0.1 Introduction

0.2 Background and Motivation

Transitioning from non-renewable energy sources to renewable energy sources is one of the largest, if not the larges political challenge of today. Renewable energy is less polluting that non-renewable energy and should therefore be preferred. However, renewable energy sources only make up 17.5 percent of the worlds energy sources as of 26th of May 2015 (renewableenergyworld.com).

0.2.1 Goal and Research Questions

This section states the goal statement and research questions that will be investigated in this thesis.

Goal statement

> *The project goal is to investigate the advantages of using distributed genetic algorithms to optimizing wind farm layout, i.e. solving the wind farm layout optimization problem.*

The performance of distributed genetic algorithms will be studied and compared to the performance of a simple genetic algorithm (not distributed) as well as to each other, with the goal of answering the research questions stated below.

Research question 1

> *Can distributed genetic algorithms improve the quality of the solution to the wind farm layout optimization problem as compared to simple genetic algorithm.*

Research question 2

> *Which distributed genetic algorithm works best for the wind farm layout optimization problem? What properties are essential for its success?*