

ENERGY EFFICIENCY

Luna and the Energetica -
the energy-efficient ship



Design & Layout by Kite Group
www.kitegroup.com.mt
info@kitegroup.com.mt

First published in 2022

Written by: Clinton Cassar
Editor: Amanda Zahra
Publication Copyright ©: Kite Group
Literary Copyright ©: Energy and Water Agency

No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior permission of the author and the publisher.

ISBN

WELCOME!

Energy is essential in the operation of many global events, opportunities, and tasks. We cannot live without different sources of energy as they are vital for our day-to-day actions. We use energy for light, for cooking, to watch television or to use a computer. It is practically unimaginable living our life without energy! We need to act wisely and make some changes in our behaviour to adopt renewable sources of energy. We need to plan together to make efficient use of these resources which are available to all!

It is for this reason that the Energy and Water Agency has prepared this book to help you discover, learn and act responsibly towards our environment in a fun and engaging manner. This book might help you come up with ideas to save energy and encourage you to do your part. You can make that little difference in the world! Remember, every little action counts as altogether it will lead to bigger actions!

THE EDUCATIONAL POTENTIAL OF THIS RESOURCE

The Energy and Water Agency's mission is to educate the younger generation about the crucial role of renewable sources of energy in our lives. This resource aims to primarily guide and assist educators in their curriculum. It should in no way restrict them in their teaching. This resource could also be utilised by students as an extension of the learning activities at GHAJN National Water Conservation Centre and in the classroom.

This resource is divided into three main sections:

The first part of this book includes a story that revolves around a mission that a pirate named Luna needs to undertake to save the planet and her ship called the Energetica.

The second part of this book contains a range of different/varied activities to help support and consolidate the learning process.

The third part of this book contains additional material including useful websites and a glossary of important keywords (which are marked in bold throughout the text).

Tasks are differentiated and graded using a 'traffic light' system to determine the level of difficulty. This does not mean that such guidelines are prescriptive.



EASY - These activities can be easily completed without any assistance.



MEDIUM - These activities require some thought and additional analysis. Some adult assistance might help in completing this task.



HARD - These activities require additional effort and thought. The need for adult assistance is required for these tasks.



ACTIVITY 1: OBSERVE AND ACT

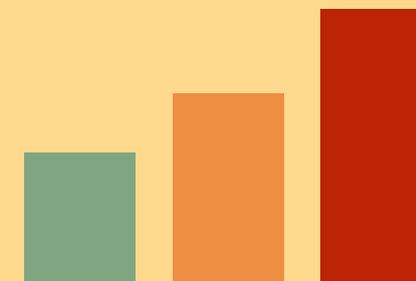
Take a look around you and observe your surroundings. How many items or devices make use of electricity?

Write them down:

Any item, device, or appliance that requires a plug or even batteries, makes use of energy. Practically everything around us requires energy, but most of the time energy is lost or wasted. To prevent this from happening, energy efficiency needs to be considered.

Energy efficiency means that less energy is used by specific devices to perform particular tasks. It is essential to reduce greenhouse gases in the atmosphere and lower electricity bills. Many measures can be adopted to implement energy efficiency in everyday life whether it's in households, industries, offices or even means of transport.

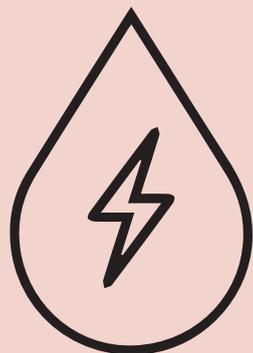
This book will help you to become more aware of energy efficiency and how it can be implemented. The KWL chart on the next page will guide you in making an informed decision upon completing the activities in this book. Fill in the first two columns of this table now and then come back to it once you finish off the content presented in this book to complete the last column of the KWL chart.





ACTIVITY 2: KWL CHART

KNOW	WANT-TO-KNOW	LEARNED
Write down what you already know about energy saving and energy efficiency.	List some factors about energy you would like to know more about.	What have you learned from this book and activities?



CHAPTER 1 - THE DREAM

Another dawn was breaking and the first sun's rays started to peek over the horizon, transforming the dark blue sea into a palette of orange-red hues painted on each swelling wave. Luna lay peaceful in deep slumber, swaying gently to and fro on an old, tattered hammock which had stood the test of time. She squinted as she was gently awakened by the light of the sun's rays and its accompanying warmth on her wide, round face. With difficulty and dread, she rubbed her dark hazel eyes to try to shake off sleep. When her vision became clearer, she stood up and realised that it was already morning. While stretching both hands with all her might in mid-air and yawning repeatedly, she slowly realised that this was the life she had always imagined as a child. She was finally living her dream!

Luna smiled a wide, beaming grin as memories from the celebrations held during the previous night came back to her. The state of the galleon now was completely different from the night before! Even though a dead silence prevailed, she could almost still hear the cheer and elation echoing across the ocean. It was an indescribable moment seeing the other crew members - who she now considered more like family - singing and humming to 'Happy Birthday' jubilantly in unison.

The crew included Roger, nicknamed the Terrible, who had a heart of gold, despite his stout, towering and intimidating physique. Since her father's death, Luna considered him a father figure - an indisputable pillar of strength and refuge. He was not only a mariner responsible for sailing the galleon in the right direction, but he gave the best advice one could ever ask for! Indeed, he had promised that, after her father's death, he would do anything in his power to protect Luna. Another crew member is Sephora, who like Luna, was born and raised in piracy.

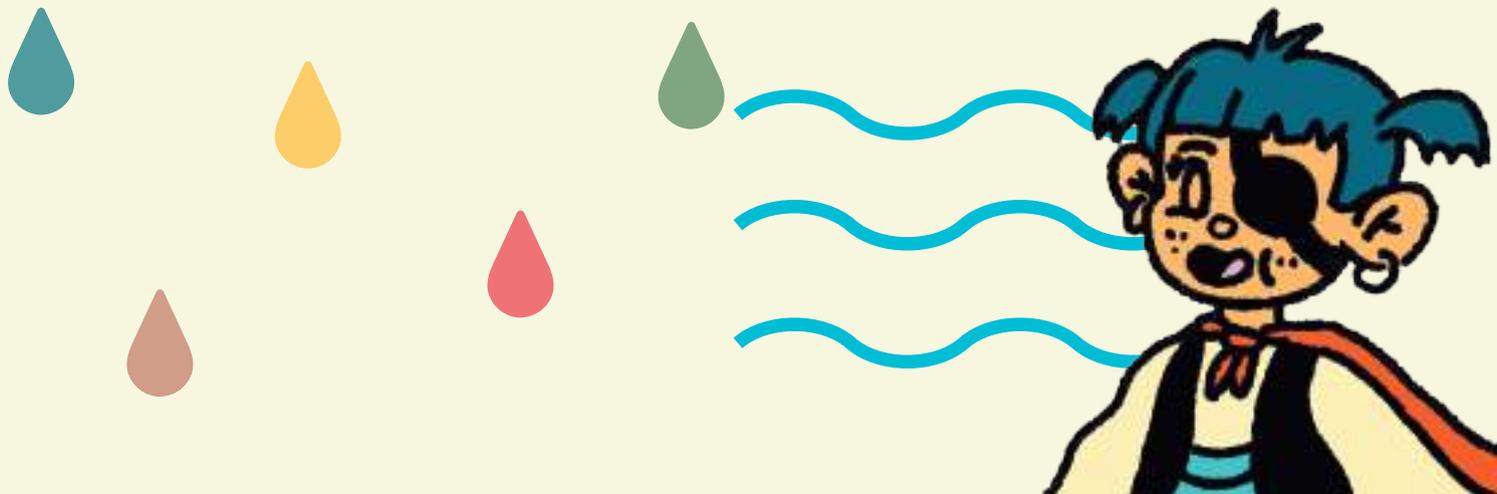




Despite being the closest of friends, they do not seem to see eye to eye on a wide range of issues. They are literally chalk and cheese! Sephora, a sunny soul by nature, is a fair-skinned girl with a mane of curls cascading over her small pale face. On the other hand, Luna despite being quite introvert, is rather happy-go-lucky, with her jet black hair often tied into two uneven pigtails. Sephora is responsible for cooking the most mouth-watering dishes possible, even though she favours spice at times! Rosemary, curry, sage and turmeric seem to be her companions. She has an innate gift of mixing this variety of spices and herbs to elevate any dish with the necessary flavour.

