

# Results and Discussion

## Resonance capacitor

- A modified half-bridge converter (Fig.6) is used to transform DC signals to AC ones. The square waves signal is amplified by using two coupled transistors.
- Coupling two separated half-bridge inverters in parallel to form a full-bridge converter (Fig.7).
- Output power as well as the range of working frequency were found to be largely enhanced, through the increases of the adjustable parameters.
- A resonant capacitor (marked C in Fig. 8) at the end of the converter is used to matching the frequency of the transmitter and the receiver.
- The frequency matching not only transform the square wave into sine wave, but also reinforcing the sine wave amplitude for resonance receiving.
- Transform power of the converter at 32 W with an efficiency of 74% can be achieved.

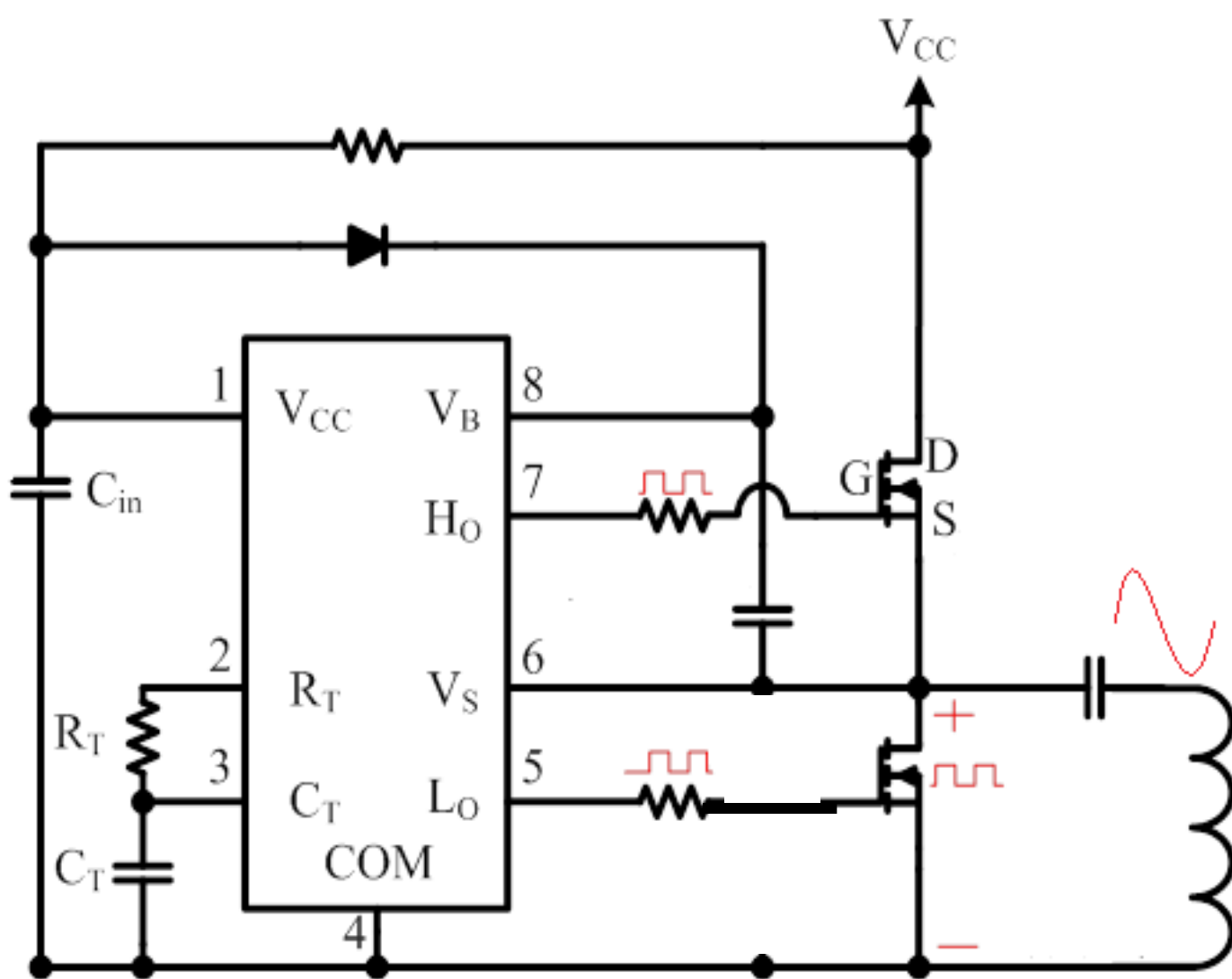


Fig. 6. The half-bridge converter

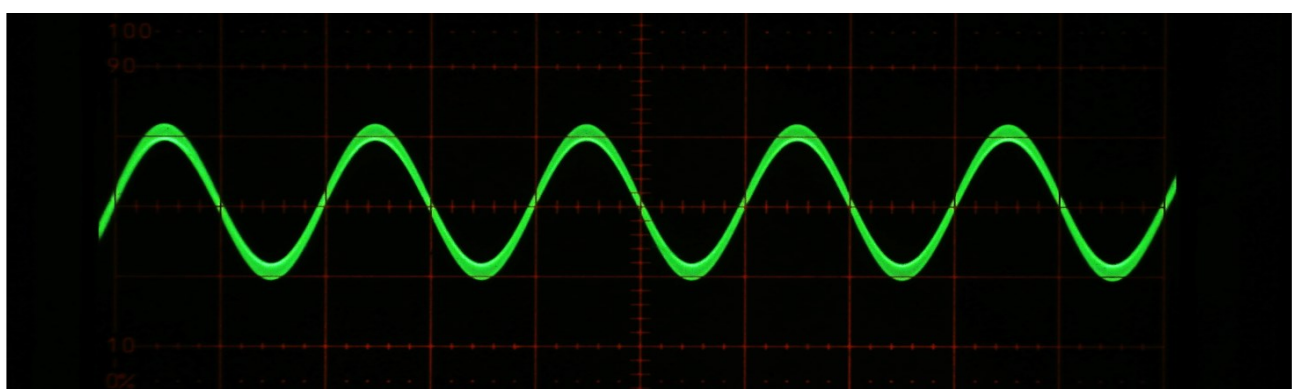
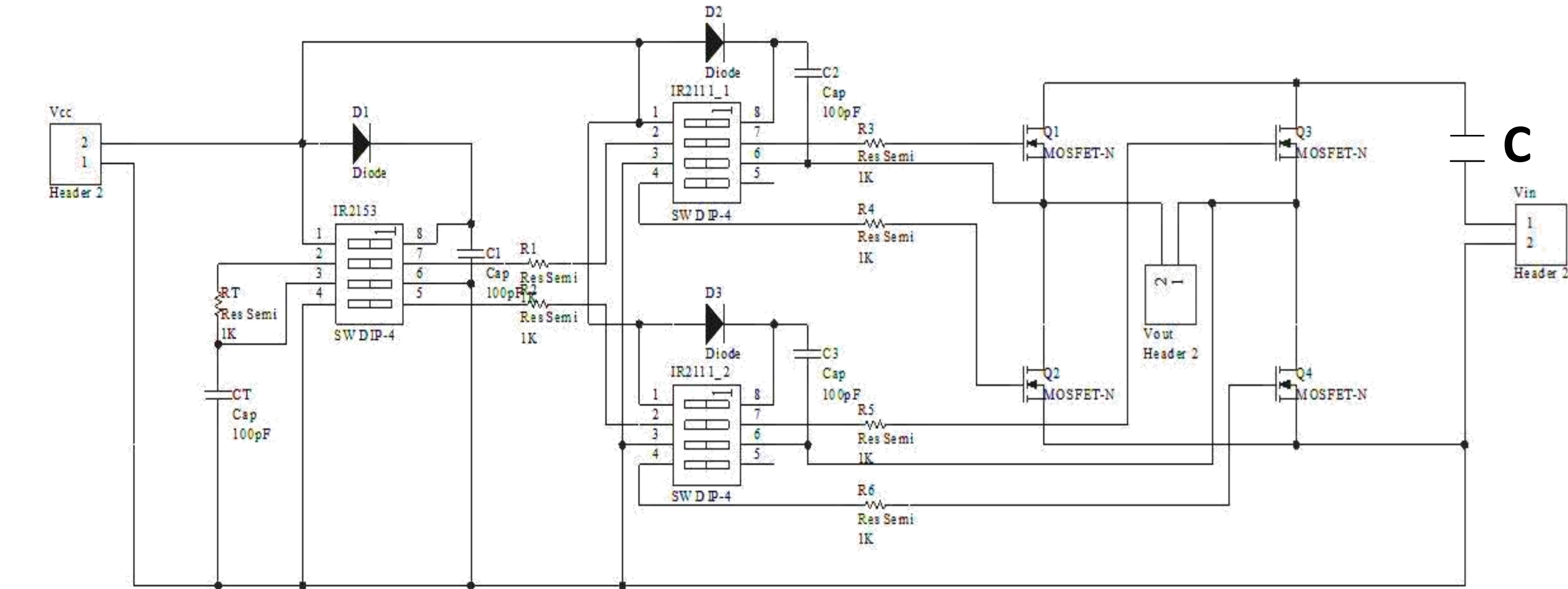


