# AN INTERNATIONAL COMPARATIVE STUDY OF THE TAX INCENTIVES FOR ENERGY-EFFICIENT IMPROVEMENTS FOR INDIVIDUALS

by

Claudia de Beer

22139801

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Mrs H. du Preez

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# ABSTRACT
# AN INTERNATIONAL COMPARATIVE STUDY OF THE TAX INCENTIVES FOR ENERGY-EFFICIENT IMPROVEMENTS FOR INDIVIDUALS

by

CLAUDIA DE BEER

STUDY LEADER: HANNEKE DU PREEZ

DEPARTMENT: TAXATION

DEGREE: MAGISTER COMMERCII

Carbon dioxide emissions are increasing dramatically on a yearly basis. The quantities of carbon dioxide emissions per capita are published per country on an annual basis. Countries need to ensure that programmes are implemented in order to reduce carbon dioxide emissions. As an incentive, certain countries have introduced tax credits / incentives for individuals to motivate them to live a greener lifestyle. No research has been performed on the tax deductibility of green expenses incurred in South Africa for individuals. For this study, reference has therefore been made to foreign countries, and the study analyses the tax credits / incentives available to individuals in the United States of America, Belgium, France and Australia. The purpose of the study is to establish trends in tax credits / incentives implemented by these selected countries. These trends are compared with the situation in South Africa, where individuals currently do not enjoy any tax benefits for purchasing energy-efficient products. Suggestions and recommendations are made on what could be implemented as tax credit / incentives by the South Africa government. Tax credits / incentives as a reduction of income tax will encourage individuals to purchase energy-efficient products, buildings and motor vehicles, in order to live in such a way that a sustainable future is ensured.

**Keywords:**

*Climate change*

*Green expense / act*

*Tax credit / incentive*

*Carbon dioxide emissions*

*Energy-efficient products*

*South Africa*

# OPSOMMING
# 'N INTERNATIONALE VERGELYKENDE STUDIE VAN BELASTINGVOORDELE VIR ENERGIE EFFEKTIEWE VERBETERINGE VIR INDIVIDUE

deur

CLAUDIA DE BEER

STUDIE LEIER: HANNEKE DU PREEZ

DEPARTEMENT: BELASTING

GRAAD: MAGISTER COMMERCII

Koolstofdioksiedvrystellings verhoog drasties. Die koolstofdioksiedvrystellings per kapita per land wat vrygestel word, word op 'n jaarlikse basis gepubliseer. Daar word van individuele lande verwag om programme in plek te stel om te verseker dat koolstofdioksiedvrystellings verlaag. As 'n aansporing, het sekere lande belastingkrediete / aansporings vir individue geïmplementeer as motivering om groener te leef. Geen vorige navorsing is gedoen op die belastingaftrekbaarheid van 'groen uitgawes' in Suid Afrika vir individue nie. Die doel van die studie is om 'n vergelyking te tref tussen die Verenigde State van Amerika, België, Frankryk en Australië ten opsigte van belastingkrediete / aansporings vir individue. Die belastingkrediete / aansporings vir individue wat geïmplementeer word deur hierdie lande word vergelyk met die Suid-Afrikaanse individu wat tans geen belastingvoordeel vir die aankoop van energie effektiewe produkte geniet nie. Voorstelle en aanbevelings vir implementering deur die Suid-Afrikaanse regering word gemaak. Belastingkrediete / aansporings as vermindering van inkomstebelasting moedig individue aan om energie effektiewe produkte, geboue en motors aan te koop, ten einde 'n volhoubare toekoms te bewerkstellig.

.

**Sleutelwoorde:**

*Klimaatverandering*

*Groen uitgawe / aksie*

*Belastingkrediet / aansporing*

*Koolstofdioksiedvrystellings*

*Energie effektiewe produkte*

*Suid-Afrika*

# AN INTERNATIONAL COMPARATIVE STUDY OF THE TAX INCENTIVES FOR ENERGY-EFFICIENT IMPROVEMENTS FOR INDIVIDUALS

## CHAPTER 1

## INTRODUCTION

### 1.1 BACKGROUND

The environment is an irreplaceable living resource; once it is exhausted another cannot be purchased. One needs to ensure the longevity of the environment for the sake of the future of mankind. However, most of the actions taken to save the environment unfortunately result in an outflow of cash resources. If companies have the initiative to "go green", most of the expenses undertaken would be deductible against taxable income as per section 11(a) of the Income Tax Act (58/1962) (hereafter referred to as the Income Tax Act). On the other hand, where individuals undertake to "go green", no income tax deduction is currently available in South Africa.

The atmosphere is a natural non-renewable resource and the creatures on this living planet therefore need to take care of the atmosphere. As the carbon dioxide ($CO_2$) concentrations in the earth's atmosphere are increasing, causing climate change (Ceulemans, Ferris, Taylor, Shao & Gardner, 2001), humans need to ensure that they do everything in their power to reduce these $CO_2$ levels. To incentivise this action, an added benefit of a tax deduction or tax credit when expenses are incurred to save the environment would make it more cost-effective for the individual and encourage an attitude of "going green".

As there has been no previous research on a green tax deduction or tax credit in respect of the individual South African taxpayers, reference is made to available international tax credits. The following points relate to tax credits which are internationally available to individuals:

- Bourgeois, Breaux, Chiasson and Mauldin (2010) state that: "The credit applies to improvements in existing dwelling units that affect the energy efficiency of the home as it relates to 'qualified energy efficiency improvements' and 'qualified energy property.' …"
- Garrison (2011) comments: "Generally, personal tax incentives lower the cost of the purchase and installation of renewable energy or energy efficient systems and/or equipment ..''
- Watson (2009) expands on this by stating that: "A 30% tax credit is available for geothermal heat pumps, solar panels, solar water heaters, small wind energy systems and fuel cells in terms of the United States Income Tax Act section 25D. The credit applies to the cost of labour and installation as well as the cost of the equipment …''

## 1.2 PROBLEM STATEMENT

The Conference of the Parties (COP) has been held every year for the past 19 years, whom had been attended by representatives from most countries, in order to reduce $CO_2$. The representatives determine what can be done to reduce $CO_2$ emissions. One of the conferences held, COP 17, resulted in a project (which will become effective in 2020) to combat greenhouse gases (News24, 2011). This COP project will only become effective seven years from now. It is therefore imperative for each individual to ensure a sustainable future in the meantime.

Will a deduction against taxable income, or a tax credit for "green expenses" incurred, increase the number of individuals who will participate in building a greener household? Individuals internationally are currently benefiting from tax credits and incentives, in

contrast to the South African resident, who currently enjoys no tax benefit (Bourgeois *et al*., 2010).

As only certain qualifying expenditure (for example medical aid credits, donations and pension fund contributions) relating to the longevity of the South African individual may be deducted from an individual's taxable income, other expenses or activities have not been examined as possible deductions. Extensive research will be required to estimate what benefit would enable South African residents to incur the expense of "going green".

South Africa is in a unique position when compared to the rest of the world. As Van der Walt, Wolhuter, Potgieter, Higgs, Higgs and Ntshoe (2011) state, South Africa is a Third World country striving to become a First World country but failing to do so as a result of a few shortcomings identified by Petras and Morley (1981). Thus, in evaluating a potential green tax benefit for individuals, the unique position of South Africa and its resultant shortcomings as a Third World country (and the potential solutions thereto) require further consideration.

## 1.3 PURPOSE STATEMENT

The purpose of the study is to carry out an international comparison between South Africa and certain other countries, in order to establish the tax incentives available to individuals abroad when green expenses are incurred and compare that with the incentives available in South Africa. The countries chosen were the United States of America (USA), Belgium, France and Australia.

The reasons for choosing these countries for a comparison between the environmental tax credits available to individuals in respect of green expenses and the credits available to individuals in South Africa will be explained.

The USA was selected as it is the leading country in technology, especially green technology, as confirmed by Bierenbaum, Frank, Lenox and Maheshwari (2012) on the basis of the fact that the USA has had the most greentech patents granted since 1990.

Australia was selected as the agriculture and climate are similar to those of South Africa.

The European countries, France and Belgium, were selected as alternative energy is being extensively researched and used in Europe. France is currently pushing to become number one in green technology, as documented in *The Wall Street Journal* by Tiplady (2010). Belgium was chosen as South Africa had been ranked higher, with 10.2 $CO_2$ emissions per capita, compared with 9.7 $CO_2$ emissions per capita in Belgium in 2009 (The World Bank, 2013).

## 1.4 RESEARCH QUESTION

The research question that will guide this study has been formulated as follows:

- What are the tax benefits available to individuals who have incurred green expenses in South Africa?

## 1.5 RESEARCH OBJECTIVES

The study will be guided by the following research objectives:

- To analyse tax benefits for green expenses available for individuals living in the USA, Australia, Belgium and France.
- To compare the impact of the tax benefits available in the four countries by using a case study scenario.
- To perform a comparative analysis in which the available tax benefits as discussed in objective 1 are compared with what is available in South Africa.
- To offer some suggestion on possible tax benefits to be implemented in South Africa.

## 1.6 DELIMITATIONS

The study will focus specifically on the individual. Therefore the study will not include companies, trusts or sole proprietors.

Personal income tax equalled 33.8% in 2011/12, in comparison with commercial income tax, which totalled 20% of total income to the fiscus (National Treasury and SARS, 2012). Thus individuals contributed a higher percentage of income tax to the fiscus than corporate taxes did.

The South African individual therefore makes a bigger impact on the total amount of taxes accumulated for the country than the public sector does. The impact of a potential "green expense" incentive on the fiscus will therefore be excluded from the study.

When expenses are incurred by a company, unlike when the expense is incurred by an individual, the company is allowed a tax deduction. Therefore, there is no real relationship between companies and individuals in respect of a "green" tax deduction.

This study will not investigate cases where a company can claim a 100% or even higher deduction for green expenses incurred.

## 1.7 ASSUMPTIONS

Assumptions were made regarding the appropriateness and correctness of the research information collected and used in this study.

Firstly, it was assumed that the tax legislation of the countries would not change for the periods the case study is based on.

Secondly, the countries were assumed to be compatible on the basis that all the countries need to contribute to the reduction of their $CO_2$ emissions.

## 1.8 DEFINITION OF KEY TERMS

The key terms in this study are described and defined below.

**Climate change:** A change in the world's climate due to the increase in $CO_2$ emissions.

**Green expense/act:** The reduction in use of a natural non-renewable resource, thereby reducing the $CO_2$ emissions. A green expense is therefore an expense incurred to minimise the use of natural non-renewable resources, and in certain instances it would be an expenditure of money. For example: installation of a solar geyser or fuel cells or recycling.

**Tax credit/reduction:** A deduction from actual tax payable for the tax year.

**Tax deduction:** A deduction against taxable income for the tax year.

**South African individuals:** Those who qualify as a "resident" as defined per section 1 of the Income Tax Act. "Resident" is defined as follows: "Any natural person who is ordinarily resident in the Republic or not at any time during the relevant year of assessment ordinarily resident in the Republic, if that person was physically present in the Republic ….for a specified period…." This is also known as the physical presence test.

The following abbreviations have been used in this document. The meanings of these abbreviations are given below:

**Table 1 : Abbreviations used in this document**

| Abbreviation | Meaning |
|---|---|
| AUD | Australian dollar |
| $CO_2$ | Carbon dioxide |
| COP | Conference of the Parties |
| DWARF | Department of Water and Environmental Affairs |
| EU | European Union |
| G-20 | Group of 20 finance ministers and central bank governors |
| G-8 | Group of 8 large economies |
| GDP | Gross domestic product |
| LEED | Leadership in Energy and Environmental Design |
| NATO | North Atlantic Treaty Organisation |
| SARS | South African Revenue Service |
| SAWS | South African Weather Service |
| USA | United States of America |
| USD | United States Dollar |

## 1.9 OVERVIEW OF CHAPTERS

The background to the study is set in chapter 1, which describes the importance of green tax incentives for the individual. The tax incentives are necessary to ensure that green expenses will be incurred, in order to save the environment one step at a time.

The literature review for the study can be found in chapter 2, which will shed light on ways for households to live greener.

