terms this transition is seen to be positive, as lower fertility generally correlates to higher living standards. As fertility falls, the size of the workforce increases relative to the numbers of dependent children. In addition, the increase in educated women (who spend less time bearing children) entering the employment market further reduces dependency. With low levels of unemployment, as in Abu Dhabi, this trend can lead to rising productivity in the short-term.

2.2.5 The International Workforce

2.2.5.1 Guest Workers

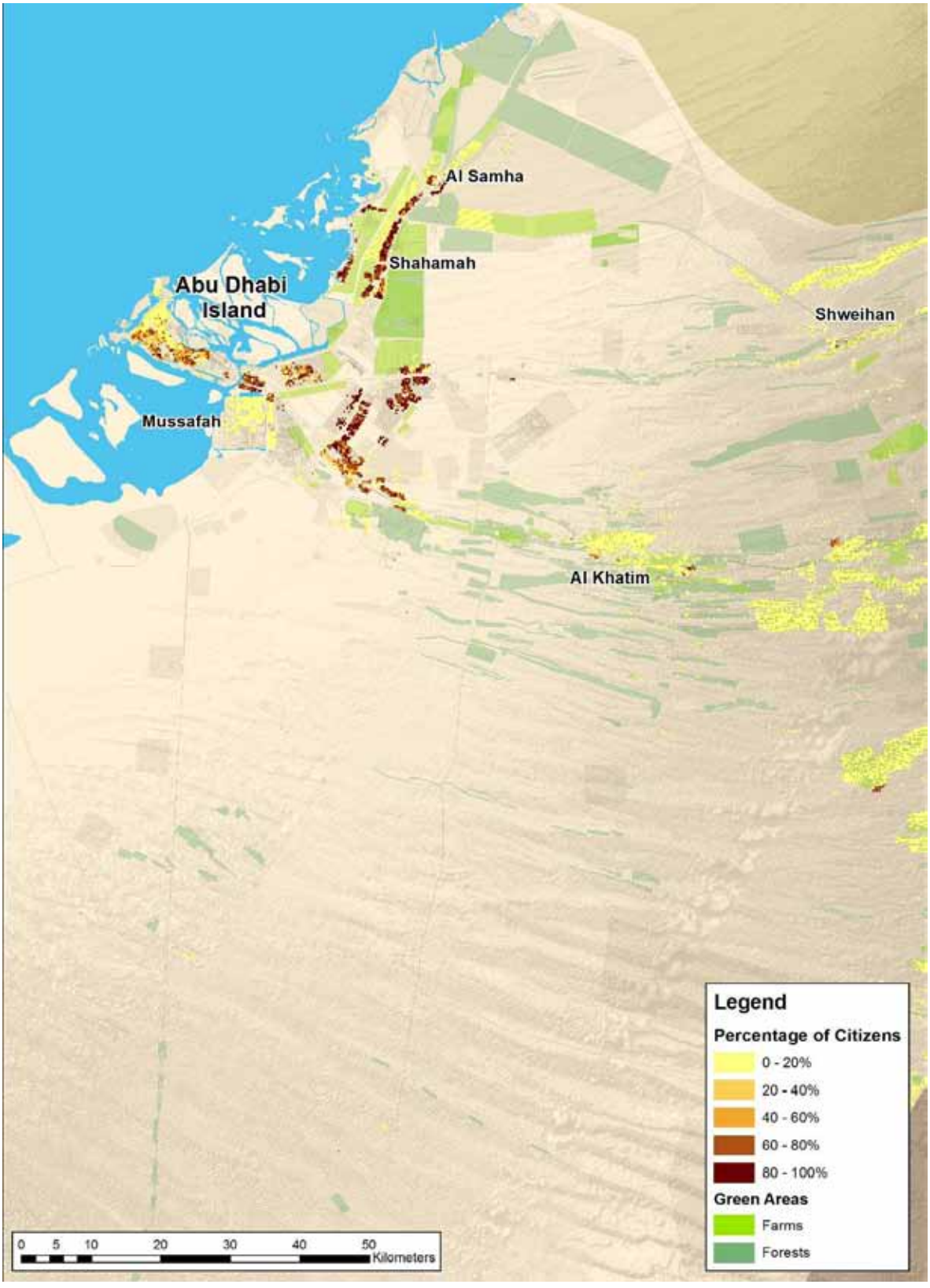
Abu Dhabi's rapid population growth is overwhelmingly driven by the influx of foreign workers, who are required to support the Emirate's economic growth.

In 2005, the UAE was the country with the highest proportion of expatriates in the world, with 3.2 million or 71% of the total population. Within Abu Dhabi Emirate, the proportion is even higher, with non-citizens representing around 75% of the population.[13] In Al Ain national citizens represent around a third of the total population, although this is expected to decline to around a quarter by 2020. In Al Gharbia, the ratio of non-citizens to citizens is as high as 5 to1, largely as a result of high numbers of overseas guest workers employed in agriculture, services and industry.[14]

Figure 2.3 shows the distribution of citizens and non-citizens in Abu Dhabi, Figure 2.4 shows Al Ain and the Eastern Region, and Figure 2.7 represents Al Gharbia. The darker areas highlight where the proportion of national citizens is high compared to non-citizens, such as in areas of Emirati housing on the outskirts of Abu Dhabi such, as Shamkah and Shahama, in parts of Al Ain, and in small enclaves within most of the towns in Al Gharbia. The Census data also shows a high bias towards non-citizens located in the rural areas around Liwa and Al Ain and in industrial areas such as Mussafah and Ruwais.

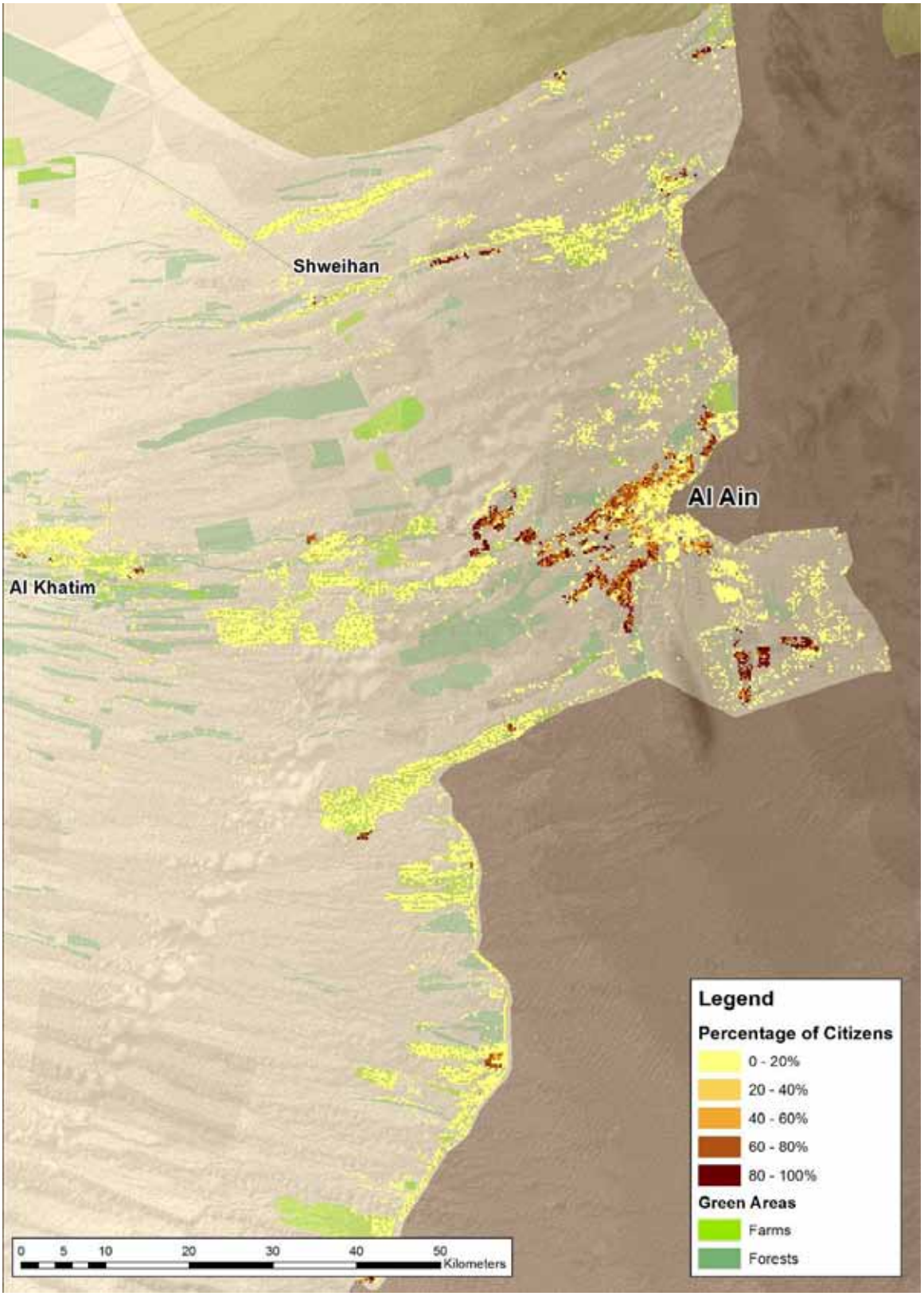
13. DPE, The 2005 Census
14. Ibid., and UPC 2030 Structure Plans

Figure 2.7: Population Distribution by Residential Status (percentage national citizens), Abu Dhabi



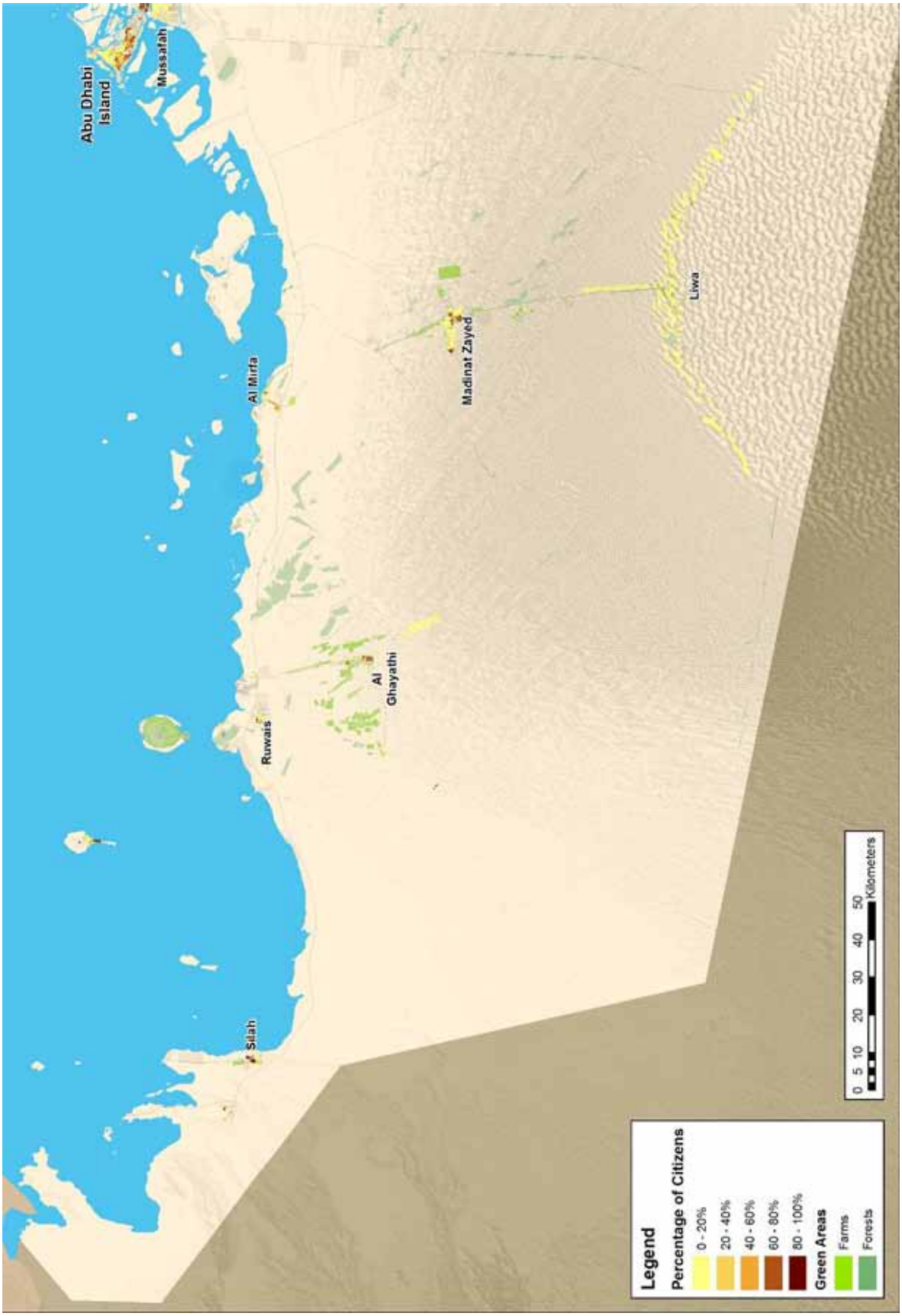
Source: Census, 2005

Figure 2.8: Population Distribution by Residential Status (percentage national citizens), Al Ain / Eastern Region



Source: Census, 2005

Figure 2.9: Population Distribution by Residential Status (percentage national citizens), Al Gharbia



Source: Census, 2005

The ethnicity and skill levels of non-citizens in Abu Dhabi are largely determined by a combination of the following factors.

- **The local labor market:** Abu Dhabi has a considerable requirement for low-cost / low-skilled labor, principally in the construction, agriculture and service sectors, as well as skilled professionals, neither of which can be fully met by local human resources.

- **The availability of guest workforce:** Abu Dhabi has the financial capital to attract large numbers of guest workers, particularly from countries which have a deficit of capital and surplus of labor. In addition, many skilled workers are also drawn by relatively competitive remuneration packages, and absence of income tax.

- **Historic and cultural factors:** Many international workforce trends are related to a range of historic and cultural factors. For example, a relatively large proportion of Abu Dhabi's work force originates from Kerala, Southern India. This trend is closely related to the state's strong historical links to the Emirate, as well as its geographical proximity and surplus of low-cost labor

As in most societies, Abu Dhabi has a number of social groupings which have differential access to wealth and resources. As in much of the region, the main social stratification within the Emirate's population is between its national citizens and expatriates. National citizens live within a hierarchical society, broadly represented by the ruling Sheikh families and wealthy business elite and a large middle class, as well as lower income groups. For non-citizens the most basic divisions are along the lines of ethnicity, class and educational attainment. Employment in Abu Dhabi's private sector is highly stratified, with national groups often dominating certain occupations, and receiving similarly stratified incomes between occupations.

The major expatriate communities in Abu Dhabi are low or semi skilled workers from India, Pakistan, Bangladesh, Sri Lanka and the Philippines. Large groups of low skilled workers, such as construction laborers, often live in large complexes, which are often remote from the local population. Skilled foreign labor is also essential to Abu Dhabi's economy and significant numbers of teachers, professionals and other tertiary educated workers and their families have been attracted to the Emirate from the elsewhere in the region and globally. Typically, foreign workers stay in the country for a relatively short period of one to three years, although a notable number remain in the country for many years as residents before being repatriated.

The relatively large proportion of foreign labor in the economy allows the Emirate to maintain a highly flexible workforce that can be hired and released as required. Therefore, changes in labor markets, such as that caused by the decline in construction activity, can alter the demographic structure of the population considerably over a short time period.

It is likely that Abu Dhabi's economy will retain a significant dependency on the international workforce over the long-term as demonstrated by the growth rates estimated in the 2030 Structure Plans. However, it is hoped that a drive to increase productivity and develop a more high-tech, knowledge-based economy, as set out in the Economic Vision 2030, will eventually lead to a decrease in the ratio of unskilled foreign labor in the Emirate.

2.2.5.2 Illegal Workers

Estimates on the proportion of expatriates in Abu Dhabi's population do not include illegal workers (i.e. those without valid contracts and residence permits). In the absence of official estimates or statistics, the extent to which this would make a difference is uncertain. However, anecdotal evidence suggests that the actual figure may be significant, considering that around 100,000 illegal workers took up the opportunity to return to their home countries legally during an amnesty period in 2003.[15]

Offending employers often cite the expense of registering and obtaining visas for workers, as well as mandatory health insurance costs, as the reason for using illegal workers. The Abu Dhabi Government fines, detains and deports illegal workers, and their employers fined or detained for labor contract infringement.

Both the Federal Ministry of Interior and the Abu Dhabi Naturalization and Residency Directorate (ADNRD) have recently implemented a number of measures to discourage illegal working, including stricter controls on workers, tourists and employers.

The number of people entering the Emirate illegally is likely to have fallen, alongside legal entrants, following the global economic downturn. However, it is also possible that a number of workers, whose visas were cancelled as a result of losing their jobs during this time, could have either stayed on in the hope of finding alternative employment illegally and some may have become stranded.

15. National Media Council, UAE Interact, Online http://www.uaeinteract.com/docs/100,000_benefit_from_amnesty_over_six_months/8564.htm

2.2.5.3 Cultural Impact

Abu Dhabi's population growth outstrips that of natural population increase, driven by increasing numbers of guest workers and declining fertility rates. There are concerns that this will lead to the population of national citizens accounting for a progressively smaller share of the total. Coupled with an increasingly globalized existence in Abu Dhabi, there are increasing fears among citizens and officials about the potential erosion of local heritage, identity and culture.

2.3 Population Distribution and Growth Projections

Of the 1.4 million people recorded in the 2005 Census, more than 68% were residing in urban areas, the vast majority living in the nation's Capital City, Abu Dhabi, and the historic oasis town of Al Ain, close to the border with Oman. The rural population, which constitutes the remaining 32%, is largely concentrated along the two principal areas of fresh groundwater in Al Ain's rural hinterland (Eastern Region) and the Liwa crescent.

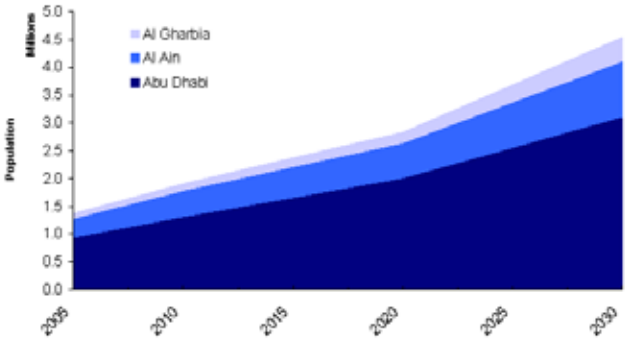
The Structure Framework Plans produced by UPC classifies the Emirate according to three regions (refer to Section 4.2). The Abu Dhabi Region is the most densely populated and contains 62% of the total population (930,000), followed by Al Ain and the Eastern Region, which together support around 31% of the total population (463,000). Al Gharbia is the largest Region in terms of total land area, yet contains only 7% of the population (106,000).[16]

Excluding the likely population growth associated with industrial development in the Eastern Region[17], a major increase in population is forecast within the 2030 Structure Framework Plans which would more than triple the population of the Emirate over the next two decades. The share of population growth for each of the regions is shown in Table 2.1: Regional Population, 2005, and Projections, 2010 - 20302.1 and Figure 2.10 is discussed in more detail below.

Table 2.1: Regional Population, 2005, and Projections, 2010 - 2030

Structure Plan Area	2005	2010	2020	2030
Abu Dhabi	930,000*	1,300,000**	2,000,000	3,100,000
Al Ain City & expansion areas	338,970	476,000**	627,000	1,000,000
Al Gharbia	106,000	136,300	211,600	450,000

Figure 2.10: Regional Population, 2005, and Projections, 2010 - 2030



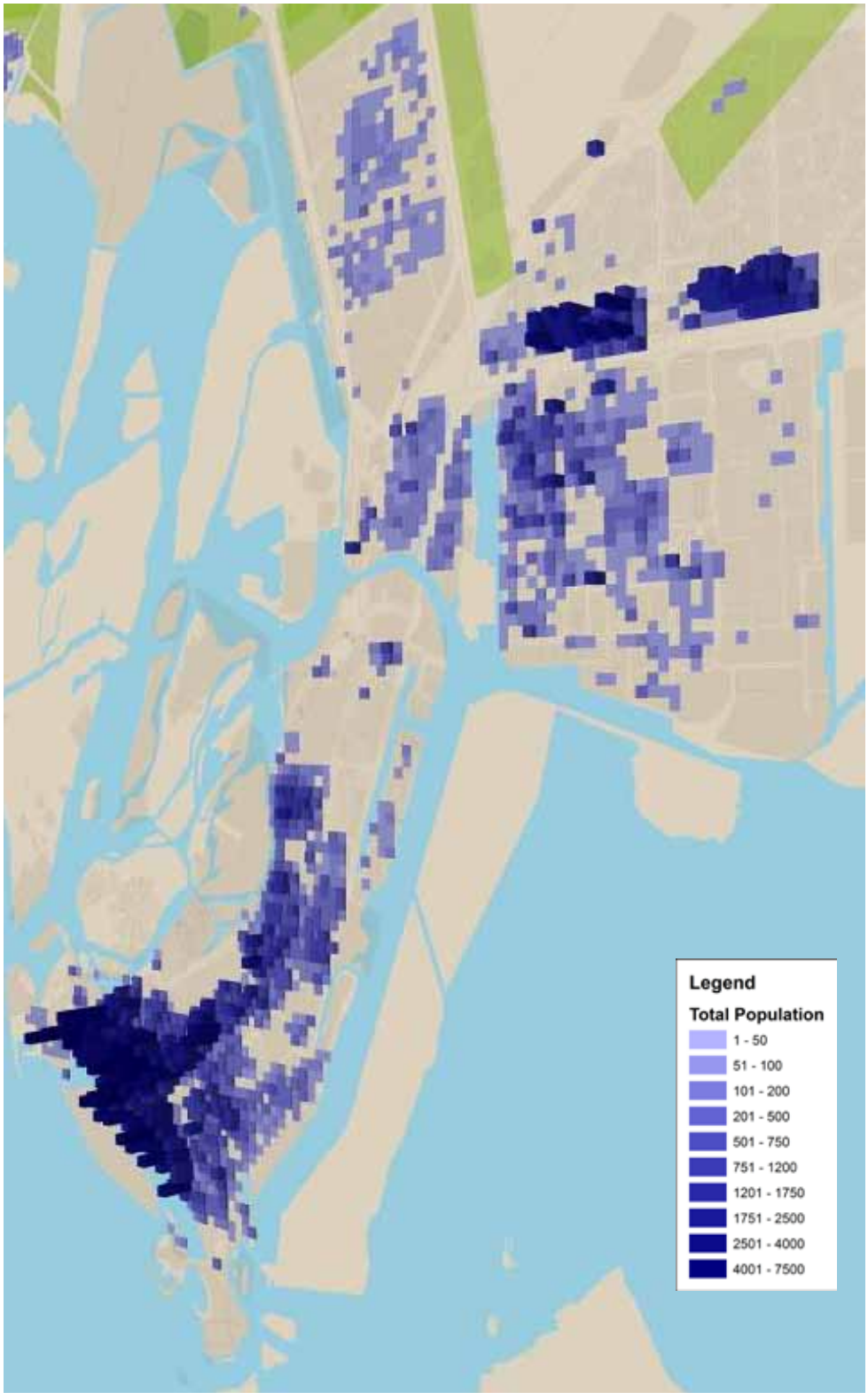
Source: 2005 Census Data and 2030 Structure Plans
Note: Excludes Eastern Region, *2007, ** 2013

2.3.1 Abu Dhabi

Figure 2.11 below shows the distribution of population on Abu Dhabi Island and immediate surrounds. The present Central Business District (CBD), focused on The Tourist Club Area, contains the vast majority of the city's residential population in predominantly high rise - high density apartment blocks. Population density is lower on the landward and western sides of the Island. Significant urban populations are also located off Abu Dhabi Island around Mussafah, Khalifa City, Mohammed Bin Zayed City, Shahama, Shamkah and Al Raha Gardens, which are the focal points for growth in lower cost housing, housing for National Citizens and a number of major mixed use developments.

16. 2005 Census
17. The Urban Structure Framework Plan for the Eastern Region is currently in development.

Figure 2.11: Normalized Geographic Population Distribution, Abu Dhabi



Source: Census 2005

2.3.2 Al Ain / Eastern Region

Figure 2.12 below shows the 2005 distribution of population in Al Ain. The city has a relatively low density in comparison to Abu Dhabi, covers a smaller area and is constrained on the southern side by the Hajar range. The planned expansion of Al Ain, which would more than double the population from 476,000 to a million over the next two decades, will be developed to similar density levels; therefore, a significant land area will be required to accommodate this development.[18]

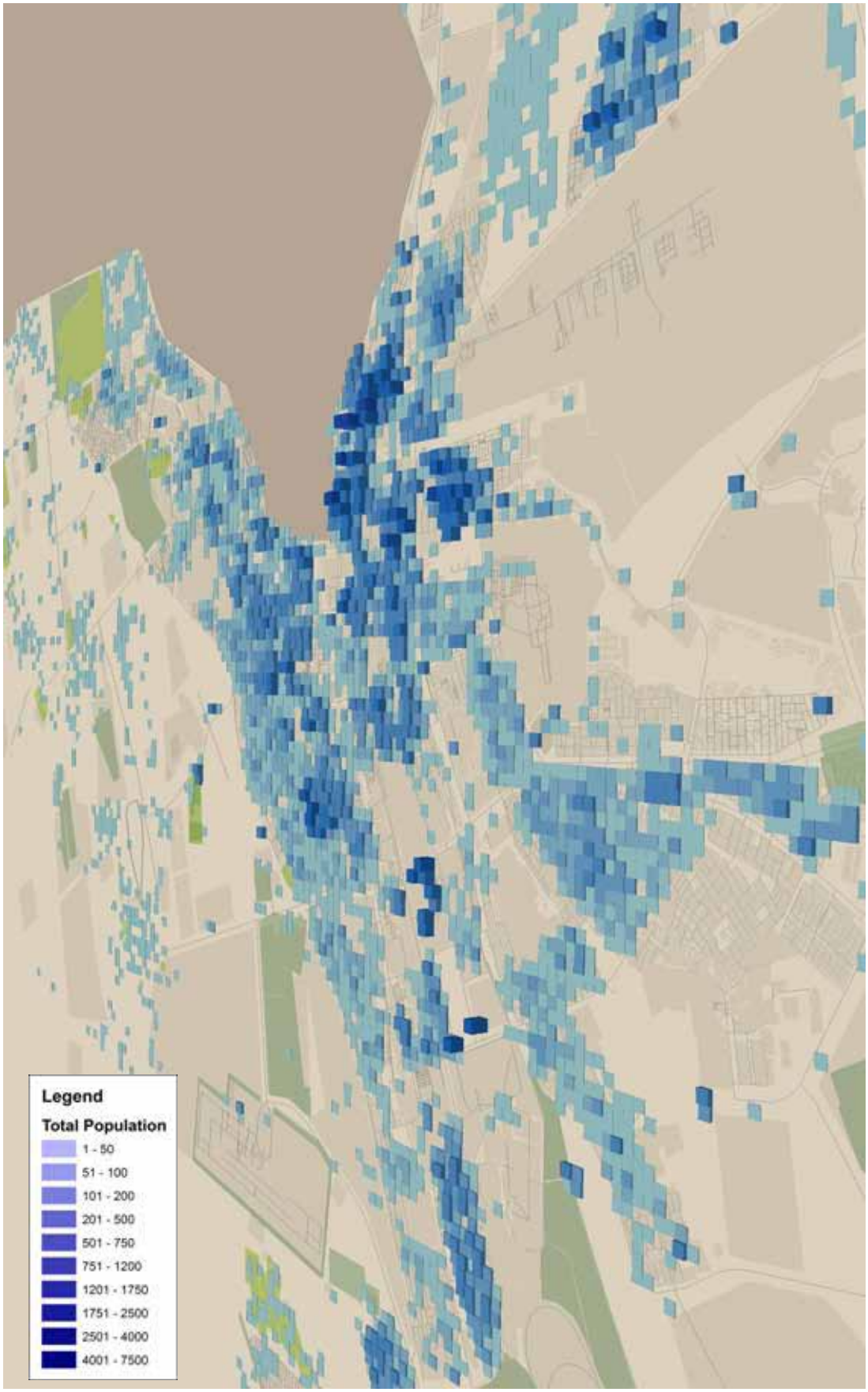
The Eastern Region surrounds the City of Al Ain and covers a large land area. Currently this area contains limited urbanization and a low population density and large areas of desert and agricultural land. As such, the region's population represents a small fraction of the total. According to UPC data, the Eastern Region (excluding metropolitan Al Ain) had a population of about 206,000 in 2008 and this population is projected to rise to 374,000 in 2030.

More detailed demographic analysis of this region will be presented in the forthcoming Eastern Region 2030 Structure Framework Plan currently being developed by the UPC. This Plan is required to deliver development to the approximately 20 main settlements of the region, including Sweihan, Nahel, Al Hayer and Remah, as well as the many dispersed hamlets each consisting of only a few homes.

The Eastern Region is not known to possess significant oil or gas reserves. However, the region is likely to become a center for industrial development away from the oil and gas sector, in line with the Government's plans for economic diversification. Such development will inevitably give rise to the parallel development of the residential communities required to service those developments.

18. Plan Al Ain 2030

Figure 2.12: Normalized Geographic Population Distribution, Al Ain



Source: Census 2005

2.3.3 Al Gharbia

The Al Gharbia region has the largest land area and the lowest density of population. The majority of the population is distributed across several small towns and their surrounding areas, the largest of which include Silah, Ghwaifat, Ghayathi, Ruwais, Jebel Dhana, Liwa and Madinat Zayed (see Figure 2.13 to Figure 2.16 below).

The Al Gharbia 2030 Structure Plan outlines plans for substantial economic growth in the region, which will see the population grow from around 106,000 people in 2005 to an estimated 136,000 in 2010, 211,600 in 2012 and 450,000 in 2030. This represents a projected 425% increase in population over the next two decades.

According to the Structure Plan, the largest level of expansion will be around Ruwais, which is projected to increase from 28,900 in 2010 to 130,000 20 years later. Similarly Liwa, Mirfa and Silah will see their populations grow to several times their current size within the same period. The majority of this population growth is planned in order to support massive investment in industry in those locations.

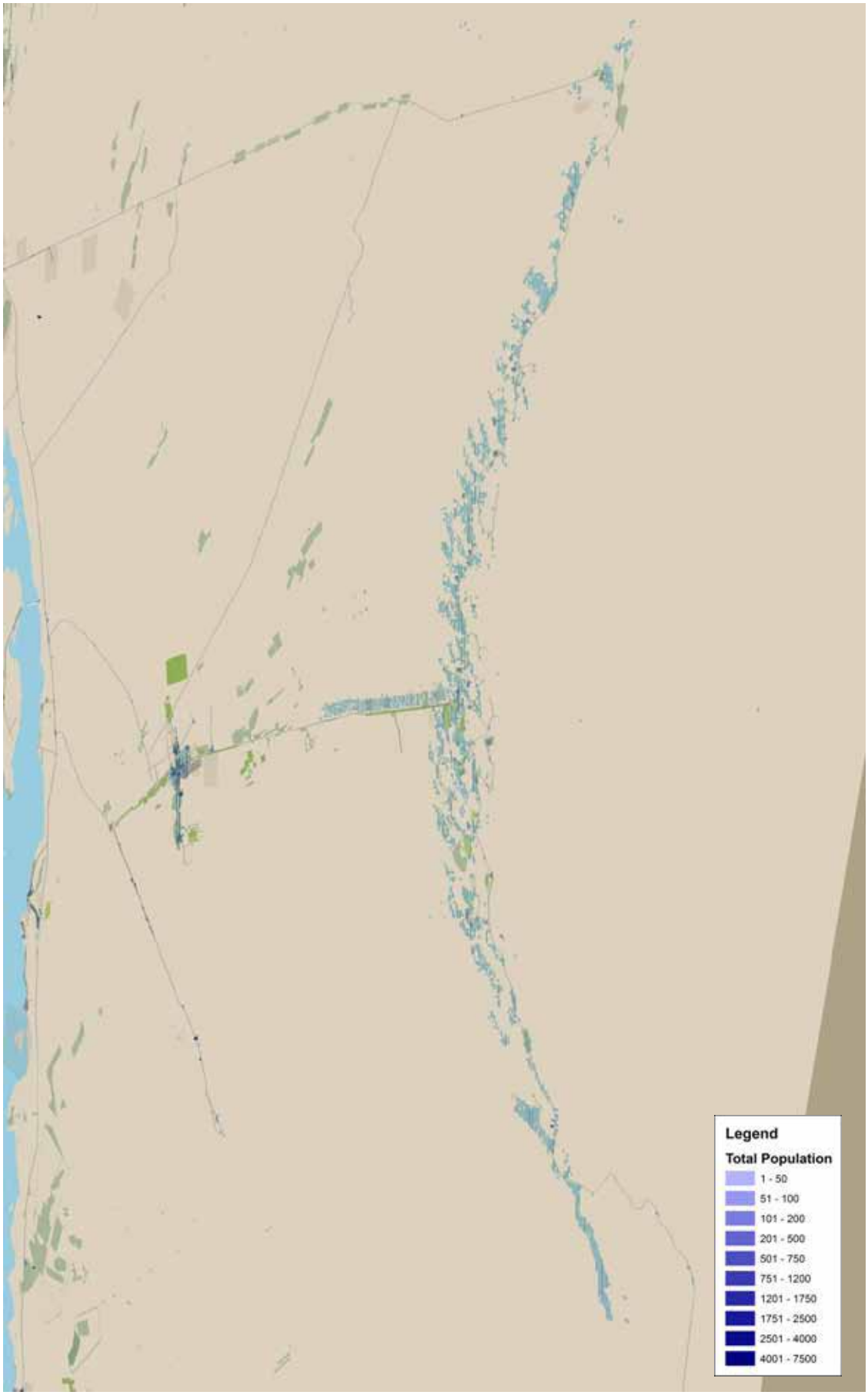
Figure 2.13: Normalized Geographic Population Distribution, Silah and Ghwaifat

Source: Census, 2005

Figure 2.14: Normalized Geographic Population Distribution, Ghayathi, Ruwais and Jebel Dhana

Source: Census 2005

Figure 2.15: Normalized Geographic Population Distribution, Liwa



Source: Census 2005

Figure 2.16: Normalized Geographic Population Distribution, Madinat Zayed

Source: Census 2005

2.4 Education

2.4.1 Institutional Development and Investment

The Government of Abu Dhabi sees investment in education and training as fundamental to delivering Abu Dhabi's long-term Economic Vision. Considering that the national population of the Emirate is predominantly youthful, this is particularly important to ensure there are qualified citizens to fill job vacancies and reduce dependency on foreign workers in all areas of the economy. Furthermore, encouraging innovation through the development of the Emirate's research and development capacity is fundamental for the creation of a competitive economic base. Accordingly, Abu Dhabi's Government has introduced an ambitious and comprehensive program of reform to ensure the highest standards of education for both residents and citizens.

The Emirate of Abu Dhabi has achieved considerable progress in the field of education in parallel with its rapid economic development. This has been achieved through sustained investment and successful policies aimed at improving the accessibility and availability of quality education for Abu Dhabi's population. The further development of higher education and vocational facilities has also been a key priority for the Government, building on established institutions of the UAE through a number of links with internationally renowned institutions.

The Emirate of Abu Dhabi is divided into three educational zones for administrative purposes, namely Abu Dhabi Education Zone (ADEZ), Al Ain Education Zone (AAEZ) and Western Education Zone (WZ).

2.4.2 The Abu Dhabi Education Council

The education system is overseen by the Abu Dhabi Education Council (ADEC) at all levels. ADEC is responsible for program and performance management for educational institutions (public and private primary, secondary and higher education). In particular, ADEC's role is to manage the link between strategic planning and implementation in the education sector. In recent years, the Council has been responsible for the introduction of a number of important strategic programs.

In terms of planning, ADEC has recently prepared Strategic Plans for Schools and Higher Education; and a comprehensive Education Policy Agenda.[19] One of the most fundamental aims of ADEC Strategic Plan for Schools is to increase the quality of education at all schools and particularly to close the gap between standards at public and private schools. In order to achieve this, as well as meet targets relating to Emiratisation of teaching staff (90% by 2020) ADEC is prioritizing improvements in teacher training. To this end, the Emirates College for Advanced Education (ECAE) opened in 2008, facilitating the graduation of around a hundred people with a post-graduate diploma in Education the following year. ADEC also recently increased the school day by two hours at public schools to match private schools and increased the mandatory minimum time for physical education from one to two hours a week.

A major milestone in the reform of the education sector is the recent release of ADEC's new public school curriculum, which is to be phased in over a six year period. The curriculum has been designed in accordance with the Emirate's Economic Vision 2030 in order to "*prepare students to contribute to, and be competitive in, the global society while preserving national identity, local culture, and traditions*".

The Council completed the creation of a detailed education database in February 2009, which contains statistics collected on teachers, students and facilities and will be updated twice a year. Building on this, a demographic analysis currently proposed by ADEC will provide enrolment projections by grade and by level of education across the three educational zones.

ADEC has also overseen the advances in administration and management of both staff and pupils at public schools with the development of two major new electronic systems. The Electronic Resource Planning (ERP) program assists managers in the efficient administration of payroll, HR and other staff related administration. The enterprise Student Information System (e-SIS) provides real time access to the records of students, including attendance and a Geographic Information System (GIS) including a school finder and advanced analysis features was created in 2009.

2.4.3 Schools

Education is universal and compulsory up to the age of 18, and is broken down into three school 'cycles'.[20] For national citizens education is provided free at all levels within Government schools, although there is also an extensive private education sector.

2.4.3.1 Public Schools

In the public sector, there were a total of 301 facilities operating during the 2008/9 academic year within all

19. Policy Agenda is currently awaiting Executive Council approval.

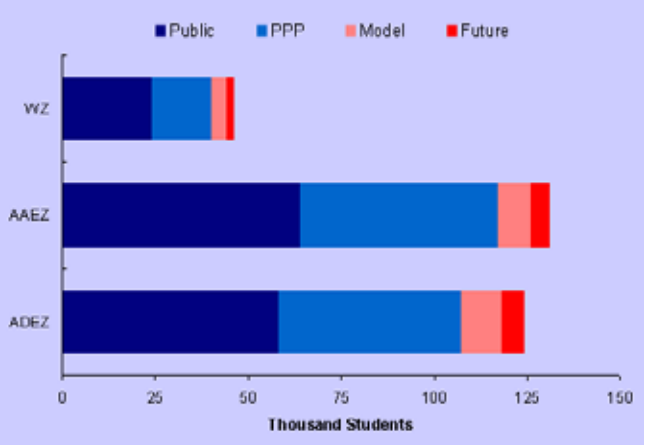
20. Grade 1 to 5 (6-12 years), Grade 6 to 9 (12 – 15 years), and Grade 10 to 12 (16-18 years).

cycles. Al Ain contains a large proportion of these facilities relative to its total population size, with 131 facilities, reflecting its status as a center of learning. 124 facilities are located in Abu Dhabi and a further 46 in the Western Region.

