

Renewable energy resources in the SEEA

Are renewable energy resources assets in the
SNA and SEEA or not?

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1. Introduction and relevance

- More public attention for renewable energy
 - Energy transformation process
 - Fossil energy reserves are recorded as assets in the SNA
 - Renewable energy resources are generally not recorded as assets on the national balance
- Balance sheets that are restricted to non-renewable energy resources only could lead to a serious underestimation of a country's available energy resources



2. Key research question

The key research question to be answered in this issue paper is whether the various renewable energy resource categories can be meaningfully identified as independent assets according to the SNA and SEEA asset boundaries.



3. Assets in the SNA and SEEA (1)

SNA definition on assets:

Assets as defined in the SNA 2008 are entities that must be owned by some unit, or units, and from which *economic benefits* are derived by their *owner(s)* by holding or using them over a period of time.

SEEA definition on assets:

Natural resources translate into economic entities if there exists competition between the environmental functions of the environmental resource. They are scarce in that more of one entails less of the other. A sacrifice has to be made of some of the competing functions and thus opportunity costs are necessarily involved in making the trade-off of between functions (SEEA, §7.32)



3. Assets in the SNA and SEEA (2)

Water bodies:

The SEEA and SNA boundary of assets includes hydropower reservoirs

Wind & solar radiation:

Wind en solar energy fall outside the asset boundaries of both SNA and SEEA.

→Income but not an asset:

Still surplus income can be created. This surplus income is either created due to environmental regulation (climate change) or increasing scarcity of mineral energy resources. This leads to the dilemma that there seems to be no asset in the SEEA and SNA sense while there is a surplus income resulting from its use in production.



4. Split up of fixed assets and renewable energy assets (1)

- strong complementarity between produced assets and the renewable energy resource
- similarity with discussion on land improvements in the SNA
- The final outcome of this discussion was that the non-produced component of land should be valued at its present unimproved value. This implies that land improvements should be recorded in the balance sheet separately from the original land, thus as two separate assets.



4. Split up of fixed assets and renewable energy assets (2)

→ Any excess in the higher valuation of renewable energy facilities which cannot be explained by the new capital formation is recorded as economic appearance in the 'other changes in volume account'.



5. Definition of resource rents (1)

Resource rent in the SEEA 2003-

....the value of capital service flows rendered by the natural resources, or their share in gross operating surplus, is the...resource rent (SEEA-2003, §7.167).

This SEEA definition does not provide any information on the nature of the resource rent like the Hotelling definition does. It only indicates that the gross operating surpluses of mining operations contain an income component that is related to the capital service flow of natural resources.



5. Definition of resource rents (2)

Economic rent is obtained when the profit earned exceeds the opportunity costs of all input factors. Rents can be generated by way of at least three different mechanisms:

1. *Differential rent (Ricardian rent)*
2. *Hotelling rent*
3. *Monopoly rent*



5. Definition of resource rents (3)

Rent creation in renewable energy sector by:

- 1. Exploiting the endowments of countries:**
Ricardian rent
- 2. Rents in the light of government intervention:**
Ricardian rent, temporary
- 3. Rents in the light of scarcity of substitute natural inputs:**
Ricardian rent, temporary



6. Balance sheets of energy producers (1)

The asset accounts (balance sheets) of SEEA should be able to indicate how natural versus fixed capital evolves overtime.

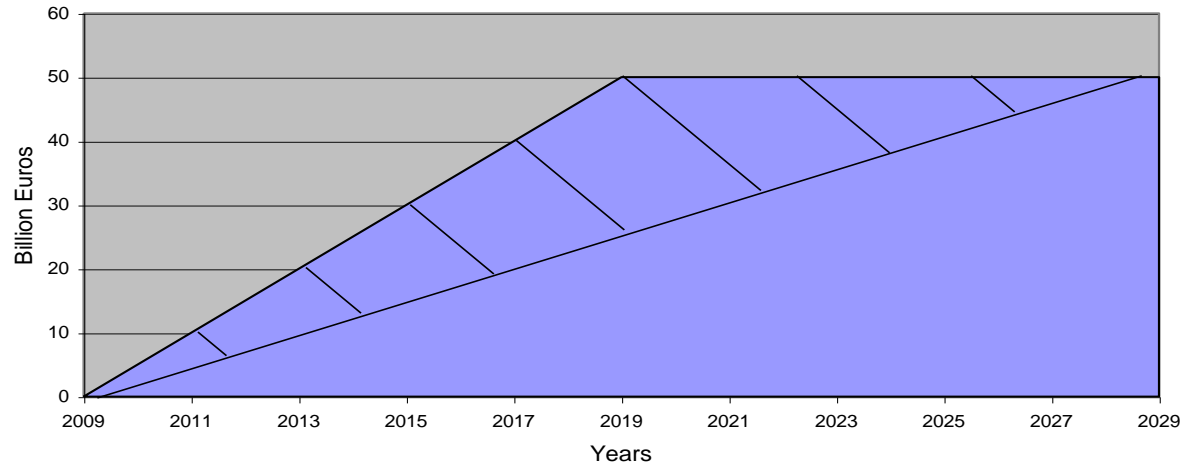
This seems particularly important in periods in which countries transform there electricity supply from fossil to renewable technologies

