Energy Root and Energy Transformation Stages

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Author's contribution

The sole author designed, analysed, interpreted and prepared the manuscript.

Original Research Article

ABSTRACT

After allowing transformations of different forms of energy into other forms with the aid of devices and agents, all the associated information were observed severally. In which mean values for each were recorded. The paper is launching new resultant initiatives, namely energy root and energy transformation stages. And hence, energy is defined as square rate of a mass of moving mass in a given suitable area. $E = \frac{mA}{t^2}$ mathematically.

1. INTRODUCTION

In physics, mass-energy equivalence is the relationship between mass and energy in a system's rest frame, where the two values differ only by a constant and the units of measurement [1]. The principle is described by the physicist Albert Einstein's famous formula: $E = mc^2$ [2]. This interchangeable is an indication of that energy can form to mass. When energy is added to an isolated system, the increase in the mass is equal to the added energy divided by c^2 [3].

However, the conversion of energy is a universal principle in physics and holds for any interaction, along with the conservation of momentum [4]. Energy cannot be created or destroyed in an isolated system; it can be converted to another form of energy [5]. Though, Einstein stated that the laws of conservation of energy and conservation of mass are "one and the same" [6]. Science has uncountable number of evidences of energy transformation in different areas. Photovoltaic cells convert light into electric current using the photovoltaic effect [7]. And

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electric motor converts electrical energy into mechanical energy [8]. A hydroelectric power plant converts the mechanical energy of water in a storage dam into electrical energy [9]. The international Energy Agency (IEA) said in 2021 that under its "Net Zero by 2050" scenario solar power would contribute about 20% of worldwide energy consumption, and solar would be the world's largest source of electricity [10]. And this can be achieved through the knowledge of science of energy transformation. There is need of more knowledge of energy transformation in present and future time for better and life continuity on earth. For achieving this, science is also demanding to know what are the energy roots and energy transformation stages during energy transformation. As a result, the paper is launching an initiative which will contribute to the science in knowing what is called energy root and energy transformation stages, hence paper bear its name.

2. METHODOLOGY

2.1 Transformation of Kinetic Energy to Thermal Energy

About $50cm^3$ of sandy soil at 37^oC was transferred to five $250cm^3$ gas jar capacity and closed with stopper each. A good lagging process with special materials was used in order to avoid any heat transfer in 37^oC laboratory. Four of these lagged gas jars was vigorously shaken for good 20, 30, 40 and 50 minutes mechanically but at different time. At that time, we have kinetic energy. The other lagged gas jar was placed unshaken. Immediately after shaken, one mercury in liquid thermometer was quickly inserted inside that different lagged gas jars each. The procedure was performed repeatedly with different sets of lagged gas jars, and any changed in temperature reading was observed and recorded, in which, mean value was used.

2.2 Transformation of Kinetic Energy to Electrical Energy

A high moving magnetic flux along a coil wire with many turns (generator) is enough to generate electricity. After a generator is on, an ammeter at output source of generator was connected in order to measure quantity of electricity flow. After a series of observations, mean value was used.

2.3 Transformation of Electrical Energy to Thermal Energy

An alternative current with 240 volt was used. Five labeled A, B, C, D, & E electric pressing irons of some company at 37^oC with ratted 250 volt and 13A with 100% efficiency each were used. These were plugged and on at maximum in 1, 2, 3, 4 and 5 seconds, and recorded at different time respectively. The temperature at 1, 2, 3, 4 and 5 seconds were recorded for good 5 consecutive days, in which mean value was used each.

2.4 Transformation of Electrical Energy to Kinetic Energy

An Alternative Current (AC) motor was connected to an AC circuit with 240v. The moving speed of this AC motor was observed repeatedly and recorded.

2.5 Transformation of Chemical Energy to Thermal Energy

About $70cm^3$ of concentrated soapless detergent at 37^0C was introduced into lagged $250cm^3$ gas jar. About $25cm^3$ of water at same temperature was poured and quickly closed with stopper. After 15 seconds, a mercury in liquid thermometer was quickly inserted inside this lagged gas jar. The thermometer reading was observed and recorded accurately. The procedure was performed severally and means value of temperature reading was used.

2.6 Transformation of Chemical Energy to Electrical Energy

An acid lead accumulator battery was connected with ammeter in which quantity of electricity flow (current with time) was observed and recorded repeatedly.

2.7 Transformation of Chemical Energy to Kinetic Energy

A 35 years old hypoglycemic patient who failed to walk on the floor due to hypoglycemia was used. 1g of glucose tablet was taken by the patient and became able to walk and run quickly 10 to 15 seconds after administering.

2.8 Transformation of Potential Energy to Kinetic Energy

A bulb mass of 2kg at 37^0C temperature was suspended from the ground level of 10m height in an environment of 37^0C of temperature. The

bulb was then allowed to hit the ground; liquid in mercury thermometer was placed on the surface of the bulb to observe if there is any temperature changed. The procedure was performed repeatedly at the same condition but different time.

2.9 Transformation of Electrical Energy to Light Energy

An electric bulb of 26W was connected to a circuit of an alternative current with 240V. The plug in the circuit was 'on' in order to allow the movement of radians from the bulb.

2.10 Transformation of Electric Current to Sound Energy

An alternative current of 240V passes to amplifier connected to a radio set. This was allowed to played a large mass of air around the radio loudspeaker vibrated and produced a loud sound.

3. RESULT AND DISCUSSION

The purpose of this research is to observe the energy root and energy transformation stages during energy transformation process.

Among the limitations, not all forms of energy paper talks about.