As illustrated in Figure 2.17, in addition to the regular public schools, which constitute the majority of facilities in all regions, there are 24 'Model' and 13 'Future' schools. These 37 schools have been allocated more resources and greater autonomy. A further 118 schools are currently administered by Public Private Partnership (PPP) with further partnerships planned. Model, Future and PPP managed schools are intended to increase competition and create a range of models from which best practices can be adopted.

A total of 13,683 staff members were employed in Abu Dhabi's public schools during 2008/9, 10,983 of which were teaching staff. Around 40% of teachers are UAE nationals; the remainder are from overseas, the vast majority from Arab countries, particularly Egypt, Jordan and Syria. 44% of teachers were employed in schools in Abu Dhabi, 44% in Al Ain, and the remaining 12% located within the Western Zone.

Figure 2.17:Schools, by Region and Type – All Cycles, 2008/9



Source: ADEC Academic Data Reference Book 2008/9 (2009)

Table 2.2: Public School, Academy, Center and Family Development Enrolled Students, by Grade and Region (Educational Zone), 2008/92.2 shows the 2008/9 breakdown of students at public schools, academies, centers and 'family development' by educational zone at each level to Grade 12. This data, presented within the ADEC Academic Data Reference Book (2008-9), shows that there were a total of 119,226 students enrolled in Public Schools within all Cycles, the majority of which were in Al Ain (AAEZ) and Abu Dhabi Educational Zones (ADEZ). Dividing the number of facilities by the number of pupils in each region shows the average number of pupils per facility to be 452 students in Abu Dhabi, 395 in Al Ain and 248 in the Western Zone (WZ).

Table 2.2: Public School, Academy, Center and Family Development Enrolled Students, by Grade and Region (Educational Zone), 2008/9

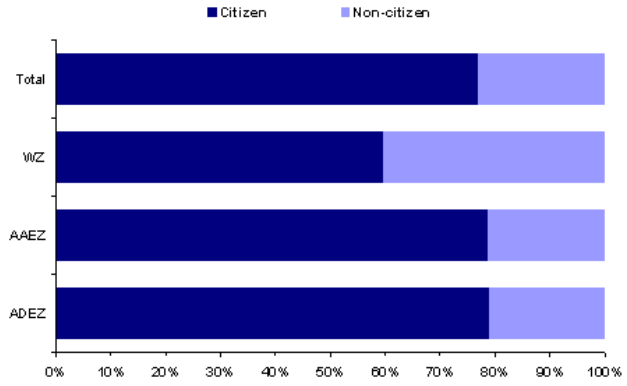
Cycle	Grade	Public Schools				Academy, Center and Family Development			
		ADEZ	AAEZ	WZ	Total	ADEZ	AAEZ	WZ	Total
0	KG1	2,295	2,146	474	4,915				
	KG2	2,673	2,293	488	5,454	23	27	9	59
1	Grade 1	3,726	3,449	917	8,092	136	72	39	247
	Grade 2	3,815	3,427	833	8,075	118	55	22	195
	Grade 3	3,658	3,539	830	8,027	15	55	3	73
	Grade 4	4,022	3,704	860	8,586	18	28	3	49
	Grade 5	4,061	3,784	858	8,703	70	-	25	95
2	Grade 6	4,100	4,140	919	9,159	44	-	16	60
	Grade 7	4,625	4,336	980	9,941	74	26	28	128
	Grade 8	4,198	4,135	876	9,209	85	34	24	143
	Grade 9	5,167	4,510	924	10,601	85	39	24	148
3	Grade 10	5,053	4,349	896	10,298	115	73	24	212
	Grade 11	4,295	3,810	802	8,907	114	78	26	218
	Grade 12	4,131	3,973	724	8,828	172	121	58	351
Special Education		261	117	53	431				
Total		56,080	51,712	11,434	119,226	1,046	581	292	1,919

Source: ADEC Academic Data Reference Book 2008/9 (2009)

Figure 2.18 shows that the majority of students enrolled in public schools in the Emirate, around 77%, were UAE citizens in 2008/9. The pattern is roughly similar in Al Ain and Abu Dhabi, but the proportion of non-citizens is higher in the Western Region accounting for roughly 40% of the public school population in that educational zone.

In response to recent and anticipated population growth in the Emirate, ADEC recently announced the development of 100 new public schools in the Emirate, 18 of which are programmed for completion in 2011 and a further 12 by the end of 2012. About 30 of the 100 new schools will replace existing institutions. However, the decision to build a large number of new public schools is related to the need to accommodate the greater number of expected students which will naturally accompany the Emirate's projected population growth, as well as the need to replace aging schools with more modern facilities.

Figure 2.18: Proportion of citizens to non-citizens enrolled in Public Schools, 2008/9



Source: ADEC (2009) Academic Data Reference Book 2008/9

2.4.3.2 Private Sector Schools

Detailed statistical information on the performance or demographic profile of schools in Abu Dhabi's private education sector was not available at the time of writing (January, 2010). However, according to ADEC's records there were 182 private schools in the Emirate during 2008/9 academic year. Over the past decade, this private sector has grown dramatically to accommodate a growing expatriate population and an increasing enrollment of national citizens.[21]

At the lower end of the private market, there were estimated to be around 40,000 children attending schools housed in villas and other facilities during 2009.[22] These facilities, colloquially known as 'villa schools', often cater for the needs of low income communities. However, standards at such schools are often not centrally managed and classes are frequently overcrowded. Relocating these students to more appropriate facilities is a key objective for ADEC.

2.4.4 Higher Education

The Government sees Abu Dhabi's higher education system as an essential part of economic diversification and private sector development. Effective higher education and vocational training is necessary to provide Abu Dhabi's youthful Emirati population with the necessary level of skills and education to fill job vacancies in all sectors and reduce dependency on overseas labor. An advanced higher education sector is also required to provide the necessary research and development to innovate and compete in the global market, particularly in the manufacturing and technological sectors targeted by the Government as part of its plans for economic diversification.

Abu Dhabi has 26 public and 15 private higher education institutions as well as industry specific establishments such as the Petroleum Institute. Figure 2.19 to Figure 2.21 show that the distribution of people with higher education, according to the 2005 Census, are concentrated in the two main urban centers of Abu Dhabi and Al Ain. The education sector in Al Ain is a key part of the local economy, as the city contains a relatively large number of higher education facilities and students proportional to its population.

2.4.4.1 Public Institutions

National citizens can attend public education institutions in the UAE free of charge. These establishments are exceptionally well provided for in terms of facilities and resources. However, many local students choose to travel overseas or to other Emirates, particularly Dubai and Sharjah, to attend university.

The main Government Higher Education Institutions in Abu Dhabi Emirate are as follows,

- Zayed University
- United Arab Emirates University
- Higher Colleges of Technology
- Khalifa University of Science, Technology and Research

21. http://www.uaeinteract.com/education/

22. The Report – Abu Dhabi 2009

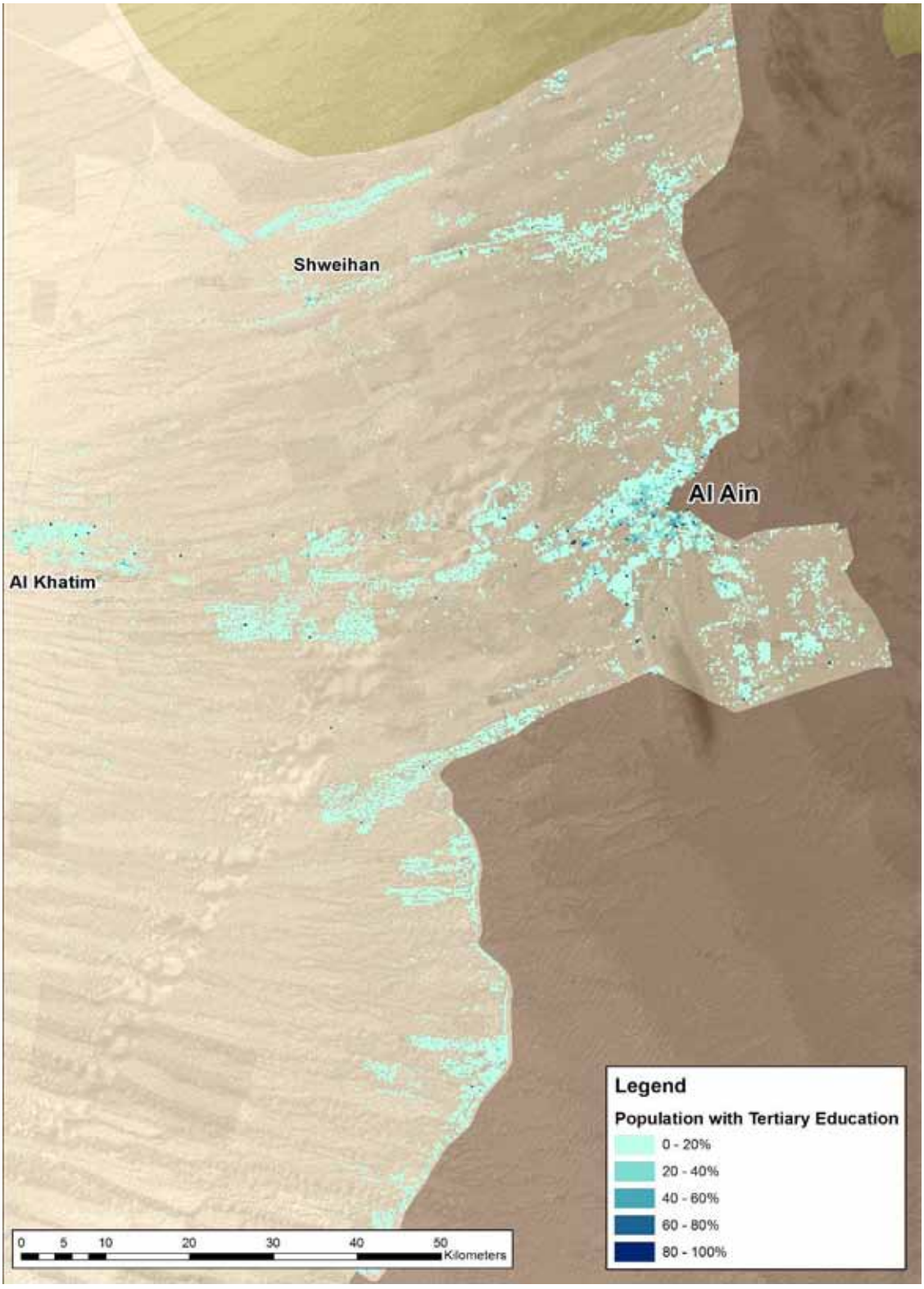
While access to Government Higher Education institutions is restricted to national citizens, university places are to be offered to non-citizens in certain key fields to increase the pool of skills required for the Emirate's economic growth. The Zayed University enrolled its first non-Emirati students in the last academic intake 2009/10.

In order to provide vocational training in the Emirate, three new Vocational Education and Training Institutes (VETI) have been established at campuses in Al Ain, Abu Dhabi and Al Gharbia. With the increasing specialization of the labor market, the VETI prepare students for careers in a diverse range of vocational occupations in industries such as retail, information technology, business, hospitality and mechanics, through learning programs which emphasize occupational, industry and essential skills.

Figure 2.19: Distribution of Population with Higher Education, Abu Dhabi

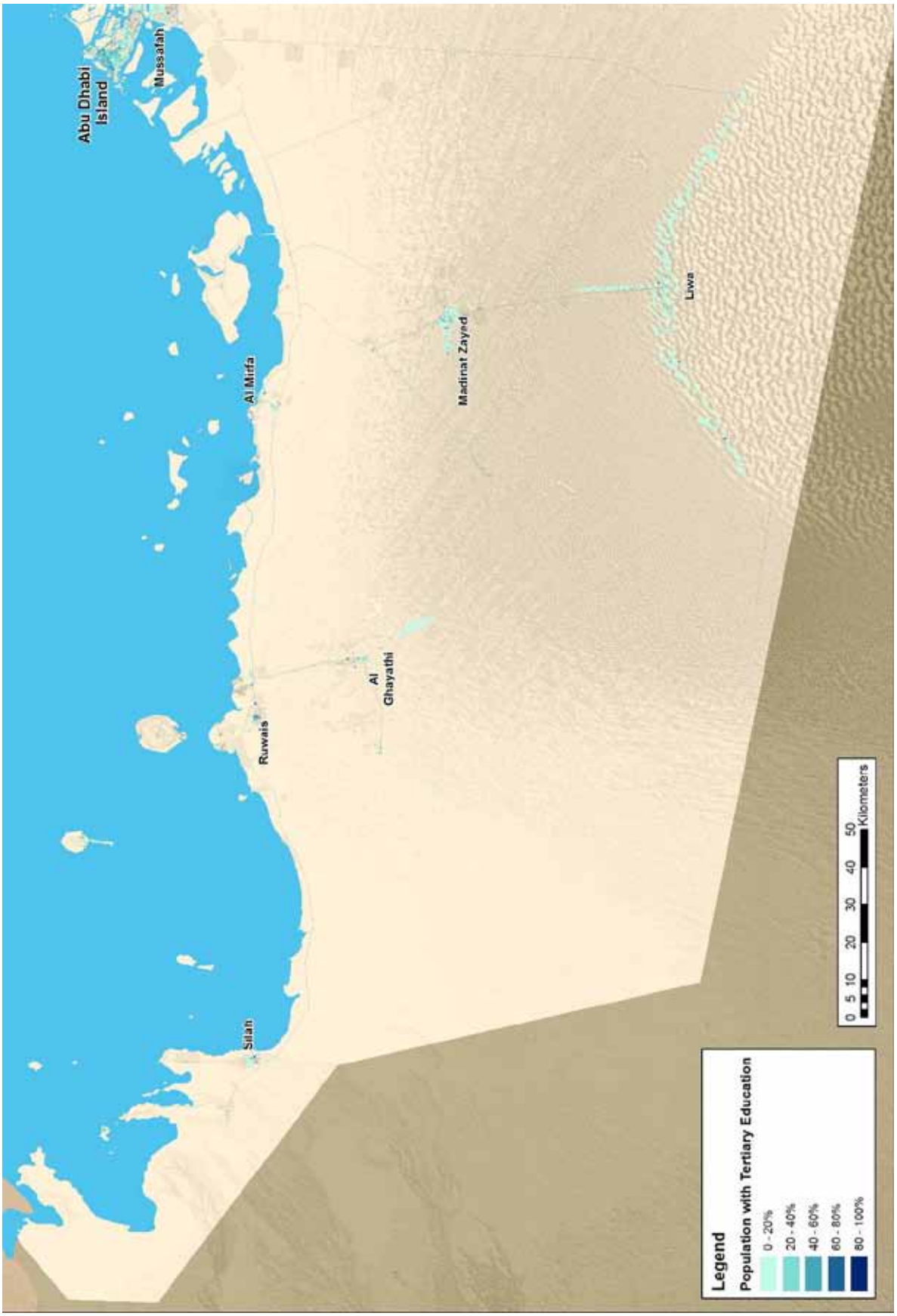
Source: Census 2005

Figure 2.20: Distribution of Population with Higher education, Al Ain



Source: Census 2005

Figure 2.21: Distribution of Population with Higher Education, Al Gharbia



Source: Census, 2005

2.4.4.2 Private Institutions

Private fee-paying institutions are open to admissions from all nationalities. Public institutions such as the UAE and Zayed Universities and the Higher Colleges of Technology (HTCs) continue to expand and advance through continued government investment. Several private sector institutions have developed high profile links with prestigious international universities. Established international institutions include the Paris-Sorbonne University - Abu Dhabi, the University of Strathclyde Business School and the New York Institute of Technology. Other private universities in the Emirate include the following institutions.

- Abu Dhabi University
- Al Ain University of Science and Technology
- Al Hosn University
- Al Khawarizmi International College
- Emirates College of Technology

Due to accept its first intake of students in 2010, the Abu Dhabi Campus of the New York University (NYUAD), will establish a research university with an integrated liberal arts and science college on Saadiyat Island.

The recent addition of the Masdar Institute of Science and Technology (MIST) in partnership with the Massachusetts Institute of Technology (MIT) this year will serve to foster the development of the future energy and sustainability economy in the Emirate.

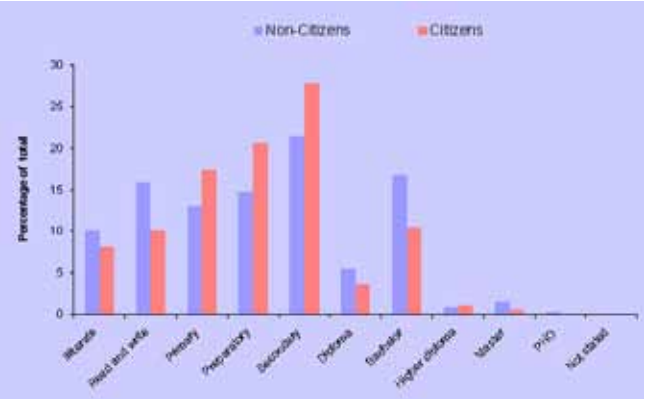
At present, all higher education campuses in Abu Dhabi are single-sex. However, the first co-ed Campus in Abu Dhabi is set to be opened within the Sheikh Mohamed bin Zayed University Scholars Program at the NYUAD in 2010.

2.4.5 Educational Attainment

Figure 2.22 shows the maximum level of educational attainment for national citizens and non-citizens above the age of 10. The implementation of successful policies in primary and secondary education has contributed to the achievement of a high adult literacy rate of around 92% amongst citizens in 2008; and represents a rapid increase from around 77.3% in 2003 and 69% in 1985.[23] The higher proportion of non-citizens who are either illiterate or literate but did not attend school (more than 25%), is likely to reflect the large number of unskilled or semi-skilled laborers working in construction, agriculture and the service sector. The higher proportion of post-graduate educated non-citizens (25%) compared to citizens (16%) is likely to be representative of the large pool of foreign professionals.

23. UNDP (2005) Human Development Report 2005

Figure 2.22: Educational Status (10 years and over) in Abu Dhabi Emirate, by Residential Status, 2007 - 2008

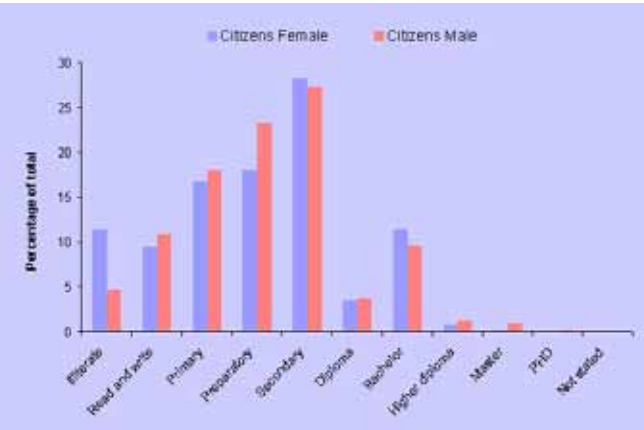


Source: SCAD (2009) Household income and expenditure survey 2007 / 2008

The UAE's continued commitment to female education is demonstrated by recent figures from the United Nations Educational, Scientific and Cultural Organization (UNESCO) which show the UAE to be one of only 15 countries, and one of only two Gulf States, where the educational balance is tipped in favor of girls.[24]

In Abu Dhabi, 11.4% of females and 9.5% of males possess a Bachelor's degree and there are an increasing number of women enrolling in university compared to men (see Figure 2.23).[25] However, illiteracy remains higher amongst females than males, although it is likely this is more likely to be representative of women from the older generation.

Figure 2.23: Educational Status of National Citizens (10 years and over) in Abu Dhabi Emirate, by Gender, 2007 - 2008



Source: SCAD Household income and expenditure survey 2007 / 2008

24. UNESCO (2009) Education for All (EFA) - Global Monitoring Report: Overcoming inequality: why governance matters

25. The National (2009) http://www.thenational.ae/apps/pbcs.dll/article?AID=/20091106/NATIONAL/711059868

2.5 Health

2.5.1 Overview

The health of Abu Dhabi's population has been transformed over the past 40 years as a result of the Emirate's exceptional economic development and the implementation of successful healthcare policies. In particular, the introduction of mandatory health insurance for foreign workers in 2007, and free healthcare insurance for citizens in 2008, now gives all residents in Abu Dhabi access to high quality care. The Abu Dhabi Government is aiming to accelerate this positive trend, through an ambitious program of structural reform which is set to revolutionize the health sector in the Emirate.

The health system in Abu Dhabi is administered by the Health Authority Abu Dhabi (HAAD). HAAD's main responsibilities are to define the health strategy, policies and regulatory framework, inspect, regulate and enforce minimum standards and performance targets, drive social health programs and monitor and analyze health and the performance of the overall healthcare system.

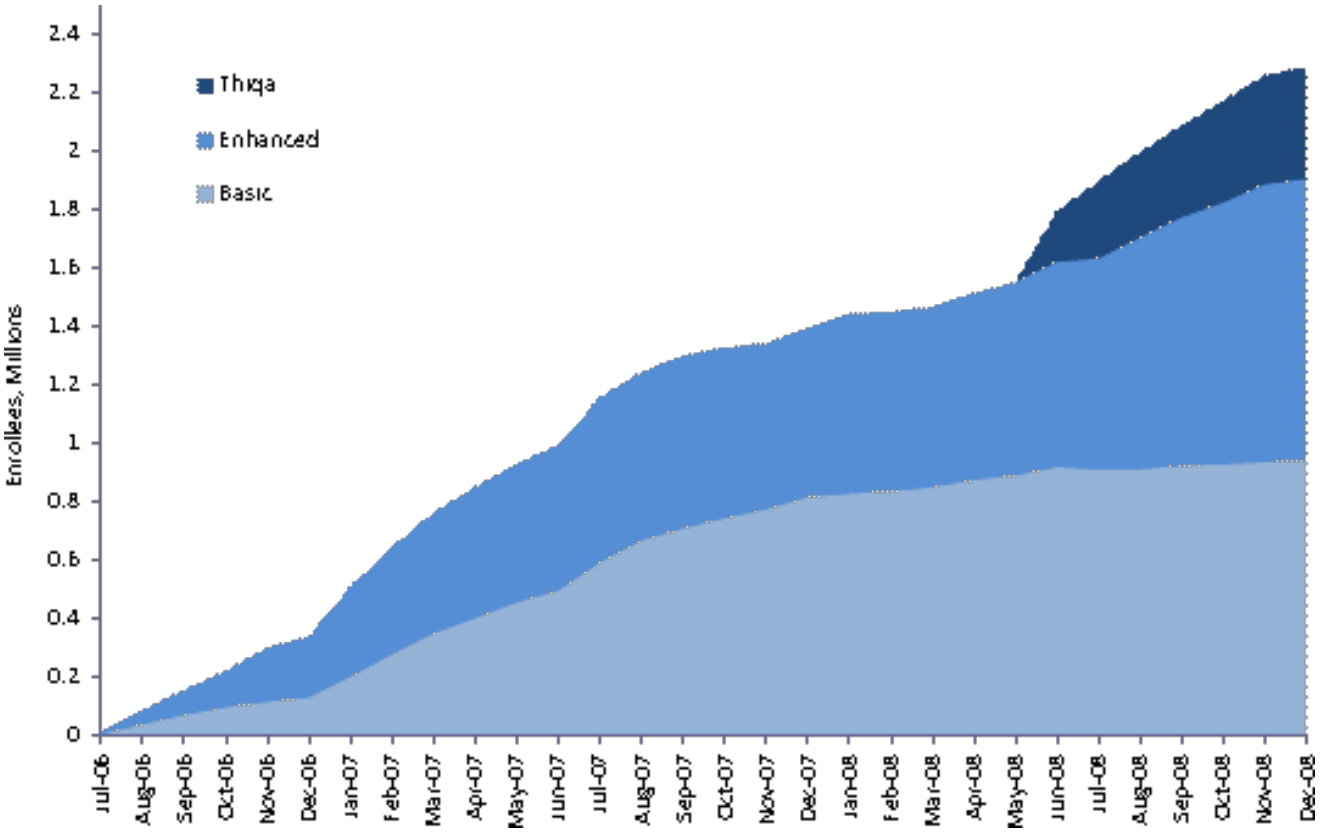
The foundation for universal health insurance coverage in Abu Dhabi and the UAE is provided through Daman, the National Health Insurance Company, which is majority owned by the Government, through its basic package, while enhanced packages compete with higher end private schemes. Daman also provides funded access to public and private health facilities for all national citizens through its 'Thiqa' program. The level of public health coverage provided in Abu Dhabi, since the establishment of these schemes, is shown in Figure 2.24.

Health services are provided by a range of private companies, while public health care hospitals are managed by the Abu Dhabi Health Services Company (SEHA). SEHA hospitals are Government subsidized and have an exclusive contract with Daman. SEHA facilities provided 94% of all critical care bed days during 2008 and treated 62% of all in-patients and 28% of all outpatients. SEHA manage around 32% of hospitals and 15% of centers.

The HAAD *Statistical Highlights Report 2008* provides the following snapshot of the health sector in Abu Dhabi Emirate.

- 1,050 healthcare facilities were licensed at the end of 2008: 37 hospitals with 3,546 beds, 582 centers and clinics as well as 431 pharmacies and stores;
- They employed 5,299 Doctors 6,888 Nurses and 3,516 Allied Health Professionals;
- 33 licensed insurers compete for members;
- 2.3 million insurance contracts were issued in 2008, including 380,000 Thiqa contracts covering the majority of national citizens;
- 4.1 million claims were processed in 2008, 98% of which were filed by outpatients;
- Overall bed occupancy rates vary significantly by facility, but have not increased in aggregate. Bed occupancy levels were consistently over the optimal of 85% throughout 2008 and the beginning of 2009.

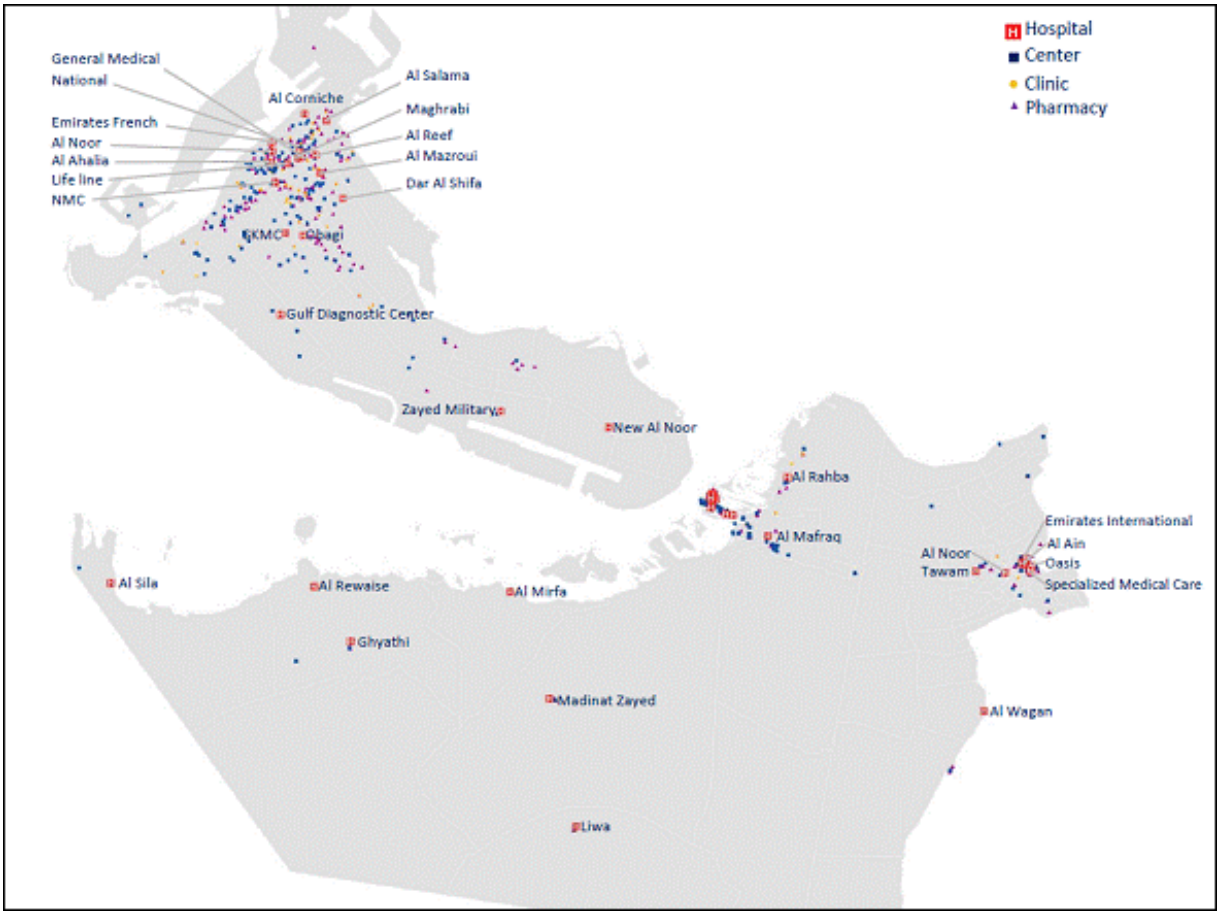
Figure 2.24: Public Health Insurance Enrolments by Type, July 2006 to December 2008



Source: HAAD, 2009

multiple clinics

Figure 2.25: Location of Health Facilities



Source: HAAD (2009) Statistical Highlights Report 2008

Table 2.3: Health Facilities in Abu Dhabi Emirate, by Region, 20082.3 and Figure 2.25 show the number and location of Abu Dhabi's health facilities. As would be expected, the provision of facilities is correlated according to population density, with the majority of hospitals and health centers located in Abu Dhabi and Al Ain Urban Areas. In the Western Region, hospitals and centers are dispersed within its main towns.

Table 2.3: Health Facilities in Abu Dhabi Emirate, by Region, 2008

Facility	Abu Dhabi	Eastern/ Al Ain	Western	Total	SEHA
*Hospital	23	8	6	37	32%
**Center	286	95	5	386	15%
Clinic	125	66	5	196	5%
Pharmacy	249	101	19	369	9%
Store	56	6	0	62	0%
Total	739	276	35	1,050	11%

Source: HAAD Q2 2009 Health Statistics
* Hospital – healthcare facility with in-patient beds; ** Center - facility with

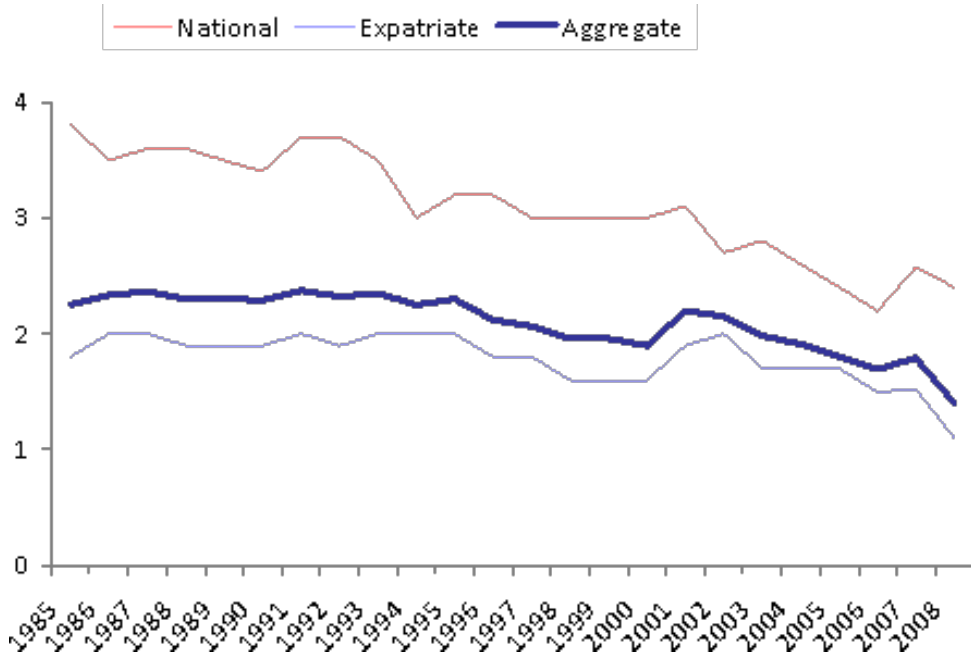
The burden on the Emirate's health services is reduced by the fact that the majority of the population consists of non-citizens, whose residence status is generally contingent on being employed, creating very few retirement-aged people compared to other countries.

1.1.1 Health of the Population

As shown in Figure 2.26, the mortality rate of Abu Dhabi's population declined steadily over the past two decades and today's national life expectancy of 78.5 years is comparable with most other developed countries. [26] Infant mortality (children under one year) also reported a significant decrease between 1990 and 2007 from 15 to 8 per 1,000 live births across the UAE.[27]

26. National Media Council (2009) UAE Yearbook 2009
27. SCAD (2010) Demographic and Social Indicators Report.

Figure 2.26: Annual mortality rate per 1,000 population, 1985 – 2008



Source: HAAD (2009) Statistical Highlights Report 2008

According to the 2009 HAAD Statistical Highlights Report, the main health issues currently affecting Abu Dhabi's population include the following:

- High rates of chronic diseases related to lifestyle such as obesity, diabetes, and cardiovascular disease. The WHO reports obesity rates of 25.6% for males and 39.9% for females for UAE residents over 15 years of age. Without major intervention, these rates are set to increase further as the young population ages. Cardiovascular diseases accounted for a quarter of deaths in 2008. Consequently, adult Nationals are now screened for cardiovascular risk factors as a condition for enrollment in Thiqa insurance.

- In 2008, diseases of the Circulatory System were the number one cause of death, accounting for 24% of all deaths registered in the Abu Dhabi Emirate. 'External causes' were the next most significant cause of death, largely related to high rates of injuries resulting from road traffic accidents, which accounted for 15% of all deaths and was the leading cause of death amongst young males.

- Respiratory infections are the most common non-life threatening condition, accounting for 15% of all encounters across all healthcare facilities. Respiratory infections impact workforce productivity and quality of life.

- Neoplasms were the third highest cause of mortality in Abu Dhabi during 2008, with cancer causing around 14% of all deaths. Breast cancer is the dominant cancer in Abu Dhabi. Late detection of breast cancer leads to significant increases in mortality. Female adult citizens aged 40-69 are being screened for breast cancer as part of their Thiqa insurance renewal.

- There were 18,489 notifications of communicable diseases in 2008, an increase of 2,200 from the previous year. However, rates of childhood communicable diseases remain very low, largely due to immunization programs targeting children less than 5 years of age. Expatriates are screened for communicable diseases before acquiring residence status; and,

- An estimated 11.2 million encounters (i.e. the number of times a medical provider service has been used) occurred in 2008. Hospitals were associated with half of encounters, 174,588 of which were inpatients; of which national citizens accounted for 40% of these encounters (despite representing less than 25% of the population).

Table 2.4: Abu Dhabi Health Demand Projections to 2018

	2008	2018		Additional Capacity Needs over 10 years							
		Low	High	CAGR*		Absolute		Annualized			
				Low	High	Low	High	Low	High		
Outpatients (mil.)	11	19	22	6	7	8	11	1			
Inpatients (,000)	174	251	276	3.7	4.7	77	102	6	8	Including Staff Turnover	
Beds	3,500	5,000	5,500	4	5	1,400	1,900	120	160	Low	High
Doctors	5,300	9,100	10,200	6	7	3,800	4,900	300	360	1,500	1,600
Nurses	6,900	11,900	13,300	6	7	5,000	6,400	390	470	1,600	1,800

Source: HAAD (2009) Statistics Highlights Report 2008. *Compound Annual Growth Rate

2.5.2 Projections

Alongside other factors, rapid population growth has led to large increases in the demand for health services in the Emirate in recent years. Population growth is projected to continue for the foreseeable future in line with plans for development across all regions. In addition, significant growth in health service demands related to chronic diseases such as diabetes and cancer is expected to lead to large volume increases in both inpatient and outpatient services.

HAAD projections of patients, staff and hospital beds, presented in It is anticipated that a significant proportion of the demand for new health facilities will be generated as a result of major new development projects in areas such as Khalifa City A, Mohammed Bin Zayed City, Capital City, the islands adjacent to Abu Dhabi Island and new developments surrounding Al Ain. Existing centers within Al Gharbia are also likely to require expansion to accommodate the significant population growth expected in the urban areas.2.4, show that demand for inpatient services may require up to 2,000 additional beds within ten years beyond the current 3,546 beds. Additionally, despite substantial growth in the proportion of doctors to residents, it is estimated that up to 5,000 additional doctors and 6,500 nurses will be required by 2018. If staff turnover rates remain at their 2008 level, this will require the annual recruitment of an additional 1,600 doctors and 1,800 nurses.

It is anticipated that a significant proportion of the demand for new health facilities will be generated as a result of major new development projects in areas such as Khalifa City A, Mohammed Bin Zayed City, Capital City, the islands adjacent to Abu Dhabi Island and new developments surrounding Al Ain. Existing centers within Al Gharbia are also likely to require expansion to accommodate the significant population growth expected in the urban areas.

2.5.3 Health Sector Development

The institutional context for the health sector in Abu Dhabi is changing rapidly. Structural reforms and an increasing role for the private sector are underway to meet the considerable demands of the rapidly expanding population and to underpin the social and economic development of the Emirate.

In 2007, the erstwhile General Authority for Health Services (GAHS) was replaced by HAAD, which took on its regulatory role, while operational functions moved to SEHA. This decision was taken to remove potential conflicts of interest and increase confidence in the health system. From this foundation, both HAAD and SEHA have instated a raft of reforms aimed at raising the quality of health care to international standards. Key objectives for these institutions set by the Abu Dhabi Executive Council are as follows:[28]

1. Improve quality of care, always the primary consideration, to be promoted through application of rigorous service standards and performance targets for all.
2. Expand access to services, giving all residents access to the same standard of care with the power to choose healthcare services thus promoting excellence through free-market competition.
3. Shift from public to private providers safely and efficiently so that private providers, rather than government, services healthcare needs, with the role of government restricted to the development and enforcement of new, world-class healthcare standards.
4. Implement a new financing model through a new system of mandatory health insurance.

28. Emirate of Abu Dhabi Executive Council, General Secretariat: Social and Human Resources Policy

2.5.4 Link between Health and the Environment

The WHO has estimated that as much as 24% of the global burden of disease is attributable to environmental factors.[29] Indeed, alongside the major health gains which have accompanied Abu Dhabi's rapid development and industrialization (outlined above), there has been an increase in the population's exposure to environmental pollution.

In order to reduce this burden across the UAE, the EAD, in cooperation with several other agencies, have produced the UAE National Strategy and Action Plan for Environmental Health (2009). This Strategy outlines the country's plans to reduce avoidable deaths and illnesses which can be attributable to environmental pollution, particularly related to contamination of air, water, soils and food, as well as exposure to radiation and hazardous substances in occupational settings.

The Strategy outlines a series of short-term (2014) and long-term (2030) goals to improve environmental health as well as Key Performance Indicators (KPIs) to measure progress towards these goals. The associated Action Plan provides a framework of initiatives through which the strategy will be delivered.

The Strategy is strongly linked to a number of other key strategic documents recently produced in Abu Dhabi, including the 2009 Abu Dhabi Water Resources Master Plan, the Abu Dhabi Waste Management Strategy and the newly developed Abu Dhabi Environment, Health and Safety Management System (AD EHSMS).