What happens if a particular transition scenerio evolves over time?

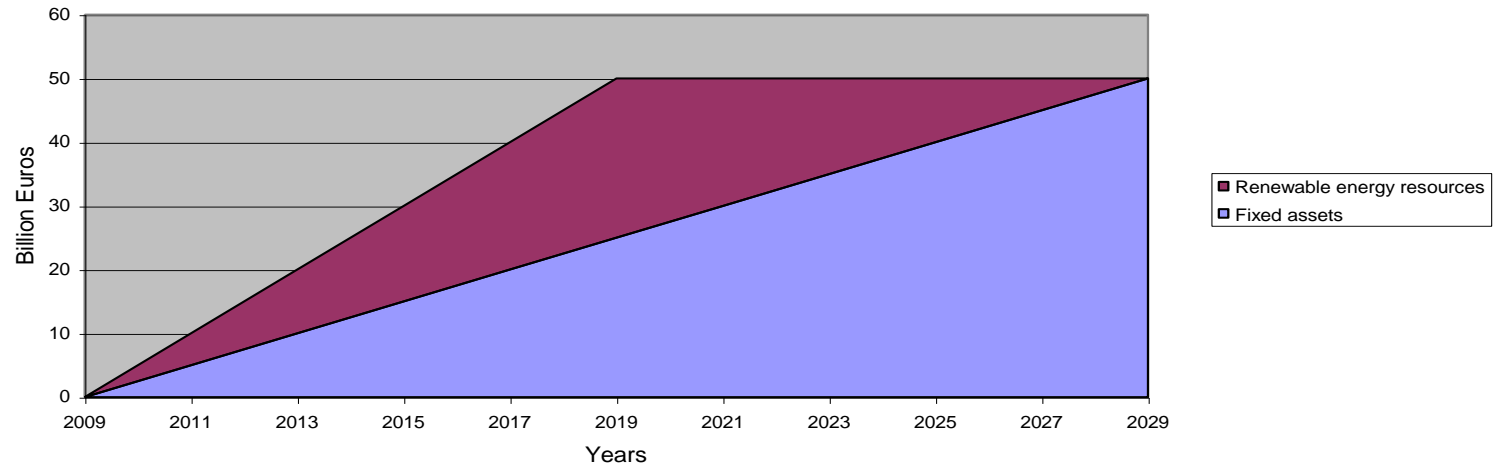


6. Balance sheets of energy producers (2)

Total asset values, renewable energy producers, SNA



Total asset values, renewable energy producers, SEEA



6. Balance sheets of energy producers (3)

In the SNA context there are at least two ways to look at the value of fixed assets:

1. the surplus income generated by renewable electricity production has nothing to do with a return to capital → excess profits
 2. the surplus income is a temporary rise in the return to capital. This will lead to upward revaluations of fixed assets.
- If we accept the (temporary) existence of renewable energy assets, the SEEA asset accounts will not undergo this SNA dilemma. The SEEA will explicitly reflect the value of renewable energy resources.



