



# **STATE OF THE ENVIRONMENT REPORT 2018**

## **Chapter 1: Driving Forces**

**Reporting status from 2009 to 2015**



## KEY MESSAGES

This chapter presents a discussion on some of the major socio-economic drivers of environmental change in Malta, discussing the key aspects of the relationship between these forces and the state of the environment, and examining the data furnished by a set of key indicators in this regard. The discussion is also informed by key developments in each of the domains. The key messages that emerge are the following:

- National demographics exhibit growing proportions of elderly and persons living in Malta who are not of Maltese origin. This merits attention given diverse demands for environmental and infrastructural services and environmental footprint.
- The Northern Harbour Region in Malta is under significant pressures from high population density, which is continuing to increase. The density is of course higher with seasonal tourism, affecting St Paul's Bay/Qawra, Tas-Sliema and St. Julian's, where tourism poses particular management challenges related to traffic, noise, and general disturbances. Urban areas with high densities place pressures on infrastructure and environmental quality.
- In the light of Malta's high population density and absolute land scarcity, and given the pressures caused by construction, as well as the cumulative impact of development on virgin land, a greater focus is needed on maximizing the efficient use of land and resources. In particular, the rehabilitation of old buildings rather than construction on virgin land would generate economic benefits with fewer environmental impacts.
- The economic share of mining and quarrying, construction and real estate also declined between 2008 and 2015, as has employment in the sectors. Given the considerable strain that this sector puts on the environment, the declining dependence of the economy observed in the period could be a positive change for environmental quality. Nonetheless, indications of subsequent periods suggest significantly stronger construction activity.
- The increased importance of the tertiary sector within the Maltese economy is a positive development, given that it is less strongly associated with resource extraction and environmental impacts. But growth in Growth Domestic Product (GDP) in absolute terms, even if mainly driven by growth in the services sector, may result in environmental and resource impacts particularly in transport, energy and infrastructure demands. The decoupling of the growth of the tertiary sector and environmental impacts is to be studied further. The challenge is to move activities - and infrastructure - from linear extractive/polluting systems to more circular and restorative systems.
- The number of inbound tourists has continued to increase over the 2008-2015 period. However, this was not the case in several of the niche tourist segments. The importance of focusing also on the quality of tourists while reducing seasonality patterns remains a key challenge for Malta's tourism sector and for managing the associated environmental and infrastructural pressures.
- Malta remains heavily dependent on imported fossil fuels for energy generation with a low, albeit increasing, share of renewable energy in gross final energy consumption. Correlation of fuel import growth and real GDP growth indicate that recent GDP growth is being accompanied by greater efficiency in fuel usage, which may be pertained to increased efficiency of electricity production, and the Malta-Sicily interconnector.

- Malta's continued rise in vehicle numbers continues to be a matter of concern due to the environmental (air quality, congestion) and social impacts (health, pedestrians) of private motor vehicle use. The slight shift in Malta's car fleet towards fuel efficient vehicles is positive, but alternatives to private car use continue to elude the transport sector, making this one of the key forces for environmental concern.
- The general decline in the size of the industrial sector and the expansion of the regulatory regime, driven mainly by accession to the European Union (EU) and ensuing legislation, foresees a positive development on the environment. In 2008, the environmental permitting system was still at design stage. By 2015 there were 16 Integrated Pollution Prevention and Control (IPPC) permits, 136 operational Environmental Permits (of which 51 were for waste management installations, and 27 for quarries and batching plants) and 4909 registrations, mainly waste carriers.
- Environmental impacts associated with agriculture-induced environmental impacts may be declining overall, because the sector is in decline, coupled and the regulatory regime and good farming practices that are being encouraged in the sector have improved. At the same time, this calls for caution, as land abandonment, or alternative forms of development, with other environmental impacts, become increasingly attractive.
- The rate of growth in domestic material consumption has increased at a faster pace than the rate of increase in real GDP, an indication of declining resource productivity. The need to make more efficient use of resources remains pertinent.

## 1.1 INTRODUCTION

The material footprint for high-income countries is larger than that of low-income countries.<sup>1</sup> Hence, understanding how the demands of our daily lives affect the environment we depend on is at the heart of the environmental challenge. The following chapter updates the discussion presented in the 2008 State of the Environment Driving Forces chapter, providing insight on a number of socio-economic drivers of environmental change in Malta. The discussion presented in this chapter contributes to a better understanding of the dynamics driving the environmental state and pressures discussed in the subsequent chapters.

## 1.2 DEMOGRAPHY AND TOURISM

### 1.2.1. Population change

*How will population trends impact the Maltese environment?*

Worldwide, the main pressures on the environment derive from human activities. This phenomenon describes environmental pressures in Malta too. A core variable that drives human pressures on the environment is the size, composition and distribution of the human population. While people may exert different degrees of pressures on the environment depending on the types of activities that they engage in, and on how these are regulated, demographic change is a core force that can drive demand for many economic goods and services. Some of the more obvious relationships are those between population growth and the demand for housing, services, jobs, transport and infrastructure.

Changes in demography merit particularly careful consideration in Malta, given that Malta is already by far the most densely populated EU country, having reached an average of 1,325 persons per square kilometre in 2011. This said, a key finding from the 2011 census is that Malta's population has been growing very slowly (albeit steadily) since 1967. According to the European Population Projections (EUROPOP2015) as produced by Eurostat, Malta's population is set to reach 488,632 by 2030 and increase to just over 519,214 by 2060, with the share of foreign nationals expected to continue with its increasing trend.<sup>2</sup> As a headline trend, these figures suggest increasing pressures on the environment at a macro level driven by population growth, assuming constant per capita consumption and investment pressures.

The overall trend however conceals larger fluctuations taking place at district levels. Of the six census districts which constitute the Maltese Islands, the harbour districts are the most densely populated (Southern Harbour District and Northern Harbour District), containing an estimated total population density of 3,035 and 5,014 persons per square kilometre, respectively. This, in contrast with the least densely populated area of Gozo and Comino, where density is a mere 483 persons per square kilometre. To compound pressures further, the Northern Harbour District saw a net increase in population density over the 2005-2011 period. The adjacent Northern District saw the greatest net influx of population between the 2005 and the 2011 census where density increased by 12 % to a

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<sup>1</sup> Hickel 2018.

<sup>2</sup> Eurostat 2017a.

moderate 866 persons per square kilometre. These findings call attention to the Northern Harbour Region as an area which is under significant pressures from high and increasing population density.

Zooming in to the locality level reveals further diversity and volatility. The most populated locality in the Maltese Islands is Birkirkara, with over 21,700 inhabitants. The least populated locality is Mdina with an estimated population of some 270 people. In terms of density, the strongest pressures are found in Senglea, with a population of 17,146 per km<sup>2</sup>, whereas the locality with the least population density is Għasri with a population of 86 per km<sup>2</sup>. The locality that experienced the highest percentage increase in population growth is Xgħajra, where density increased by an estimated 26 %, in contrast with almost all other localities in the Southern Harbour District, where a decline in density was experienced. Marsaskala, Pembroke and Birżebbuġa also experienced spikes in population density. Certain localities experienced considerable decline in density: for example in Mdina, already one of the least densely populated areas of Malta, density fell by 14 % over the period, while Ta' Xbiex also saw a considerable decline of 16.1 %.

However, the localities that are located at the high end of the population density scale, and where further increases in population density were observed, merit particular consideration. Between the 2005 and 2011 census, high density localities which continued to receive a net influx of people included Fgura and Ғal Tarxien in the South Harbours District, Santa Venera, Tal-Pietà and Tas-Sliema in the North Harbours District and Ғal Balzan in the Western District. Tas-Sliema is particularly noteworthy given the tourism pressure that it is also subject to. These estimates generally reflect the population decline in the older settlements in the Southern Harbour District, and the increase in population in the newer settlements in the Northern District. They also suggest that certain localities (already highly dense or with high rates of net population increase) may need closer attention to cater for stronger pressures on their infrastructure and environmental quality.

National averages also conceal the diversity occurring in the different demographic bands of the Maltese population. A key issue is that the population of Malta is an ageing one. Projections indicate a continuously ageing population with the proportion of inhabitants aged 65 and over set to increase from 18.5 % in 2015 to 29.5 % in 2060.<sup>3</sup> An aging population poses different infrastructural, housing, transport and special needs, as well as exhibiting different consumption/investment patterns. Given the strength of the trend, this area merits closer examination. Furthermore, and in contrast with the Maltese population as a whole, the growth rate of the non-Maltese population has been exponential. These findings suggest a closer focus on this growing segment of the population (elderly and non-Maltese), whose per capita demand for economic goods and services and consequent environmental footprint may be different from that experienced in Malta to date.

Notwithstanding the diversity of the sub-trends in population, the overall rate of growth has been low (indeed negative in some demographic segments). However, concurrently, dwelling provision has increased considerably from 195,337 in 2005 to 223,850 in 2011. The two trends have resulted in a high and increasing rate of vacant dwellings between the two census dates (2005 and 2011), totalling 71,080 in 2011. Closer inspection reveals that vacant properties have increased across most of the localities in Malta and Gozo. The Western District had the lowest rate of vacant dwellings relative to

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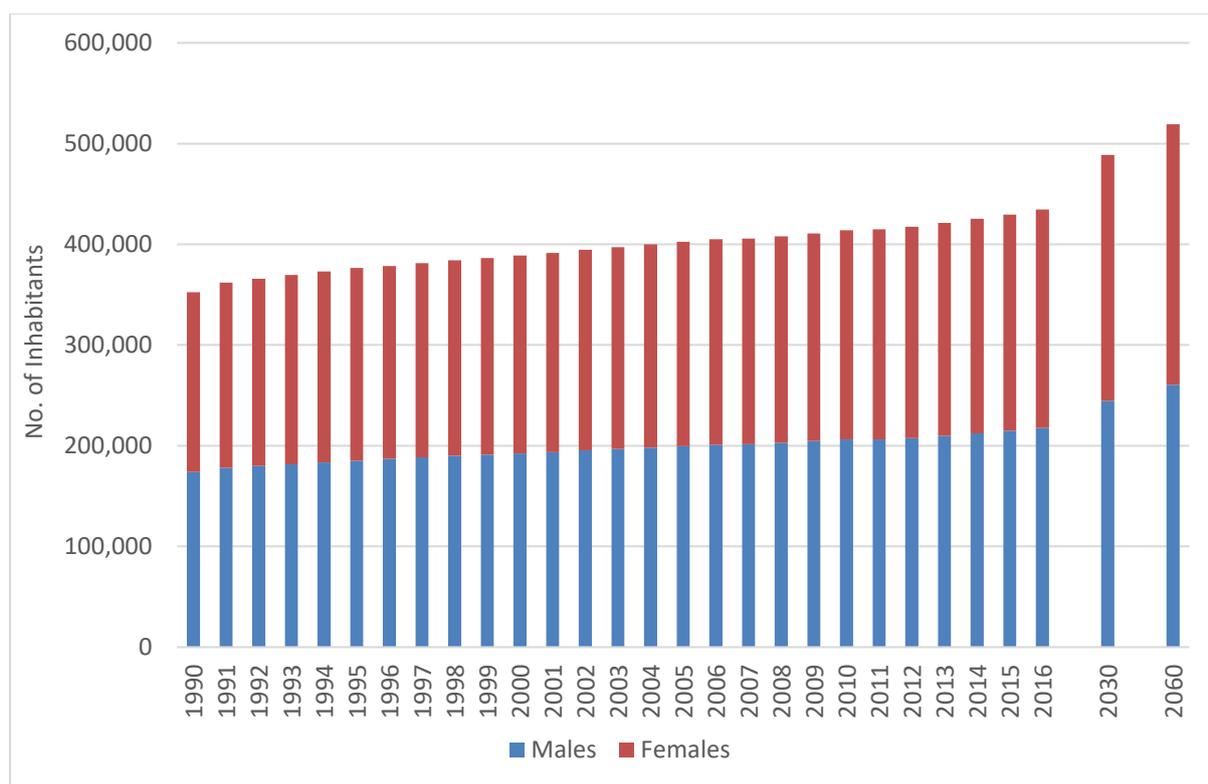
<sup>3</sup> Eurostat 2017a.

population in 2011, while the district with the highest level of vacant dwellings relative to their population in 2011 was Gozo and Comino (a factor that is also reflected in property prices),<sup>4</sup> although more than half of these were used at least seasonally. The locality of Żebbuġ (Gozo) alone reported that over 80 % of its dwellings were vacant.

Localities like Ғaḏ-Żabbar, Valletta, Birkirkara, Ғal Qormi, St. Julian’s, Tas-Sliema, Ғaḏ-Żebbuġ (Malta), Rabat (Malta), Mellieħa, Mosta, Naxxar, St. Paul’s Bay and Victoria (Gozo), each reported over 1000 permanently vacant properties. In Tas-Sliema and St. Paul’s Bay, permanently vacant properties totalled 1,760 and 2,119 respectively, with a further 2,593 and 8,087 used only seasonally. In light of Malta’s high population density and absolute land scarcity, and given the declining population as well as the pressures caused by construction, vacant property constitutes a clear and urgent area for intervention.