Fig. 7. Circuit and output of the full-bridge converter.

## Focusing magnetic flux

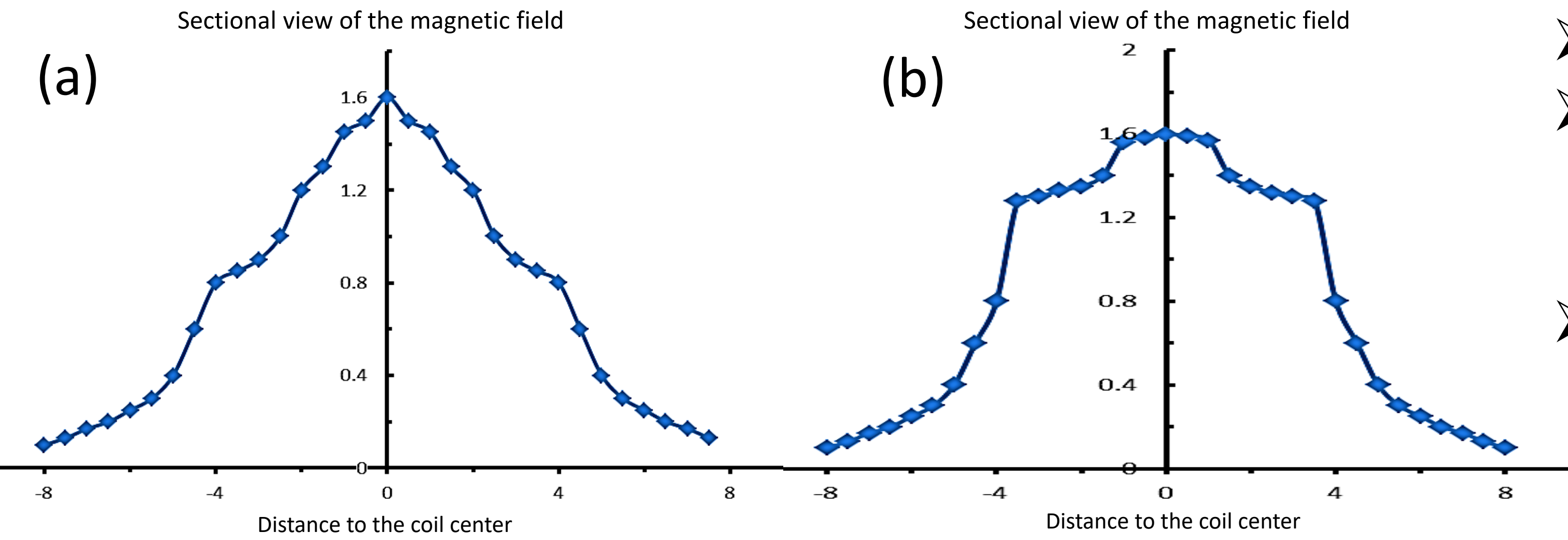


Fig. 8. Magnetic field distributions around the coils (a) without and (b) with magnetic condensers.

- Magnetic field condenser consists of four inter-crossed stripes, placed on the back-side of the coil, is used to direct the magnetic filed onto the center of the device (Fig. 8).
- This is found to be capable of increase the working distance of the charger by 21%.