The international levels, that is for the following countries: the USA, Australia, Belgium and France, are analysed in chapter 3. The available green tax benefits are researched and summarised in this chapter. The benefits available previously and currently are explained.

Chapter 4 outlines a scenario and compares it to each country scrutinised in the case study. Where individuals incur certain green expenses, the tax incentives or benefits and tax payable are compared and given per country. The tax credits are set out in a clear illustration, as for a tax return.

Chapter 5 concludes the study. The case studies are collated and summarised in order to establish what tax benefit, if any, a South African would be likely to get.

# CHAPTER 2

# LITERATURE REVIEW

## 2.1 INTRODUCTION

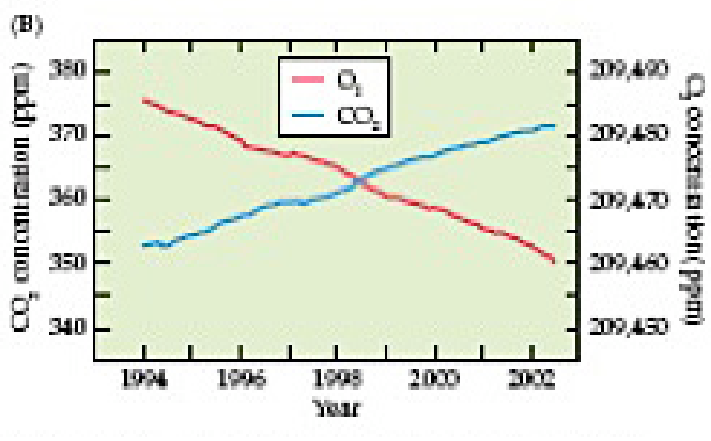
The concentration of $CO_2$ in the atmosphere is increasing dramatically year by year (Manabe & Wetherald, 1974). This increase in $CO_2$ in the atmosphere has led to climate change (Cox, Betts, Jones, Spall & Totterdell, 2000).

Moroka (2005) states that climate change will affect everyone. In fact temperature increases have been recorded over the past few years. Not only will temperatures increase in certain parts of the world, but in other parts heavy snowfalls and cold temperatures will be experienced. Furthermore, it has been stated that river flow will decrease in certain areas of the world, which will lead to drought conditions in other areas, so that water will become a scarce commodity.

The fact that human beings are destroying the earth needs to change. A solution needs to be implemented to ensure that global warming can be decreased as much as possible.

Figure 1 illustrates the increase in the $CO_2$ levels in the atmosphere from 1994 to 2002. This figure shows how drastically the $CO_2$ levels increase by the year, and therefore how important it is to ensure a decrease in $CO_2$ levels.

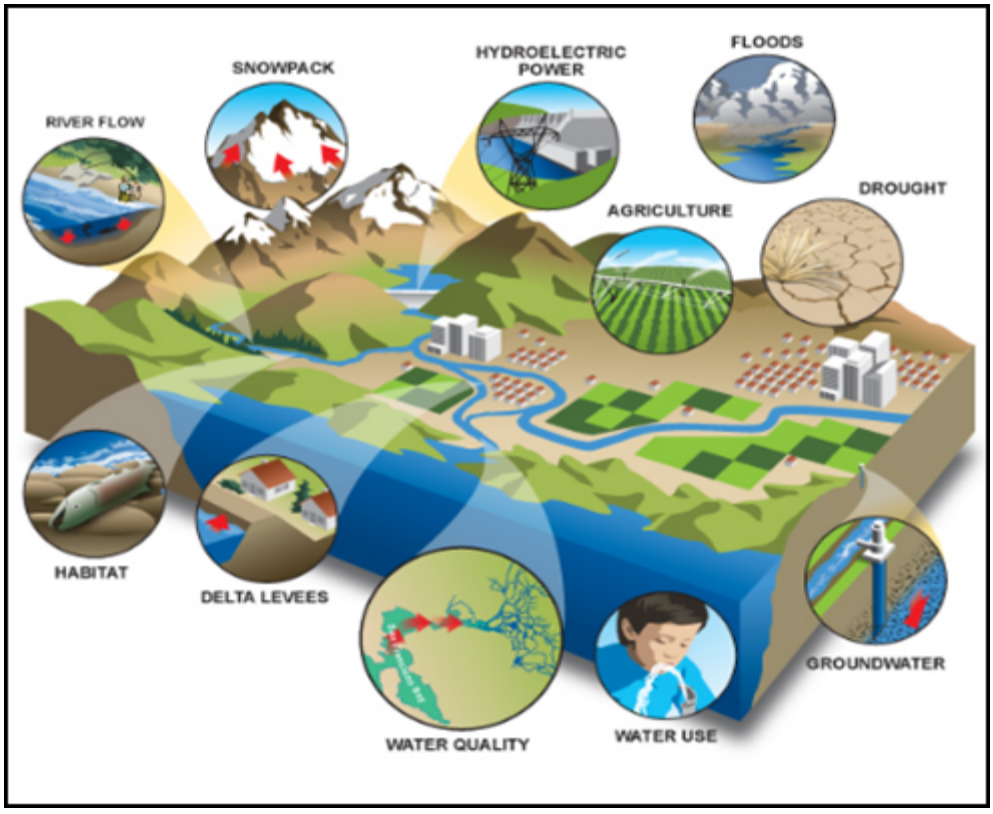
**Figure 1 : Increase in $CO_2$ levels and decrease of $O_2$ in the atmosphere**




**Source:** Encyclopaedia of Earth (2010)

Figure 2 illustrates how global warming will affect every individual. One can easily decide that the rising $CO_2$ levels will not have an effect on one as an individual. As demonstrated below, global warming affects everything and everyone.

**Figure 2 : Global warming affects everyone**




**Source:** Brun (2010)

## 2.2 LOW-ENERGY BUILDINGS

Green buildings are taken to be commercial buildings, but the characteristics of these buildings could also be found in houses that are built as low-energy buildings.

Green buildings have to meet certain standards, and these standards are rated by LEED certifications (Leadership in energy and environmental design) (Green Building Certification Institute, nd). These LEED certifications are governed by the Green Building Certification Institute, and are therefore consistent worldwide (Green Building Certification Institute, nd).

What is a “green building”? As explained by the United States Environmental Protection Agency (2010), “a green building, also known as sustainable or high performance building, is the practice of:

- Increasing the efficiency with which buildings and their sites use and harvest energy, water, and materials; and
- Protecting and restoring human health and the environment, throughout the building life-cycle: siting, design, construction, operation, maintenance, renovation and deconstruction”.

Building a low-energy building is therefore not only beneficial to the owner in the long run, but also beneficial to the environment. Therefore, a low-energy building would also be more cost-effective in terms of day-to-day expenses and maintenance.

What makes a building “green”? As explained by the United States Environmental Protection Agency (2010), a green building is an environmentally responsible and resource-efficient structure throughout the life-cycle of the building. The difference between a non-green building and a low-energy building lies in concerns relating to economy, utility, durability and comfort.

Low-energy buildings are built to reduce the impact on the environment, human health and the natural environment by:

- using water, energy and other resources efficiently,
- protecting the health of the residents and improving productivity, and
- reducing waste, pollution and environmental degradation (United States Environmental Protection Agency, 2010).

Low-energy buildings could typically include sustainable building materials which could consist of recycled, reused and renewable materials and incorporate a plant landscape that reduces water usage, for example by using plants that do not need excessive watering (United States Environmental Protection Agency, 2010).

The benefits of green buildings are endless, as buildings have a colossal impact on the economy, human health and the environment, as discussed by the City of Bloomington (nd).

The environmental benefits of building a low-energy building rather than a normal building include the ability of such a building to:

- Enhance and protect biodiversity and ecosystems
  Green buildings protect and enhance living resources, habitats and animals. As these are on-renewable resources, one needs to ensure the longevity of these resources (United States Environmental Protection Agency, 2010).

- Improve air and water quality (emissions reduction)
  Fewer emissions are released into the air compared to the emissions from fossil fuel fired electricity, which contribute to global climate change. Low-energy building techniques like solar energy and daylighting (to maximise the use of natural interior light) increase energy efficiency and decrease toxic emissions (United States Environmental Protection Agency, 2010).

- Reduce waste streams and capture rainwater

  Stormwater runoff can cause erosion and flooding and may be responsible for carrying pollution into existing water resources. Surfaces can be built from permeable material, so that the water flows through the material, thereby controlling and utilising rainwater. In addition, a green roof can be constructed. This consists of a layer of vegetation that absorbs rainwater, clears the air of pollutants and provides natural insulation. One can control and use water overflow or water from many other sources (City of Bloomington, nd).

- Conserve and restore natural resources

  Natural resources, minerals, forests, water and fertile land are protected from harm and the resources already damaged are restored to normal levels (United States Environmental Protection Agency, 2010).

- Temperature moderation

  Temperature moderation exists when green roofs are built with lush gardens with 2–6 inches of growing medium (Deneen, nd). When a green garden is built, the respiring plants create a microclimate which keeps the temperature at a moderate level (Deneen, nd), and conserves a wildlife habitat. This would typically only apply to commercial buildings and stacked flats, as it is not likely that a house would build a green garden on the roof.

The economic benefits to be derived from a low-energy building include:

- Reduced maintenance costs

  One can imagine that a low-energy building which is self-sustaining, in comparison with an ordinary building, would use fewer resources and therefore cost less to maintain. Lifelong “fruit” are produced by a low-energy building (United States Environmental Protection Agency, 2010).

- Improved occupant productivity

  Productivity would be increased not only in a commercial building, but also in a household. One can imagine living in a green house, being cool without any means

of air-conditioning, living in a structure that requires the minimum effort to maintain (United States Environmental Protection Agency, 2010).

- Optimal life-cycle economic performance

  The building materials used would have a longer lifespan, thus ensuring that materials need not be replaced as rapidly as with a normal building. Costs are therefore kept to a minimum (United States Environmental Protection Agency, 2010).

- Increased property values

  Where a property is built as a low-energy building, large amounts of money are invested in the building. A low-energy building that is self-sustaining and can be maintained with minimal effort and cost would have an increased property value (United States Environmental Protection Agency, 2010).

- Development of engineering talents

  As the world is moving towards a greener environment owing to the increased and high levels of $CO_2$ emissions, a market has been developed for individuals who can create a sustainable future as a permanent objective. People around the world are learning new skills because they have to learn to build these sustainable buildings (City of Bloomington, nd).

- Markets for green products and services are created, expanded and shaped

  The above comments on exploring and developing talents also apply to the marketing sector which sells the products to the builder. The green market is therefore a permanent, fast-growing and developing market. Products and services are being improvised on a daily basis (United States Environmental Protection Agency, 2010).

The social benefits associated with a low-energy building include the following:

- Enhancement of the occupants' comfort and health
  Residents feel more comfortable in low-energy buildings. The health of the occupants improves, as they are living a more natural lifestyle (United States Environmental Protection Agency, 2010).

- Heightening visual qualities
  The natural and manmade elements of a visual low-energy building provide a pleasing visual experience (North Dakota Parks and Recreation Department, nd).

- Minimising strain on local infrastructure
  By generating one's own electricity, one reduces the strain on the local electricity provider (Kashyap, 2008), which is an important factor in South Africa.

- Improvement of overall quality of life
  Quality of life is improved by the knowledge that one is contributing to environmental enhancement and creating a sustainable future for humanity by living in a low-energy building.

Low-energy buildings have a variety of benefits in comparison with normal buildings. Currently, low-energy apartments are being built by BASF and investors of the Renova StroyGroup in Yekaterinburg, Russia. Irina Seliverstova from BASF Market Development in Russia says that she expects the building to consume 30% less energy in comparison with standard construction methods (Molitor, 2012).

## 2.3 MOTOR VEHICLES

Motor vehicles powered by petrol emit enormous amounts of $CO_2$. Alternatively, hybrid, plug-in or electric vehicles are available on the market. Although the prices of the vehicles are higher than those of the conventional motor vehicle, the benefits of purchasing the more efficient vehicles are endless.

