ENERGY & MOTION SONGS

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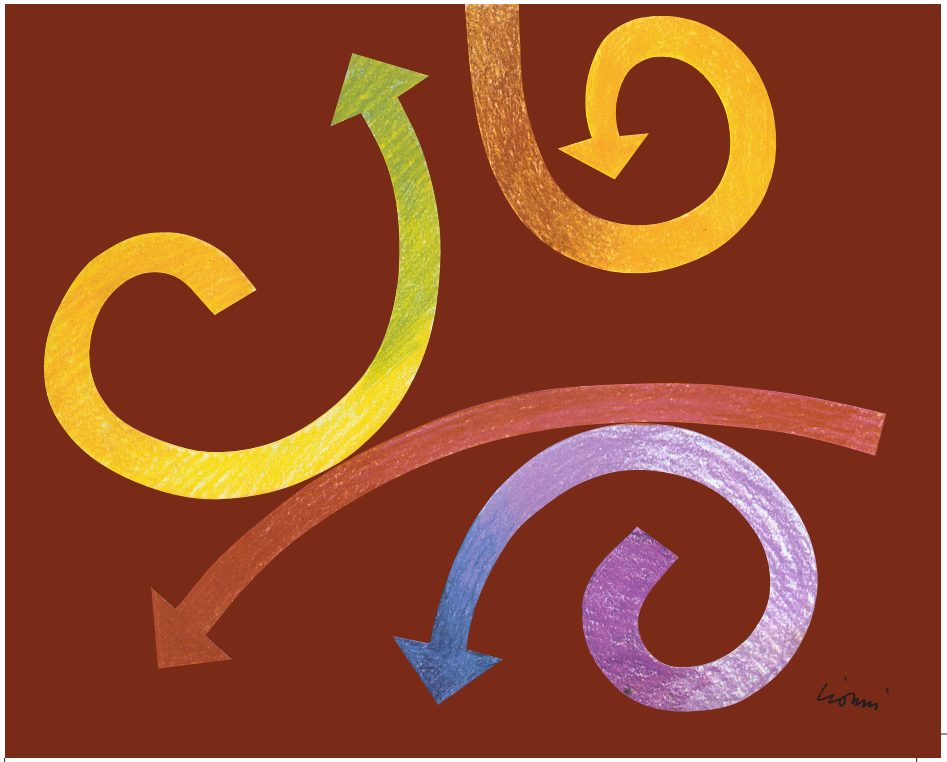
MOTIVATION RECORDS
(A division of Argosy Music Corporation)

Tom Glazer & Dottie Evans

Energy & Motion Songs

Motivation Records

from Ballads For The Age Of Science by Hy Zaret and Lou Singer



WHAT IS ENERGY (PART 1)

Q: What is energy?

A: Energy is the ability to do work.The ability to cause motion and change.

To understand the fundamental facts of energy,
You must have a working knowledge of its terminology
From atoms down to x-rays sing along and learn with me
The ABCs and XYZs of energy

Q: What kinds of energy are there?

A: There's Nuclear, Mechanical and Solar Energy,
And Electrical and Chemical and Radiant and Heat
There's Light and there's Magnetic and that's quite enough for me
'Cause that makes nine different kinds of Energy
There are more of course, but we won't go into that now.

GRAND COULEE DAM

Q: Can energy change from one kind to another?

A: Yes, energy can change from one kind to another For example, water power can be changed into mechanical energy, and from that into electrical energy. Would you like to see how it happens? Let's take a quick trip to the Grand Coulee Dam.

They've got a lot of water at the Grand Coulee Dam
They use a lot of water at the Grand Coulee Dam
They need a lot of water at the Grand Coulee Dam
To turn a lot of turbines at the Grand Coulee Dam

They change water power...
The turbines are a-hummin'

THUMBNAIL SKETCH OF ATOMIC ENERGY

Here's a thumbnail introduction to Atomic Energy
Here are some important highlights of Atomic History
From the X-ray and Electron and the Quantum Theory
Down to Einstein and his formula for Mass and Energy

HIP HOORAY! WE'VE GOT ATOMIC ENERGY
IT COULD MEAN A BETTER WORLD FOR ALL
HIP HOORAY! FOR THOSE WHO MADE IT COME TO BE
THEY REPRESENT THE MAIN EVENTS AND HEROES GREAT AND SMALL...

