Introduction
Virtually all existing systems for Contactless Energy Transfer (CET) make use of electromagnetic fields for the transfer of energy, which has severe drawbacks. Most importantly, the energy transfer efficiency is extremely low when covering a large distance with respect to the system dimensions.

Acoustic Energy Transfer (AET) relies on sound waves for the transfer of energy. It is much better suited for covering large distances. Further advantages are its highly directional energy transfer and the absence of electromagnetic fields. Lastly, the frequencies involved are several orders of magnitude lower than in the electromagnetic case, resulting in considerably higher efficiencies of the driving power electronics.

Approach
The main goal of the project is to investigate whether AET as a CET method is feasible. The research comprises the calculation of the maximum attainable energy transfer efficiency and its optimisation. At first, a system with a transducer radius of no more than 10 cm and a distance of 1 m will be considered.

New transducer types will have to be developed to optimise the efficiency through acoustic impedance matching. Additionally, dedicated power electronics will be designed for the AET system. Lastly, several prototypes will be built to verify the calculations. At first only transmission of energy through air will be considered, later on the concept will be extended to biomedical applications.

Results
The investigation has been focussed so far on the derivation of a theoretical maximum efficiency of the energy transfer. The transfer is limited by a number of effects:

- Diffraction due to imperfect focussing
- Attenuation in the medium.
- Acoustic matching between domains.
- Losses in power electronics.

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