Emerging trends: Between 2010 and 2016, the population increased by almost 5 % from 414,027 to 434,403 in 2016. This growth rate is higher than the EU-28 average population increase of 1.4 % during the same time period and continued to be mainly driven by net inward migration.<sup>5</sup>

**Figure 1.1: Total population in Malta**

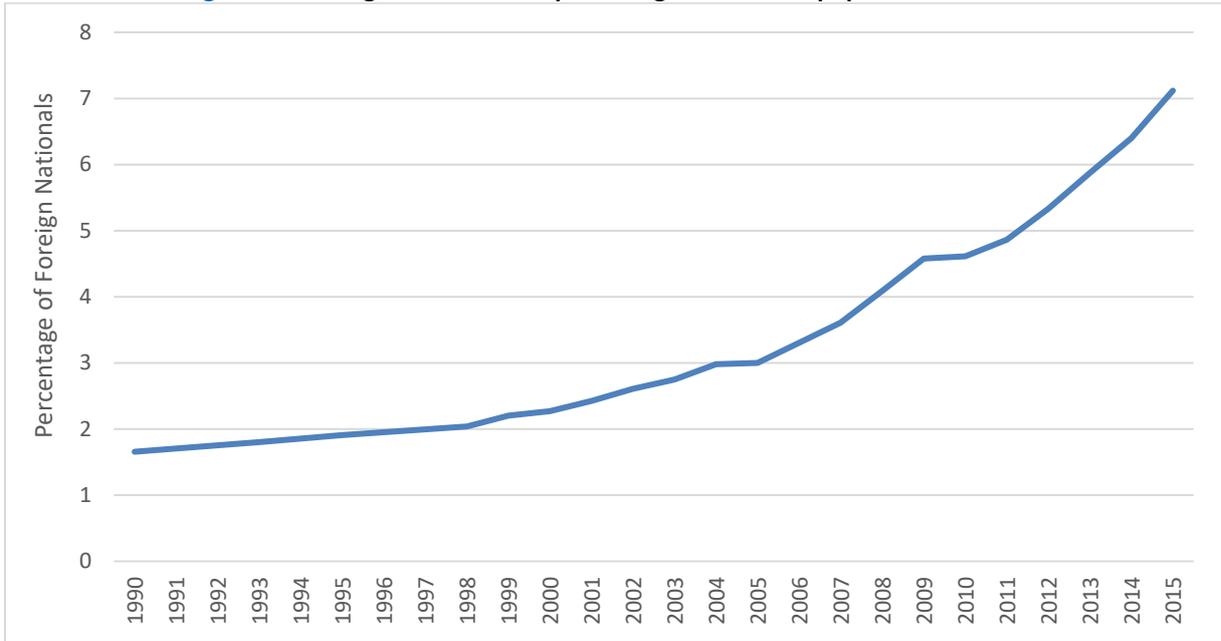


Source: Eurostat 2016

<sup>4</sup> NSO 2014.

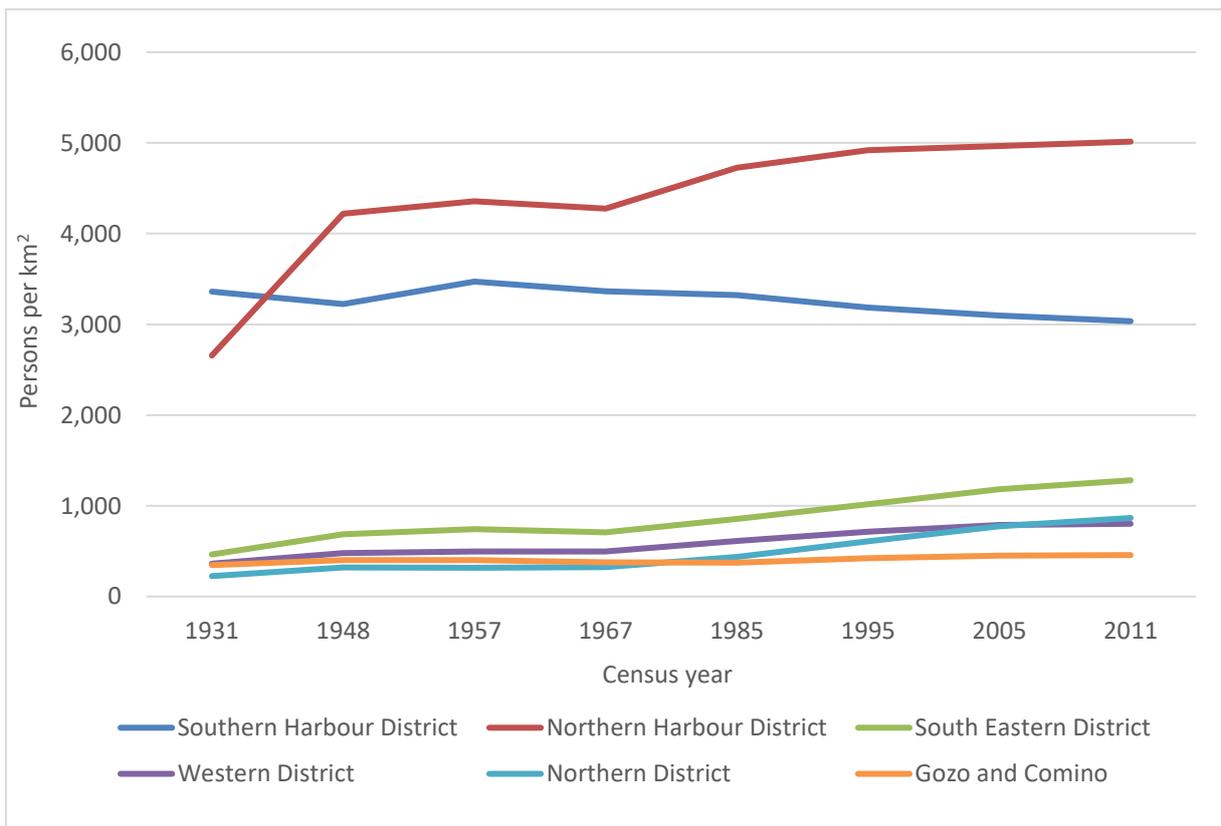
<sup>5</sup> Eurostat 2017b.

**Figure 1.2: Foreign nationals as a percentage of the total population in Malta**



Source: National Statistics Office, Malta

**Figure 1.3: Population density by census district**



Source: National Statistics Office, Malta

### 1.2.2 Daily number of tourists

#### *How will tourism trends impact the environment?*

The tourism sector plays a key role within the Maltese economy, accounting for 5.7 % of total gross value added generated within Malta's economy in 2015, a figure that was slightly higher than its share of 4.8 % in 2008. This industry is directly associated with accommodation and catering establishments, however it also has other inter-industry linkages, including the transportation and storage sector, the manufacturing sector and the agricultural sector, among others. An estimate of the output multiplier for the accommodation and food services activities sector (an approximation to the tourism industry) suggests that every EUR 1 million increase in demand for the tourism sector results in a direct and indirect increase in production of EUR 1.63 million from all sectors of the economy. Furthermore, the rise in production generates higher consumption and additional increases of production in the other sectors of the economy such that the type II multiplier<sup>6</sup> for the accommodation and food services activities sector amounts to EUR 2.25 million. In fact, when taking into account the direct, indirect and induced effects, an increased demand of EUR 1 million for tourism products and services leads to an increase of approximately 30 jobs.<sup>7</sup>

However, the tourism sector also contributes both directly and indirectly to significant environmental impacts, including increases in waste disposal and wastewater treatment, pressures on ecologically-sensitive areas, increases in consumption of water and electricity and take-up of land for tourism infrastructure.<sup>8</sup> During the peak season, both the natural and the infrastructural carrying capacity<sup>9</sup> is strained, placing particular pressure on sensitive locations such as beaches and historical sites, and increases road traffic, noise and waste production, as well as electricity and water demand. The annual number of tourists in 2015 amounted to over four times as much as the resident population. The density is of course higher during the peak months, particularly felt in tourist areas such as Gozo, St Paul's Bay/Qawra, Tas-Sliema and St. Julian's, where tourism poses particular management challenges related to traffic, noise, and general disturbances in summer, Easter and long weekends.<sup>10</sup> Managing these impacts helps render the tourism industry sustainable, such that the economic benefits are not outweighed by the social and environmental costs of the sector.

One way in which to reduce this impact is to diversify the tourists' profile, shifting tourists away from peak months towards shoulder months (for instance by improving accessibility to Malta by different markets).<sup>11</sup> More recent statistics indicate an increase in the number of inbound tourists in the shoulder months.<sup>12</sup> Other considerations include product development such as the support of tourism

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<sup>6</sup> Type II output multipliers capture the direct, indirect and induced output multiplier effects that a EUR 1 increase in final demand of a specific industry will have on overall output production (Cassar 2015).

<sup>7</sup> Cassar 2015.

<sup>8</sup> Briguglio and Briguglio 1997.

<sup>9</sup> This sought to be addressed through the 2001 Carrying Capacity Study, which recognized the support provided by air and land transport, general infrastructure, water and energy, land and human resources, and which are hence central to the orderly and planned development of the tourism industry. The study sought to contribute to a higher level of visitor satisfaction, to meeting the local community's expectations and to the economic viability of Malta's tourism.

<sup>10</sup> Briguglio 2008.

<sup>11</sup> MTA 2013.

<sup>12</sup> NSO 2018a.

for retirees, conferences and corporate travel, as well as sports tourism. These are among the challenges identified in the Tourism Policy for the Maltese Islands 2012/2016. The policy also identifies other niches more intimately linked to the environment, like eco-tourism, agri-tourism and cultural tourism, pointing towards a complementary need to enhance the environment of Maltese towns and villages. The development of a rural tourism policy to promote the creation of small-scale tourism infrastructure was also intended to exploit these synergies.<sup>13</sup> In general, the growth of such niches may help alleviate the pockets of density in specific areas of Malta and Gozo, distribute income more evenly throughout localities and boost the overall tourism carrying capacity<sup>14</sup> without additional pressures on the environment.

In 2015, the total expenditure from tourism amounted to about EUR 1.6 billion, an average annual increase of EUR 81.4 million over the 2008-2015 period. In fact, with the exception of notable declines in 2009, possibly related to the global economic crisis, all of the tourism indicators have reported annual increases. From an environmental perspective, however, the trend is not particularly encouraging. While in 2008, the number of inbound tourists to Malta amounted to about 1.3 million, this figure rose to around 1.8 million in 2015, an average annual increase of 4.8 % over the 7 years. During the same period, total nights spent increased from 10.9 million in 2008 to around 14.2 million in 2015, an increase of 23.3 %. At the same time, the average tourist expenditure per night spent also increased from an average of EUR 97.6 per night in 2008 to an average of EUR 115.80 per night in 2015, an increase of 18.6 %. In terms of pressures, however, it must be noted that the total increase in economic return came about as a result of an increase in the number of tourists, hence increasing the induced environmental pressures. Moreover, focusing on August as a reflection of the peak tourism period, its share of total inbound tourists remained roughly the same between 2008 and 2015 at around 13.8 %. In absolute terms, the total inbound tourists in August increased from 178,569 to 248,284, an average annual increase of 5.6 %. Seasonal tourism continues to constitute a driving force for environmental pressures in Malta.

The trends indicate that, in general, the number of inbound tourists has continued to increase over the 2008-2015 period. However, this was not the case in several of the niche tourist segments. The importance of focusing also on the quality of tourists, while reducing seasonality patterns, remains a key challenge for Malta's tourism sector and for managing the associated environmental and infrastructural pressures.

Emerging trends: Figures from the niche markets suggest that in 2015, the number of foreign students who attended an English language course in local schools amounted to 75,524, an overall decrease of 2.6 % when compared to 2014.<sup>15</sup> Likewise, the cruise liner industry reported decreases in 2015 when compared to 2014. The United Kingdom (declining) and Italy (increasing) continued to be the most important source markets, with visitors from these countries accounting for nearly half of total tourist arrivals.

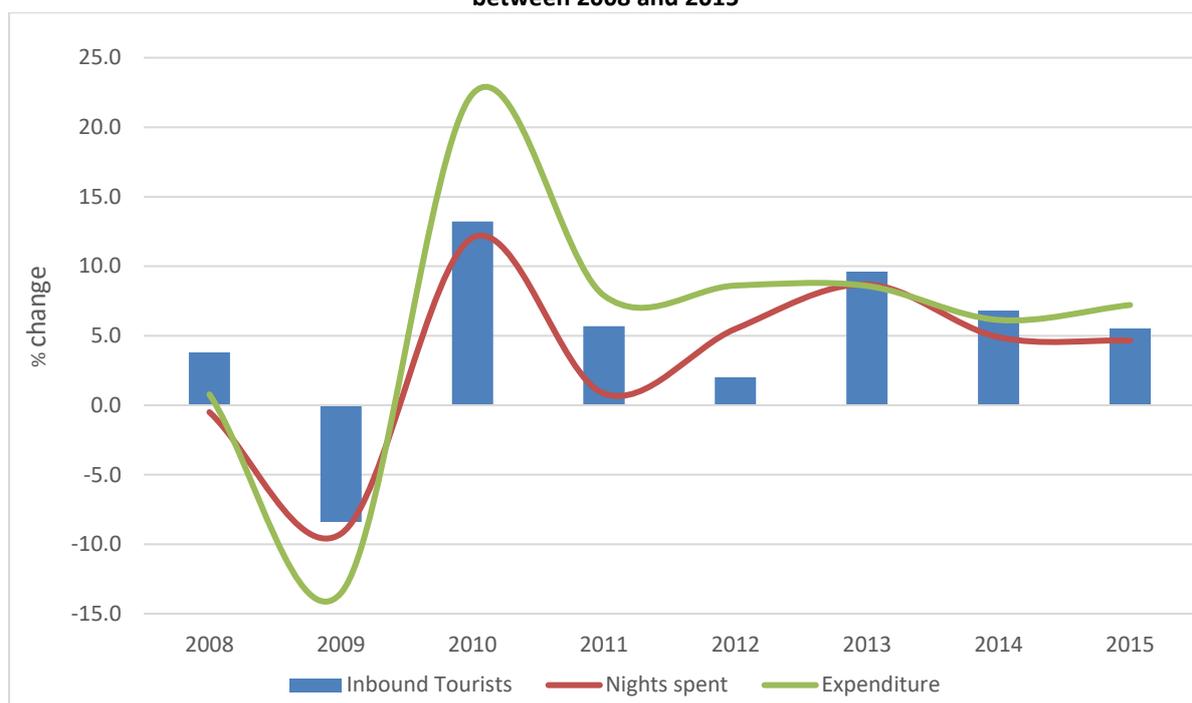
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<sup>13</sup> Ministry for Tourism 2015.

<sup>14</sup> Carrying capacity is understood as being constant and dependent on the environmental limits to pollution absorption potential.

<sup>15</sup> NSO 2016a.