2.6 Summary of Key Population and Social Development Factors

Rapid population growth has been accompanied by a sustained investment in education, health and social services. As a result, Abu Dhabi's citizens and residents enjoy one of the highest standards of living in the region. If it were assessed alone, the Emirate would rank 30th on the United Nations Development Program's (UNDP) Human Development Index (HDI), which measures quality of life (according to life expectancy, education and literacy, and purchasing power) across 178 countries.

This is largely thanks to the Abu Dhabi Government's recognition that people rather than oil are the Emirate's most important asset as they are both the producers and consumers which underpin the economy and the guardians of its rich culture and heritage.

This theme is carried through and strengthened within the Government's new policy agenda, with the '*development of social and human resources'* identified as the pre-eminent objective and driving motivation behind all policies and initiatives. This objective is also recognized as one of the four key pillars of the Economic Vision 2030.

However, the huge societal transformation which has accompanied Abu Dhabi's rapid demographic and economic growth has inevitably led to a number of key social, environmental and economic issues which face the Emirate today. The following bullet points provide a brief summary of the key challenges facing the Emirate in the sustainable development of social and human resources, according to the issues discussed in this Section.

- The enormous growth planned to 2030 within the four Structure Plans, Economic Vision and other policy tools will drive the spatial characteristics of the Emirate's demography in the coming decades. However, there is little discussion on what constitutes a sustainable level of population in the current planning and policy literature. Higher populations will be required to support the ambitious developments and continued economic growth, which will in turn lead to increasing use of local resources, environmental pollution and degradation, production of waste and demands on physical and social infrastructure and utilities.

- The majority of planned population growth will come from international guest labor. Combined with falling fertility rates amongst national citizens, the indigenous population is representing a declining proportion of the total. Examining current trends, according to the forecasts within the 2030 Structure Framework Plans, the current population could almost triple over two decades. If this were to occur, at the current rate of fertility, the local population would represent a very small proportion of the total.

  This scenario has led to increasing concerns about how to maintain national identity and traditions. The process of globalization and the increasing dependency on overseas labor exacerbate the challenges. Efforts to address these concerns through policies of Emiratisation have so far had mixed results.

29. WHO (2006) Preventing disease through healthy environments: towards an estimate of the environmental burden of disease.

- The 'youth bulge' is a significant common issue in the Arab region.[30] In Abu Dhabi, this trend has led to an increasing number of young Emiratis entering the labor market. Although many new jobs will be created by the scale of new development in the Emirate, most of these are within the private sector. As the public sector, within which the majority of national citizens work, is approaching saturation, many Emiratis are no longer guaranteed to find their position of first choice. This has resulted in high unemployment among young Emiratis, which is further diminishing the proportion of nationals within the workforce.

- The Government's commitment and positive attitude towards female education has led to significant improvements in educational attainment. At present Emirati women outperform men in both results and levels of enrollment in tertiary education. However, despite some recent improvement, this has not yet translated into the desired levels of participation of women in the workforce. Increasing the number of women in the workplace is key aspect of public and private sector Emiratisation policies.

- The large influx of overseas workers into Abu Dhabi's economy has produced one of the most ethnically diverse populations in the world. However, wide variations in income, class and culture have led to an extremely stratified society. Some of the poorest social groups are often located on the outskirts of towns or in remote areas with few services and facilities. As such areas often lack public transport systems, those without access to motorized transport can be at risk of social exclusion.

30. UN (2009) Arab Human Development Report 2009

3. ECONOMY

3.1 Overview and Economic Vision

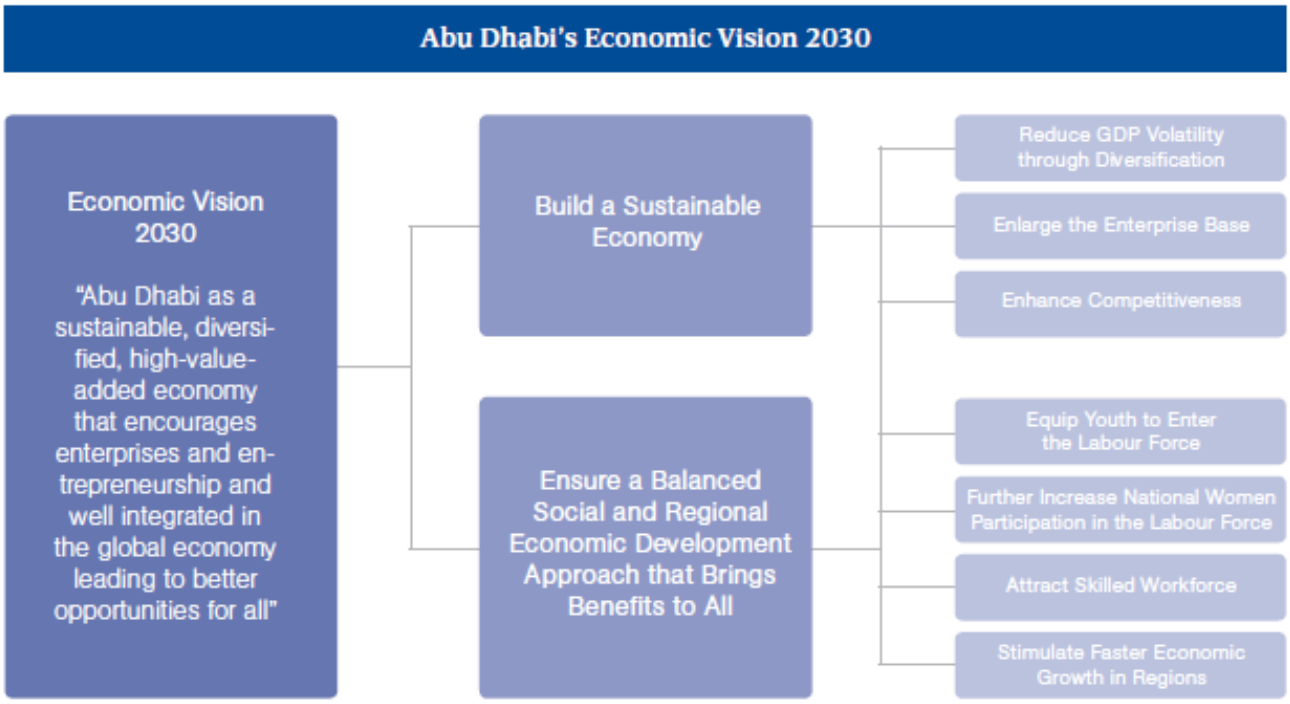
Over the past decade, Abu Dhabi has become one of the world's fastest growing economies. Despite rapid population growth, both through an increase in the international guest workforce, and the national birth rate, the Emirate's Gross Domestic Product (GDP) per capita has also increased substantially, reaching 204 thousand Dirhams ($55,500) in 2005, placing the Emirate among the world's highest income economies.[31] The Emirate is in a strong financial position, with no external debts, a large savings account and increasing fiscal surpluses.

This achievement has largely been built on the successful exploitation of the Emirate's significant hydrocarbon resources. Oil revenues are the Emirate's primary source of fiscal revenue, accounting for 74% of income between 2000 and 2005. As the international oil price has risen, this proportion has increased to as much as 84%, contributing to a reported surplus of 21.3 billion Dirhams in 2006. As a result, the fiscal balance is connected to fluctuations in the oil price. While oil prices are high, fiscal revenues remain buoyant, but when the oil price dips, the fiscal balance falls into deficit, requiring injections from Abu Dhabi Investment Authority (ADIA) to maintain the zero-deficit policy followed since 1993.[32]

In 2009, the Abu Dhabi Council for Economic Development (ADCED) published the Economic Vision 2030 outlining the Emirate's strategy for building a sustainable economy, ensuring balanced social and regional development. The 2030 Vision, summarized in Figure 3.1, is built around the need to diversify the economy, broaden the enterprise base, develop the labor force and disperse the benefits of economic development to all regions. The Department of Economic Development (DED) is the lead agency mandated to implement the Economic Vision through rolling five year development plans.

31. The Government of Abu Dhabi (2008) Abu Dhabi Economic Vision 2030
32. Ibid.

Figure 3.1: The Abu Dhabi Economic Vision 2030



Source: Abu Dhabi Economic Vision 2030

3.2 Recent Economic Development

In 2008 the world economy witnessed deep economic fluctuations and change resulting from a series of structural failures in the global financial system. In the first half of that year global demand for commodities including oil, iron, and food, amongst many others, increased to unprecedented levels. Inflation in raw materials was accompanied by a weak dollar exchange rate and rising demand, particularly from developing countries and emerging economies.

This led to price rises in various goods and services in the international market, which were further exacerbated by high transportation and insurance costs. The outcome was a rise in the global inflation rate and food and fuel crises in many importing countries. At the same time, the economic growth rate in countries producing and exporting oil increased as a result of greater oil revenues, which generated strong demand for raw materials and other goods in those countries.

In turn, this demand led to further increases in the growth rates for countries exporting raw materials, particularly for newly industrialized states such as China and India, assisted by further liberalization and development in international trade.

In the second half of 2008 the financial systems in the United States (US), which is the world's largest national economy, experienced significant difficulties characterized by the well documented crisis in the sub-prime mortgage market. The decline in the US economy quickly evolved into a global financial crisis, which spread across international markets and economies in developed and developing countries alike. The extreme economic insecurity which followed resulted in the drying up of the credit markets that are essential to the smooth running of the global economy.

The outcome of the above changes was that there was a decline in aggregate demand and GDP, and a slowdown in economic growth rates across the world. At the regional level, the economies of most Arab countries suffered along with the rest of the world. However, the oil producing states of the Gulf were somewhat insulated by the negative effects of the global downturn due to

high oil revenues - at least in the short-term, and the UAE was initially less affected by the economic crisis than most countries. Nevertheless, the country eventually felt the effects of the global crisis due to its openness and interdependence with the global and regional economy, particularly through its exposure to debts, overseas investments, and a decline in the international property market. Within the UAE, the economy of the Emirate of Abu Dhabi was the least affected by the economic downturn due to its abundant oil revenues and the swift response of the Government to manage the crisis through increasing public expenditure and steps to increase liquidity in credit markets.

The following sections present an analysis of economic development between 2003 and 2008 based on the social and economic indicators produced by the Abu Dhabi Department for Economic Development (DED). These indicators cover the following aspects as a snapshot of the UAE and Abu Dhabi Emirate's recent economic performance.

- GDP
- Inflation
- Balance of trade
- Performance indicators in economic and social sectors
    - Value added
    - Fixed investment
    - Foreign Direct Investment (FDI)
    - Public finance

This Section is intended to be a snapshot of recent economic development rather than providing any projections or economic forecasts. It should be noted that due to the timing of this Sector Paper, and the lag between the collection, analysis and publication of statistical information, a number of key recent economic trends are unlikely to be represented within the data. This will be addressed within the next iteration of the Sector Paper.

3.3 Economic Development in the United Arab Emirates

3.3.1 GDP Performance

The UAE's GDP represents the market value of all the goods and services produced by its economy and can be used as a proxy for economic performance in a historic or international context.

Boosted by exceptionally high oil revenues, the UAE economy witnessed remarkable growth in its GDP during the first half of 2008. The economic boom saw oil production rise from 2.7 million barrels in 2007 to 2.8 million barrels in 2008, and the volume of oil exports reached 2.6 million barrels in 2008 compared to about 2.5 million barrels in 2007, and the oil price peaking at $147 per barrel by mid-2008.

Increasing revenues were reflected in the high pace of economic activity which followed, including enormous investment in a large number of major development projects (see Section 4). However, the surge in economic growth was somewhat limited by the high commodity prices and raw material imports were observed throughout the first half of 2008 which led to a sharp rise in prices and production costs, particularly in the construction sector.

In the second half of 2008 the international financial crisis occurred and increased in its severity, reaching a peak during the last quarter of the year. The impact of the crisis was felt most severely in the finance and construction industries, which represent two of the most important activities in the UAE's economy. As a result, the International Monetary Fund (IMF) reported a slowdown in the country's real GDP growth rate from 8.1% in 2007 to 8.8% in 2008. However, this growth rate remained exceptionally high compared to those of many other countries throughout the world at this time. Indeed the rate of economic growth in the UAE led to an overall increase in GDP per capita of around 33.6% in 2008 compared to the previous year, rising from 156 thousand Dirhams in 2007 to 208.3 thousand Dirhams in 2008.

3.3.2 Inflation

Inflation represents rising prices across the board and the rate at which this occurs is important because rapidly rising prices erode consumer purchasing power. The change in prices in the UAE is measured using a Consumer Price Index (CPI) which represents a fixed basket of consumer goods and services with appropriate weightage. The CPI for 2008 is presented in Table 3.1: Consumer Price Index, 2008 (2007=0)3.1 below.

During 2008, the UAE experienced an unprecedented rate of inflation as prices rose on average 12.9% over the year. High inflation levels were caused by several factors, including rising oil and other commodity prices, the increased cost of imports, and a decrease in the strength of the US dollar (to which the UAE Dirham is linked) as well as rising demand for accommodation. Instability in international markets raised the level of uncertainty and created a vicious circle of rising prices during the year 2008 affecting all goods including construction materials,

Table 3.1: Consumer Price Index, 2008 (2007=0)

Groups of Commodities & Services	Weight	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	AV
General Index	100,000	112	112	113	113	113	114	117	117	117	118	118	117	115
Food and non-alcoholic beverages	16,051	116	116	118	119	118	121	122	123	124	126	124	121	121
Alcoholic beverages, tobacco and narcotics	253	101	101	101	101	101	101	101	101	101	101	101	103	101
Clothing and footwear	9,765	119	120	126	125	128	132	134	134	135	134	134	135	130
Housing, water, electricity, gas and other fuels	37,865	110	110	110	110	110	110	116	116	116	116	116	116	113
Furnishings, household equipment and routine household maintenance	4,833	114	114	114	114	115	115	116	116	117	117	117	115	116
Health	847	110	110	110	110	110	110	110	110	110	110	112	112	110
Transport	9,668	107	107	107	107	107	106	107	107	108	109	109	109	107
Communication	7,715	100	100	100	100	100	100	100	100	100	100	100	100	100
Recreation and culture	2,424	112	112	112	112	112	112	112	112	112	112	112	112	112
Education	2,591	112	112	112	112	112	124	124	124	124	124	124	124	119
Restaurants and hotels	3,373	124	124	124	124	124	124	124	124	124	124	124	124	124
Miscellaneous goods and services	4,616	112	113	113	114	115	115	115	115	115	115	117	117	115

Source: SCAD (2009)

food, and other goods and services. However, the high cost of accommodation and utilities, which accounts for 38% of the consumer basket in 2008, is the most influential factor in the recent escalation of Abu Dhabi's inflation rate. The high rental and purchase price of accommodation resulted from an imbalance in the housing market associated with increasing international guest labor arrivals (refer to Section 2.2) and a limited and constrained supply of available stock.

After August 2008, problems in the US economy led to a decline in the values of the Dollar against most major currencies. The UAE Central Bank continued its policy of stabilizing the exchange rate Dirham against the Dollar (1 USD/3.67 Dirham) despite the considerable pressure on the Dirham. As a result of this average exchange rate of the Dirham fell against most other major currencies and Special Drawing Rights (SDR)[33] during the second and third quarters of 2008 compared to the previous year. The policy of pegging the exchange rate against the US left a narrow margin for monetary policy to reduce inflation.

3.3.3 Balance of Trade

The UAE's foreign trade volume increased in 2008, compared to the previous year, due to the high price of oil, which is the country's major export commodity, and other exports, as well as the high cost of imports. Between 2007 and 2008, the value of national exports rose by 34% from 693.3 billion to 932.5 billion Dirhams. Oil exports represented the largest share of this growth, the value of which grew from 261.3 billion to 382.4 billion Dirhams. Considerable growth in import payments also took place in the first and second quarters of 2008 due to higher prices in international markets and the growing momentum for economic development in the country. The overall growth in the value of imports increased by 24% between 2007 and 2008 from 544.9 billion to 680 billion Dirhams. Therefore, the country's annual export growth rate exceeded that of imports between 2007 and 2008, raising the national annual trade surplus by 70.3% from 148.3 billion Dirhams to 252.5 billion Dirhams.

33. Special Drawing Rights represent a basket of major currencies used in international trade and finance.

3.3.4 Employment, Income and Expenditure

This sub-section uses data from the 'Household Income and Expenditure Survey 2007 / 2008' (SCAD, 2009) to outline key data, trends and issues in relation to employment, incomes and expenditures in Abu Dhabi Emirate.

3.3.4.1 Employment

Abu Dhabi's population represents both the work force needed to contribute to the production process, and the demand in the domestic consumer market. As a result of large inflows of expatriates, the majority of Abu Dhabi's population is of working age. It is estimated that the total size of the workforce in the Emirate of Abu Dhabi reached around 919,299 people in 2008, representing approximately 58.6% of the population (See Table 3.2: Employment by Residential Status in Abu Dhabi Emirate, 2005 and 20083.2).

National citizens represented around 10.5% of the total labor force - the vast majority employed in the Government sector. There was a 12% increase in the Emirati labor

Table 3.2: Employment by Residential Status in Abu Dhabi Emirate, 2005 and 2008

	Citizens			Non-citizens			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
mid-2008									
Labor force	75,870	20,449	96,319	697,480	125,500	822,980	773,350	145,949	919,299
Working	68,074	18,198	86,272	683,558	119,587	803,146	751,632	137,786	889,418
Unemployed	7,796	2,251	10,047	13,921	5,913	19,834	21,718	8,164	29,881
Unemployment rate 2008	10.3	11.0	10.4	2.0	4.7	2.4	2.8	5.6	3.3
mid-2005									
Labor force	68,551	17,287	85,838	628,993	100,480	729,473	697,544	117,767	815,311
Working	60,911	14,607	75,518	617,039	94,181	711,220	677,950	108,788	786,738
Unemployed	7,640	2,680	10,320	11,954	6,299	18,253	19,594	8,979	28,573
Unemployment rate 2005	11.1	15.5	12.0	1.9	6.3	2.5	2.8	7.6	3.5

Source: SCAD (2009) Household income and expenditure survey 2007 / 2008

force between 2005 and 2008, a result of the demographic trends outlined above. Corresponding growth of 13% was also experienced in the expatriate labor force during the same period. Therefore, the proportion of nationals and expatriates in the workforce remained stable at 10.5% to 89.5% respectively despite an increase of almost 100,000 in the number of overseas workers.

However, with extensive population growth forecast in the Emirate and falling fertility rates among national citizens, there is a risk that national citizens will make up a progressively smaller proportion of the workforce. In order to lessen this risk and reduce dependency on imported labor, the Government has recently put in place new labor policies to encourage nationals to participate in the private sector. Policies are targeted at key areas of the economy such as finance and industry and the Government is investing heavily in education and the provision of practical and specialized training to provide national citizens with the skills required to participate in these sectors (refer to Section 3.4).

To date, Emiratisation policies in the private sector have had limited success. This is related to a range of factors, including the attractiveness of the high level of job security, remuneration and benefits provided by the public sector and the relatively high wages commanded by national citizens compared to non-citizens deterring some private sector employers.

Of the total available labor force in 2008, 96.7% were in employment, meaning that the unemployment rate was just 3.3%, one of the lowest rates in the world. Low unemployment is largely a product of the fluidity of the labor market and the ability of the Emirate's economy to create employment opportunities through sustained growth. Unemployment is significantly higher amongst national citizens, with around 10% of the available pool not working the majority of which are young people between 15 and 24 years of age. This trend is partly a result of increasing competition between graduates as a high number of nationals enter the job market, as well as a disparity between the expectations and the quality of jobs available.[34]

The unemployment rate is slightly higher for Emirati women at 11% than for men at 10%. However, this represents a considerable improvement from the 15.5% recorded in 2005, and is testament to the increasing participation of female nationals in the labor market, which is seen as a way of increasing the indigenous labor force and lessening the country's dependence on foreign labor. However, the participation of Emirati women in the labor force in Abu Dhabi is low by international standards, with female citizens accounting for just 21% of all nationals in the workforce (and only 2% of the total workforce). This represents a slight improvement from 2005, when the corresponding proportion was 20%.

As employment is a precondition for residency for the majority of non-citizens, unemployment amongst non-citizens is exceptionally low with only 2.5% and it is assumed that this figure is largely represented by family dependents.

34. The National (2009) Job hunt 'is toughest for the young', May 15 2009, Online: http://www.thenational.ae/apps/pbcs.dll/article?AID=/20090515/NATIONAL/705149825

The Abu Dhabi Government hopes to reduce dependency on the international guest labor force through the following policies:

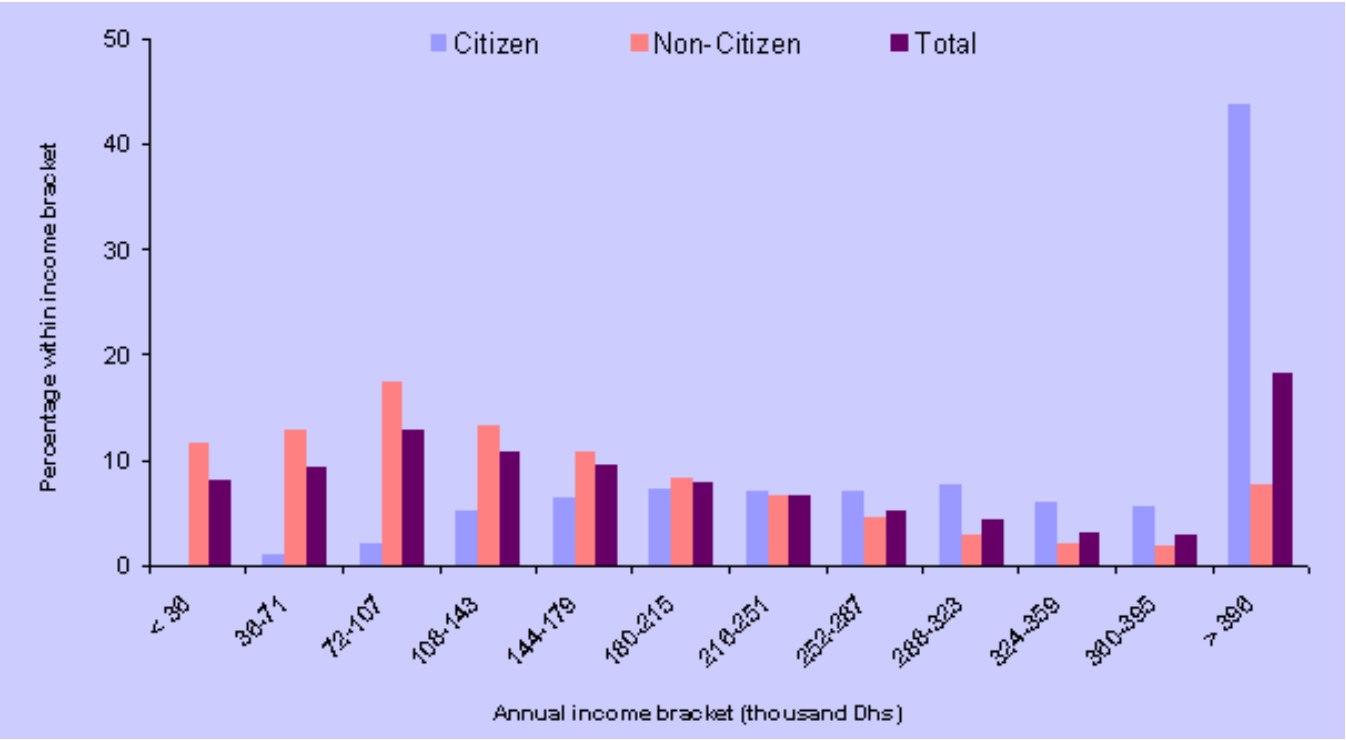
- Improving quality of education for national citizens to provide them with the skills required to enter the labor market,
- Increasing the share of national citizens in the private sector workforce,
- Emiratisation of the public sector, particularly in health and education, and
- Raising the participation of women in the workforce.

3.3.4.2 Incomes

Average income in Abu Dhabi is among the highest in the world. However, there is a wide disparity in earnings between national citizens and non-citizens (Figure 3.2). The findings of the 2007/8 Household Income and Expenditure Survey showed that almost 44% of households occupied by national citizens had an annual income in excess of 396 thousand Dirhams in 2008 compared to just 8% of non-citizen households. Around 66% of non-citizen households had an income of less than 179 thousand Dirhams in that year. The most common income bracket for non-citizen households (17.5%) was between 72 and 107 thousand Dirhams. Almost 12% of non-citizen households had a total income of less than 36 thousand Dirhams, whereas no households occupied by national citizens were recorded in this latter income bracket.

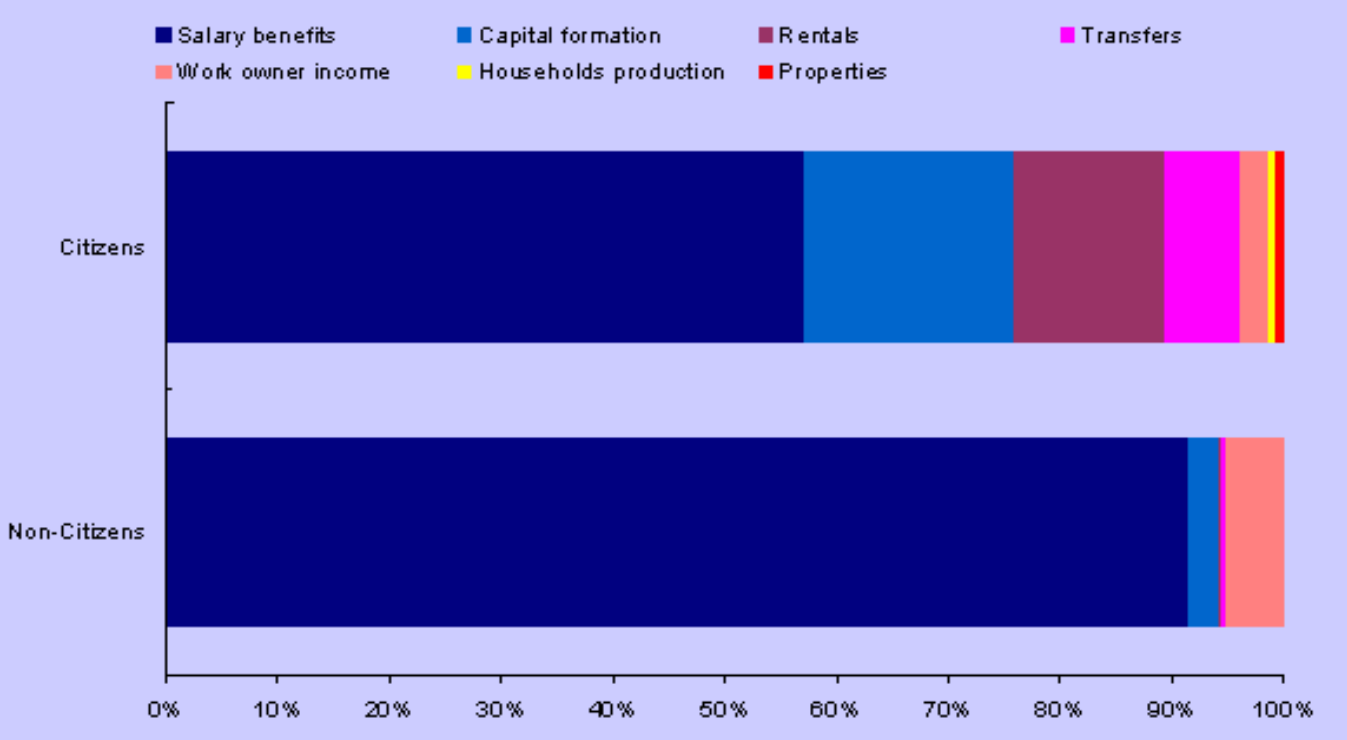
There is also a significant gap in incomes within the expatriate community, with western managers and other professionals claiming salaries far in excess of the mainly Asian unskilled and semi-skilled workers in the construction, agricultural and service industries. Despite the broad gap in incomes between non-citizens, salaries are generally higher in Abu Dhabi than in most home countries and workers also benefit from the absence of income tax obligations and other benefits allowing most to send money home to support their family or to save money for their future.

Figure 3.2: Household Annual Income, by Residential Status, 2007/8



Source: SCAD (2009) Household income and expenditure survey 2007 / 2008

Figure 3.3: Average Annual Income for Households by Source and Annual Expenditure Groups, 2007/8



Source: SCAD (2009) Household income and expenditure survey 2007 / 2008

The 2007/8 Household Income and Expenditure Survey also investigated the source of household income according to nationality (see Figure 3.3). The findings show that more than 91% of the average non-citizen household's income is generated by salaries. National citizens, by comparison, are far less reliant on their basic salary, which accounts for around 57% of total household income. Income from investment, including real estate as rental form a significant proportion of the total income for national households with 19% and 13% respectively, largely as a result of access to property ownership.

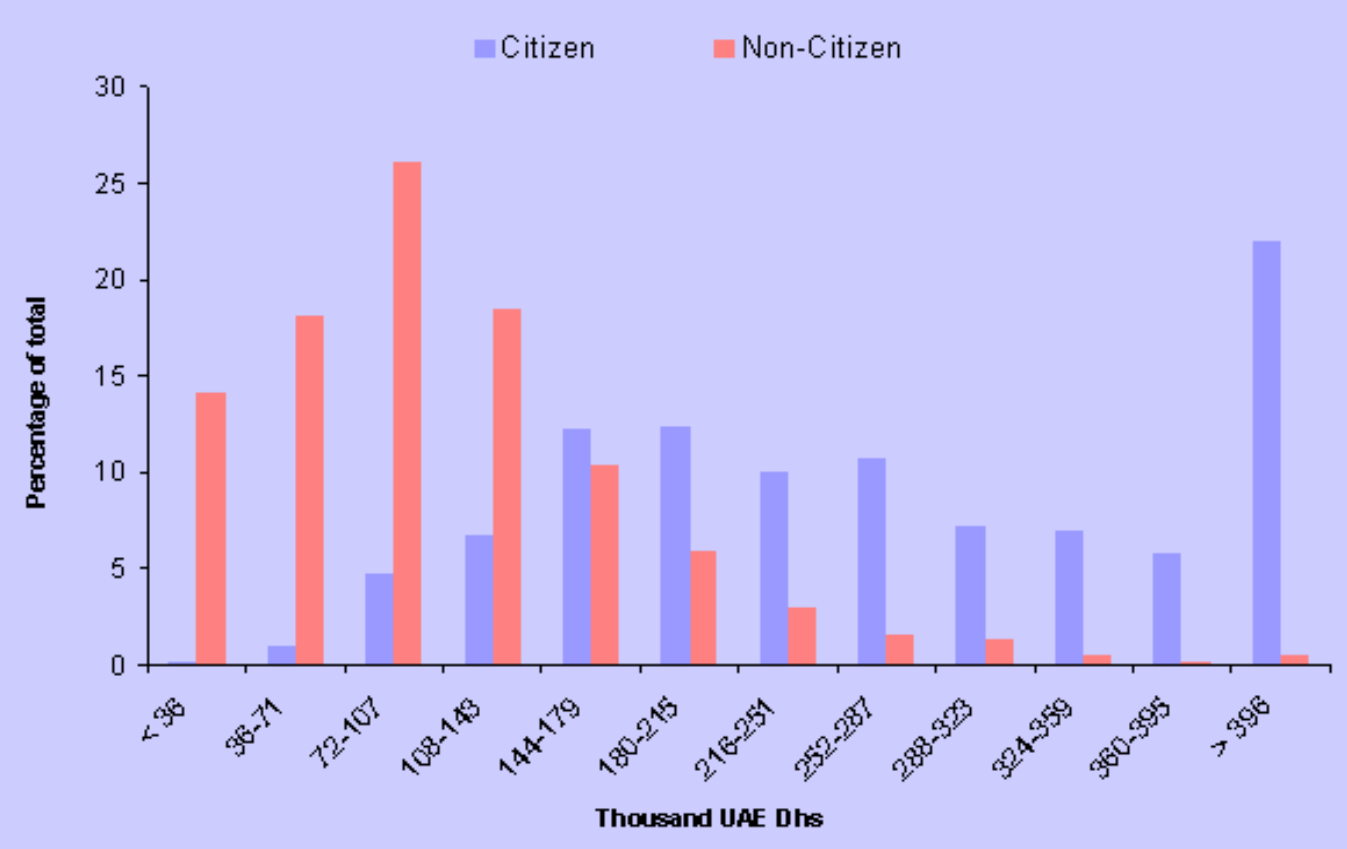
3.3.4.3 Expenditure

On the whole, expenditure is correlated to income as higher earning groups spend more than those with low incomes. Data from the 2007/8 Household Income and Expenditure Survey shows annual household expenditure in Abu Dhabi Emirate (see Figure 3.4). According to this data, around 22% of citizen households had an annual expenditure in excess of 396 thousand Dirhams compared to just 0.4% of non-citizen households.

Furthermore, three quarters of non-citizen households had an expenditure of less than 143 thousand Dirhams in that year, with a similar proportion of national citizen households having an annual expenditure in excess of 180 thousand Dirhams. Besides lower incomes, lower expenditure of non-citizen households is likely to be related to several factors, foremost the restrictions on ownership of property for non-citizens, as well as a propensity for the latter group to save rather than spend as a result of the temporary nature of their residency.

The basic expenditure requirements of national citizens are reduced somewhat as a result of benefits provided by the Government in the form of free or subsidized utilities, education and health insurance and from property allowances (i.e. land grants and subsidized loans).

Figure 3.4: Annual Household Expenditure in Abu Dhabi Emirate, by Citizens and Non-Citizens, 2008



Source: SCAD (2009) Household income and expenditure survey 2007 / 2008

3.4 Abu Dhabi Economic Indicators

3.4.1 GDP Growth and Shares in Abu Dhabi Emirate

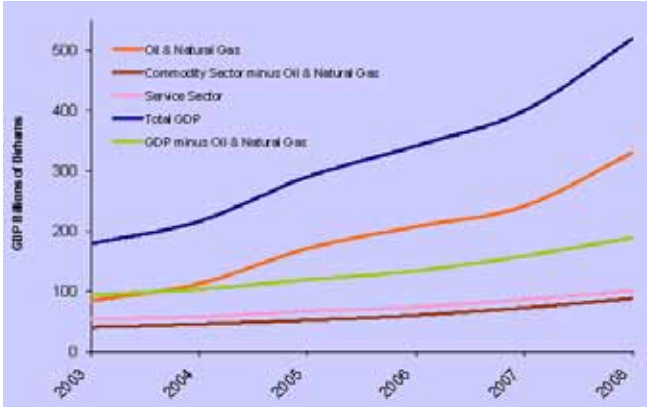
Overall GDP

As shown in Figure 3.5, Abu Dhabi's economy performed strongly in 2008, despite the economic turmoil which affected the global financial system, recording a real increase in GDP of 30% compared to 17.2% in the previous year. Driven up by high levels of economic activity, the price of a barrel of crude oil reached US$ 90.7 [35] by the end of 2007, and went on to reach US$ 147 by mid 2008 – the highest level for more than 50 years.

High oil prices led to a 37% rise in the value added to the economy by the oil and gas sector during 2008. This growth was matched by most activities within the non-oil sector, however a number of activities, notably manufacturing, utilities and non-oil related extraction industry experienced a slow down in growth during the last quarter of that year.

35. OPEC basket

Figure 3.5: GDP in Abu Dhabi Emirate for Various Sectors at Current Basic Prices 2003 – 2008



Source: SCAD (2009)

Commodities Sector

An analysis of the period between 2003 and 2008 indicates that activities in the commodities sector experienced significant growth averaging 47.2% (see Table 3.3: GDP by Commodity Activity in Abu Dhabi Emirate at Current Basic Prices, 2003 – 2008 (Million Dhs)3.3). This growth is overwhelmingly related to the growth of the oil and natural gas sector, which recorded average annual growth of 58.4% across the period. The largest growth during a single year took place in 2005, when revenue from the oil and gas sector grew by 52%.

Although lower than that of oil and gas, growth in the remaining, non-oil, activities was nonetheless formidable during the period, averaging 27.1% each year. In particular, electricity, gas and water activities achieved an average rate of growth of 34.2% during that period, which was largely related to privatization and increasing consumption due to GDP growth, urbanization and industrial development. However, annual income from agriculture, livestock and fishing activities fell by 6.2% on average during this period.

Services Sector

Rapid growth was also experienced in the service sector, with an average annual increase of 17.5% between 2003 and 2008 (see Table 3.4: GDP by Service Sector Activities in Abu Dhabi Emirate at Current Basic Prices, 2003 – 2008 (Million Dhs)3.4). Economic growth in the services sector was most prominent in the finance and insurance services sector and banking which recorded respective annual average growth rates of 46.8% and 30.8%. This impressive growth was largely related to the liberalization of trade and foreign investment in Abu Dhabi which occurred at that time.

Population expansion, GDP growth and increasing investment of revenues in large residential, commercial and tourism developments also led to considerable growth in the hotels and restaurants, real estate and business services, and social and personal services activities during that time.

Table 3.3: GDP by Commodity Activity in Abu Dhabi Emirate at Current Basic Prices, 2003 – 2008 (Million Dhs)

Commodity Activities	2003	2004	2005	2006	2007*	2008**	Average Annual Growth Rate %
Agriculture, Live Stock & Fishing	6,291	6,602	4,946	4,590	4,367	4,350	-6.2%
Extraction Industry	84,425	112,953	171,316	207,491	241,260	330,888	58.4%
- Crude Oil & Natural Gas	84,295	112,816	171,174	207,341	241,100	330,744	58.5%
- Others	130	137	142	150	160	144	2.2%
Manufacturing	21,128	24,487	29,410	34,539	41,529	49,761	27.1%
Electricity, Gas & Water	2,974	3,645	4,634	5,291	6,296	7,209	28.5%
Construction	9,892	10,531	13,005	15,984	20,070	26,794	34.2%
Total of Commodity Activities	124,710	158,218	223,311	267,895	313,522	419,002	47.2%

*Estimated ** Preliminary Estimates (to be reconsidered after finalizing the results of economic surveys 2007)
Source: SCAD data 2009

Table 3.4: GDP by Service Sector Activities in Abu Dhabi Emirate at Current Basic Prices, 2003 – 2008 (Million Dhs)

Services Activities	2003	2004	2005	2006	2007*	2008**	Average Annual Growth Rate %
Wholesale, Retail Trade	9,201	9,945	10,982	12,623	14,895	17,549	18.1%
Hotels & Restaurants	1,608	1,772	2,123	2,507	2,958	3,726	26.3%
Transport, Storage and Telecoms	7,419	8,073	9,109	9,934	11,325	13,193	15.6%
Financial Institutions & Insurance	7,762	9,835	16,492	18,991	22,018	25,912	46.8%
Real Estate & Business services	8,438	9,563	10,738	12,695	15,800	18,801	24.6%
Social and Personal Services	584.60	672	798	900	981	1,174	20.2%
Less-Imputed Bank Services	2,233	2,497	3,738	4,317	4,808	5,673	30.8%
Public Administration & Defense	13,008	12,031	11,408	10,500	12,705	14,073	1.6%
Domestic Services of Households	838	863	880	906	978	1,165	7.8%
Education	4,158	4,592	5,091	5,164	5,732	6,452	11.0%
Health	3,024	3,111	3,129	3,488	3,941	4,547	10.1%
Total of Service Activities	53,808	57,961	67,012	73,391	86,525	100,919	17.5%

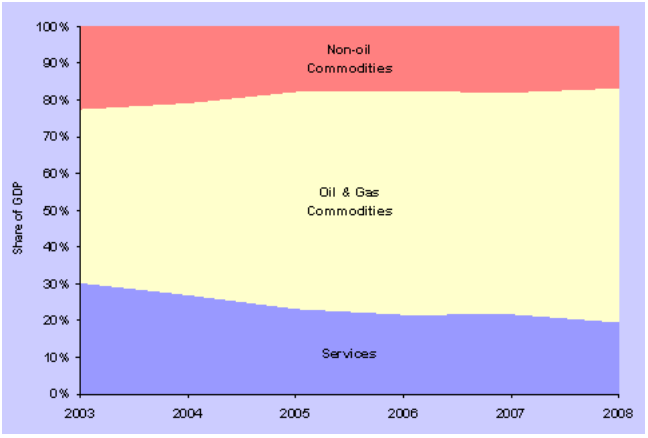
*Estimated ** Preliminary Estimates (to be reconsidered after finalizing the results of economic surveys 2007)
Source: SCAD, 2009

The growth rate of some service activities, particularly wholesale and retail trade, repair and maintenance, business services, public administration and defense slowed during 2008 compared to the previous year as they were affected by the global financial crisis and decreased level of aggregate demand, especially for raw materials and supplies and consumer goods. The decline of productivity in public administration and defense activity between 2003 and 2006 is partly attributable to structural changes in government departments which were put in place to improve management techniques used and raise staff efficiency.