## Optimization

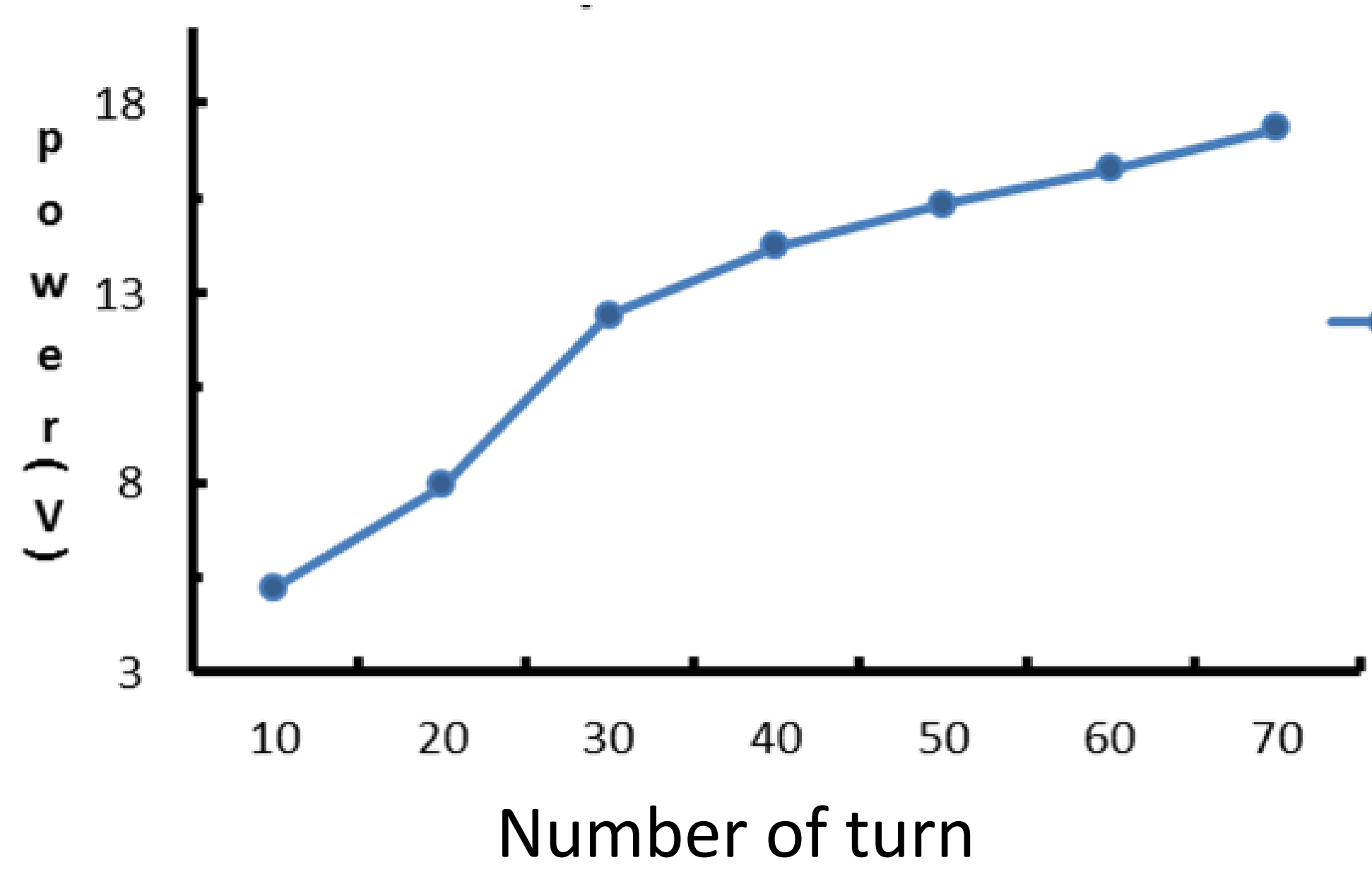


Fig. 9. Higher power can be generated upon using more turns of wires in the coil for induction.

