Climate Neutral Notebooks

Report of the possibility of making the operation of Averatec-laptop computers climate neutral by purchasing carbon credits from hydroelectric power projects

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1. Underlying principles

a. Principle of Climate Neutrality

Extreme Summers, massive hurricane damage, melting glaciers, rising sea levels – man-induced climate change is more and more noticeable and frequently in the news. It is now scientifically accepted that man has caused the global increase in greenhouse gas.

The greenhouse gases concerned are:

- Carbon dioxide(CO_2)
- Methane gas (CH_4)
- Nitrous oxide (laughing gas, N_2O)
- Partially halogenated perfluorocarbons (H-CFC/HFC)
- Perfluorocarbons CF_4, C_2F_6, C_3F_8
- Sulphur hexafluoride (SF_6)

The most important greenhouse gas is carbon dioxide and serves as the reference value. The remaining gases will be calculated in CO_2 equivalents. The most important Climate Protection conference took place in Kyoto in December 1997, when the so called Kyoto-Protocol came into being that took effect 12.2.2005. Up to now 161 states have ratified this agreement. These states represent 85% of the world's population and emit 62% of the world's CO_2 emissions.

According to UNEP "*The Kyoto Protocol is an agreement under which industrialized countries will reduce their collective emissions of greenhouse gases by 5.2% compared to the year 1990 (but note that, compared to the emissions levels that would be expected by 2010 without the Protocol, this target represents a 29% cut). The goal is to lower overall emissions from six greenhouse gases - carbon dioxide, methane, nitrous oxide, sulfur hexafluoride, HFCs, and PFCs - calculated as an average over the five-year period of 2008-12. National targets range from 8% reductions for the European Union and some others to 7% for the US, 6% for Japan, 0% for Russia, and permitted increases of 8% for Australia and 10% for Iceland.*"

Unfortunately, although the US signed the Kyoto-Protocol they have not ratified the agreement. As the US is responsible for 24% of the worldwide Greenhouse gas emissions, there are numerous regional and private climate protection initiatives there. There is also a consensus of opinion that something must be done to reduce greenhousegas emissions, although the administration will not give any firm directive to US citizens that they must reduce their emissions.

Given this background greenhouse gases especially CO_2-emissions wherever possible must be avoided or reduced. However, this is not always possible. This is where the principle of climate neutrality offers a realistic climate protection option, when avoiding emissions altogether is not an option.

Figure 1: *Principle of climate neutrality (Source: Sustainable Partner GmbH)*

The basic idea of climate neutrality is simple. Greenhouse gases have a globally damaging effect; with regard to climate protection it is irrelevant where in the world the emissions are created or avoided. Therefore, unavoidable emissions can be compensated/neutralized at Place A through climate protection measures at Place B. The creation of climate neutral activities is enabled through the purchase of ecologically high quality Emissions reduction certificates from acknowledged and verified climate protection projects that are then audited and set aside.

The Sustainable Partner GmbH led climate protection initiative acknowledges that certain selected products have neutralized their unavoidable emissions through investing in high quality climate protection projects and allows the use of its climate neutrality logo to be used when marketing these products.

Figure 2: *specific Climate Partner goods logo (Patent/copyright: Sustainable Partner GmbH)*

b. Principles and Methods of Emissions calculation

Sustainable Partner GmbH's emissions calculations are based on two firm principles:

1. Independent data
2. Accurate and comprehensive calculations

We only use data that is sourced from independent scientific research projects.

To ensure the accuracy and credibility of the emissions calculations it is important to include all factors that may have a bearing on this figure. In cases where an exact figure is not possible (i.e. to the last kg) due to the high cost in manpower or time in extracting these figures then an average calculation, based on our own research and previous experience, will be made.

Sustainable Partner GmbH will use two calculation methods:

1. Individual calculations from selected scientifically qualified personnel.
2. Calculations via our automatic emissions calculator.

Using scientific experts enables us to make an accurate and comprehensive emissions calculation and to take into account the various specific factors pertinent to creating a climate neutral activity (e.g. local and regional gas, oil and electricity figures etc.).

Automatic climate calculators are based on standardized formulae and empirical values together with individual criteria. National emissions factors form the basis for these calculations. The climate calculator is a tool for the general public and offers private individuals the opportunity to compensate for their own carbon emissions.

The cost of adapting this calculator to be used by business clients is proportionally small to our other climate protection products and so we are able to offer this to businesses as a means of enabling their clients and staff to calculate their individual emissions more comprehensively.