Relative Share of GDP Represented by Commodities and Services Sectors

Between 2003 and 2008, the nominal contribution to GDP made by services increased. However, the relative importance of the sector within the overall economy fell as it was outpaced by growth in commodities (see Figure 3.6). On average, growth in the commodities sector represented around 76% of the overall GDP growth during the period, compared to a 24% contribution from the services sector. Oil and gas activity represented the lion's share of growth, accounting for 72% of the total growth experienced during this period. As a result, the relative share of the economy represented by services declined from 30% to 19%, while the total contribution from oil and gas activities rose from 47% to 64% in the same period.

Figure 3.6: Relative Share of Commodities and Services Activities in Total GDP in Abu Dhabi, 2003 – 2008



Source: SCAD, 2009

Relative Share of GDP Represented by Government, Public and Private Sectors

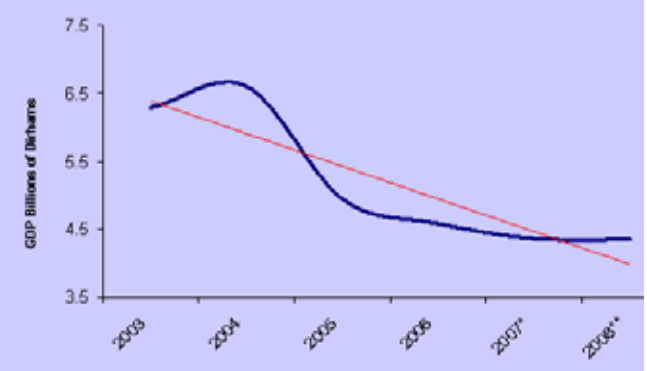
In 2008, the Government sector's overall contribution to GDP declined from 11% to 4%. However, the public sector is still the major contributor to the GDP, representing 73% of output in 2008 compared to 23% in the private sector. Despite a nominal increase in its productivity, the share of the economy represented by the private sector continues to decline due to the fact that the bulk of output comes from oil, natural gas and petrochemical industries, which are controlled by the public sector.

3.4.2 Value-added: Economic Sectors

3.4.2.1 Agriculture, Livestock and Fisheries

The agriculture, livestock and fisheries sector is considered to be important in terms of its contribution to domestic food security. However, the relative contribution of this sector to the overall economy has declined significantly in recent years, falling from 3.5% of GDP in 2003 to 0.8% in 2008, as it has become dwarfed by other activities within the commodities sector. Figure 3.7 shows the overall decline in output from this sector, which averaged a 6.2% annual fall in value-added. Between 2003 and 2007 output from agriculture declined by more than 17%, which is largely attributable to the approximately 36% fall in yields which is attributable to a deterioration in the availability and quality of groundwater and poor soil quality.

Figure 3.7:Productivity of Agriculture, Livestock and Fishing Industry in Abu Dhabi (GDP Billions of Dirhams), 2003 to 2008



*Estimated ** Preliminary Estimates (to be revised following finalization of results of 2007 economic surveys)

Source: SCAD, 2009

3.4.2.2 Extractive Industries

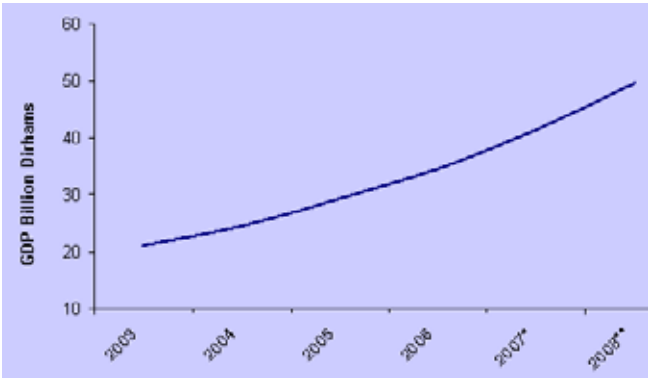
The extractive industries sector is dominated by crude oil and natural gas, which represent more than 99% of total value added in 2007 and 2008. The remaining extractive industries include the quarrying of materials such as lime and gravel, although these represent a tiny fraction of the total by comparison (<0.05%). As discussed earlier in this section, high oil prices experienced over the past five years, led to significant increases in the volume of production, which in turn led to a remarkable increase in the output of extractive industries in the Emirate.

In fact, output in this sector increased four fold during the period 2003-2008, with the total value added rising from 84 billion Dirhams to almost 331 billion Dirhams, thereby increasing its share of total GDP from 47.3% in 2003 to 63.6% in 2008. The largest rise in output occurred between 2007 and 2008 as the contribution of the oil and gas sector increased by around 37% in line with the peak of economic growth witnessed in the first half of 2008.

3.4.2.3 Manufacturing

Manufacturing is of strategic importance to the Emirate in terms of diversifying its economic base and achieving comprehensive development. International experience demonstrates that success in achieving high economic growth is largely related to an economy's ability to develop an effective manufacturing industry and to increase its share in GDP and exports. This strategy is reflected in the 'Economic Vision 2030', which states that the full support of the manufacturing sector is vital in facilitating the Emirate's path to sustainable development. However, the Emirate continues to also base its economic strategy on the further exploitation of abundant oil resources, while adding value to these resources through a focus on manufacturing processed products for the export market including refining, liquefied petroleum gas, fertilizer, and the petrochemical and chemical industries.

Figure 3.8: Productivity in the Manufacturing Sector (GDP Billion Dirhams), 2003 to 2008



*Estimated ** Preliminary Estimates (to be revised following finalization of results of 2007 economic surveys)

Source: SCAD, 2009

The total contribution of the manufacturing sector to the Emirate›s GDP was 9.6% in 2008. This represents a significant increase in the value added to the economy by manufacturing between 2003 and 2008 from 21 billion Dirhams in 2003 to almost 50 billion Dirhams in 2008 (see Figure 3.8). Again, the largest section of growth was related to rising oil prices during 2007 and the first half of 2008 with substantial growth in petrochemicals contributing the largest share of total value added.

The value added to the economy by non-oil related manufacturing activity also grew in consecutive years during that period, increasing by 28.8% to a value of slightly less than 13 billion Dirhams in 2008. This can be attributed the high productivity in most non-oil industries at that time and a substantial rise in the volume of investments in these industries, especially iron, steel and aluminum production.

3.4.2.4 Electricity, Gas and Water

Although the electricity, gas and water sector represented only 1.4% of total GDP, the Abu Dhabi Government has taken a clear interest in actively developing these industries as critical infrastructure components required to underpin economic and social development. Privatization played a major role in raising the productive capacity of these sectors, facilitating access to populations in all areas of the Emirate, and meeting the growing demands of customers in relation to quality of services.

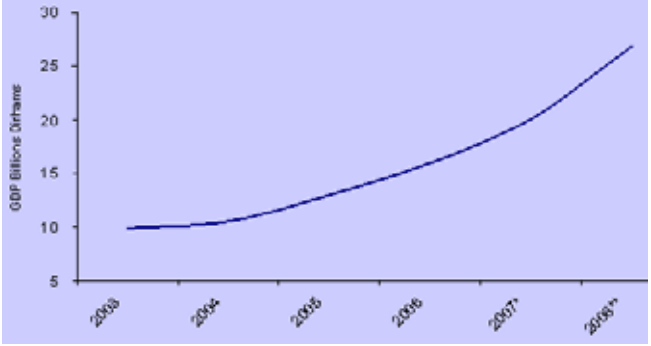
Rapid increases in electricity and water production experienced in the years leading up to 2008 (refer to Section 4.6.1) were largely in line with the significant intensification in economic activity, including urban and industrial development, which occurred at that time. Accordingly, the value added to the economy by the electricity and water sectors increased from 2.9 billion in 2003 to 7.2 billion Dirhams in 2008, with an average annual growth rate of 14.5%.

3.4.2.5 Construction

After oil and gas, construction is one of the most influential sectors in the national economy. It is important for investors and is highly influenced by trends in demographics, global finance and economic planning. The contribution of the construction sector to the Emirate's economy represented around 5.2% of GDP in 2008, slightly above that of the previous year (5%). Construction activity can include site preparation, civil engineering works, building construction, finishing of buildings, and plant.

Construction activity in Abu Dhabi Emirate experienced enormous growth over the five years leading up to the economic slowdown of 2008 with the launch of a large number of mega projects (See Section 4). Construction output grew by 34.2% on average between 2003 and 2008 (see Figure 3.9). In 2008 output grew by as much as 33.5% in 2008 compared to the previous year. Much of this development occurred as a result of Government investment in projects such as transport and communications, health and education facilities and the number of contractors working on public projects grew at a rate of 18% during this period.

Figure 3.9: Productivity in the Construction Sector (GDP Billion Dirhams), 2003 to 2008

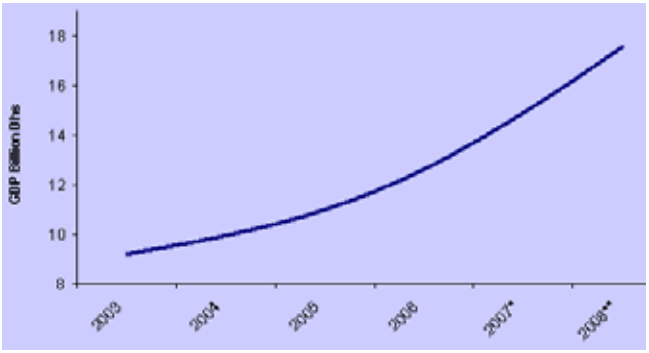


*Estimated ** Preliminary Estimates (to be revised following finalization of results of 2007 economic surveys)
Source: SCAD, 2009

3.4.2.6 Wholesale, Retail Trade, Repair Services and Maintenance

The wholesale and retail trade, and repair and maintenance sectors has witnessed extraordinary growth in recent years boosted by a growing population, with increasing purchasing power, as well as easing of foreign and domestic trade barriers, and investment in trade related facilities such as customs, ports and airports (see Figure 3.10).

Figure 3.10: GDP in the Wholesale and Retail Trade, and Repair and Maintenance (Billions Dirhams), 2003-2008



*Estimated ** Preliminary Estimates (to be revised following finalization of results of 2007 economic surveys)
Source: SCAD, 2009

Average annual average growth of both sectors was 13.8% between 2003 and 2008, with above average growth of 17.8% experienced between 2007 and 2008. In the wholesale and retail trade sector, output increased by around 18.5% from 13.3 billion Dirhams in 2007 to 15.8 billion Dirhams in 2008. While, the corresponding growth in the repair and maintenance services sector was 12%, increasing from a base of 1.58 billion to 1.77 billion Dirhams.

However, despite an impressive nominal increase in output, the overall contribution from both sectors to the Emirate's total GDP decreased from 5.2% in 2003 to 3.4% in 2008 as they were eclipsed by growth in other sectors, particularly oil and gas.

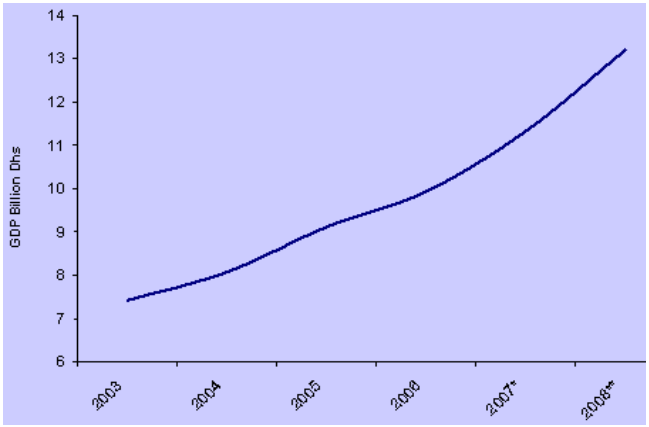
3.4.2.7 Hotels and Restaurants

The hotels and restaurants sector is directly linked to the tourism sector and is therefore important in terms of supporting the Abu Dhabi Government's aim to become a preferred international tourist destination (See Section 4.4). As such, the provision of adequate quality and quantity of hotels and related services plays a prominent role in providing an attractive climate for tourism in the face of intensifying regional and global competition. Correspondingly, the value added of the hotels and restaurants sector climbed steadily between 2003 and 2008 as a result of the huge investment in this area from both the public sector and foreign investors. As a result, the value added to the economy increased from 1.6 billion to 3.7 billion Dirhams during that period, and an annual growth rate of around 18.5%.

3.4.2.8 Transportation, Storage and Communications

The transport, storage and communications sector is essential to support Abu Dhabi's economy. The sector directly contributed 13.2 billion Dirhams in 2008, an increase of 16.5% from the previous year. This was a continuation of the constant growth experienced since 2003 (see Figure 3.11). Development in this sector is also vital to facilitate and support economic activity in many other sectors. As such, huge projects to modernize transport and communications infrastructure are currently underway in the Emirate (see Section 4).

Figure 3.11: GDP of the Transportation, Storage and Communications Sector (Billions Dhs), 2003-2008



*Estimated ** Preliminary Estimates (to be revised following finalization of results of 2007 economic surveys)

Source: SCAD, 2009

3.4.3 Value-added: Social Sectors

3.4.3.1 Public Administration and Defense

Spending in public administration and defense is aimed at the efficient functioning of the Government and satisfying the needs and goals of public interest and society in general, rather than in pursuit of profit. This sector includes all Government departments and ministries, federal services, public administration and defense activities taking place in the Emirate.

The data shows that the output of the public administration and defense sectors fluctuated between 2003 and 2008. From 2003 to 2006 the sector recorded a continuous decline in output from 13 billion to 10.5 billion Dirhams, which can be partially attributed to structural changes in all government departments which were implemented at that time in order to improve management systems and raise the staff efficiency.

Output rose again between 2007 and 2008 from 12.7 billion to 14 billion Dirhams, boosted by adjustments to the salaries of Government workers which were instituted to raise productivity and security. Overall, output from this activity grew by average rate of 1.6% during the entire period, with a significant 10.8% increase recorded in 2008.

3.4.3.2 Education

Investment in education is essential to create the human capital required to meet the Emirate's economic goals and reduce dependency on overseas workers (refer to Section 2.4). Accordingly, the Abu Dhabi Government has dramatically increased spending on education infrastructure, systems and human resources in recent times. The value added to Abu Dhabi Emirate's economy by the education sector increased from 4 billion Dirhams in 2003 to almost 6.5 billion Dirhams in 2008. This represents an annual average growth of 9.2%, with above average growth recorded in 2008 of 12.6%. The average contribution of the private sector to the total output was 50.2% during that time, and this proportion rose to around 55.6% in 2008.

3.4.3.3 Health

As detailed in Section 2.5 above, there has been a dramatic improvement in the health of Abu Dhabi's population over the past decade or more, and the Emirate now ranks alongside most developed countries when comparing the principal health indicators such as mortality and life expectancy. In addition to advances in economic development and the success of Government policies aimed at universal health

insurance, significant investment and growth in the health sector were achieved between 2003 and 2008. During this period, the output of the health sector grew by an annual average of 8.5%, from 3 billion Dirhams in 2003 to 4.5 billion Dirhams in 2008. As with other sectors, annual productivity grew by an above average increment in 2008 with an increase of 15.4%.

3.5 Fixed Investment in the Emirate of Abu Dhabi

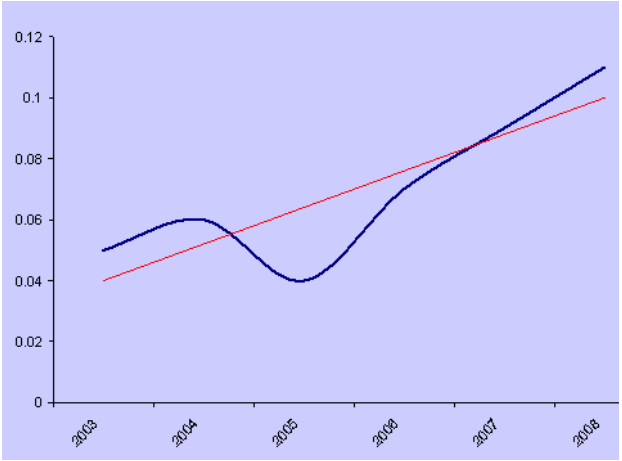
The value of total fixed investment in the Emirate more than doubled from 33.8 billion to 69.9 billion Dirhams in just five years from 2003 to 2008. Fixed investment is divided into the commodities and services sectors. The value of investment in commodities recorded an 80% growth during that period from 18.8 billion Dirhams in 2003 to 35.5 billion Dirhams in 2008. Investment in the services sector rose by an even greater amount during that period, rising from 13.2 billion Dirhams to 30.5 billion Dirhams.

During this period, there was a significant increase in public investment, which saw the value of Government investments grow from 1.5 billion Dirhams in 2003 to 2.75 billion Dirhams in 2008. However, the relative contribution of public expenditure to total fixed investments declined from 5% in 2005 to 4% during the next three years.

3.5.1 Physical Capital: Economic Sectors

Physical capital is made up from fixed capital, which represents assets, such as buildings, machinery, vehicles and infrastructure and working capital, which are assets used up in production (e.g. fuel and raw materials). The value of physical capital stock in Abu Dhabi Emirate's economy increased considerably between 2003 and 2008 (see Figure 3.12). However, the ratio of capital stock to GDP declined steadily in that period from 1.93% to 0.97%, which represents a more efficient use of capital. A summary of physical capital formation by sector between 2003 and 2008 is provided in the following paragraphs.[36]

Figure 3.12: Growth Rate of Capital Stock, 2003-2008 (%)



Source: DED, 2009

3.5.1.1 Agriculture, Livestock and Fisheries

Physical capital formation in the agriculture, livestock and fisheries sector grew by annual rate of 13.6% between 2003 and 2008. However, the relative weight of capital formation from the government declined in this period from 80.1% to 58.3% (an annual average fall of 15.4%) as a result of policy driven increases in the share of the private sector. However, the contribution from the private sector which was expected to replace this decline was not forthcoming as only a 5.4% increase in total capital was recorded in the private sector over this period, as a result of deterioration in environmental quality.

3.5.1.2 Extractive Industries

Physical capital formation in the extractive industries sector rose from 6.4 billion Dirhams in 2003 to 10.5 billion Dirhams in 2008, growing at an annual average of about 10.4%. The sector witnessed a total capital growth rate of 9.5% in 2008 compared to 2007. The volume of net investment in extractive industries stood at 914.5 million Dirhams in 2008. The main areas of investments in the sector include spending on research / exploratory studies and development to meet the demand for oil and gas. The vast majority (around 99.5%) of capital formation in the extractive industries sector was as a result of investment from public companies, during the period from 2003 to 2008.

3.5.1.3 Manufacturing

The Abu Dhabi Government is pursuing a strategy aimed at developing the manufacturing sector to strengthen its competitiveness at the global level. The following main points can be made regarding the volume of investments

36. Capital is said to be formed when savings are invested to create productive assets.

in the manufacturing sector between 2003 and 2008.

- Increasing growth in the volume of industrial investments was accompanied by an increasing number of industrial installations from 258 to 326 facilities.
- The food, beverages and tobacco industry accounted for the largest share of the total investments, accounting for 59% in 2008. In contrast investments in the furniture industry and timber constituted a small proportion to the total investments in the manufacturing sector, accounting for only 0.2% of the total volume.
- High volumes of investments in chemicals and associated products, non-metallic mineral products also occurred in this period.
- Further increases in investments in the industrial manufacturing sector are expected in the future in line with the Economic Vision 2030.

The manufacturing sector achieved large-scale development and high economic growth rates during the period from 2003 to 2008. This growth is reflected in the huge increase in investment in manufacturing assets from a base of 5.9 billion Dirhams in 2003 to 14.3 billion Dirhams in 2008. The main areas of investment were in the petrochemical industry, which accounted for 64% of total physical capital formed in manufacturing in 2008.

Abu Dhabi's Government pursues a policy of economic diversification through increasing investments in non-oil manufacturing industries like food and basic metal, in addition to the petroleum industry. This is illustrated by the steady increase in the gross fixed capital accumulated in non-petroleum related manufacturing of from 1.8 billion Dirhams in 2003 to 5.1 billion Dirhams in 2008. The rapid growth in formation of capital experienced in the manufacturing sector is expected to continue in the coming years.

3.5.1.4 Electricity, Gas and Water

A significant increase in investment in the electricity, gas and water sectors occurred between 2003 and 2008 in order to meet the increasing demand for utilities resulting from population expansion and the requirements of new industrial, commercial and residential developments in the Emirate. This resulted in the value of total physical capital rising considerably during this period from 3.2 billion Dirhams in 2003 to 5.6 billion Dirhams in 2008. This represents a high average annual physical capital growth rate of 17.2% over the period and a 20% growth in 2008 from the previous year.

3.5.1.5 Construction

Investment in construction has been a key factor in meeting the goals of the Emirate's economic Strategy and Vision. As such, fixed investment in construction activity rose between 2003 and 2008 from 1.35 billion to 4.3 billion Dirhams, which represents an extraordinary average growth rate of 43.7% per annum. Indeed, investment in the sector saw an increase of 1.8 billion Dirhams in a single year during 2008 as a result of the development of a number of huge commercial, residential, infrastructure and industrial projects.

3.5.1.6 Wholesale and Retail Trade and Repair Services and Maintenance

Physical capital formation in wholesale and retail trade, and repair services and maintenance activities experienced steady growth between 2003 and 2008, representing an average annual growth rate of 25.1%. The volume of fixed capital formed in this sector increased by 27.6% between 2007 and 2008. The private sector accounted for the largest contribution to the total fixed capital formed in the sector (around 60%), compared to 35% from public companies, and the remaining 5% from government departments. Growth in this sector largely follows demographic trends and consumption patterns.

3.5.1.7 Hotels and Restaurants

The Emirate's ambitious goal to become one of the world's premier tourism destinations, coupled with growth in the business tourism related to economic development, resulted in significant investments in the hotels and restaurants between 2003 and 2008 (see Section 4.4). Gross fixed capital formation in these activities more than doubled in this period, from 2.25 billion to 4.6 billion Dirhams in 2008, growing at an annual average of about 15.5% during the period. The pace of growth increased towards the end of the period as total physical capital formed in these activities increased by 834 million Dirhams (or 22%) in 2008.

3.5.1.8 Transport, Storage and Communications

The implementation of new investment projects in transport, storage and communications, led to a rise in physical capital formation over the five years from 2003 to 2008 from 4.8 billion to 7.6 billion Dirhams, an increase of 2.8 billion Dirhams or 58.4%. This represents an average annual capital growth rate for the sector of 9.6%. The contribution of the private sector to total physical capital formation was somewhat volatile during the period, mirroring patterns of Government spending on major projects to upgrade infrastructure.

The commitment of the Abu Dhabi Government to promote the private sector to play an active role has helped to increase the private sector's contribution to total physical capital formation in the sector during this period from 29% to 34%. Capital formation in transport is set to continue with vast investments in all aspects of transport infrastructure and related activities planned within the Emirate's Surface Transport Master Plans and Aviation Strategy (see Section 4.6.2) and increasing trade volumes.

3.5.1.9 Finance and Insurance

Physical capital formed in the finance and insurance sector increased by more than a factor of four between 2003 and 2008 with average annual growth of about 32.3%. During this period, the total value of fixed investments rose from 280 million to 1.14 billion Dirhams due to the expansion of financial services and intermediaries which occurred at that time. In particular, public sector finance experienced sustained growth followed by a surge in financial and insurance activity in 2007 and 2008, which increased the value of fixed capital assets by 33.7% and 41% respectively.

3.5.1.10 Real-estate and Business Services

Between 2003 and 2008, physical capital formation in the real-estate and business services sector increased significantly. In particular, the level of investment in real estate at this time was particularly high, contributing to the economic boom and attracting a large volume of international investment especially in the lead up to the third quarter of 2008. During the entire period, from 2003 to 2008, the volume of fixed capital formation in the real estate sector rose from 3.2 billion to 12.76 billion Dirhams, which represented a formidable average annual growth rate of 31.6 %.

However, the rate of growth of investment in real estate fell sharply during the last quarter of 2008 alongside the escalation of global financial instability, and mortgage lending fell significantly, further reducing investment in this sector. The government moved quickly to mitigate the effects of the global financial crisis and restore confidence in investment, including the strengthening of bank liquidity and provision of guarantees for customer deposits. However, a continuation of previous growth patterns in fixed capital formation within the real estate sector is unlikely to continue in the short term as many developers seek to de-stock already developed assets. As such, fixed investments are expected to be subject to reallocation according the economic needs and in accordance with the Economic Vision 2030.

3.5.2 Total Fixed Capital Formation of Social Activities

3.5.2.1 Public Administration and Defense

Total physical capital formation in the public administration and defense sector varied between 2003 and 2008, rising from 912 million Dirhams in 2003 to 1.57 billion Dirhams in 2004, and then falling to 1.2 billion Dirhams in 2007. Fixed capital formation then rose again by around 31.6% in 2008 to around 1.59 billion Dirhams. In general, gross fixed capital formation in public administration and defense recorded an annual growth rate of 11.7% on average between 2003 and 2008. However, the high level of variation experienced during this period was largely as a result of the increasing involvement of the private sector and administrative restructuring which took place in Government sectors between 2004 and 2007.

1.1.1.1 Education

Physical capital formation in the education sector increased from 363 million Dirhams in 2003 to 1.1 billion Dirhams in 2008, an average annual growth of 25%. Total fixed capital formation increased by 241 million Dirhams between 2007 and 2008, which represents a growth in the value of capital assets in the sector of 27.9% in a single year. Increasing investment in the education system is a result of recent reforms to the entire education system which have been introduced in order to meet the goals of the Emirate's Economic Vision 2030 (See Section 2.4).

1.1.1.2 Health

The health sector recorded some fluctuation in gross fixed capital formation between 2003 and 2008, with a decline from 285 million Dirhams in 2003 to 189 million Dirhams in 2005, followed by a significant rise to 2008 as a result of increased Government and private sector investment in facilities and services. In general, total fixed capital formation in the health sector grew at 3.1% on average during this period, with a growth rate of 1.2% experienced in 2008.

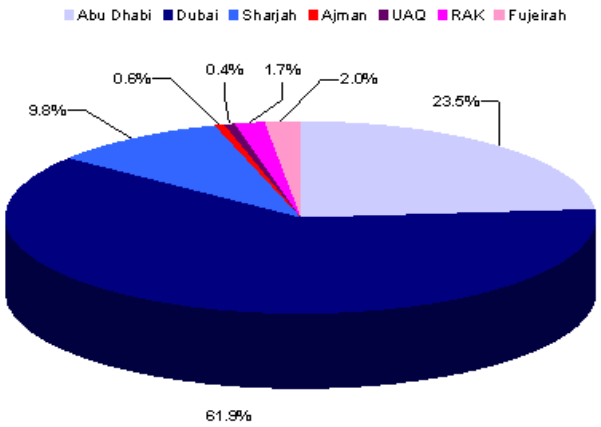
3.6 Foreign Direct Investment

3.6.1 The Distribution of FDI in the UAE

Although Abu Dhabi's economy represents around 58% of the UAE's total GDP, the Emirate's share of total Foreign Direct Investment (FDI) stood at only 23.5% in 2006, with neighboring Dubai accounting for the largest share of overseas investment capital with 61.8% (see Figure 3.13). However, rapid overseas

investment in Abu Dhabi's economy during 2007 and 2008 and a corresponding reduction in investments in other emirates are expected to reduce this gap in the coming years according to the results of a survey of FDI launched during the second half of 2008.

Figure 3.13: The Distribution of FDI by Emirate 2006 (%)



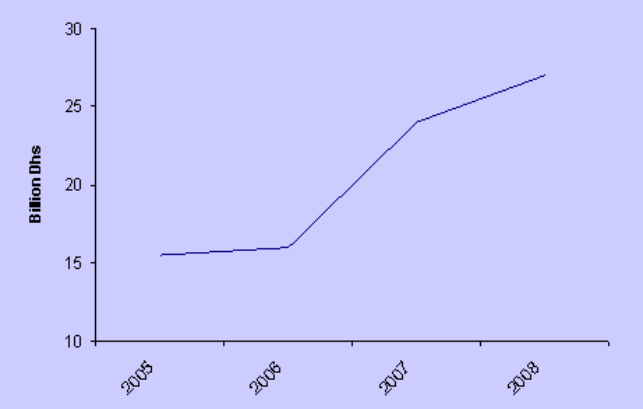
Source: Ministry of Economy, 2007. State of the United Arab Emirates

3.6.2 Total FDI in Abu Dhabi Emirate

Abu Dhabi Emirate's rapid economic growth in the years leading up to 2008 saw a huge in-flow of FDI (see Figure 3.14). This acceleration in FDI has led to substantial benefits for the Emirate's economy across a number of economic sectors. It has also had an important role in stimulating local competition in suppliers and distributors and infrastructure-related investments, which reflected positively on the size of investment and fixed capital formation in the Emirate. The average annual FDI growth rate in the Emirate between 2005 and 2008 was about 27%, and in 2007 recorded growth of around 45%, one of the highest annual FDI growth rates anywhere in the world.

The volume of FDI attracted to the Emirate of Abu Dhabi over the past years, reached 24 billion Dirhams in 2007, and was expected to reach 27 billion Dirhams in 2008. This significant achievement was achieved under the package of reforms and economic incentives that were followed by the government to improve its investment environment and policies encouraging the participation of the private sector in the economy.

Figure 3.14: FDI in the Emirate of Abu Dhabi, 2005-2008

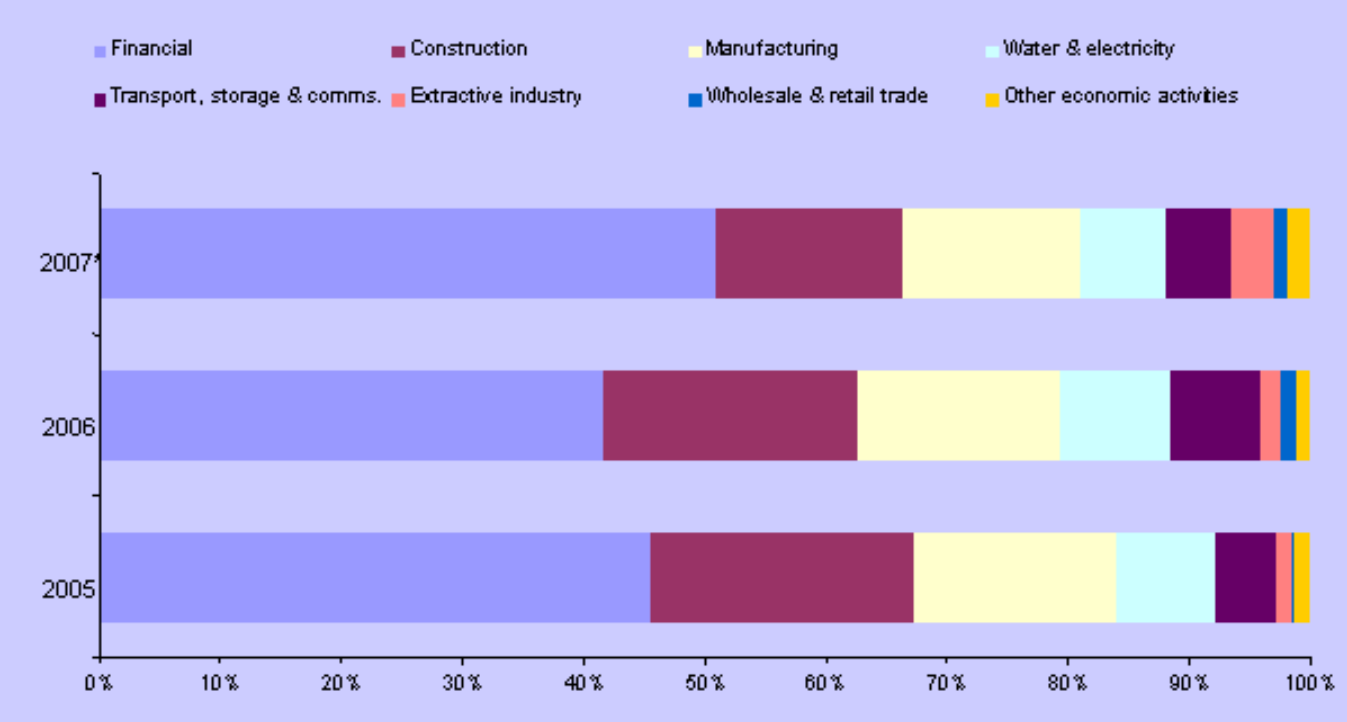


Source: Ministry of Planning and Economy, 2009

3.6.3 Total Foreign Investment by Economic Activity

Figure 3.15 shows the proportional volumes of annual FDI according to economic activity from 2005 to 2007. The data shows that more than half of all FDI (51%) was in the financial services and insurance activities in 2007, up from 41.5% in the previous year. The construction and contracting industry accounted was the second larges recipient with 15.4% of total FDI, recording a significant decline from 21% in 2006. Construction was closely followed by the manufacturing sector which attracted 14.6% of total FDI in 2008. Together these three sectors constituted more than four fifths of total FDI in the Emirate.

Figure 3.15: Percentage of Total FDI Represented by Economic Activities in the Emirate of Abu Dhabi, 2005-2007



Source: SCAD, 2009 * Estimates

3.6.4 Sources of FDI

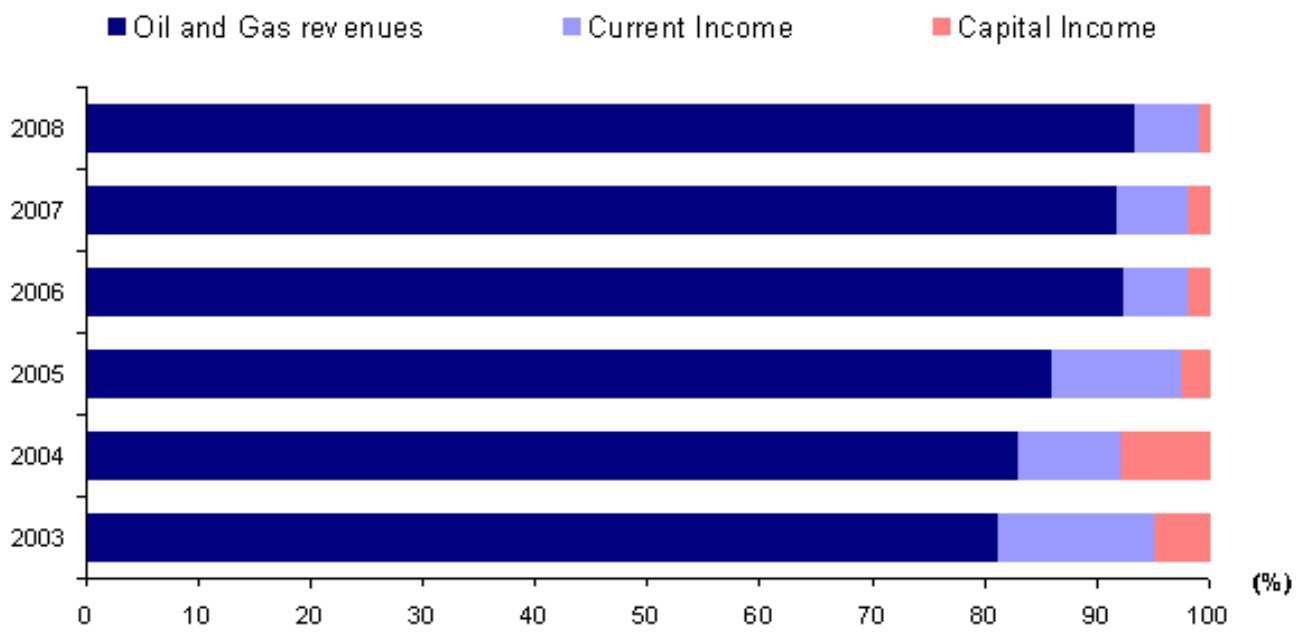
As shown in Table 3.5 below, Japan is by far the most significant source of overseas investment in the Emirate of Abu Dhabi, accounting for some 31% of the total FDI in 2006. India is also a significant source of investment with almost a fifth of the total (18%). Collectively, other Gulf States and Arab countries represented around 12.6% of the total. As such, European and US investment in the Emirate is very low in comparison to the size of their economic relations. By way of example, the US accounted for 0.7% and 1.2% of total FDI in the Emirate during 2005 and 2006, respectively. Therefore, the Emirate clearly has not benefited significantly from the excellent international standing it enjoys with the EU and US in relation to industrial and technological trade.

Table 3.5: FDI in the Emirate of Abu Dhabi by Country of Origin, 2005 and 2006

The country of origin	2005		2006	
	Value	%	Value	%
Japan	4,822	31.1	4,962	30.7
India	3,112	20.1	2,929	18.1
Denmark	1,260	8.1	1,389	8.6
Iran	872	5.6	870	5.4
United Kingdom	419	2.7	510	3.2
Switzerland	189	1.2	272	1.7
New Zealand	293	1.9	267	1.7
United States	111	0.7	201	1.2
Gulf States	1,119	7.2	1,030	6.4
Other Arab countries	1,055	6.8	1,005	6.2
Other States	2,234	14.4	2,736	16.9
Total	15,486	100	16,172	100

Source: Ministry of Economy, 2007. State of the UAE

Figure 3.16: Evolution of the Structure of Public Revenues in Abu Dhabi Emirate, 2003-2008



Source: DED, 2009

3.7 Public Finance

3.7.1 General income

The relative distribution of public revenues by type in the Emirate of Abu Dhabi between 2003 and 2008 is shown in Figure 3.16.