Hybrid vehicles burn petrol, just as conventional vehicles do, but hybrid vehicles are far more fuel efficient. The average distance with a hybrid is 16.5 kilometres per litre, compared with 11.4 kilometres per litre for conventional vehicles. If 1 litre of petrol contains 2.36 kilograms of carbon dioxide, then a conventional car would emit 34 kilograms of carbon dioxide every 160 kilometres and a hybrid 23.1 kilograms of $CO_2$ (Roos, 2013).

Technically, electric vehicles do not emit $CO_2$, but $CO_2$ is emitted when the batteries of the vehicle are charged (Schroeder, 2011). The $CO_2$ emitted when generating the electricity to charge the batteries is beyond the scope of this study.

Therefore it is concluded that hybrid and electric vehicles do emit less $CO_2$ than conventional vehicles.

## 2.4 WAYS OF GENERATING GREEN ENERGY AND LIVING GREENER

### 2.4.1 GENERATING GREEN ENERGY

By being sensible about household energy use, individuals can reduce the $CO_2$ emissions of their households. Leaving aside the effects of global warming, one needs to understand that the resources currently utilised are limited (Brook, 2008). There are many potential benefits from changing one's way of living into "green living".

There are various methods of living greener; these are not confined to building low-energy apartments or houses. Electricity can be generated by using wind, solar power and hydropower as discussed in *Homepower Magazine* (2012).

*Homepower Magazine* (2012) discusses solar panels, which can be purchased and placed on the roofs of houses. These solar panels absorb sunlight and convert this natural energy into electricity, which can be used to heat water tanks, swimming pools or run household appliances.

ScienceOnline (2002) also comments on the advantages and disadvantages of the use of these solar panels. The advantages are the use of renewable sources of energy, which are relatively maintenance-free and non-polluting. The disadvantages are the high costs involved in purchasing the solar panels.

Hydroelectricity generation is another method of generating electricity, as documented by Utilityfree (2012). However, it is not a solution available to smaller households, but could be used for larger residential accommodation where a river is part of the property, for example farms or smallholdings.

Wind can also be used to generate electricity and reduce utility bills. The U.S. Department of Energy (2011) states that stand-alone wind turbines can be installed for homeowners who live in areas that are generally quite windy.

### 2.4.2 LIVING GREENER

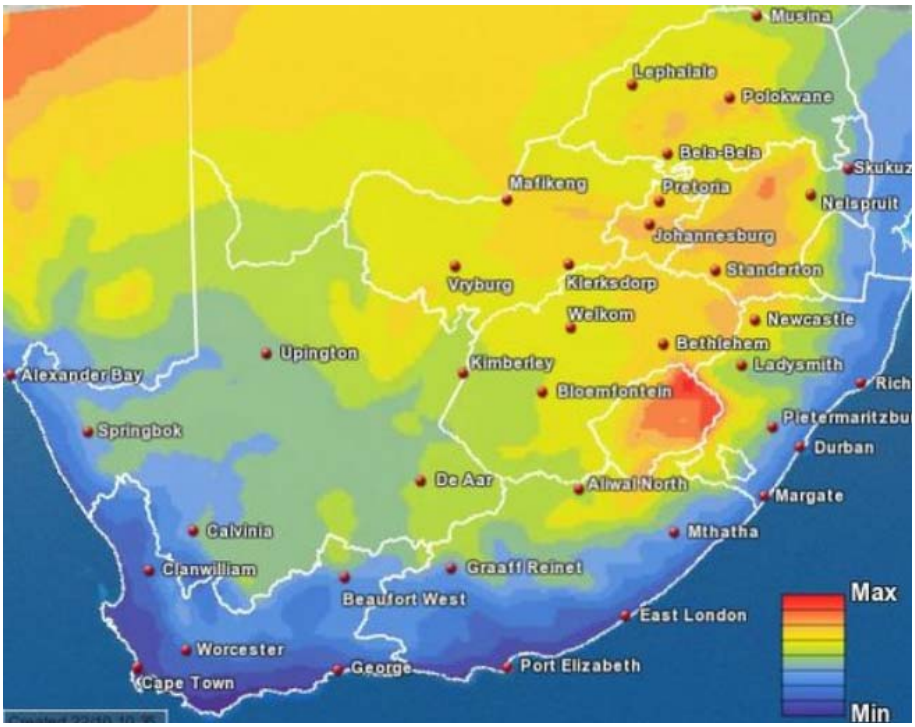
#### *2.4.2.1 ENERGY-EFFICIENT INSULATION*

The installation of ceiling insulation reduces heat in summer and keeps heat in during winter, as discussed by Eco-insulation (nd). Therefore, less energy is required to keep houses cool in summer and warm in winter. Various types of insulation are currently on the market, ranging from layers of sponge to layers of granulated material with a low resistance to heat flow (Eco-insulation, nd). An added bonus is that the ceiling insulation also adds value to one's property, and therefore makes it more marketable.

#### *2.4.2.2 CONSUMING WATER SPARINGLY*

Water is a scarce commodity. Although the planet is covered by more than two-thirds water, there is still a shortage of potable non-saline water. According to South African Info (2012), South Africa is a relatively dry country. South Africa has an average annual rainfall of about 464 mm while the global average is about 860 mm, as stated by South African Info (2010). Figure 3 illustrates the annual rainfall in South Africa. The figure reflects low rainfall in the greater part of South Africa, thereby illustrating that this is a dry country.

**Figure 3 : Annual rainfall in South Africa**




**Source** : SAWS (2008)

According to the Department of Water and Environmental Affairs (nd) (DWARF), the demand for water in South Africa will exceed supply by 2025. The two major sectors which contribute to the country's economy are the agricultural industry, which uses 60% of water resources, and the mining sector, which uses 10.5% of water resources (DWARF, nd).

By collecting one's own rainwater and filtering the water before drinking, thereby making it cleaner and free of chemicals and other impurities from the municipal reticulation system, one would already be living a greener lifestyle. The government would save expenses, because no new dams or infrastructure would be needed. Roads would not be damaged in the process. This would result in taxpayers paying less tax.

One means of reducing water consumption is to use bath water and dishwater (known as grey water) to water gardens, as suggested by Greenworks (nd).

### *2.4.2.3 REUSING AND RECYCLING*

Materials for disposal can be divided into six categories: plastic, paper, glass, garden material, construction or building material and metal, according to the Department of Environmental Affairs (nd).

One of the benefits of recycling glass is that Consol can use recycled glass to manufacture newly generated glass. But when glass is not recycled, Consol removes large areas of sand dunes, which are melted with soda and lime at very high temperatures to manufacture new glass (Consol website, 2012). Recycling therefore saves the dunes as well as reducing energy consumption, which results in a saving of electricity. (Glass Recycling Company, nd).

Similar advantages are experienced when cans are recycled. If cans are recycled, this decreases the amount of iron ore that needs to be mined for new cans, thereby saving energy and reducing the need to mine iron ore. More than 36 000 tons of cans are recycled in a year (Collect-a-can, nd).

Reuters Africa (2009) adds that China imports large quantities of used metal. Therefore, if garbage metal is not buried it could rather be exported by South Africa and reused appropriately.

A reduction in general consumption will improve our environment and in the long run the economy. According to Benjamin Cohen, on ScienceBlog (2009), the landfills decreased during the recession, and these landfills can therefore now be used for a longer period of time. By ensuring that only the necessary items are sent to the landfills and the rest of the items either recycled, by composting or by a recycling company, only the essential items that are not recyclable would end up in landfills.

As stated by Treevolution (nd), it is crucial to recycle and to live in such a way that one decreases one's carbon footprint. A metric ton of paper recycled will save 17 trees, saving 40% in energy and 50% in water, compared to manufacturing paper from trees. 750 000 cubic metres of landfill space a year would be saved if all South African households recycled. This in turn would result in the local authorities saving R60 million in collection and landfill costs.

Items can also be re-used, as discussed by the Recycling Guide (nd). Everyday items around the house can be used for different purposes. By re-using items rather than throwing the items away, energy consumption is reduced and less use is made of the landfill areas where these items would have ended up.

Garden material can be recycled to create compost and then used to fertilise gardens. This is an added advantage, as the price of fertiliser at nurseries is quite high, as mentioned by RecycleNow (nd).

When buildings are joined or demolished, building rubble is produced and this could be recycled, as explained by South Africa Crusher (nd). Furthermore, large pieces of cement, rock and/or brick could be reused to reinforce foundations, a technique used in Japan and China.

#### *2.4.2.4 TAX ALLOWANCES FOR GREEN INDIVIDUALS*

South African companies currently need to comply with the National Environmental Management Act (107/1998). This Act ensures that companies undertake certain “green” expenditure and that companies are responsible, caring citizens through their actions. The expenses incurred generate an income tax deduction against taxable income, as the expenses are incurred in the production of income.

However, it is not only companies that contribute to the increase in $CO_2$ levels; individuals also participate in the increase in $CO_2$ levels. In South Africa no income tax deductions or tax credits are previously or currently been offered by SARS to incentivise individuals.

Changes to the environment are dependent on the willingness of politicians and government to ensure the required changes (Brook, 2008). Braathen and Greene (2011) state that solutions need to be found that consider the effects on economic growth. One of the potential solutions would be the inclusion in the Income Tax Act of an income tax deduction or credit for individuals.

“For too long the power of the private sector has been forgotten in the fight against global challenges", International Development Secretary Andrew Mitchell said at the World Economic Forum in Davos (BusinessGreen Staff, 2012). This comment clearly indicates that there needs to be a focus on individual needs in future, in order to reduce $CO_2$ levels.

“Individual responsibility towards nature is modelised by the voluntary effort to which the households have agreed insofar as the improvement of environmental quality is

concerned", according to Ballet, Bazin, Lioui and Touahri (2007). Therefore currently "going green" on the part of households is entirely voluntarily. Most of the "green" initiatives being implemented result in a rather large monetary investment by the homeowner. However, in the long term these investments pay off for the home-owner, as utility bills decrease as a result, which means a month-to-month saving (Bourgeois *et al*., 2010).

## 2.5 CONCLUSION

Much more could be done by individuals in order to reduce the $CO_2$ levels in the atmosphere. One needs to be more aware of environmental issues while performing one's daily tasks and duties. Water and electricity must be used sparingly, and items must be reused and recycled. Furthermore, one can generate electricity by means of various appliances, but this would result in an outflow of money.

Low energy buildings can be built and occupied, together with the purchase of an electric vehicle. This would be the ultimate energy-saving lifestyle.

# CHAPTER 3

# TAX INCENTIVES FOR ENERGY-EFFICIENT IMPROVEMENTS AT AN INTERNATIONAL LEVEL

## 3.1 INTRODUCTION

A few countries around the world offer tax benefits to individuals who purchase energy-efficient products and motor vehicles. These incentives encourage individuals to purchase energy-efficient products and are therefore more cost-effective in the long run and conserve resources that would otherwise have been used.

## 3.2 TAX INCENTIVES AT AN INTERNATIONAL LEVEL

It appears from the Income Tax Act that South Africa currently does not offer any tax advantages to an individual undertaking an investment in a "green product". An income tax deduction or tax credit might motivate the taxpayer to make such investments. These income tax deductions or tax credits need to be evaluated on an international basis in order to identify tax incentives that the South African Government could implement to incentivise individuals.

An analysis of tax incentives available to individuals, at an international level, is given below. The countries studied are the USA, Australia, France and Belgium.

### 3.2.1 THE UNITED STATES OF AMERICA (USA)

#### *3.2.1.1 INTRODUCTION*

The USA is one of the most populous countries in the world (Rosenberg, nd). The economy has achieved relatively steady growth, low unemployment and inflation, and rapid advances in technology (CIA, 2013). It is therefore inevitable for the country to be a leader in most industries, including that of green technology (Bierenbaum, *et al.,* 2012).

Carbon dioxide emissions from the consumption of energy amounted to 5.61 billion metric tonnes (MT) in 2010, making the USA the world's second largest consumer. Electricity is being produced from the following sources:

- 75.5% from fossil fuels
- 9.9% from nuclear fuels
- 12.5 % from other renewable resources (CIA, 2013)

Figure 4 below depicts the USA.