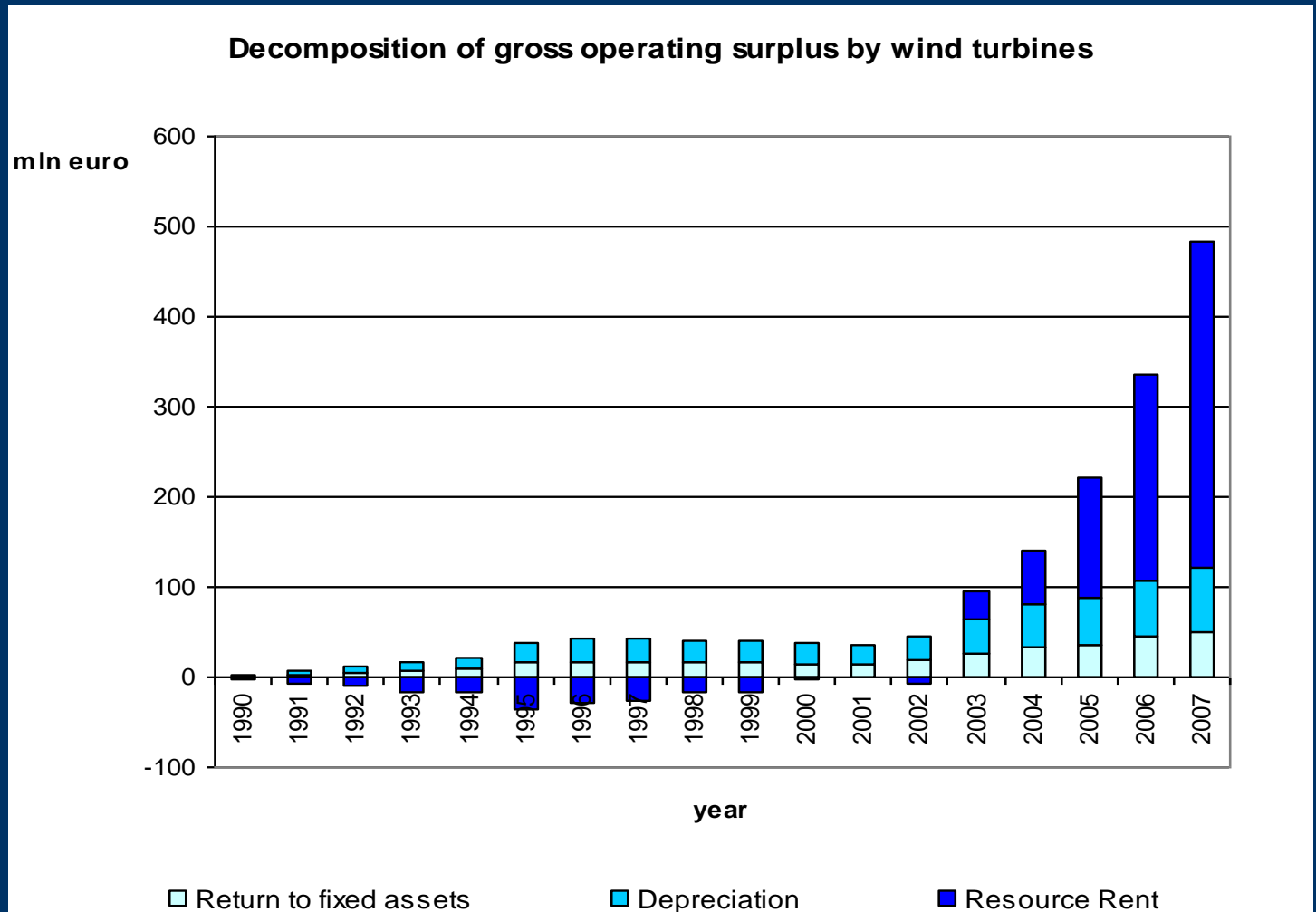
8. Some numerical examples (1)

Production value	257	
Intermediate consumption	68	
Value added	189	
Of which		
Subsidies (-)		-294
Consumption of fixed capital		71
Return to fixed assets		50
Resource rent		362