**Figure 1.4: Tourist expenditure and total nights spent of inbound tourists between 2008 and 2015**



Source: National Statistics Office, Malta

**Table 1.1: Monthly inbound tourists**

	2008	2009	2010	2011	2012	2013	2014	2015
January	63,849	51,452	55,013	64,093	61,352	64,888	69,524	74,280
February	57,336	51,199	53,136	65,661	61,788	61,443	65,300	74,189
March	90,503	71,129	76,431	100,203	80,142	89,286	97,800	101,161
April	104,894	101,558	100,657	120,817	122,979	133,173	148,188	152,102
May	131,352	108,164	128,638	130,355	133,648	155,366	166,496	177,203
June	129,378	113,930	137,525	138,733	147,360	162,880	177,446	183,766
July	149,492	135,772	160,321	162,994	174,805	181,899	197,390	206,625
August	178,569	172,438	195,117	191,571	199,431	218,271	235,094	246,485
September	139,794	130,243	151,022	153,990	163,252	176,370	185,439	192,549
October	126,941	124,151	146,716	147,886	151,794	173,305	177,963	196,692
November	73,605	72,486	79,297	83,817	85,492	99,928	102,941	113,043
December	45,140	49,971	54,969	54,902	61,372	65,346	66,231	72,568

**Monthly inbound tourists (continued)**

% Change								
	2008	2009	2010	2011	2012	2013	2014	2015
January	23.4	-19.4	6.9	16.5	-4.3	5.8	7.1	6.8
February	13.4	-10.7	3.8	23.6	-5.9	-0.6	6.3	13.6
March	27.0	-21.4	7.5	31.1	-20.0	11.4	9.5	3.4
April	3.0	-3.2	-0.9	20.0	1.8	8.3	11.3	2.6
May	20.5	-17.7	18.9	1.3	2.5	16.3	7.2	6.4
June	10.2	-11.9	20.7	0.9	6.2	10.5	8.9	3.6
July	1.2	-9.2	18.1	1.7	7.2	4.1	8.5	4.7
August	1.2	-3.4	13.2	-1.8	4.1	9.4	7.7	4.8
September	-2.7	-6.8	16.0	2.0	6.0	8.0	5.1	3.8
October	-9.3	-2.2	18.2	0.8	2.6	14.2	2.7	10.5
November	-10.8	-1.5	9.4	5.7	2.0	16.9	3.0	9.8
December	-12.4	10.7	10.0	-0.1	11.8	6.5	1.4	9.6

Share of total inbound tourists (%)								
	2008	2009	2010	2011	2012	2013	2014	2015
January	4.9	4.4	4.1	4.5	4.3	4.1	4.1	4.1
February	4.4	4.3	4.0	4.6	4.3	3.9	3.9	4.1
March	7.0	6.0	5.7	7.1	5.6	5.6	5.8	5.6
April	8.1	8.6	7.5	8.5	8.5	8.4	8.8	8.5
May	10.2	9.1	9.6	9.2	9.3	9.8	9.9	9.9
June	10.0	9.6	10.3	9.8	10.2	10.3	10.5	10.3
July	11.6	11.5	12.0	11.5	12.1	11.5	11.7	11.5
August	13.8	14.6	14.6	13.5	13.8	13.8	13.9	13.8
September	10.8	11.0	11.3	10.9	11.3	11.1	11.0	10.8
October	9.8	10.5	11.0	10.5	10.5	11.0	10.5	11.0
November	5.7	6.1	5.9	5.9	5.9	6.3	6.1	6.3
December	3.5	4.2	4.1	3.9	4.3	4.1	3.9	4.1

*Source: National Statistics Office, Malta*

## 1.3 THE BUILT ENVIRONMENT, INFRASTRUCTURE, AND TRANSPORT DEMANDS

### 1.3.1 Number of dwelling units permitted

*How will trends in dwellings impact the environment?*

Housing plays an important role within the Maltese economy and indices within this sector are often used to signal social and economic levels of development. Such indicators also provide signals of the pressures that exist on land and natural resources (mineral resources, water, energy) from the construction sector, both in the process of construction, as well as in the use of the eventual built structure itself. Land is one of the scarcest resources in Malta and the management of the growth of housing units constitutes a critical consideration.

As discussed below, the share of the construction sector in the economy declined during the period under consideration. This decline is significant in level terms.<sup>16</sup> In fact, the share of the construction sector in gross value added declined from just under 5 % in 2008 to 4.2 % in 2015.<sup>17</sup> Over 33,000 dwelling permits were issued over the period 2008 to 2015, an average of 4,125 dwelling permits per annum. The actual number of permits issued annually has varied considerably during this period, peaking at 6,836 permits during 2008, followed by 5 consecutive years of declines, picking up again in 2015 when 3,947 permits were issued, still significantly below 2008 levels. Considering the low rate of population growth on the one hand, and the influx of foreigners and increased economic activity on the other hand, a careful assessment is warranted in terms of the supply of residential property and the issue of vacant dwellings. Residential vacancy risks inefficient use of land, mineral and other resources, which could have been more productively employed elsewhere. Over-supply poses a risk to price sustainability, as well as raising the question of unnecessary impacts on the landscape, the environment and society.

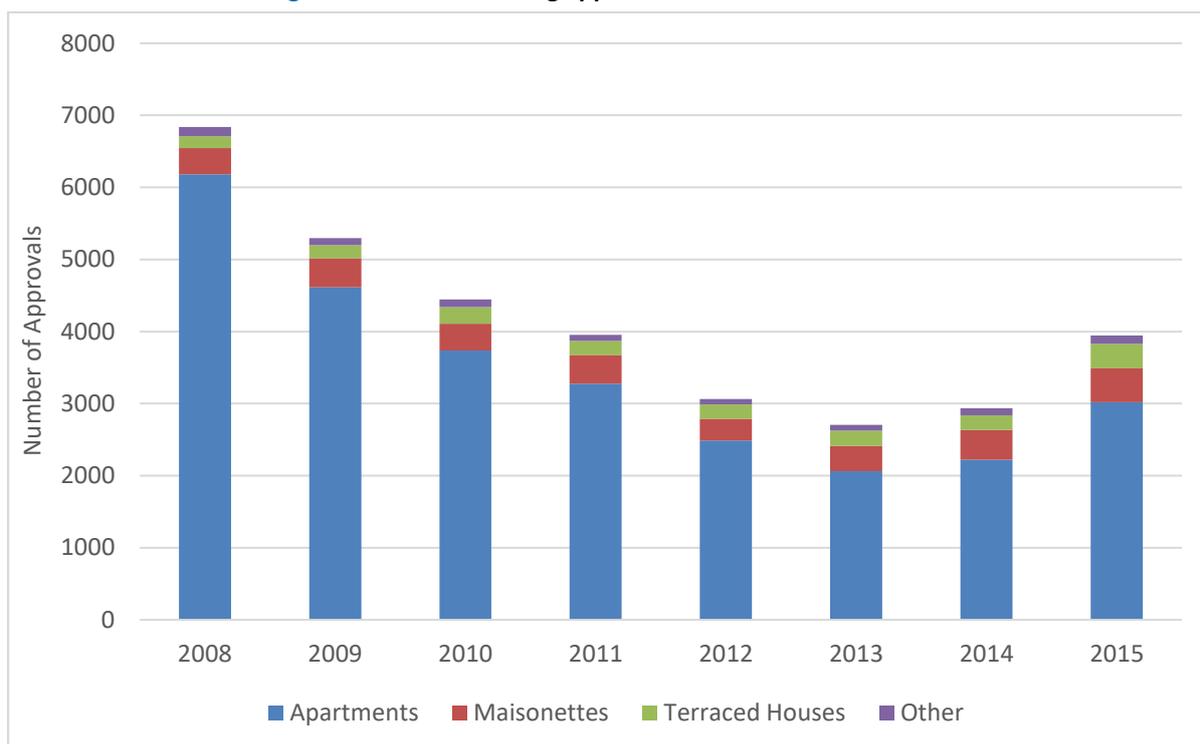
An analysis of permits issued for new dwellings in 2015 relative to 2008 reveals that some 76.5 % of the total dwellings approved were for apartments (compared to over 90 % in 2008), 12 % were for maisonettes (up from 5.3 % in 2008), and 8.7 % for terraced houses (compared to 2.4 % 2008) and the remaining 2.9 % for other buildings (compared to 1.9 % in 2008) which is a composite of the remaining property types such as farmhouses, bungalows and villas amongst others. This seems to indicate a slight reversal of the earlier trend towards apartments, back to single family dwellings.

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<sup>16</sup> Central Bank of Malta 2016.

<sup>17</sup> NSO 2016b.

**Figure 1.5: MEPA dwelling approvals between 2008 and 2015**



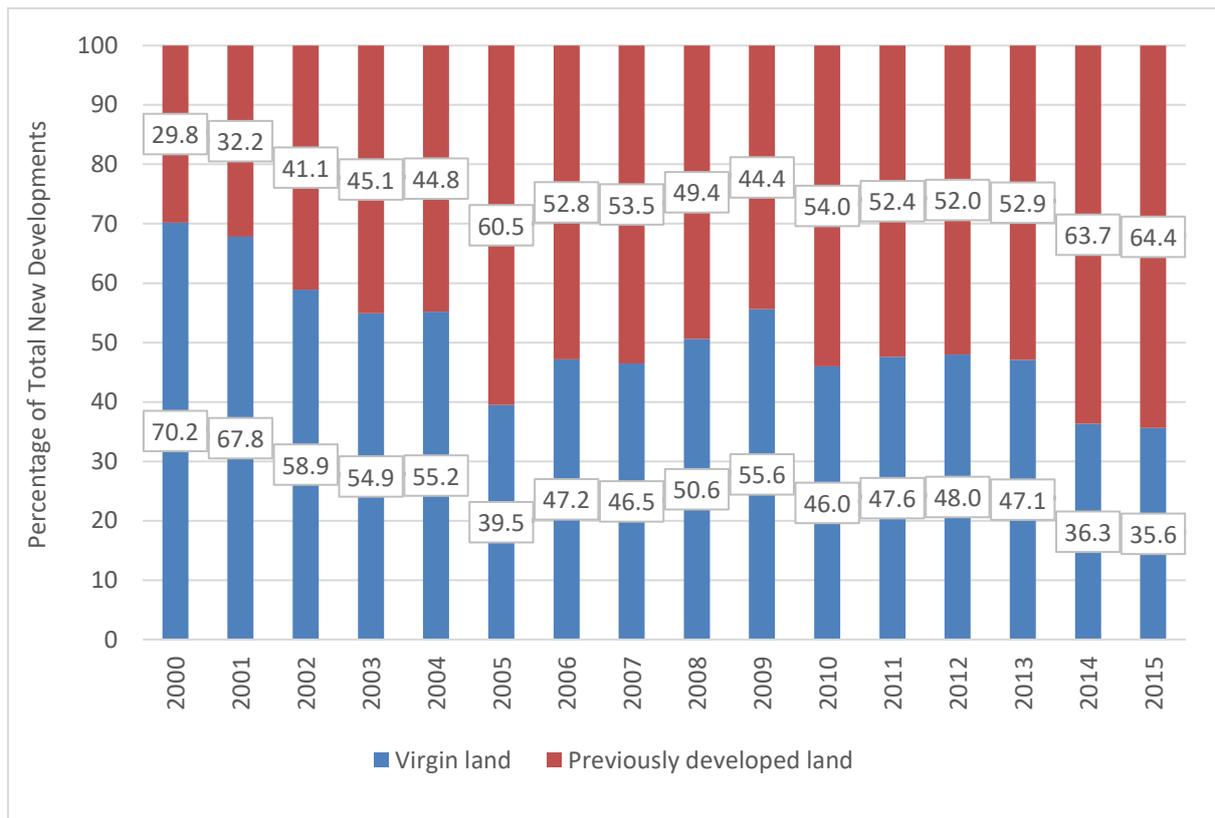
*Source: Planning Authority*

A critical aspect to examine is the extent of new development occurring on virgin land, effectively constituting urban sprawl. Over the period 2008–2015, an average of 46 % of the development permits were granted on virgin land.<sup>18 19</sup> In 2015 just over one third (35.6 %) of the permits were granted on virgin land. While this percentage is lower than in earlier periods, the cumulative impact of development on the limited virgin land is a cause for concern. On the other hand, 2015 saw some 1,935 dwellings created as a result of the demolition of older buildings, while 605 were the result of conversion of existing properties. In fact, the year 2015 registered one of the highest numbers of converted dwellings since 2000. The exemption of stamp duty for first-time buyers could partly explain such an increase and points towards a positive re-orientation of the construction sector towards rehabilitation.

<sup>18</sup> MEPA 2016.

<sup>19</sup> Virgin land is the terminology used by the Planning Authority to differentiate between existing built fabric and new land.

**Figure 1.6: Land-type categorisations (as a percentage of the total new developments)**



Source: Planning Authority

### 1.3.2 Industry

*How are changes in the industrial sector contributing to environmental impacts?<sup>20</sup>*

The industry-environment relationship merits attention due to the use of natural resources, as well as the waste and emissions generated in the process of industrial production. Industrial enterprises vary considerably in nature, and whilst most industries do not exceed 50 employees, there is a considerable number of larger enterprises,<sup>21</sup> and therefore the potential impact of related operations is also highly variable. Particularly serious issues arising from industrial enterprises include the unlawful disposal of hazardous and toxic materials such as waste oils, which can be a threat to environmental systems as well as a danger to local residents. Emissions to air can also be a cause of serious local nuisance because of noxious odours, deposition of soot and other solids, corrosion of equipment, and health issues.<sup>22</sup> It is also worth mentioning that industrial activities are dispersed across the Islands and not entirely contained within industrial estates. Malta's limited land area accentuates the island's population density and the proximity of commercial/industrial enterprises to residential and tourism areas have contributed to a situation where complaints about emissions to air from kitchens and emissions from vehicle repair garages are common.

<sup>20</sup> Note that the data related to environmental permits cited in this section also feature in the Policy Responses Chapter of this publication.

<sup>21</sup> NSO 2016c.

<sup>22</sup> EPA 1991.

Two key developments occurred in the period, both of which resulted in positive changes in this relationship. The first was the general decline in the size of the industrial sector, as discussed in Sectoral Contributions to GDP. The second was the expansion of the regulatory regime, driven mainly by accession to the EU and ensuing legislation, (including the Directive on industrial emissions which is the main EU instrument regulating pollutant emissions from industrial installations or industrial emissions (Framework regulations) and waste legislation), and related obligations (such as Best Available Technology). Other obligations, such as those stemming from Air Quality and Water directives and national strategies, also informed the permitting approach.