Last but not least, there is Marcus, the oldest of the lot. His pearls of wisdom, are always welcome and well-received. He has an inherent ability to forecasting weather conditions effortlessly and precisely! It may seem too good to be true, but he is always spot on –whether it’s raining cats and dogs or sweltering heat is in store!

Luna had truly savoured the moment when she enthusiastically cut the moist three-tier chocolate cake. It was whipped with the delicious buttercream which Sephora had wholeheartedly prepared for her. For a few minutes, Luna stared at the eighteen candles rigorously positioned equidistant from each other waiting impatiently for her to blow them profusely. Looking forward with great anticipation to reach this milestone, she had to pinch herself to realise that she finally and officially reached adulthood! Now she was on the verge of making her dream come true – to live the true life of a pirate!



After reading the first chapter, answer the following questions:

1. At what time of the day does the story start? How do you know? Find ONE phrase from the text that supports it.

2. Find phrases from the text which show that Luna found it hard to wake up.

3. Describe Luna’s physical characteristics.

4. What occasion did the crew celebrate on the galleon?

5. What does the phrase ‘pearls of wisdom’ mean?

6. What talent did Marcus have?

7. Explain the following words: wholeheartedly, slumber, stout

8. Find the meaning of these expressions:

Chalk and cheese

Don't see eye to eye

Raining cats and dogs



CHAPTER 2 – THE MESSAGE IN A BOTTLE

Luna leaped to her feet as a distant memory suddenly came back haunting her thoughts. She often felt as though her father's presence lingered in the simplest of things. In fact the gentle morning breeze enveloped Luna in a way that reminded her how her father used to hug her tight before sending her off to bed.



'Dad! Do you really have to go?' Luna asked, tucked tightly in her bed.

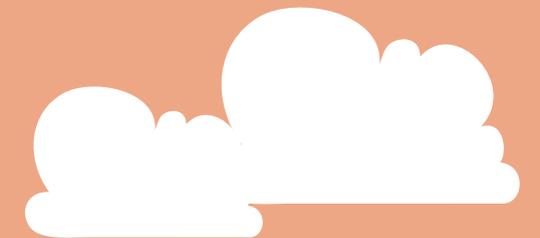
'Luna, it's late. You should already be sleeping at this hour,' her father reassured her, covering the little seven-year-old girl with several thick and colourful bedsheets.

'Dad, could you please tell me why you wanted to become a pirate?' the young girl insisted.

'Oh, Luna! You've heard this story over a thousand times. You must know it by heart by now!' Jack said sternly.

'Please daddy... please!' she pleaded, even though she knew every word he was going to say.

'Alright... alright....' Jack said as he gave in to her request and started narrating the story with a deep but enthusiastic voice. 'It all started thanks to your great-great-grandfather Peter who led us out of troublesome times and built this legacy from generation to generation – the Lionwaves. He fought to hold our name high – dominating unspoiled lands and unimaginable treasures. Now it's my turn to do my part.... and one day you will take over and become our pirate.... little Luna.'



He had barely finished his sentence, when Luna fell into a deep slumber – dreaming of how she would live up to her family’s legacy; that of being the next Lionwave.



How she wished he was still alive... His spirit lived on in Luna, so much so, that many still remarked that she bears a striking resemblance to him. Needless to say, she was determined to make him proud and fulfil his wish that upon reaching adulthood she would follow in his footsteps and become a pirate! With her mother’s blessing, she bid farewell to her homeland, the island of Ampere, and sailed out on this new adventure, days short of her eighteenth birthday.

Looking proudly at the large dressing mirror, Luna was on cloud nine as she saw herself wearing official pirate attire. It included an oversized white satin shirt and a pair of dark trousers completed with a large waistcoat and a crimson bandana, on top of which she wore a bicorne hat. She rushed down the flight of steps in the blink of an eye while she was still tying up the laces of her heavy black boots. She huffed, trying to catch her breath as she hurriedly crept to an enormous wooden desk. Luna could not stop shivering with excitement. Her hands grabbed the knob of the drawer and pushed it forward. A peculiar glass bottle caught her attention. In her heart of hearts, she knew that the bottle was still there, untouched, after all this time.



Some years back.....

‘Luna.... Luna....’ shouted her mother, Esther, at the top of her voice. Heaps of carrots, turnips and potatoes lay in a large stack on the kitchen top. They were dreading their turn to be peeled by the huge knife in Esther’s delicate hands. Always busy as a bee, Luna’s mother had been in the dark kitchen preparing a scrumptious vegetable soup for her family and crew members all morning.

‘Coming,’ Luna yelled back, as she proudly hoisted the flag and fastened the rope to the ship’s mainmast. Upon completing such a difficult task, she felt a pricking numbness taking over both hands. Luna was still trying to get her sense of touch back as a multitude of splinters had embedded themselves into her hands during this endeavour! She slowly dragged her feet down the steps leading to the kitchen.

BoOM, BOoM, BOoOmM, BOoOmMmM, BOoOmMmM

The boots insisted on being heard loudly as they hammered on the wooden deck. When she entered the kitchen, without uttering a word, her mother pointed her finger at the old mahogany chair and directed her to bring it closer to where she was sitting. Luna thought that the darkness engulfing the kitchen was perfectly in line with her mother’s stern look and the gloomy atmosphere reigning this corner of the ship.

Without hesitation, her mother pronounced, ‘I have been meaning to tell you this for a long time now.....and, I think..... the time has come....’

‘The time for what?’ Luna asked cautiously.

‘To prepare you for your future,’ she replied unhesitantly.

A puzzled look crossed Luna’s face as she did not understand her mother’s affirmations. She asked her, ‘and... what should I prepare for?’

Her mother sighed. She stopped peeling the carrots and dried her wet hands in a rapid motion, dampening the checked green kitchen cloth she was holding. Pausing for a few seconds, she seemingly tried to mince her words. Esther then started speaking her mind, in what looked like a speech she had long rehearsed beforehand.

'You know that we belong to a family of pirates. We are living a comfortable life thanks to your father – the renowned Pirate Jack Lionwave.'

While displaying signs of fondness towards her husband, Esther gazed at his painting which was hanging prominently and with symmetric precision on the other side of the cabin. She then continued, 'You are our last hope. We want our long renowned tradition of piracy to continue. You need to live up to our name by following in your father's footsteps and breaking the spell that has been inflicted on our family.'

'Spell? Which spell? Tell me... tell me... what can I do to help?' cried Luna desperately.

Esther then stood up from her chair and trudged towards a big desk in another room. Luna heard the old drawer squeak open, out of which Esther picked up a large glass bottle. Luna could see an important, hidden message within it. Esther brought over the bottle and dropped it on her daughter's lap. Luna could hardly resist the urge to open it straight away.

'Wait! Do not open it!' her mum said. She added, 'not for now.... you will need to wait until your eighteenth birthday and when the last coal fragment will be used to sail this ship. It is your responsibility to keep this bottle safe.'