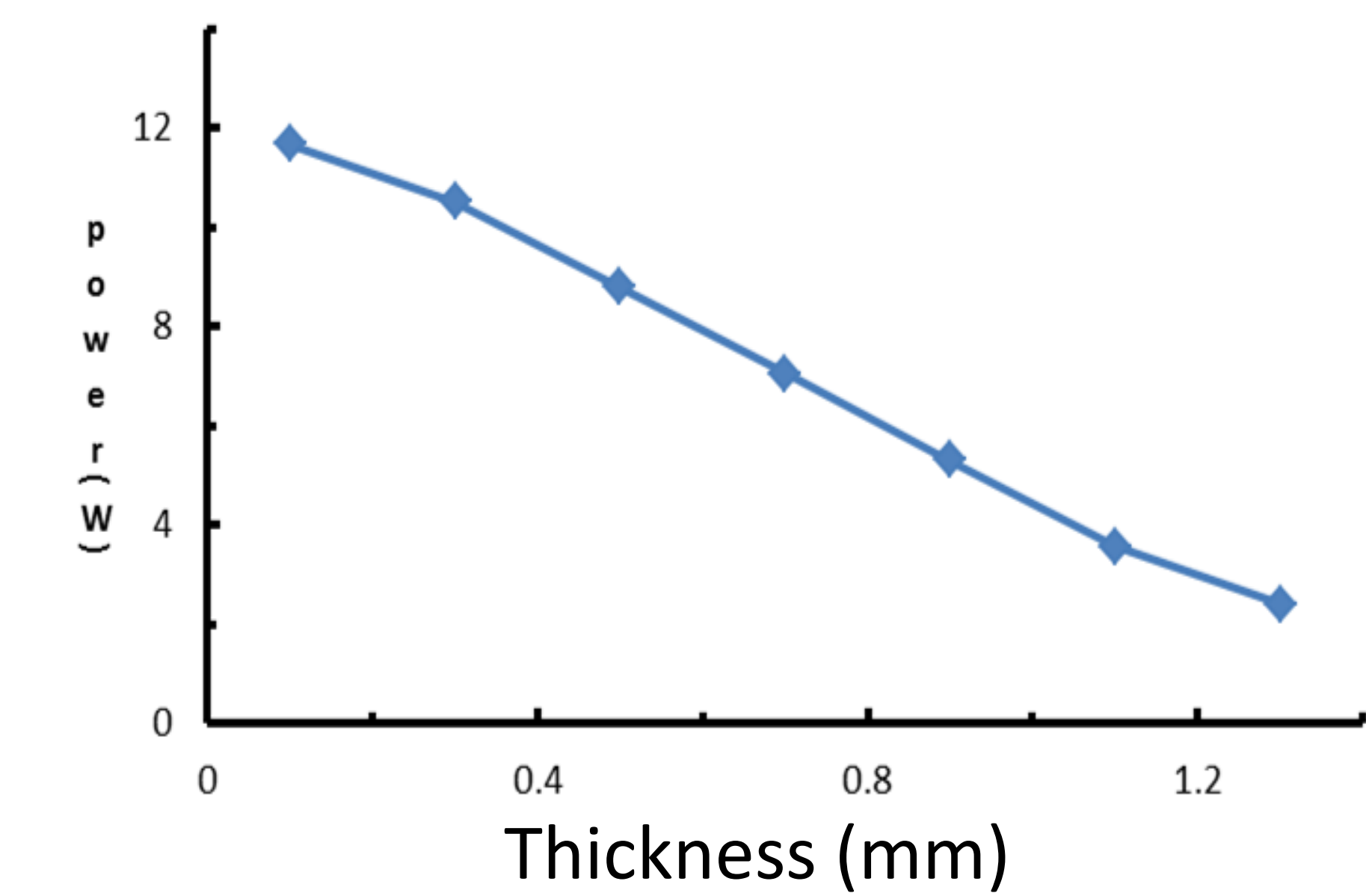


Fig. 11. The thicker the wire is, the smaller the inductance and power generated, when a self-adhesive multi-core coils is used.

