Extended Summary

1. Introduction and Relevance

„It is not because a particular technology is efficient that it is adopted, but rather because it is adopted that it will become efficient” (Arthur, 1989). This logic is the reason why governments implement policies aimed at fostering renewable energies (RE). Because of the importance of the energy sector in terms of influence on the environment and on our economic system, they play a central role in achieving a sustainable future. However, RE, like any new technology, have to compete with established technologies that are more mature, more reliable and thus more cost-effective. Only thanks to learning by using will it be possible for renewable energies to represent competitive alternatives to conventional energy sources. Several countries have recognized the importance of green technologies. Among them is Switzerland, which in 2010 implemented a committed policy aiming at fostering their deployment. The aim of this thesis is to evaluate how sustainable this policy is to foster the deployment of RE. In this process, no primary material was collected; only secondary literature was used. The analysis is based on principles developed by two ecological economists, Herman Daly and Joshua Farley1:

- Plurality of policy goals
- Necessary degree of macro-control with the minimum sacrifice of micro-level freedom
- Room for margin of error when dealing with the biophysical environment
- Recognition of historically given initial conditions
- Adaptation to changed conditions

Among those five principles, the first one needs further explanation. According to ecological economic policy theories, there are three goals to consider (following that order): sustainable scale, just distribution, and efficient allocation. Each independent policy goal requires an independent policy instrument.

The choice of using ecological economics’ concepts as theoretical basis for the analysis was not made randomly. The reason lied within the trans-disciplinary dimension that both the notion of sustainability (analyzed) and ecological economics (analyzing) show. To concretize the analysis, it was decided to reduce the evaluation to a comparison between the policy chosen in Switzerland (FiT: price-based) and the one in the UK (green certificates: quantity-based). Each country aspiring to shift its energy sector from conventional sources to RE has to choose one from those two main types of policy. This increases the relevance of this thesis’ findings because they can be generalized to all RE policies. However, this must be done very carefully since details in the design of the policy can have a vast influence.

The thesis is structured as follows: First, the reader is introduced to the fundamentals of ecological economics with a special focus on how it differs from standard economics. The second chapter focuses on the reasons as well as the challenges behind government interventions in context of environmental protection. More details are given concerning interventions in the energy sector, elucidating on the two main types of policies that can be implemented to foster the deployment of RE (price-based and quantity-based). Following this, Daly and Farley’s general policy design principles for a sustainable

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government intervention are presented. This marks the end of the theoretical section. Then, starting with the Swiss FiT system (technical name: Cost-covering remuneration for feed-in to the electricity grid (CRF)) and followed by the British green certificates scheme, known under the name of Renewables Obligation (RO), the level with which both policy instruments respect Daly and Farley’s principles is analyzed. From this comparison, a conclusion on the sustainability of the CRF is drawn. The thesis ends with a paragraph evaluating the limitations of the chosen analysis method and proposing a few ideas for further research.

2. Results

Plurality of Policy Goals

According to Daly and Farley, a policy instrument should drive the size of the economic system towards sustainable scale. In this respect, the Swiss government seems to have taken the initiative since one of its energy objectives for 2030 concerns specifically the stabilization of households’ energy consumption. Both the CRF financing modus and the ProKilowatt Initiative help limiting the quantitative expansion of our economic system. The British government has also introduced a surcharge (climate change levy) on consumption of non-RE but it only applies to non-domestic consumers, which strongly limits its repercussions. Additionally, besides CO2-emission reduction targets within the European Union, no explicit goal for energy efficiency has been set by the government. From a sustainable scale perspective, Switzerland is better equipped than the UK.

The CRF tends to have a positive effect on distribution in comparison to the RO because it encourages the deployment of small-scale installations relatively to large-scale ones. Consequently, the CRF allows for a broader distribution among the population of the benefits arising from the RE deployment. But for a FiT scheme to have a fundamental positive impact, it would need to include in its design a form of social/community-based financial help to allow all actors, especially the poorer ones, to benefit from it. This is not yet the case.