After reading the second chapter, answer the following questions:

1. What was Luna's mother cooking?

2. How do we know that Luna made an effort to put up the flag?

3. Was Luna ready to help her mother? Find evidence from the text to support your answer.

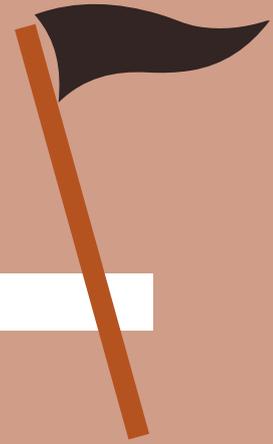
4. Explain the following words: gloomy, scrumptious, savour

5. Explain the following expressions:

Leapt to her feet

Busy as a bee

To be on cloud nine



CHAPTER 3 – THE SPELL

Just like any other pirate, Jack was a notorious, doughty, free spirit who yearned for adventure, power and glory. He had fought numerous battles, many of which he had won, and as a result, he had amassed a considerable amount of treasure. Jack captained The Energetica, a three-mast sturdy barquentine with weather-worn decks and an engine vibrating power thanks to the tonnes of coal stored in its chambers. Carved on its bow, stood a majestic, fierce lion, ready to engulf every battering wave. While other ships tend to have a mermaid or any other animal guarding their bow, Jack's family insisted on having a lion, the animal with which they had an affinity. This is the reason he was known by many as Jack Lionwave; due to his indomitable fighting spirit which he had inherited from his ancestors.

The Energetica was far from being any ordinary galleon. It was a state-of-the-art vessel possessing several rooms. One could find a spacious living area and interconnecting kitchen on the first deck. During her free time, Luna would regularly rest on the enormous sofa. She would select a book from the immense mahogany shelves and immerse herself in one of the outstanding stories. Across the room, I'd bet you would find various saucepans and pans scattered randomly over the entire kitchen top, where Sephora would be trying out one of her exotic recipes. Marcus on the other hand wouldn't miss his afternoon nap for anything in the world! Indeed, you would more often than not find him drowsing in the living quarters on the lower deck.

Jack steered The Energetica and set sail on the seven seas to plot an attack in the hopes of conquering as many lands as he could dream of. He wanted to increase his fortune by searching for hidden treasures of legendary value. This was no easy task as he sailed through treacherous seas in all kinds of weather conditions to reach unspoiled lands.

The Lionwave family was a group of pirates who inhabited the island of Ampere and had a long ongoing feud with the people of Joulenix, at the Cape of Lost Energy, which the Lionwaves had wanted to colonise for centuries, but to no avail. Joulenix is rich in a variety of resources and treasures which the Lionwave family would benefit from, especially the variety of renewable resources it possessed.

Standing on Joulenix's promontory is Mount Newton, a majestic volcano which spews flowing lava during its occasional eruptions. It offers spectacular scenes that only Mother Nature can provide! However, despite being a threat due to its powerful eruptions, it is thanks to this volcano that the inhabitants can yield geothermal energy. The magma is beneficial in heating underground water tapped by enormous wells which provide warm water to the majority of the island's houses and even generate electricity. Also, the distant humming of the propellers from an offshore wind farm can be heard operating tirelessly to generate electricity from Watt harbour - the main port of Joulenix.

The Lionwave family was jealous of the fact that Joulenix had so many renewable resources they could benefit from, while Ampere still depended on fossil fuels. Their main source of fuel was oil, which was used to produce electricity for the entire island. Furthermore, tonnes of coal were required to make use of the various means of transport on the island, such as the railway and a fleet of galleons it possessed, which included the Energetica. It was for this reason that the Lionwaves saw Joulenix as their ultimate goal, however, try as they might, it was a dream that hadn't come true!



It was exactly eighteen years ago, when Luna was still a few months old that the crew of the Energetica decided it was the ideal time to try their luck in capturing this land again, a fortune to be inherited by the younger generation, namely Luna and Sephora. With little apparent resistance, after a long tiresome voyage, the crew anchored the galleon in Joulenix's main harbour. Jack and his crew set foot on the golden sand of the beach, in awe of all the unspoiled natural surroundings they were immersed in. Despite colonising and capturing many small islands all over the globe, Jack had gained the respect of many people and he was considered a hero by many, unlike this time, as it soon turned out to be a different story.

Awaiting them was a tribe of people who, unbeknownst to Jack's crew, were observing their every move from the mountains found further inland. They departed the forests and marched swiftly towards the pirates on the beach, refusing to give up their land. Tensions started to build up between the two groups. The locals chanted furiously against Jack and his crew:

'We do not want you here!'

'We do not need you!'

'You are not welcome!'

Then suddenly, the mob of people, regimentally split into two rows, leaving space for Amelia, the chieftess of the tribe. A slender figure in a long grey dress with curly, black hair and pale skin appeared out of nowhere. She strutted majestically towards the Lionwaves holding a long sceptre, and stopped in front of her people. She scolded the pirates; her dominant voice echoing, 'I warn you! Do not trespass our boundary. We do not need you here. You have been



trying to take over our land for years but you will never be welcome at Joulenix. You'd better leave now!'

However, Jack showed no sign of leaving the island.

Upon seeing their reluctance to obey Amelia's orders, one of the locals challenged the Lionwaves; 'You will only get our homeland over our dead bodies.'

Others joined in, 'This land is ours and you can't take it!'

The surging tribe clamoured violently as they fiercely flung rocks and weapons towards the pirates. A gruesome quarrel ensued.

Amid this fight, Amelia was blinded by rage seeing her people and homeland being threatened by foreigners. Grey black mist started to encircle her as she took her sceptre and swivelled it swiftly into the air. As if by magic, with every twist and turn, the mist suddenly thickened into a swoosh of large towering dark clouds dominating the skyline.

She moved towards the pirates and inspected Jack, all of his crew, his wife and particularly his baby daughter. She then roared at the top of her lungs:

'The time will come when you will no longer have anyone to take over your legacy. You and your family will live in misery. You will no longer be known as a famous pirate that dominated the world but you will be forgotten once and for all.'

The locals witnessed a frightening scene. Some men were still shocked, trying to figure out what was happening. A few women could be heard crying in horror while covering their children's eyes to stop them from seeing this scene. They were bracing themselves for the worst, which was yet to come.



WARNING

As Amelia paused and chanted out these words, she pointed her sceptre towards the Energetica. Knowing that the 'Lionwaves' main target was to take control, especially of their renewable resources, she continued in a deep husky laugh, 'You will only have a supply of coal until that little girl reaches adulthood. Precisely on her eighteenth birthday. If by the last fragment of coal available in Ampere, you will not find any other possible renewable sources, you will no longer have a ship to help you sail through the ocean and you will no longer cause any harm to our people and the world'.

Amelia stopped and amidst the confusion, she heard the cries coming from the tiny infant cradled in Esther's arms. She resumed,

'Unless.... this little girl breaks the spell and tries to save the planet by being the change in the world!'

As she concluded her prophecy, a powerful blinding light similar to lightning erupted from the sceptre and flashed straight onto the Energetica. She vanished, her deep laugh echoing across Joulenix.

Jack couldn't believe what he had just witnessed as he helplessly fell to his knees, letting out an angry wail. He bellowed angrily as he felt helpless and broken-hearted. If only he could erase this spell!



After reading the third chapter, answer the following questions:

1. Find TWO adjectives that describe Jack.

2. Where did Jack and his crew land and why?

3. How did the locals receive Jack and his crew?

4. Describe Amelia's attitude and appearance.

5. Find words or phrases from the text which mean:

Not ruined

To shout as much as a person can

Not being eager

A quarrel



ACTIVITY 3: COMPARING ENERGY MIXES!

