

The Energy Payback or natural resources before financial resources

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The Energy Payback or Natural Resources before Financial Resources Ueli Seemann¹

Summary of a presentation given at the SASEG annual convention 2012 in Lucerne, Switzerland.

Introduction

Within the next two to three generations, conventional natural energy resources will become a dwindling commodity. Unlike financial commodities, energy resources follow the rule of «gone is gone»! Financial commodities in their own right are renewable; money can be printed at any time (as long as the necessary energy for the printing machines is available).

Most sophisticated forecasting methods (value assessments) have been developed by the financial business and less so by the energy-resource business. One commonly used financial value assessment method is the Financial Payback method. The Financial Payback yields the time span between the point in time when a certain financial investment is made and its break-even (time) point is reached.

This paper introduces the concept of an Energy Payback («EPB») method applying the same methodology as for the Financial Payback. With the diminishing of non-renewable energy resources, the assessment of «EPB's» might in future overtake Financial Payback assessments in importance. The «EPB» case history presented here, is a first attempt at creating a feeling for the sensitivities of «EPB» calculations. Hence, it is not meant to yield precise numbers, but orders of magnitudes and general trends.

[In this paper the expression «energy» encompasses all conventional, non-renew-

able energy resources consumed in the «Monte Rosa Hütten», including coal, oil, kerosin and gas. All «energy» is normalised into comparable energy units (BOE = barrels oil equivalent.)]

Test case

The much discussed «Monte Rosa Hütte (Cabin)» project in the Swiss Alps was chosen, as a test case for calculating an EPB:

1. The starting point for the EPB assessment is the Energy-Portfolio (Consumption) of the «Old Monte Rosa Hütte» which was 102 BOE per year.

2. The following input is the – much improved – Energy-Portfolio (Consumption) of the newly built «Monte Rosa Hütte», which is approximately 39 BOE per year.

3. The difference (gain) between the two Energy-Portfolios («Old Monte Rosa Hütte» and newly built «Monte Rose Hütte») equals 63 BOE per year.

This gain did not come free. Just as in the finance business, investments have to be made. In the case of the «New Monte Rosa Hütte» 1,400 BOE were invested in «construction-energy» (helicopter flights and petrochemical construction products) and in the dismantling of the «Old Monte Rosa Hütte».

4. The actual EPB is calculated by dividing the invested energy (1,400 BOE) by the annual energy gain (63 BOE). For the given example of the «Monte Rosa Hütten Project» the EPB equals 22 operating years of the «New Monte Rosa Hütte».