Table 1. Transformation of Kinetic Energy to Thermal Energy

Gas Jars	Volume of Sandy Soil (cm^3)	Speed of Shaking (m/s)	Temperature before Shaking (^0C)	Temperature after Shaking (^0C)	Time (minute)
A	50		37.0		
B	50	1.5	37.0	47.0	20
C	50	1.5	37.0	50.0	30
D	50	1.5	37.0	59.0	40
E	50	1.5	37.0	62.0	50

Table 2. Transformation of Kinetic Energy to Electrical Energy

Machine Efficiency (%)	Current Flow (A)	Time of Current Flow (s)
100	Full-deflection	<0.001

Table 3. Transformation of Electrical Energy to Thermal Energy

Electric Iron	Electric Voltage (V)	Electric iron rated	Time (s)	Temperature before connected (^0C)	Temperature after connected (^0C)
A	240	250v, 13A	1	37	39
B	240	250v, 13A	2	37	51
C	240	250v, 13A	3	37	60
D	240	250v, 13A	4	37	69
E	240	250v, 13A	5	37	92

Table 4. Transformation of Electrical Energy to Kinetic Energy

Electric volt (V)	Revolution of AC Motor (rps)
240	60

Table 5. Transformation of Chemical Energy to Thermal Energy

Volume of detergent (cm^3)	Volume of water (cm^3)	Temperature of detergent (^0C)	Temperature of water (^0C)	Temperature of detergent + water after 15 seconds
70	25	37	37	72

Table 6. Transformation of Chemical Energy to Electrical Energy

Electrolyte	Concentration of electrolyte (M)	Current flow (A)	Time of current flow (s)
H_2SO_4	Approximately 5	Full-deflection	<0.001

Table 7. Transformation of Chemical Energy to Kinetic Energy

Chemical	Amount of Chemical (g)	Route of Administration	Condition	Speed of Movement before Administration (m/s)	Speed of Movement after Administration (m/s)
Glucose	1	Oral	Hypoglycemia	0	4

Table 8. Transformation of Potential Energy to Kinetic Energy

Bulb Mass (kg)	Temperature of Bulb before Hitting the Ground (^{0}C)	Height (m)	Temperature of Bulb after Hitting the Ground (^{0}C)
2	37	10	37

Table 9. Transformation of Electrical Energy to Light Energy

Electric volt (V)	Bulb Power (W)	Light
240	26	Produced

Table 10. Transformation of Electrical Energy to Sound Energy

Electric volt (V)	Device/Agent	Sound
240	Amplifier and radio set	Produced

3.1 Transformation of Kinetic Energy (E_k) to Thermal Energy (E_t)

A moving mass (energy) inform of $\frac{1}{2}mv^2$ observed in a lagged measuring cylinder during shaking, where m and v are mass and velocity respectively. Now we can say we have kinetic energy (E_k). This moving mass is the initial form of moving mass that may transform to another form of moving mass. As a result, this stage of energy transformation can be called 'Initial Stage'. An initial stage is the stage that consists of enough initial moving mass which may or not transform to another form of moving mass. For a successful transformation of this form of initial moving mass (E_k), there must be a device or an agent. In this case, agents were used, that is, soil particles themselves and inner part of measuring cylinder. No doubt, the heat must produce due to movement of soil particles themselves and with cylinder. For this reason of device or agent involvement, the energy transformation event passes another stage called 'Device or Agent Stage'. Device or agent stage is the stage between an initial stage and acceptance stage where the moving mass from the initial stage remains unchanged but may be or not matched with the device or agent in that transformation. E_k matched with all agents used in this transformation and moved to the next stage called 'Acceptance Stage'. Acceptance stage is a stage in which the initial moving mass accepted to transform into energy root of that target moving mass. The next stage of energy transformation after acceptance stage is 'Mega Stage'. Mega state is the stage that consists of ratio of generated or used stage to the partial stage. 'Generated or used Stage' is the stage where high initial moving mass is generated into mega stage in which nature type or number of device or agent used is regardless. But 'Partial Stage' involved uncompleted participation of mass of initial moving mass, or any quantity generated immediately after acceptance stage. In this transformation, the moving mass in initial stage is highly greater than in target stage when observed the resultants of table 1. Small raised in temperature after several times vigorously shaking shows that mass of initial moving mass of E_k is incomplete participated in transformation to target moving mass of thermal energy (E_t). Nevertheless, the quantity generated is temperature as seen in table 1. This mega stage that was explained is the stage that can be used to determine the energy root of target moving mass. 'Energy Root (R_e)' is the root form of target moving energy which can form during energy transformation.

Energy root can be calculated as: $R_e = \frac{Generated\ State}{Partial\ Stage}$

