

## Energy Systems

You train for one reason, to improve your performance. In order to achieve that goal, you must have some understanding of the energy systems of the body and which of those systems are used at different times during a race.

Three energy systems of the body:

1.) Anaerobic Lactate System - This is an anaerobic system (works without oxygen) that fuels the muscles contraction for about 5 to 7 seconds. This system can be used during the start of the race to get out quick. It takes about 5 minutes for this system to be replenished up to 95%. Therefore when doing workouts that train this system specifically, you must allow that much time between repetitions. Example:

8 X 30 meters at full speed - 5  
minute recovery between each.  
This is a pure speed workout.

2.) Anaerobic Glycolic Lactate System - Again, this is an anaerobic system. This system can fuel the muscles for up to two minutes. During exercise, glycogen (sugar) is broken down and used as energy for muscles. As a result of this breakdown hydrogen ions and lactate are produced. The presence of these hydrogen ions makes the muscles acidic and therefore they are fatigued to the point where they can't continue to work at the same level. This system can recover to about 75% within five minutes, to about 85-90% in about 10 minutes and nearly fully recovered in about 20 minutes. If you are attempting to train

this system specifically, you should follow these recovery guidelines. Sample workout:

150-600 meters at 90-100% effort  
anywhere from 2-6 reps., depending  
on the distance  
this is a speed endurance workout

3.) Aerobic system - This system uses oxygen in the energy production process. This system can fuel the muscles for very long periods of time, as long as the exercise level does not exceed the body's ability to supply oxygen to the muscles. In order to train this system, you must achieve a heart rate above 120 beats per minute and not to exceed about 180 beats per minute. Once you exceed 180 BPM, you get into the anaerobic range. When doing repeats in a workout, you can judge recovery time by how long it takes you to return to 120 BPM. The number of reps can be determined by a dramatic change in the amount of time it takes to return to 120 BPM. If you had been recovering in 90 seconds, and all of sudden you are not recovered after three minutes for example, you have reached your limit that day.

## Breakdown of the Energy System Used for Various Distance

<u>Distance</u>	<u>% Aerobic</u>	<u>% Anaerobic</u>
400 meters	20%	80%
800 meters	45%	55%
1500 meters	65%	35%
3200 meters	80%	20%
5000 meters	85%	15%

As you see, the longer you go, the more the aerobic system is emphasized. It stands to reason then that you should concentrate on training this system more extensively, while not ignoring the others.