**Figure 4 : A map of the United States of America**


**Source:** CIA (2013)

### *3.2.1.2 TAX CREDITS AVAILABLE FOR THE HOUSEHOLD*

Green power can be purchased in the USA instead of purchasing electricity produced by coal. Green power is electricity produced with the aid of wind, water and solar energy. Savings can therefore be made on the generation of electricity while contributing positively to the environment (Brook, 2008).

The USA has a tax credit system in place that is applicable to property owned by individuals as their primary residences and in certain instances to second homes as well.

Qualifying energy-efficient improvements or qualified energy products have to be purchased to qualify for a tax credit, as explained by Energy Tax Incentives (nd).

These improvements relate to material that would decrease the heat loss or gain of the unit. Typical qualified products would be windows, doors and skylights. Typical qualifying energy-efficient improvements would be the installation of insulation roofing material and insulation to walls and other parts of the building.

The installation of an Energy Star rated heating and cooling system would be a qualified product. Products can earn the Energy Star label by meeting the energy efficiency requirements set out in the Energy Star product specifications. These cooling systems can run on either electricity, natural gas, propane or oil, as discussed in *Pays to live green* (2009).

A 30% tax credit on the value of the qualifying material, including labour costs, can be claimed in the year following the year in which the expenses were incurred (Bourgeois *et al.,* 2010).
Qualifying materials include:

- Solar energy systems
- Small wind turbines
- Geothermal heat pumps
- Fuel cells (EnergyStar, nd)

These tax credits are available from 2006 to 2016 (DSIRE Solar, 2012), and they are applicable to primary residences and second homes. Rental homes do not qualify for the tax credit (EnergyStar, nd). Watson (2009) adds that the tax credit is limited to USD 2,000 claimable per taxpayer per lifetime. However, this limitation has been removed from 2009 onwards, and therefore no limitation has been set on green energy (DSIRE Solar, 2012).

Residential fuel cells get a tax credit equivalent to 30% of the cost, limited to $500 per 0.5 kW of power capacity. This incentive is valid until 2016, for existing and newly constructed primary homes (DSIRE Solar, 2012).

Residential fuel cells are expensive and are selling at $50 000 per fuel cell, excluding installation. “Fuel cells can operate in different ways, but in general, residential fuel cells combine oxygen with hydrogen extracted from natural gas or propane to produce electricity. The chemical process uses the fossil fuels more cleanly and efficiently than the combustion process that occurs in, say, a gas furnace. The primary by-products of fuel cells are heat and water” (Houselogic, 2013). One fuel cell, shown in figure 5, is as large as a refrigerator, according to Houselogic (2013).

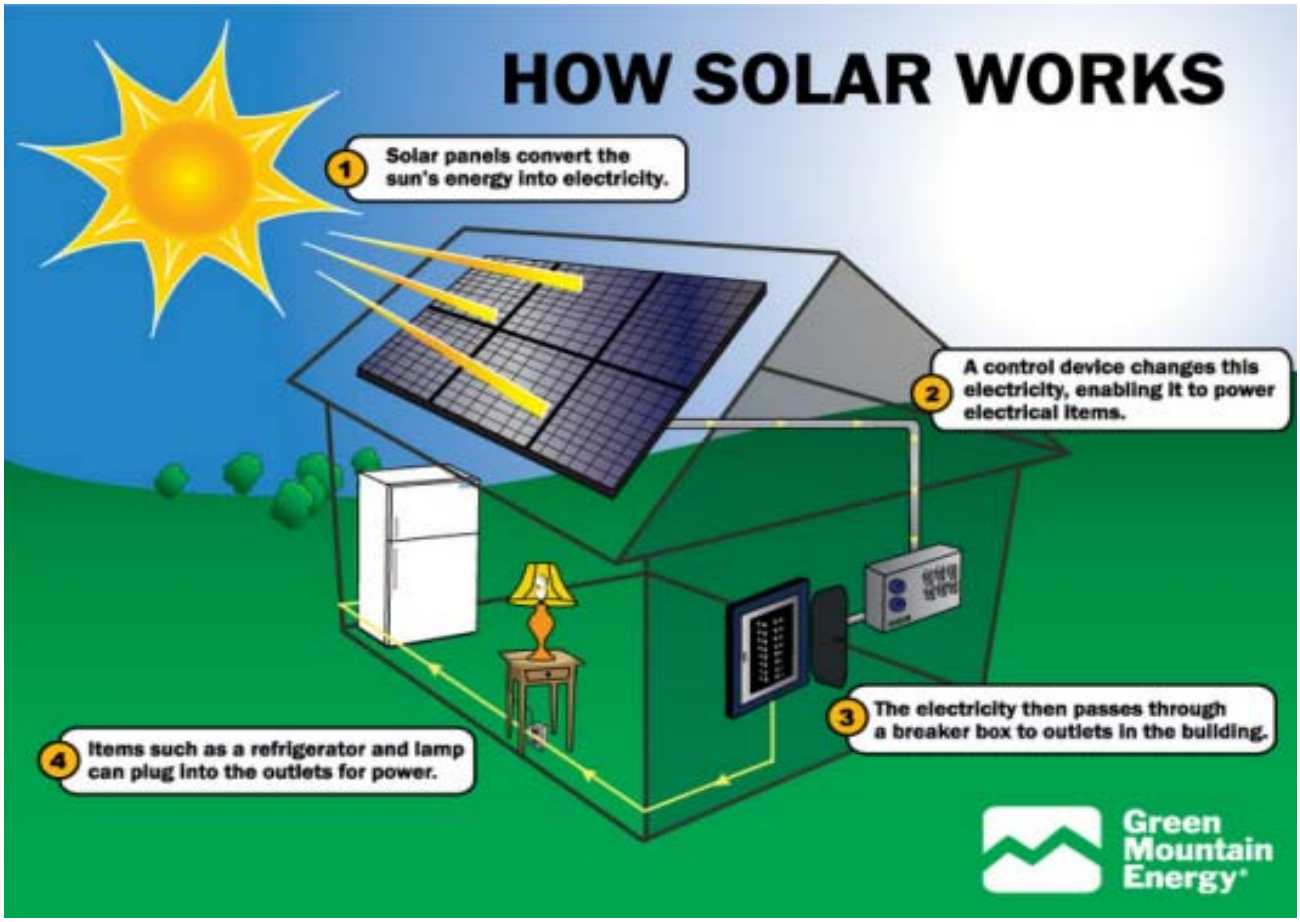
**Figure 5 : A fuel cell that is as large as a refrigerator**

**Source:** Houselogic (2013)

A permit is required to install solar panels. It is important to ensure that one’s roof structure is in good shape before solar panels are installed. The cost of making one’s roof structurally sound is not taken into account for the available tax credit. Any other cost necessarily incurred to ensure that the solar panel works as effectively as possible, for example cutting down trees that are too close to the solar panel, are also not part of the tax credit available (Houselogic, 2013).

Figure 6 illustrates how solar panels work (Gough, 2013).

**Figure 6 : How solar panels work**




**Source:** Gough (2012)

The following qualifying energy products installed in residential property are eligible for a tax credit of 10% of the cost and installation fee.

- Biomass fuelled stoves
- Heating, ventilation and air conditioning units
- Qualified roof products (metal and asphalt) (that reduce the surface temperature by reflecting sunlight)
- Windows, doors, skylights (energy-efficient windows, doors and skylights can reduce energy bills – new and replacements)
- Electric heat pump water heaters (Bourgeois *et al.,* 2010)

This tax credit is available from 2006 until 2013, but it is only available for existing primary homes and not for newly constructed homes or rentals (EnergyStar, nd). Limitations do apply between $50 and $300, depending on the type of installation.

An added tax credit under the Federal Tax code is a tax credit for insulating a primary home. Improvements made on rental homes, second homes or vacation properties are not eligible for this tax credit. A tax credit is 10% of the expenditure, limited to $500. The credit does not apply to the installation costs. The tax credit is available from 1 January 2012 to 31 December 2013. All types of insulation, fibreglass, cellulose, mineral wool, spray foam, foam board and cotton batting qualify for the tax credit, as long as the main purpose is the insulation of the residence (Houselogic, 2013). The tax credit is limited to $500 (Houselogic, 2013).

The tax credit cannot create a tax refund. If the tax credit exceeds the amount due to the Internal Revenue Service, the balance will be carried forward to the next tax period (Houselogic, nd).

#### *3.2.1.3 TAX CREDITS AVAILABLE FOR MOTOR VEHICLES*

From 2006 to 2010 a tax credit of up to $3 400 could be claimed if one purchased a hybrid car, according to Earth911.com (2010). A tax credit is currently available for owners of plug-in electronic drive vehicles.

Earth911.com states that a tax credit of $2 500 is available for a plug-in drive vehicle that has a battery capacity of at least 4 kilowatt hours. For each kilowatt hour of battery above the 4 kilowatt hours, an additional $417 can be added to the tax credit, limited to a total tax credit of $7 500 for vehicles up to 14 000 pounds gross vehicle weight.

This tax credit applies to vehicles acquired after 31 December 2009. The tax credit will phase out as all the manufacturers have a limited number of 200 000 vehicle sales for which this specific tax credit can be claimed (Tax Incentives Assistance Project, nd).

An additional tax credit was enacted for certain low-speed electric vehicles and two-wheelers or three-wheelers. The Energy Provision of the American Recovery and Reinvestment Act of 2009, section 1142 states: “To qualify, a vehicle must be either a low speed vehicle propelled by an electric motor that draws electricity from a battery, with a capacity of 4 kilowatt hours or more, or be a two- or three-wheeled vehicle propelled by an electric motor that draws electricity from a battery with the capacity of 2.5 kilowatt hours. The amount of the credit is 10% of the cost of the vehicle, up to a maximum credit of $2,500 for purchases made after 17 February 2009, and before 1 January 2012.”

#### *3.2.1.4 CONCLUSION*

The United States of America has had a wide range of tax credits available for the individual when investing in green expenses or a green vehicle, for a long period of time. The country is investing in decreasing their carbon dioxide emissions.

Although the tax credits do phase out over time, these credits were available at a certain point in time, and could have been utilised then.

### 3.2.2 BELGIUM

#### *3.2.2.1 INTRODUCTION*

Belgium was occupied by Germany in World War I and World War II, although it had become independent from the Netherlands in 1930. The country has thrived as a modern, technologically advanced European state in the last 50 years. It is also a member of the North Atlantic Treaty Organisation (NATO) and the European Union (EU) (CIA, 2013).

Belgium has a modern, open and private enterprise-based economy which has capitalised on its central geographic location (CIA, 2013). The country is a diversified industrial and commercial base, with a highly developed transport network. However Belgium showed a negative growth in GDP in 2012, which almost led to a possible recession (CIA, 2013).

Carbon dioxide emissions from the consumption of energy amounted to 127.2 million (metric tonnes) MT in 2010, making Belgium the world's number 34th consumer. Electricity is manufactured from the following sources:

- 46.4% from fossil fuels
- 33.7% from nuclear fuels
- 12.3 % from other renewable resources (CIA, 2013)

Figure 7 below depicts Belgium.

**Figure 7 : A map of Belgium**


**Source:** CIA (2013)

### *3.2.2.2 TAX CREDITS AVAILABLE FOR THE HOUSEHOLD*

Belgium is currently contributing to the installation of solar panels on public buildings as well as contributing to the investment of energy efficiency of social housing (Greunz, 2011).

These improvements have been implemented not only for solar energy production, but to set an example for the residents of Belgium, and to contribute to a positive image of the

region (Greunz, 2011). A method of motivating people to use solar photovoltaic energy, solar-thermal energy and geothermal energy has therefore been implemented in Belgium (Cansinon, Pablo-Romero, Roman & Yniguez, 2010).

A tax credit has been introduced for energy-efficient equipment bought for residential purposes. The following equipment qualifies for a 40% of costs deduction against tax payable by individuals (Cansinon, *et al*., 2010), (Greunz, 2011):

- Solar water heating systems
- Solar photovoltaic panels
- Geothermal heat pumps
- Double-glazed windows
- Roof insulation
- Regulated thermostats
- Wall and floor insulation
- All RES-E technologies (RES-E technologies include: bioenergy, direct solar energy, geothermal energy, hydropower, ocean energy, and wind energy) (Miller, Bird, Cochran, Milligan, Bazilian, Denny, Dillon, O'Malley & Neuhoff, 2013)

The tax credit for the above equipment is limited to a maximum deduction of €2 770 per household (Greunz, 2011). However, the tax credit for the solar equipment is limited to a maximum of € 3 600 per household (Greunz, 2011).

