

# GREEN COMPUTING AND ITS ROLE IN REDUCING COST OF THE MODREN INDUSTRIAL PRODUCT

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## ABSTRACT

*The Importance of this research the Recycling and reuse is one of the green computing tools that contribute to protecting the environment, keeping it safe and clean, as well as using it to reduce the cost of direct raw materials in the modern industrial product. The Problem of this research Technical waste is gradually increasing day by day, which has negatively affected the environment in the form of toxic materials, heavy waste, resistant plastic materials and other hazardous wastes This necessitates finding appropriate solutions for the technical pollutants of the environment. The Aim of this research is treating heavy technical waste by adopting green computing tools, including recycling and reuse, which reduce the cost of the modern industrial product. the Hypothesis of this research The use of recycling and re-use as green computing tools that reduce the cost of raw materials used in the manufacture of the modern product .the Results of this research is Through the recycling and reuse as green computing systems, the cost of Direct Raw materials will be reduced at the rate of 42%. And the Total cost per smartphone reduced for 40%.*

**Keywords:** Green Computing, Reducing Cost, Modern Industrial Product.

## INTRODUCTION

We used to hear terms like recycling and clean green energy in the past, as the word "green" was associated with anything that contributes to preserving the environment, but today we hear something completely new, in fact it is not completely new, but we may not have heard of it before, which is computing Green It seems that preserving the environment has connected to technology in some way, and it is a bit strange that there are no links between the two, but there is much to tell you today about green computing, the term that began to appear in the media in 1992, Green computing is a somewhat new term that means the companies that manufacture technical products adhere to some environmentally friendly procedures and policies in the manufacture and use of computers, servers, or any other technical equipment, and disposing of them in an appropriate and environmentally friendly manner (Brown, 2021). These measures generally focus on reducing the percentage of energy consumed in addition to finding suitable ways to dispose of equipment in an environmentally friendly way. One of the proposed solutions to this problem is to remove certain parts of these fixtures that are made of materials such as aluminum, copper, iron and plastic, to be reused again in the manufacture of a modern product, which in turn leads to Reducing costs.

Here, we can say that the concept of green computing has begun to crystallize more clearly and to come out to us in a formal form, as there is a problem and there are solutions and measures to reduce this problem (Aws et al., 2021).

## LITERATURE REVIEW

### Green Computing

The first appearance of green computing was in 1992, when the Energy Star program was launched for the first time, and it was in the form of optional labels given to technical

products that succeed in reducing energy consumption and increasing efficiency in use to the maximum. We have found Energy Star reaches all devices from computers and screens Televisions, coolers, and other similar devices (Aws et al., 2021).

The results of this movement began to appear in the public gradually, and the first results were Sleep Mode in computers and electronic devices; Which leads to putting the computer in standby or standby mode after a period of time in order to save energy, instead of turning off the computer and restarting it every time (Al-Maqtari & Ayed, 2019).

After that, we saw a sleep or stability mode, which is the best solution to save energy, and from that moment on, the concept of green computing began to gradually expand to include many aspects that aim to use computers and technical devices with high efficiency. Green computing, green information technology, or computer information technology sustainability refers to computing or environmentally sustainable information technology (Bjorn, 2021). In the article *Harnessing Green Information Technology: Principles and Practices*, San Morrison defines the field of green computing as “*the study and practice of designing, manufacturing, using, and disposing of computers, servers, and associated subsystems - such as monitors, printers, storage media, networking and communication systems - efficiently and effectively with Less or no impact on the environment.*” The goals of green computing are similar to green chemistry, reducing flammable materials, increasing energy efficiency during the product life cycle, and increasing the recyclability and biodegradability of waste products and manufacturing waste. Research continues in pivotal areas such as making the use of computers more energy-efficient as possible and designing algorithms and systems for efficiency related to computer technologies (Burak, 2021).

### **The Importance of Green Computing**

Green computing was the result of dangerous environmental information that people circulated in the past about the depletion of our threatened natural resources and our non-renewable wealth, and then the technology companies realized that they had to do something about this problem and contribute to protecting the environment, so green computing is considered as a contribution to protecting the environment and keeping it safe and clean (Ankita et al., 2021).