When equated dimensionally or any other physical expression of R_e in this transformation, the specific heat capacity (c) is the resultant.
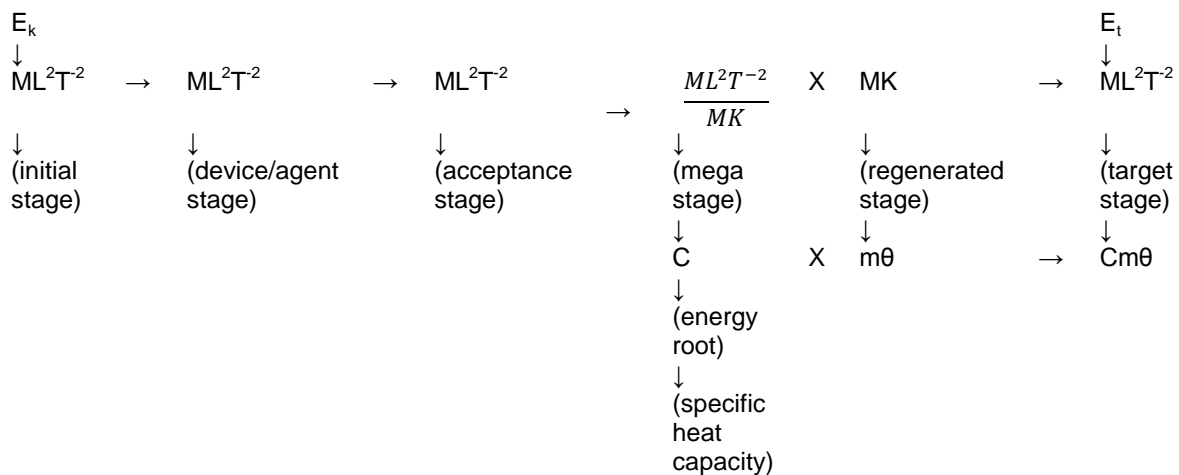
$$c = \frac{Energy}{Mass \times Temperature} = \frac{Joule}{Kilogram \times Kelvin} = \frac{ML^2T^{-2}}{MK}.$$
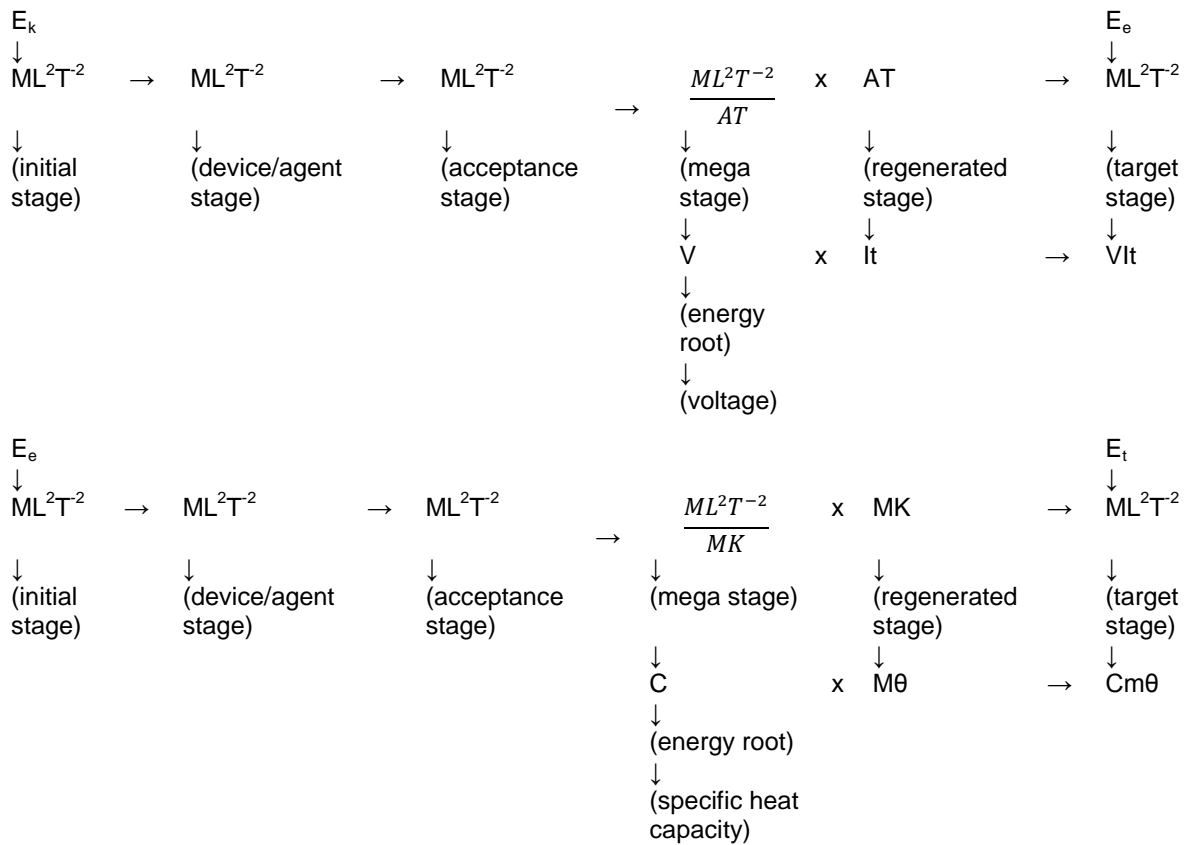
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The next stage after mega stage is the 'Regenerated Stage'. Regenerated stage is the stage in which the quantity(ies) in the partial stage is regenerated in order for that energy root to form into its target moving mass. Since there is incomplete participation of mass in initial moving mass and temperature as generated quantity during this energy transformation. Therefore, more of mass from initial moving mass and temperature where regenerated in this stage. Since we have 'c' in mega stage and 'mθ' in regenerated stage, where c, is specific heat capacity measured in joule per kilogram kelvin (J/kg-K), m is mass measured in Kilogram (kg) and θ is temperature measured in Kelvin (K). Therefore, now we have c x mθ. After this happens successfully, the energy transformation moves to the advance stage which is also the final stage in energy transformation. And this stage is called 'Target Stage', the target stage is the stage in which all the initial moving mass transformed to target moving mass. In this form $^1/_2mv^2$ transformed to mcθ and mcθ is thermal energy (E_t). The following sketch will also help and give more clues for better understanding of this new initiative. The sketch (flow chart) has two directions of arrows forward and downward, forward one indicating the formation and series and sequence of successful stages, while the downward defined stages and events formed during the transformation process.