In this chapter, we also learned about the different types of energy in Ampere and Joulenix. A country's **energy mix** refers to the variety of energy sources that provide electricity to satisfy its consumption needs. The energy mix varies according to:

- The availability of renewable resources found in a country or region
- The need to import energy from other countries
- The country's level of development in determining its energy consumption which varies considerably from one country to another. This can also change from time to time.
- The different policy choices that influence energy consumption.

Below, find the energy mix for Ampere and Joulenix and then answer the questions that follow:

JOULENIX'S ENERGY MIX

Geothermal 38%

Wind 62%

AMPERE'S ENERGY MIX

Coal 44%

Oil 34%

Natural Gas 22%

a) Which country makes use of sustainable resources of energy? Why?



b) Which country will have a long supply of resources? Why?

c) Compare the energy sources of Ampere and Joulenix with Malta.

(i) Which energy sources are also used at present in Malta?

(ii) Which other source/s of energy can be harnessed in Malta?

(iii) Which source of energy is not possible in Malta? Why?



ACTIVITY 4: ORGANISING AN ENERGY MIX PLAN!

Ampere is a tiny island found in the middle of the ocean, with few neighbouring countries. Help Ampere to be more sustainable and diversify its energy mix! Imagine being an expert of a scientific research team planning to make better use of energy sources for the future years.

Ampere has:

- A large quantity of fossil fuels – coal and oil.
- Warm sunny weather most of the days.
- Strong winds from the north
- Forests
- One main river crossing the forest



From the available options, can you think of any renewable sources of energy that might be suitable for the island of Ampere? Propose a plan for Ampere's Energy Mix, by answering the following questions:

1. Mark on the diagram below the various energy-producing installations you would introduce depending on the resources available.
2. Identify the advantages and disadvantages of each renewable source of energy available.

3. What, in your opinion, is the best renewable source of energy for Ampere? Why?

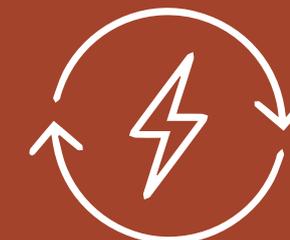
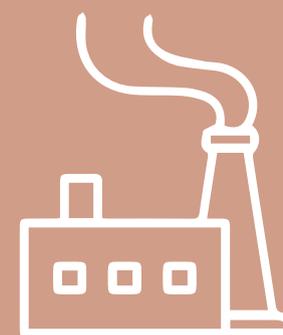


Now that you have learned more about energy mix, the focus shall be directed towards the Maltese islands.

THE MALTESE ISLANDS' ENERGY MIX

Since Malta is a member state of the European Union, it needs to follow its laws regarding energy. The nation has been diversifying its energy sources, obtaining it through three different sources:

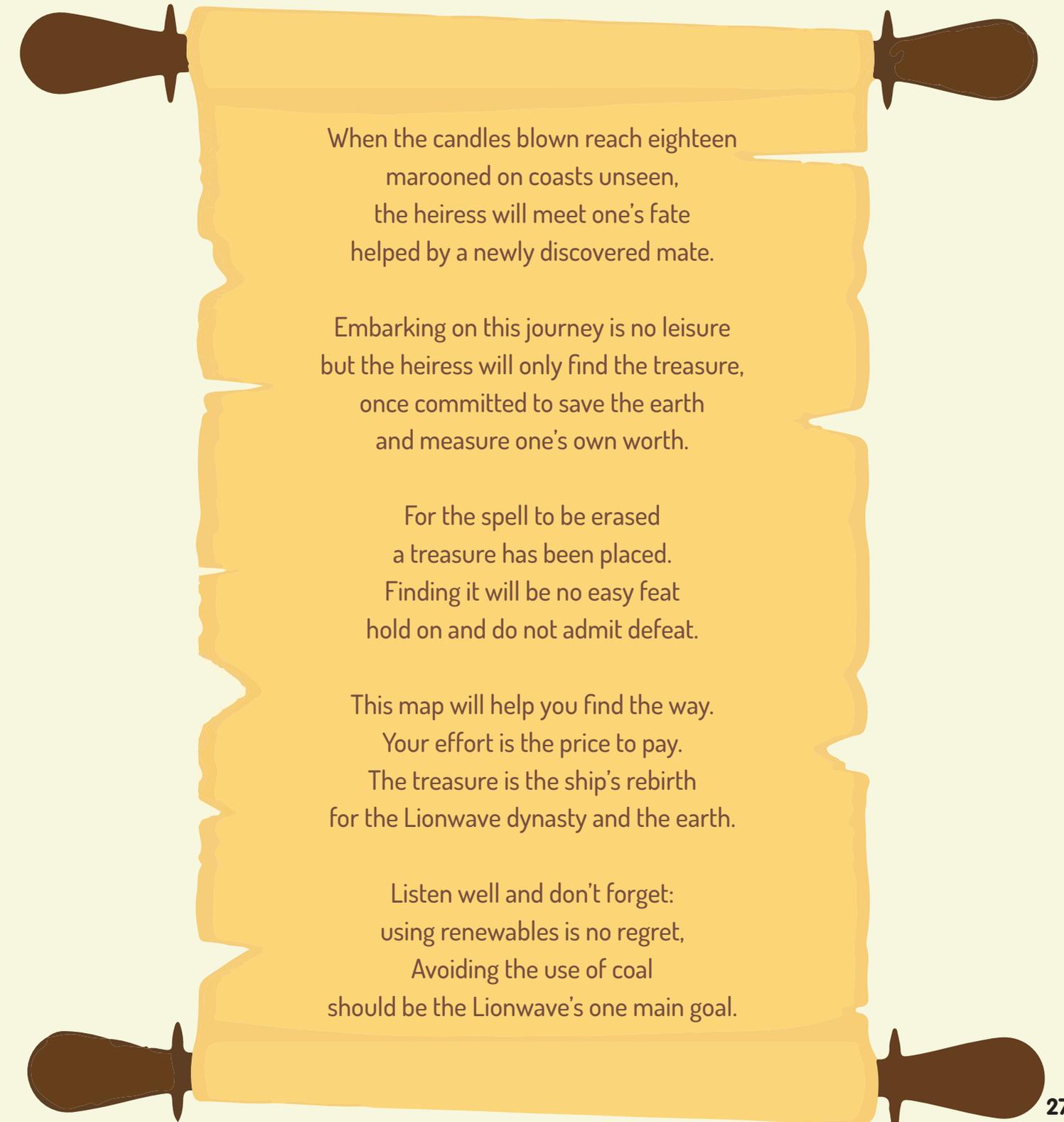
1. The Power Plant now runs on natural gas which is a cleaner type of oil, instead of heavy fuel oil which was used until 2017.
2. The Interconnector is a cable that connects Malta to Sicily in order to exchange electricity between the two countries.
3. Solar energy is being exploited to generate electricity. In fact, photovoltaic (PV) systems on household rooftops and solar farms are connected to the electricity grid. This is the most sustainable method as it does not pollute, unlike fossil fuels.



CHAPTER 4 - A MESSAGE IN THE BOTTLE

After the unfortunate encounter in Joulenix, Jack immediately prepared invaluable hints inside a glass bottle for his daughter to open when the time was appropriate. Amelia's words echoed in his mind over and over again. He couldn't remain passive, watching the years pass by and letting her win. That same night, alone at his large desk, with only a flickering candle in sight, Jack planned the necessary course of action down to the tiniest detail to prevent the spell from taking its toll on his daughter and the Energetica. He put pen to paper and started writing clues in the form of a riddle to accompany a treasure map.

Now the time has come for Luna to cautiously remove the cork from the bottle and read the scroll. As she was opening it, her eyes fell on to a map indicating a hidden treasure together with the following poem, which she read meticulously:



When the candles blown reach eighteen
marooned on coasts unseen,
the heiress will meet one's fate
helped by a newly discovered mate.