In 2008, the environmental permitting system was still at design stage, assisted by EU funding, expertise from the Austrian Environmental Protection Agency and staff capacity building. This permitting system was intended to improve the environmental performance of enterprises of all sizes, while considering the extent of their risk and keeping the administrative burden on industry to a minimum. The establishment of a dedicated unit within the Environmental Protection Directorate was also intended to ensure a more systematic approach.

Following extensive consultation throughout 2008-2012, the strategy eventually adopted by the environmental permitting system was a risk-based one, improving the transparency, proportionality and consistency of implementation measures taken. Apart from the high-risk enterprises requiring an Integrated Pollution Prevention Control (IPPC) permit, a structured permitting regime was created, where sub-IPPC enterprises classified activities into one of three general categories depending on the nature of the activity and its potential environmental impact, the scale of the activity in terms of size, the requirement of EU and Maltese legislation for issue of Permits, and current environment problems in Malta. Sub-IPPC enterprises could require an Environmental Permit (EP), or be bound by General Binding Rules (GBRs) or may be exempted from the proposed permitting/GBR system. Site-Specific Environmental Permits (envisaged to capture some 500 enterprises, almost entirely medium or large) include regulation of activities, such as those in the waste management and quarrying sectors, for which GBRs are not appropriate or adequate, and which are not required to have an IPPC permit. GBRs were deemed an appropriate control measure for large groups of enterprises (estimated at 5,000) which have common issues in terms of operation, storage and emissions (e.g. garages), and by design, included conditions of a general nature and broadly applicable in a range of circumstances (e.g. bunding of stored liquids).

The development planning application process was amended to facilitate the immediate adoption of the required site infrastructure dictated by the EP or GBR requirements throughout the processing of the development permission application, hence reducing the requirement of reapplying for a new development consent posthumously. At the same time, other entities also maintained regulatory functions. These include the Water Services Corporation (competent body for regulating discharges to sewers), and the Malta Competition and Consumer Affairs Authority (chemical authorisation and usage), and the Malta Tourism Authority (guidance to the hotel industry).

The early stages of implementation identified priorities for permitting as those of existing Integrated Pollution Prevention and Control (IPPC) plant, basic registration requirements for operators in the waste management industry (particularly brokers and carriers), and selected priority sectors, such as quarrying. In fact, as at the end 2008, six out of the 13 operational installations which required an IPPC

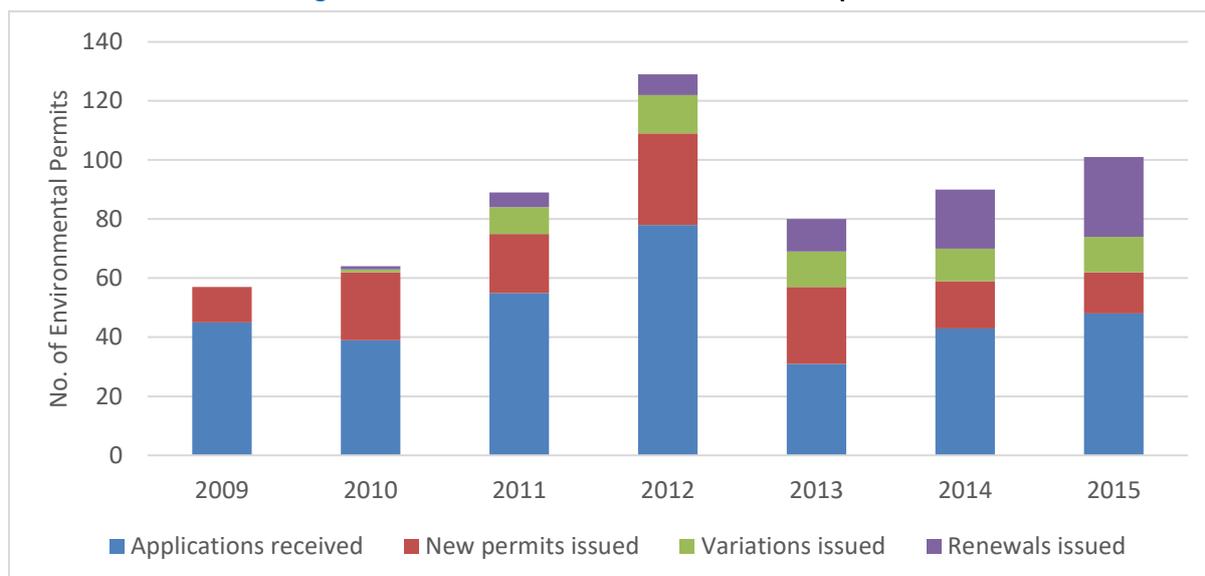
permit had been permitted. A total of 14 new permits had been issued which included Waste Management permits (9) and Volatile Organic Compound (VOC) permits (2) which were operational at the time. Meanwhile 46 new applications (mainly for waste) were received. In addition, 15 GBRs had been developed, and accordingly, 677 new registrations issued, (mainly for waste carriers, and 6 for animal holdings).

In 2009, existing Waste Management and Volatile Organic Compounds (VOC) permits were adopted into the new Environmental Permitting (EP) regime. There was considerable activity between 2009 to 2015, as summarized in the chart below. The cumulative result of this annual activity was a total of 136 permits operational as at end 2015, of which 51 were for waste management installations, and 27 for quarries and batching plants. The remaining 58 Environment Permits covered a number of other categories, including pharmaceutical and chemical plants, hotels, food and beverage manufacture, other manufacturing, fuel terminals, laundry and dry cleaning, printing presses, container terminals, petrol stations and boatyards.

In parallel, by the end of 2015 the number of entities with valid GBR registrations was 4,909, of which 4,432 were waste carriers and 75 were waste brokers. In 2015 alone, 680 new waste carrier permits were issued and 3,752 were renewed, while 63 applications were received for various sectors including farms, hotels and restaurants and vehicle maintenance, and 31 notifications regarding hull cleaning and/or propeller polishing applications were also reviewed and issued. Notably also, as at 2015, the number of operational IPPC installations stood at 16, of which 11 had been newly-permitted during the year. A further 8 installations were waiting for IPPC applications to either start operations or increase their operations to above the IPPC threshold. These numbers are expected to increase further in the coming years as more installations will require an IPPC permit under the Industrial Emissions Regulations.

The concrete results of these permitting systems can best be illustrated with reference to two specific examples on land (waste) and at sea (marine discharges). There is now a variety of permitted waste management sites, (excluding IPPC sites), which include a variety of recycling facilities, civic amenity sites and scrap yards to waste electronic and electrical equipment dismantlers, and other hazardous waste management facilities. Meanwhile, entities like shipyards, desalination plants, wastewater treatment plants, hotels with discharges from reverse osmosis plants and/or swimming pools, oil and fuel terminals, marinas and other installations with a direct discharge to the marine environment, have been targeted for environmental permitting and are currently at various stages of the environmental permitting process.

**Figure 1.7: Annual movements in environmental permits**



Source: ERA

**Table 1.2: IPPC installations by sector**

Category	Number of operational installations	Number of other installations with pending IPPC applications
Waste management	7	8
Energy generation	2	0
Chemical and pharmaceutical	7	0
Farms	0	0
<b>Total</b>	<b>16</b>	<b>8</b>

Source: ERA

### 1.3.3 Vehicle ownership

*Trends impacting vehicle ownership and the environment:*

Malta's land transport sector is heavily slanted towards private personal mobility, a characteristic which is reflected in the high number of vehicles per capita. This, in turn, creates well documented negative external impacts on the environment, chiefly air pollution and congestion, and consequently on human health, including through risk of accident. The reliance on private cars also creates the need for improved road and parking infrastructure, in turn resulting in fragmentation and loss of natural areas.<sup>23</sup>

In 2015 the stock of licensed motor vehicles reached 346,918, a considerable increase of 18.2 % from 293,515 in 2008, while the number of vehicles per capita increased from 0.71 (i.e. 1.4 inhabitants per vehicle) to 0.80 (1.24 inhabitants per vehicle) over the same period.<sup>24</sup> Private passenger cars continued

<sup>23</sup> WHO 2009.

<sup>24</sup> NSO 2016d. NSO 2010. NSO 2018b.

to dominate the composition of the vehicle fleet in Malta, rising from 78.2 % to 79.3 % in the period. All other vehicle types, namely agricultural vehicles, coaches and private buses, minibuses, route buses and motorcycles, goods carrying vehicles, special purpose vehicles and road tractors shared the remaining 10.7% of the total, without any significant fluctuations. Vehicles between 10 and 20 years of age make up 39.3 % of the stock of licensed motor vehicles.<sup>25</sup> Malta's continued rise in vehicle numbers is a matter of concern due to the environmental and social impacts of private motor vehicle use. There were some positive changes in the composition of passenger cars: By the end of 2015 there were 246 registered electric cars and some 439 hybrid vehicles which result in lower emissions at the point of use. Moreover by 2015, 56.2 % of newly licensed vehicles were second hand, in comparison with 66.7 % in 2011.

Vehicle use also demonstrates a socio-economic gradient. Some 3 % (4,200) of households do not own a car due to their inability to afford the costs associated with ownership, while 15 % (20,960) of households do not have a car for other reasons. The percentage of the elderly population that does not own a car, for instance, is more than three times as high (36 %) as the average for the entire population (11 %).<sup>26</sup> This suggests that continued focus on private-vehicle infrastructure provision, to the detriment of other modes of transport (including walking, public transport and cycling) also has negative distributional effects. High levels of vehicle use also have more direct socio-economic implications, such as increased accidents. A total of 15,504 accidents were recorded in 2015, of which 11 were fatal.<sup>27</sup> The Maltese are also among the bottom of the list in Europe when it comes to walking.<sup>28</sup> The North Harbour district continues to see the highest number of contraventions issued by police, as well as the highest number of accidents. The high number of vehicles in the Islands creates particular pressure points for traffic management, high traffic volumes contributing to reduced modal shift and hence less consideration of cleaner and possibly healthier transport means.

Efficient public transport systems are one of the principal measures for reducing dependence on private vehicles and the impact of transport on the environment. There was an increase of 47.8 % (over 15 million commuters) in the number of commuters between 2008 and 2015.<sup>29</sup> This increase must be interpreted with caution however, since the commuter data were generated using different operational systems and methodologies, thus limiting the scope for comparisons over this time period. As at 2015, however, there continued to be an urgent need to make public transport a reliable and attractive alternative to private car use to stem the environmental impacts from private vehicle use.

In terms of travel by sea, there has also been an increase in ferry travel between Malta and Gozo during 2008-2015. The number of passengers more than tripled to reach 4.7 million, while the number of vehicles increased by 27.4 %, reaching approximately 1.35 million. In all the years under review, the movement of passengers and vehicles between the two islands was at its peak between July and September, reflecting tourism trends. This underlines the need to examine the increased pressure on infrastructure and the environment during the summer months.

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<sup>25</sup> NSO 2016d. NSO 2010. NSO 2018b.

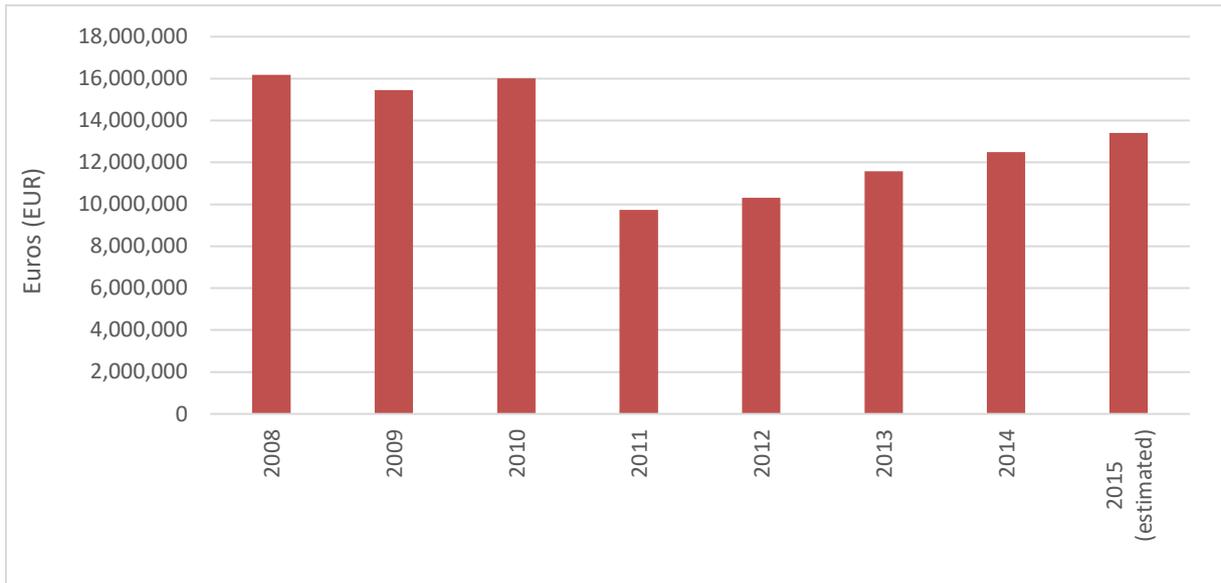
<sup>26</sup> NSO 2012a.

<sup>27</sup> NSO 2017a.

<sup>28</sup> EC 2014.