3.2 Transformation of Kinetic Energy (E_k) to Electrical Energy (E_e)

An initial moving mass of $^1/_2mv^2$ from moving coil in magnetic field of generator was observed (Initial Stage). A generator was involved in (Device or Agent Stage). It is important in general to know that, there is possibility of initial moving mass and device or agent matching failure even if there is an enough initial moving mass. It may be there is an enough initial moving mass but no suitable device or agent to match in that transformation, e.g. using loudspeaker in converting electrical energy into light energy. But in this transformation, there is great matched between initial moving mass and the device used. As a result of this great matched, the (Acceptance Stage) was successful and agreed to transform into (V) as energy root in mega stage. Where that V is voltage measured in 'volt'. $V = \frac{Energy}{Current \; x \; Time} = \frac{Joule}{Ampere \; x \; Second} = \frac{ML^2T^{-2}}{AT}$. Generated stage is ML^2T^{-2} and partial stage is M^0L^0TA. In this transformation, there was full (whole) participation of mass of initial moving mass, and there was also generation of new quantities namely current flow with time (current x time (AT)) as seen in table 2. Large amount of electric current produced shows that, whole of mass of initial moving mass participate in generated stage. Same quantities in partial stage was regenerated in regenerated stage in order to ensure successful transformation of initial moving mass to target moving mass. Since mega stage $= \frac{generated \; stage}{partial \; stage} = \frac{ML^2T^{-2}}{AT} = V$ and regenerated stage = AT = It. Where I is current measured in ampere while t is time measured in second. Therefore, mega stage x regenerated stage = V x It. When this happens the transformation of initial moving mass (E_k) to target moving mass (E_t) was completed (Target Stage), since $E_e = VIt$

E_k
↓
ML^2T^{-2} → ML^2T^{-2} → ML^2T^{-2} →

$\frac{ML^2T^{-2}}{MK}$ X MK → ML^2T^{-2} ← E_t ↓

↓   ↓   ↓   ↓   ↓   ↓
(initial stage)   (device/agent stage)   (acceptance stage)   (mega stage)   (regenerated stage)   (target stage)

↓   ↓
C   X   mθ   →   Cmθ

↓
(energy root)

↓
(specific heat capacity)

E_k
↓
ML^2T^{-2} → ML^2T^{-2} → ML^2T^{-2} → $\dfrac{ML^2T^{-2}}{AT}$ x AT → ML^2T^{-2} ← E_e

↓   ↓   ↓   ↓   ↓   ↓

(initial stage)   (device/agent stage)   (acceptance stage)   (mega stage)   (regenerated stage)   (target stage)

↓   V   x   It   →   VIt

↓
(energy root)
↓
(voltage)

E_e
↓
ML^2T^{-2} → ML^2T^{-2} → ML^2T^{-2} → $\dfrac{ML^2T^{-2}}{MK}$ x MK → ML^2T^{-2} ← E_t

↓   ↓   ↓   ↓   ↓   ↓

(initial stage)   (device/agent stage)   (acceptance stage)   (mega stage)   (regenerated stage)   (target stage)

↓   C   x   Mθ   →   Cmθ

↓
(energy root)
↓
(specific heat capacity)

3.3 Transformation of Electrical Energy (E_e) to Thermal Energy (E_t)

An initial moving mass of VIt from an alternative current was used in initial stage. After an electric iron was connected, it was immediately accepted to allow the transformation of E_e to E_t. But not all mass of initial moving mass was participated in generated stage and also, temperature was released after transformation acceptance as seen in Table 3. Change in temperature due to different time is an indication of that mass of initial moving mass was incompletely participated. Therefore, energy root is $R_e = \dfrac{ML^2T^{-2}}{MK} = \dfrac{Energy}{mass \times temperatue} = \dfrac{Joule}{kilogram \times kelvin} = c$, and c is specific heat capacity obtained from mega stage. MK were regenerated in regenerated stage in order to obtain target moving mass (E_t) of target stage. That is, $\dfrac{ML^2T^{-2}}{MK}$ X MK $=$ c x mθ $=$ cmθ $= E_t$.

3.4 Transformation of Electrical Energy (E_e) to Kinetic Energy (E_k)

An alternative current motor was used here in attempting to convert initial moving mass inform of VIt to $^1/_2mv^2$. After matching of VIt and AC

motor and their acceptance, whole mass of initial moving mass was participated in generated stage (mega stage). And another thing interesting in this transformation is, there is no any single quantity generated after acceptance. Meaning, sum of initial moving mass in acceptance stage is same as in used (generated) stage, for this reason, is 100% used-up of initial moving mass in used stage. When this happens with no any quantity generated the value of partial stage and regenerated stage is 1 each. In this case, what obtained in mega stage will be the same in target stage. $R_e = \dfrac{ML^2T^{-2}}{1} = \dfrac{Energy}{1} = \dfrac{Joule}{1}$.

The ML^2T^{-2} in this form is $^1/_2mv2$. Since this ML^2T^{-2} x $Regenerated\ Stage\ (1) = ML^2T^{-2} \left(\frac{1}{2}mv^2\right) = Target\ Stage\ (E_k)$ and $E_k = \frac{1}{2}mv^2$.

3.5 Transformation of Chemical Energy (E_c) to Thermal Energy (E_t)

Water was used as agent in device or agent stage, in which an initial moving mass is in form of ∆H - RT∆n, where ∆H is heat change measured in joule, R is ideal gas constant in

joules per mole kelvin (8.3145J/mol-K), T is temperature measured in kelvin and △n is change of number of moles measured in (mol).