Technical waste is increasing day by day, and we will gradually see its negative impacts on the environment; The rapid deterioration of the technical equipment resulted in the presence of 70 percent of waste, which is very hazardous to the environment, consisting of toxic materials, heavy waste and resistant plastics, and most of these materials and waste easily seep into the groundwater, in addition to all the aforementioned, companies that manufacture chips need very large amounts of resources to manufacture their products (Anna et al., 2021).

Unfortunately, the reality is very sad! This is because the end of our technical equipment and our computers is either in landfills or in developing countries, or worse still, the existence of global circuits and circles for the trade of scrap and waste and its export to poor countries, the matter is very complex and the presence of movements around the world calling for the application of green computing principles will have a positive impact in the whole world if We wanted to preserve our environment (Rinki et al., 2021).

### **Green Computing Technologies**

Green computing aims to reduce the energy consumed by computers and electronic devices, reduce the dangerous radiation emitted by them, and increase the profits of enterprises. This section will explain the technologies that are used by green computing to achieve the goals mentioned above and as follows.

**Software and Development Optimization:** The cost of electronic devices is constantly decreasing as a result of the great competition in the computer industry and its components, but the cost of implementing programs and algorithms that are written is still large and consumes computer hardware resources and energy. One of the most important solutions is to use a central server, which reduces power consumption because it supports more than one user at the same time (Wisam et al., 2021).

**Virtualization:** Virtualization is a new technology that has appeared recently. This technology aims to reduce energy and costs, it helps increase reliability, and it forms the infrastructure for fuzzy computing. Fuzzy computing is a way to share computational resources over the Internet. Fuzzy computing allows a group of users to share the same physical device by dividing it into virtual machines. This technique helps reduce the amount of greenhouse gases emitted; because a large number of devices are replaced by one physical device. It also reduces cost for users; as the user only pays for the resources they have used. Also, the user is no longer concerned about maintenance. Fuzzy computing has helped greatly with the preservation of the environment. While this technology suffers from many challenges, such as its ability to meet all the services that you receive in the event of a shortage of virtual devices.

**Power Management:** There are several ways to save energy, the most important of which is to turn off devices when you are finished using them. Also, most devices and operating systems currently provide many advantages and ways to save energy (Wisam et al., 2021).

**Powering off Computing Devices:** The user should be responsible for rationalizing energy consumption, and therefore he must turn off the devices when they are finished using them (Wisam et al., 2021).

**Power Saving Modes:** Most devices and operating systems support many power saving modes, including screen savers, this mode allows the screen to enter a hibernation state after a certain period of inactivity. Monitor the sleep mode, this mode causes the screen to turn off after a certain period of inactivity, and this mode saves a large amount of energy. For example, Dell's DELL20 monitor reduces power consumption from 55 watts to 3 watts in this mode. There is also a hard disk sleep mode, but the amount of power saved in this mode is not great. While the standby mode turns off all computer components after a period of sleep mode. This mode is characterized by the rapid recovery of the system upon restart, so this method is considered the best in terms of comfort for the user, and preserving the environment, but the amount of energy consumed by the computer in this mode is not a little, up to 5 watts, The last mode currently supported by the systems is the hibernate mode, which takes an additional step compared to the standby mode, whereby it loads the memory onto the hard disk and turns off all computer components. This method is considered the best in terms of the amount of power consumed, which reaches 3 watts, but it needs a longer time when restarting, because it needs to load the memory from the hard disk first, and then restore the system (ASADI, 2021).

**E-documents:** Electronic papers are known as the digital form of printed paper. Electronic papers reduce the need to purchase and print a book, or even care about where to store it. In the last three years, more than 200 million e-books were downloaded from various websites, the reliance on electronic services saved a lot for users, and it also helped greatly in preserving the environment by reducing logging and forests, which in turn can absorb greenhouse gases polluting the environment (Keshav & Bishwajeet, 2021).

**E-Waste Disposal:** E-waste is one of the most important things that negatively affect the environment. This is because electronic devices consist of toxic materials and do not decompose when disposed of. Therefore, disposing of electronic waste is of utmost importance, because disposing of it in ill-considered ways causes health and environmental

problems (Ahmad, 2020).

**Reuse:** The old devices must continue to be used as long as they meet the required needs, which in turn will reduce the negative effects resulting from their disposal in the landfill, and the manufacture of new devices.

**Refurbish:** It is possible to replace or replace the component parts of electronic devices, which in turn reduces the cost of purchasing a new device. It is also possible to donate these devices to charities and schools if they do not suit the current needs (Pratomo, 2019).

