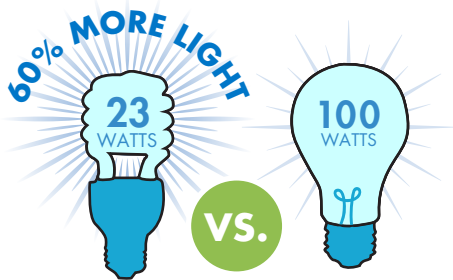


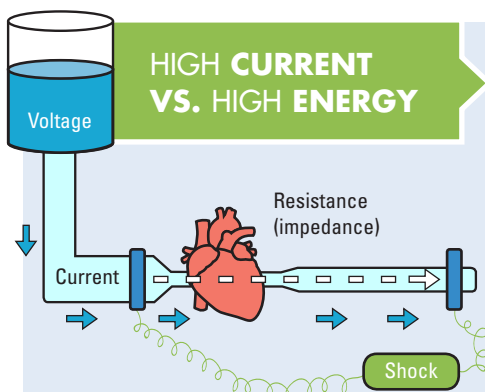
### MORE ENERGY DOESN'T ALWAYS MEAN MORE OUTPUT

We're conditioned to think that more is better. As clinicians, sometimes that means we think that more energy is better with defibrillation. But that's not always the case. Consider a lightbulb. A 23-watt fluorescent bulb produces 60% more light than a 100-watt incandescent bulb. That is more output with less energy! In this case, less is more. The same can be true for defibrillation energy.



### ENERGY SETTINGS ON DEFIBRILLATORS CAN BE CONFUSING

Electrical current is the 'medicine' defibrillators use to shock the heart into a normal rhythm. However, energy, measured in joules, is commonly used as a descriptor for shock strength—leading many to think

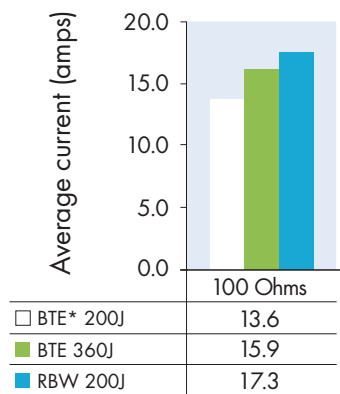


that it's better to have more joules. But much like the light bulb, this isn't always true. Published studies show that average current, measured in amperes, is the better predictor of shock success.<sup>1</sup>

### CONSTANT CURRENT, FIXED DURATION

The goal of a defibrillation shock is to deliver the appropriate amount of average current to the heart. Defibrillation with a lower peak current but higher average current allows for optimal defibrillation with the least amount of energy. High-current rectilinear biphasic waveform (RBW) defibrillators maintain a

Comparison of Average Current at Maximum Energy with 100 Ohms Impedance



\*Biphasic Truncated Exponential

constant current over a fixed duration (10ms) by measuring patient impedance prior to a shock and then adjusting the defibrillator impedance via built-in resistors, thereby providing the desired therapy.

“

*Modern defibrillators deliver current based on stored energy...Energy is a nonphysiologic descriptor of defibrillation despite its entrenchment in traditional jargon.”<sup>2</sup>*

”

— American Heart Association Scientific Guidelines for Resuscitation

### A WAVEFORM DESIGNED FOR EXTERNAL DEFIBRILLATION

The RBW was developed specifically for external defibrillation. RBW defibrillators have been created to meet the specific needs of external defibrillation and can consistently provide more current than the “high-energy” waveforms that other defibrillators use.

### THE BOTTOM LINE:

**For superior defibrillation and cardioversion performance, always think high current.**

An increase in energy doesn't necessarily equate to an increase in current. Energy is the product of voltage, current, and time. An increase in energy can mean that any one of those variables is increased. In fact, the 'high energy' defibrillators increase time but do not deliver any more 'medicine' – i.e., electrical current.

<sup>1</sup>Chen B, Yu T, et al. Average current is better than peak current as therapeutic dosage for biphasic waveforms in a ventricular fibrillation pig model of cardiac arrest. Resuscitation. 2014;85(10):1399-1404.

<sup>2</sup>Link MS, et al. Circulation. 2010;122(suppl 3): S706-S719