After acceptance, the whole mass of initial moving mass participated in generated stage, but in this transformation, there is quantity generated which is temperature as seen in table 5. High raised in temperature is an indication of that initial moving mass was completely participated and this is an exactly what will be happening in burning of gasoline. Note that, light, sound and mechanical moving masses observed in burning of gasoline stand for their specific transformations each. As a result, energy root $R_e = \frac{generated\ stage}{partial\ stage} = \frac{ML^2T^{-2}}{K} = \frac{Energy}{temperatue} = \frac{Joule}{kelvin} = C$, and C is heat capacity measured in Joule/Kelvin. When temperature is resupplied in regenerated stage, a target moving mass will obtained in target stage. $\frac{ML^2T^{-2}}{K}$ x k $= ML^2T^{-2}$. This ML^2T^{-2} in target stage

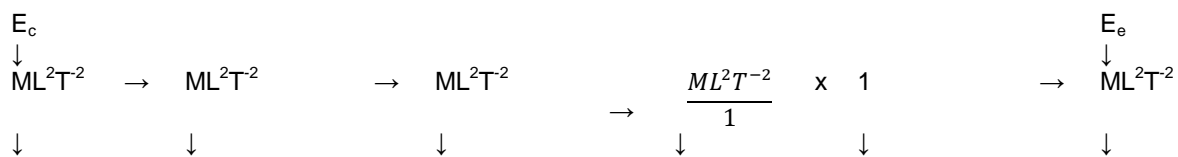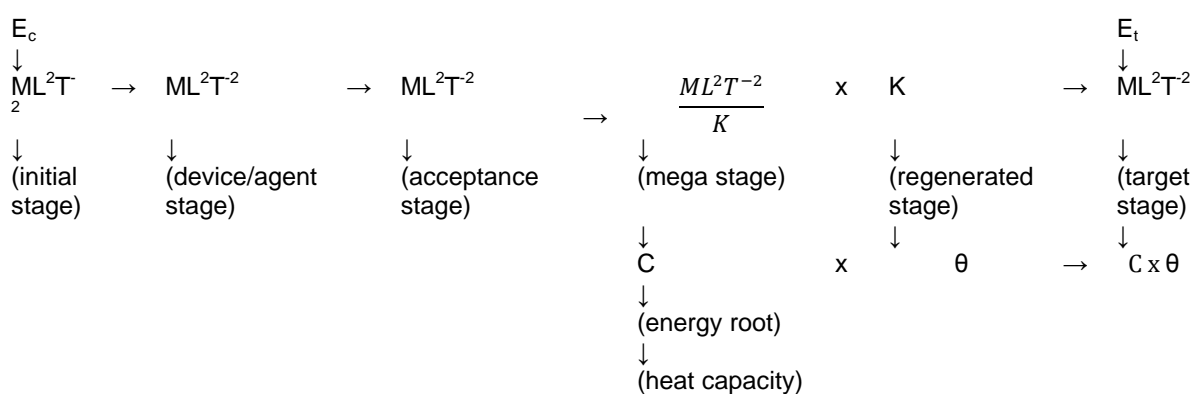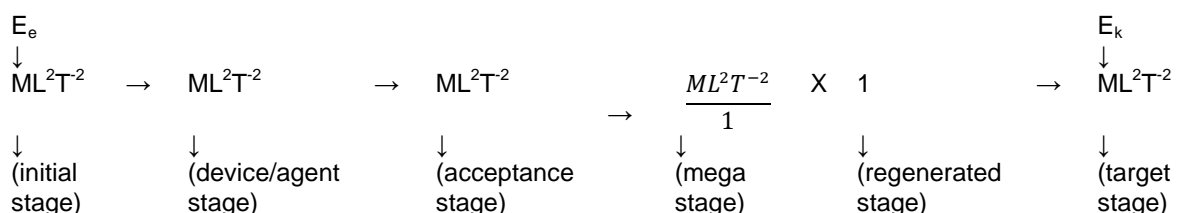is thermal moving mass (thermal energy (E_t)) in form of Cθ.

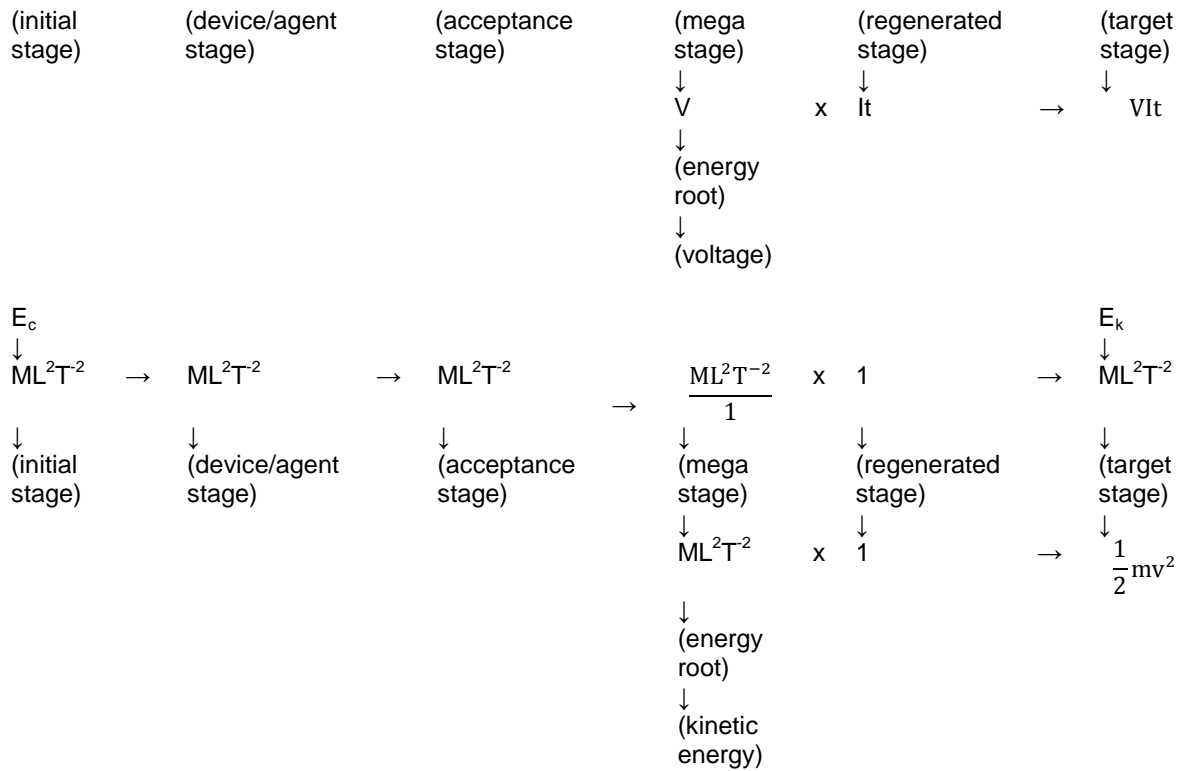## 3.6 Transformation of Chemical Energy (E_c) to Electrical Energy (E_e)