**Recycle:** When it is impossible to renew or reuse electronic equipment, a recycling option appears. Recycling these devices is a very difficult process; because electronic devices contain dangerous substances such as carbon, mercury and other toxic and non-decomposing materials.

## Reducing Cost

The key success factors of any economic institution or unit are reducing its cost while preserving the quality of its products; In 1908, the Welsh neurologist and psychoanalyst Ernest Jones wrote a paper titled "*Rationalization in every-day life.*" Jones writes, "*Everyone feels that as a rational creature he must be able to give a connected, logical and continuous account of himself, his conduct and opinions, and all his mental processes are unconsciously manipulated and revised to that end (Ajay, 2020).*". The Rationalization knows is a reorganization of a company in order to increase the operating efficiency. This sort of reorganization may lead to (an expansion, reduction in company size, a change of policy, an alteration of strategy pertaining to particular products offered). Similar to reorganization a rationalization is more widespread encompassing strategy as well as structural changes. And the Rationalization is necessary for a company to increase revenue decrease costs and improve its minimum line. Or the Rationalization may also refer to the process of becoming calculable. For example entered of the certain financial models or a financial technology rationalizes markets and makes them more efficient. The entered of the Black-Scholes model for options pricing for instance helped to rationalize the options markets in Chicago in the late 1970s (Minos-Athanasios & Nikos, 2021). And it's the process of control and good direction in the resources of the enterprise in order to provide goods and services at the lowest cost through the control of the organization at its cost to detect deviations and then take corrective action and thus can obtain a competitive advantage in order to achieve a competitive position in the market (Yongjian, et al., 2020). The concept of rationalization is different from the concept of reduction real costs. The concept of reduction means reducing the resources used and eliminating any redundant costs; whereas the concept of cost rationalization means optimal utilization of available resources in order to reduce waste and increase productivity efficiency (Srikant & Madhav, 2018). And the meaning of reduction is a planned positive approach to reduce expenditure. It is a corrective function by continuous process of analysis of costs, functions, etc. for further economy in application of factors of production. Or Cost reduction means conducting some innovations in the way of working in a new style; so that the excess costs of production and operation could be eliminated. Costs reduction programs are directed toward specific efforts to reduce costs by improving methods work arrangements and products. Cost reduction can be made in different areas and stages of production, storing and distribution process by applying more advanced and scientific techniques of operation. So the cost reduction program needs a research and development activity. The overall actual expense involved in creating a good or service for sale to consumers. and the meaning of real cost of production for a business typically includes the value of all tangible resources such as raw materials and labor that are used in the production

process (Cherepanov et al., 2018). As mentioned before the Rationalization and Reduction Of real Costs (R&RORC) focus on inputs of economic resources which represents (materials, labors, factory overhead).and outputs of economic resources which represents (Products or services).and the following terms (efficiency, effectiveness, productivity).

### **Advantages of the Reducing Of Real Costs (RORC) (Abo & Kahlel, 2019)**

- The (RORC) are working to increase profits. It provides a basis for more dividends to the shareholders, more bonuses to the staff and more retention of profit for expansion of the business which will create more employment and overall industrial prospects. And higher profits will provide more revenues to the government by way of taxation.
- The (RORC) will help to providing goods available to the consumers at lowest prices. This will create more demand for the products and services, economies of large-scale production, more employment through industrialization and all-round improvement in the standard of living.
- The (RORC) will be helpful in meeting competition effectively. As a result of reduction in cost, export price may be lowered which may increase total exports.
- The Rationalization of real cost is obtained by increasing productivity efficiency. Therefore, a developing country like India which suffers from shortage of resources can develop faster if it makes the best use of resources by increasing productivity.
- The (RORC) lays emphasis on a continuous search for improvement which will improve the image of the firm for long-term benefits to fulfil the sustainability.