The contribution of oil and gas revenues to Abu Dhabi Emirate's total public revenues increased from 81.2% in 2003 to 93.3% in 2008. This increase was particularly marked between 2006 and 2008 as a result of exceptionally high oil prices. The Abu Dhabi Government recognizes the importance of diversifying its sources of national income, alongside the parallel development of the crude oil sector, in order to offset economic volatility and reduce uncertainty. This is enshrined in the Emirate's Economic Vision 2030, which targets a reduction in the contribution of oil and gas to 36% of total GDP by 2030. At the same time, Abu Dhabi retains its premier status as an energy capital, including as a developer of renewable energy assets.

Non-oil revenues can be divided into 'current income' and 'capital income'. Current income is that which is obtained by Government departments for services provided to residents such as tariffs and service fees. The share of public revenues contributed by current income declined from 13.9% in 2003 to 5.7 % in 2008.

Capital income, relates to the returns from Government investments and loans. The share of capital income in public revenues also decreased significantly from 4.9% in 2003 to 1.0% in 2008. Capital income depends on the size of internal and external lending and the ability of the public treasury to recover loans.

3.7.2 Public Expenditure

In 2008, total public expenditure was 44.8% higher than in the previous year. This growth reflects the high level of public investment in a host of ambitious development projects (see Section 4) and financial markets. In that year, Government investment in development grew by 123.7% while investment in capital transfers increased by 306.8%.

The proportion of Abu Dhabi Emirate's annual expenditure which was provided for Federal expenses (e.g. to finance development projects of the Federation and administrative expenses) was 33.6% in 2007, having fallen from 35.8% in 2007 and 42.7% in 2003. The proportion of income that is devoted to the Emirate's

share of national expenses has declined over the period largely as a result of the overall increase in revenues received.

The proportion of total public finances expended on 'aid and loans' to other states and various regional institutions increased dramatically between 2003 and 2008, rising from 9.3% in 2003 to 18.2% in 2005, eventually reaching 28.6% in 2008. In this time, international loans and grants moved from the 4th to the 2nd highest category of public expenditure.

'Recurring charges for services' relates to salaries and wages, running expenses for the purchase of goods and services and current transfers. The proportion of total public spending in this category decreased in 2008 to 23.3% from 31.9% the previous year. High levels of expenditure in 2003 and 2007 are largely accounted for by structural reorganization in public sector administrative departments.

'Capital payments' for operational loans to Abu Dhabi's institutions increased from only 0.5% in 2003 to 7.4% of the total public expenditure in 2008. This represents the increasing leverage of public funds required to fund large-scale development and other economic projects.

'Development expenses' for the facilitation of service and infrastructure projects represented 7.1% of total public expenditure in 2008, a significant fall from the 16.2% expended in 2003. This trend is partially as a result of increasing private sector participation in the implementation of infrastructure and development projects, including the expansion of Public Private Partnerships (PPP).

3.8 Trade

3.8.1 The Structure of Commodity Exchange

Data on the exchange of commodities through Abu Dhabi's ports shows significant growth in trade volumes during 2008 compared with the previous year.[37] Total merchandise exports grew by more than three-fold in this year, from 11% to 37%. This was largely as a result of high world oil prices which led to growth in oil exports of 46%. Imports to the Emirate also grew, as trade in-flow volumes increased by 42% during 2008, largely as a result of rising commodity prices.

3.8.1.1 Commodity Exports

According to shipping records, Abu Dhabi's total merchandise exports amounted to approximately 362.7 billion Dirhams in 2008, a growth of 37% from the previous year. The vast majority of these exports were represented by crude oil which had a value of 283.9 billion Dirhams in 2008, an increase of almost 90 billion Dirhams in a single year (a 46% increase). Additionally, exports of petroleum products from Ruwais and Umm Al Nar also rose by 19% in 2008 in line with efforts to diversify the economy through the stimulation of the industrial sector.

Non-oil exports amounted 6.25 billion Dirhams in 2008, representing only 1.7% of total merchandise exports for the same year. Although derived from oil, plastic and its products represented 46.8% of Abu Dhabi's total non-oil exports in 2007. Minerals and related products also represented around 13% of non-oil exports. The value of commodity re-exports was around 6.2 billion Dirhams in 2008, although there was a decline in the growth rate from 37% in 2007 to 11% in 2008.

The Government of Abu Dhabi has realized that such overwhelming dependency on a single strategic export exposes the economy to serious risks and fluctuations within the global market. As such, significant efforts have been introduced in order to facilitate the development of non-oil commodity exports and downstream processing, including petrochemical products.

3.8.1.2 Commodity Imports

Imported goods had an estimated cumulative value of around 90.3 billion Dirhams in 2008. This represented a rise of around 42% from 2007, well above the 34% average rate of growth during the period from 2003 to 2008. The rise in the value of imports is a direct result of the increase in the global prices of goods in interest rates experienced in the first half of last year, as well as the fall in value of the Dirham against the Euro and the Yen (Japan being Abu Dhabi's largest trading partner). Consumer goods accounted for the highest percentage of the total value of imports in 2008, with 66% of the total. This was followed by capital goods which represented 23% of total imports, and intermediate goods which represented 10.7%, with little variation occurring between 2007 and 2008.

3.8.2 Balance of Trade

The trade balance, that is the difference between goods received by the Emirate of Abu Dhabi and export goods, achieved a surplus in the period between 2003 and 2008, due to increased oil revenues in the later years. Net exports amounted to 200.2 billion Dirhams in 2007 and 236.4 billion Dirhams in 2008 with an increased

37. According to available data (inter-emirates trade data is complicated, as goods produced in one Emirate may be exported from another Emirate).

growth rate of 18%. The data also indicates that the relative importance of foreign trade declined from 81.7% in 2007 to 80.2% in 2008. However, this decline is not a negative indicator of trade openness, considering that both the value of foreign trade and GDP increased at higher rates during 2008 than in 2007 and the global economic downturn.

As a result of a high level of oil exports, the Emirate had positive trade surplus (months that exports exceed imports) of more than 400% for most of the period between 2002 and 2008.

3.8.3 Significant Trading Partners

3.8.3.1 Principal Export Partners

In terms of non-oil commodities, regional Arab states account for the bulk of the exports from the Emirate of Abu Dhabi, followed by exports to Asian countries. It is interesting to note the evolution of the share of these two groups between 2000 and 2007. While the proportion of exports for the Arab and Asian states was 45.42% and 16.58%, respectively in 2000, the ratio of exports to Arab countries had grown to 57% in 2007 and fallen to 35% for exports to Asian countries. Therefore in 2007 around 92% of Abu Dhabi's total exports were to Arab and Asian countries, which indicates the growing importance of these regions and the positive impacts associated with regional free trade negotiations within the framework of the UAE's membership of the Gulf Cooperation Council (GCC).

The importance of geographic and regional groupings is evident once again in the pattern of distribution of exports between Abu Dhabi and its main foreign trading partners. In terms of non oil exports, the two most significant trade partners for Abu Dhabi are Qatar and Saudi Arabia. These two GCC states received 19.8% and 12.2% of total non-oil exports respectively in 2007, which together account for around a third of the total volume. China, Iran, India, Oman, Kuwait and Pakistan, and to a lesser degree Syria and Egypt, make up the other significant trade partners.

3.8.3.2 Principal Re-export Partners

Regarding the distribution of re-exports, geographical factors and membership of regional trade blocs defines the most important trading partners, the most significant of which are respectively Qatar (16%), Oman (13%), India (11%), Saudi Arabia (9.9%) Bahrain (8.3%). Together, these five states accounted for 58.2% of the total re-exports moving through Abu Dhabi in 2007.

3.8.3.3 Principal Import Partners

The EU provides 35% of all imports into Abu Dhabi, while Asian countries have an import share of more than 23.7%. In terms of regional Arab countries, Saudi Arabia is the most significant source of imports to the Emirate, with such goods having an estimated value of 10 billion Dirhams, or 15.7% of total imports, in 2007. Japan and the US each make up around 10% of total during 2007, while imports from China increased thanks to rapid economic development, reaching 2.9% of total imports.

3.9 Summary of Key Economic Development Factors

Several key recurring themes can be identified when examining the Emirate's economic performance between 2003 and 2008. Firstly, Abu Dhabi experienced phenomenal economic growth during this period, which largely resulted from increased oil revenues due to high prices and production. To a lesser extent, growth was also seen in most other sectors as a result of the investment of revenues in non-oil activities, particularly finance, manufacturing and tourism as part of policies to diversify the economy. The period was also characterized by structural reforms in the public sector and a greater involvement of the private sector in the economy.

In the last quarter of 2008, the global financial crisis slowed economic growth rates in all aspects of the economy, particularly construction, finance and real estate. However, large surpluses and effective Government intervention served to mitigate the effects of the slowdown compared to other countries. It should be noted however, that forthcoming economic data for 2009 will provide a more complete picture of the effects of the slowdown in relation to Abu Dhabi's economy.

The first priority within Abu Dhabi's Economic Vision 2030 is to 'build a sustainable economy' in the Emirate. According to the Vision, "*the key to more sustainable development lies in stimulating non-oil sectors, diversifying the range and depth of economic activity taking place in the Emirate, and increasing productivity through a focused approach on Abu Dhabi's competitive advantages*".

In the past, economic growth has brought increasing social development, wealth and prosperity to Abu Dhabi's citizens and residents alike. However, in maintaining this extraordinary economic growth while moving towards a more diversified economic base, the Emirate faces a number of challenges relating to the creation of a sustainable economy, including the following aspects:

- The investment of national surpluses coupled with the attraction of significant FDI capital has led to the commencement of a large number of mixed-use and industrial mega-projects in Abu Dhabi. Taken together, these projects are substantial consumers of energy and resources (land and materials) adding to the Emirate's ecological footprint.

- The fulfillment of the Emirate's Economic Vision is dependent on continued growth in the population based on international guest workers, to provide the necessary workforce and consumers to build and sustain it. This growth in population is likely to lead to increasing demands on local resources and imports, and social and environmental impacts, and contribute to rising inflation unless supply is also managed.

- Initiatives are in place to reduce resource use in economic development through sustainable waste management, Estidama, efficient land-use planning and development control and other measures and structural reforms. [38] However, Abu Dhabi is considered to have one of the highest consumption rates (e.g. potable water) per capita at present.[39] Therefore, further development in Abu Dhabi, particularly in industry, is likely to increase the consumption of local energy and resources further in the future.

- While diversification is essential for the creation of a sustainable economy, the move to increase industrial development will inevitably lead to a greater need to prevent pollution and protect ecological assets through effective regulation and management practices. This is particularly necessary considering that many industrial areas are located in sensitive environments such as coastline and desert areas. For example, it is likely that a number of key industries will be located in the Eastern Region, which also contains the majority of the Emirate's terrestrial ecology as well as being of great importance for its landscape and cultural value.

- Due to the extension of major industries into the more remote areas of the Eastern Region and Al Gharbia, measures to foster integrated sustainable communities in these areas is a priority to assure a high quality of life for all and avoid any potential risks of social exclusion.

The principal challenge for sustainable economic growth in Abu Dhabi is to maintain the levels of GDP which have brought the Emirate great advances in wealth and social welfare, and reduce reliance on oil and overseas labor, while managing potential negative impacts on the local community and culture, creating efficient patterns of consumption and production and protecting the environment.

38. For more details on Estidama see Section 4.7.1
39. According to the WWF Living Planet Report 2008 the UAE has the highest ecological footprint per capita in the World.

4. DEVELOPMENT

4.1 Overview

Revenues from the oil and gas industry have permitted Abu Dhabi Emirate to compress decades of economic growth into a relatively short period. The societal transformation which has accompanied this growth has been monumental. In less than four decades, Abu Dhabi Emirate has evolved from a small and traditional society, with an economy centered on fishing, pearling and sea trading at the coast and small oasis farming in-land, to a regional economic powerhouse and commercial center, with one of the most multi-cultural societies in the world.

This period has been characterized by enormous population growth, from less than 100 thousand people to more than 1.5 million, and large scale urbanization and industrialization, which has dramatically altered Abu Dhabi's physical environment.

The purpose of this Section is to provide an overview of physical development in Abu Dhabi and the institutions that are shaping it, including the following key development aspects:

- Urban development
- Tourism development
- Industrial development
- Infrastructure development
- Coastal development
- Development Control

Physical development in Abu Dhabi Emirate has grown at an increasing rate over the past decade. This trend is set to continue with substantial urban and industrial developments planned for each of the Emirate's regions within the framework of the Vision 2030 Structure Framework Plans described below.

4.2 The Abu Dhabi Urban Planning Council and the 2030 Structure Framework Plans

Urban development is generally guided by an overarching framework or strategy plan throughout the world and this is indeed the case in Abu Dhabi. The Abu Dhabi Urban Planning Council (UPC), which was created by Emiri Decree no. 23 of 2007, is the agency responsible for the future of Abu Dhabi's urban environment and is the entity behind the development of the Vision 2030 urban development strategy for the Emirate.

The UPC initiates, drives and supports Abu Dhabi's urban development strategy. By transferring its 2030 Vision to physical settings, the UPC develops strategic development plans that create guiding principles which cascade over critical projects designed to shape the Emirate. The Vision is built on comprehensive analysis of the urban fabric, land availability and its best use, environmental issues, mobility, infrastructure and urban services that need to be integrated into our City Development Strategy.

As the agency responsible for ongoing land use planning in the Emirate, the UPC has introduced four key structure framework plans (in various stages of production) for all prominent regions of Abu Dhabi Emirate:

- Plan Capital 2030
- Plan Al Ain 2030
- Plan Al Gharbia 2030
- Plan Eastern Region 2030

These framework plans have been successful in establishing consistent visions for the growth and development of the Emirate, in which Abu Dhabi's cities and regions progress in a way that is complimentary and synergistic. The Plans have also met the principal objective of serving as a strong foundation for improving local service delivery to residents of towns and cities across the Emirate.

The Plans provide recommendations on the most sustainable spatial distributions for the following land uses, in conjunction with appropriate supporting transport infrastructure:

- Residential,
- Commercial and retail,
- Industry,
- Civic and institutional facilities,
- Protected areas,
- Community facilities, and,
- Open space, sport and recreation.

The areas of Abu Dhabi to which Plan Capital 2030 and Plan Al Ain 2030 apply are illustrated in Figure 4.1 and Figure 4.2 respectively. The primary vision, aspirations and proposed developments presented within these plans are outlined below.

4.2.1 Abu Dhabi

In 2006 the City of Abu Dhabi was experiencing unprecedented large-scale and fast-paced urban development. The City's plan, dating from the mid 1980s, had reached its conceptual limits, and several planned developments were competing to establish themselves as Abu Dhabi's new Central Business District (CBD). Construction had started on a planned 10-lane highway through Abu Dhabi Island to improve vehicular access from the E-11 to the City's emerging waterfront developments at Al Sowwah, Al Reem and Al Saadiyat Islands.

The Government of Abu Dhabi hired a prominent planning consultant from Vancouver, Canada, to lead a new comprehensive land use plan for the City. The Plan was developed based on inspirational sessions with His Highness Sheik Mohamed Bin Zayed Al Nahyan, Crown Prince of Abu Dhabi and Chairman of the Abu Dhabi Executive Council and other key government agencies. Besides that, an analysis of the environmental context, social, cultural and economic trends, detailed review of planned developments, and an evaluation of the City's needs in terms of infrastructure and transport were also implemented.

To meet the requirement of quickly delivering a plan in order to meet the extremely rapid urbanization occurring in Abu Dhabi and align large scale developments, the consulting team adopted a planning process that relied on senior government representatives and experienced international practitioners to work together in an intensive series of 'charrettes' to produce and refine the guiding principles and key concepts that comprised the heart of the plan.

A Charrette is an intensive, creative and collaborative session which brings together participants from a multidisciplinary team consisting of urban planners, designers, architects and landscape architects, engineers, and other field experts to engage local government representatives and stakeholders. The purpose is to enquire into a pre-defined series of issues and challenges of importance to the various stakeholders through a program of discussion, workshops and interactive design.

The visionary Plan Capital 2030, Urban Structure Framework Plan, was the result of this intensive process, and this immediately became a landmark document

intended to guide the development of the City to the year 2030 with a projected population of more than three million people. The Plan sets out the basic urban structure of land use, transportation, open space and built form, outlines key 'building blocks' and provides a road map of principles and policies. It is designed to help Abu Dhabi filter and respond to current and future development needs, establish a planning culture and introduce strong guiding principles for new development.

The UPC has developed the Capital 2030 Urban Structure Framework Plan to optimize the city's development through a 25-year program of urban evolution. In doing so, it is laying the foundations for a socially cohesive and economically sustainable community that preserves the Emirate's unique cultural heritage. The foresight to plan for infrastructure ahead of time is a key example of visionary governance.

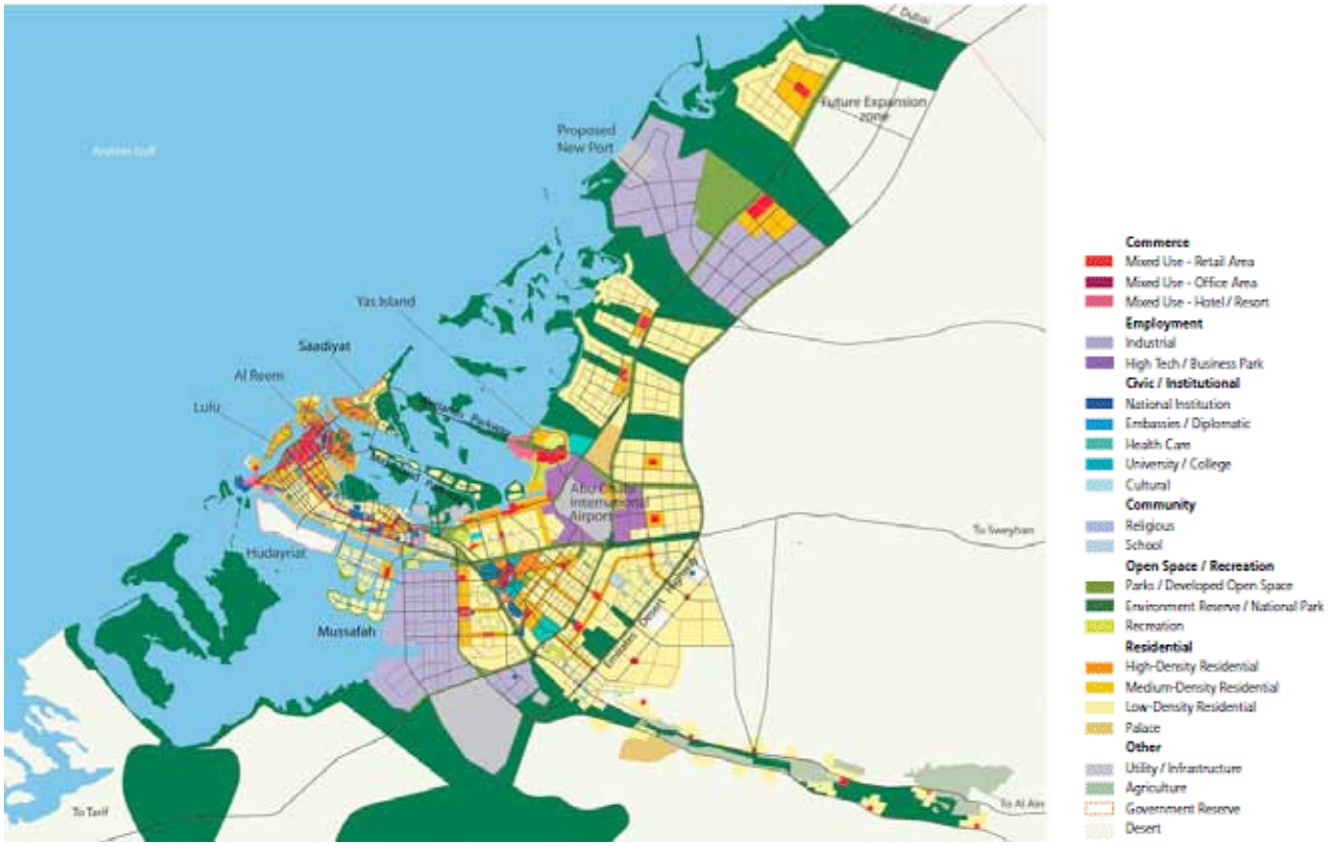
Plan Capital 2030 was published in September 2007. However, it is understood that the completion of a comprehensive detailed Plan will take several years of complex, technical work. The Structure Plan is intended to serve in the interim. Projections of GFA (estimated) for commercial, industrial and hospitality sector land use to 2030 are presented in Table 4.1. The proposed land use framework for Abu Dhabi is shown below in Figure 4.1.

Table 4.1: Abu Dhabi Region Estimated GFA by Commercial, Industrial and Hospitality Sectors, Baseline 2007 and Projections 2010 to 2030

	Office Space (million m^2)	Retail Space (million m^2)	Industry Space (million m^2)	Hotel rooms
2007	1.4	0.86	4	10,000
2013				
- Low estimate	1.8	1.1	1	-
- High estimate	2.7	2.8	6.5	-
- Suggested	2.5	1.5	6.5	21,000
2020				
- Low estimate	3	2	1.8	-
- High estimate	4.5	4.7	11.6	-
- Suggested	3.5	2.5	10	49,500
2030				
- Low estimate	5.2	3.5	3.3	-
- High estimate	7.7	8.5	21.8	-
- Suggested	7.5	4	15	74,500

Source: Plan Capital 2030

Figure 4.1: Plan Capital 2030 Land Use Framework



Source: UPC (2007) Plan Capital 2030: Urban Structure Framework Plan

4.2.2 Al Ain

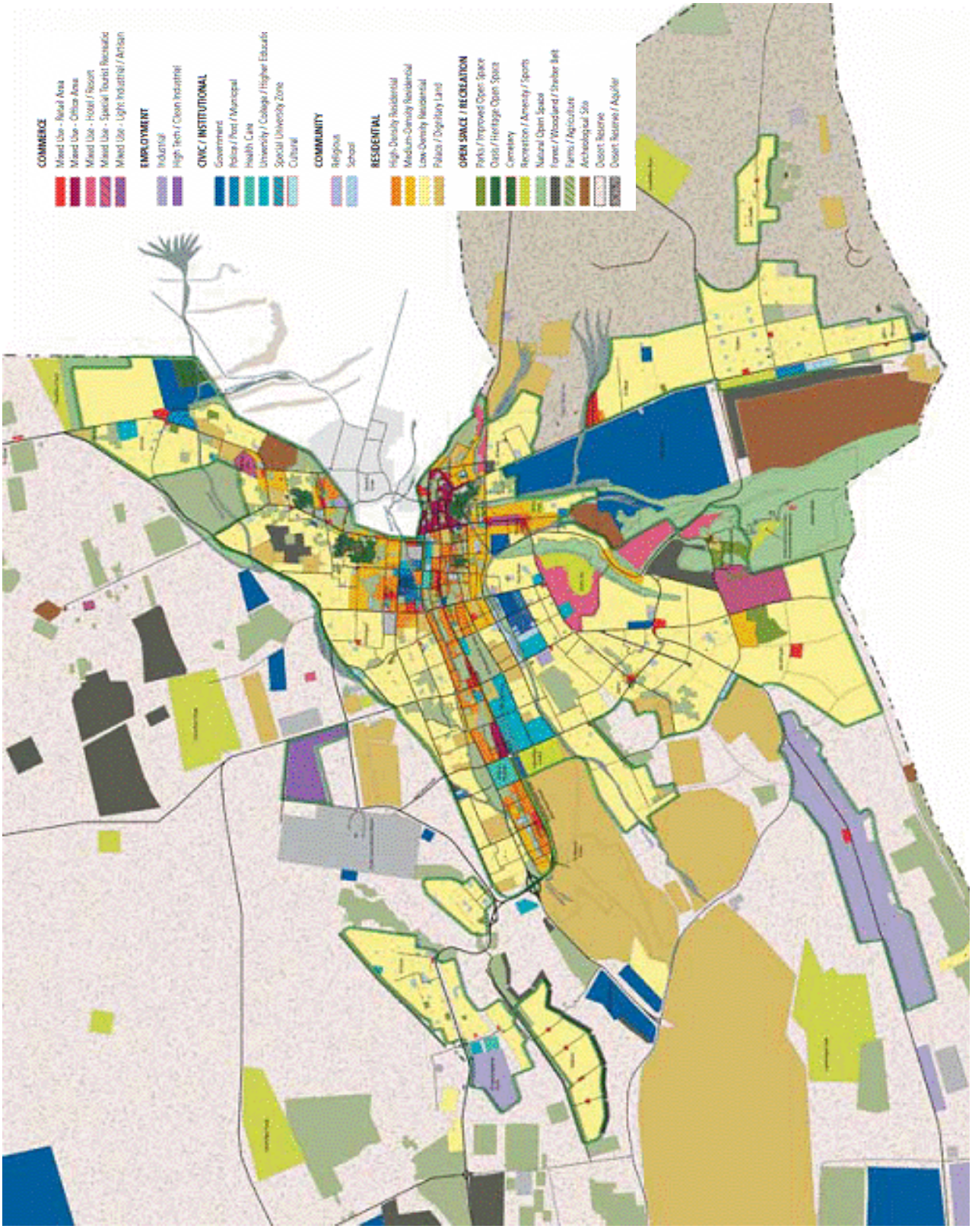
In 2007, the UPC embarked on Plan Al Ain 2030: the Urban Structure Framework to help Al Ain evaluate and respond to current and future development challenges and support the evolution of the city into a model desert community. Released in April 2009, the Plan covers the City of Al Ain and as such, has now been re-branded as Al Ain City Urban Structure Framework Plan in recognition of the urban area that is covers. This long-term plan is part of the overall vision for the region of Al Ain to guide the development of the oasis city upto the year 2030, with a projected population of around one million people.

In November 2009, following the release of the Plan, the UPC began creating a regional development strategy for the settlements located in the 29 districts across the wider Al Ain region. This will become the Al Ain Structural Framework and will combine together with the Al Ain City Urban Structure Framework Plan to become 'Plan Al Ain 2030'.

The proposed land use framework for Al Ain is shown below in Figure 4.2. A distinct east-west transport and movement axis is promoted for the urban area of Al Ain, facilitating key movements from Abu Dhabi through to Oman.

Plan Al Ain 2030 proposes to increase urban densities within the core urban areas of Al Ain. Districts with higher population densities will in many cases incorporate office, retail and hotel floor space. Projections of GFA (estimated) for commercial, industrial and hospitality sector land use to 2030 are presented in

Figure 4.2: Plan Al Ain 2030 Land Use Framework



Source: UPC, Plan Al Ain 2030: Urban Structure Framework Plan

Table 4.2: Al Ain Estimated GFA by Commercial, Industrial and Hospitality Sectors, Baseline 2007 and Projections 2010 to 2030

	Office Space (,000 m²)	Retail Space (,000 m²)	Industry Space (,000 m²)	Hotel rooms
2007				
- Baseline	150	460	800	796
2010				
- Emerging	291	169	186	1,554
- Growing	729	657	1,371	2,525
- Suggested	250	600	1,000	1,800
2020				
- Emerging	412	248	263	2,481
- Growing	1,030	965	1,937	4,032
- Suggested	400	800	1,450	2,700
2030				
- Emerging	612	388	391	4,009
- Growing	1,531	1,511	2,881	6,516
- Suggested	600	1,100	1,975	4,000

Source: Plan Al Ain 2030

4.2.3 Plan Al Gharbia 2030

Situated between the Empty Quarter and the Arabian Gulf to the West of Abu Dhabi City, the Al Gharbia Region encompasses approximately 60,000 km², and includes the UAE's richest oil and gas reserves.

Plan Al Gharbia 2030 is designed to aid in moving the Al Gharbia region toward the future with managed, responsible growth. Environmental respect, social health, cultural identity and economic development all share equal status and provide the opportunity to leverage economic growth without sacrificing the cultural and historic significance of the region for future generations.

The UPC initiated work on Plan Al Gharbia 2030 in the second Quarter of 2008 and is currently nearing completion. This effort has diverged from the previous Structure Plans in two respects. Firstly, it is a regional plan, intended to guide development throughout the vast land area of Al Gharbia and its seven principal settlements. Secondly, it is a joint initiative of the UPC, Western Region Municipality and Western Region Development Council. According to the UPC's preliminary projections, the population of Al Gharbia is expected to grow from 106,000 people in 2005 to 450,000 people in 2030.

The Al Gharbia Land Use Framework Plan consolidates development at the coastal corridor and in specific desert areas of historic settlement. Industrial Land and Utility / Infrastructure Zones are placed throughout the settlement areas of the region.

4.2.4 Plan Eastern Region 2030

The Eastern Region of Abu Dhabi Emirate surrounds the oasis city of Al Ain and contains approximately twenty villages, most of which range in size up to more than 10,000 people. The UPC, which has in the recent past unveiled comprehensive masterplans for the other regions of the Emirate including Abu Dhabi, Al Ain, Capital City District etc., is working on developing the Eastern Region Plan 2030 along with the Eastern Region Development Council, Al Ain Municipality, the DOT, EAD and ADACH.

The UPC initiated work on the Eastern Region Plan 2030 in mid-2009. This Plan will effectively cover the balance of land located between the primary urban areas of Abu Dhabi and Al Ain. It is anticipated that Eastern Region Plan 2030 will be available in draft format in mid-2010.

The Regional Structure Framework Plan for the Eastern Region will be a principal milestone in Abu Dhabi's urban planning process. The formulation of the Eastern Region Framework Plan will mark the completion of masterplans for every part of the Emirate including Abu Dhabi, Al Ain and the Western Region of Al Gharbia. Similar to other frameworks, the Eastern Region 2030 Plan will complement the already introduced Plan Al Ain 2030.

4.2.5 Integration of Structure Plans with the Abu Dhabi Economic Vision 2030

The structure framework plans, developed by the UPC, are a key guide to evaluate the nature and scale of development proposals in response to the sustained high aspirations and ambition of Abu Dhabi's development community.

The Government of Abu Dhabi has directly committed itself to strengthen and develop the Emirate's economy and has hence charted its strategy in the Economic Vision 2030. The UPC's Vision 2030 urban development strategy directly complements the economic vision of Abu Dhabi's leadership with the creation of a world class sustainable urban infrastructure to achieve Emirate-wide distribution of economic activities and associated benefits.

One challenge that has emerged is that the Plans did not fully account for the demand to allocate ex-urban industrial and residential development plots. The UPC is working with ZonesCorp and other agencies to remedy this through the creation of new policies, including an Emirate-wide industrial lands policy, and is also working with Abu Dhabi Department of Transport (DOT) to evaluate the impact that this trend may have on strategic transportation policy.

Two key areas that the urban and regional structure plans must be aligned with are plans for economic development and environmental conservation. The Abu Dhabi Council for Economic Development (ADCED) and Abu Dhabi Department of Economic Development (DED), together with the Executive Council, published the Abu Dhabi Economic Vision 2030 in November 2008 (refer to Section 3).

The Abu Dhabi Economic Vision 2030 identifies important aspects of economic policy that require further development and also identifies a number of high growth sectors to lead Abu Dhabi's economic development. The Vision states that 'to achieve its vision for 2030, Abu Dhabi will continue to diversify its economy, investing in those capital intensive, export-orientated sectors in which it has or can build a competitive advantage'. The following sectors have been identified as those to provide the growth to achieve Abu Dhabi's agenda of economic diversification and to successfully target both regional and global markets:

- Energy – oil and gas,
- Petrochemicals,
- Metals,
- Aviation, aerospace and defense,
- Pharmaceuticals, biotechnology and life sciences,
- Tourism,
- Healthcare equipment and services,
- Transportation, trade and logistics,
- Education,
- Media,
- Financial services, and
- Telecommunication services.

Pursuit of economic development in the abovementioned sectors has a number of significant land use and development implications for Abu Dhabi. Until the recent global credit crisis, high end residential and mixed-use development was largely the development of choice. More recently (and in line with the Emirates' Economic Vision 2030) an increased focus has been placed on the development of employment based sectors, particularly industry (refer to Section 4.5).

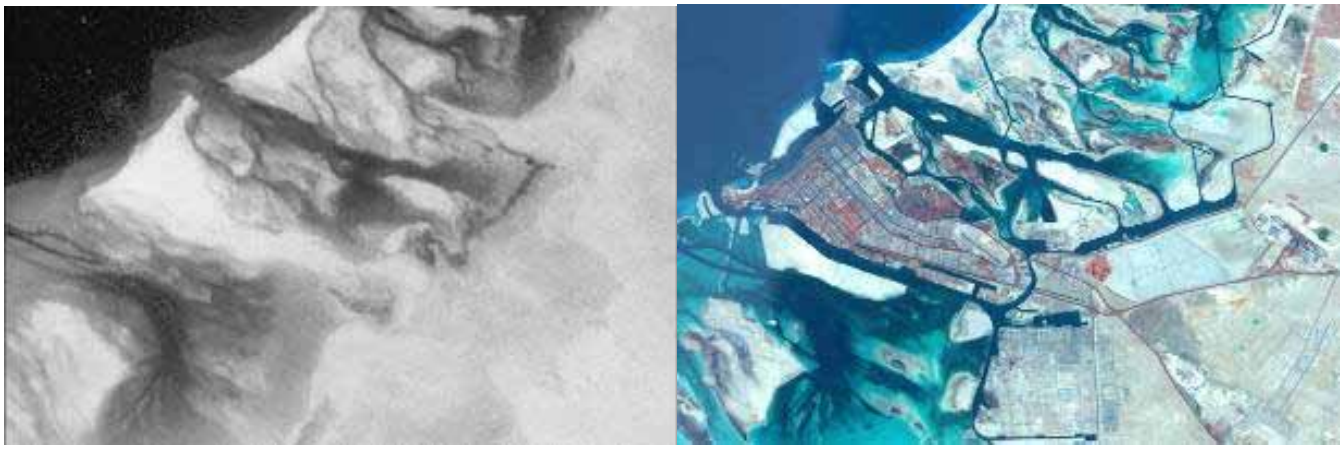
4.3 Urban development

Urbanization is a complex process in which a country's organized communities become larger, more specialized and more interdependent. In Abu Dhabi this process is fed by international guest labor arrivals, natural population growth and the migration of rural populations to urban areas. This is symptomatic of a wider global trend towards urban living that has led to more than half the world's population living in urban areas.[40]

Rapid urbanization imposes increasing pressure on resources and the environment. This pressure is particularly acute in constrained and sensitive environments such as the UAE. There has been a considerably high rate of urbanization in the Emirate, with remarkable increasing demand on land, energy, water and other resources during the last two decades. In particular, development around Abu Dhabi Island has led to a vast amount of marine dredging and land reclamation that has significantly altered the natural coastline. The changing shape of Abu Dhabi Island is illustrated in Figure 4.3, which shows an aerial view of Abu Dhabi City in 1965 compared to 2001.

40. UN (2008) 'Half of global population will live in cities by end of this year, predicts UN', 26 Feb 2008, Online at http://www.un.org/apps/news/story.asp?NewsID=25762

Figure 4.3: Abu Dhabi Island 1965 and 2001, and Reclaimed and Dredged Areas of Abu Dhabi City, 2001



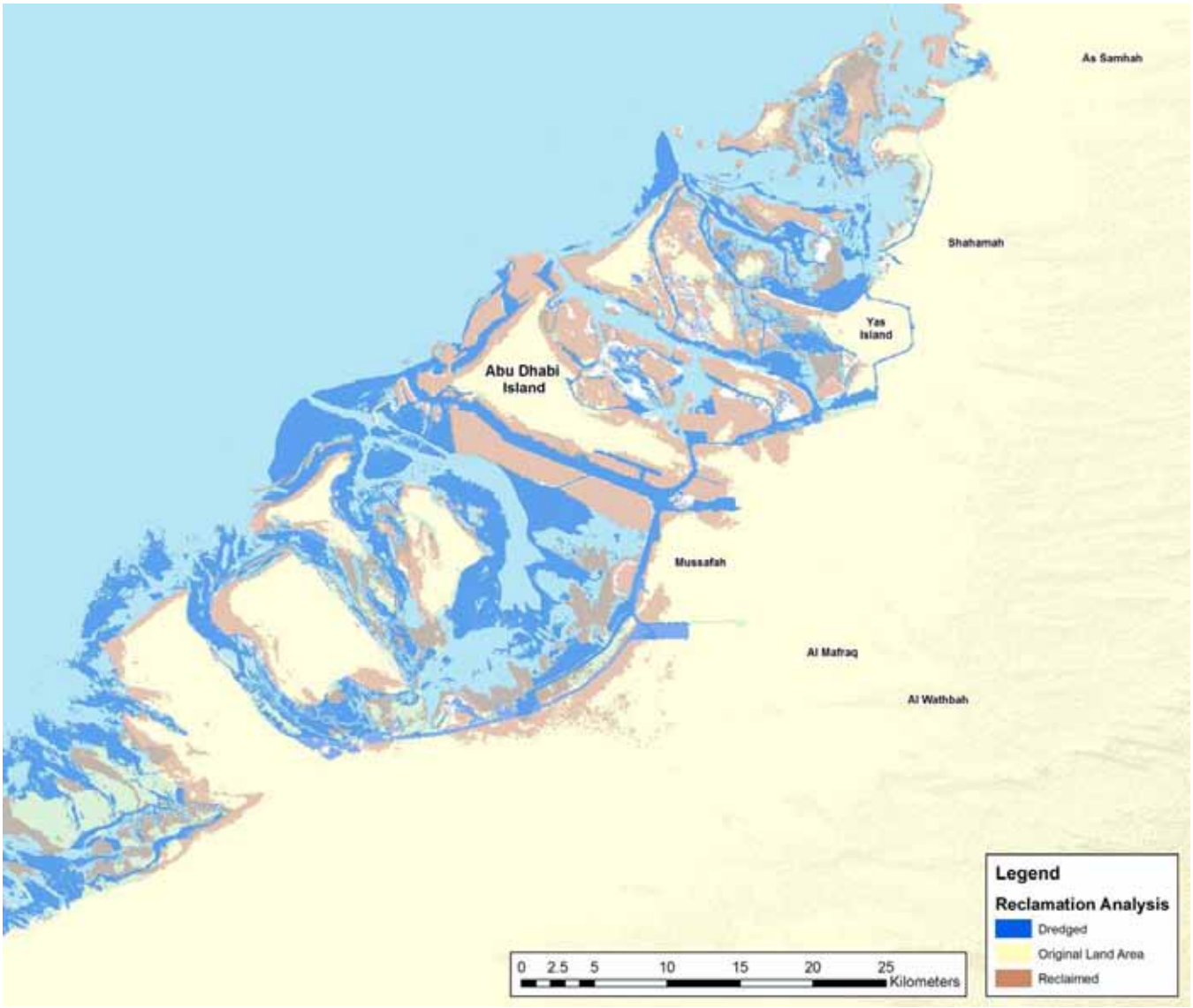
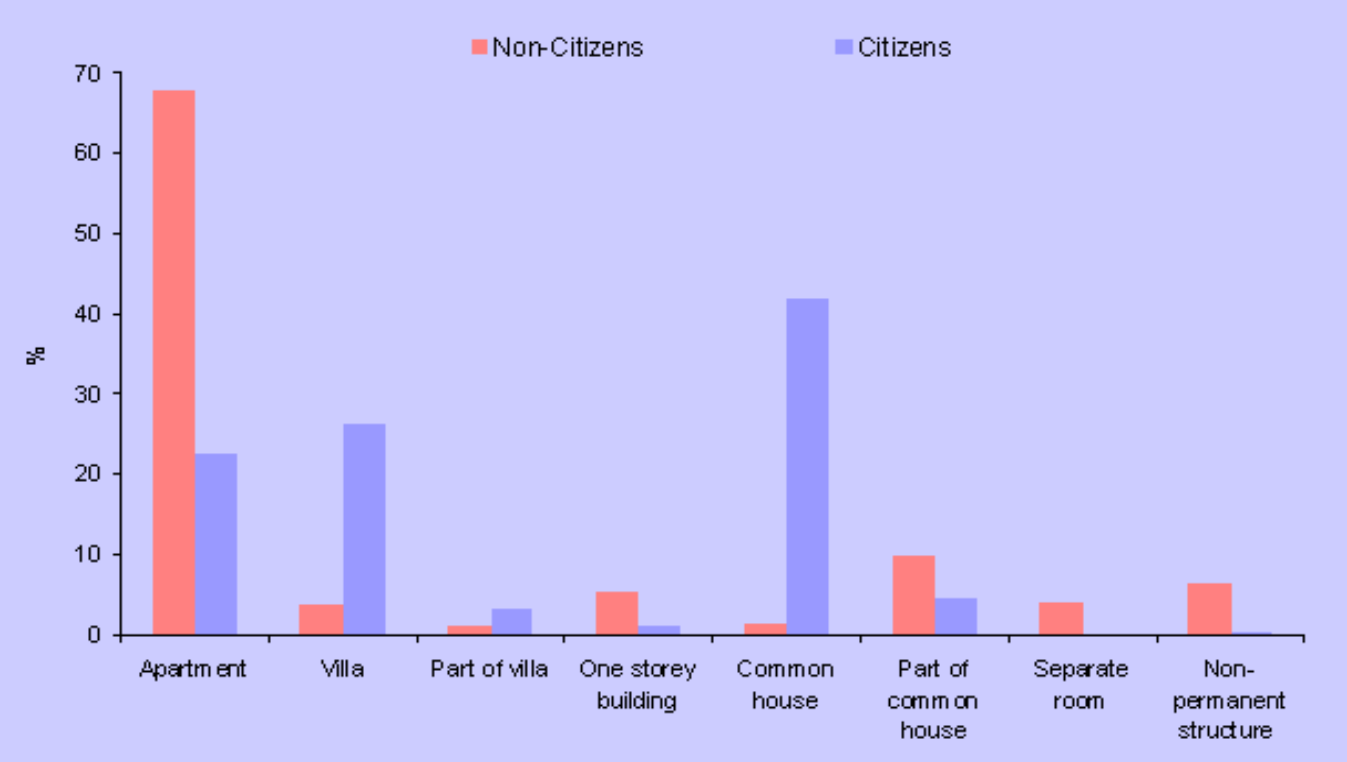


Figure 4.4: Household type, total, and by residential status, Abu Dhabi Emirate, 2008



Source: SCAD (2009) Household income and expenditure survey 2007 / 2008

This Section outlines key urban developments within Abu Dhabi Emirate, including UPC led developments and residential, retail and commercial land uses. Industrial land use is discussed in Section 4.5.