Lead acid accumulator was used in device or agent stage. After acceptance of initial moving mass in form of △H - RT△n, all the mass of initial moving mass was participated in generated stage with generation of current flow with time detected by using ammeter as seen in table 6. Therefore, Mega Stage $= \frac{generated\ stage}{partial\ stage}$, also

$R_e = \frac{generated\ stage}{partial\ stage} = \frac{ML^2T^{-2}}{AT} = \frac{Energy}{current\ x\ time} = \frac{Joule}{ampere\ x\ second} = V.$ Where V is voltage , which is energy root of target moving mass. AT were resupplied in regenerated stage in order to obtain target moving mass, that is, R_e x regenerated stage = target stage, which is V x It = VIt. VIt is the target moving mass (E_e) of target stage.

E_e
↓
ML^2T^{-2} → ML^2T^{-2} → ML^2T^{-2} → $\frac{ML^2T^{-2}}{1}$ X 1 → E_k ↓ ML^2T^{-2}

↓ ↓ ↓ ↓ ↓ ↓
(initial stage) (device/agent stage) (acceptance stage) (mega stage) (regenerated stage) (target stage)

↓ ↓ ↓
ML^2T^{-2} X 1 → $\frac{1}{2}mv^2$

↓
(energy root)
↓
(kinetic energy)

E_c
↓
ML^2T^{-2} → ML^2T^{-2} → ML^2T^{-2} → $\frac{ML^2T^{-2}}{K}$ x K → E_t ↓ ML^2T^{-2}

↓ ↓ ↓ ↓ ↓ ↓
(initial stage) (device/agent stage) (acceptance stage) (mega stage) (regenerated stage) (target stage)

↓ ↓ ↓
C x θ → C x θ

↓
(energy root)
↓
(heat capacity)

E_c
↓
ML^2T^{-2} → ML^2T^{-2} → ML^2T^{-2} → $\frac{ML^2T^{-2}}{1}$ x 1 → E_e ↓ ML^2T^{-2}

↓ ↓ ↓ ↓ ↓ ↓

| (initial stage) | (device/agent stage) | (acceptance stage) | (mega stage) | (regenerated stage) | (target stage) |

$\downarrow$ $\downarrow$ $\downarrow$

V   x   It $\rightarrow$ VIt

$\downarrow$

(energy root)

$\downarrow$

(voltage)

E_c
$\downarrow$
ML^2T^{-2} $\rightarrow$ ML^2T^{-2} $\rightarrow$ ML^2T^{-2} $\rightarrow$ $\dfrac{ML^2T^{-2}}{1}$ x   1 $\rightarrow$ E_k ML^2T^{-2}

$\downarrow$ $\downarrow$ $\downarrow$ $\downarrow$ $\downarrow$ $\downarrow$

(initial stage)   (device/agent stage)   (acceptance stage)   (mega stage)   (regenerated stage)   (target stage)

$\downarrow$ $\downarrow$ $\downarrow$

ML^2T^{-2} x   1 $\rightarrow$ $\dfrac{1}{2}mv^2$

$\downarrow$

(energy root)

$\downarrow$

(kinetic energy)

3.7 Transformation of Chemical Energy (E_c) to Kinetic Energy (E_k)

An initial moving mass in form of $\triangle H - RT\triangle n$ was used in this transformation, in which man was used in device or agent stage. After matching of $\triangle H - RT\triangle n$ and man body cells, whole mass of initial moving mass participated in generated stage after acceptance as seen in table 7. 4m/s speed of man seen after taking that 1g glucose tablet is an indication of whole initial moving mass was participated in used stage without generating of any new quantity after acceptance. Note that, heat (temperature) changes seen after $\triangle H - RT\triangle n$ (initial moving mass) used-up, it stand for its separate transformation.

E.g., as in the case of propane combustion.
Energy root $= \dfrac{\text{generated stage}}{\text{partial stage}} = \dfrac{ML^2T^{-2}}{1} = ML^2T^{-2}$.
Therefore, $R_e = ML^2T^{-2}$ and R_e is its target moving mass which is $^1/_2mv^2$. The Target stage $= \dfrac{\text{generated stage}}{\text{partial stage}} \text{ x regenerated stage} = \dfrac{ML^2T^{-2}}{1}$ x 1 $= ML^2T^{-2}$. This target moving mass is in form of $^1/_2mv^2$.