1896, France...
Henri Beckerel finds that Uranium ore is radioactive.

1905, Switzerland...
Albert Einstein shows that matter and energy are equivalent. $E = MC^2$.

1913, Denmark...
Neils Bohr explains how atoms emit light as electrons jump from higher orbits to lower ones.

1938, Germany...
Otto Hahn and Fritz Strassmann split the Uranium atom.

1942, The United States of America...
Enrico Fermi builds the first atomic pile, and shows that atomic energy is practical.

HOPE AND PRAY, WE USE THE POWER CONSTRUCTIVELY
TO BRING ABOUT A PEACEFUL WORLD FOR PEOPLE GREAT AND SMALL

Stars and Waterfalls
Motors and Bouncing Balls
Sunlight and Sound and Air
Moving continually
Are proving conclusively:
Motion, Motion, Everywhere!

Rocks and Minerals,
Insects and Animals,
Have one thing that they all share
Moving continually
They're proving conclusively:
Motion, Motion, Everywhere!

Clouds and Jumping Beans
Roses and Evergreens
Dishes and Silverware
Moving continually
Are proving conclusively:
Motion, Motion everywhere!

Take a look at me,
What are you sure to see —
Muscle, skin, and teeth and hair —
Moving continually
Are proving conclusively:
Motion, Motion everywhere!

Change water power...
The power keeps a-comin'
Change water power...
The great generators
Make electric current at the Grand Coulee Dam

The turnin' of the turbines at the Grand Coulee Dam
Is turnin' generators at the Grand Coulee Dam
And turnin' water power at the Grand Coulee Dam
Into electric current at the Grand Coulee Dam

They change water power...
The turbines are a-hummin'
Change water power...
The power keeps a-comin'
Change water power...
The great generators
Make electric current at the Grand Coulee Dam

They turn mechanical energy
Into electrical energy
When they make electric current
At the Grand Coulee Dam

E-LEC-TRI-CITY

E-LEC-TRI-CITY... (AC)
E-LEC-TRI-CITY... (DC)
A WONDERFUL KIND OF ENERGY
THAT'S E-LEC-TRI-CITY (SI, SI)

It's the kind of energy,
You can change so easily...
You can change it into heat in a heater
Change it into light in a lamp
Change it into motion in a motor
Change it into sound in a phone

E-LEC-TRI-CITY... (AC)
E-LEC-TRI-CITY... (DC)
A WONDERFUL KIND OF ENERGY
THAT'S E-LEC-TRI-CITY (SI, SI)

It's the kind of energy
We produce so easily
You can
make it with a steam or water turbine
make it when the generator turns
make it with a simple storage battery
make it with a photoelectric cell

E-LEC-TRI-CITY... (AC)
E-LEC-TRI-CITY... (DC)
A WONDERFUL KIND OF ENERGY
THAT'S E-LEC-TRI-CITY (SI, SI)

How would modern living be, without electricity?????

It would be terribly inconvenient to say the least. Can you imagine what modern living would be like without...

Electric lights... bells and clocks
Heaters and refrigerators
And it's combined with oxygen —
Then in the form of heat
It's giving off Energy
The energy released
When particles of matter change —
The energy released
Is Chemical Energy... Chemical Energy

HOW DO WE MEASURE ENERGY

How do we measure energy? ... in foot pounds... foot pounds
How do we know when it gets to be... a foot pound... foot pound
The energy expended by lifting one pound one foot high
That's one foot pound... that's one foot pound
The foot pound measures Energy!

Pick up an object from the ground... Easy does it
Say that the object weighs ten pounds... ten pounds... ten pounds
Lift up the object four feet high, ten by four you multiply
That's forty foot pounds... forty foot pounds
The foot pound measures Energy!
The foot pound measures Energy!