Details of planned urban development projects in Abu Dhabi, Al Ain and Al Gharbia until the year 2030 are provided in the respective Structure Framework Plans. The UPC is currently developing an updated list of major development projects across the Emirate to reflect changes in planned area, population and scheduling which have arisen since the Plans were produced.

4.3.1 UPC Facilitated Developments

The UPC has prepared a number of area master plans that build on the 2030 Structure Framework Plans. For example, work has been initiated on the Abu Dhabi Capital City District. Framework and Master Plans that are facilitated by the UPC are generally for large, strategic areas that will attract a multitude of investors and developers. The UPC is best placed to lead such Plans as they can co-ordinate the private sectors' interests in the proposed developments and also ensure that developments are undertaken for the public good.

UPC led Master Plans have been prepared and approved for the Capital District, Shahama and Bahia, Khalifa City A and Khalifa City B Master plans are currently being developed for North Wathba, Baniyas, Mussafah and for three settlements in Al Gharbia, namely Liwa, Mirfa and Ruwais.

4.3.2 Residential Land Use

4.3.2.1 Housing

Data from the 2008 household survey showing household type by residential status is presented in Figure 4.4.[41] According to this survey, the majority of non-citizens (68%) live in apartments, with a further 10% residing in accommodation defined as 'part of a common house'. It is worth noting that almost 10% of non-citizens were recorded as living in non-permanent housing classified either as a shed, caravan, shack or tent. Almost 42% of national citizens are recorded as living in a 'common house' (distinct from living in part of one), while 26% live in villas and 23% in apartments.

41. SCAD (2009) Household income and expenditure survey 2007 / 2008

Emirati Areas

The provision of housing for national citizens is an important issue in Abu Dhabi Emirate and is a key aspect of the 2030 Structure Plans and Economic Vision, through the national housing plan.

Many national citizens are provided with housing benefits, which can include the provision of housing itself, or plots and/or financial grants or loans to develop or extend property, through the Government's Sheikh Zayed Housing Program. Tens of thousands of national citizens have applied for housing through this scheme and the waiting list can be several years long.

In order to speed up the delivery of homes, the Government has committed to delivering more than 50,000 new homes for citizens over the next 20 years. In August 2009, the UPC announced the development of 17,000 new villas over five years in 23 separate locations. The largest of these proposed developments is the 43 km^2 South Shamkah development which will contain around 10,500 villas. A further 2,472 villas, 1,600 plots of land and 400 units are proposed in Al Gharbia, and 225 villas, 1,313 plots and 1,898 units are to be developed in the Eastern Region. A full list of proposed Emirati housing developments is provided in Table 4.3 below. The Abu Dhabi Centre for Housing and Service Facilities Development (ADCHS) was created in August 2009 to oversee the delivery of Emirati housing communities and associated services, including general infrastructure, education, health and sporting facilities and other amenities.

Many national citizens prefer to live outside the core urban areas, but also need to be fairly close to the services offered in towns. As such, the majority of existing and planned Emirati housing developments are located on the outskirts of towns. Therefore, ADCHS and the UPC are paying special attention to the provision of adequate services and facilities within communities to avoid residents having to travel long distances. However, residents living in most of these developments are likely to remain highly dependent on motorized transport.

Table 4.3: Abu Dhabi Citizen Housing Projects, at Planning, Design or Construction Phases, 2009

Region / Development stage Housing Project	Villas	Plots	Units
Al Gharbia			
Planning phase			
Liwa	400	800	-
Al Marfa	400	800	-
Delma	-	-	200
Al Silah	-	-	200
Design phase			
Umm al Ijtan	20	-	-
Mahdhara al Yubana	20	-	-
Under construction			
Al Ghayathi	786	-	-
Bidia al Mutawa	60	-	-
Madinat Zayed	788	-	-
Eastern Region			
Planning, design or construction phase	-	-	-
Al Saad	187	24	-
Naama 1	-	493	-
Naama 2	-	460	-
Naama 3	38	-	-
Shuiba	-	-	-
Salamat 1	-	-	588
Salamat 2	-	-	625
Salamat 3	-	-	13
Rimah	-	-	45
Al Yihar 2	-	-	627
Al Hiar 2	-	336	-
Abu Dhabi			
Planning phase			
South Shamkah	-	-	10,500
Al Falah	-	-	168

Source: UPC August, 2009 42

42. in The National (2009) Abu Dhabi plans to build 17,000 villas for Emiratis, http://www.thenational.ae/apps/pbcs.dll/article?AID=/20090825/NATIONAL/708249857

The current pattern of low-density housing will be continued within planned zones with development intended to be generally in the order of 30 x 36 m plot sizes, achieving a gross density of 4.5-5.0 units per hectare (including services and facilities).

4.3.2.2 Spatial Patterns of Residential Land Use

In Abu Dhabi, the highest density is preserved at the head of the island with density decreasing in all directions (refer to Section 2.3). The central portion of the Capital District is allocated a similar amount of residential density to create the critical mass of people necessary for a vibrant street life. The projected number of residential units within Plan Capital 2030 between 2007 and 2030 is shown in Table 4.4 below. This projection indicates extraordinary growth in housing development of around 281.1% over the 23 year period.

Table 4.4: Abu Dhabi Residential Unit Projections 2007 to 2030

Year	Residential Units
2007	~180,000
2013	251,000
2020	411,000
2030	686,000

Source: Plan Capital 2030

Currently, the Central District is the only part of Al Ain with a high population density. The Gateway Corridor concept focuses development intensity into a linear strip that runs the length of the city in an east-west direction. By 2030, Al Maqam, Asharej, and Al Muwajii will join the Central District in housing the bulk of the population of Al Ain. A second north-south axis consisting of Hili, Al Jimi, Al Mutaredh, and Sanaiya will also contain higher density, creating a cross roads structure where the two major axes meet. Projections of the number of residential units that will be provided in Al Ain to 2030, according to the Plan 2030, are shown in Table 4.5 below. This indicates a 201% increase in residential units during the period, representing a 214% increase in the Emirati units compared to a 198% increase in units likely to be inhabited by expatriates.

Table 4.5: Al Ain Residential Unit Projections 2010 to 2030 by Residential Status

	Citizens	Non-Citizens	Total Residential Units
2007	13,203	53,846	67,049
2013	15,254	71,538	86,792
2020	22,584	101,706	124,290
2030	41,428	160,633	202,061

Source: Plan Al Ain 2030

As is the case in many countries, housing patterns in Abu Dhabi Emirate are highly segregated according to levels of affluence, class and social ties. In Abu Dhabi, this situation has resulted in differential access to many services and facilities for certain groups.

Many employers house construction workers in dormitory-style dwellings on the outskirts of urban areas, while agricultural workers usually reside in remote areas of the Eastern Region and Al Gharbia. Other low income workers have accommodation on the outer fringes of urban areas due to the relative lack of affordability of housing in alternative areas within the towns. Public facilities, services and amenities are often located far from these areas. Therefore, as the vast majority of low-income workers do not have access to motorized transport, and in the absence of adequate public transport, access to such facilities is often restricted.

Affluent suburbs are also found on the outskirts of the urban areas, with large Emirati housing communities and mixed gated communities. These more affluent areas are often similarly remote from public services, but residents have almost universal access to a car. Differential patterns of access to services and facilities between socio-cultural and economic groups are therefore apparent.

Reinforcing social equity through better access to facilities and services is therefore a key consideration for the Abu Dhabi's Labor Policy, in order to attract quality workers, reduce staff turnover, and increase the productivity of the workforce through improved welfare. This will have the added benefit of enhancing the Emirate's positive image in the international arena.

The legal rights of the expatriate workforce are protected under Federal legislation, principally Law 8 of 1980, which governs labor relations. Article 101 of the Law affirms that where workers are located in areas that are remote from cities and where there is no access to normal means of transportation employers have a responsibility to provide employees with the following facilities:

- Adequate means of transport
- Adequate accommodation
- Drinking water
- Proper foodstuff
- Medical aid equipment
- Entertainment and sports amenities.

Until fairly recently, access to some of these facilities was somewhat limited, especially in older and temporary labor accommodation. However, more recently, the Federal and Abu Dhabi Governments have taken concrete steps to improve access these facilities across the Emirate.

The delivery of extensive public transport network through the framework of the Surface Transport Master Plans (STMP) should also increase accessibility for expatriate workers living on the outskirts of urban areas.

The Capital 2030 Urban Structure Framework Plan contains the following policy statement on international guest worker accommodation:[43]

S–3 - Develop comprehensive policies for the location and size of expatriate worker accommodation taking into account workers' and employers' needs, and immediate and long-term economic trends in the service, construction and manufacturing industries.

S–4 - In its Labor and Human Resource policy, the Government of Abu Dhabi has outlined the development of dedicated low-cost worker residences that meet or exceed international benchmarks for worker accommodation, including living and communal space, leisure facilities, hygiene and safety. The Government's expatriate worker housing policy, when applied to this Urban Structure Framework Plan, produces the following guidelines:

- Avoid housing a large number of temporary or permanent construction and manufacturing workers in a limited number of settlements by establishing a maximum worker settlement population of 10,000 people.

- Where possible, locate temporary construction worker housing on, or near, large construction sites with appropriate services and facilities;

- Provide small localized nodes of permanent worker housing on, or near, industrial and manufacturing sites with appropriate services and facilities and with access to larger service areas and transportation;

- In intensive job-generating areas, or to accommodate workers from remote construction sites or service industries, develop worker settlements of up to a generally preferred maximum of 5,000 people with a local service center with religious, health, recreational and entertainment facilities;

- If larger worker settlements are developed, they should be located close to long-term job sites or on transportation routes and provide a full range of services and amenities (places of worship, health care, shops, entertainment, recreational facilities and emergency services).

1.1.2 Commercial Land Use

At present commercial land use is focused within the Emirate's two principal urban areas of Abu Dhabi and Al Ain.

Abu Dhabi

Two major centers of office spaces are to be created in Abu Dhabi City; the new CBD and Capital District, at a sufficient distance, and with differentiated employment focuses, so that they will complement, rather than compete with each other. The remainder of office density is distributed through the urban fabric to ensure employment options in every neighborhood.

In general, retail density has been allocated to serve the neighborhood's needs and more. Some of this retail will occur along city streets and some within climate controlled malls, scaled to the neighborhood. Large regional malls are minimized and new ones are strategically located as they create intense traffic congestion.

Distributed retail density will reduce the number of vehicle trips and associated traffic by providing services near to where they are needed. As such, any large regional retail areas, such as the new Central Souq and the fish and vegetable markets are likely to be centrally located. It is possible that an additional large regional mall or area in each of the large quarter sections of the city could be accommodated, as this would be more easily accessible by transit so as to be convenient for the greatest number of people.

Al Ain

Current retail density in Al Ain is also focused along the Gateway Corridor to ensure that shoppers and workers have the opportunity to access it through transit.

Outside the Corridor, future retail density has been allocated to serve neighborhood needs. As with Abu Dhabi, some of this retail will occur in city streets and some within climate controlled malls, scaled to the neighborhood, with regional malls minimized and strategically located.

43. Chapter 8.9: Policy Statements, Social Policy, III Expatriate Worker Housing, page 146.

4.4 Tourism Development

4.4.1 Overview

Tourism is seen as a key sector in the further development and diversification of Abu Dhabi's economy. While starting from a modest base the tourism sector is expected to add significantly to both the economic and social development of Abu Dhabi, helping to stimulate and diversify the economy, generate new private sector opportunities and elevate the Emirate's international standing.

The Government of Abu Dhabi seeks to position the Emirate as offering access to a distinctive and comprehensive set of cultural institutions, a large and diverse selection of luxury hotels, a world-class airport and airline, a range of convention and business services, a serene desert, beautiful beaches, a unique heritage and the warm hospitality of the Arabian Peninsula. The Emirate's tourism strategy is designed to build the reputation of Abu Dhabi as an exclusive, high-end tourist destination.

The Abu Dhabi Tourism Authority (ADTA) was established in September 2004 as the statutory body for the tourism industry in the Emirate. It has wide ranging responsibilities for building and developing the emirate's tourism industry. These include: destination marketing; infrastructure and product development and regulation and classification.

ADTA Vision	**ADTA Mission**
To be a leading tourism authority that is positioning the Emirate of Abu Dhabi as an outstanding, globally recognized, sustainable tourism destination, while enriching the lives of the Abu Dhabi community and visitors alike.	To drive and support the development and promotion of tourism in Abu Dhabi efficiently, effectively, and transparently, in partnership with all our stakeholders while ensuring the highest quality standards.

The Tourism Development & Investment Company (TDIC), which is wholly owned by ADTA, was created in April 2005 as ADTA's tourism asset development and management arm. Since its inception, TDIC has acted as the master developer of numerous leading tourism assets and infrastructure within the Emirate. Notably, TDIC is driving the strategic development of 'Saadiyat Island', which is an important component of the Government's ambitions for the Emirate to realize its potential as a world class tourism destination.

4.4.2 Previous Performance

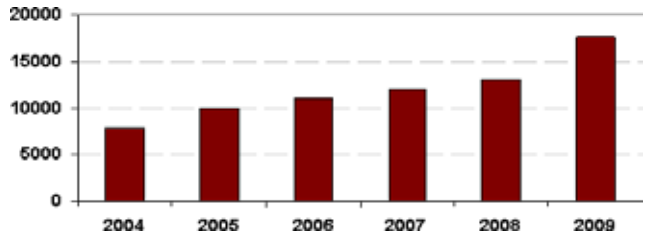
The Government of Abu Dhabi has made considerable progress in a short space of time with the delivery of major infrastructure and visitor growth.

Building on previous growth, and set against the context of the global economic downturn, Abu Dhabi had a comparatively strong year in 2009 with just over 1.5 million guest arrivals, 4.7 million guest nights and AED 4.3 billion in hotel revenue. This represents annual growth in arrivals of 2%, guest-nights of -7%; average occupancy rates in 2009 of 72%, and no change in revenues. It should be noted that a large proportion of the guest arrivals/nights and associated revenues generated in Abu Dhabi Emirate are associated with business tourism.

4.4.3 Hotels

As shown in Figure 4.5, the supply of hotel rooms has steadily increased since 2004 with stock growing from around 8,000 to more than 17,500 in 2009. Towards the end of 2009 Abu Dhabi realized significant increases in accommodation capacity. Amongst others, seven new hotels were opened on Yas Island.

Figure 4.5: Growth in Hotel Rooms in Abu Dhabi Emirate, 2004-2009

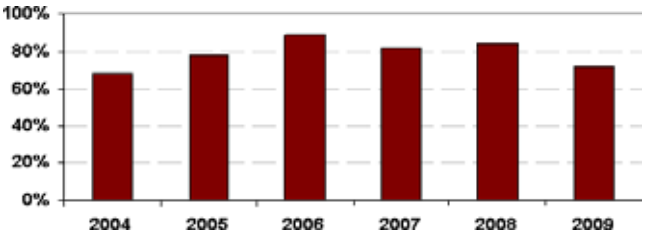


Source: ADTA, 2010

The Emirate's capacity of approximately 17,500 rooms is supplied by 62 hotels and 46 hotel apartments, including 20 five star hotels, 16 four star hotels, 13 three star hotels, 8 two star hotels, 5 one star hotels, 11 deluxe hotel apartments, 18 standard hotel apartments, and 17 superior hotel apartments.

In 2004 Abu Dhabi's hotel sector recorded average occupancy rates of 68%. This rate increased to a more than 80%, in 2008, achieving one of the world's strongest occupancy rates, reflecting the destination's growing popularity (see Figure 4.6). Occupancy rates softened to around 70-75% in 2009 primarily due to substantial additions to the accommodation supply coupled with the effects of the global economic downturn.

Figure 4.6: Hotel Establishment Occupancy Rates, 2004-2009



Source: ADTA, 2010

4.4.4 Tourism Markets

ADTA uses a portfolio based approach to manage its core regional markets which are:

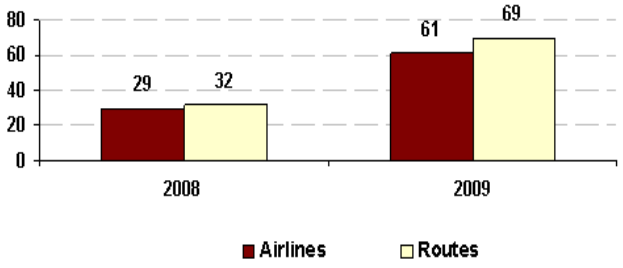
- **GCC and Pan-Arab** e.g. UAE, Saudi-Arabia and Qatar
- **Western Europe** e.g. UK, Germany, and France
- **Other** e.g. India, China, Russia, Australia, US

Abu Dhabi's biggest market for hotels in 2009 was the local UAE market 516,000 guests (34%). Europe is the Emirate's biggest longer haul market, recording 360,000 guests (24%). While the regional Arab market with 252,000 guests (17%), and the Asian and North American markets are also important accounting for 192,000 (13%) and 102,000 (7%) hotel guests respectively in the same year.

4.4.5 Accessibility

As illustrated in Figure 4.7, air access significantly improved between 2008 and 2009, with several new direct routes to major international tourist destinations opening up, including Germany, Singapore, Turkey, Greece, and Cyprus.

Figure 4.7: Abu Dhabi Airlines and Destinations Served, 2008 and 2009.



Source: ADTA, 2010

In 2009 61 cruise ships and almost 100,000 visitors were received at Abu Dhabi's Mina Zayed port, and this number is expected to increase in 2010.

4.4.6 Issues and opportunities for 2010

The following points are seen by ADTA as key issues and opportunities for 2010:

- The ongoing resolution of the financial crisis and the changing business imperatives and balances of power which may result.
- Increased accommodation supply delivers a competitive landscape which gives fertile ground for the expansion of business and Meetings, Incentives, Conventions and Exhibitions (MICE) tourism, and particularly leisure tourism at the more price and value sensitive end of the tourism portfolio.
- Changed operating conditions are also driving the maturation of the tourism sector with a more deal orientated, integrated approach being pursued by many players.

- The delivery of a range of new products and precincts is also greatly enhancing the Emirate's business and leisure tourism offer.

4.4.7 Abu Dhabi Tourism Master Plan

ADTA's Strategy, is aligned to the Abu Dhabi Government's intention to maintain and enhance its confident and secure society in an open, global, sustainable and diversified economy.

ADTA will continue to work with public and private sector stakeholders to identify existing quality standards and achieve consensus on improvements where necessary, and will gauge performance satisfaction through a comprehensive visitor survey and provide stakeholders with constructive feedback. Quality will also be assured through a commitment to training investment for the ADTA's workforce and that of the wider industry.

Abu Dhabi is targeting 10% growth in hotel guest arrivals in 2010 followed by annual growth of 15% in both 2011 and 2012. To realize these targets the ADTA plans to leverage its major events, launch a global marketing campaign, and facilitate international trade engagements through its overseas offices.

The ADTA's strategic plan aims to deliver 2.3 million hotel guests to the emirate in 2012. In addition to the current stock of more than 17,500 hotels rooms, this would necessitate a total capacity of 24,000 hotel rooms by 2012.

The next significant milestones for tourism in the Emirate include the following:

- The Roll-out of signature cultural/lifestyle attractions, including:
  - Saadiyat Cultural District (2013 and beyond)
  - Revitalisation of cultural legacy - Al Jahili Fort, Al Hosn Palace, Cultural Foundation (ongoing)
- Expanding tourism infrastructure, including:
  - ADAC – 20 million passenger capacity by the end of 2010 and the Mid field terminal (2015)
  - ADNEC – expanded exhibition space, capital city development, entertainment and convention facilities (ongoing)
  - An expanding public transport network
  - Etihad – Linking Abu Dhabi to 70 destinations by the end of 2010
  - New Airline entrants
  - Potential new cruise tourism terminal

4.5 Industrial Development

4.5.1 Economic Diversification

The large-scale urbanization of the islands and lagoons around Abu Dhabi Island was proposed, in part, to take advantage of the opportunity to attract global capital investment. As this opportunity has diminished, so too has market demand.

As a result, the large-scale development proposals proposed for the area around Abu Dhabi City are going forward at a more measured pace. This situation has allowed the Government of Abu Dhabi to make the most of the opportunity to more fully evaluate the implications of these proposals in terms of urban form and quality of life, and to make appropriate adjustments.

The Government of Abu Dhabi has also been able to divert some of its resources from meeting the unprecedented demand for mixed-use urban developments to its agenda for economic diversification. As a consequence, several new, large-scale industrial developments are being pursued or considered, in addition to those that are already in development, and the UPC is working to identify the appropriate land base for these new projects.

A key consideration is to site large-scale industrial facilities in locations that are supported by existing infrastructure, including water and power supply and transportation systems. An extensive freight railway is being planned for near-term implementation to support this effort.

However, the identification of sites is also frequently developer or politically led, in which case the UPC controls development through a more reactive planning process.

4.5.2 Specialized Economic Zones

The establishment of specialized economic zones at strategic locations in Abu Dhabi is a key driver of economic diversification in the Emirate. Each zone has been designed to cluster specialized industrial sectors in a commercially cooperative manner and contains complimentary facilities, utilities, logistics capabilities, communications infrastructure and workers' residential accommodation. Incentives for industrial companies to establish in the zones include duty free imports; tax exemptions and unrestricted repatriation of income, profits and capital; low-cost energy; access to land on a long-lease basis; and assistance with labor and licensing procedures.

The Higher Corporation for Specialized Economic Zones (ZonesCorp) is the government agency responsible for

the establishment, management and future development of special economic zones. The corporation currently operates a number of industrial cities in the Mussafah district of Abu Dhabi, namely:

- Industrial City Abu Dhabi (ICAD) I – heavy to medium manufacturing, engineering and process industries (14km^2).
- ICAD II – Light to medium manufacturing, engineering and process industries (11 km^2).
- ICAD III – A variety of clusters, including an oil and gas zone, a wood and engineering zone and a construction materials zone (12 km^2).
- Abu Dhabi Polymers Park (within ICAD III) – the first cluster in the UAE dedicated exclusively to plastics conversion (4 km^2).

ZonesCorp also completed the first phase of the Al Ain Industrial City (AAIC) development in 2008 which is located in the Madina Sanaya District, close to Al Ain City. This industrial multi-use development has a priority focus on Small and Medium-sized Enterprises (SMEs) in the light to medium manufacturing engineering and processing industries (5 km^2 with a further 5 km^2 reserved for phase II).

Table 4.6 shows the industrial activities currently operating within Abu Dhabi's specialized economic zone, and details the number of industrial facilities, staff and capital investment for each industrial type. This data shows that around 134,500 workers are employed within Abu Dhabi's Specialized Economic Zones (SEZ), the majority – 70% in industries related to manufacturing of Construction Products and Fabricated Metal Products. These two industries are also the most significant in terms of capital investment, representing a combined 285 billion Dirhams (or 58% of the total capital across all industry types).

Table 4.6: Industrial Facilities, Employment and Capital Invested in Abu Dhabi's SEZ, 2009

Industry Type	Number of Facilities	Staff	Total Capital (AED)
Construction Products	306	37,993	14,871,728,682
Fabricated Metal Products	320	55,814	13,632,518,974
Fiber Glass and Plastic Products	139	9,978	8,567,563,506
Chemicals	109	4,488	4,372,566,246
Food	74	5,590	2,820,721,515
Wood and Paper Products	128	11,312	2,473,362,862
Assembling Products	58	6,060	1,847,448,164
Textiles and Leather Products	35	2,858	412,975,122
Recycling	8	408	36,800,000
Total	1,177	134,501	49,035,685,071

Source: ZonesCorp (2009)

4.5.3 Planned Industrial Development

Abu Dhabi

Over the last few years, a number of major industrial developments have been initiated in the Abu Dhabi Region. The largest of these is the new Khalifa Port and Industrial Zone (KPIZ) which is proposed for heavy industry that relies on bulk materials imported from abroad. The development of this facility will minimize the amount of overland travel required for these materials and products and diverts heavy traffic and industrial processes away from centers of population density.

Adjacent to the Abu Dhabi International Airport a second new industrial zone is planned, focusing on clean, high tech industries, which provides a compelling gateway image to the city. Types of industry that are more service oriented will be in the existing Mussafah and Mafraq industrial zones and integrated in small enclaves in each residential area, within close proximity to the bulk of the population. Allowances have been made to accommodate industrial warehousing at key locations to serve transshipment, wherever it is most needed.

Major industrial projects currently under development in Abu Dhabi Emirate include:

- Khalifa Port and Industrial Zone (KPIZ) - ICT
- South Hudariyat Island
- Ghantoot
- Industrial City of Abu Dhabi (ICAD IV & V) -ZonesCorp
- Emirates Steel Industrial Plant – Mussafah - Emirates Steel
- Emirates Aluminum (EMAL), Taweelah - EMAL Ltd.
- Abu Dhabi Airport Free Zone (ADAFZ) - ADAC

Al Ain

One of the most important structural moves in Plan Al Ain 2030 is to transition heavier industrial uses away from around the Sanaiya district, to new purpose built areas further from the City's center. Industries rely on sound logistics and so the best place to locate them is near the infrastructures that supply them. In the case of Al Ain, two major industrial areas are allocated:

- a High-Tech Business Park at the airport, and
- a heavy Industrial district along the Al Ain – Abu Dhabi truck route.

The Plans noted above seek to minimize the amount of overland travel required for materials and products and keeps necessary processes of heavy industry away from the centers of population density. However, worker housing is being constructed along the truck route, and will also be built at the airport.

Al Gharbia

To support industrial diversification and continued expansion of the oil and gas industries in the region, the Plan Al Gharbia 2030 Land Use Framework Plan, positions Industrial Land and Utility/Infrastructure Zones throughout the main settlement areas. Table 4.7 below, lists key developments planned in the region and their respective settlements, estimated populations and status.

Table 4.7: Al Gharbia Regional Framework Summary

Settlement / Area	Key Developments	Estimated Population
Silah	Power and infrastructure (including ENEC Plants & Village), manufacturing, port and transport hub, Government services, local retail	70,000
Ghayathi	Oil and gas services, local retail, Government services	15,000
Ruwais	Petrochemicals, port, manufacturing, regional retail, Government services, regional hospital, Masdar Hydrogen Plant	130,000
Madinat Zayed	Oil and gas services, manufacturing, local retail	40,000
Mirfa	Oil and gas services, manufacturing, regional retail, Government services	75,000

Source: UPC, 2010

4.5.4 Industrial Lands Strategy

With the increased pressure placed on the non-oil industrial sector to take a leading role in economic development, the UPC has identified the need to prepare a detailed Industrial Lands Strategy for the Emirate of Abu Dhabi. Industry generally is an intensive user of land and its co-location with high quality infrastructure, including transport, is imperative.

The Industrial Lands Strategy will assess the phased demand for industrial land to 2030 and identify appropriate sites for the location of industry. It is envisaged that the completed strategy will inform amendments to the Urban Structure Framework Plans for the various regions of Abu Dhabi and also inform the emerging UPC development review process and regulations.

4.5.5 Oil and Gas Development

Since the 1960s, the oil industry has been the main engine of Abu Dhabi's development. The Emirate is home to the world's sixth largest proven oil reserves, of around 98bn barrels, and is the world's tenth largest producer, at around 2.5 million barrels per day (bpd), most of which is for export.[44]

Following the nationalization of the oil industry in 1971, the Abu Dhabi National Oil Company (ADNOC) was established to manage all aspects of the oil and gas industry. ADNOC has 14 subsidiary companies working in the various upstream and downstream operations of the oil, gas and petrochemical industry, including the following main entities:

Exploration and Production of Oil & Gas

- Zakum Development Company (ZADCO)
- Abu Dhabi Marine Operating Company (ADMA-OPCO)
- Abu Dhabi Company for Onshore Oil Operations (ADCO)

Oil and Gas Processing

- Abu Dhabi Gas Industries Limited (GASCO)
- Abu Dhabi Gas Liquefaction Limited (ADGAS)
- Abu Dhabi Oil Refining Company (TAKREER)

ADNOC is one of the world's largest producers of hydrocarbons, Abu Dhabi's largest industrial developer and lynchpin of the Abu Dhabi economy. As one of the

44. The Abu Dhabi Government (2008) The Abu Dhabi Economic Vision 2030

Table 4.8: Key Oil and Gas Industry Initiatives in Abu Dhabi Emirate

Initiative	Project Proponent	Components
Integrated Gas Development (IGD)	ADNOC, GASCO, ADGAS	Ruwais LPG storage, sourgas treatment, Das Island process units & utilities, Habshan gas expansion O&U, gas processing plant, sulphur recovery; acid gas & utilities
Offshore Associated Gas Project (OAG)	GASCO, ADGAS	Gas development and utilization, connection of on-shore and off-shore gas networks
Bab expansion	ADCO	Field development, compression Units
Sahil Asab Shah (SAS) Development	ADCO, GASCO	Asab gas plant expansion, field development, Flowlines and wellheads
Jarn Yaphour Field Development	ADNOC	Field development
Ramhan Field Development	ADNOC	Field development
Shah Field	ADNOC	Sour Gas Development Program, sulphur recovery units and pipeline, O&U
Nasr; Qusahwir; Bida Al Qemzan Fields Development	ADNOC	Fields development
Inter-refineries pipeline	Takreer	Pipeline
Ruwais Petrochemical & Oil & Gas Plant expansion	Takreer	Ruwais Refinery Expansion, including Sulphur Handling Terminal (RSHT), storage tanks, sulphur recovery, nitrogen unit and control systems, infrastructure and worker housing project

Source: ADNOC Website (Accessed 2009)

Emirate's largest employers, ADNOC is responsible for the welfare of more than 23,000 people, many of whom are located in remote areas away from the main urban centers. As such, the company is also a major developer of housing and associated services as well as industrial facilities.

While the key theme of the Abu Dhabi Economic Vision 2030 is the diversification of the economy through the expansion of the non-oil sectors, the strategy recognizes that hydrocarbons will continue to dominate the Emirate's economy for the foreseeable future and aims to further develop and expand the industry. Alongside exploration and primary production, the Government is also investing heavily in downstream processing industries in order to add value to the sector and to promote further economic diversification.

ADNOC and its subsidiaries are currently undertaking a number of initiatives in order to increase oil production, with an objective of raising crude production to more than 3.5 million barrels per day over the next decade.[45] These initiatives include the redevelopment of currently-producing fields, as well as the development of smaller fields that had not previously been in production. Simultaneously, natural gas production is being expanded via the development of sour gas reserves, as well as the potential substitution of carbon-dioxide and nitrogen to replace significant volumes of natural gas that are currently being reinjected into the oil fields to maintain production pressure.

Table 4.8 summarizes key recent and planned initiatives within Abu Dhabi's oil and gas industry.

45. ibid

4.6 Infrastructure Development

The continued expansion and improvement of infrastructure is essential to support the growing population of Abu Dhabi Emirate and deliver the Governments ambitious goals of long-term social and economic development. Accordingly, the Government of Abu Dhabi has committed to sustained investment and structural reform, including the increasing role of the private sector, to deliver world class infrastructure in the following sectors:

- Utilities – electricity, water, natural gas, and wastewater (including treated wastewater),
- Transport – surface transport (including marine) and aviation, and
- Waste management.

An overview of each of these infrastructure sectors is provided in the sub-sections below.

4.6.1 Utilities

Public utilities in Abu Dhabi Emirate are delivered by a group of specialized companies responsible for different stages in the provision of water and electricity to customers and the collection, treatment and disposal/ distribution of wastewater.

The water and electricity companies were created in 1999, when the Sector was restructured, with the Abu

Dhabi Water and Electricity Authority (ADWEA) having sole ownership of these companies. However, in 2000, the first independent water and power producer, a joint venture between a foreign partner and ADWEA called Emirates CMS Power, was created. Since that time, several other Independent Water and Power Producers (IWPP) has similarly been established.

The production of electricity and the desalination of water are dominated by large-scale operations using conventional technologies such as gas turbines and thermal desalination, common in the region. All production output in the public power and water sectors is purchased by Abu Dhabi Water and Electricity Company (ADWEC). Wastewater collection, treatment and disposal assets are owned and operated by the Abu Dhabi Sewerage Services Company (ADSSC), a public joint stock company created in 2005.

The transmission and dispatch of water and electricity in the Emirate is carried out by Abu Dhabi Transmission and Dispatch Company (TRANSCO) and two companies are currently responsible for the distribution and supply of power and water, namely, Abu Dhabi Distribution Company (ADDC) and Al Ain Distribution Company (AADC).

4.6.1.1 Power

Power Generation

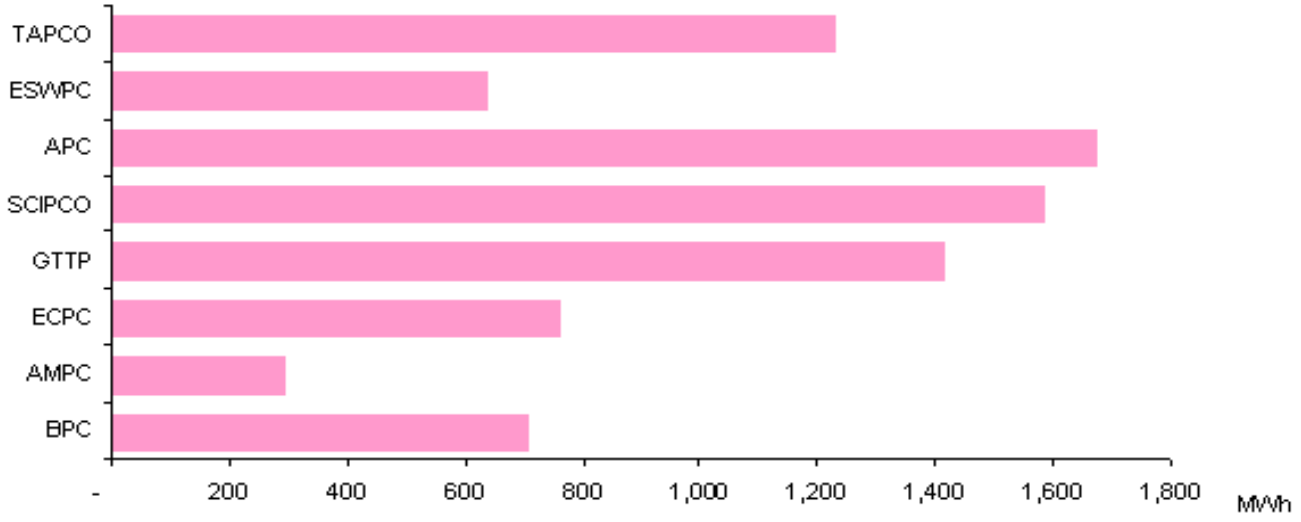
Power generation in Abu Dhabi Emirate is supplied into a central power grid system which encompasses four major power plants operated by the following companies. Al Mirfa Power Company (AMPC)

- Emirates CMS Power Company (ECPC)
- Gulf Total Tractebel Power Company (GTTP)
- Shuweihat CMS International Power Company (SCIPCO)
- Arabian Power Company (APC)
- Emirates Sembcorp Water & Power Company (ESWPC)
- Taweelah Asia Power Company (TAPCO)

In 2007, these plants had a combined installed capacity of 8.3 Giga Watts (GW). The locations of the four power plants and their respective operating company are shown in Figure 4.8, and the total 2007 production for each are illustrated in Figure 4.9. It should be noted that Bainounah Power Company (BPC) is no longer operating.