Embarking on this journey is no leisure
but the heiress will only find the treasure,
once committed to save the earth
and measure one's own worth.

For the spell to be erased
a treasure has been placed.
Finding it will be no easy feat
hold on and do not admit defeat.

This map will help you find the way.
Your effort is the price to pay.
The treasure is the ship's rebirth
for the Lionwave dynasty and the earth.

Listen well and don't forget:
using renewables is no regret,
Avoiding the use of coal
should be the Lionwave's one main goal.

'What does all this mean? Eighteen? Marooned on coasts unseen? And who is this newly discovered mate? Should I find any other resource? This is all so confusing!' Luna sighed, reading the poem over and over again, whilst trying to figure out the map's contents at the same time.

Upon reading and puzzling over the last lines of the poem, Luna was interrupted by a startling, loud sound that vibrated through the galleon like thunder.

Boom, BoOom, BooOmmMm!

With her jaw tightening and her teeth grinding together in fear, Luna swayed from one side of the ship to the other as it tumbled over and over. When she had seemingly recovered from the shock, Luna plucked up some courage and ran up the few steps back onto the deck to see what had caused that loud noise. It suddenly dawned on her, that the spell was being enacted. It was a pity that the once majestic Energetica, which had sailed undefeated through storms and misadventures, had to meet its fate in such a miserable way.

As Luna stepped with all her strength onto the deck, she turned pale in utter disbelief! The hull had hit a rock. She instantly asked for help from her friends who were presumably still in their rooms.

'Roger!' she shouted, to no response.

She persevered and tried once again, this time in a louder tone.

'Roger! Roger!'

'Maybe he is busy and can't hear me,' she thought to herself.

'Sephora! Where are you?'

'Marcus.... Are you there?'



'Can you hear me?' she called helplessly.

However, no one answered her pleas.

She found this very strange.

She jumped the flight of steps and rushed downstairs.

On seeing one of the doors was ajar, she flung it open, finding Marcus standing close to the coal supplies.

'Marcus.... Didn't you hear that loud noise?'

He showed no signs of hesitation or reaction. Luna moved close to her friend and realised he was standing completely motionless. She started waving at him frantically, but to her disbelief, Marcus had seemingly turned into a statue.

Lying on the floor next to him, was the last coal fragment on the Energetica.

Luna cried in shock.

Her feet seemed to have lost their strength. Luna fell on her knees touching the cold wooden floor, crying her heart out. As she stood up and wiped her tears, she still had to figure out what had happened to the other crew members.

She soon discovered that they had all met the same fate as Marcus. How had they all turned into statues? This all seemed surreal. While the prospect of turning eighteen, had been exhilarating, it was cut short by all this! It seemed like a nightmare. She was still unaware of how her life could take a turn for the worse in a heartbeat!

Hit by anxiety, she tried to calm down herself by repeatedly inhaling the air inwards and exhaling it outwards. She managed to concentrate and tried re-reading the poem. All of a sudden, things became clearer. Luna rapidly went back on deck, took the telescope, and peered carefully over the horizon.

She thanked her lucky stars as a small island seemed to rise from the waves not very far from the ship. It appeared to be the same one her father had drawn on the map! Luna was determined to find the hidden treasure at all costs!

She removed her heavy boots and dived into the sea hoping to reach this new land. Despite being refreshing, the water chilled Luna to the bone. By braving the cold sea currents, she managed to reach the island safe and sound. Drenched in seawater, she dragged herself slowly to the shore and scanned her surroundings. She was alone on an immense beach peppered with seashells. It was a feast for Luna's eyes. No sound could be heard, except for a colony of loud seagulls flying over her head. Luna gasped for air as she lay on the beach, feeling the fine sand grains cushioning her and tingling her bare feet.

Luna closed her eyes tightly and wished that she could open them to discover this had all been just a nightmare! She was suddenly startled by heavy rainfall.

Is the climate so unpredictable on this island? How could it be possible?

She pondered the many peculiarities she had experienced in the past few hours. However, this time round she was wrong – it wasn't any ordinary rainfall – but a rainfall of coconuts! Luna looked up at the trees behind her. She could see that the culprit was a tiny chameleon.

'Pssst! Pssst!! Psssssst!!! I'm Mirko,' he hissed loudly.

The chameleon stood high up on the coconut tree, hugging a branch as he playfully hollered with joy. Mirko continued to throw coconuts at Luna, luckily missing his mark everytime.



Growing angered by his actions, Luna stood up and sprinted to take vengeance on him. After her ordeal, Luna was running on adrenaline, but she ran as fast as her feet could possibly allow her while still drenched in water. Alarmed, the chameleon sprinted zig-zagging amongst the trees and bushes. Luna tried to catch up with the agile animal, who seemed to be way ahead of her.

Never did she imagine that a tiny island could possess such diverse vegetation as she ran through large numbers of huge trees, ferns, figs, and bamboo. Suddenly, Luna got entangled in a large cobweb; a beautiful masterpiece of silver lace woven by gigantic, persistent spiders between two tree branches. Panicking to remove the cobwebs enveloping her body, Luna got so distracted by her surroundings that she lost her footing. Luna thought that she would fall to the ground in a few seconds, but much to her dismay, she fell into what appeared to be a dark, deep ditch.

A loud scream escaped from her lungs and was heard across the quiet island!



Arghhhhhhhhhhh!

Fortunately, a bed of wet leaves drenched in morning dew broke her fall. A sharp pain travelled all along her slender body, needling her left elbow, out of which tiny drops of crimson blood oozed gently. Facing upwards, still in panic and her mind fogged with confusion, she could only see clouds rolling in over the blue sky. The chameleon was peering down cautiously from above the ditch to check on her.

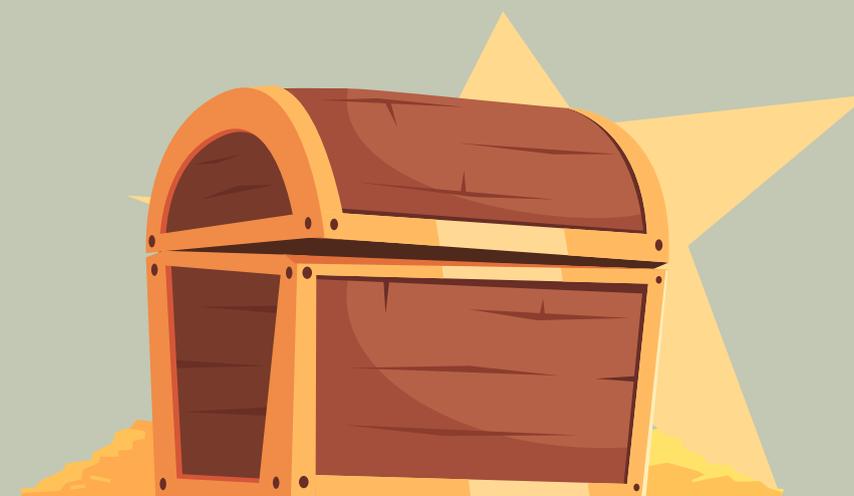
'Look.... Look behind you,' Mirko advised her.

Still bewildered by the recent chain of events, Luna tried to decipher what Mirko was saying. Her eyes widened at the sight of a treasure chest that lay in front of her.

'Could it be true? Was it pure luck or was it marked in my destiny?' she mumbled.

In the meantime, Mirko did not waste any precious time and came to the rescue. With much effort, he rapidly wrapped a robust rope to a branch and threw it at Luna. Her knuckles turned pale with the tremendous effort needed to grab the rope. She managed to make her way up to the ground once again, clutching the treasure chest.