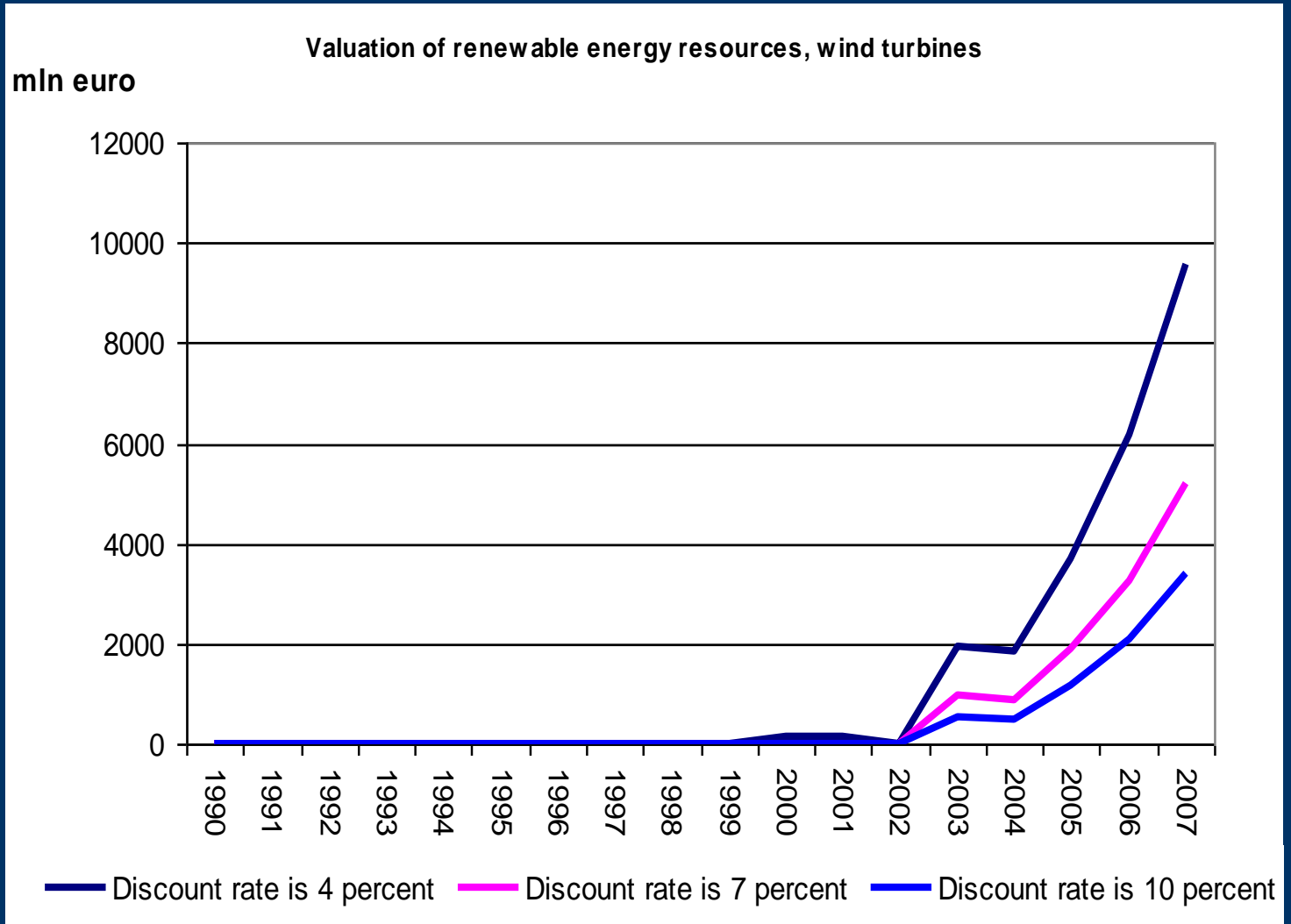
Table 1-Determination of resource rent for wind turbines in the Netherlands, 2007