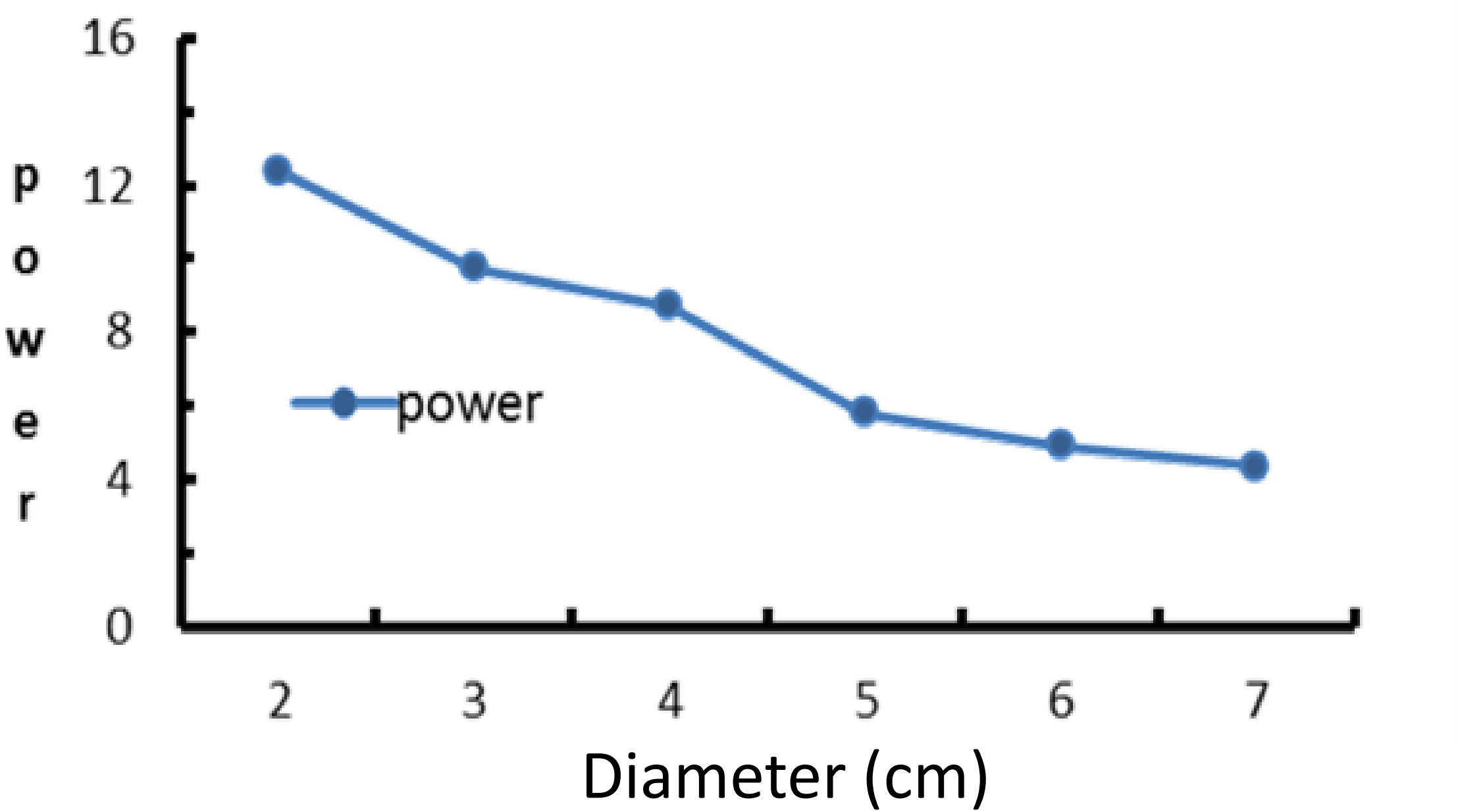


Fig. 10. A larger diameter of the wire for the coil produces a smaller inductance and less power.

- A non-linear dependency of the power generated on the number of turn in the coil was found.
- A critical number of turn should be used for effective induction.
- Smaller wires for accommodating more turns in the coil is the key.
- A transform power of the converter at 27 W with an efficiency of 62% can be achieved.
- The average magnetic field intensity in operation is as small as 1.43 gauss.