A tax credit of 15% will be given for the first year, for the cost of the replacement of water heating systems, with new heaters meeting minimum efficiency requirements. For the subsequent years 40% of the cost can be deducted (Greunz, 2011).

The remaining costs can be carried forward to the next three fiscal years for all energy-efficient equipment bought in excess of the limit available per year. These tax credits are deductible for primary houses, newly constructed houses and rental accommodation (Greunz, 2011).

The tax credits were only valid until 28 November 2011. For a tax credit to be claimed after that date, contracts with contractors had to be signed before 28 November 2011. The necessary work had to be carried out in 2012. Only the roof insulation remained enacted after that, although the percentage credit decreased to 30% of cost (Deloitte, 2012).

The scheme contributes to a 1.5% interest rate subsidy when a loan is taken out to finance an investment in green products. Therefore, an additional 1.5% interest rate is deducted from the interest rate charged by the lender, to arrive at an interest expense (Greunz, 2011).

In addition, a tax reduction of 40% is allowed on the residual interest taken out for such investments (green loans). Such loans are subject to the condition that the amount borrowed is between €1 250 and €15 000.

#### *3.2.2.3 TAX CREDITS AVAILABLE FOR MOTOR VEHICLES*

Belgium has a tax reduction against tax payable when an electronic vehicle is purchased. Electronic vehicles that are exclusively powered by an electric motor will receive a credit of 30% against tax (ACEA, 2012), limited to €9 510. This tax credit is only valid until 2012 (Ernst & Young, nd).

A fringe benefit must be paid when a company car is used for private purposes. However, expenses can be deducted at a rate of 120% for zero-emissions vehicles and 100% for vehicles emitting between 1 and 60 g/km of $CO_2$. Above 60 g/km, the deductibility rate decreases from 90% to 50% (ACEA, 2012).

#### *3.2.2.4 CONCLUSION*

Belgium is one of the European countries that is committed to reducing its $CO_2$ emissions and committed to making the citizens more aware of their footprint.

The deductions allowed are very generous. The tax reductions allowed certainly give the citizens the power to ensure that their coal electricity usage is reduced to the lowest possible level and their footprint is reduced.

### 3.2.3 FRANCE

#### *3.2.3.1 INTRODUCTION*

France is a leading European nation and one of the most forward-thinking countries. France is also a member of NATO, the G-8 (group of the eight largest economies), the G-20 (group of twenty finance ministers and central bank governors), the EU and other multilateral organisations (CIA, 2013).

France is the most frequently visited country, with 79 million visitors a year, and with the third largest income in the world from tourism (CIA, 2013). France has had some difficulties since the recession as the country is quite influential; however, plans have been put in place to ensure the growth of the country (CIA, 2013).

Carbon dioxide emissions from the consumption of energy amounted to 395.2 million (metric tonnes) MT in 2010, which puts France in the 18th place in world consumption. Electricity is manufactured from the following sources:

- 20.5% from fossil fuels
- 53% from nuclear fuels
- 22.9 % from other renewable resources (CIA, 2013)

Figure 8 below depicts France.

**Figure 8 : A map of France**


**Source:** CIA (2013)

### *3.2.3.2 TAX CREDITS AVAILABLE FOR THE HOUSEHOLD*

Estate agents are required to display the energy efficiency grading of a house they are selling or letting as this has been made compulsory. Therefore, home owners are choosing to become more “green” conscious. This has affected the value and attractiveness of houses on the market (French Property News, 2013).

France promotes the use of solar photovoltaic energy, as well as investments in systems that produce energy from wind power, hydropower or biomass. To claim a tax credit, individuals must install these systems at either their main residence or an unfurnished rental property with a 5-year or longer lease contract. However, properties built after 1 January 2011 will not be eligible for a tax credit as it is deemed that these properties are intended to be built to high energy efficiency standards (French Property News, 2013).

A percentage of total cost (excluding labour) will be allowed as a tax credit against tax payable. The only exception is the cost of the roof and wall insulation, of which a percentage of the labour cost can be claimed (French Property News, 2013).

The installations done must be completed by a provider, therefore DIY projects do not attract a tax credit from the tax authorities (French-Property, 2013).

Although every year the percentage of the tax credits decreases and the standard that must be complied with increases, an average tax credit of 40% has been implemented for cases when two different types of system were installed consecutively (French Property News, 2013). This scheme has been extended for an additional three years, which takes it up to December 2015 (French Property News, 2013).

The table below summarises the energy conservation tax credits available in France for the 2012/3 year of assessment. The first column of the table illustrates, under Rate 2012/3, the percentage of the cost of the materials that can be claimed as a tax credit for the 2012/3 year of assessment. In the second column, under Package 2012/3, the column illustrates the percentage tax credits available on the cost of the material, if several projects are undertaken simultaneously.

**Table 2 : Energy conservation tax credits in France**

| Energy Conservation Tax Credits | | |
|---|---|---|
| **Type of works** | **Rate 2012/3** | **Package 2012/3** |
| **All Properties** | | |
| Photovoltaic Solar Panel | 11% | 11% |
| Wind/Thermal Solar/Hydraulic Power | 32% | 40% |
| Heat Pump Air-Water | 15% | 23% |
| Geothermal Heat Pump | 26% | 34% |
| Thermodynamic Heat Pump | 26% | 34% |
| Combined Heat and Power (Cogeneration) | 15% | |
| Wood Pellet Boiler (New Installation) | 15% | 23% |
| Wood Pellet Boiler (Replacement) | 26% | 34% |
| Wood Burning Heater (New Installation) | 15% | 23% |
| Wood Burning Heater (Replacement) | 26% | 34% |
| Energy Survey (DPE) | 32% | |
| **Properties At Least Two Years Old** | | |
| Condensing Gas Boiler | 10% | 18% |
| Loft/Floor/Wall Insulation | 15% | 23% |
| Front Door Insulation | 10% | |
| Combined Heat and Power (Gas) | 17% | 26% |
| Thermostatic Controls/Equipment | 15% | |
| Rainwater Harvesting System | 15% | |
| Double Glazing* | 0% | 10% |

**Source:** French-Property (2013)

A maximum amount of €8 000 per single person or €16 000 per couple who submit a joint tax return can be claimed in tax credits by French residents. For additional dependants the maximum amount increases by €400 (French Property News, 2013).

For individuals doing installations at a rental property, a maximum amount of €8 000 per rental property, limited to three houses per year, can be claimed. The ceiling applies for five consecutive years, for the periods between 1 January 2005 and 31 December 2015 (French Property News, 2013).

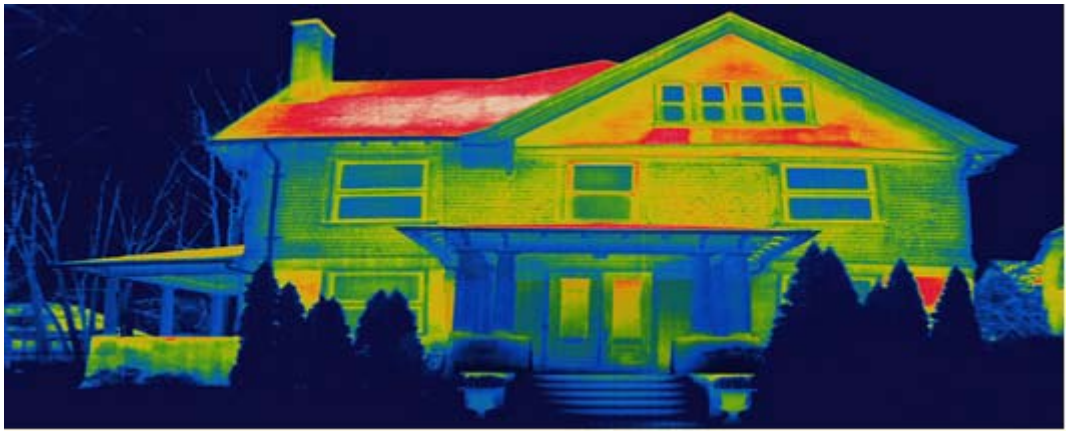
In France a tax relief is a reduction in tax payable to the tax authorities, and tax cannot be converted to a liability payable by the tax authorities. A tax credit also has the effect of a reduction in tax, and this reduction can result in a refund payable to the individual by the tax authorities.

A 0% interest rate eco-loan has been provided to assist homeowners and landlords to finance renovations to their homes to achieve savings in energy and greenhouse gas emissions (Build up, 2013).

A loan amount of up to €20 000 can be supplied if at least two elements of projects are being undertaken. For projects that extend over at least three elements, a loan amount of up to €30 000 can be obtained (French-Property, 2013). The 0% interest rate co-loan is only applicable to houses built before 1 January 1990. A thermal survey would have to be performed (French-Property, 2013).

Figure 9 shows the heat absorbed at a residential property during a thermal survey.

**Figure 9 : Thermal survey of a residential property**



**Source:** P-O Life (nd)

After the installation of the energy-efficient products, certain decreased levels of energy consumption must be achieved. Two of the following installations have to be completed in order to get a 0% interest rate eco-loan:

- high thermal performance insulation of the roof

- high thermal performance insulation of the walls
- high thermal performance insulation of the windows, glazed walls and doors
- replacement or installation of heating or domestic hot water system
  (French Property News, 2013)

However, to qualify for this tax credit the individual needs to prove these expenses by supplying the necessary documentation and invoices (Cansinon, *et al*., 2010).

In addition to the above, an exemption of between 50% and 100% of property taxes is granted for five years for newly constructed residential property. This exemption is applicable when the energy-efficient standard implemented is higher than the regulations currently in force (French-Property, 2013). An additional two years of property tax exemption can be claimed if the owner lets the authorities know about the completion of the newly constructed house within 90 days (French-Property, 2013).

Energy conservation work done on older homes, built before 1989, will receive a 50% to 100% exemption on property tax for five years. The work done should exceed €10 000 once off or €15 000 over a period of three years. This is applicable to main houses and rental property (French-Property, 2013).

#### *3.2.3.3 TAX CREDITS AVAILABLE FOR MOTOR VEHICLES*

The following tax credits for motor vehicles are available:

- For a vehicle emitting 20g/km or less of $CO_2$, the tax credit is €7 000.
- For a vehicle emitting between 20g/km and 50g/km of $CO_2$, the tax credit is €5 000.
- For a vehicle emitting between 50g/km and 60g/km of $CO_2$, the tax credit is €4 500.
- For a hybrid vehicle emitting 110g/km or less of $CO_2$, the tax credit is €4 000 (ACEA, 2013).

The above tax credits are limited to 20% of the vehicle's purchase price including VAT. However, for vehicles that emit 20g/km or less, this is 30% of the vehicle's purchase price (ACEA, 2013).

An additional bonus is that hybrid vehicles emitting 110g/km or less are exempt from paying vehicle registration fees for the first two years. Electric vehicles are also exempt from company car tax (ACEA, 2013).

The vehicle tax credits change annually therefore these specific tax credits will only be available for 2013. The vehicle tax credits did improve from 2012, however.

#### *3.2.3.4 CONCLUSION*

France has made a commitment to reducing $CO_2$ emissions; various tax credits have been implemented, and changed over the years. France not only provides tax credits for commercial buildings but also takes households into account.

Various tax credits have been implemented for households, although the percentage tax credit has decreased over the years. As the purchase price of the technology decreases, and more individuals become aware of green technology, the supply and demand increase. Naturally the government then becomes less anxious to persuade individuals to purchase green products.

France is one of the few countries that currently still have tax credits on motor vehicles.

### 3.2.4 AUSTRALIA

#### *3.2.4.1 INTRODUCTION*

“Australia has become an internationally competitive, advanced market economy due in large part to economic reforms adopted in the 1980s and its location in one of the fastest growing regions of the world economy. Long-term concerns include aging of the population, pressure on infrastructure, and environmental issues such as floods, droughts, and bushfires” (CIA, 2013).