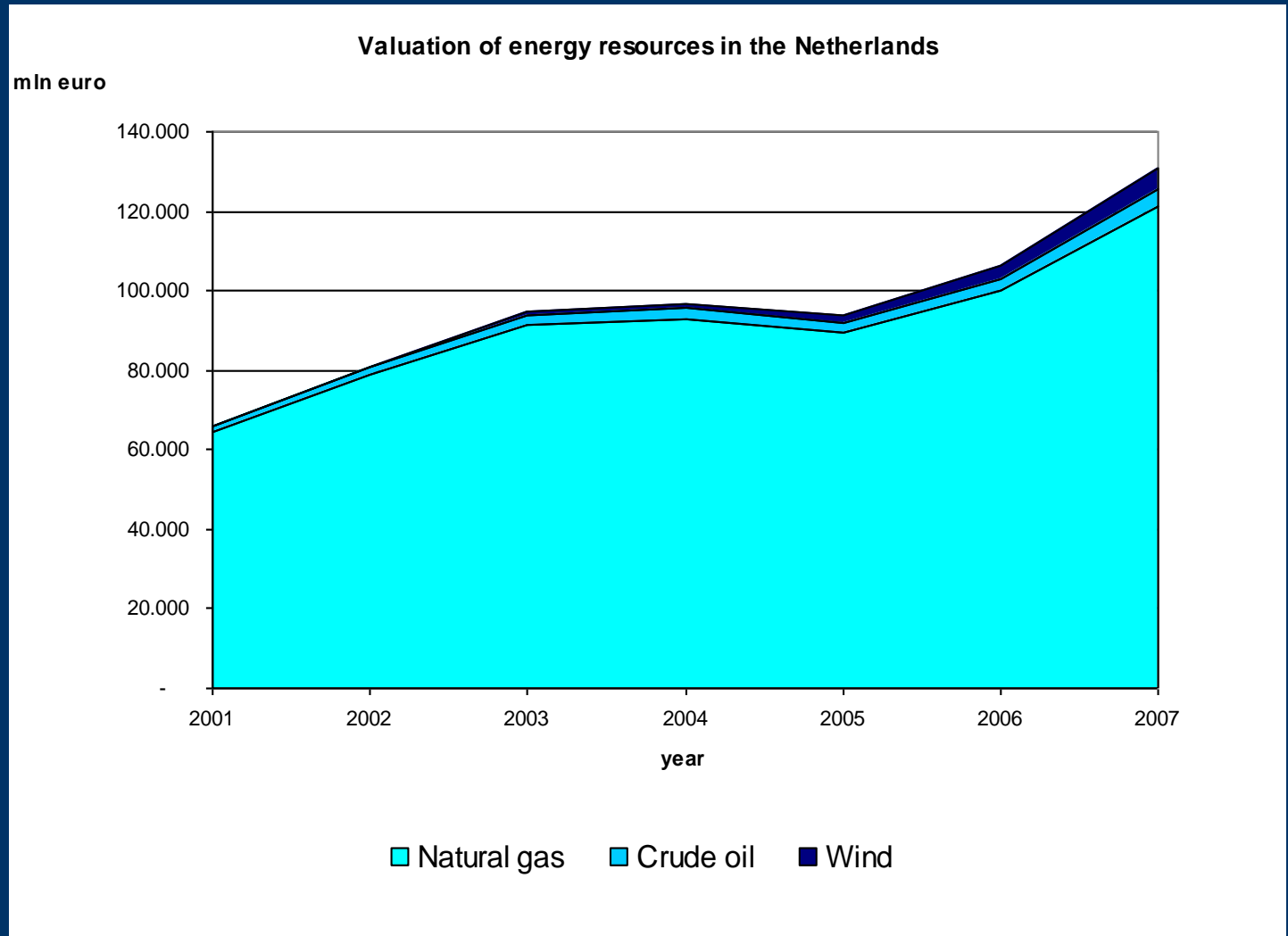
8. Some numerical examples (2)



8. Some numerical examples (3)



Some numerical examples (4)



9. Questions for the London Group (1)

Question 1 Does the London Group agree with the conclusions drawn in this paper that in principle artificial water reservoirs (as in the SEEA Water, EA1311) do comply, while wind and solar radiation do not comply, with the SNA and SEEA definitions of assets?

Or, alternatively, should the SEEA definition on assets be broadened to include water, wind and solar energy resources? If yes, how?

Question 2 Does the London Group agree that in principle it is desirable to have separate asset values for fixed assets required for renewable energy production and the renewable energy resource itself?



9. Questions for the London Group (2)

Questions 3 Do both Hotelling rents and Ricardian rents comply with the SEEA definition of a resource rent?

Do monopoly rents comply with the SEEA definition of a resource rent?

Do these answers give rise to changing the current SEEA-2003 definition of a resource rent?

Questions 4 If Ricardian rents are included as resource rents, represents any surplus income generated from hydropower a resource rent? If yes, represents hydropower a renewable energy asset?



9. Questions for the London Group (3)

Questions 5 Is the existence of long lasting rents a criterion for assets or can temporary rents, for example as a result of government policies, also lead to the (temporary) existence of assets?

If yes, does this make wind and solar radiation assets in the SEEA framework?

Questions 6 Are temporary surplus incomes that result from technological transformation processes resource rents?

If yes, does this make wind and solar radiation assets in the SEEA framework?



Thank you for your attention

For questions, suggestions and remarks, please
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