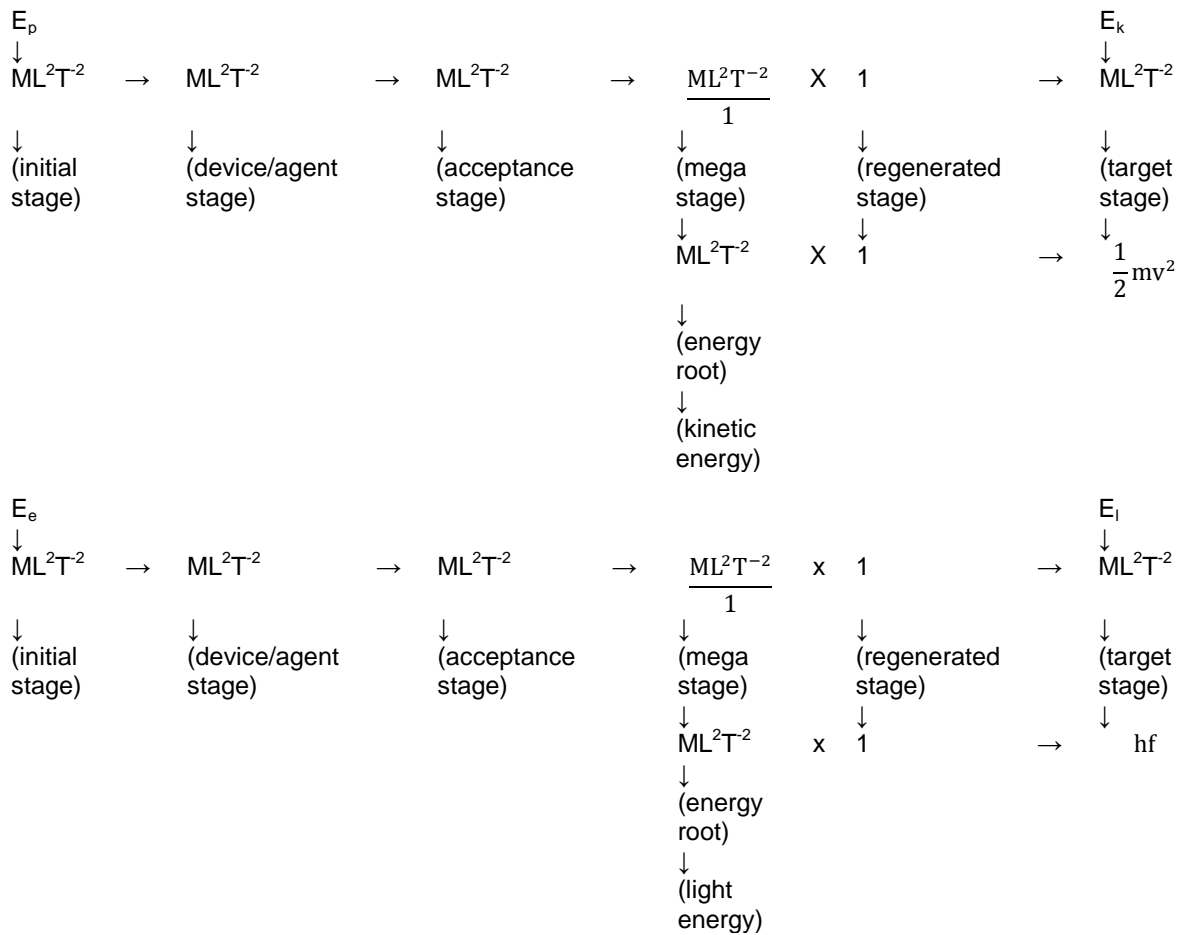## 3.8 Transformation of Potential Energy (E_p) to Kinetic Energy (E_k)

Space was used in device or agent stage in which stored initial moving mass in form of mgh matched with space. Kinetic energy possessed by the bulb shows that all the mass of initial moving mass of mgh participated in used stage after acceptance. Therefore, due to absence of both mass of initial moving mass participation and generation of new quantity, the value in partial stage and regenerated stage is 1 each.

$$R_e = \dfrac{\text{generated stage}}{\text{partial stage}} = \dfrac{ML^2T^{-2}}{1} = ML^2T^{-2}.$$

This moving mass obtained (R_e) is same as target moving mass which is $^1/_2mv^2$.

Target moving mass (target stage) $=$ mega stage x regenerated stage $= \dfrac{\text{generated stage}}{\text{partial stage}} \text{ x regenerated stage} = \dfrac{ML^2T^{-2}}{1}$ x 1 $= ML^2T^{-2}$. This ML^2T^{-2} is in form of $^1/_2mv^2$ (kinetic energy (E_k)).