Australia is one of the countries that have demonstrated that the citizens are positive about adopting a green lifestyle (Johnstone, 2013).

Figure 10 below depicts Australia.

**Figure 10 : A map of Australia**


**Source:** CIA (2013)

### *3.2.4.2 TAX CREDITS AVAILABLE FOR THE HOUSEHOLD*

Across Australia solar credits have been offered under the Small-scale Technology Scheme. The current Solar Energy Scheme is based on the renewable energy certificate market for individuals and companies that have installed solar, wind or hydro renewable electricity systems (Dooley, 2009).

Dooley (2009) says that for each ton of $CO_2$ saved, the owner is issued with a renewable energy certificate that is tradable at a current price of between AUD 15 and 50. This is beneficial for the owners of these certificates, as Australia's electricity companies need to submit a certain number of these certificates in order to contribute to achieving the mandatory renewable energy target (Dooley, 2009).

A rebate with a limit of AUD 500 is due to individuals who install one of the following products:

- ceiling insulation, including a top-up of existing insulation
- underfloor and cavity wall insulation
- window pelmets
- lined block-out curtains or blinds
- double-glazed windows

- insulation of hot water pipes
- energy-efficient showerheads
- draft-sealing around window and doors
- an insulation cover for external electric or gas storage hot water tanks
- energy-efficient lighting
- removal of downlights and repairs to the ceiling if ceiling insulation effectiveness is compromised
- installation of approved fire-rated downlight covers
- construction of trombe walls that increase the thermal mass of a house
- self-sealing exhaust fans to replace an existing non-sealed exhaust fan
- exhaust fan covers
- ceiling fans
- external shading
- external insulated cladding, only for concrete-walled (monocrete) dwellings (ICANZ, 2012)

The rebates need to be claimed from the government. Therefore a rebate can be claimed, but not a credit against tax. The rebate and incentives are available for 2013. While the incentives and rebates do change year on year, the government is ensuring that these rebates and incentives are provided annually.

The additional incentives available to the public have been determined separately by each province. Each province will be discussed individually.

#### *3.2.4.3 SOUTH AUSTRALIA*

Households could be eligible to receive an AUD 500 rebate for concession card holders who install a solar or electric heat pump water heater (Government of South Australia, 2012). Concession cards give people access to a range of Australian government concessions for eligible holders such as single parents, students and pensioners.

Individuals are entitled to rebates if they ordered or replaced a conventional electric storage water heater (geyser) before 30 June 2013. These rebates are available to property owners, landlords and tenants (Government of South Australia, 2012).

South Australia has implemented an additional initiative to reduce monthly household energy and water usage. The use of energy-efficient light bulbs and water-efficient shower heads qualifies for an additional rebate of AUD 50 (Government of South Australia, 2012).

The Government of South Australia also offers a free home energy audit to low-income households, to identify more methods to save energy and therefore reduce utility bills (Government of South Australia, 2012).

A home energy toolkit can be borrowed from the local library, so that one can do an energy audit oneself. The energy audit identify which appliance uses the most electricity and to determine whether there are any electricity leakages (Government of South Australia, 2012).

#### *3.2.4.4 NORTHERN TERRITORY*

If an electric storage hot water system has been replaced by a solar hot water system, a rebate of AUD 1 000 is due to the individual (ICANZ, 2012).

When products eligible for an energy smart rebate are being installed, a 50% rebate is given on the cost and the labour, with a limit of AUD 200. These energy smart products include the following items:

- Power-saving multi-switch power boards
- Remote control mains outlet
- 24-hour timers
- Power usage metres
- ‘One Shot’ hot water booster relay switch
- Low energy LED downlights
- Infrared motion sensor
- Fridge or freezer seal replacements

- Energy-saving light bulbs (ICANZ, 2012)

#### *3.2.4.5 SOUTH EAST QUEENSLAND*

A rather unusual type of incentive is offered by South East Queensland. EFTPOS gift cards which can be used as a debit or credit card are given (EFTPOS, 2013). Cash can also be withdrawn from a retailer.

AUD 100 EFTPOS gift cards are given to individuals who install an electric hot water system at an economic tariff (ICANZ, 2012). For installing a specific air-conditioner for up to three split inverters, an AUD 750 EFTPOS gift card is given, and an AUD 500 gift card for a ducted air-conditioner (ICANZ, 2012).

When connecting one's pool pump to an off-peak electricity tariff an AUD 150 EFTPOS gift card is issued, and a further AUD 250 EFTPOS gift card is given for purchasing an energy-efficient pool pump.

#### *3.2.4.6 WESTERN AUSTRALIA*

New water-efficient shower heads are given free of charge in exchange for one's old inefficient showerhead (ICANZ, 2012). If a gas-boosted solar water heater is installed a rebate of between AUD 500 and AUD 700 can be claimed (ICANZ, 2012).

#### *3.2.4.7 VICTORIA*

The state of Victoria also has a showerhead exchange programme, where new water-efficient shower heads are supplied free of charge in exchange for one's old inefficient showerhead.

A gas heater discount of AUD 700 is available for concession cardholders who replace their electric heater with a new high-efficiency gas space heater. By replacing one's existing wood-fired or peak-rate electric hot water heater with a natural gas hot water system, the owner can claim a rebate of between AUD 400 and AUD 700, in the form of a gas hot water rebate.

Furthermore, a white goods appliance rebate of AUD 100 is available to concession cardholders for purchasing an energy-efficient home appliance (ICANZ, 2012). An energy saver incentive provides discounts and special offers on a wide range of energy-saving products and services.

The following are included in the energy saver incentive:

- energy-efficient cooling
- under-floor insulation, weather-proofing strips, double-glazed windows, chimney dampers
- energy-efficient freezers and fridges
- energy-efficient heaters
- hot water system replacements and upgrades
- energy- and water-saving showerheads
- energy-efficient lighting
- high efficiency televisions
- energy-efficient clothes dryers
- energy-saving pool pumps
- standby power controls to reduce power used by home entertainment systems and computers (ICANZ, 2012)

A solar hot water rebate carries a discount of up to AUD 1 500 at the point of sale, when individuals change from an existing hot water system to any of a range of new gas and solar hot water solutions (ICANZ, 2012).

#### *3.2.4.8 MOTOR VEHICLES*

The Australian government is not anxious to give citizens a tax credit on hybrid or electric motor vehicles. In the state of Victoria, a registration discount of AUD 100 is given to drivers buying a hybrid or electric motor vehicle. And in the state of New South Wales a registration discount of a mere AUD 30 is given (McCowen, 2013).

#### *3.2.4.9 CONCLUSION*

Australian citizens are eager to become more aware of green issues, although the government only has limited rebates in place.

The lucrative rebates seem to apply in the wealthy countries only. Nevertheless, Australians seem to understand that there will be savings towards their electricity bills, and that this would also be beneficial.

## 3.3 TABLES OF COMPARISON FOR THE FOUR COUNTRIES

The tables below summarise the tax credits and rebates available to each country highlighted in the case study in chapter 3. Tax credits or incentives for energy-efficient products and motor vehicles are shown separately.

### 3.3.1 UNITED STATES OF AMERICA

The table summarises the tax credits available to Americans when energy-efficient products are purchased.

**Table 3 : USA – Tax credits on energy-efficient products**

| | % Tax credit | Year | Property: Primary | Property: Second | Property: Rental | Property: Limitation |
|---|---|---|---|---|---|---|
| A | 30% | 2006 - 2016 | ✓ | ✓ | ✗ | ✗ |
| | Tax credit on material and labour<br>· Geothermal heat pumps · Fuel Cells (Ltd $500 per 0.5 kW)<br>· Solar energy systems · Small wind turbines etc. | | | | | |
| B | 10% | 2006 - 2013 | ✓ | ✗ | ✗ | ✓ |
| | Tax credit on material and labour<br>· Bio-mass fuelled stoves · Electric heat pumps<br>· Air conditioning · Roofs, windows & doors<br>Limit : $50 - $300 | | | | | |
| C | 10% | 2006 - 2013 | ✓ | ✗ | ✗ | ✓ |
| | Limit to $500 | | | | | |

The table below summarises the tax credits available to Americans when hybrid and electric vehicles are purchased.

**Table 4 : USA – Tax credits on motor vehicles**

| Tax credit | Year | Limitation |
|---|---|---|
| **Hybrid** | | |
| $3 400 | 2006 - 2010 | ✗ |
| **Plug-in** | | |
| $2 500 | 2010 - phase out | ✓ |
| >4 KWJ + $417 p/1 KWH<br>Maximum $7 500 | | |
| **Low-speed electric, two and three wheeled** | | |
| 10% | 2009 - 2011 | ✓ |
| Maximum $2 500 | | |

### 3.3.2 BELGIUM

The table below summarises the tax credits available to Belgians when energy-efficient products are purchased.

**Table 5 : Belgium – Tax credits on energy-efficient products**

| | % Tax credit | Year | Property: Primary | Property: Second | Property: Rental | Property: Limitation |
|---|---|---|---|---|---|---|
| A | 40% | 2003 - 2011 | ✔ | ✔ | ✔ | ✔ |
| | Tax credit on material<br>· Solar water heating systems · Solar photovoltaic panels<br>· Geothermal heat pumps · Double glazed windows<br>· Roof, wall & floor insulation · Regulated thermostats etc.<br>Limit : €2 770 per household<br>Solar limit : $ 3 000 per household | | | | | |
| B | 30% | 2011 - on going | ✔ | ✔ | ✔ | ✘ |
| | Tax credit on material<br>· Roof insulation | | | | | |
| C | 15% 1st year<br>40% thereafter | 2003 - 2011 | | | | |
| | Heaters meeting minimum efficiency requirements | | | | | |

The table below summarises the tax credits available to Belgians when hybrid and electric vehicles are purchased.

**Table 6 : Belgium – Tax credit on motor vehicles**

| Tax credit | Year | Limitation |
|---|---|---|
| **Electric vehicles** | | |
| 30% | until 2012 | ✔ |
| Limit : € 9 510 | | |

### 3.3.3. FRANCE

The table below summarises the tax credits available to French individuals when energy-efficient products are purchased.

**Table 7 : France – Tax credits on energy-efficient products**

| | | Property | | | |
|---|---|---|---|---|---|
| % Tax credit | Year | Primary | Second | Rental | Limitation |
| See below | Prior - 2015 | ✓ | | ✓ | ✓ |

Tax credit only on material

| All properties | 1 Item | >1 Item |
|---|---|---|
| · Photovoltaic Solar Panel | 11% | 11% |
| · Wind / thermal solar / hydraulic power | 32% | 40% |
| · Heat Pump Air-Water | 15% | 23% |
| · Geothermal heat pump | 26% | 34% |
| · Combined heat & power (cogeneration) | 15% | 34% |
| · Wood pellet boiler (new installation) | 15% | 23% |
| · Wood pellet boiler (replacement) | 26% | 34% |
| · Wood burning heater (new installation) | 15% | 23% |
| · Wood burning heater (replacement) | 26% | 34% |
| · Energy survey (DPE) | 32% | |
| **Properties at least 2 years old** | **1 Item** | **>1 Item** |
| · Condensing gas boiler | 10% | 18% |
| · Loft, floor & wall insulation | 15% | 23% |
| · Front door insulation | 10% | |
| · Combined heat & power (gas) | 17% | 26% |
| · Thermostatic controls | 15% | |
| · Rainwater harvesting system | 15% | |

**Limits:**

Rental contract, al least 5 years.
Landlord limited to 3 rentals per year & €8 000 p/rental
Not applicable for properties built after 2010.
Limited to €8 000 p/y + € 400 p/dependant
Tax credit not for DIY projects

The table below summarises the tax credits available to French individuals when hybrid and electric vehicles are purchased.

**Table 8 : France – Tax credit on motor vehicles**

| Tax credit | Year | Limitation |
|---|---|---|
| **Electric& hybrid vehicles** | | |
| €4000 - €7000 | 2013 | ✔ |

### 3.3.4 AUSTRALIA

The table below summarises the rebates available to Australians when purchasing energy-efficient products.

