KM TORSO TEAM
Kinematics of Human Motion

Energy Systems and Conditioning

Summary Guide

This document gives you a fast, practical overview of how fighters produce and restore energy.

Why Energy Systems Matter in Combat Sports

Combat sports demand rapid changes in pace, force, and decision-making. A single round can shift from a short burst to a longer sequence to a brief recovery window — all within seconds.

Energy systems explain how the body powers these changes.

Science describes this through three energy systems:

- ATP-PC (alactic)
- Anaerobic glycolytic (lactic)
- Aerobic oxidative

But athletes don't think in biochemical pathways. They think in speed, power, fatigue, breathing, pace, survival.

KM TORSO TEAM translates physiology into s simple, coach-friendly model:

- **Lightning** — ATP-PC
- **Thunder** — Anaerobic Lactic
- **Rain** — Aerobic
- **Storm** — Fight Mode (All Energy Systems Combined depending on the athlete's fitness level)

This model keeps physiology practical, visual, and easy to teach.

Lightning — The ATP-PC System

Instant. Short. High output.

Lightning represents rapid actions powered by stored ATP and phosphocreatine (PCr).

Duration: 0–6 seconds

Fuel: stored ATP + PCr

Recovery: slow, requires long rest (the aerobic fitness is speeding this process up)

Training: short maximal bursts with full recovery

Lightning is the athlete's ability to act immediately and decisively.

Thunder — The Anaerobic Lactic System

Demanding. Costly. Time-limited.

Thunder represents sequences where effort rises and the body relies on glycolysis.

Duration: 10–60 seconds

Fuel: glucose → lactate + H^+

Recovery: moderate

Training: 15–30 s efforts with incomplete rest

Thunder is the system behind demanding sequences that require sustained effort.

Rain — The Aerobic System

Steady. Efficient. Restorative.

Rain represents the athlete's ability to maintain pace and restore readiness.

Duration: minutes to hours

Fuel: oxygen + carbohydrates + fats

Recovery: fast

Training: steady work or long intervals

A strong aerobic system improves recovery between efforts and supports consistent performance.

The Storm — Fight Mode (All Energy Systems Combined)

All systems working together.

A storm is not a separate system — it is the real-fight expression of Lightning, Thunder, and Rain working in constantly changing proportions.

Combat sports require:

- rapid actions
- demanding sequences
- short recovery windows
- smooth transitions between them

Conditioning teaches the body to move between these demands without losing technical quality.

The Car Analogy — Your Simple Teaching Tool

KM TORSO TEAM created a brilliant analogy:

- **Gear 1 = Lightning**
- **Gear 2–3 = Thunder**
- **Gear 4–5 = Rain**
- **The whole engine = Storm (Fight Mode)**

Better conditioning means:

- smoother gear changes
- higher thresholds
- more efficient use of each system

This analogy makes complex physiology easy to explain and easy to apply.

Why Conditioning Is the Athlete’s Second Leg

Skill is the first leg. Conditioning is the second.

Together, they allow athletes to:

- maintain output
- preserve technical quality
- stay composed under pressure
- express their game plan across rounds

Conditioning is not about doing more — it is about preparing the body to use the right system at the right time.