E_p
↓
ML^2T^{-2} → ML^2T^{-2} → ML^2T^{-2} → $\dfrac{ML^2T^{-2}}{1}$ X 1 → ML^2T^{-2} ← E_k
↓

↓   ↓   ↓   ↓   ↓   ↓

(initial stage)   (device/agent stage)   (acceptance stage)   (mega stage)   (regenerated stage)   (target stage)

ML^2T^{-2} X 1 → $\dfrac{1}{2}mv^2$
↓
(energy root)
↓
(kinetic energy)

E_e
↓
ML^2T^{-2} → ML^2T^{-2} → ML^2T^{-2} → $\dfrac{ML^2T^{-2}}{1}$ x 1 → ML^2T^{-2} ← E_l
↓

↓   ↓   ↓   ↓   ↓   ↓

(initial stage)   (device/agent stage)   (acceptance stage)   (mega stage)   (regenerated stage)   (target stage)

ML^2T^{-2} x 1 → hf
↓
(energy root)
↓
(light energy)

3.9 Transformation of Electrical Energy (E_e) to Light Energy (E_l)

A bulb filament was used in device or agent stage in which the mass of an initial moving mass in form of VIt from an alternative current source was fully participated in generated stage without generating of any new quantity after acceptance. Note, any temperature detected is due to this conversion, is due to continue transformation of light energy (E_l) to another form, that is thermal energy (E_t). Therefore, this E_t is from E_l, as a result, it stand on its own transformation. Since $R_e = \frac{\text{generated stage}}{\text{partial stage}}$ and value of partial stage and regenerated stage is 1 each due to absence of both mass of initial moving mass participation and generation of new quantity after acceptance. Therefore, $R_e = \frac{\text{generated stage}}{\text{partial stage}} = \frac{ML^2T^{-2}}{1} = ML^2T^{-2}$. R_e moving mass is same as target moving mass which is hf, where h is plank's constant which is 6.63 x 10^{-33}joules second and f is frequency of the light measured in hertz. Therefore, mega stage x regenerated stage = target stage, that is

$\frac{\text{generated stage}}{\text{partial stage}}$ x regenerated stage = target stage.
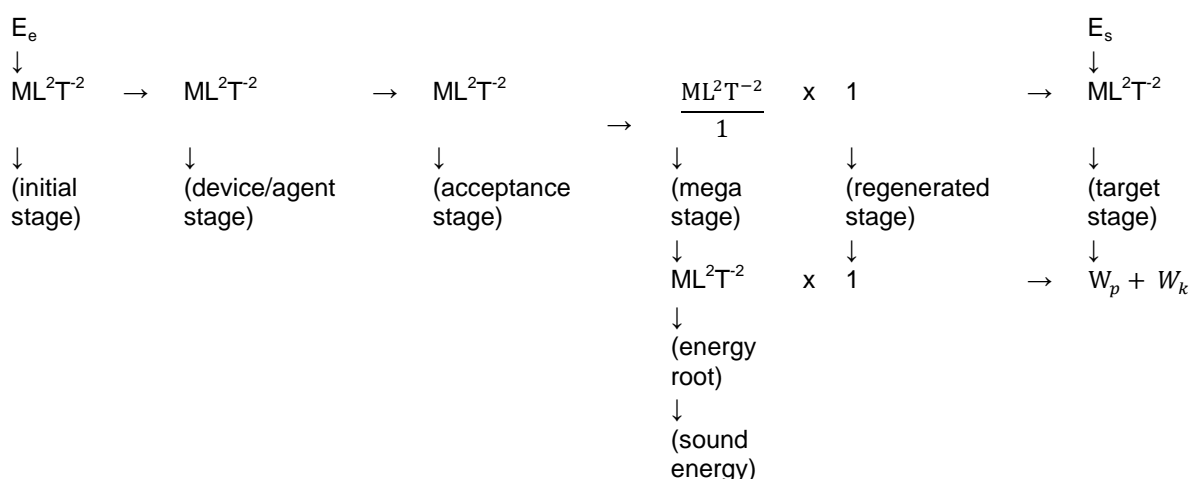Now, $\frac{ML^2T^{-2}}{1}$ x 1 = ML^2T^{-2}. This target moving mass (ML^2T^{-2}) is in form of hf (light energy).

3.10 Transformation of Electrical Energy (E_e) to Sound Energy (E_s)

A moving coil loudspeaker in radio set was used in device or agent stage. Mass of an initial moving mass of VIt from an alternative current source was fully participated in generated stage after acceptance. During this participation, there was no any new quantity observed, that is, no generation of any new quantity after acceptance. $R_e = \frac{\text{generated stage}}{\text{partial stage}} = \frac{ML^2T^{-2}}{1} = ML^2T^{-2}$. The resultant obtained (moving mass) in R_e will be same as in target stage, which is $W_p + W_k$. where W_p is potential energy density and W_k is Kinetic energy density. Since Target stage = mega stage x regenerated stage = $\frac{\text{generated stage}}{\text{partial stage}}$ x regenerated stage = $\frac{ML^2T^{-2}}{1}$ x 1 = ML^2T^{-2}. This target moving mass (ML^2T^{-2}) in target stage is in form of $W_p + W_k$ (sound energy (E_s)).

E_e
↓
ML^2T^{-2} → ML^2T^{-2} → ML^2T^{-2}

E_s
↓
→ $\dfrac{ML^2T^{-2}}{1}$ x 1 → ML^2T^{-2}

↓ ↓ ↓
(initial stage) (device/agent stage) (acceptance stage)

↓ ↓ ↓
(mega stage) (regenerated stage) (target stage)

↓ ↓ ↓
ML^2T^{-2} x 1 → $W_p + W_k$

↓
(energy root)

↓
(sound energy)

4. CONCLUSION

Energy can be defined as a square rate of a mass of moving mass in a given suitable area. $E = \dfrac{mA}{t^2}$ Where E is energy measured in Joule, m is mass of moving mass measured in kg, A is area measured in m^2 and t is time measured in second.

Energy root is a source of target moving mass.

Energy transformation stages include: initial stage, device or agent stage, acceptance stage, mega stage (used or generated stage and partial stage), regenerated stage and target stage.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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