The moment of truth had finally arrived. Mirko was waiting with excitement as Luna anxiously opened the treasure chest with caution. There was a large note on top of the treasure, and Mirko hurriedly handed it over to Luna. She recognised the calligraphy immediately- it was her dad's! Luna started reading the note with curiosity:



Dear Luna,

I left this important task in the hands of Mirko.... he knows the entire plan and will help you throughout. If you are reading this note, then most probably the last fragment of coal available has been used on the Energetica and the spell has left its toll on it. Please, give the ship the transformation it requires to become an energy-efficient galleon. Restore it to its former glory - only then will the spell be removed.

P.S. Remember to always switch off any unnecessary items!

I am always with you, little Lionwave.

Love, Dad



As her eyes were brimming with tears, she peeped inside the treasure chest. Gasping in surprise, no gold or money was inside. There were items she would never imagine to be in a treasure chest, such as LED bulbs, thermal insulation, seeds and small photovoltaic panels.

Without giving her enough time to think, Mirko jumped up to advise her, 'We need to hurry! Bring the treasure chest with you and let's go on the Energetical!'

After reading chapter 4, answer the following questions:

1. Find two words that rhyme from the poem.

2. Explain the following words:

Heiress

Marooned

3. Why did Luna's friends turn into statues?

4. Why did Luna swim towards the island?

5. Describe Mirko the chameleon.



CHAPTER 5 – THE CHANGE

Despite being a small chameleon, Mirko turned out to be a trustworthy organiser, something that Jack had already foreseen in his plan. Following the instructions, upon reaching the shore, the duo found an old boat with flaking bright blue paint. Although it looked like it had seen better days, the boat served its purpose well as both Luna and Mirko rushed to paddle it towards the Energetica in the shortest time possible. With tremendous effort, the pair managed to carry the treasure chest from the boat up onto the deck.

Both of them wanted to obey orders and without further ado, they started working on the items found in the treasure chest. The note ordered Luna to change the galleon's bulbs first. The old incandescent bulbs were replaced with LED bulbs. Luna grinned at managing this task so effortlessly. Mirko made himself handy as he proudly went into each room and started to switch on the lights. They could both instantly spot the difference.

When all rooms were lit up, Luna wanted to verify whether the spell's effect was revoked. She ran to each of her friends to check whether they were still motionless. Still, she obtained no response when she started calling their names. However, in a matter of seconds, Roger's statue seemed to slowly dismantle and he was coming back to life.

'Oh Roger, it is so nice to see you,' Luna jumped enthusiastically.

Still bewildered by what had happened, Roger could not resist hugging her while she started wiping away her tears.

The added help of Roger was a true relief for Luna and Mirko. With perseverance, they were able to erase the spell and bring their friends back to life. They continued on their mission relentlessly. Their next task was to insulate the various rooms of the Energetica with expanding foam to prevent any heat from escaping. While every corner of the



ship was being insulated, parts of Sephora's statue were melting. Luna was overjoyed now that her friend was back with her!

The next step was to make good use of the various seedlings by planting them in different-sized pots. Besides creating a pleasant environment on the galleon, they would also help in reducing pollution. Sephora had always thought she had green fingers, so she was eager to lend a hand and sow the seeds in colourful pots of different shapes and sizes. She was delighted to see that some new herbs would be added to her collection! Ever the intruder, Mirko took a jug and started watering the plants. In a few seconds, as if by magic, the seeds started to sprout in marvellous plants and herbs. The Energetica exhibited an array of colourful plants and brought life to the dark atmosphere that prevailed.

Now, the crew had to accomplish the last task to free Marcus. They had to install small photovoltaic panels to abandon the galleon's dependency on coal. A collaborative effort between all team members was needed to install them. Roger took the lead in placing them on top of the cabin where they would be exposed the most sunlight. As soon as he finished positioning these devices and the sun's rays started to diffuse on the dark surface of the photovoltaic panels, Marcus' statue seemingly start to melt.



'Marcus!' yelled Sephora at the top of her lungs.

'Welcome back!' cheered the others.

Mirko hopped in delight.

The spell was now officially broken! All the crew members had come back to life. Luna was overjoyed with what she was able to do for the Energetica and for planet Earth.

All of a sudden, the pleasant breeze blowing across the ocean changed into a strong whirlwind. The galleon started to swivel rapidly in a strong motion, terrifying its crew members who were now huddled together in terror while strongly gripping the deck.

With every turn, the ship started to undergo small changes, transforming into a different means of transport. Firstly, any parts damaged in the collision were instantly repaired. Once this occurred, the Energetica was changed completely into an energy-efficient ship.

The Energetica was no longer using coal to operate, but it was now making use of photovoltaic panels to sail across the ocean!

Old appliances and devices were no longer on board – a new refrigerator, oven, washing machine and television set were now available!

The galleon was also now well insulated to stabilise the temperature inside throughout each season – to protect it against the cold in winter and the summer heat.

The spell cast by Amelia was completely erased. Luna was glad that despite her slight contribution, she had been able to help the environment and her family. Mirko, her new companion, crawled over her shoulder as she stared at the immensity of the horizon in front of her – she was now a pirate and many adventures were awaiting her! Most importantly, not only was the Energetica completely transformed, but the Lionwave legacy was more alive than ever... with its family flag fluttering prominently on its main mast!



ACTIVITY 5: UNDERSTANDING ENERGY LABELS

Just like the appliances on the Energetica have been changed into modern energy-efficient devices, most electric items in our houses have energy labels.

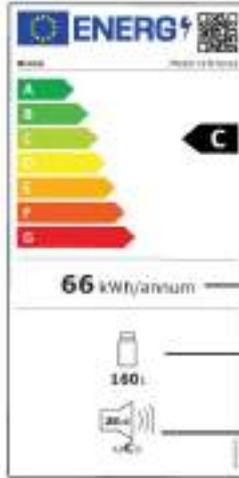
Energy labels serve as a guideline to improve the energy efficiency of various appliances and devices. These labels were first introduced in 1994 and modified in 2004, when a scale from letters A (being the most efficient) to G (the least efficient) was established. As of 1st March 2021, a new version of the EU energy label has been applied to four types of appliances – refrigerators and freezers, dishwashers, washing machines and television sets. On the other hand, new labels have also been approved for light bulbs from 1st September 2021. Other products will be added in the near future. This new scale has a stricter framework for achieving the 'A' rating. It has also included some additional features such as a QR link to an EU-wide database.

Some important characteristics found on the energy labels are:

1. The details belonging to the particular device or appliance, such as its model and its materials.
2. Energy class gives a clearer picture of the device's electric consumption through a colour code linked to a scale from A to G.
3. Further information such as capacity, consumption, and efficiency is also listed, according to the type of appliance.
4. The noise emitted by the device is displayed in decibels.



How to recognise a rescaled product ?

Current energy label	New energy label
	
62 kWh/annum	66 kWh/annum
160 L	160 L
38 dB	38 dB

The energy labels for a fridge without freezer

- The QR code gives access to more information on the model
- The rescaled energy efficiency class for this fridge, an A+++ in the previous label
- The annual energy consumption of this fridge is calculated with refined methods
- The volume of the fridge expressed in liters (L)
- The noise level measured in decibels (dB) and using a four classes scale

Source: https://ec.europa.eu/commission/presscorner/detail/en/IP_21_818



a) What are energy labels?

b) What do the letters on the energy label represent?

c) How is the volume of the appliance expressed?

d) In which units is the noise level measured?

e) Mention ONE difference between the past version and the recent version of the energy label.



ACTIVITY 6: ENERGY-EFFICIENT ENERGETICA!

Help the Energetica become more energy efficient. Fill in the blanks below.

1. Turn off the when leaving the room.

2. Turn off the when not using it.

3. Close the when you have taken the food out.

After reading the story, draw your own version of the Energetica, as an energy-efficient ship.