**Table 9 : Australia – Tax credits on energy-efficient products**

| Province | Rebate | Year | Energy efficient products |
|---|---|---|---|
| **Australia** | AUD 500 | 2013 | · Insolation · Double glazing windows etc. |
| **South Australia** | AUD 500 | 2013 | · Solar / electric heat pump water heater |
| **Western Australia** | AUD 500 - 700 | 2013 | · Gas solar water heater |
| **Northern Australia** | AUD 1000 | 2013 | · Replace solar hot water system |
| | AUD 200 | 2013 | · Power saving multi-switch power boards etc. |
| **Victoria** | AUD 700 | 2013 | · High efficient gas space heater |
| | AUD 400 - 700 | 2013 | · Gas hot water system |
| | AUD 1500 | 2013 | · Solar hot water |
| **South East Queensland (EFTPOS Gift** | AUD 100 | 2013 | · Connects hot water system to economic tariff |
| | AUD 750 | 2013 | · Air-conditioner with 3 split inverters |
| | AUD 500 | 2013 | · Ducted air-conditioner |
| | AUD 150 | 2013 | · Connects pool pump - off-peak electricity tariff |
| | AUD 250 | 2013 | · Energy efficient pool pump |

## 3.4 CONCLUSION

The majority of countries that can afford to absorb the cost of going green are offering tax credits. The countries that have a pool of funds to finance the tax credits given to individuals are doing this at the country's expense. Because these countries do know and foresee that the earth has limited resources, the governments are committed towards ensuring a decrease in $CO_2$ levels.

Counties that are not fortunate enough to be able to provide green tax credits still have vast $CO_2$ emissions. An alternative way of ensuring the reduction of $CO_2$ emissions needs to be looked into.

Currently South Africa is only providing a deduction of 5% per annum for new and unused office buildings that are built in terms of section 13quin of the Income Tax Act. No additional deduction is allowed when green buildings that would reduce carbon dioxide emissions are built.

# CHAPTER 4

# CASE STUDY BASED ON EACH RESPECTIVE COUNTRY

## 4.1 INTRODUCTION

A scenario will be described and then the facts of the case study will be applied to each of the comparative countries. Following this, the case study will be applied to the South African scenario and recommendations are made.

## 4.2 CASE STUDY

A resident of a country had a total taxable income of $200 000/€144 930/ R1 956 000 for the year ending February 2013. Except for the following expenses, all the qualifying deductions have already been deducted from gross income. Assume the individual pays tax at an average rate of 35%. The resident has a primary house, a rental property and a second home (holiday house).

He installed solar photovoltaic panels to the value of $7 000/€5 072/R68 460 in his primary house. Labour amounted to $700/€530/R6 846. He also insulated his second house by installing insulation in the roof, walls and floors to the value of $2 000/ €1 450/R19 560. Labour costs for the insulation work amounted to $500/€362/R4 890.

He installed a biomass stove in his primary house to the value of $4 500/€3 260/ R44 010. He installed a duct air conditioning unit at the rental house. The value of the air conditioning unit was $4 000/€2 900/R39 120.

He installed a water heater operated by an electric heat pump which met the minimum efficiency requirement in his rental property and cost $800/€580/R7 824. He installed solar water heating systems (thermal solar) to the value of $4 000/€2 900/R39 120 and solar photovoltaic panels to the value of $3 000/€2 174/

R29 340. Geothermal heat pumps to the value of $4 000/€2 900/R39 120 were installed in his rental property.

He installed an energy-efficient showerhead valued at $50/€36/R489 in his primary residence. He also installed an infrared motion sensor valued at $400/€290/R3 912 and a power-saving multi-switch power board valued at $300/€220/R2 934.

The resident also bought an electric vehicle (plug-in vehicle) the total cost of which was $30 000/€21 740/R29 340. This vehicle emits 0g/km of $CO_2$. The plug-in vehicle has a battery capacity of at least 10 kilowatt hours.

(**Note:** Exchange rates: $1 = €0.72; $1 = AUD 1; $1 = R9.78)

### 4.3 UNITED STATES OF AMERICA

The tax payable is calculated in Table 10 for the individual residing in the USA for the case study illustrated in 4.2.

**Table 10 : Tax payable in the USA**

| Description | Amount | Calculation |
|---|---|---|
| Taxable income | $200 000 | |
| | | |
| Average taxable charge | $70 000 | (35% * $200 000) |
| ***Tax credits :*** | | |
| - Solar panels | $2 310 | (30% of cost)(($7 000 + $ 700)*30%) |
| - Insulation | $250 | (10% of cost) (($2,000 + $ 500)*10%) Labour excluded |
| - Biomass stove | $300 | (10% of cost) ($4,500*10%) |
| | | (Biomass stove limited to $300) |
| - Duct air conditioning | - | No tax credit available - rental property |
| - Electric heat pump water heater | - | No tax credit available - rental property |
| - Solar water heating system, solar photovoltaic panels & geothermal heat pumps | $3 300 | (30% of cost) ($11 000*30%) |
| - Showerhead, infrared motion sensor & multi-switch power board | - | No tax credit allowed |
| - Plug-in vehicle | $5 002 | ($2,500 (for 4 KWH) + ($ 417*6) |
| ***Tax payable*** | **$58 838** | |

## 4.4 BELGIUM

The tax payable is calculated in Table 11 for an individual residing in Belgium for the case study in 4.2. Assume that the year of assessment is 2011, as no information for 2013 was available.

**Table 11 : Tax payable in Belgium**

| Description | Amount | Calculation |
|---|---|---|
| Taxable income | €144 930 | |
| | | |
| Average taxable charge | €50 726 | (35% * €144 930) |
| ***Tax reductions :*** | | |
| - Solar panels | €2 169 | (40% of cost)((€5 072 + €350)*40%)) Limited to €3 600 |
| - Insulation | €725 | (40% of cost)((€1 450 + €362)*40%)) Limited to €2 770 |
| - Biomass stove | €1 304 | (40% of cost)(€3 260*40%) |
| - Duct air conditioning unit | - | No reduction available |
| - Electric heat pump water heater | €87 | (15% of cost in 1st year,40% subsequently) (15%*€580) Limited to €3 600, but rental property is seen as another household |
| - Solar water heating system | €1 160 | (40% of cost)(€2,900*40%) Limited to (€3600 - €87) already utilised |
| - Solar photovoltaic panels | €870 | (40% of cost)(€2 174*40%) Limited to (€3 600 - €87 - €1 160) already utilised |
| - Geothermal heat pumps | €1 160 | (40% of cost)(€2 900*40%) Limited to €1 483 (€3 600 - €87 - €1 160 - €870) |
| - Showerhead, infrared motion sensor & multi-switch power board | - | No reduction available |
| - Plug-in vehicle | €6 522 | (€21 740* 30%) Limited to €9 510 |
| ***Tax payable*** | **€36 729** | |

**Note:** Expenses in pink are for the rental property.

## 4.5 FRANCE

The tax payable is calculated in Table 12 for the individual residing in France for the case study in 4.2.

**Table 12 : Tax payable in France**

| Description | Amount | Calculation |
|---|---|---|
| Taxable income | €144 930 | |
| | | |
| Average taxable charge | €50 726 | (35% * €144 930) |
| ***Tax credits:*** | | |
| - Solar panels | €558 | (11% of cost of material)(€5 072*11%) |
| - Insulation | €334 | (23% of cost of material)(more than one element utilised in the year) (€1 450*23%) |
| - Biomass stove (wood pellet boiler) | €750 | (23% of cost of material)(€3 260*23%) |
| - Duct air conditioning unit | - | 50% tax credit available only until Dec 2009 |
| - Electric heat pump water heater | €134 | (23% of cost of material)(more than one element utilised in the year) (€580*23%) |
| - Solar water heating system | €1 160 | (40% of cost of material)(€2 900*40%) |
| - Solar photovoltaic panels | € 239 | (11% of cost of material)(€2 174*11%) |
| - Geothermal heat pumps | €986 | (34% of cost of material)(€2 900*34%) |
| - Showerhead, infrared motion sensor & multi-switch power board | - | No deduction available |
| - Electric vehicle | €6 522 | €7 000 deduction, limited to actual cost €6 522 (€21 740*30%) |
| ***Tax payable*** | **€40 043** | |

**Note:** Total deductions did not exceed €8 000 for either the primary property or the rental property. Expenses in pink are for the rental property.

## 4.6 AUSTRALIA

The tax payable is calculated in Table 13 for the individual residing in Australia for the case study in 4.2.

**Table 13 : Tax payable in Australia**

| Description | Amount | Calculation |
|---|---|---|
| Taxable income | AUD 200 000 | |
| | | |
| Average taxable charge | AUD 70 000 | (35% * AUD 200 000) |
| ***Tax credits:*** | | |
| - Solar panels | - | No tax credit available |
| - Insulation | - | No tax credit available |
| - Biomass stove | - | No tax credit available |
| - Duct air conditioning unit | - | No tax credit available |
| - Electric heat pump water heater | - | No tax credit available |
| - Solar water heating system, solar photovoltaic panels & geothermal heat pumps | - | No tax credit available |
| - Showerhead, infrared motion sensor & multi-switch power board | - | No tax credit available |
| - Plug-in vehicle | - | No tax credit available |
| ***Tax payable*** | **AUD 70 000** | |

The following can be claimed from the government. Table 14 below shows all the available rebates that can be claimed in Australia.

**Table 14 : Available rebates in Australia**

| Description | Amount | Calculation |
|---|---|---|
| - Solar heat pump water heater | | |
| - South Australia | AUD 500 | AUD 500 rebate is applicable |
| - Northern Australia | AUD 1 000 | AUD 1 000 rebate is applicable |
| - Victoria | AUD 1 500 | AUD 1 500 rebate is applicable |
| - Insulation - whole of Australia | AUD 500 | AUD 2000 with a ceiling of AUD 500 |
| - Showerhead | AUD 50 | AUD 50 with a ceiling of AUD 500 |
| - Infrared motion sensor | AUD 200 | (50% * AUD 400) Limited to AUD 200 |
| - Power-saving multi-switch power board | AUD 175 | (50% * AUD 350) Limited to AUD 200 |
| - Electric vehicle | - | No deduction or credit available |
| ***Tax payable*** | **AUD 3 925** | |

Therefore although no tax credits are granted, the total out-of-pocket expense is AUD 66 075.

## 4.7 SOUTH AFRICA

The tax payable by an individual residing in South Africa who installs the products described in the case study is shown in Table 15.

**Table 15 : Tax payable in South Africa**

| Description | Amount | Calculation |
|---|---|---|
| Taxable income | R 1 956 000 | |
| | | |
| Average taxable charge | R 684 600 | (35% * R1 956 000) |
| | | |
| ***Tax payable*** | **R684 600** | |

There are currently no tax credits available to South African individuals under South African tax legislation, that is the Income Tax Act.

South Africa is currently in the early stages of investing in more green options, and being green is a fairly new concept to most South Africans. Individuals and companies are only now being made more aware of their $CO_2$ footprint and becoming more environmentally accountable.

In committing to greater environmental accountability, South Africans can build a more sustainable future. It is therefore inevitable that the government should try to ensure that South Africans implement green products and more energy-efficient products. The onus rests on the government to ensure that the $CO_2$ emissions per year decrease, as well as to report back to the next COP conference. There is a need to make the citizens environmentally aware and give them a reason to live a greener life.

A good practice would be to implement tax credits in order to ensure awareness on the part of individuals and companies. When possible tax credits are to be implemented,

guidance could be sought from the European countries that have tax credits in place. The factors that South Africa as a Third World country would need to take into account should be considered, along with the budget available for these tax credits, as the tax credits would have a direct effect on the amount of tax collected.

## 4.8 CONCLUSION

Hypothetically, a 15% tax credit could be claimed for items generally used in South Africa. Currently, solar panels, insulation in roofs, heat pumps and energy-efficient bulbs are frequently used in South Africa.

The table below illustrates the tax that would have been payable by South Africans if a 15% tax credit been implemented in the scenario outlined in 4.2.

