

Green Energy 2020: A New Perspective on Electric Power, Sweden-Per Ribbing- Division of Electricity

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Introduction

In the old, physical, way of regarding the Product Electricity; as being similar to water flowing in pipes, the statement "All power mixes on the grid!" held true. However, from a market and consumer power point of view, from an economic view of the product that we purchase (i.e. the Product Electricity), that statement is false. Electricity which is audited; Production vs Consumption, does not mix with any other electricity. Only electricity which is not audited does mix. The anonymous agents which are the carriers of the purchased Product Electricity, i.e. the kWh:s, are mixed. The product itself (the electricity) is not mixed.

This new perspective is not intuitively easy to understand, especially not for electrical engineers or anyone working in the power sector. Nevertheless, it is the correct way to understand the new situation with deregulated power markets offering different "colours" of power, i.e. electricity with different environmental loads.

In this new situation the new perspective on the product electricity shows that there exists a possible choice of not consuming any coal power.

However, the market based methods for reporting purchased electricity do have shortcomings and in this article we propose a concrete solution to the most apparent problem; that it is possible to buy only the Guarantee of Origin (GO), separate from the Product Electricity itself.

The fact that transactions like that are both possible and correct (in theory) they do not increase the acceptance, nor the understanding of how it is actually possible to not purchase and consume any coal power. Furthermore, the ongoing important scientific discussion about consumer power on the power markets is hindered.

Keywords: Guarantee of Origin, electricity, Product Electricity

Background of the Research

New innovations will empower future significant distance exchange sustainable power source bearers. Such exchange either requires introducing between mainland power networks for transmitting sustainable power or creating inexhaustible energizes and moving them with (existing) fluid or vaporous fuel foundation. Power transmission frameworks permit monetary advantages for exchange over mid-extend separations, for example between North-Africa and Europe. Be that as it may, significant distance power transmission, for example among Europe and the US, needs a lessening of transmission costs by a factor of 5 to make it monetarily viable.⁸ Yet, transmission networks are an experienced innovation, rendering noteworthy cost decreases of this significant degree sketchy.

Conversely, fluid and vaporous powers would take into account the re-utilization of existing exchange framework. At present, the main in fact develop, enormous scope choice for significant distance exchange sustainable power source transporters are biomass-based energizes, for example bio powers. Be that as it may, bio fills can reasonable supplant, best case scenario a minor portion of non-renewable energy sources in existing worldwide vitality frameworks, as photosynthesis has low sunlight based vitality to fuel change productivity. This outcomes in high land necessities and, thusly, in a related decrease in regular carbon stocks because of land-use change and land the board. New advances for sustainable fuel creation, for example, the creation of hydrogen from water electrolysis dependent on inexhaustible power alongside a possible move up to vaporous or fluid carbon-based fills, are related with fundamentally lower direct land impacts. For example, a procedure that gets hydrogen from electrolysis, utilizing power from wind power (WP), and carbon dioxide legitimately caught from air, could deliver between 410 GW h km⁻² a⁻¹ and 680 GW h km⁻² a⁻¹ of methanol. Interestingly, one of the most land-productive biomass innovations which is industrially accessible.

Coordination's and circulation don't really establish significant hindrances to universal exchange of inexhaustible fuels²⁸ as some sustainable fills, for example, sustainable methane and sustainable diesel are immediate substitutions of their fossil reciprocals. For other carbon-based powers, for example,

ethanol, methanol, and dimethyl-ether (DME), in any case, the current framework would need to be adjusted somewhat. Using hydrogen, absolutely or put away in substance mixes, for example, methanol or smelling salts, needs considerably more foundation adjustment, both with respect to transportation and dissemination, and in regards to applications and last use.^{29,30} Today, hydrogen isn't melted for abroad transportation everywhere scale, in spite of liquefaction of hydrogen being a since quite a while ago known process.³¹ Even however, first showing ventures for abroad delivery of hydrogen are underway.³² Yet, at the current degree of innovative turn of events, vitality needs and costs identified with hydrogen liquefaction forbid huge scope commercialization. Current appraisals of future expenses, in any case, show that the full expenses of sustainable hydrogen including significant distance transportation can become cost-serious with inexhaustible methane in the medium-term,^{27,32} specifically if hydrogen is put away in non-carbon powers, for example, ammonia.^{30,33,34} Therefore, extraordinary failure cost synthetisation strategies for hydrogen, methanol, and methane, in light of sustainable power sources, will build the open doors for significant distance exchange of inexhaustible powers.

References

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