### **Disadvantages of the Reducing of Real Costs (RORC) (Hilton & David, 2014).**

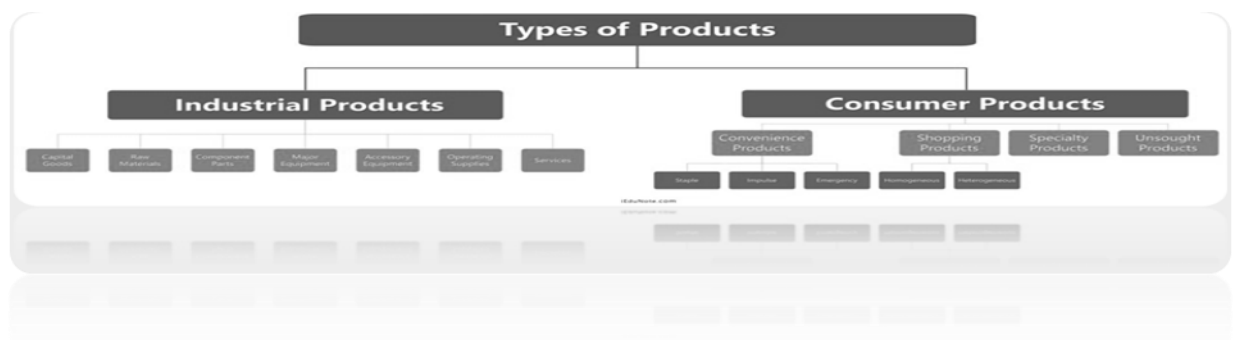
- The Quality may be sacrificed at the cost of reduction in cost. To reduce cost a quality may be reduced gradually and it may not be detected till it has assumed alarming proportion. Quality may be reduced to such an extent that it may not be accepted in the market and the business may be lost to the competitors.
- In the beginning cost reduction programs may not be liked by the employees and danger may be poised to the programs because success of any cost reduction plan depends upon the willing cooperation and active participation of the employees.
- It is possible that reduction in cost may not be real and permanent. It may not be based on sound reasons and may be short lived and cost may come back to the original cost level when temporary conditions (i.e. fall in prices of materials) due to which cost has reduced disappear (Gatzweiler et al., 2021).
- There may be a conflict between individual objective and organizational objective. It is possible that a head of a particular department may follow activities which may reduce the cost of his department but may lead to increase in cost for the organization as a whole.

### **Industrial Products Cost**

The issue of cost reduction is one of the issues that grab the administration's attention, as reducing the cost of production to a minimum must lead to increased profitability; the cost is known as Resource sacrificed or forgone to achieve a specific objective. And that the importance of cost reduction results from the fact that any establishment whose main goal is to control and reduce costs, and based on that, the cost is the essence of the industrial process in any establishment, but it is one of the requirements of practicing the activity, so it cannot be dispensed with except in the event of stopping the entire activity and for the purpose of

increasing the profitability The establishment and support its competitive position in the market, then resorting to reducing this cost as much as possible without compromising the quality of the product. The concept of cost reduction resources used and eliminating any redundant costs; or cost reduction is a positive, planned approach to spending avoid. It is considered a corrective function through the continuous analysis of costs and a function that leads to the efficiency of production factors. And the Product knows any output that has a positive total sales value, or an output that enables an organization to avoid incurring costs. Such as an intermediate chemical product used as input in another process. As for Product Cost is the sum of the costs assigned to a product for a specific purpose. And the Types of products, It can be classified into two groups.

1. **Consumer product** : As products directed to the final consumer
2. **Industrial products**: All materials that are purchased by organizations or individuals for the purpose of using them in their operations, whether for the production or sale of another commodity such as (Raw materials, manufactured materials, supplements, equipment, accessory equipment, operating supplies.... etc.).



Source: [14].

Figure 1  
SHOW TYPES OF PRODUCTS

### Characteristics of a Successful product

1. It provides a solution to the customer's problems, needs and desires
2. The product should be easy to use for customers
3. It provides a better user experience
4. Have an acceptable and attractive visual design
5. Lower cost to achieve better profit margin
6. The pricing of the product should be according to the quality of the product.

### The Product Dimensions

**The Essential Dimension:** This dimension expresses the basic benefit that the customer perceives or expects from this product. This dimension largely explains the reason for purchasing the product.

**The Tangible Dimension:** It is the dimension that represents the tangible aspects of the product, which include the physical characteristics that facilitate the exchange process of the product such as, shape, quality level, color, brand name, taste ... etc.

**The Extra Dimension:** This dimension expresses all the services that accompany the product and the customer gets when he buys the (product, such as (transportation, installation, warranty, maintenance, installment sales, and spare parts).