In the subsections concerning the effect of both measures on efficient allocation, a distinction is made between static and dynamic efficiency. In the short run (static efficiency), it seems more judicious for a government to invest in a quantity-based mechanism such as the RO but in the long run (dynamic efficiency) a price-based mechanism such as the CRF proves to be a better choice. Because of increasing planning and transmission problems (consequences of the lack of dynamic efficiency), the British government made adjustments to the initial policy designs. It is in this context that the banding system and the new FiT for <5 MWh came into existence. Both of these measures influence the way risk is dealt with within the scheme, narrowing the gap between the CRF and the RO. Finding the right balance between too much market risks exposure for RE projects and too little is one of the most complex challenges faced by a policy maker aiming to foster RE. From an efficient allocation perspective, the RO seems to be more successful because it includes elements improving static and dynamic efficiency, while the CRF almost ignores static efficiency.

Macro-control and micro-freedom

The CRF gives such strong incentives to invest in RE (thanks to the high tariffs) that a macro-control mechanism is not necessary to assure that the targets will be reached. On the other hand, the RO has set a penalty system – the buy-out rate – that actually doubly penalizes the non-participants but still does not manage to reach its quotas.
The total cost cap, the funding ceilings for each individual technologies and especially the purchase obligation included in the CRF limit micro-level freedom for RE generators and suppliers. Conversely, within the UK’s support scheme, RE suppliers can reach their quota through different methods. These include concluding direct contracts with RE generators, purchasing certificates at the spot market price or vertically integrating RE generation in the firm’s activities. Consequently, the British government adopted a policy where micro-level freedoms have been sacrificed to a minimum. However, this is changing because of the recent introduction of banding and FiT for small generators.

Room for margin of error when dealing with the biophysical environment

The CRF guarantees a faster RE deployment than the RO. First, the CRF reduces market risks for investors and encourages research and development conducted by the RO generators. On top of that, the RO engenders wrong incentives for suppliers and producers behaving strategically. For all those reasons, the CRF is more ecological effective that the RO and thus leaves a bigger room for margin of error when dealing with the environment.

Recognition of historically given initial conditions

Both governments seem to have overestimated the level of engagement necessary to foster RE. Both governments, each in a different way, failed to show consistency in their RE deployment program. This represents a breach to Daly and Farley’s fourth principle.

Adaptation to changed conditions

From the perspective of this last principle, the CRF is superior to the RO in the short-run as well as in the long-run because it is quantity-based and because RO’s timetables are not flexible at all. Furthermore, in the long-run, the superiority of the CRF relates to its capacity to encourage the development of a variety of RE technologies.

The next table summarizes the results obtained for each individual principles.

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<th>RO United Kingdom</th>
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<td>1. Plurality of policy goals</td>
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<td>c. efficient allocation</td>
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<td>a. macro-control</td>
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<td>3. Room for margin of error when dealing with the biophysical environment</td>
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Table 1: Results of the critical assessment

All in all, the results obtained in this thesis are in accordance with the general political and scientific opinion on FiT and green certificates schemes.
3. Limitations and Further Research

The first thing that is striking when one considers Daly and Farley’s principles is their abstract and broad nature. Because of that, a substantial freedom of interpretation is left for the determination of the method that should be used to apply them to specific policies such as the CRF or the RO. This reduces the objectivity and with that the scientism of the obtained results. Additionally, Daly and Farley’s principle are not unanimously acclaimed within the ecological economics community. Consequently, one of the main limitations of this thesis appeared already by the selection of the principles on which will be based the analytical section. Developing a new set of more concrete criteria based on ecological economics fundamental concepts is an idea for future research. In this context, it is important that ecologists and economists work together.

The material used as basis for the arguments raised throughout the analysis generated further limitations. Because no primary data was collected, the material was limited to what the secondary literature on energy policy judges relevant to analyze. This is why for example the sections on scale and distribution are shorter than the one on efficient allocation – the focus of standard economics. Moreover, the strength of ecological economics is its characteristic to encompass multiple disciplines. However, this feature is not sufficiently present in this thesis. Beside the limit in scope with which every bachelor thesis has to comply, another reason behind it is the predominant economic background of the author. Comprehensive analysis such as the one indented here are crucial for the future of policies aiming to improve the relation of our economic system with its environment. In this context, more cooperation between the different disciplines is needed.