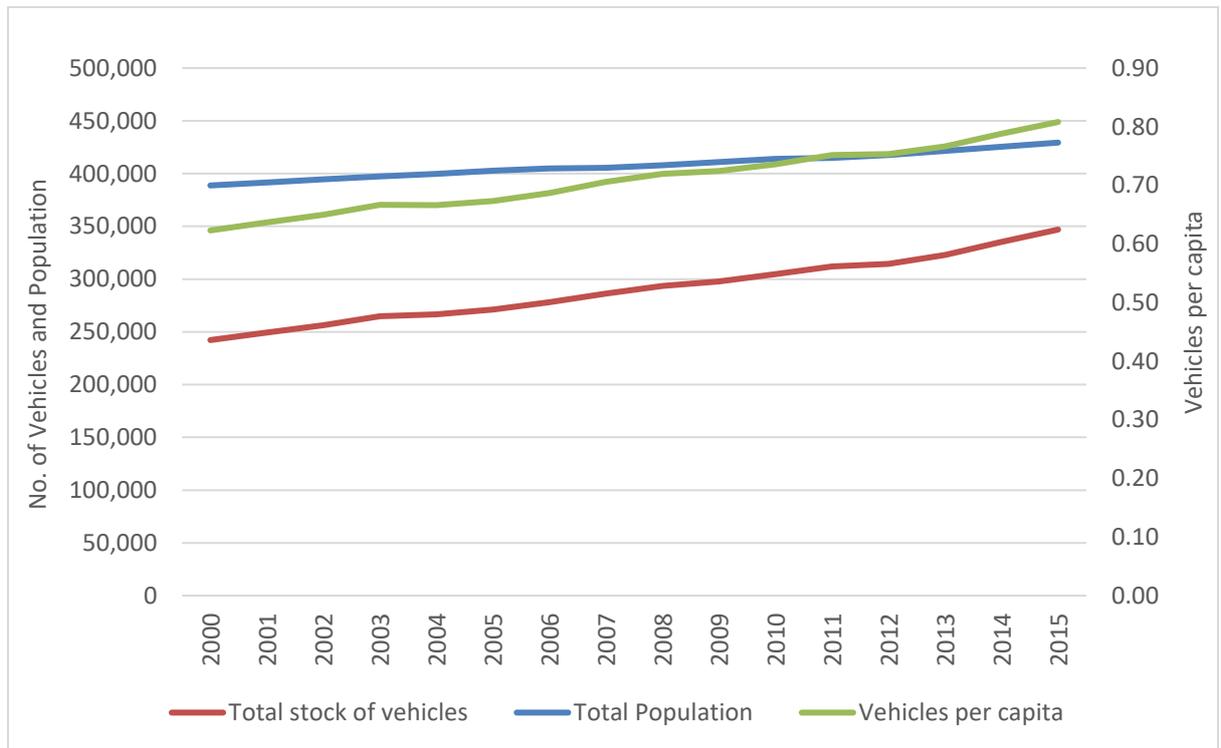
<sup>29</sup> NSO 2016d; Authors' own estimates for 2015.

**Figure 1.8: Public transport ticket sales in Malta between 2008 and 2015<sup>30</sup>**



*Source: National Statistics Office, Malta; Authors' own estimates for 2015*

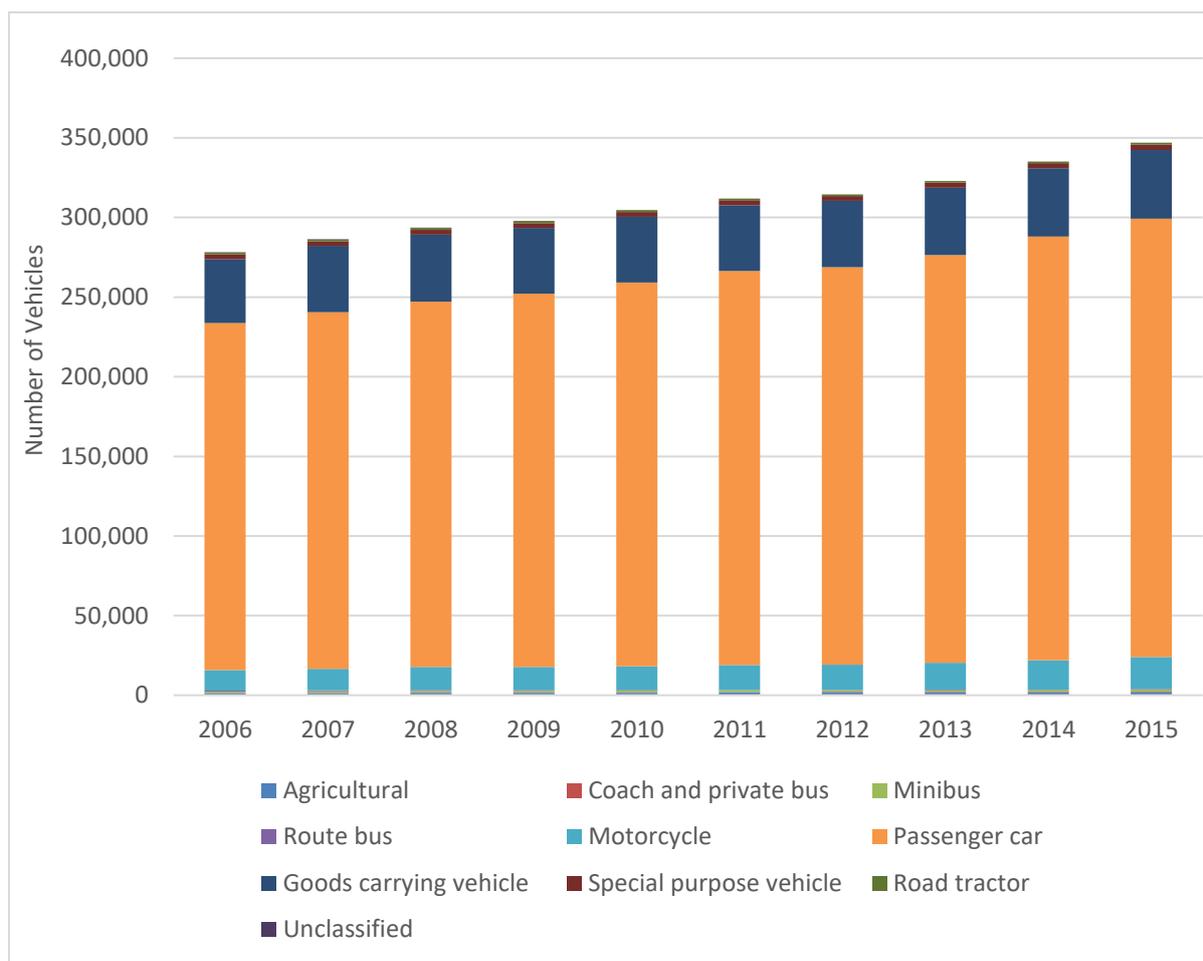
**Figure 1.9: Total stock vehicle fleet in Malta, and vehicles per capita**



*Source: National Statistics Office, Malta*

<sup>30</sup>Note that public transport commuter data are not directly comparable over the period 2008 to 2015 due to a change in the operational systems and methodologies used to compile the data.

**Figure 1.10: End of year vehicle stock by type**



Source: National Statistics Office, Malta

## 1.4. Resources

### 1.4.1 Agriculture

*How will trends in agriculture impact the environment?*

Agriculture dominance in Malta's rural landscape makes it a guardian of the countryside, its cultural landscape value, and agricultural biodiversity. Although the economic share of the agricultural and fisheries sector is relatively small, with a contribution of 0.5 percentage points of total Gross Value Added (GVA) growth and a share of 1.8 % of total employment in 2013, the sector is nonetheless a major environmental player. The activities carried out by farmers in arable farming and livestock rearing may impact on a number of areas in the environment such as soil, water, waste management, air pollution, loss of biodiversity and fragmentation of natural habitats, particularly when intensive methods are used. In arable farming, the main environmental impacts concerned are pollution from fertilizers and pesticides, which serve to boost crop yields, but which affect soil and groundwater quality.<sup>31</sup> Animal husbandry on the other hand is a source of rural land take-up having landscape impacts, and presents waste management challenges.

<sup>31</sup> MRAE 2007.

The use of irrigation equipment also contributes to increased efficiency in irrigation methods, but may also be related to illegal water abstraction, leading to the damage and pollution of the aquifers in the long run. The dense rearing of farm animals can negatively affect the environment, particularly with regard to waste generated. Indeed, pig, cattle, and poultry farms produce large concentrations of nitrates and other substances, which can leach into water bodies unless appropriate precautionary measures are taken. The relatively more recent use of greenhouses constitutes an additional type of intensive agriculture, which tends to have a greater impact on the landscape, consumes large amounts of energy to maintain optimal climatic conditions but allows a more controlled use of water and agrochemicals.

This said, the agriculture, forestry and fishing sector supported some 3,219 business units in 2015, the vast majority (99 %) of which are micro-enterprises,<sup>32</sup> employing 2,378 full-time workers (about 1.4 % of the total full-time employment) and 2,185 part-time workers (about 3.8 % of the total part-time employment).<sup>33</sup> Most of the agricultural land area (91 %) in Malta is utilized agricultural area, of which 30.6 % is irrigated land, while the rest is non-irrigated land. Of the utilized agricultural area, nearly 80 % is arable, around 11 % is land utilized for permanent crops while the rest consists of kitchen gardens. In turn, arable land is mainly used for forage plants (59 %) and vegetables (20 %). Fallow land, land for potatoes, flowers and seeds constitutes the rest. The land used for permanent crops consisted of vineyards (53.4 %), fruit and berry plantations (26.6 %), olive plantations (8.4 %) and citrus plantations (10.9 %).

Against this background, the trends indicate that the total utilized agricultural area (UAA) in the Maltese Islands accounted for 11,690 ha in 2015, increasing slightly from 11,453 ha in 2010.<sup>34</sup> Of this land, 8,801 ha was located in Malta (down from 8,840 in 2010) and 2,888 was in Gozo and Comino (up from 2,613 over the same time period). Production levels in agriculture are one of the key determinants of environmental impact, as chemical inputs are often used to increase production numbers. Between 2008 and 2015, the production of fruit and vegetables declined by 14.7 %.<sup>35</sup> In Gozo alone, there was a decrease of 36.8 % in fruit and vegetable production, mainly driven by a pronounced decline in fruit production.

In the animal husbandry sector, the density of livestock per hectare of arable land in Malta and Gozo reflects intensive farming practices. An examination of the figures between 2008 and 2015 reveals significant fluctuation in the numbers of farmed animals and farms, though all livestock experienced a decline over this time period. The number of pigs and pig farms registered a decline of 33.4 % and 30.2 % respectively, as indicated in the table 1.3 below during this time period. Cattle numbers decreased by 15.5 %, and there was a commensurate decrease of 30.5 % in the number of cattle farms. In the case of sheep, the number of heads decreased by 13.8 %, while sheep farms decreased by 12.7 %. Similarly, the number of goats decreased by 22.4 %, while goat farms decreased by 6.5 %.

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<sup>32</sup> NSO 2016c.

<sup>33</sup> NSO 2017b.

<sup>34</sup> Eurostat 2015.

<sup>35</sup> NSO 2009; NSO 2016e; NSO 2017c.

**Table 1.3: Pigs, cattle, goats and sheep heads and farms over the 2008-2015 period**

	Pigs		Cattle		Goats		Sheep	
	<i>heads</i>	<i>farms</i>	<i>heads</i>	<i>farms</i>	<i>heads</i>	<i>farms</i>	<i>heads</i>	<i>farms</i>
<b>2008</b>	65,511	142	17,777	383	6,361	883	12,843	1,520
<b>2009</b>	65,918	139	16,264	367	5,983	885	12,889	1,488
<b>2010</b>	70,583	131	14,954	341	5,110	830	12,397	1,395
<b>2011</b>	46,287	116	15,074	322	4,938	846	11,887	1,374
<b>2012</b>	45,209	111	15,593	308	4,847	839	11,697	1,392
<b>2013</b>	49,451	105	15,220	290	4,598	819	10,930	1,384
<b>2014</b>	47,465	100	14,883	281	4,627	803	10,526	1,341
<b>2015</b>	43,634	99	15,020	266	4,937	826	11,076	1,327

*Source: National Statistics Office, Malta*

From a policy perspective the Rural Development Programme, together with the Code of Good Agricultural Practice, are both important opportunities to improve the viability of the agricultural sector in the context of countryside stewardship. The current Rural Development Strategy includes measures to modernize agricultural holdings, as well as various agri-environment measures that provide important opportunities to reinforce the role of farmers as stewards of the rural landscape.<sup>36</sup> These measures should enable farmers to optimize their production without compromising the environment, by instilling environmental awareness, and encouraging them to reduce the impact of farming activities on the environment. This can be achieved through the use of environmental planning techniques, such as reducing the amounts of pesticides used, encouraging crop rotation, providing protection to wildlife and more forage areas for bees, promoting organic farming and the preservation of native varieties, and promoting the maintenance of habitats associated with endangered fauna and flora. Good farming practices, as exemplified in successive rural development plans, can positively influence countryside and landscape quality, and sustain key environmental resources such as biodiversity, soil and water, whilst agricultural programmes should continue to recognize the role of agriculture in shaping the countryside.

Nevertheless good farming practices and the restructuring and upgrading of animal husbandry farms have yet to be substantiated with a strategic framework for agricultural waste management as stated in the Agricultural Waste Management in the Maltese Islands (2015- 2030), and the necessary infrastructure to manage agricultural waste. The provision of adequate infrastructure and improved practices is addressed in the strategic direction given in Thematic Objective 4d of Malta's Partnership Agreement (PA) (2014-2020), which seeks the improvement of the handling of manure on farms and its subsequent application / disposal on agricultural land; and the investment in a mechanical bio treatment plant for the processing of specific animal waste.<sup>37 38</sup> Achieving this objective requires:

- a. overcoming possible resistance from the farmers who feel that they are subject to too many conditions whilst also facing increased foreign competition;

<sup>36</sup> MRAE 2007.