ENERGY EFFICIENCY

Now, we shall focus on your input. As a youngster, you can do your part to use energy sustainably, by starting from your own house and school.

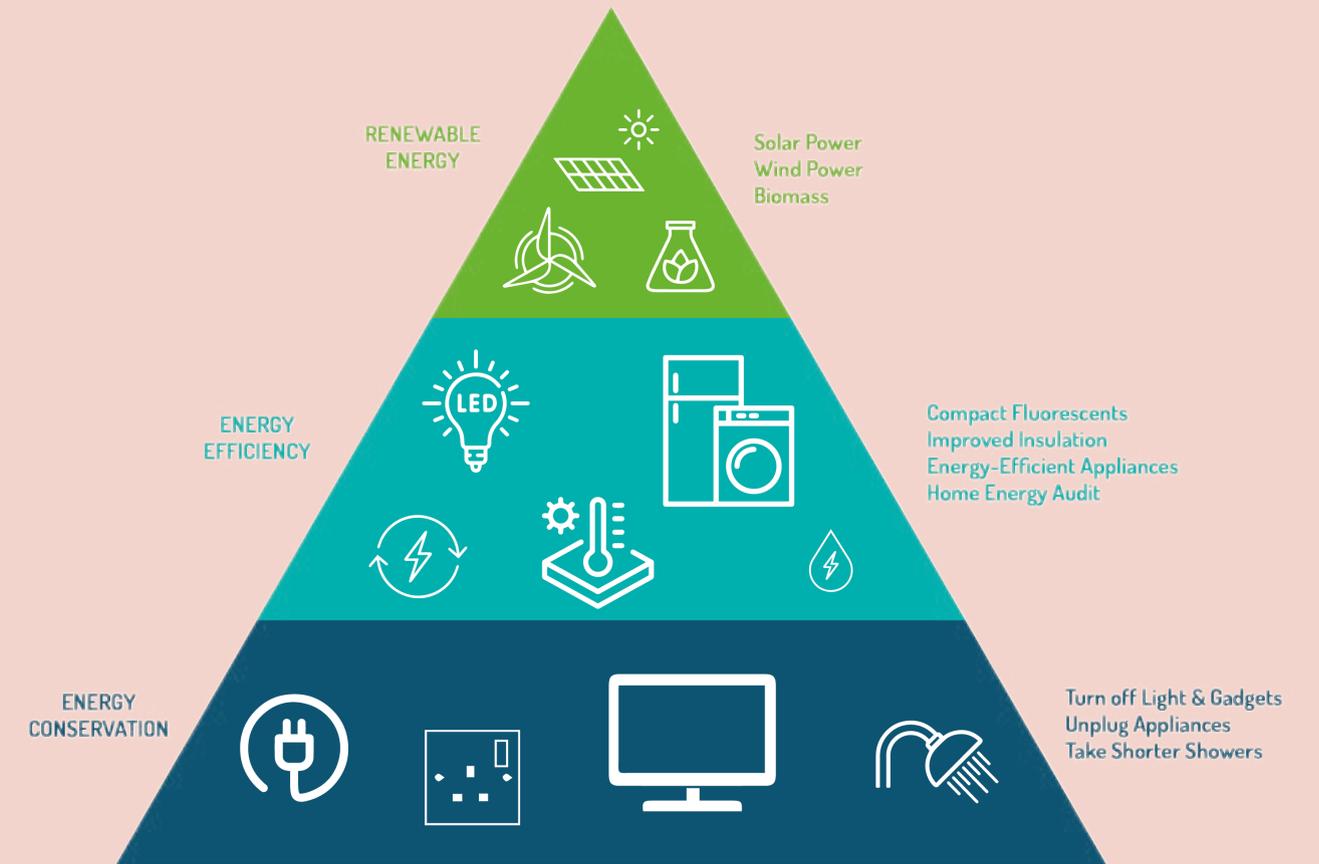
Sustainable development is a type of development that requires people to act responsibly towards not only present but even future societies. Everyone would certainly like to have a better quality of life – a better school, a well-equipped home, more open spaces and less pollution. These are all valid factors and you can easily add some of your own. Always remember that to act and live sustainably you need to take into consideration a better environment, a better economy, and better social conditions. To do this, the United Nations adopted 17 Sustainable Development Goals (SDGs) as part of The 2030 Agenda for Sustainable Development.



The SDG which focuses on renewable energy is Goal 7 – Affordable and Clean Energy. An important term that comes across these targets is energy efficiency.

To achieve these goals, we need to start from our daily actions and use energy wisely. We use energy every day, everywhere – at home, at school, at workplaces, at shopping centres and in other public places. By making wise and sustainable choices we will make the world a better place to live in.

Take note of the diagram below, which displays the Energy Saving pyramid and it might help you to make informed decisions.



The lowest level of this pyramid is referred to as Energy Conservation which includes simple everyday actions that everyone can undertake anywhere – at home or school. An example of energy conservation is switching off lights when leaving a room.

Energy efficiency means making use of less energy to perform a task or to use a device. This reduces energy waste and in turn decreases greenhouse gas emissions, which ultimately contribute to global warming. An example of an energy efficiency measure is making use of a Compact Fluorescent light (CFL) bulb rather than an incandescent light bulb.

Moving to the top tier of this pyramid requires more effort and cost. In fact, at this level, an individual implements any type of renewable energy in his lifestyle. An example of this would be placing photovoltaic panels on the household's roof.

Click on energyefficiencymalta.com tips you may wish to follow in your own house!

ACTIVITY 7: ENERGY CONSERVATION

Energy conservation means saving energy or using the amount of energy with caution. Therefore, only the required amounts of energy utilised as electricity are needed. As a result, one needs to be careful and not waste this energy!

ENERGY AUDIT

A good way to reflect upon our consumption choices and habits is to carry out an energy audit. An **energy audit** is a way to check whether individuals are using energy wisely in their house and can help reducing one's **carbon footprint**. You can do this by completing this survey. Once completed add up your points to see whether you are acting sustainably. You might need the help of an adult to answer the questions.

SOLAR DEVICES

Do you have any solar devices (photovoltaic panels and water heater) in your household?

- | | | |
|-------------|--------------------------|----------|
| No devices | <input type="checkbox"/> | 0 points |
| One device | <input type="checkbox"/> | 1 point |
| Two devices | <input type="checkbox"/> | 2 points |

REFRIGERATOR

Leave a piece of paper half in and half out of the fridge while closing its door. Try to pull out the paper. Is it....

- | | | |
|-------------------|--------------------------|----------|
| Easy to pull out | <input type="checkbox"/> | 1 point |
| Hard to pull out | <input type="checkbox"/> | 2 points |
| Does not pull out | <input type="checkbox"/> | 4 points |

LIGHT BULBS

How many LED bulbs do you have in your household?

- | | | |
|-------------------|--------------------------|----------|
| No LED bulbs | <input type="checkbox"/> | 0 points |
| 1 to 3 bulbs | <input type="checkbox"/> | 2 points |
| 4 to 6 bulbs | <input type="checkbox"/> | 3 points |
| More than 6 bulbs | <input type="checkbox"/> | 5 Points |

ELECTRICITY LOAD

Go round your household and check your appliances.

How many appliances are turned off if not in use?

- | | | |
|------------------------|--------------------------|----------|
| No appliances | <input type="checkbox"/> | 0 points |
| 1 to 4 appliances | <input type="checkbox"/> | 2 points |
| More than 5 appliances | <input type="checkbox"/> | 4 points |

How many air conditioners do you have?

- | | | |
|-----------------------------|--------------------------|----------|
| No airconditioner | <input type="checkbox"/> | 3 points |
| Up to 2 airconditioners | <input type="checkbox"/> | 2 points |
| More than 2 airconditioners | <input type="checkbox"/> | 0 points |

How many television sets are found in your household?