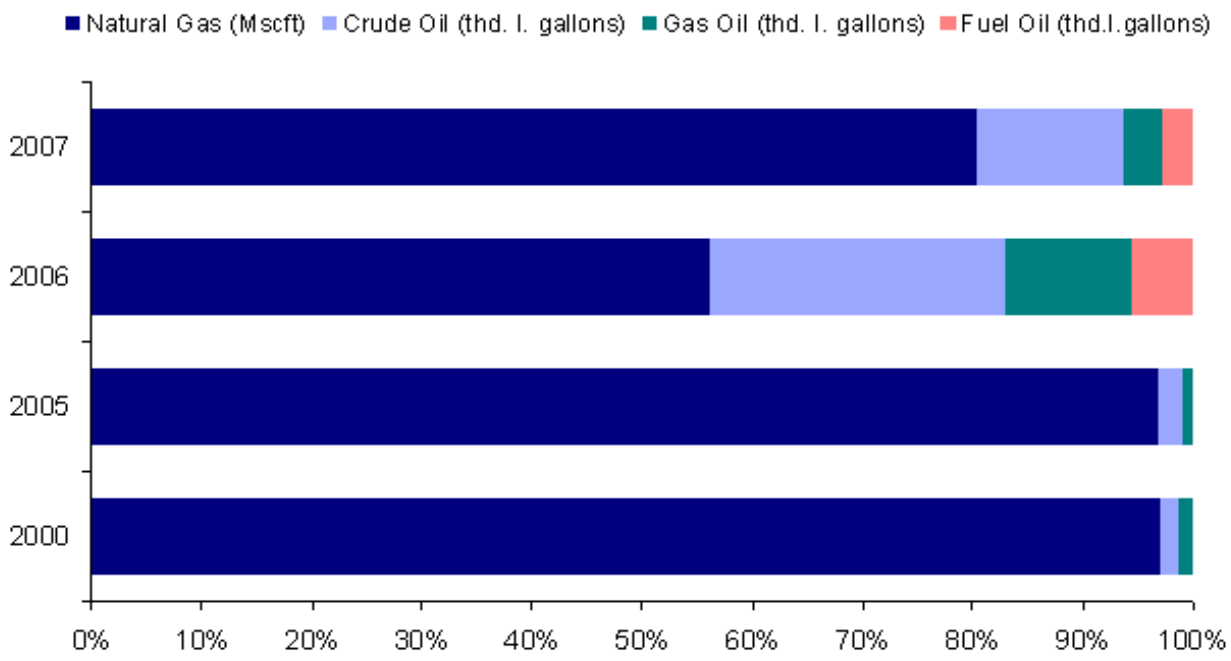
Figure 4.8: Location of Civilian Power Plants and Operating Companies

Figure 4.9: Power Generation in Abu Dhabi by Operating Company, 2007



Source: NEWRC, ADWEA

Figure 4.10: Consumption Trends of Fuel Types During the Years 2000-2007 in Abu Dhabi



Source: NEWRC, ADWEA

Most production sites are located along the coast, as almost all the power plants have associated thermal desalination facilities. In addition, the sea water available for cooling purposes allows for more efficient and less expensive power generation when compared with air cooled condensers in-land. This increases efficiency and enable large quantities of potable water to be produced through a thermal desalination process (co-generation). The desalination of water is discussed in the sub-section on water generation below.

The Emirate is largely reliant on natural gas as the fuel for its power stations, producing between 88% and 99% of annual electrical energy output in the period from 1990 to 2006.[46] Table 4.9 shows annual fuel consumption related to public power and desalination activity in Abu Dhabi. According to the data, annual consumption of gas increased by around 45% between 2000 and 2007, and significant increases in crude, gas and fuel oils were also recorded. Variation in proportional fuel consumption, shown in Figure 4.10, is related to the ability to switch between sources in response to fluctuations in fuel prices and availability. However, natural gas is largely preferable in terms of environmental impacts and lower maintenance, and is likely to remain the major source of fuel in the near future.

46. NEWRC, ADWEA data (2008)

Table 4.9: Fuel Consumption for Water and Electricity Generation in Emirate of Abu Dhabi

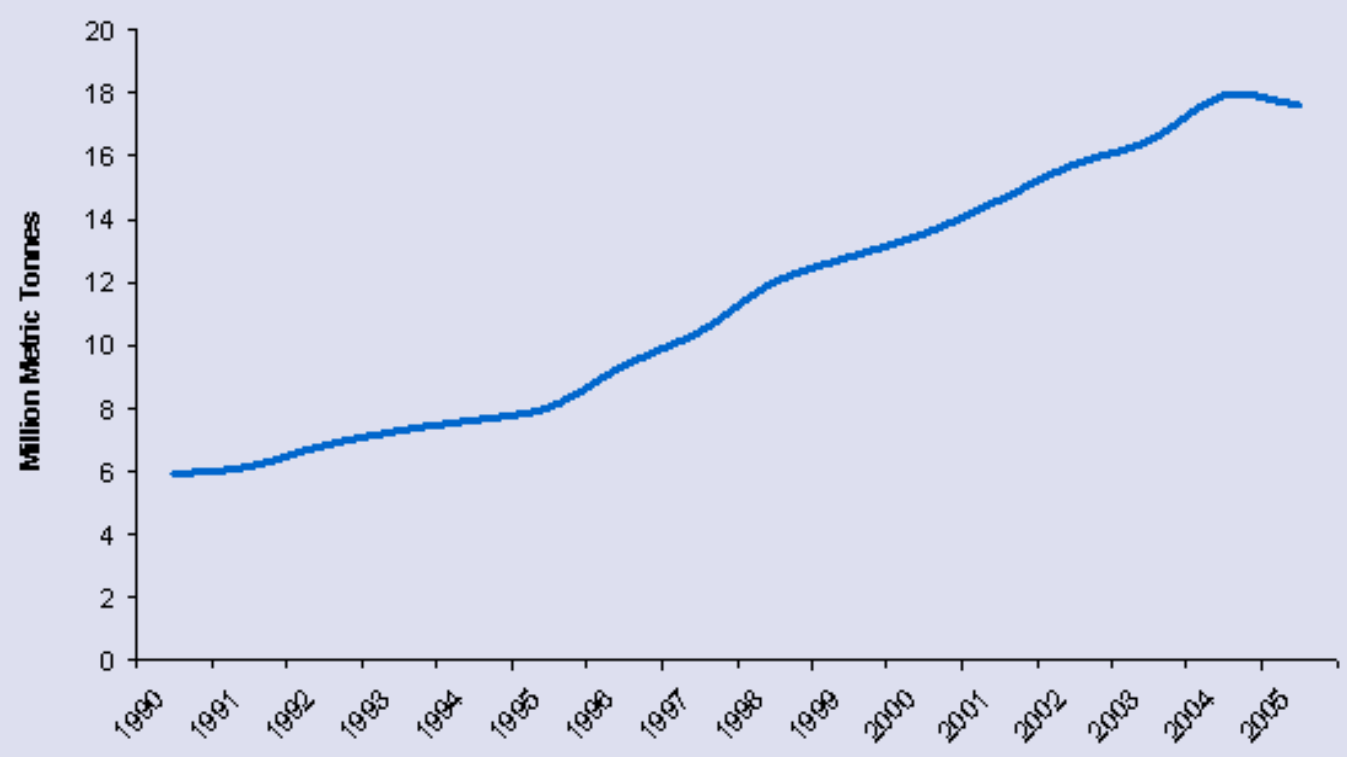
Items	2000	2005	2006	2007
Natural Gas (million cubic feet)	274,469	356,622	345,915	398,714
Crude Oil (thousand. Imperial gallons)	4,775	7,924	164,506	66,099
Gas Oil (thousand. Imperial gallons)	3,598	3,369	71,548	18,150
Fuel Oil (thousand. Imperial gallons)	15	8	33,923	13,455

Source: SCAD, ADWEC (2009)

Power Generation Related Carbon Dioxide Emissions

Estimates of power related CO^2 emissions provided by NEWRC and ADWEA show a year on year increase from 6 million tonnes in 1990 to a peak of 17.9 million tonnes in 2004, before a slight decrease the following year to 17.6 million tonnes. Using the population figures from the 2005 Census, this would represent around 11.9 tonnes of CO^2 per capita produced from public power generation alone.

Figure 4.11: Estimates of Carbon Dioxide Emissions from Public Power Generation in Abu Dhabi, 1990 - 2005



Source: NEWRC, ADWEA (2008)

Renewable Energy Development

Renewable energy currently accounts for a minor fraction of Abu Dhabi's energy generation (<1%), despite the Emirate's comparative advantage in solar radiation levels. However, significant investment is being made in renewable energy technologies through the Masdar Initiative, which owns the Emirate's only solar photovoltaic power plant, located at the Masdar City site, which will have a capacity of 10 MW when fully operational. A small (850 kW) wind turbine was also built and licensed on Sir Bani Yas Island in Al Gharbia in 2008 (not yet operating), and there are current proposals for a Concentrating Solar Power (CSP) plant at Bainounah.

Plan Al Gharbia 2030 recommends that a number of renewable energy projects should be provided in the region, including a large scale wind farm along the E11 Highway near Tarif in the Western Region and smaller turbines on Dalma Island and at Silah, and CSP arrays at each of the major settlements (possibly up to 3km for each town). Masdar has also registered a 100 MW thermal CSP plant, Shams 1, to be built in Madinat Zayed. Construction contracts for Shams 1 are likely to be awarded in 2010 and commercial operation of the plant is expected to start in 2011.

The contribution of renewable energy to the overall energy mix in Abu Dhabi is set to increase significantly as a result of Government investments in future energy sources and a self imposed target of achieving 7% of its total installed power capacity from renewables by 2020.

Civilian Nuclear Energy Development

The Federal Government has recently embarked on a program to develop civilian nuclear power plants in the UAE and for this purpose has established a regulator, the Emirates Nuclear Energy Corporation (ENEC). This is a response to the anticipated need to expand power generation capacity to meet projected growth in energy demand related to the significant population growth and anticipated expansion of energy-intensive industrial and commercial developments.

Consumption

The significant rise in total annual electricity generation from 19.1 TWh in 2000 to 36.5 TWh in 2008 has resulted from a rapid increase in population, combined with a small increase in average consumption levels and the growth of an inter-Emirate export market between Abu Dhabi and Dubai (see Table 4.10).

Table 4.10: Electrical Power Generation and Consumption Statistics, Abu Dhabi Emirate (MWh)

Items	2000	2005	2006	2007	2008*
Electricity Generation	19,128,388	25,423,862	28,502,419	34,142,472	36,458,356
Electricity Transferred from Takreer Co.	-	-	835,371	814,616	814,616
Export to Dubai Emirate	-	-	2,014,773	5,614,875	5,940,476
Electrical Consumption by power Stations	2,407,680	3,812,660	4,375,584	4,369,801	4,666,205
Distributed Electricity Through the Network	16,720,708	21,611,202	22,947,434	24,972,413	26,666,291
Technical Loses Through network (9.7%)	1,621,909	2,096,287	2,225,901	2,422,324	2,586,630
Electricity Consumption	15,098,799	19,514,915	20,721,533	22,550,089	24,079,661
Per Capita Electrical Consumption	14	14	14	15	15

*Preliminary Data - Source: ADWEC (2008)

Annual electricity consumption during this period of between 14 and 15 MWh per capita is comparable to the US (13.6 MWh) and neighboring Qatar (14.1 MWh) but is well above that of the Organization for Economic Co-operation and Development (OECD) average (7.6 MWh).[47]

The ADWEC data, shown in Table 4.10 above, shows Abu Dhabi Emirate's total electricity consumption to be 22.55 TWh in 2007. According to sales data from the Regulation and Supervisory Bureau (RSB), total public electrical consumption in the same year was around 14.97 TWh. The domestic market was the largest consumer of public electricity with 44%, closely followed by the 'commercial sector' and 'government' customer categories, which each represented 37% and 19% of public electricity sales respectively. In terms of domestic customers, national citizens living in villas have the highest household consumption rates, with an average annual consumption of between 93 and 97 MWh, compared to between 7.2 and 12.4 MWh for non-citizens (see Table 4.11).

The remaining 7.58 TWh of total consumption in the Emirate in 2007 is likely to be attributable to unspecified major industrial entities, including significant private energy producers. By way of illustration, the Emirate's Aluminum Company Limited (EMAL) which became partially operational in 2007 has an installed power production capacity of around 1,344 MW in order provide electricity for its industrial production process.

Table 4.11: Household Consumption by Property and Residential Status

Residential Status	Property	MWh per year
Non-Citizens	flats	7.2 - 12.4
	villas	32.1 - 97
National Citizens	flats*	12
	villas	93 - 97
	shabiyat	69 - 80

Source: PB Power surveys (2005 and 2007)
* Limited data available, range not possible

47. World Bank (2009) Online: http://datafinder.worldbank.org/electric-power-consumption, 2006 statistics

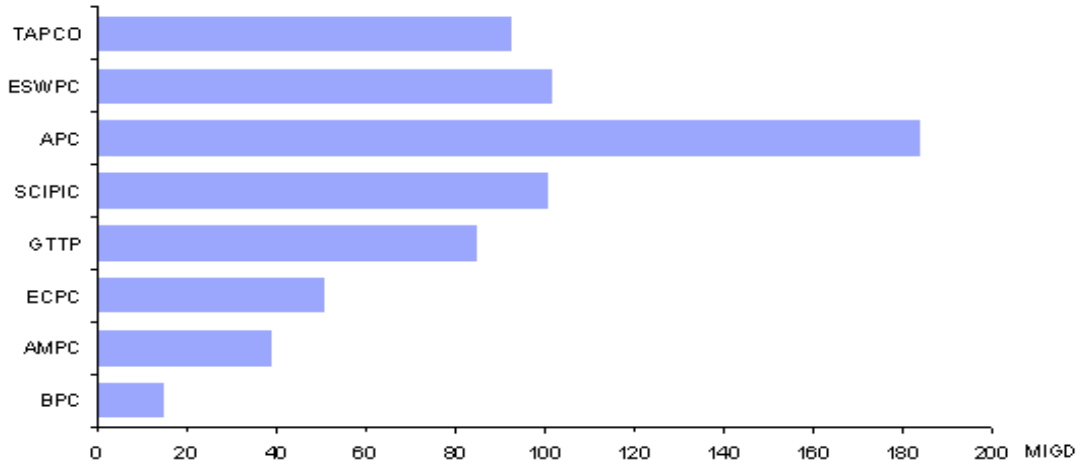
Power Generation Demand Projections

Projections from the RSB suggest that annual electricity generation demand is likely to increase from its 2008 level of 36.5 TWh to more than 60 TWh in 2013 as a result of pressures from demographic growth and industrialization. In order to meet this demand, the Abu Dhabi Government, in partnership with the private sector, has initiated the development of the following facilities: [48]

- Taweelah B IWPP – will involve the expansion of the existing Taweelah B power and desalination plant from current capacity of 928 MW and 65 MIGD to approximately 1,000 MW and 92 MIGD.
- Shuweihat IWPP S2 – will have an installed capacity of 1,600 MW and 100 MIGD. Construction was started in 2008 and the project is estimated for completion in Q4 2011.
- Shuweihat IWPP S3 – this expansion of the existing power plant will generate 1,500 MW of electric power and 100 MIGD. Construction is due to begin on this project in early 2010 and the estimated completion date is Q4 2013.
- Hydrogen Power Abu Dhabi (HPAD) – also located in the Shuweihat complex, this project will be the world's largest hydrogen based power plant upon it completion in 2012 (estimated). The technology will utilize natural gas to create hydrogen and will incorporate pioneering carbon capture and storage technology;
- Nuclear Power Plant – Abu Dhabi's first civilian nuclear power plan is expected be capable of producing 1,000 MW of electricity and 40 MIGD.
- Shams 1 Solar PV plant – developed by Masdar, when fully operational this plant will have an installed capacity of 100 MW
- Capacity at the Emirates Aluminum (EMAL) facility is set to increase to approximately 2,000 MW when fully operational, which will make this facility one of the largest electricity producers in the Emirate.

48. Ventures Middle East (2008) United Arab Emirates: Power & Desalination Industry Overview, September 2008

Figure 4.12: Capacities of Desalinated Water Production in Abu Dhabi Emirate, by Operating Company, 2007*



Source: NEWRC, ADWEA

*See section 4.6.1.1 above for abbreviations of operating companies.

4.6.1.2 Water

A detailed account of the Emirate's water resources, including the issues surrounding water availability, consumption, development and future demand and associated environmental impacts are provided in the Abu Dhabi Water Resources Master Plan[49] and Sector Paper[50] produced by the EAD. This Sub-section provides a brief overview of the sector in order to outline development supply and consumption and likely trends in future supply.

Water Production and Consumption

The scarcity of renewable freshwater resources in Abu Dhabi Emirate is a major challenge for sustainable development. The per capita water consumption rate is among the world's highest, and pressures on supply have risen sharply alongside the Emirate's increasing population and economy. Total water use in the Emirate was estimated to be around 818.9 billion gallons (3.1 billion m^3) in 2007.[51] Water is supplied from two main sources, namely:

- Groundwater, and
- Desalinated seawater

Groundwater provides is the main source of water in the Emirate, accounting for 66% of the total. The vast majority of this water is used for irrigation in forestry and agriculture as a result of historic policies of 'greening the desert' and the rapid expansion of the farming sector to areas surrounding the oases.

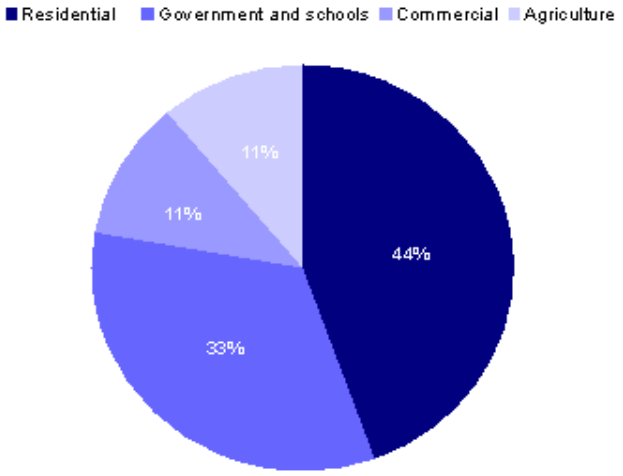
Desalinated seawater accounted for the remaining 34% of total water supply, including 6% from the reuse of urban wastewater as Treated Sewage Effluent (TSE). Thermal desalination, using waste heat from power generation, was used to produce around 96% of desalinated water, while Reverse Osmosis (RO) was used for the remaining 4%.

Figure 4.12 shows the total capacities for seawater desalination of power and cogeneration companies in Abu Dhabi for the year 2007 according to NEWRC data.[52] According to this data, the total capacity for desalination, excluding imports and other more minor sources, was 668 MIGD (3.04 million m^3), with a maximum potential annual supply in excess of 243.8 billion gallons (923.1 million m^3). Actual net desalinated water production in 2008 increased by 5.3% from the previous year to 198.6 billion gallons (751.9 million m^3). Peak supply to consumers reached 614 MIGD (2.3 million m^3) on 25 September, 2008, which was 8.1% more than the peak for the previous year and significantly higher than the average of 547 MIGD.

49. EAD (2009) Abu Dhabi Water Resources Masterplan, January 2009
50. EAD - AEGDI (2010) Abu Dhabi Water Resources Sector Paper
51. Ibid
52. Data supplied by NEWRC (2009).

Figure 4.13 shows how the total supply of desalinated water was distributed among users according to RSB administrative classifications. According to this breakdown, less than half of this water produced is supplied to residential users, while a third is received by the government and schools. 11% is used to supplement groundwater for agriculture, and it is likely that this proportion will increase as groundwater resources become more depleted. ADWEC estimates for 2008 suggest that around 70% of this valuable resource is used for irrigation purposes.

Figure 4.13: Users of desalinated water



Source: RSB (2009)

According to data quoted in the RSB 2008 Annual Report, average residential water consumption is 525 to 600 liters per capita per day (see Table 4.12). However, consumption differs significantly between national citizens and non-citizens and further differences exist between flats and villas. The broadly similar consumption pattern for both national citizens and non-citizens living in flats provides a benchmark for essential needs, and compares favorably with 141 to 153 liters per day in the UK.

To determine consumer pricing and revenue flows for companies, an extensive water metering system has been installed from production to transmission, transmission to distribution and from distribution to customers. During 2008 companies continued to replace outdated meters with smart meters to allow automatic meter management. By the end of 2008, 66% of all meters in operation were electronic.[53]

Table 4.12: Consumption by Property and Nationality

Nationality	Property type	Liters (per person per day)
Non-citizens	Flats	160 – 220
	Villas	270 – 730
National citizens	Flats*	165
	Villas	460 – 1,760
	Shabiyat	610 – 1,010
All		525 – 600

Source: PB Power surveys (2005 and 2007), AIS data and 2005 Census

* Reduced data available, no range possible

Demand Projections

Projections from the RSB suggest that annual unit demand for desalinated water may increase from 198.6 billion gallons in 2008 to more than 240 billion gallons in 2013, an increase of 21% in just five years. This increase is related to demographic growth and economic development projects with large irrigation requirements. The projected growth in demand will be met through a number of supply projects including the power and desalination projects listed in Section 4.6.1.1 above.

4.6.1.3 Wastewater

Generation and Treatment

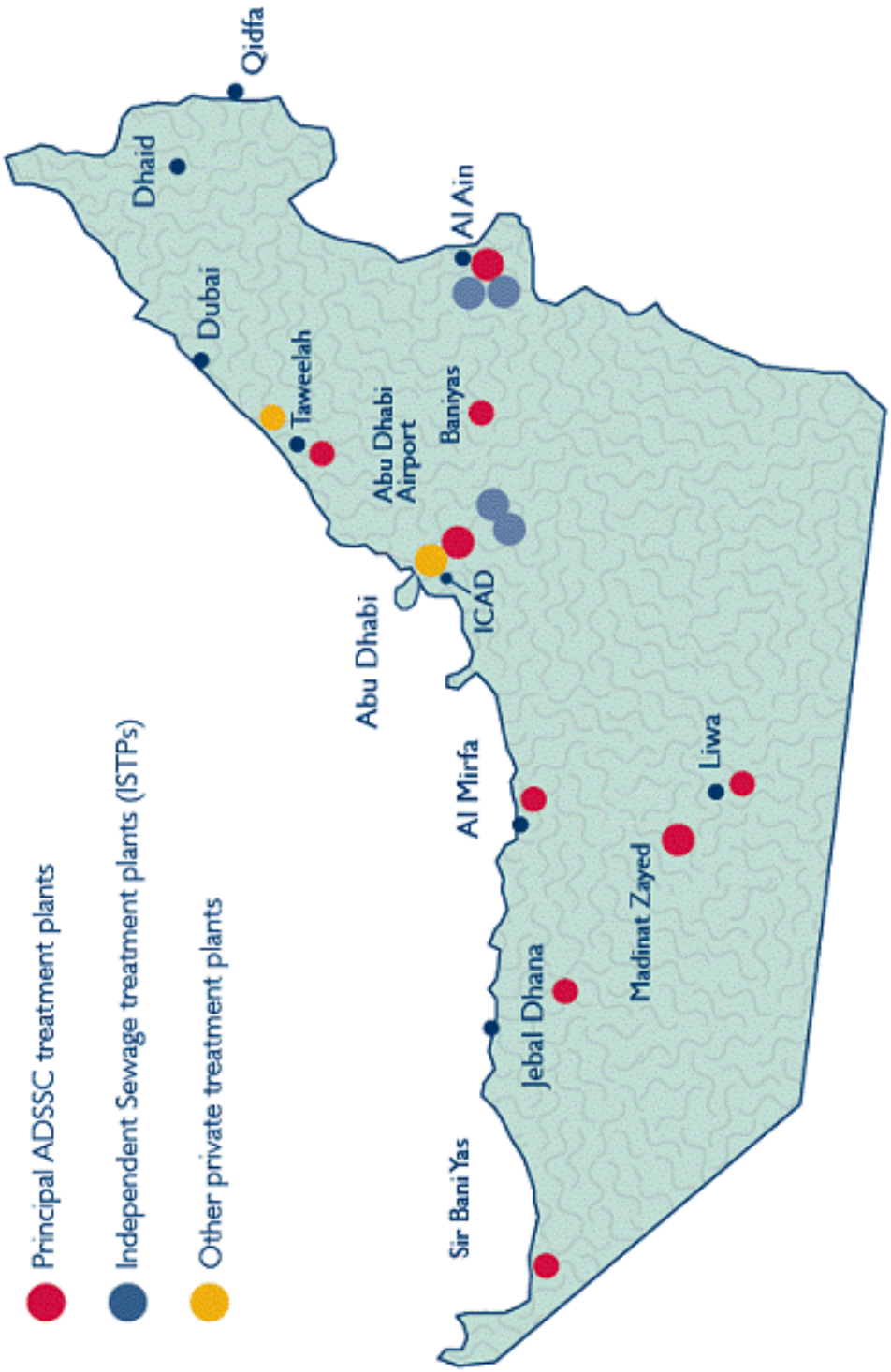
Abu Dhabi Sewerage Services Company (ADSSC) is the sole provider of sewage collection, wastewater treatment and disposal services in the Emirate. Wastewater from domestic, commercial or industrial customers is collected using a network of sewers and pumping stations and transferred to one of over 20 Sewage Treatment Plants (STPs) located throughout the Emirate, where it is treated to a standard suitable for disposal or reuse (See Figure 4.14).

Independent Sewage Treatment Plants (ISTPs) have also been recently established to take wastewater from ADSSC, while a number of private plants have been established as part of new development projects, including Yas Island and ICAD.

The two largest facilities for the treatment of wastewater, which serve the Emirate's two principal urban areas and surrounding localities, are Al Mafraq STP on the outskirts of Abu Dhabi City and Zakher STP in Al Ain City. Currently, these two facilities serve the majority of the Emirate's total requirement for wastewater treatment.

53. RSB (2008) Annual Report

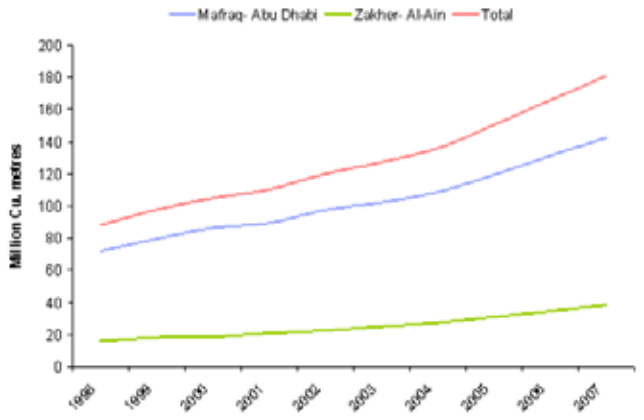
Figure 4.14: Wastewater Treatment Plants in Abu Dhabi



Source: RSB (2009)

Figure 4.15 below illustrates the significant growth in the total annual volumes of wastewater received by the Al Mafraq and Zakher STPs over the past decade. This trend is indicative of the growing demand for treatment capacity across the Emirate as a result of growing population and economic development.

Figure 4.15: Trend of Wastewater Received by Mafraq and Zakher STPs, 1998-2007



Source: NEWRC, ADWEA

A large proportion of the TSE output from the Emirate's STPs is used for irrigation in urban and other landscaped areas and is supplied by ADSSC to reservoirs and storage tanks. The Parks and Recreational Facilities Directorate (PRFD) are responsible for these storage facilities and all downstream infrastructure.

Future Development

While waste water projections are not available at present, it is clear that this trend is set to continue in Abu Dhabi Emirate in proportion to the projected increase in desalinated water production, beyond the capacities of existing wastewater infrastructure. To this end, the following major projects are currently being developed:

- To supplement the existing wastewater treatment capacity in Abu Dhabi and Al Ain, ADSSC is developing two sewage treatment plants in Al Wathba and Al Saad, with daily treatment capacities of 300,000 m^3 and 130,000m^3 respectively. Construction on both facilities started in September 2008 and is expected to be completed in March 2011.

- ADSSC are developing plans for a major gravity link sewer and tunnel, known as the Strategic Tunnel Enhancement Program (STEP), to run from the northern end of Abu Dhabi Island to Mafraq on the mainland with a planned continuation to the proposed STP at Al Wathba. The project is due to be completed by 2012 and represents a key wastewater asset for the development of Abu Dhabi.

4.6.2 Transport

4.6.2.1 Introduction

The Abu Dhabi Department of Transport (DOT) was established in 2006 to develop the Emirate's transport system in accordance with the Plan 2030 Vision. The DOT is currently in the process of developing transport data sets and taking over selected responsibilities from the Abu Dhabi and Al Ain Municipalities which previously controlled all surface transport infrastructure.

Since its inception, the DOT has made significant progress in developing its capabilities and published its strategic vision for surface transport in June 2009. It should be noted that the following limitations to transport data currently exist and that the DOT is commissioning work to address the short falls:

- *Road accident statistics:* are collected by the Abu Dhabi Police. There are limitations to the police database, which only provides summary statistics. The DOT and police are in the process of updating the database and data sharing procedures.

- *Highways inventory:* The highway inventories of the DOT and the municipalities have been established from periodic surveys carried out by maintenance consultants. These surveys provide updates of road conditions, out of which maintenance plans are prepared. In the future, these procedures will be replaced by the more comprehensive instrumented survey and planning tools being developed under the ongoing Road Asset Management and Information Systems (ADRAMIS) project. These are being designed to optimize value-for-money from maintenance expenditures, and are part of a strategy to move to a more performance based approach to road asset management.

- *Traffic statistics:* there is no systematic data collection process in relation to traffic levels or composition. The DOT is currently working to provide a source of information on traffic, including the implementation of regular surveys to analyze the flows and composition of traffic.

- *Public transport movements:* The bus company (part of DOT) collects statistical information on numbers of people using buses, but do not distinguish how people use the system (i.e. where they travel to/from).

The DOT addresses surface transport and aviation separately, both in terms of how it manages the network and also in its planning. The following sections summarize the surface transport (including maritime) and aviation sectors in turn.

4.6.2.2 The Surface Transport Master Plans

As noted above, the DOT published the Abu Dhabi Surface Transport Master Plan (STMP) in June 2009. This has been developed to deliver a world-class surface transport system for Abu Dhabi needed to support the ambitious vision of Plan Capital 2030.

The STMP addresses the regional transport needs of the Emirate as a whole, while focusing particular attention on metropolitan Abu Dhabi. It is a strategic plan, designed as part of an ongoing process of delivery, whereby the various elements of the STMP are subject to study, design and refinement yet are complementary to the overarching strategic framework.

The STMP is an integrated transport plan designed to reduce dependency on the car and encourage use of public transport. The Plan proposes a hierarchy of public transport for the Emirate with an inter-city passenger and freight rail network; a Light Rail Transit (LRT) in Abu Dhabi City; and complementary bus and taxi systems. A raft of policies will support the Plan designed to manage traffic, transport demand, and improve road safety and address environmental and sustainability issues. The key infrastructure components of the STMP are:

- 590 km of inter-city passenger rail;
- 1,300 km of freight rail;
- 130 km of metro in Abu Dhabi City;
- 340 km of street running tram (LRT) in Abu Dhabi;
- Fine grained bus network and water ferry services where appropriate; and
- 1,500 km of new and upgraded highways.

The Abu Dhabi STMP will be implemented through a series of five year action plans from 2010 to 2030, and the phasing is driven mainly by the need to put infrastructure in place to meet the travel demands generated by population growth and economic development. The phasing of the Plan requires the core Metro system and a number of key tram and highway components to be open by 2015, to accommodate significant changes in land use which have been forecasted.

The STMP Action Plan is subject to annual review. It is proposed that the first major review will be published at the end of the first plan period (2015) as the large number of initiatives that are either ongoing or due to start in the first plan period are expected to substantially influence subsequent phasing and implementation.

The key infrastructure projects for the STMP are set out in Table 4.13 (2009 -2030). The table highlights the latest dates to start the necessary feasibility study and design, the suggested start of construction and the planned opening date by when the Plan indicates the component is required.

Table 4.13: Action Plan – Infrastructure Components

Ref.	Project Title	Start Study and Design	Start Construction	Open	Project Update – January 2010
Committed Highway Schemes					
CH1	Sheikh Zayed Bridge	2004	2006	2010	On target
CH2	Saadiyat –Shahama Freeway	2003	2006	2009	Open
CH3	Shahama Freeway Extension between E10 and E11	2004	2006	2010	On target
CH4	Mafraq – Ghwaifat Highway (E11)	2007	2006	2010	On target
CH5	Ghayathi –Madinat Zayed rd	2004	2006	2010	On target
CH6	Salaam Street Tunnel (includes grade separated junctions on Salaam Street)	2005	2009	2011	On target
CH7	Saadiyat Bridge to Mina Road Tunnel	2009	2011	2015	On target
CH8	Connecting City to Suwwah Island – Bridge 1-4	2004	2007	2010	On target
CH9	Connecting City to Suwwah Island – Bridges 5-7	2009	2011	2015	On target
CH10	Connecting Suwwah and Reem Islands –Bridges 11-13	2004	2006	2010	On target
CH11	Connecting Suwwah and Reem Islands –Bridge 8 -10	2009	2011	2015	On target
CH12	AL Ain to Dubai Highway 9E66) Upgrading	2009	2012	2015	On target
CH 13	Lulu Highway (with bridge links from Marina Mall to Mina Zayed)	2009	2012	2015	On target
CH14	Al Ain Northern Bypass	2008	2009	2011	On target
CH 15	Bainounah Street widening	2009	-	-	Under review
CH 16	Electra Street Tunnels at junctions 6 and 4	2009	-	-	Under review
CH 17	Tunnels linking Lulu Island to Abu Dhabi	2009	-	-	Under review
Proposed Highway Schemes					
NH1	Shahama Freeway Extension between E11 and NH2	2009	2011	2015	On target
NH2	Second Abu Dhabi – Dubai Highway	2009	2012	2015	On target
NH3	Reem Island to Abu Dhabi	2006	2008	2010	On target
NH5	Mid Island Parkway	2009	2017	2020	On target
NH6	Al Ain to KPIZ Highway	2009	2017	2020	On target
NH7	Mussafah to Abu Dhabi Island new link	2009	2012	2015	On target
NH9	Marina Mall/ Corniche Grade Separated Junction	2010	2012	2015	On target
NH10	Widen E10 Freeway from Sheik Zayed Bridge to E11	2009	2009	2012	On target
NH15	South Hodariyat –link from Mussafah	2009	2011	2015	On target
NH16	South Hodariyat –link to Abu Dhabi Island	2009	2011	2015	On target
NH17	Upgrade E15 to Dual 2 with grade separated junctions and crossings (from E11 to south of Ghayathi)	2010	2012	2015	To be reviewed in Al Gharbia STMP
NH17	Upgrade e15 to Dual 2 with grade separated junctions and crossings (remainder)	2010	2027	2030	To be reviewed in Al Gharbia STMP
NH 19	Upgrade E90 to Dual 2 with grade separated junctions and crossings	2010	2012	2015	To be reviewed in Al Gharbia STMP
NH20	Second Link from Reem Island to Saadiyat Abu Dhabi Island Bridge	2010	2012	2015	On target
NH22	Tunnel from Reem Island to 31st Street	2009	2013	2015	On target
NH23	Khaleej Al Arabi upgrading (including ADNEC tunnel)	2009	2011	2015	On target

Ref.	Project Title	Start Study and Design	Start Construction	Open	Project Update – January 2010
	Mafraq to Ghwaifat Highway scheme	2008	2010	2014	On target
Metro (LRT)					
MT1	CBD – Airport – Capital City Loop	2009	2010	2012	Award of study and design expected early in 2010
MT2	Link to Marina Mall	2009	2011	2015	Award of study and design expected early in 2010
Tram					
TR1	First stage route linking Reem, Suwwah, CBD and Marina Mall	2009	2010	2015	Award of study and design expected early in 2010
TR2	Independent route linking Raha, Yas, Masdar and Airport	2009	2010	2012	Award of study and design expected early in 2010
TR3	Second stage route extensions to serve Saadiyat and Capital City	2009	2011	2015	Award of study and design expected early in 2010
TR4	Completion of tram network on Abu Dhabi Island, including connections to ADNEC, Zayed Sports City, Grand Mosque and Lulu Island.	2009	2016	2020	Award of study and design expected early in 2010
TR5	Extension of Capital City network with links around Airport to Al Falah	2009	2016	2020	Award of study and design expected early in 2010
TR6	Extend tram network, in stages as appropriate, to serve Mussafah, South Hodariyat, Mohammed Bin Zayed City, ICAD and Mafraq	2009	2021	2025	Award of study and design expected early in 2010
TR7	Extend tram network, in stages as appropriate, to serve Shahama and to complete planned network	2009	2026	2030	Award of study and design expected early in 2010
Personal Rapid Transit					
RT1	PRT Masdar City	2009	2010	2015	Feasibility and design of the Masdar PRT system is ongoing. First phase open in 2010.
Bus					
BS1	Fine grained network of local buses with bus priority	2009	2010	2015	Ongoing development
BS2	Enhanced inter-regional long distance coach network	2010	2012	2015	Ongoing development
Water Transport					
WT1	Scheduled ferry services – Emerald Gateway to Al Bateen via Zayed Sports City / ADNEC	2010	2012	2015	Study to commence early 2010
WT2	Scheduled ferry service Yas Island Marina to CBD Station via Raha Beach	2010	2012	2015	Study to commence early 2010
WT3	Circular ferry service – Suwwah Island, Saadiyat, Reem Island	2010	2012	2015	Study to commence early 2010
WT4	Network of jetties for water taxi services	2010	2012	2015	Study to commence early 2010
Freight					
FS1	Multimodal distribution centers at ICAD and Mina Zayed	2010	2012	2015	A review/study expected in 2010
FS2	Multimodal distribution centre at Khalifa Port	2010	2012	2015	A review/study expected in 2010
FS3	Multimodal distribution centre at Airport free trade zone	2010	2012	2015	A review/study expected in 2010
FS4	Union Railways freight rail lines	2010	2018	2020	A review/study expected in 2010
FS5	E40 Truck Route extension to E11 (ICAD)	2009			A review/study expected in 2010

In terms of financing and delivery of transport projects envisioned within the STMP, there is an increasing role for the Private Sector. The first project utilizing the Public, Private Partnership (PPP) model was initiated in 2008 for the delivery of the Mafraq to Ghwaifat highway project. The PPP model was chosen in order to share financial, technical and operational risks, and increase the level of efficiency and quality compared to previous projects.

More detailed surface transport plans for Al Gharbia and Al Ain are scheduled for completion in 2010.

4.6.2.3 Aviation

The aviation industry in Abu Dhabi has undergone rapid and significant growth in recent years. This growth has been supported by major development and significant investment by the two major aviation stakeholders in the emirate, namely the Abu Dhabi Airports Company (ADAC) and the national airline company Etihad Airways. During 2009, 9.7 million passengers went through ADAC's airports, while Etihad carrying 6.6 million of these passengers. Around 60 key international destinations are served by Etihad, and an aggressive marketing strategy has positioned Abu Dhabi as one of the region's fastest growing business and tourism destinations. Growth in the aviation sector is forecast to continue and development of the industry will be essential to support the Emirate's long-term economic development strategy, as stated in the Abu Dhabi Vision 2030.

Abu Dhabi Airports Company (ADAC)

ADAC, the primary airport infrastructure developer and operator in Abu Dhabi, was created in 2006 as part of a wider structural reorganization of the transport sector and a policy shift towards the increasing involvement of the private sector. ADAC is a joint stock company managing all of the Emirate's commercial airports. The three main operating airports in the Emirate are Abu Dhabi International Airport and al-Bateen City Airport in Abu Dhabi and Al Ain International Airport in the Eastern Region. While these three airports are currently operating, they are undergoing extensive planning and development to fulfill the strategic objectives of the study above to constantly provide infrastructure capacity to support the huge growth in air transport demand in Abu Dhabi.