### Factors for successful product development

Why do some new products fail and fail to achieve the purpose for which they were created? Many companies struggle to find out how to increase the probabilities of their new product's success, and according to various studies, the secret of a successful new product depends on several factors, including:

1. Developing a unique and superior product with new features, focused on value and high quality.
2. Defining and studying the concept of the new product, in terms of its goal, market and advantages, and accurately and specifically before starting to develop it, and this of course places on the company's development team the burden of evaluating the target product markets, their requirements and benefits.
3. Senior management commitment to innovation and efficiency when implementing new product development.
4. In short, before your company succeeds in marketing a new product, keep your focus on understanding the company's market, competitors, and customers.

### Product Categories

1. Physical product (tangible) these are tangible items, for example electrical or electronic appliances, books, cars, etc.
2. Intangible (intangible) product these are non-physical elements, that is, they lack physical features compared to physical products, such as commercial brands, trade names, bank accounts, intellectual property rights, and others.
3. Another angle of product classification includes the product in terms of benefits, which is the one that the consumer uses directly according to its permanent and daily need, or the one who is interested in possessing it to benefit from it in the long term under the name of consumer goods, or that product that is provided as a necessary basis for the manufacture of another product such as raw materials.

With the products listed below, the standard of risk and effort is used, where the effort means the time, the financial value and the effort expended by the customer to acquire the commodity, while the risk is the failure of the product or its inability to achieve the characteristics and advantages required of it, and the product according to this classification is as follows:

1. Convenience Good this product represents the least degree of effort and risk for the customer, meaning that the customer will not take much money and time to acquire these products, and the level of risk that he will have when acquiring this product remains minimal. Examples of such fresh products are foodstuffs, gums and batteries, in addition to the possibility of listing raw materials as suitable or suitable for industry. Some services can also do justice to this type of product, such as transportation services such as taxis or garbage transportation services.
2. Preferences Good this type of product requires more effort on the part of the consumer (time and money) in addition to a greater risk factor as a result of the advertising, pricing and marketing operations carried out by the producing company.
3. The common example of this type of product is canned products, such as toothpastes and drinks, where the customer may "prefer" to acquire a certain type of beverage or toothpaste based on an image or advertisement he has seen.
4. Some companies sometimes work to convert their products from the appropriate or appropriate product to the customer's preferred type by making some adjustments to their products in terms of changing the method of packaging and the shape of the package and raising the price while promoting it through an intense advertising campaign.
5. Shopping Good It is the product or products that last for something and the consumer does not accept to buy them periodically, and in which the customer or consumer compares several brands to choose the most suitable ones due to their high price compared to the affordable products. Some of these

commodities include cars, some electronic items, household items, homes, and others. Some services such as insurance, health care, and real estate rental may also fall under this category.

6. Specialty Good It is a distinct product or products with special specifications that the customer seeks to search for in order to purchase them in particular instead of the search and comparison process that he makes when buying shopping goods, i.e. directing the customer from the beginning to acquire this commodity specifically without others despite the difficulty of obtaining it in some cases for one reason or another (Price increase, for example, or its presence in specific places). These products are highly rated on the effort-risk curve.

## RESEARCH METHODOLOGY

**Research instrument:** The theoretical aspect the author relied on the inferential descriptive approach through a group of sources and research papers published in scientific journals related to the subject of the study and on articles, reports and studies published on the Internet. In addition to the practical aspect the author relied on the descriptive and analytical approach to study the actual reality of data and information with a set of records and financial statements of the department, the study sample and personal interviews with officials with specialization, and the adoption of the inductive approach to reach the results by using the cost system based on the activities of ABC as a basic rule for calculating costs Products and then using recycling and reuse to determine the amount of cost reduction in the modern industrial product.

**Research model:** This paper uses multiple linear models. There are one dependent variable and two independent variables in this model

Dependent variable: **Cost Reduction**

Independent variables: **Recycle and Reuse**

**Method of data analysis:** Data are analysed by Using the Excel program in analysing and calculating the company's costs. This program helps interpret the data collected in order to accurately test the significance of the dependent variable and the independent variable.

**Descriptive analysis:** The General Company for Electrical and Electronic Industries was established in 1973 and is a Shareholding company through the Merge of several factories of similar activity, such as the (Radio & Television Factory in the Light Industries Company, the Baqir Al-Baqer Factory, and the Montazer Factory). The company is still operating to this day and the Table 1.