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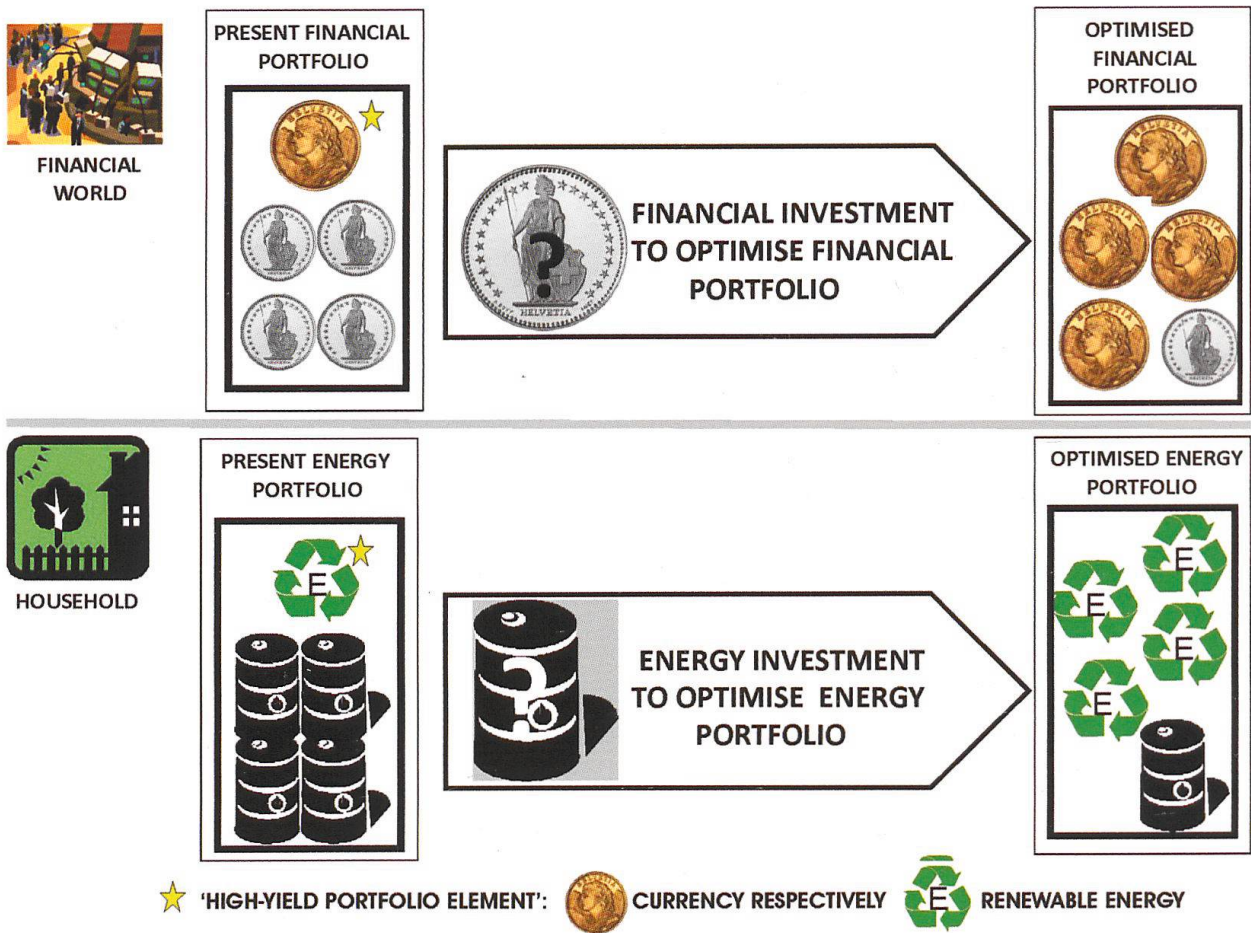
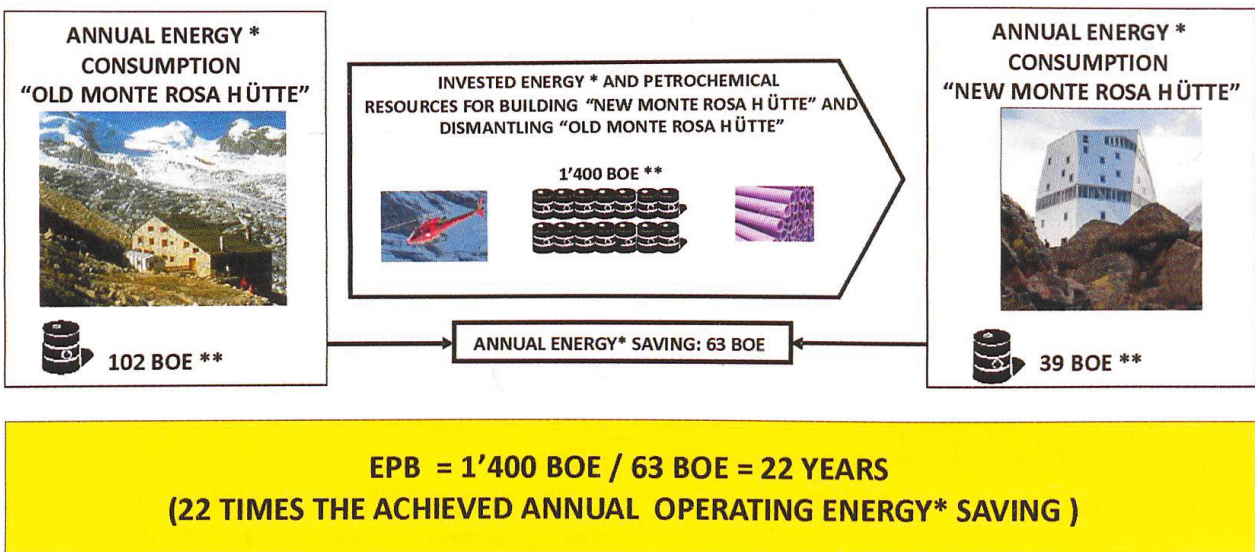


Fig. 1: Financial payback versus energy payback (EPB) – the concept.



* ONLY NON-RENEWABLE RESOURCES ARE CONSIDERED, INCLUDING COAL, GAS, OIL, KEROSENE, PETROCHEMICALS
 ** BOE = BARRELS OIL EQUIVALENT = 'NORMALISED' UNIT TO ALLOW PROPER CORRELATION. (ONE EQUALS 100BOE)

Fig. 2: The energy payback (EPB) of the «Monte Rosa Hütten» project.

In other words: the invested energy in building the «New Monte Rosa Hütte» aiming at improving its energy portfolio will reach the break-even point after 22 operating years.

Discussion

- The obvious question resulting from the above is: «What is the meaning of an EPB of 22 years?» The honest answer must be: nobody can tell; since an EPB case history as presented in this paper has – to the author's knowledge – not been published before.
- The somewhat less blunt answer is: an EPB of 22 years is within a sensible range that might have been expected for a first class, frontier project like the «New Monte Rosa Hütte».
- In order to get a better feeling as to what the significance of a given EPB really is – further calibration with additional EPB case histories would be essential.
- In the meantime, the 22 years EPB of the «New Monte Rosa Hütte» frontier project could be used as an upper benchmark, when assessing the expected EPB for a planned building project.

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