To estimate the number of LEDs that can be put in parallel within the given power budget, we need to consider the available power from the power supply as well as the power dissipation from both the step down transformer and voltage regulator.

The power dissipated by the 330 ohm resistor is calculated as follows by using ohm’s law:

P-dissipated=**V2/R=** 52/330= 0.076W

By assuming the efficiency of step down transformer is 70%. Therefore,

power dissipated by transformer=1440-(1440\*0.7)=432W

And regarding the regulator, if we assume the input voltage is 22.6 and the output voltage is 5v and i-output=1A. Therefore, the power dissipated by regulator = (22.6-5)\*1=17.6W

Therefore, the number of leds that can be put in parallel with power budget is:

No.of leds=(1440-0.132-17.6-432) / 0.08 = 12738 led

But since the regulator supplies 1A current and the current passing through the led will be V/R=5/330=0.015A

Therefore, the number of leds that can be put in parallel with the given power are:

Number of leds=1/0.015= 66 leds only

That’s why, the buck converter is more suitable since it lowers the voltage and increases the current to operate more leds in range 50-100.