MOTION, MOTION EVERYWHERE

A rock looks so still. But is it? The rock is made of tiny, invisible particles called molecules. These molecules vibrate rapidly. The molecules are made of atoms. In the atoms, electrons whiz around at tremendous speeds. There is plenty of motion in the rock, and in everything else. And that motion is energy!

Hey bambino, Why do you make it tough for me —
Hey, okay, I'll try to answer that

When wood is being burned
And it's combined with oxygen
Then, in the form of heat,
It's giving off energy
The energy released
When particles of matter change —
The energy released
Is Chemical Energy

Mama, mia, what is this Chemical Energy
Mama, mia, what do they mean by that?
Hey bambino, Why do you make it tough for me —
Hey, okay, I'll try to answer that

Each time you light a match
Or spark a motor's gasoline,
The energy released
Is Chemical Energy.
The energy released
When particles of matter change —
The energy released
Is Chemical Energy

Hey bambino, what is this Chemical Energy
Mama, mia, what do they mean by that
Hey bambino, try to explain it now to me
Hey, okay, I'll try to do just that

When something's being burned
Vacuum cleaners... washers, dryers
Freezers, fans and elevators
Radios and TV sets
Hi-fi phonographs
Motion pictures... x-rays and
The telephone and telegraph
Electric motors and machines for home and farm and industry
Our modern world is resting on E-lec-tri-city

It's essential in today's transportation
Vital if you want light and heat
Necessary in communication
Indispensable mechanic'lly

E-LEC-TRI-CITY... (AC)
E-LEC-TRI-CITY... (DC)
A WONDERFUL KIND OF ENERGY
THAT'S E-LEC-TRI-CITY (SI, SI)

ENGINES (MECHANICAL ENERGY)

Now, tell us something about engines.

Rocket or Turbine or Gasoline —
Three different kinds of engines —
Rocket or Turbine or Gasoline
All have a similar function.
They convert energy for machines,
Separately or in conjunction —
Providing mechanical energy

Is an engine's primary function.
Providing mechanical energy
Is an engine's primary function

Engines burn fuel (chemical energy) to create heat (heat energy). The heat makes gasses expand and exert force to cause motion (mechanical energy). In a gasoline engine, the fuel explodes inside closed spaces called "cylinders" and forces moving parts called "pistons" to move down and up. This motion makes the wheels turn.

Providing mechanical energy
Is an engine's primary function

SOLAR ENERGY

Long, long ago the world began
Long, long before the time of man
Even then the sun was shining
Shining on the Earth below

Plants, nourished by the sunlight
Flourished on the land and sea
And, in time, hosts of living creatures
Came to be

Now, long ago is far away
How do we need the Sun today
If, somehow the sun stopped shining
What would happen here below
Plants from the Earth would vanish
Vanish from the land and sea
And, in time, every living creature
Would not be...

And when you're thinking of this light ray
This fact should linger in your head

Infra red rays are very useful in broiling food, and for heating.

Ultra Violet and Infra Red
Ultra Violet and Infra Red
Among the many kinds of Light Rays
There are Ultra Violet and Infra Red

Q: And what are the others?

A: The spectrum of visible light ranges from red to violet. On one side of the spectrum are the infra red rays. On the other side are the ultra violet waves. These are a small part of a much larger spectrum of electromagnetic rays. The complete spectrum of electromagnetic waves ranges from radio and TV waves through infra red, to light, ultra violet, and then to x-rays, gamma rays and cosmic rays at the opposite end.

Ultra Violet and Infra Red
Ultra Violet and Infra Red
Among the many kinds of Light Rays
There are Ultra Violet and Infra Red

WHAT IS CHEMICAL ENERGY

A fire releases heat energy, light energy, smoke, and gasses. All materials are made up of tiny particles, called "molecules". When a chemical like wood is burned, its molecules rearrange themselves to form new combinations. A lot of motion and commotion of molecules results. This is heat! Electrons jump from orbit to orbit inside the atoms. This causes the light!