**Table 16 : Hypothetical tax payable in South Africa**

| **Description** | **Amount** | **Calculation** |
|---|---|---|
| Taxable income | R 1 956 000 | |
| | | |
| Average taxable charge | R 684 600 | (35% *R1 956 000) |
| ***Tax credits:*** | | |
| - Solar panels | R11 296 | (15%*R75 306) |
| - Insulation | R3 668 | (15%*R24 450) |
| - Biomass stove | - | No tax credit available |
| - Duct air conditioning unit | - | No tax credit available |
| - Electric heat pump water heater | R1 174 | (15%*R7 824) |
| - Solar water heating system, solar photovoltaic panels & geothermal heat pumps | R16 137 | (15%*(R39 120+R29 340 + R39 120)) |
| - Showerhead, infrared motion sensor & multi-switch power board | - | No tax credit available |
| - Plug-in vehicle | - | No tax credit available |
| ***Tax payable*** | R652 325 | |

By looking at the least tax payable, it can be established which country grants the largest tax credits, and therefore which resident would need to pay the least tax to the respective tax authorities.

Converting the tax payable per country in the case study to ZAR produces the following figures:

- USA = R575 436
- Belgium = R498 902
- France = R543 918
- Australia = R646 214 (out of pocket)
- South Africa = R684 600 or R652 325

Even with the hypothetical tax credit South Africa still has the highest tax payable when compared to the other four countries, despite the fact that the products selected for tax credits are the most popular green items in South Africa. These tax credits would encourage South Africans to go green.

Apart from the South African resident, with no tax credits, the Australian resident would pay the fourth highest tax, after installing the products in the case study. The reason is that no tax rebates are legislated; rebates can only be claimed from the government. Australia is also very different from the other countries under study, as the country is divided up into states and rebates are given according to the state.

In the case study, if one were to deduct the government rebates from the tax payable, the total out-of-pocket expenses would be R646 214. The rebates granted are only a means of motivating the individual to purchase a more energy-efficient product, instead of a product that costs a little less.

A resident in the USA would pay a tax of R575 436 in the case study, the third highest tax payable. The reason is that rental properties are not allowed a tax credit for green materials or labour employed in improving the energy efficiency of the rental property.

Improvements could therefore be made to the legislation regarding tax credits for rental properties, as the rental properties are as important as the primary residence.

The USA has determined a tax credit that will be applicable for 7–10 years. Therefore, there will be no review of these tax credits during this period, which makes the rebate rather conservative. One needs to assess every year whether the tax credits are in fact in line with the required reduction of $CO_2$ emissions.

The French resident is in second place, with a tax of R543 918 payable. The reason is that Belgium offers lucrative tax credits. Almost all the tax credits offered in France are exceeded by the Belgian tax credits in the case study, although higher percentage tax credits are given to French residents if more than one element has been included.

French individuals do get tax credits per item. A detailed summary of the tax credits available has been published. In addition, higher tax credits are given when more than one item has been installed.

Last but not least, the winner in the case study is the Belgium resident, with a liability of R498 902. Compared to France, which is in second place, Belgium makes higher tax credits available. This is an interesting result, as one would assume that a bigger country would have been the leader. Belgium focuses on giving a tax credit to primary, second houses and rental property, which is not the case with the USA or France. Belgium also focuses on giving a relatively large tax credit compared to the other countries under study.

Therefore, it is evident that Belgium is strongly committed to reducing the country's $CO_2$ emissions as well as providing energy-efficient products to individuals at a reasonable price.

# CHAPTER 5

# CONCLUSION

## 5.1 INTRODUCTION

“At work, you use your smart phone to check the real-time pricing updates on your power supplier’s app. It predicts electricity prices will shoot up during the hottest time of the day, between 4pm and 6pm – the time when people get home from work and turn on air-conditioners, massively increasing power demand. The kids are at home today, so your air-conditioner is already on. You log-in to your home’s power control system and program it to cycle on and off every 10 minutes from 4 pm, halving your household’s power use during the expensive peak.

“Before 4 pm, the system tells you, the solar panels on your roof will be pumping out more than enough to not only run the air-conditioner but also the fridge, freezer and home entertainment system. Excess energy from the panels will also have topped up your home’s power batteries.

“After you get home tonight, stored energy from the batteries will run the air conditioner and the TV and will mean all you’ll need to buy from your power company is a small amount of electricity to cover your needs late in the evening – at a much lower cost than earlier in the day.

“Of course, you’re well aware that the cheapest electricity is the electricity you don’t use. Long before this hot summer you have taken steps – using expert advice from your local, independently-accredited energy advice centre – to reduce your energy use to a minimum” (Green, 2013).

What is being described above is the ideal situation. Fossil-fuel electricity is being saved in favour of the greener option. However, these greener options come at an additional expense to the consumer.

Internationally every country has its own method of calculating the income tax credit. The tax credits available to the individual are decided at the discretion of these countries and depend on the available budget. It is evident that it is not possible to give an individual a tax credit for the full amount, and therefore it is over-ambitious to believe that South Africa will allow a 100% tax credit.

The South African Government is focused on investment to ensure economic growth for the future. South Africa is a Third World developing country, and an income tax credit of this nature is not considered a priority.

However, South Africa contributed 1.49% of total $CO_2$ emissions in 2009, as stated by Urban Earth (2012). Furthermore South Africa's $CO_2$ emissions in 2009 made it the 12th highest carbon dioxide contributor globally. In 2009 South Africa contributed 10.2 tons of $CO_2$ equivalent emission rate per person, which is in excess of the global average rate of 7 tons per person (The Worldbank, 2013). Therefore, relief for "green expenses" or "green investments" is necessary and should be implemented.

The USA is seen as the world leader in most areas, as stated by BBC News (2012). One would expect the USA to have implemented an effective income tax deduction, as the USA contributed 17.3 tons of $CO_2$ equivalent emission rate per person in 2009 (The Worldbank, 2013). However one needs to look at the differences between South Africa and the USA.

In estimating the tax benefit, political and therefore government decisions need to be made. COP17 demonstrated that the USA is ready to participate in the global project of reducing carbon dioxide, as discussed by Stern (2011) at the event.

South Africa could introduce a tax credit, a tax deduction or a fixed amount of rebate, which appears to be the trend internationally. It is also important to establish the percentage of tax credit or tax deduction that would be implemented.

Without government intervention, there is no incentive for companies or households to consider environmental damage, since it affects many individuals who have little or no direct contact with the polluter. Therefore, protection of the environment generally requires collective action, usually led by government.

## 5.2 ADDRESSING THE RESEARCH OBJECTIVES

The research objectives were as follows:

- To analyse tax benefits for green expenses available for individuals living in the USA, Australia, Belgium and France.
- To compare the impact of the tax benefits available in the four countries with reference to a case study scenario.
- To perform a comparative analysis between the available tax benefits as discussed in objective 1 and what is available in South Africa.
- To offer some suggestion on possible tax benefits to be implemented in South Africa.

The first objective was met by detailed analyses of the green tax credits that are available for the respective countries. All countries have their own unique percentage tax credits or initiatives available to the individual. The tax credits analysed only have one thing in common; they aim to put more energy-efficient products in homes in order to reduce the $CO_2$ footprint.

Australia has a unique rebate system in place per area, where rebates can be claimed from the government. Belgium has higher percentage tax credits in place compared to the other countries under study. Belgium is the only country under study offering tax credits for primary, secondary and rental property.

France is unique, as greater percentage tax credits are offered if more than one investment is made simultaneously and furthermore tax credits are only offered for projects done by a professional. The USA is an exception in that it has implemented tax credits applicable for 7–10 years without any change in tax credit rates. Similar types of tax credits are offered by the USA, Belgium and France. The tax credits are also similar regarding the type of items on which tax credits are offered.

The second and third objectives were met by the case study scenario and then applied to each respective country, with the available tax credits per country. Not all the countries included in the study had tax credits. Therefore, it is not a given that any country would

have tax credits for energy-efficient products. Various tax credits and limitations have been identified per country. However, no tax credit of more than 50% was found; the cost of purchasing the products is being split between government and the individual.

Suggestions have been made regarding factors the South African government needs to consider in implementing green tax credits. Every government needs to establish what tax credits can be created as a deduction for environmentally responsible individuals and companies.

On the other hand, tax money has to be split between various sectors. Therefore, governments with fewer sectors would be able to spend more on reducing $CO_2$. For instance, in South Africa, a large portion of tax money is being contributed to AIDS medicine and awareness and is being spent on court cases involving parliamentarians.

Hopefully, tax credits will soon be implemented for individuals in South Africa, to enable them to purchase energy-efficient products at a lower cost than the cost at which such products are currently available.

## 5.3 FINAL CONCLUSION

The implementation of a tax credit would encourage individuals to purchase energy-efficient products instead of purchasing the normal energy non-efficient products. The cost of these products is higher than that of the non-efficient products, but the energy-efficient products contribute to a better future. The benefits of these products also exceed the costs in the short term.

The energy-efficient products contribute to a more sustainable future. One would therefore be building a better world and future for one's children and grandchildren.

It is evident from the case study of the different countries that tax credits would decrease the cost to the resident dramatically. Tax credits do encourage residents to live a greener life and be aware of their daily $CO_2$ footprint.

A dramatic change in $CO_2$ emissions can only be made if every living being and company across the board contributes to a greener lifestyle. The implementation of a tax credit specifically for energy-efficient products would inspire individuals to invest in energy-efficient products. The investment would be beneficial not only to the purchaser and tenant, but also to the country and the world as a whole.

South Africa would need to do research on the various percentages of tax credits available across the world, and would then need to establish the possible deductions available for South Africans.

## 5.4 RECOMMENDATION

Recommendations made on the basis of the study would be to make tax credits available to individuals in South Africa. The tax credits would not only promote energy-efficient products, but would also reduce electricity usage and $CO_2$ emissions.

Although tax credits of 50% or more of the cost of the product were not seen in the case study, any percentage tax credit would be beneficial to the individual. A tax credit similar to that offered in the European countries studied or the USA would be appropriate. Therefore, any tax credit ranging from 10% of the cost of labour and materials to 40% of the cost of labour and materials would be beneficial.

At present Eskom is the sole provider of electricity in South Africa, and only uses coal. Further, the demand for electricity is also higher than the supply at certain times during the day. Eskom is currently investing in new opportunities to generate electricity through wind farms. However, it will take a decade or two to get this project running.

An additional type of tax credit would be to offer another incentive to individuals for energy resources that are not used. This would involve individuals' reducing their energy consumption, as this is an on-going concern in South Africa. Not only would energy be saved, but there would be savings on coal consumption and costs.

Eskom raises tariffs annually, in order to save for the erection of a new plant. Tariffs therefore increase substantially year on year. If an average rate of 100 c/kWh is used for this example, a tax credit of between 10 c/kWh and 50 c/kWh could be introduced. Thus, the tax allowance would be based on more efficient use of energy resources by consumers.

Brazil, which is also a Third World country, has had a residential energy tax credit program in place since 1977. Tax credits for solar heating systems, geothermal heating systems and wind electric generation have been issued. Furthermore, in 1989 tax credits for premium efficient appliances, duct testing and sealing, heat pumps, air-conditioning systems, furnaces, boilers, air handlers and hybrid/alternative fuel vehicles were enacted. Various tax credit percentage rates and calculations of how much electricity had been saved multiplied by a factor had been introduced in Brazil (Dillard, 2006).

It is evident that the trend is for governments to supply energy-efficient tax credits to individuals. South Africa is therefore bringing up the rear in offering energy-efficient tax credits. Thus South Africa is behind and needs to implement energy-efficient tax incentives, as it is very important to reduce $CO_2$ levels. A tax credit of at least 15% would be sufficient to motivate South Africans to invest in energy-efficient products.

## 5.5 FUTURE RESEARCH

Building a greener life is of vital importance, although no incentives are being offered by the South African government. The four countries that the case study was based on not only had tax credits in place, but also contributed to and showed commitment towards becoming greener.

Future research could be done in the following areas:

- Identifying all the products that contribute to a more energy-efficient environment, and determining the tax effect

- Establishing what part of the national budget South Africa could set aside to decrease $CO_2$ emissions
- Determining the costs and benefits of a greener lifestyle in South Africa
- Tax effect of tenants' installing energy-efficient products
- Investigating the tax allowances applicable to the commercial sector and green buildings

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