Item	Productises Group	Engineering and Projects Group
1.	<p><b><i>Home appliances production</i></b></p> <ul style="list-style-type: none"> <li>✓ Television</li> <li>✓ Radio</li> <li>✓ Solar Heaters</li> </ul>	<ul style="list-style-type: none"> <li>➤ Engineering projects.</li> <li>➤ Technology solutions.</li> <li>➤ Apps.</li> <li>➤ Completion of projects.</li> <li>➤ Maintenance and training</li> </ul>
2.	<p><b><i>Communication devices production</i></b></p> <ul style="list-style-type: none"> <li>✓ Telephones, Electronic Exchanges, digital Switches and Rural Exchanges.</li> <li>✓ Design and Installation of Communication systems and Networks, including Microwaves</li> </ul>	
3.	<p><b><i>Production of parts and components</i></b></p> <ul style="list-style-type: none"> <li>✓ Production of plastic parts and containers.</li> <li>✓ Production of metal parts, containers and racks.</li> <li>✓ Production of electronic cards (PCB electronic circuits)</li> <li>✓ Production of power and signal converters and coils</li> </ul>	



4.	<b>Capacity and Renewable Energy</b> <ul style="list-style-type: none"> <li>✓ Production of Power Supplies.</li> <li>✓ Production of UPS.</li> <li>✓ Production of Solar Heaters and Renewable Energy systems</li> </ul>	
5.	<b>Information Technology</b> <ul style="list-style-type: none"> <li>✓ Production of personal computers, laptops, tablets and smartphones (mobiles).</li> <li>✓ Business software and software on demand.</li> <li>✓ Various control and monitoring systems</li> </ul>	

Note: Electronic Industries Corporation bulletins 2019.

From the above table 1, we note that the company has two main Gropes and several subsidiary activities branch out from it, one of these activities is the production of the smartphone.



Source: Electronic Industries Corporation bulletins2019

**Figure 2**  
**SHOW SMART PHONE MODEL EIC 5.7"-02 N**

The Product costs based on company records, calculating the cost of the product in the form of (materials, labour, facture overhead costs) in table 2.

Item	Materials	Materials Withdrawal Rate	<sup>1</sup> The price is in dinars
1.	Panel	1 Piece	80,000
2.	Touch screen	1 Piece	60,000
3.	PCB Board Assay	1 Piece	55,000
5.	Plastic case	1 Piece	7,000
6.	Battery	1 Piece	20,000
7.	Charger	1 Piece	5,000
8.	USB Cable	1 Piece	5,000
9.	Earphone with microphone	1 Piece	5,000
10.	User manual	1 Piece	1,000
11.	Home Buttons	1 Piece	1,000
12.	Home Paper for Battery (Black)	1 Piece	1,000
13.	Adhesive Tape Black, Past on the Buttons silver	1 Piece	250
14.	Inner Card Cover Upper	1 Piece	1,000
15.	Inner Card Cover Lower	1 Piece	1,000
16.	PO Bag	1 Piece	1,000
17.	PO Bag Charger	1 Piece	1,000
18.	Silicon Rubber for Knob (White)	1 Piece	1,000
19.	Screw Black	1 Piece	2,000
20.	Screw Silver	1 Piece	1,250
21.	Sticker Pass	1 Piece	250
22.	Barcode Sticker (IMEI)	1 Piece	1,000
23.	EIC Sticker Specification	1 Piece	1,000
24.	Metal Logo EIC	1 Piece	1,000
25.	Label EIC	1 Piece	100
26.	Carton Box	1 Piece	3,500
Total Cost Per unit from Raw Materials ID for year 2019			<u>274,350</u>

Note: author own Computations, depending on data of Electronic Industries Corporation bulletins 2019.

From the previous table, we note that the cost of the current raw materials for the Smartphone has reached (274,350) ID for year 2019, as for other costs such as (labour, facture overhead) in Table 3.

Item	Cost Elements	Cost per Smartphone ID
1.	Direct Materials	274,350
2.	Direct Labour	10,687
3.	facture overhead	4,049
Total cost ID for year 2019		<u>289,086</u>

Note. author own Computations, depending on data of Electronic Industries Corporation bulletins 2019.

From the previous table, we note that the Total cost (289,086), as the direct materials constitute 95% of the total Cost.