Mama, mia, what is this Chemical Energy
Mama, mia, what do they mean by that?

Pushes out in all directions
Sideward thrusts are equalized
And can't escape from the jet
Gas exhausted through the engine
Brings an opposite reaction
Gives the jet is forward thrust —
That's all there is to a jet

The Law of Motion, applied to jets,
Is simply "action and reaction"
The zooming power the engine gets
Is simply "action and reaction"

Newton said it...
Give him credit...|
His Law of Motion still applies:

"For every action, there is an equal an opposite reaction."

And that's how a jet plane flies...!

ULTRA VIOLET AND INFRA RED

Among the many kinds of light rays
There's one called "ultra violet"
And when you're thinking of this light ray
Here's one thing you should not forget:

Ultra violet rays are important in fluorescent lights; and they also cause sunburn.

Among the many kinds of light rays
There's also one called "infra red"

ENERGY IN ROUNDABOUT WAYS

Leaves of plants use energy from sunlight to make food. This process is called "photo-synthesis". Animals and people feed on the plants and obtain the energy they need. Sunlight also keeps the surface of the Earth warm, and makes it possible for us to exist... In fact, almost all of the energy we use on Earth comes from the sun's rays. And, almost all of the energy we get from the sun comes "in roundabout ways".

In roundabout ways... in roundabout ways
The Sun gives energy... the Sun gives energy
In roundabout ways
The sun's energy has been stored, in the past,
In the plants and in animal bodies —
Time marches on! — they are coal, oil and gas —
Energy in roundabout ways

Ancient plants and animals died, and were buried under Earth and sea. Their fossil remains were changed into coal, oil, and gas. Today we use these fuels as energy sources for our modern civilization.

In roundabout ways... in roundabout ways
The Sun gives energy... the Sun gives energy
In roundabout ways
The energy in moving water and wind
Has been brought into play by the sunlight
Energy from wind and water becomes
Energy in roundabout ways

Sunlight heats the oceans, and makes the water evaporate. Later, this water falls as rain to form rivers and create water power. Winds are also created by the heating of the earth. The energy of wind can push sailboats, turn windmills, and operate electric generators on farms.

In roundabout ways... in roundabout ways

The Sun gives energy... the Sun gives energy
In roundabout ways

WHAT IS ENERGY (PART 2)

With the discovery of atomic energy, scientists have found that matter can be changed into energy, and energy can be changed into matter. But, even though matter and energy may change their form, the total amount in the universe remains the same.

The "Law Of Conservation", speaking universally,
Says you can't increase or decrease the amount of Energy
Though Energy may change its form and does it constantly
You can't increase or decrease the quantity

Though energy may change its form and does it constantly,
You can't increase or decrease, the quantity.

KINETIC AND POTENTIAL ENERGY

The rolling boulder crashing down the mountain —
That's *Kinetic Energy (Kinetic)*
The boulder sitting high upon the mountain —
That's *Potential Energy (Potential)*

Energy in motion is kinetic
Energy that's waiting is potential
But whether it's kinetic or potential
Both of them are Energy! (Olé!)

You stretch a rubber band and then release it —
That's *Kinetic Energy (Kinetic)*

You stretch a rubber band and then you hold it —
That's *Potential Energy (Potential)*

Energy in motion is kinetic
Energy that's waiting is potential
But whether it's kinetic or potential
Both of them are Energy! (Olé!)

The heat that comes when gasoline is burning —
That's *Kinetic Energy (Kinetic)*
The energy that gasoline has stored up —
That's *Potential Energy (Potential)*

Energy in motion is kinetic
Energy that's waiting is potential
But whether it's kinetic or potential
Both of them are Energy! (Olé!)

JETS

In a jet plane, hot gasses shoot out of the back at great speed. Energy for the motion of the gases is supplied by the burning of fuel. The action of the rushing gases causes an equal and opposite reaction, which sends the jet plain forward.

And that's how a jet plane flies!

The Law of Motion, applied to jets,
Is simply "action and reaction"
The zooming power the engine gets
Is simply "action and reaction"

Gas compressed inside the engine