Abu Dhabi Aviation Sector Assets

A brief description of the aviation industry assets of Abu Dhabi is presented as follows:

Abu Dhabi International Airport

- Annual passenger numbers have grown dramatically from 3.4 million passengers in 1998 to 9.7 million in 2009, with a 12% annual increase in 2008 and 7% annual increase in 2009.
- The demand projection for 2015 is expected to be 20 million annual passengers.
- The new Terminal 3 was opened in early 2009 for exclusive use by Etihad Airways, increasing terminal capacity to 12 million annual passengers.
- Major development is underway with the new Midfield Terminal Complex (MTC) due to open in 2015, with further expansion to eventually accommodate 40 million annual passengers beyond 2020.
- With the MTC development major transport infrastructure is underway to provide multi-modal access, which includes major access roadways and interchanges to the regional highway network as well as a multi-modal airport station to provide access to the airport by high-speed rail, metro rail and light rail in addition to the other highway modes.
- A major midfield air cargo terminal is also planned to accommodate expected growth in air freight demand in the long-term.

Al-Ain International Airport

- Originally built to serve 320,000 annual passengers, with a 4,000 meter runway and parallel taxiway system.
- The airport master plan is underway to provide long-term development, that includes expansion of the main passenger terminal and the development of a new cargo terminal, amongst other facilities.
- Concurrently, the airport is undergoing major development planning of an 'Aerospace Cluster' to turn the airport into an international center for aerospace industry.

- The airport master plan also provides facilities for major aviation training (civil and military), as well as the base for the national aerobatic team.

Al-Bateen City Airport

- Originally built as the Abu Dhabi International Airport, Al Bateen was transferred to military use after opening the current international airport.

- In 2009, Al Bateen airport was transferred to ADAC to serve as an executive airport for business and corporate demand.

- ADAC recently initiated a major re-development and rehabilitation plan for Al Bateen Airport to fulfill its new role as a GCAA-certified and licensed civil commercial international airport.

Desert Islands Airports

ADAC is currently developing two small domestic airports to serve TDIC-developed tourist facilities on Sir Bani Yas and Delma Islands.

Abu Dhabi Aviation Sector Strategic Plan

To achieve planned growth effectively, the Abu Dhabi DOT commissioned the Aviation Sector Strategic Plan to set the framework for stakeholders and business entities to work more closely and cohesively. The study identified important opportunities and underlined challenges facing the aviation sector in Abu Dhabi, and made important recommendations. The study identified the current infrastructure deficiencies and recommended an infrastructure investment strategy that switches from 'defensive' to 'proactive' development to keep airport capacity ahead of demand.

A strategic business plan recently developed by the Abu Dhabi DOT identified further development of Abu Dhabi's airport infrastructure as critical to satisfy the high growth in air transport over the next 25 years forecast in the STMP and 2030 Structure Plans. In order to accurately and efficiently plan for the development of airport infrastructure during this period, the business plan recommended a Strategic Airports Plan, similar to the STMP for surface transport. The Abu Dhabi Airports Strategic Plan is currently under development by the DOT.

The Plan will identify the strategic development of airports in Abu Dhabi Emirate. A key element in this planning framework is determining the siting, sizing and capacity, functional role and management of airports needed during the 25 year horizon for Abu Dhabi. This plan serves to satisfy the air transport needs of economic, cultural and social changes, and provide suitable access for air service to all parts of the Emirate in line with the Economic Vision 2030. Once the airport strategy plan is developed and maintained on a regular basis, airport infrastructure investment decisions and development schedules can then be made. This strategic plan will be integrated with the other national development plans, including the STMP.

Unlike Abu Dhabi and Al Ain, the Western Region of the Emirate, Al Gharbia, is sparsely populated and is relatively under served in terms of air travel access. Al Gharbia will however undergo substantial and swift economic growth and development as identified in Plan Al Gharbia 2030 (refer to Section 4.2.3). Therefore it is envisaged that the forthcoming Abu Dhabi Airports Strategic Plan will be conducted in two phases, prioritizing the development of aviation in this region:

- **Phase I**: Develop an integrated airport plan for the Western Region of Abu Dhabi (Al-Gharbia), and aligned with Plan Al Gharbia 2030, prepared by UPC.

- **Phase II**: Develop a comprehensive airport plan for the entire Abu Dhabi Emirate, including all recent airport planning initiatives that have been conducted for the Abu Dhabi and Al Ain airports and integral with the Al Gharbia Airports Strategic Plan developed in Phase I.

4.6.3 Waste

The Wastes and Pollution Sources Sector Paper,[54] within this AGEDI series, presents a description of the environmental and institutional aspects of waste and waste management in Abu Dhabi. The following paragraphs will give a brief outline of the waste system and context in the Emirate, including a list of existing facilities and major planned developments.

4.6.3.1 Overview

Abu Dhabi Emirate produces a relatively large volume of waste, estimated to be in the region of 1.5-1.9 Kg per capita per day.[55] The recycling/recovery market in

54. EAD – AGEDI Wastes and Pollution Sources Sector Paper, originally produced in 2007 and selectively updated in 2009

55. Fitchner (2006) Waste Masterplan Report. However, estimates vary as reliable data on average household waste generation in Abu Dhabi does not exist at present.

Abu Dhabi is largely undeveloped at present, with the exception of composting, and the vast majority of wastes produced (>90%) are disposed of at landfill sites as unsorted waste.[56] The conditions at landfill sites in the Emirate are generally below international standards and such sites are often lacking in environmental safeguards.

The principal waste management facilities in the Emirate are as follows

- Four large landfill sites in the Emirate, the largest of which is the landfill at Al Dhafra which serves the City of Abu Dhabi (see image below). As this site is currently over-capacity, a further landfill site is currently being developed close to the Al Dhafra site. There are two other large landfill sites, one in the Eastern Region close to Al Ain and the other in Al Gharbia outside Ruwais.

- A large number of smaller informal landfill sites containing a broad range of waste streams are located throughout the Emirate. More than 30 sites have been identified for potential rehabilitation by the CWM. There have also been considerable problems with illegal dumping of Construction, Demolition and Excavation (CD&E) wastes.

- A sorting facility, able to handle 1,200 tonnes of waste per day has been established in Al Ain to recover materials from mixed domestic waste. A factory big enough to recycle 2.4 million plastic bottles a day has also recently started operating at Industrial City Abu Dhabi (ICAD) outside Abu Dhabi City.

- Composting of organic wastes principally occurs at plants in Mussafah and Al Dhafra in Abu Dhabi, Liwa, Ghayathi and Ruwais in Al Gharbia, and Al Ain in the Eastern Region

- Hazardous waste in Abu Dhabi is largely generated from industrial processing and medical facilities. Industrial Hazardous wastes are usually landfilled at the main sites. The oil industry is one of the largest producers of industrial wastes in the Emirate, and this is typically managed internally by ADNOC, with a large proportion being disposed of at the Ruwais landfill site.

- The majority of CD&E waste in Abu Dhabi is disposed of at landfill. Two recent dedicated CD&E waste management facilities have been established at the Al Dhafra landfill site and at the TDIC's Saadiyat Island development to receive, sort, process, and where possible recycle inert waste from the construction industry, diverting this material from landfill.

- Collection is currently carried out by a range of private contractors. Until recently there were no municipal waste recycling services in operation in Abu Dhabi, with services exclusively provided by the private sector.

56. In March 2009, The CWM established an inventory of waste arising that represents the most recent and accurate waste profiles for Abu Dhabi for all known key waste categories.

4.6.3.2 Restructuring of Abu Dhabi's Waste Management System

Although the current system of collection and disposal serviced Abu Dhabi's population in previous years, it is largely inefficient and outdated within the current paradigm of sustainable waste management and inadequate to serve the Emirate's expanding population. Not only that, the mismanagement of landfill sites and indiscriminate dumping has left an expensive legacy for the current administration to resolve. As such, the Government of Abu Dhabi has recognized the need to modernize and expand the waste system and change the behavioral patterns of residents and industry, with the aim of becoming a world leader in sustainable and integrated solid waste management. In order to realize this aim, the Government established the Center for Waste Management (CWM) in February 2008 to be the major agency to control and coordinate waste management activities throughout the Emirate. The CWM is charged with bringing the Emirate's waste infrastructure, practices and regulation up to the levels of international good practice and to provide policy direction, systems analysis, and to administer service and contractual requirements. Existing Government entities (e.g. EAD, municipalities) and the private sector will continue in their respective roles of monitoring, enforcement and service delivery.

The Draft Abu Dhabi Waste Management Strategy was completed in September 2008. The Strategy and associated Action Plan has a short two-year timeframe which is intended to initiate the process of reform in the waste management sector.

4.6.3.3 Current Waste Facility Developments

Within the framework of its new Strategy, the CWM is overseeing the implementation of a number of new developments in the Emirate, including the following:

- Upgrading the current waste collection systems in the Emirate to provide recycling services, as well as improve the quality and efficiency of municipal collection services. This includes the roll out of a recycling project for domestic solid wastes.

- The remediation of Al Dhafra and Ruwais landfill sites, which currently lack basic environmental safeguards, as well as a number of informal dump-sites.

- The provision of new engineered landfill site to replace the existing facility at Al Dhafra.

Currently in Abu Dhabi, the most prominent example of sustainable waste planning in the Emirate is the prestigious Masdar City development. Plans for Masdar City incorporate some of the most ambitious sustainable waste management targets in the world, including for material and energy recovery. Other innovative systems implemented in the emirate are also noteworthy, including the world's largest automated vacuum waste system on Yas Island.

4.6.3.4 Increasing Future Demands

The Government's aims to establish an integrated, innovative and sustainable waste management system in the Emirate and remediate the environmental legacy of previous practices. Structural and behavioral change will be all the more challenging, and necessary, faced with the huge increase in demand for new waste collection, treatment and disposal capacity brought about by the scale of the projected demographic and economic transformation in the Emirate, including the following aspects:

- The production of wastes will increase significantly in all regions as a result of the population growth forecast in the 2030 Plans. Although efforts to reduce the high level of waste production through environmental education and recycling programs should serve to mitigate this, new facilities will certainly be required to manage additional waste generated.

- Planned industrial development will bring significant growth in the volume of hazardous waste produced and diversification of the industrial base will also increase the variation in types of hazardous materials entering the waste stream.

- Expansion of healthcare facilities in the Emirate will lead to a greater quantity of clinical waste which will require treatment and safe disposal.

- With the development of Abu Dhabi's nuclear energy capability, there will be a substantial increase in the level of radioactive wastes which will be produced in the Emirate, which will require specialist handling.

- The huge construction projects already taking place, and those outlined in the 2030 Structure Plans, produce massive volumes of C,D&E wastes and also green waste from landscaped areas.

- Abu Dhabi's recent progress and ambitions in the tourism sector also presents a number of issues for waste management in the emirate. For example, tourism facilities and attractions are often located in close proximity to sensitive natural and cultural assets (e.g. coastline, desert and historic areas). The Food and Beverage industry associated with hotels also produces large amounts of food waste, which should be diverted from landfill.

4.7 Coastal Development

1.1.3 Context

A key challenge facing Abu Dhabi Emirate is related to the fact that many different actors and stakeholders desire access to the Emirate's waterfront, islands and marine environment.

The Marine and Coastal Environment Sector Paper provides a more detailed account of coastal pressures in Abu Dhabi. The following paragraphs will provide a brief overview of development in the coastal zone, in relation to the economic and social trends outlined in this Sector Paper, and its likely implications.

While the Emirate has several hundred kilometers of coastline on the southern Arabian Gulf, it is coming under increasing development pressure for a wide range of uses across the Emirate. This development pressure coincides with some of the Emirate's most sensitive and important natural assets.

A host of different user groups utilize the coastal zone for a range of activities, including:

1. Commercial fisheries,
2. Power and desalination,
3. Urban development,
4. Leisure and tourism,
5. Ports and shipping, and
6. Oil and gas industry.

Such uses have significant impacts on physical and biological systems at the coast which are extremely valuable and are already under severe pressure.

4.7.1 Coastal Development Trends

As highlighted in Section 2.3, a large proportion of the Emirate's population is located on the low lying island of Abu Dhabi City. Faced with limited land availability for further expansion on the island, authorities, developers and planners have identified huge areas of the mainland and neighboring islands in order to meet ambitious plans for mixed-use residential and commercial development. The City's coastal areas in particular, have been subject to significant development pressure owing to their desirability for waterfront property and proximity to the existing metropolitan hub and supporting infrastructure, including the prestige developments of Saadiyat, Yas, Reem and Sowwah islands and Al Raha Beach.

The Government of Abu Dhabi has identified tourism as a key sector in the Emirate's economic diversification. This has led to the development of considerable cultural, recreational and hospitality assets in the Emirate (refer to Section 4.4). Tourism development is focused in coastal areas to take advantage of beaches, waterfront views and coastal recreation, with the most pristine and sensitive natural environments often the most desirable locations.

4.7.2 Industrial, Maritime and Fishing Sectors

Abu Dhabi has seen significant industrial development in recent times, either in direct pursuit of its economic goals or to support the substantial population growth which the Emirate has recently experienced.

As outlined in Section 4.6.1, combined seawater desalination and power plants supply the population of Abu Dhabi with the majority of its water and electricity. These facilities are located on the coast as this provides direct access to raw seawater for desalination and cooling, delivery of fuel for power generation and disposal of brine effluent.

The Straights of Hormuz is currently one of the World's busiest shipping lanes. Looking ahead, the Khalifa Port and Industrial Zone (KPIZ) development in Taweelah will become one of the Gulf's main seaports when Mina Zayed relocates its cargo operations there in 2012. When fully developed, the KPIZ will become one of the World's largest industrial zones. Abu Dhabi's coastal and marine environment is also the location of oil and gas exploration and extraction activities and associated supporting infrastructure, such as refineries, pipelines and shipping terminals.

Although not one of the major current contributors to Abu Dhabi's GDP, the Emirate's fishing industry is of considerable importance in terms of maintaining traditional and sustainable livelihoods and cultural heritage, as well as for its contribution to employment and food security. According to the EAD's fisheries statistical bulletin, Abu Dhabi's total fish catch in 2008 was more than 5,360 tonnes, caught by around 25,000 *lansh* and *tarad* fishing trips and with a wholesale value of 75 million Dirhams. Overfishing of certain species, such as Hammour, has become a significant challenge for the sustainability of the Emirate's fishing industry.

4.7.3 Impacts of Coastal Development

As the coastal zone is a highly dynamic natural environment, coastal modifications such as shoreline modification, channel and harbor dredging, and land reclamation are common aspects of coastal development in Abu Dhabi. The inherent nature of these modifications constrains the capacity of coastal systems and ecosystems to adapt to environmental change such as storm events, sea level rise and natural ecological variation. As a result, on-going human activity is often required to maintain the physical environment, such as preventing coastal erosion, sedimentation and stagnation. In addition such activities can lead to significant ecological damage, from direct loss of habitat and species, and restrictions on movement of species between nurseries or grazing areas, to deterioration of water quality due to changes in water flow patterns. High human population densities also mean increased likelihood of pollution from construction, waste and wastewater, ecological disturbance from increased light, noise and recreational activities such as boating.

Residents and tourists share in the consequences of this damage. Reduced bathing water quality and the loss of inherent landscape/seascape character directly reduce the value of the coastal zone to users. Therefore, maintaining healthy ecosystems and sustainable use of the coast is required to ensure that the vital ecosystem services, natural assets and aesthetic qualities of these areas are preserved for the community, businesses and future generations.

Impacts on the coastal zone associated with industrial and maritime activities are myriad and cannot be fully accounted within this Sector Paper (see Coastal and Marine Sector Paper). However, by way of example, desalination plants can lead to increased temperature and salinity associated with effluent discharges, overfishing has led to a drastic reduction in fishing stocks and the oil industry operates in some of the Emirate's most sensitive marine areas.

In addition, the distribution of resources, such as oil and gas, water and electricity, throughout the Emirate requires network infrastructure and the coastal zone faces unique challenges in this regard. Transportation potentially represents a threat to the coastal zone of Abu Dhabi. As the city population expands to other islands, bridges and tunnels are expected to link the cities expanding transportation infrastructure. Along with the environmental implications of the construction of these structures, and to a lesser extent the physical presence during operation, comes the implications of access to areas previously limited to a large proportion of the population. Whilst this may bring social benefits to the city population, and increase awareness amongst the population of areas of natural beauty in the Emirate, it could also bring significant risks to these environments.

In addition to the above impacts, climate change threatens coastal ecosystems and developments in a multitude of ways, including increases in sea level, higher seawater temperatures and salinity, changing storm frequency and patterns of erosion and accretion. The effects of climate change are discussed in detail within the Fenci and Klein (2008) study carried out by the EAD. [57]

4.7.4 Interim Coastal Development Guidelines

Spatial constraints imposed on coastal areas often result in conflicts amongst its user groups, particularly as the inherent value of coastal areas to human populations is rooted in natural environments, sensitive to pressures associated with human habitation and use. A key challenge for Abu Dhabi is to manage the sustainable development of these areas to ensure their valuable natural character is not lost in the process of expansion and development.

Integrated Coastal Zone Management recognizes the complex interrelationships of economic users and resources in the coastal environment. Implementation of zoning is one effective way of avoiding the exclusive use of particular coastal resources and accommodating numerous and interrelated user groups and stakeholders. Geographical zones can be assigned to enable protection and sustainable exploitation of coastal assets by multiple users.

Deploying a zoning approach, the Interim Coastal Development Guidelines, produced by the UPC represent the first step in advancing the Environmental Framework policies outlined in Plan Capital 2030. The guidelines will apply to the largely undeveloped coastal lagoons that lie adjacent to Abu Dhabi Island and will build on the echelons of the 'Green Gradient' introduced in Plan Capital 2030, setting out four land use zones:

- Nature reserve;
- Coastal Park;
- Coastal conservation zone; and
- Coastal stewardship zone

4.8 Development Control

While the urban and regional structure plans serve as a foundation for rationalizing land use in the context of many competing objectives, more work is required. Policies and regulations that are being developed to address these issues are discussed below.

In general the urban and regional structure plans are functioning as they were intended. Development proposals are evaluated in the first instance with respect to their compatibility with the Plans. Proposals that deviate are evaluated to determine whether they serve to strengthen the plans by reinforcing the principles embodied in them in a way that was not foreseen, or confound the intentions of the plans.

As noted earlier, the Emirate of Abu Dhabi is in the process of establishing a planning culture. With the absence of previous planning strategies, policies and regulations, establishing planning policies and regulations requires borrowing heavily from the best practices within established planning systems.

While planning strategies set the overall development framework for the various cities and regions of Abu Dhabi Emirate, policies and regulations provide the detail and guidance required to implement the framework plans. Planning policies can be permissive or prescriptive by nature.

The number of building permits issued between 2006 and 2008 in the municipal areas of Abu Dhabi and Al Ain is presented by type within Table 4.14 and Table 4.15. Both regions experienced a decline in the number of building construction permits issued in this period. In Abu Dhabi the largest proportional decline was related to temporary permits, including worker accommodation, whereas in 2008, the city saw a large increase in the issue of residential permits. In Al Ain the decline was mostly related to the reduced number of residential construction permits over the period.

57. Fenci, A and Klein, R (2008) 'Climate Change Impacts, Vulnerability and Adaptation: Coastal Zones in the UAE, In. EAD (2008) Climate Change Impacts, Vulnerability and Adaptation in the United Arab Emirates: Coastal Zones, Water Resources and Dryland Ecosystems, Stockholm Environment Institute

Table 4.14: Building Construction Permits Issued - Abu Dhabi **

Type of Permits	2006	2007	2008
Commercial	67	134	216
Residential	907	852	1,389
Industrial	192	252	229
Annex of low Cost house	957	889	139
Public Utilities	250	240	333
**Temporary Permits	3,682	949	1,767
Total	6,055	3,316	4,073

*Including the number of building permits issued for Abu Dhabi and the Western Region

** Includes temporary building permits, such as on site construction worker accommodation

Source: Department of Municipal Affairs - Municipality of Abu Dhabi

Table 4.15: Number of Building Construction Permits Issued - Al Ain

Type of Permit	2006	2007	2008
Annex of low cost house	393	466	363
Residential Annexes	611	303	503
Residential Villas	2,128	1,770	1,262
Industrial Shops	88	93	124
Labor Sheds	136	152	66
Commercial Buildings	64	59	45
Government Buildings	156	113	111
Total	3,576	2,956	2,474

Source: Department of Municipal Affairs - Municipality of Al Ain

4.8.1 Existing Development Control Policies

Since its inception in 2007, the UPC has introduced a number of far ranging development control policies and initiatives, including its sustainability initiatives, the Estidama Integrated Design Process (EIDP), the Complete Communities program, and the Sustainable Urban Design Principles.

4.8.1.1 Estidama Integrated Design Process

Central to the development control process is the principle of sustainability, which ensures that supply and demand is balanced based on long-term growth projections. Abu Dhabi created its own green building and sustainability program known as 'Estidama' (the Arabic word for sustainability), which was formally adopted in 2008. This arose out of the need for a sustainable planning strategy which is suited to the unique culture, climate and environment of the Emirate. The ultimate goal of Estidama is to preserve and enrich Abu Dhabi's physical and cultural identity, while creating an ever improved quality of life for its residents.

The UPC has developed the EIDP, which incorporates the principles of Estidama, and promotes cooperation and collaboration between stakeholders during the planning, design and construction of new developments in the Emirate. Prerequisites for EIDP are proposed to be embedded as requirements in development codes and regulations, meaning that all projects developed in the Emirate of Abu Dhabi will automatically achieve a higher level of environmental performance through regulatory compliance.

Beyond that, projects seeking to achieve recognition within Abu Dhabi's Green Building program, the 'Estidama Pearl Rating system' may pursue sustainability measures under the following five categories:

- Living Systems
- Livable City
- Precious Water
- Resourceful Energy
- Healthy Materials

In addition to the innovation of having Pearl Rating prerequisites for all projects, the Pearl Design System is striving to harmonize its criteria with the compliance paths of other industry rating systems. Recognizing that industry capability has been developed around each of these programs, the Pearl Design System is looking to build on the international knowledge base of development teams to address sustainability outcomes particular to the Middle East to achieve Estidama.

4.8.1.2 Complete Communities

The 'Complete Communities' Policy strives to achieve sustainable mixed use communities within the Emirate of Abu Dhabi. The concept of a 'Complete Community' is to create a neighborhood which mixes residences, shopping, services, recreation and work places to create a livable and convenient place achieving a variety of community values including open space, community vitality, housing choice, air quality and walkable, transit oriented development.

The principles incorporated within the 'Complete Communities' Policy are to be enshrined within the forthcoming Development Code for Abu Dhabi (and eventually the Development Codes for all areas within the Emirate).

4.8.1.3 Sustainable Urban Design Principles

Sustainable Urban Design Principles are proposed to be embedded within the emerging planning system in Abu Dhabi. Attaining the ambitious goal of building sustainable cities will require that development be more sustainable with respect to built form and utilities / infrastructure. The development objectives identified by the UPC within these principles, envision a more sustainable society that is economically diversified, highly livable and distinctly Arab.

The next step in implementing this ambitious policy is for the Abu Dhabi Government to formally adopt the agenda, establish targets and indicators for measuring progress and develop the means to align decision making with these overarching objectives.

4.8.2 Emerging Development Control Policies

The UPC also has several key development control tools that are in an advanced stage of production, including the forthcoming Urban Street Design and Mobility Standards Manual and Development Review Regulations.

4.8.2.1 Urban Street Design and Mobility Standards Manual

The aim of this policy is to develop new street design standards in order to create safer, more comfortable and more aesthetic street environments that provide genuine choice of movement by walking, cycling and public transport modes as well as private motor vehicles.

The overall goal is to develop a manual that will provide design guidance for all of the purposes and activities that streets serve and facilitate. Streets are the conduits for the movement of people and goods and services (by all modes), meeting places, organizing elements and they help to define the character of urban environments. Streets need to be conceived of as places in addition to being corridors for movement.

The Manual will provide design guidelines for all aspects of street design – the dimensions and layout of all elements between the curbs and for the area between the curb and building face. It will provide typical design details for all street types as well as guidance for context-specific standards to reinforce the character of the surroundings, such as ceremonial boulevards, waterfront streets and downtown shopping streets.

Special attention will also be paid to the unique urban environments and contexts in Al Ain and the towns and urban areas of Al Gharbia.

4.8.2.2 Development Review Regulations

Plan Capital 2030 identified the need for a Development Regulation System that would enforce the planning principles enshrined within the Framework Plan. Development Regulations provide the statutory framework for enforcing development policy. There are presently no planning and development regulations in existence in Abu Dhabi and as such all development assessments are undertaken on a merits basis and in accordance with guiding principles within the relevant Structure Framework Plans, existing and emerging policies and international best practice.

In the face of extremely rapid growth, the Abu Dhabi Government seeks to develop land use plans and development regulations to ensure that current and future growth implement the vision expressed in the respective 2030 Structure Framework Plans.

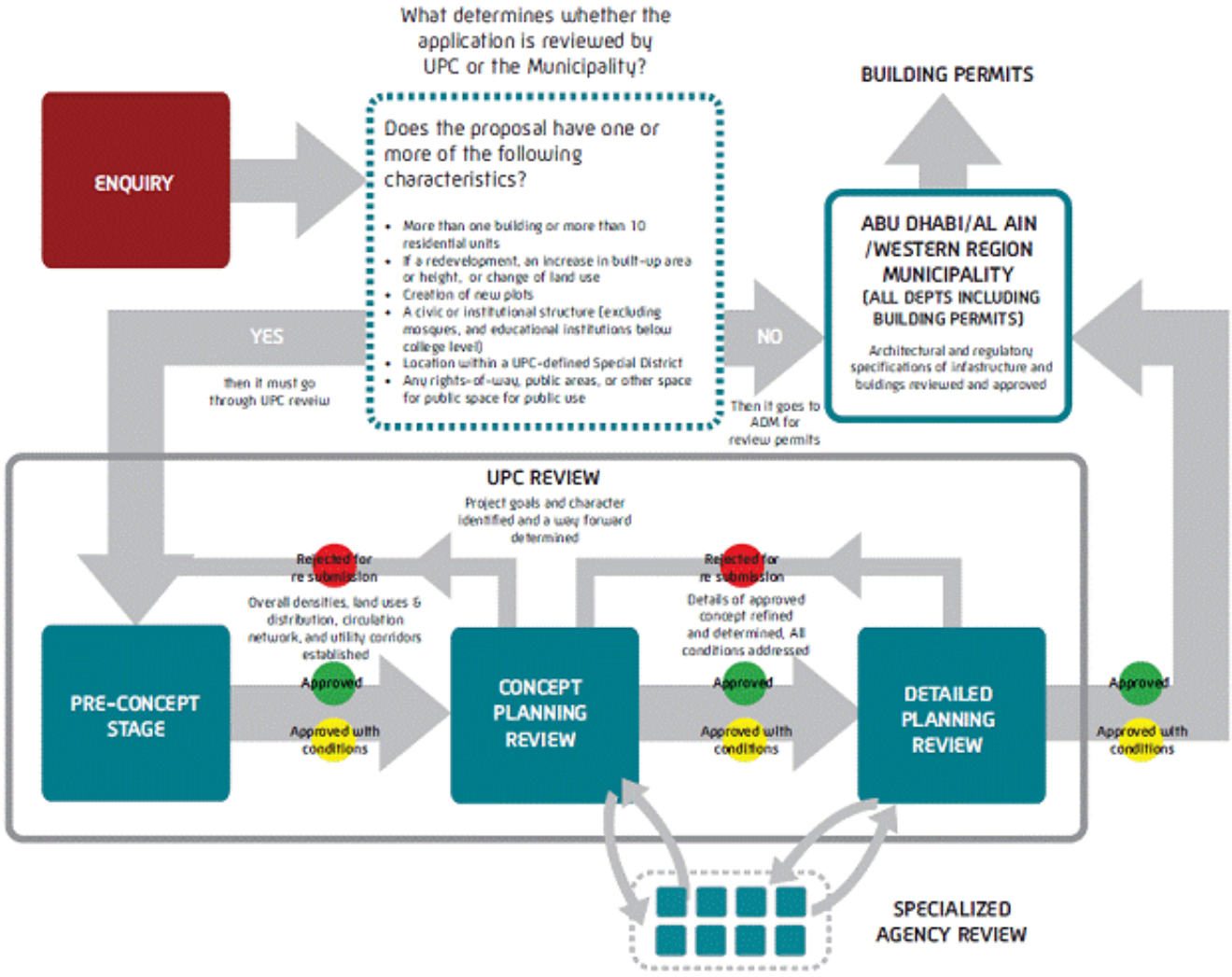
In developing the regulations, the UPC has led the detailed analysis of urban form for Abu Dhabi's CBD and the balance of the urban area, developing urban form diagrams and conceptual land use plans for the city's precincts.

The urban design and planning phase was recently completed, and resulted in the establishment of key principles to guide future planning and the review of development proposals. The completion of framework level, placed based regulations for the Abu Dhabi metropolitan area and detailed regulations for the CBD are now underway.

The Development Regulation Framework will create an important tool for use by government officials, developers and the public and will ensure that new development carries out Abu Dhabi's exciting vision for a sustainable future.

At present, all major developments are subject to a review process which itself forms part of a longer-term strategy for Abu Dhabi's urban development (see Figure 4.16).

Figure 4.16: Overview of the Development Review Process



Source: UPC (2009) Guide to the Development Review Process, Form A: General Overview

Development proposals with one or more of the following characteristics are subject to UPC development review:

- More than one building;
- More than 10 detached residential units;
- If a redevelopment, an increase in Gross Floor Area (GFA) or height, or change of land use;
- Creation of new plots;
- A civic or institutional structure other than a mosque or educational institution below college level;
- Location within a UPC defined special district; and
- Any rights-of-way, public areas, or other space for public use

Every development must fit within the framework contained within the relevant Structure Framework Plan, as well as adhering to other government regulations, policies and guidelines.

By overseeing development on this scale, the UPC ensures that growth is managed and that transport and utility infrastructures provide for growth across the entire Emirate. Central to this process is the principle of sustainability, which ensures that supply and demand is balanced based on long-term growth projections.

The UPC liaises with other government departments, such as the DOT, the EAD, municipalities and utility providers to discuss relevant development proposals, and to co-ordinate a central, considered response to infrastructure demands.

All decisions are made, based on detailed recommendations from review and planning officials, by members of the UPC. This consists of several members of the Executive Council of Abu Dhabi and is chaired by HH Sheikh Mohammed bin Zayed Al Nahyan.

The UPC has established a streamlined process to review development proposals. This process includes four stages:

- Enquiry;
- Pre-Concept;
- Concept Planning Review; and
- Detailed Planning Review.

The UPC uses this review process for two main purposes:

- To ensure development proposals comply with the Emirate's urban planning policies (including land uses, densities and Estidama).
- To coordinate the review and approval of development applications by external government agencies.

The review process is designed to:

- Provide the developer with information and direction to improve overall integration with the surrounding area;
- Provide the UPC with the necessary data to make informed decisions on development applications; and
- Ensure a transparent, consistent system for all development reviews.

4.8.2.3 Limitations of Development Assessment Process

As explained above, developments proposed within the Emirate of Abu Dhabi are now subject to a relatively rigorous assessment process. However, the key limitation in the process is that as of May, 2010 there is no formal Development Code for Abu Dhabi.

The term Development Code refers to statutory land use zoning and planning ordinance. Until statutory planning controls are implemented, all planning decisions are undertaken on their merits, rather than via a systematic assessment framework.

As noted above, the UPC is in the process of completing a comprehensive Development Code for land within Abu Dhabi Municipality boundaries. It is envisaged that the Development Code will be completed in the first Quarter of 2010.

4.9 Summary of Key Development, Plans and Trends

The 2030 Structure Framework Plans and Surface Transport Master Plans (STMPs) lay the foundations for long-term sustainable urban and regional development within Abu Dhabi Emirate. These plans were borne out of the Abu Dhabi Government's recognition of the need for more sustainable and considered spatial development in the face of unprecedented demand for mixed-use urban developments.

Rapid urbanization around Abu Dhabi Island and in other parts of the Emirate requires vast amounts of resources in development and will place increasing pressure on infrastructure and services during operation. The Abu Dhabi Government hopes to reduce the pressure on resources and the environment and produce sustainable patterns of living within a local context through the framework of its 'Estidama' program.

As opportunities to attract global investment capital and market demand have recently diminished, many large-scale mixed-use developments are moving forward at a more measured pace. The Government has taken this opportunity to more fully evaluate and improve proposals. This has also freed up resources allowing the Government to pursue its agenda of economic diversification.

Economic diversification is focused on a number of key areas, including the development of industry and manufacturing. A significant amount of land and infrastructure is likely to be required to accommodate these new industrial developments away from urban areas. As the Al Ain and Abu Dhabi Structure Framework Plans are foremost Urban Plans, these requirements may not be fully met within the current framework. Therefore, alongside the forthcoming Al Gharbia and Eastern Region 2030 Plans, the UPC has identified a need to prepare a detailed Industrial Lands Strategy to identify the demand for industrial land and appropriate sites for the location of industry. As industry is generally an intensive user of land, the Strategy will need to select sites with appropriate regard for infrastructure, services and environmental protection.

Abu Dhabi's highly valuable and sensitive coastal zone is under increasing pressure from various commercial and industrial activities such as oil and gas, tourism, fishing, mixed use development, and water and power production. Effective management of coastal developments, in accordance with the UPC's new coastal development guidelines, will be important to support the interests of multiple user groups, prevent environmental degradation and facilitate sustainable development, to conserve these assets for current and future generations alike.

The level of development envisioned in the Abu Dhabi STMP, to be followed by the Al Ain and Al Gharbia surface transport plans, is unprecedented anywhere in the world. This will undoubtedly deliver positive and much needed benefits in terms of increased accessibility, public transport, freight movement and easing of traffic congestion. However, it is likely that the financing and delivery of such a huge program will require further development and investment in the Emirate's institutional capacity.

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D	07 MAR 10	MR	MPM	AF	Fourth Draft Report
E	29 APR 10	MR	MPM	AF	Final Draft Report Update
F	12 MAY 10	MR	MPM	AF	Final Draft Report Update – UPC Changes
G	20 JUN 10	MR	JF	AF	Final Draft Report – DOT and SCAD Changes

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- 09-05-05 Encounters by setting
- 09-05-5 Key indicators '3'
- 09-05-05 Payers
- 09-05-05 Population projection '9'
- 09-05-05 Private clinics'28-30'
- 09-07-13 Seha Centers
- 09-07-26 Cancer cases
- 09-07-26 Communicable diseases
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- Hospitals
- Injuries
- Leading causes of death
- Providers

2. Coordinates or medical facilities

UPC

1. Consolidated Project Data Update

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DED

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1. Spatial data – higher education institutions, schools, school sports facilities

2. Statistical Yearbook 2007/8 – data on demographics, student enrollment and staffing

ZonesCorp

1. Summary statistics outlining industrial development in Abu Dhabi

2. Location maps of existing economic zones and industrial areas of Abu Dhabi

E. ABBREVIATIONS

AADC	Al Ain Distribution Company
AAEZ	Al Ain Education Zone
ADAC	Abu Dhabi Airports Company
ADCED	Abu Dhabi Economic Development
ADCHS	Abu Dhabi Centre for Housing and Service Facilities Development
ADCO	Abu Dhabi Company for Onshore Oil Operations
ADDC	Abu Dhabi Distribution Company
ADEC	Abu Dhabi Education Council
ADEZ	Abu Dhabi Education Zone
ADGAS	Abu Dhabi Gas Liquefaction Limited
ADIA	Abu Dhabi Investment Authority
ADMA-OPCO	Abu Dhabi Marine Operating Company
ADNEC	Abu Dhabi National Exhibition Center
ADNOC	Abu Dhabi National Oil Company
ADRAMIS	Abu Dhabi Road Asset Management and Information Systems
ADSSC	Abu Dhabi Sewerage Services Company
ADTA	Abu Dhabi Tourism Authority
ADWEA	Abu Dhabi Water and Electricity Authority
ADWEC	Abu Dhabi Water and Electricity Company
AED	United Arab Emirate Dirhams
AGEDI	Abu Dhabi Global Environmental Data Initiative
AMPC	Al Mirfa Power Company
APC	Arabian Power Company
ARNRD	Abu Dhabi Naturalization and Residency Directorate
BPC	Bainounah Power Company
CBD	Central Business District
CD&E	Construction, Demolition and Excavation
CO2	Carbon Dioxide
CSP	Concentrating Solar Power
CWM	Center for Waste Management
DED	Development of Economic Development
DOT	Abu Dhabi Department of Transport
EAD	Environment Agency of Abu Dhabi
ECAE	Emirate College for Advanced Education
ECPC	Emirates CMS Power Company
EIDP	Estidama Integrative Design Process
ENEC	Emirates Nuclear Energy Corporation
ERP	Electronic Resource Planning
e-SIS	enterprise Student Information System
ESWPC	Emirates Sembcorp Water and Power Company
EU	European Union
FDI	Foreign Direct Investment
GAHS	General Authority for Health Services
GASCO	Abu Dhabi Gas Industries Limited
GCAA	General Civil Aviation Authority
GCC	Gulf Cooperation Council
GDP	Gross Domestic Product
GFA	Gross Floor Area
GIS	Geographic Information System
GTTP	Gulf Total Teactebel Power Company
GW	Gigawatt
GWh	Gigawatt Hours
HAAD	Health Authority Abu Dhabi
HH	His Highness
HDI	Human Development Index
HCT	Higher Colleges of Technology
ICAD	Industrial City of Abu Dhabi
IGD	Integrated Gas Development
ISTP	Independent Sewage Treatment Plants
IMF	International Monetary Fund
IWPP	Independent Water and Power Producer
JV	Joint Venture
KPIZ	Khalifa Port and Industrial Zone
kW	Kilowatts
LRT	Light Rail Transit
MIST	Masdar Institute of Science and Technology
MIT	Massachusetts Institute of Technology
MTC	Midfield Terminal Complex

MW	Megawatts
MWh	Megawatts Hours
NEWRC Centre	National Energy and Water Research
NYUAD	New York University Abu Dhabi
OAG	Offshore Associated Gas
OPEC Countries	Organization of Petroleum Exporting
PRFD Directorate	Parks and Recreational Facilities
PPP	Public Private Partnership
RAK	Ras Al Khaimah
RE	Renewable Energy
RO	Reverse Osmosis
SAS	Sahil Asab Shah
SCAD	Statistical Centre Abu Dhabi
SCIPCO Company	Shuweihat CMS International Power
SDR	Special Drawing Rights
SEHA	Abu Dhabi Health Services Company
SEZ	Specialized Economic Zones
SME	Small and Medium-sized Enterprises
STEP	Strategic Tunnel Enhancement Project
STMP	Surface Transport Master Plan
STP	Sewage Treatment Plant
TAKREER	Abu Dhabi Oil Refining Company
TAPCO	Taweelah Asia Power Company
TFR	Total Fertility Rate
TRANSCO Company	Abu Dhabi Transmission and Dispatch
TSE	Treated Sewage Effluent
TW	Terawatt
TWh	Terawatt Hours
UAE	United Arab Emirates
UAQ	Umm al-Quwain
UN	United Nations
UNESCO and Cultural Organization	United Nations Educational, Scientific
UPC	Urban Planning Council
US	United States
VETI Institutes	Vocational Education and Training
WHO	World Health Organization
WZ	Western Zone
ZADCO	Zakum Development Company
ZonesCorp Economic Zones	Higher Corporation for Specialized

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