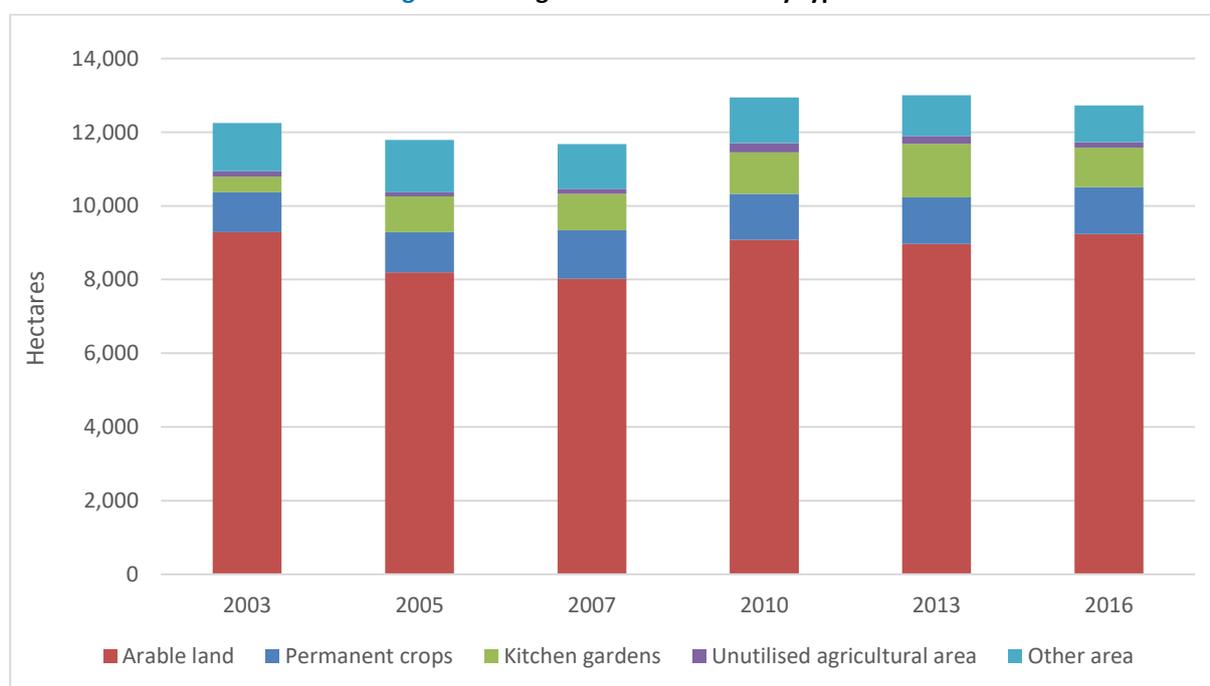
<sup>37</sup> E-Cubed Consultants and Adi Associates 2015.

<sup>38</sup> Office of the Deputy Prime Minister - Ministry for European Affairs 2014.

- b. addressing costs of removal, storage and treatment of waste; improving farm water management techniques to reduce wastes with a high water content;
- c. and initiating and implementing the timely execution of waste management facility plans, permissions and development.<sup>39</sup>

The overall picture in the case of this economic activity is one of a sector in decline, however recent diversification of this sector may contribute to its revival. This suggests that related negative environmental impacts may also be declining overall, particularly when this is seen with the policy regime and good farming practices being encouraged in the sector, and the initiation of establishing animal waste management strategic direction. At the same time, it calls for caution as land abandonment, or alternative forms of development, with other environmental impacts, are becoming increasingly attractive.

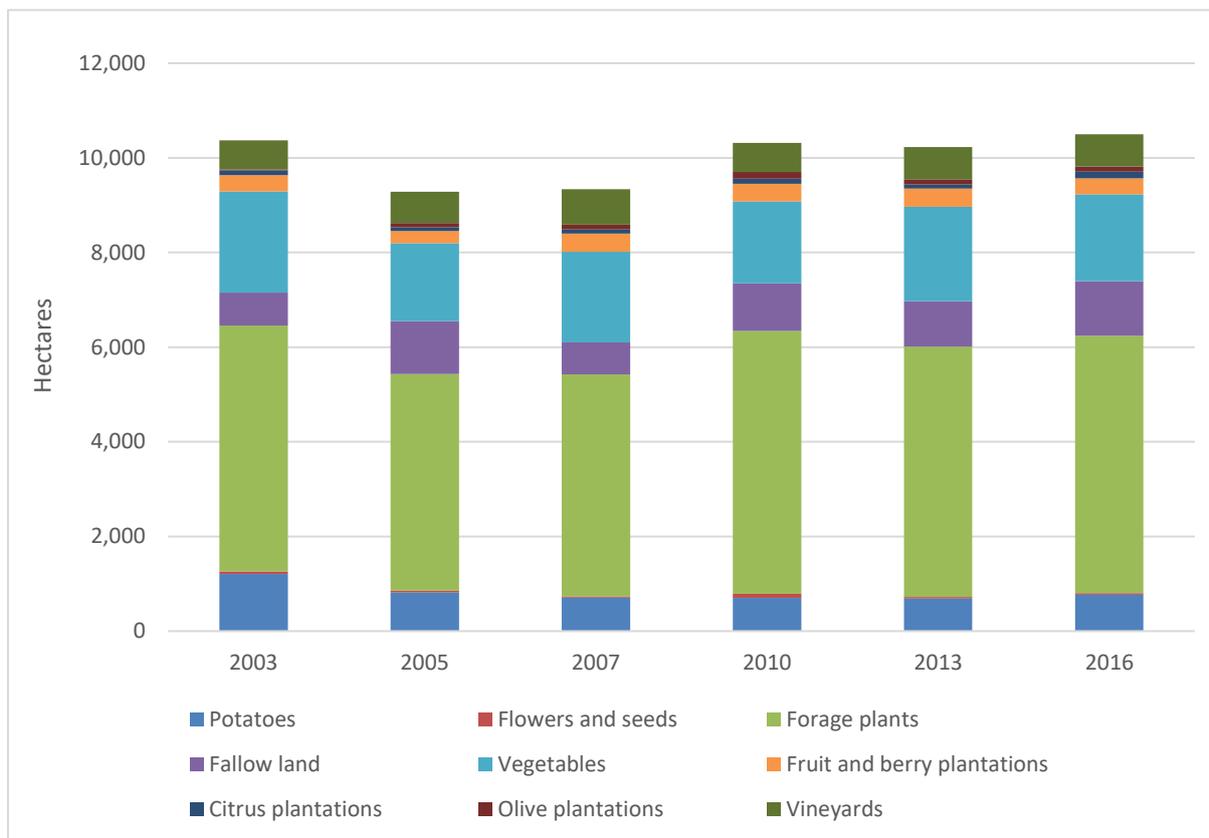
**Figure 1.11: Agricultural land area by type**



**Source:** National Statistics Office, Malta

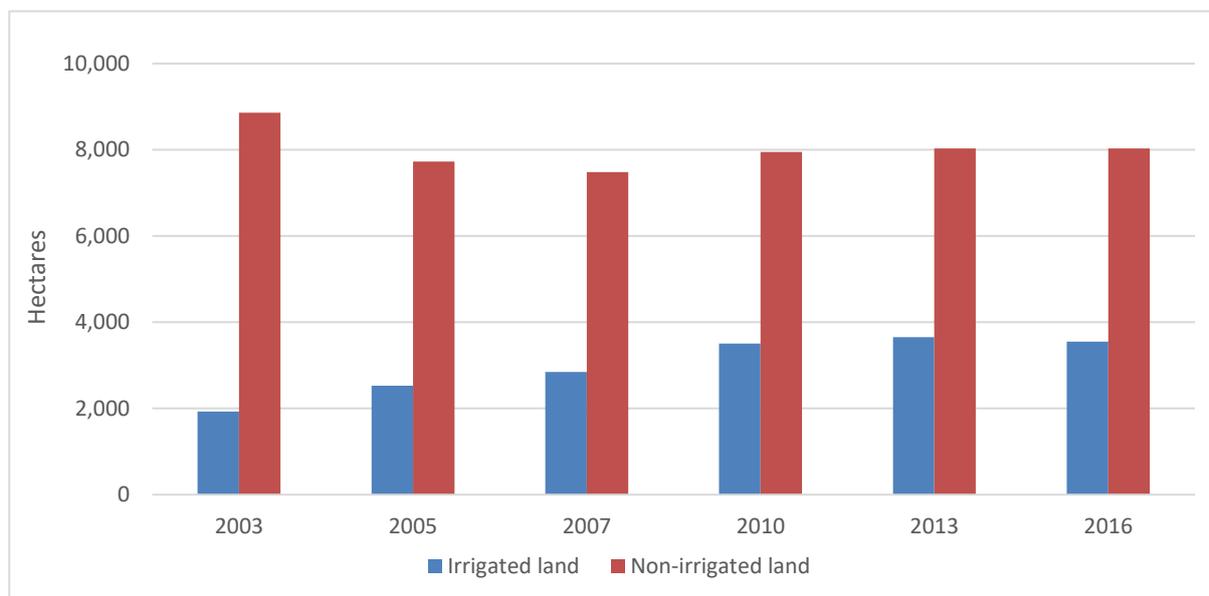
<sup>39</sup> E-Cubed Consultants and Adi Associates 2015.

**Figure 1.12: Distribution of arable land and permanent crops by type**



Source: National Statistics Office, Malta

**Figure 1.13: Irrigated land area**



Source: National Statistics Office, Malta

## 1.4.2 Fuel imports by type

*How will trends in fuel imports impact the environment?*

Malta is still heavily dependent on imported fossil fuels for energy generation as the share of renewable energy in gross final energy consumption is still low relative to the rest of the EU.<sup>40</sup> This must be seen in the light of Malta's considerable EU obligations related to the environmental impacts of energy use and the new obligations to cut down greenhouse gas emissions, increase the share of renewables as an energy source and improve energy efficiency as set down under the EU 2020 climate and energy package (enacted in legislation in 2009).

The reliance on fossil fuels not only raises socio-economic concerns related to the cost and security of energy supply, and economic competitiveness more generally, but also affects Malta's environmental quality through the generation of greenhouse gas emissions and air pollution.<sup>41</sup> The burning of fossil fuels contributes to various types of air pollution, including carbon dioxide, sulphur dioxide, nitrogen oxide, particulate matter, and carbon monoxide, in turn contributing to climate change and local air pollution.<sup>42</sup> One such pollutant is particulate matter, which is one of Malta's most pressing air pollution issues.<sup>43</sup> The greenhouse gas emissions intensity of the energy consumption has fallen by 18 percentage points in 2015 when compared to 2008,<sup>44</sup> mainly due to the launch of the Malta-Sicily interconnector in March 2015, which has significantly reduced Malta's reliance on domestically generated energy. On a more positive note, the correlation between fuel import growth and real GDP growth, which for many years was positive, is now slightly negative, mainly driven by data from the last 3-4 years, which may indicate that recent GDP growth is being accompanied by greater efficiency in fuel usage.

In fact, the energy intensity of the economy (a measure of the energy consumption of the economy and its overall energy efficiency), has decreased significantly from a ratio of 148.1 kg of oil equivalent per EUR 1,000 Euro in 2008 to 90.7 kg in 2015, a decrease of 38.8 %.<sup>45</sup> An examination of gross inland energy consumption reveals that from 967.7 tonnes of oil equivalent in 2008, this level was reduced to 755.7 tonnes of oil equivalent in 2015.<sup>46</sup> This decline, together with the average annual declines of fuel imports over the 2008-2015 period, could in part have been due to increased efficiency of electricity production as well as the commissioning of the aforementioned Malta-Sicily interconnector in 2015, coupled with decreases in demand from rising fuel prices, as well as to a lesser extent, increases seen in the number of photovoltaic panels used by households over this time period. The energy dependency indicator, which captures the extent to which an economy relies upon imports in order to meet its energy needs, has also declined.

Indeed, an analysis of the final energy consumption at a sectoral level between the 2008-2015 period reveals that the transport sector, the industrial sector and the residential sector have all reported

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<sup>40</sup> Eurostat 2016a.

<sup>41</sup> Eurostat 2013.

<sup>42</sup> For more details on air pollution refer to Chapter 2 on Air.

<sup>43</sup> MEPA 2012.

<sup>44</sup> Eurostat 2017c.

<sup>45</sup> Eurostat 2016b.

<sup>46</sup> Eurostat 2016c.

declines. And while the agricultural, forestry and fishing sector reported marginal increases, the services sector reported the largest increase in consumption between 2008 and 2015 - more than doubling its final energy consumption in 2015 relative to 2008. This is of course partly explained by the increased share of the services sector in the total economy relative to the share of the productive and the traditional sectors between 2008 and 2015. However, it serves to draw attention to the prospect that the services sector is not devoid of environmental impact and that its growth merits environmental policy attention.

A number of further developments characterize the period 2008-2015. In 2008, Heavy Fuel Oil (HFO) containing 0.7 % sulphur content started being used at Delimara power plant and occasionally also at Marsa, resulting in a reduction of sulphur dioxide emissions as from 2009.<sup>47</sup> In 2008 too, Enemalta also started using a 0.01 % or less sulphur fuel content gas-oil, while previously the maximum allowable percentage was 0.2 %.<sup>48</sup>

Emerging issues: Improving energy efficiency, diversifying the sources of energy and directing major investments towards improving energy infrastructure are certainly priority areas in the policymaking agenda. The construction of a new gas-fired power station and the new Burmeister and Wain Scandinavian Contractor (BWSC) conversion will see a switch of liquid fuel oil to (less polluting) natural gas. The electricity distribution network is being upgraded to enable connection to renewable energy installations. Six main policy areas have been identified as requiring attention, namely reducing reliance on fossil fuels, ensuring an efficient and effective energy market, enabling the energy sector, emissions reduction, energy efficiency and stability in energy supply.<sup>49</sup>

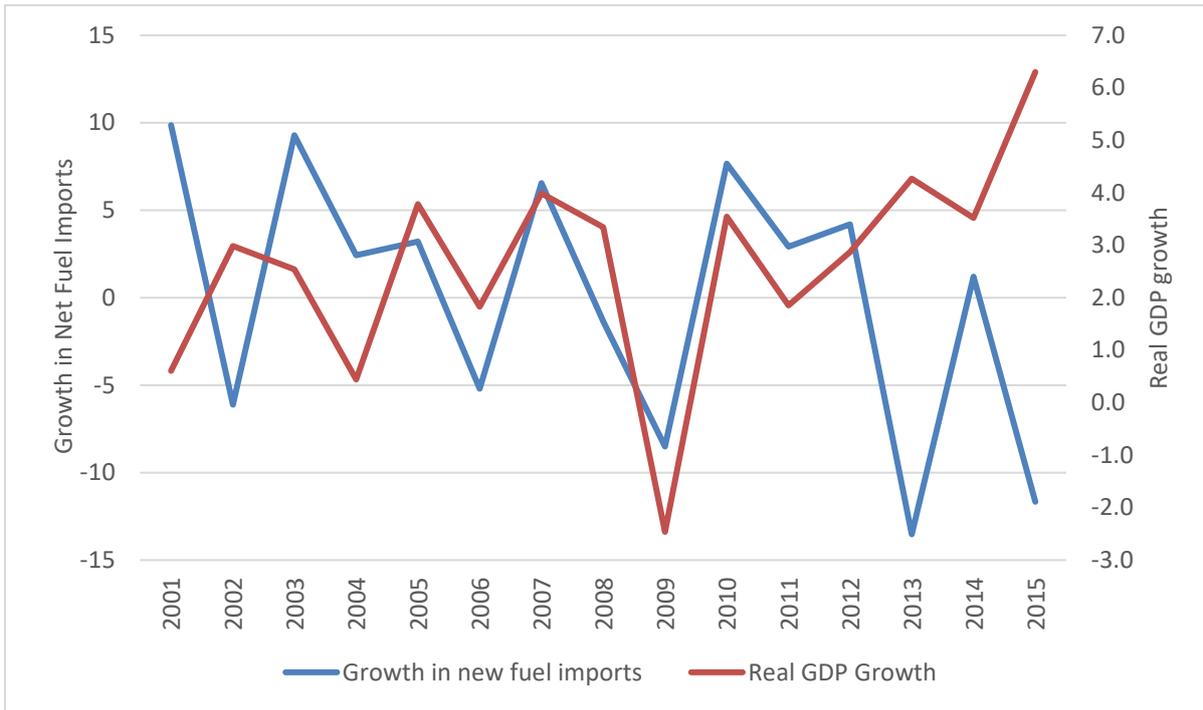
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<sup>47</sup> MRA 2012.