## RESULTS AND DISCUSSION

Descriptive data analysis and findings: The General Company for Electrical and Electronic Industries used the Recycle and Reuse for some of materials such as (Plastic, Glass, Cardboard or

<sup>1</sup> 4.Dinar is the name of the Iraqi currency

Paper, Metal ... etc.) as a parts of the smartphone with green computing technology environmentally friendly to Reduce cost of direct materials and through the Table 4.

Item	Materials	Materials Withdrawal Rate	Cost under Current system ID	Cost Under Recycle and Reuse ID	<sup>2</sup> Cost Reduction ID	<sup>3</sup> Cost Reduction Ratio %
1.	Panel	1 Piece	80,000	50,000	30,000	38%
2.	Touch screen	1 Piece	60,000	30,000	30,000	50%
3.	PCB Board Assay	1 Piece	55,000	27,000	28,000	51%
5.	Plastic case	1 Piece	7,000	5,000	2,000	29%
6.	Battery	1 Piece	20,000	20,000	0	0%
7.	Charger	1 Piece	5,000	3,000	2,000	40%
8.	USB Cable	1 Piece	5,000	4,000	1,000	20%
9.	Earphone with microphone	1 Piece	5,000	3,000	2,000	40%
10.	User manual	1 Piece	1,000	1,000	0	0%
11.	Home Buttons	1 Piece	1,000	1,000	0	0%
12.	Home Paper for Battery (Black)	1 Piece	1,000	1,000	0	0%
13.	Adhesive Tape Black (Past on the Buttons silver)	1 Piece	250	250	0	0%
14.	Inner Card Cover Upper	1 Piece	1,000	1,000	0	0%
15.	Inner Card Cover Lower	1 Piece	1,000	1,000	0	0%
16.	PO Bag	1 Piece	1,000	1,000	0	0%
17.	PO Bag Charger	1 Piece	1,000	1,000	0	0%
18.	Silicon Rubber for Knob (White)	1 Piece	1,000	1,000	0	0%
19.	Screw Black	1 Piece	2,000	2,000	0	0%
20.	Screw Silver	1 Piece	1,250	1,250	0	0%
21.	Sticker Pass	1 Piece	250	250	0	0%
22.	Barcode Sticker (IMEI)	1 Piece	1,000	1,000	0	0%
23.	EIC Sticker Specification	1 Piece	1,000	1,000	0	0%
24.	Metal Logo EIC	1 Piece	1,000	1,000	0	0%
25.	Label EIC	1 Piece	100	100	0	0%
26.	Carton Box	1 Piece	3,500	1,500	2,000	57%
Total Cost Per unit from Raw Materials ID for year 2019			<u>274,350</u>	<u>158,350</u>	<u>116,000</u>	<u>42%</u>

Note. author own Computations, depending on data of Electronic Industries Corporation bulletins 2019.

From the table 4 above, we note that under the use of recycling and reuse of some parts that are manufactured by the company, costs of Raw materials have been reduced at a rate (42%).

Item	Cost Elements	Cost per Smartphone	Cost per Smartphone Under Recycle & Reuse	<sup>4</sup> Cost Reduction	<sup>5</sup> Cost Reduction
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<sup>2</sup> Deferent between cost under current system & cost under recycle , reuse

<sup>3</sup> Cost reduction divide on cost under current system.

<sup>4</sup> Deferent between Cost per Smartphone under current system & Cost per Smartphone under recycle , reuse

<sup>5</sup> Cost reduction divide on Cost per Smartphone under current system

		<b>Under current system ID</b>	<b>system ID</b>	<b>ID</b>	<b>Ratio %</b>
1.	Direct Materials	274,350	158,350	116,000	42%
2.	Direct Labour	10,687	10,687	0	0%
3.	facture overhead	4,049	4,049	0	0%
Total cost ID for year 2019		<b>289,086</b>	<b>173,086</b>	<b>116,000</b>	<b>40%</b>

Note. Author own Computations, depending on data of Electronic Industries Corporation bulletins 2019.

From the table 5 above, we note that total Cost per Smartphone under recycling and reuse have been reduced at a rate (40%).

## CONCLUSION

1. Through the recycling and reuse as green computing systems, the cost of Direct Raw materials will be reduced at the rate of 42%. And the Total cost per smartphone reduced for 40%.
2. Recycling and reuse is one of the green computing tools that contribute to protecting the environment and keeping it safe and clean, as well as using it to reduce the cost of the modern industrial product.

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