- | | | |
|-------------------------|--------------------------|----------|
| 1 television | <input type="checkbox"/> | 3 points |
| 2 to 4 televisions | <input type="checkbox"/> | 2 points |
| More than 4 televisions | <input type="checkbox"/> | 0 points |

How many computers (including laptops) are found in your household?

- | | | |
|-----------------------|--------------------------|----------|
| 1 computer | <input type="checkbox"/> | 3 points |
| 2 to 4 computers | <input type="checkbox"/> | 2 points |
| More than 4 computers | <input type="checkbox"/> | 0 points |



How often have air conditioner filters been cleaned over the past year?

- | | | |
|----------------------------|--------------------------|----------|
| Never | <input type="checkbox"/> | 0 points |
| Once or Twice | <input type="checkbox"/> | 2 points |
| On more than two occasions | <input type="checkbox"/> | 3 points |

Do you have a tumble dryer?

- | | | |
|-----|--------------------------|----------|
| Yes | <input type="checkbox"/> | 1 point |
| No | <input type="checkbox"/> | 2 points |

Do you dry your clothes by hanging them on the line?

- | | | |
|----------------------|--------------------------|----------|
| Always | <input type="checkbox"/> | 4 points |
| Only in fine weather | <input type="checkbox"/> | 2 points |
| Never | <input type="checkbox"/> | 0 points |

WINDOWS

What kind of windows do you have at home?

- | | | |
|---------------------|--------------------------|----------|
| Single-pane windows | <input type="checkbox"/> | 0 points |
| Double-pane windows | <input type="checkbox"/> | 2 points |
| Triple-pane windows | <input type="checkbox"/> | 4 points |

Do windows have curtains or blinds?

- | | | |
|-----|--------------------------|----------|
| Yes | <input type="checkbox"/> | 2 points |
| No | <input type="checkbox"/> | 1 point |



Do most windows face the sun?

Most of the time

Sometimes

Rarely



4 points

2 points

1 point

30- 43 Points: Congratulations! You are trying your best to make your home an energy-efficient place!

16-29 Points: You are saving a considerable amount of energy, but with some more effort you could save more.

0-15 Points: Don't lose hope! With some more effort, you might use energy more efficiently.

ACTIVITY 8: CLASSROOM PLEDGE

Now that you have observed your household, it is also important to play your part at school. Identify one or more factors that you think need to improve, this time in your classroom. Write them down below as your Energy pledge. Together with your teacher and classmates, you will try to work hard to improve your school environment. For example: Shut down the computer when I'm not using it.

IN OUR CLASSROOM...

Our class promises to take serious action in:

- 1.
- 2.
- 3.

ACTIVITY 9: THE ENERGY 30 DAY CHALLENGE

Now that you have completed this book, make sure to go back to page 6 and complete the KWL chart. To conclude what was discussed in this book, we will leave you with this 30-day challenge which you may wish to take up together with your family! Remember, now you have the knowledge about renewable energy, so make sure to act on it!

1. Turn off the lights when you leave your bedroom.
2. Turn off the air conditioner when you leave the room.
3. Plant a tree or a seedling in your house.
4. Close the curtains or blinds to maintain the temperature inside.
5. Ensure that the fridge door is tightly closed.
6. Only boil the amount of water needed in the kettle.
7. Switch off the television when you are not watching it.
8. Unplug unused appliances or devices.
9. Use lids on pots and pans to heat food faster.
10. Use energy-efficient bulbs.
11. Use the dishwasher at full capacity.
12. Use natural light if it is sunny outside.
13. Take the stairs instead of the elevator.
14. Use cold water in the washing machine.
15. Put laptops in 'sleep' mode when not in use.
16. Buy locally grown crops to reduce transport emissions.
17. Try to walk more often.
18. Compost kitchen scraps and garden trimmings.
19. Keep waste out of landfills by recycling paper, plastic, metal, and glass.
20. Encourage your parents to carpool whenever possible.
21. Avoid meat in your food at least once a week.
22. If it is sunny or windy dry your clothes outside instead of using a tumble dryer.
23. Read more about the carbon footprint.
24. Read more about renewable energy.
25. Use recycled paper.
26. Save your leftovers to reduce waste.
27. Recycle bottles and paper as it saves energy.
28. Make use of reusable bottles.
29. Buy in bulk whenever possible.
30. Talk about sustainable options.



GLOSSARY

ANAEROBIC DIGESTION	Anaerobic digestion is the process to produce fuels through microorganisms that break down biodegradable material in environments that lack oxygen.
BIOMASS	Biomass consists of plant and animal remains that are used as fuel to generate electricity or heat.
BIOGAS	Biogas is a type of gas produced from raw materials to produce methane and carbon dioxide.
BIODEGRADABLE WASTE	Biodegradable waste is a type of waste that includes organic matter which undergoes decomposition.
CARBON FOOTPRINT	Carbon footprint is the total greenhouse gas emissions released through activities undertaken by a person, family, or organisation.
ENERGY CONSERVATION	Energy conservation is reducing energy consumption by making less use of an appliance or service.
ENERGY EFFICIENCY	Energy efficiency is the use of less energy to perform a particular task or to make use of a particular device.
ENERGY AUDIT	It is an exercise that examines whether individuals are using energy wisely and efficiently in their households.
ENERGY LABEL	An energy label is found on appliances and devices, giving information about its energy consumption.
ENERGY MIX	The variety of energy sources used to provide electricity in a particular country or region.
FOSSIL FUELS	Fossil Fuels include coal, oil, and gas which were formed by the decomposition of plants and animals many years ago.
FRACKING	Fracking is the process of drilling inside the earth to extract oil, natural gas, or water.

GLOBAL WARMING

Global warming refers to an increase in the world's average temperature mainly caused due to the greenhouse effect.

NON-RENEWABLE RESOURCES

These are limited in supply and are collectively referred to as fossil fuels, which include coal, oil, and gas. They are depleted once they are used.

OFFSHORE WIND FARM

An offshore wind farm is several wind turbines located at sea.

ONSHORE WIND FARM

An onshore wind farm is several wind turbines located on land.

ORGANIC MATTER

Organic matter is the result of many small organisms that decomposed throughout the years.

PHOTOVOLTAIC PANELS

Photovoltaic panels consist of several cells that convert solar energy into electricity.

RENEWABLE RESOURCES

These resources are infinite and plentiful. This means that they are always available and can be used over and over again.

SOLAR WATER HEATERS

Solar water heaters are devices that capture heat energy from the sun to warm water.

SOLAR FARM

A solar farm consists of several photovoltaic panels to provide electricity to houses and businesses.

SUSTAINABLE DEVELOPMENT

This is a type of development that takes into account the environmental, social, and economic needs of the present generation without putting in danger those of future generations.

WIND FARM

A wind farm consists of several wind turbines that harness wind energy to generate electricity.

WEBSITES

energywateragency.gov.mt
energyefficiencymalta.com



ANSWERS

ACTIVITY 3

- a) Joulenix as it makes use of renewable sources of energy which can be used repeatedly as they are infinite.
- b) Joulenix as it has a supply of renewable sources of energy which are infinite.
- c)
 - i. Oil and Gas
 - ii. Wind
 - iii. Geothermal energy as no volcanoes are found in Malta.

ACTIVITY 5

- a) Energy labels serve as a guideline to improve the energy efficiency of various appliances and devices.
- b) Letters A (being the most efficient) to G (the least efficient)
- c) Litres
- d) Decibels.
- e) This new scale has a stricter framework for achieving the 'A' rating. It has also included some additional features such as a QR link to an EU-wide database.

ACTIVITY 6

1. Turn off the lights when leaving the room.
2. Turn off the computer when not using it.
3. Close the fridge when you have taken the food out.