<sup>48</sup> MRA 2013a.

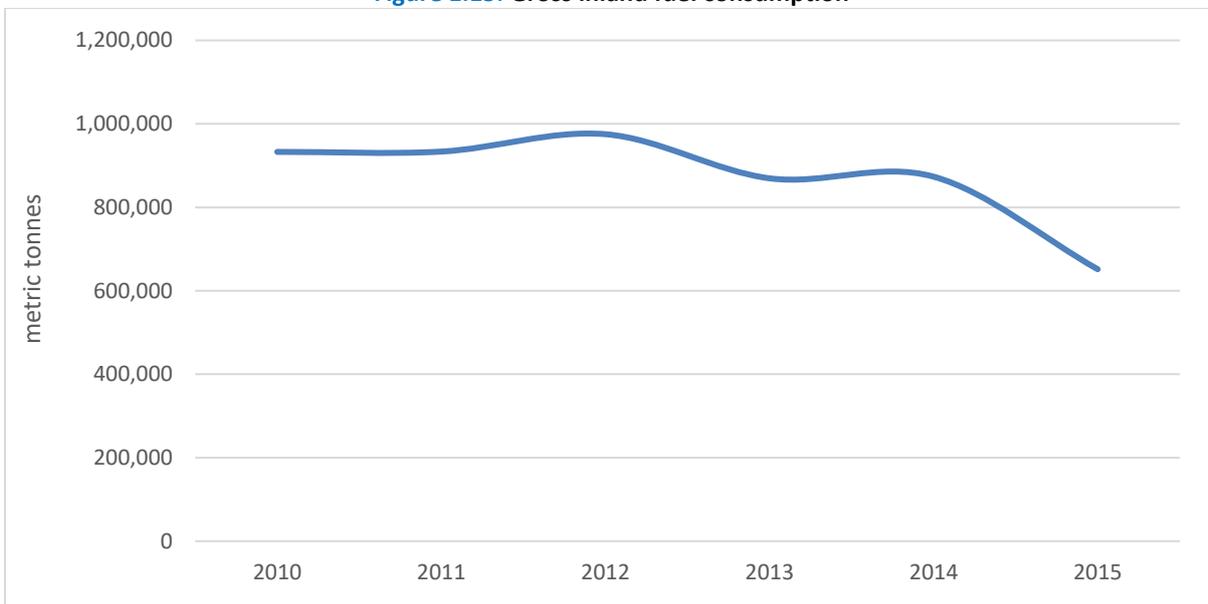
<sup>49</sup> MRA 2013b.

**Figure 1.14: Relationship between real GDP growth (on secondary axis) and growth in net fuel imports**



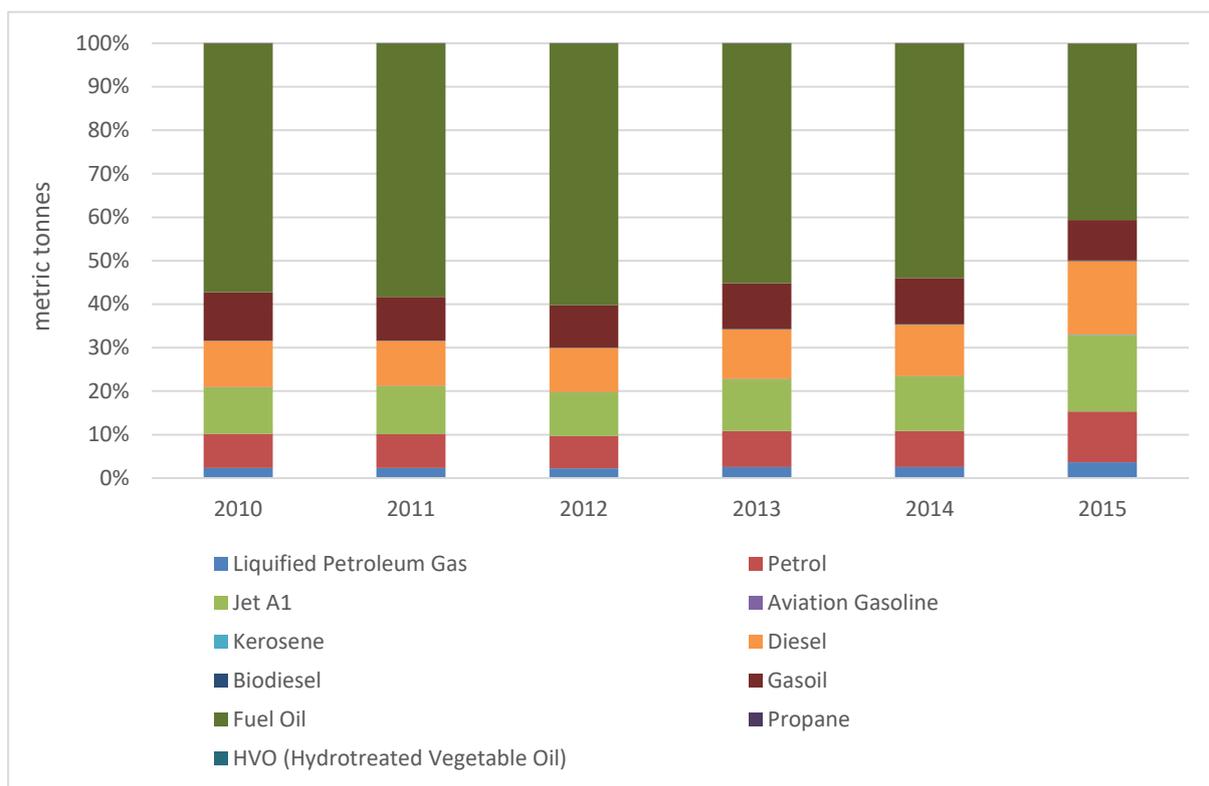
Sources: Enemalta Corporation; NSO; ERA

**Figure 1.15: Gross inland fuel consumption**



Sources: National Statistics Office, Malta; ERA

**Figure 1.16: Gross inland consumption by fuel type**



Source: National Statistics Office, Malta; ERA

### 1.4.3 Electricity

*How will trends in electricity consumption impact the environment?*

The production of electricity from fossil fuels is of concern from a climate change perspective and considered as one of Malta's main sources of air pollution. Over the last ten years, there has been an overall increase in the demand for electricity consumption. Between 2008 and 2015, billed electricity consumption in gigawatt hours (GWhrs) increased from 1,665.2 to 2,032.9, an increase of 22.1 % (or 367.7 GWhrs).<sup>50</sup> Principal sectors consuming electricity in 2015 were the services sector (37.1 %), the households sector (32.3 %) and the industrial sector (26.8 %).

The fact that the Maltese economy continued to grow over the period 2008-2015 meant that the increased production required further resources, both in the form of water and electricity, amongst others. In 2014, energy tariffs were lowered by 25 per cent for residential consumers and for enterprises in an attempt to improve the country's competitiveness. These developments may however result in higher consumption of energy and higher emissions. On the other hand, offering grants for households investing in Photovoltaic panels is leaving its desired effects as statistics have shown an increasing trend in the uptake.<sup>51</sup>

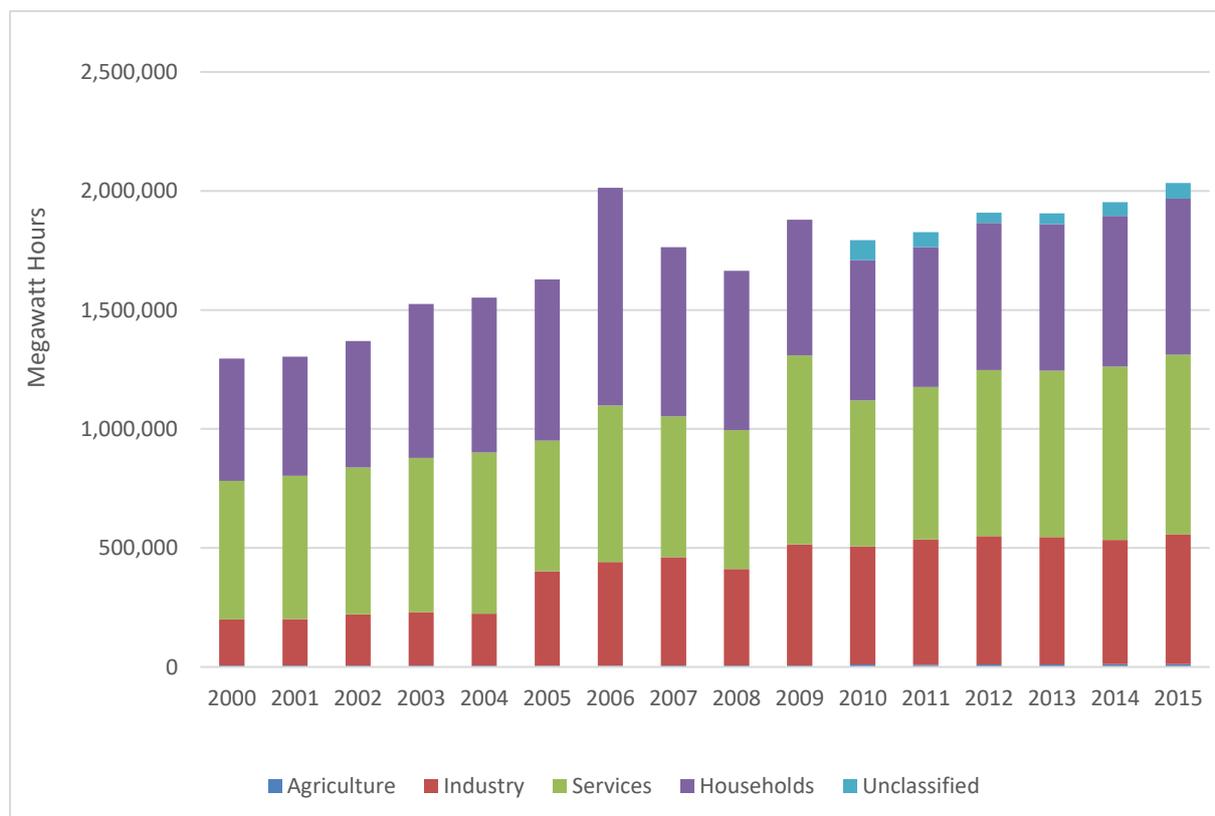
<sup>50</sup> Enemalta Corporation. ARMS Ltd. NSO 2016b.

<sup>51</sup> MRA 2013b.

A considerable improvement was noted in the share of renewables, which increased from 0.2 % of gross final consumption of energy in 2008 to 5 % in 2015.<sup>52</sup> Primary production of energy from renewables amounted to 14,800 tonnes of oil equivalent in 2015, up from 900 tonnes of oil equivalent in 2008. However, Malta is still far off from reaching the 10 % target established under the EU2020 strategy framework. During the period under review, the government extended schemes on roof thermal insulation and on the purchase of solar water heaters, and re-launched grant schemes and feed-in tariffs to promote the purchase of photovoltaic systems.

Emerging issues: A number of developments in the field have emerged beyond the period of this report, but merit consideration. These include the ongoing development of solar farms on government property; the role of renewable energy from waste recovery (two new plants expected to generate 18.86 GWhrs annually, equivalent to 0.63 % of electricity estimated to be consumed in 2015);<sup>53</sup> electricity production from the sewage treatment plants of the Water Services Corporation and upgrades of reverse osmosis plants; the inauguration of a new gas-fired plant in 2017, coupled with ongoing work to convert the existing BWSC plant from heavy fuel oil to natural gas; biomass projects included in private farms, which will reduce landfill take-up, in addition to producing electricity. In accordance with the requirements under the United Nations Framework Convention on Climate Change (UNFCCC) and European Union legislation, work has started on the establishment of a Low-Carbon Development Strategy.

**Figure 1.17: Billed electricity consumption by sector**



Sources: Enemalta Corporation; NSO; ERA; ARMS Ltd.

<sup>52</sup> Eurostat 2017a.

<sup>53</sup> WasteServ Malta Ltd.

## 1.5 Consumption and production

### 1.5.1 Sectoral contributions to GDP

*How will sectoral shifts in GDP impact the environment?*

The Gross Domestic Product (GDP) of a country aggregates the value of goods and services produced in the economy during a period of time and is a widely used measure of economic activity. Although GDP is not an accurate measure of environmental resource use, its composition in sectoral terms can lend insights as to the environmental impact, given that some sectors are more closely associated with resource use and pollution than others.

According to National Statistics Office (NSO) data, the services sector continued to dominate the Maltese economy, representing some 83 % of total economic activity undertaken in 2015 when compared to 76.6 % in 2008.<sup>54</sup> Within this sector, wholesale and retail trade, repair of motor vehicles and motorcycles and transportation and storage together contributed 17.3 % (very close to 17.6 % in 2008). Transport activity has a strong relationship with environmental impacts, mainly in terms of air pollution and land congestion. It is also strongly related to the other sectors in input and output terms and merits vigilant attention given Malta's population and built area density.

The main service sub-sectors which grew over the period include accommodation and food service activities, information and communication, financial and insurance activities, professional, scientific and technical activities, administrative and support service activities, public administration and defence, compulsory social security, education, human health and social work activities and especially arts, entertainment and recreation. At face value, none of these growth sectors poses a particularly problematic interface with the environment at least at face value, at an aggregate level, other than external effects such as those generated in the process of transport to work and use of infrastructure. Real estate was the only sub-sector which continued to shrink in relative terms within the services sector, a change which also echoes the shrinking role of construction itself during the period.

In fact, during the same period, the share of the construction sector (secondary sector) decreased by 0.8 percentage points to a share of 4.2 % in 2015. Such decrease is important because construction is rather negatively correlated with environmental quality, not just for the duration of the activity (dust, noise, congestion), but also thereafter (landscape, traffic generation). Emerging trends indicate a possible reversal of this decrease, though still below the 2008 levels.

Concurrently, the share of the secondary sector as a whole, which includes sub-sectors such as manufacturing, electricity, gas, steam and air conditioning supply, water supply, sewerage, waste management and remediation activities, (besides construction activities), declined by over 6 percentage points to 11.3 % in 2015, when compared to 2008. The share of electricity, gas, steam and air conditioning supply, water supply, sewerage, waste management and remediation activities sectors changed by 0.1 percentage points between 2008 (1.6 %) and 2015 to a share of 1.8 % with marginal changes in the inner years. In absolute terms, activities increased by EUR 50.3 million

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<sup>54</sup> NSO 2016b.

between 2008 and 2015. Whether or not these expenses translate into environmentally harmful or beneficial effects depends very much on the extent to which they were spent on remedial, restorative functions. In view of the growing pressures on infrastructure, this is an aspect that merits further investigation.

The share of the manufacturing sector to total gross value added generated in the economy decreased to 9.5 % in 2015, although the sector itself has increasingly reoriented to higher value added products. The transition that has occurred is one from a sector reliant on the traditional sub-sectors such as the manufacturing of textiles, wearing apparel and leather products and the manufacture of computer, electronic and optical products to the manufacture of basic pharmaceutical products and pharmaceutical preparations and aircraft maintenance, which generate higher value added to the economy. That the share of the secondary sector has been on a declining trend since 2000 is of particular interest, because many of the activities in this sector have adverse environmental impacts. It would be useful to examine the degree to which activities are moving from linear systems to more circular restorative systems.

Finally, the primary production sector of the economy includes agriculture, forestry and fisheries and mining and quarrying activities, and is typically associated with higher resource consumption than other sectors. This sector stood broadly stable at 1.5 % between 2008 and 2015 with some marginal changes in the inner years. However, at the sub-sectoral level, it is worth noting that mining and quarrying sector has declined from a share of 1.8 % in 2008 to a share of 0.1 % in 2015.

It is worth focusing on the impact of construction-related activities together. As mentioned, mining and quarrying sector (primary sector) declined, as did construction (secondary sector) and real estate (tertiary sector). In total, this activity increased by 24 % between 2008 and 2015, with its share decreasing from 11.3 % to 9.8 % between 2008 and 2015, respectively. Furthermore, employment decreased by 2.9 % during the same comparable period. The declining dependence of the economy on quarrying, construction and real estate is positive from an environmental perspective. From the impact of quarries on landscape and air quality to the uptake of scarce land resources (including coastal areas and valleys), to the transportation of materials and waste, the nuisance to neighbours (noise, vibrations, dust generation and damage to property), the occupancy of a constructed building itself (energy, water, wood) and finally its demolition (waste, nuisance), construction activity puts a considerable strain on the environment.

The image described by this data is an increase in the relative importance of services in the Maltese economy.<sup>55</sup> The trend also shows a shift towards higher value added sectors which employ more skilled labour, given that several of the sectors which are in decline have also historically been a large source of employment for unskilled labour (e.g. in construction and manufacturing). From an environmental perspective, the sectors most strongly associated with resource extraction and environmental impacts are also the ones which are in decline, relative to the rest of the economy.

An analysis of employment trends by sector provide an indication of economic sector growth trends, revealing similar trends presented above due to the link between each sectors economic growth and

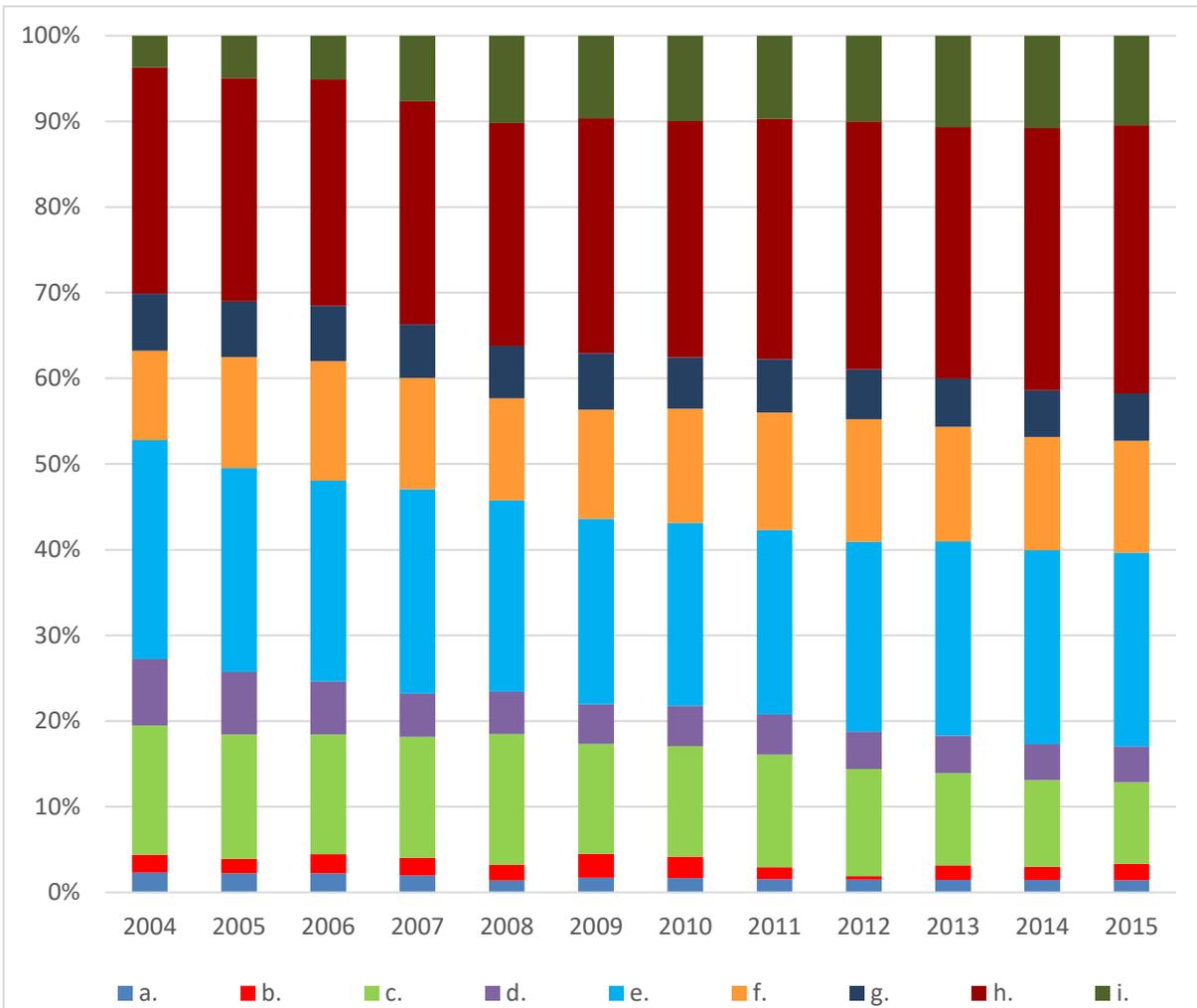
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<sup>55</sup> Grech 2015.

their impact on the environment. Employment increased by 24.7 % between 2008 and 2015. There was a 14.4 % decline in employment in the primary sector, a decline of 14 % in the secondary sector and an increase of 22.8 % in the tertiary sector over the same period. This resulted in an increased share of employment by the tertiary sector, such that, as of 2015, 86.4 % of the Maltese workforce was employed in services. Increases in the period were recorded in public administration and defence, compulsory social security, education, human health and social work activities sector, professional, scientific and technical activities, administrative and support service activities sector, wholesale and retail trade, repair of motor vehicles and motorcycles, transportation and storage, accommodation and food service activities sector.

Emerging Trends: In 2015, Malta's GDP increased by 7.3 % in real terms when compared to the average annual real growth rate of 3.0 % during the 2008-2014 period. The significant growth in 2015 has been driven by the domestic side of the economy, largely on the back of strong growth in investment and in private consumption. In fact, during the same year, Malta outperformed most European Union countries. While the sectoral changes in GDP appear to be environmentally favourable, the growth in GDP in absolute terms is likely to be associated with stronger environmental and resource impacts in all the sectors and, particularly, in sectors like transport and infrastructure on which economic activity relies. Since 2015, activity in the construction sector has gained some ground, although the level is still below the share of 2008.

Figure 1.18: The economic sectors share of the gross value added



a. Agriculture, forestry and fishing	g. Real estate
b. Mining and quarrying, Electricity, gas, steam and air-conditioning supply; Water supply, sewerage, waste management and remediation.	h. Professional, scientific and technical activities, Administrative and support service activities, Public administration and defence, Compulsory social security, Education, Human health and Social work activities.
c. Manufacturing.	i. Arts, entertainment and recreation, Activities of households as employers. Undifferentiated goods and services producing activities of households for own use, Activities of extra-territorial organisations and bodies, Other services.
d. Construction.	
e. Wholesale and retail trade, Transportation and storage, Accommodation and food services activities.	
f. Information and communication, Financial and insurance activities.	

## 1.5.2 Domestic Material Consumption (DMC)

*How will trends in DMC impact the environment?*

Domestic material consumption (DMC) measures the total amount of material used by an economy. This material is defined as the total amount of raw materials extracted from the domestic territory plus all physical net imports,<sup>56</sup> thereby making a distinction between domestic demand and that driven by the external market. Domestically, in 2015 DMC stood at 5.78 million tonnes, a significant increase of 83.4 % when compared to 2008.<sup>57</sup> Similarly, DMC per person increased from 7.7 tonnes per capita in 2008 to 13.389 tonnes per capita in 2015, an increase of 73.9 %, and an average annual increase of 0.9 tonnes per capita.

Much of Malta's DMC is imported – net imports constituted almost 65% of DMC in 2015, a share that has increased by over 37 percentage points between 2008 and 2015, mainly due to a significant drop in exports of around 30% over this period. Moreover, the composition has changed considerably: fossil energy materials/carriers, raw and processed materials accounted for 63.4 % of imports in 2015 compared to 42.2 % in 2008. Biomass and biomass products and non-metallic minerals, raw and processed materials accounted for 12.1 % (23.3 % in 2008) and 12.7 % (20.7 % in 2008) in 2015, respectively. Around 28.5 % of DMC in 2015 was attributable to total domestic extraction. Of this, an estimated 92.9 % was attributable to the extraction of limestone. The rest is biomass which mainly consists of crops, fodder crops and fishing and hunting.

Resource productivity quantifies the relationship between economic activity and the consumption of natural resources, and sheds light on whether they go hand-in-hand or the extent to which they are decoupled. Overall resource productivity has decreased from EUR 2.07 of GDP generated per kilogramme of materials used in 2008 to EUR 1.44 per kilogramme in 2015, a decrease of 30.5 % in real terms.<sup>58</sup> Real GDP increased by an annual average rate of 3.6 % over the 2008-2015 period, while DMC increased by an average annual increase of 10.5 %.

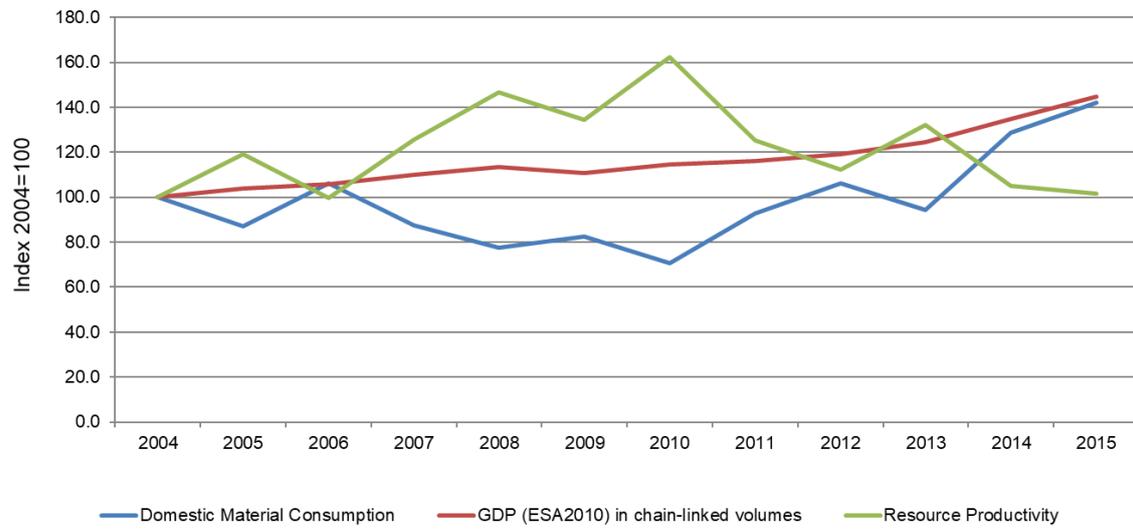
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<sup>56</sup> Physical net imports are equal to the imports minus the exports.

<sup>57</sup> Eurostat 2017b.

<sup>58</sup> Ibid.

**Figure 1.19: Domestic Material Consumption, Gross Domestic Product, and Resource Productivity**



*Source: National Statistics Office, Malta*

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