The following explain the accounting methods and data sources for making laptops climate neutral.

2. Calculating greenhouse gas emissions through the sale of laptop computers

a. Conscious decision for specific business emissions

The manufacture of laptop computers at all phases of production creates greenhouse gas emissions:

» Production
» Transport from delivery of raw materials through production to the end user
» Sales
» Disposal, Recycling

Compensating for all these emissions is possible but extremely difficult and complex due to the many international contributors involved. Full compensation would require extensive research into all the individual components and their manufacturers that make up a laptop computer. The calculation would not just include the laptop manufacturer but also their component suppliers and accompanying logistics. The smallest changes in the production process, in where the product is manufactured or changes in delivery methods or companies would demand an emissions calculation. Therefore making the production of the laptops climate neutral is not advisable. Agreed standardized emissions calculations for the production of laptops are not yet available.

Compensating the transport from delivery of raw materials through production to the end user was also considered too complex for the reasons given above as that also would have to record and account for all changes in suppliers and means of transport. Therefore, making transport climate neutral was also deemed inadvisable. To date agreed standardized emissions calculations for transport in the production of laptops are not yet available.

It would be possible to make greenhouse gas emissions from certain aspects of the transport process climate neutral. See the examples below:

» Delivery from Factory to wholesaler
» Delivery from wholesaler to retailer
» Delivery from retailer to end user

The emissions calculation for delivery from factory to a limited number of wholesalers could be done relatively easily. It was considered inadvisable however due to the difficulty in explaining to critics how the emissions were accurately calculated. There was the possibility of negative publicity from using transport whereas it is only a very small contributor of the total greenhouse gas emissions in this case

The above is also relevant with regard to the delivery from the wholesaler to the retailer and retailer to end user. The high number of deliveries from wholesalers to retailers and the even larger figure from them to customers made the process too complicated.

„Laptop trading" extends through the whole life of the product so there can be no criticism of selecting a short specific time. There is no need to justify this means of emissions reductions. In fact this choice appears generous and therefore a good option to choose.

The disposal and recycling phases were not considered options as a phase chosen that deals with the end of a laptop's life was not considered a positive communications option. Also, this phase is regulated by EU wide electro- and electronic legislation so that there is no need for further PR or raising awareness in this phase.

b. Using electricity a constant source of CO_2 emissions

An in-depth analysis of all possible causes of greenhouse gas emissions caused in the manufacture of a laptop computer cannot deny that using electricity is a constant source of CO_2 emissions.

Theoretically, one could also calculate emissions on the basis of their being constantly transported from one place to another but this is an imprecise science, as the transport involved is too variable.

A notebook needs electricity. This requires energy that requires the burning of fossil fuels and so carbon dioxide emissions are created. One can calculate the following carbon emissions during the life of a laptop.

- The average life of a laptop
- The average usage of a laptop
- The average energy emissions

c. The average life of a laptop

The average use of a laptop computer was examined in various studies.[1] See the three different studies below:

» Type of use
» Private households or offices
» Leisure

The study was taken over one year of 365 24 hours days and 8.760 hours computer use each day. The research study examined how laptops were/were not used during this period. Below are the four uses:

» Normal use
» Stand-By
» Pseudo-Off
» No use of electricity

As well as the Normal Use and Stand-by that definitely use energy, one should distinguish between Pseudo-Off and Switched Off, as power is still used to upload the battery.

It is evident that usage data will differ between private and professional use. In order to have better networking between the company and laptops, they will not only be set up for business trips and trips abroad but also for use in-house. This will lead to an increase in the collective usage time of laptops. There can be no allowance for use as a single business user given the constant demands on the laptop's time.

Due to better pricing and different opportunities for use, laptops will replace desktop home computers and their usage times will increase more and more. As laptops in the private sector do not tend to be run on battery power the use of electricity is different in this sector.

As the usage situation between professional and private sectors is changing, it is not possible to draw an accurate statistical conclusion as to the amounts of greenhouse gas emitted. Listed below alongside the actual data for 2005 are the estimated future figures for 2010. To clearly establish the trends these figures are contrasted with the figures for 2001.

Taken together, these figures create an average usage data for laptops:

[1] See Study of Fraunhofer Instituts für Systemtechnik und Innovationsforschung (ISI) and Centre für Energy Policy and Economies (CEPE), Der Einfluss moderner Gerätegenerationen der Informations- und Kommunikationstechnik auf den Energieverbrauch in Deutschland bis zum Jahr 2010 – Möglichkeiten zur Erhöhung der Energieeffizienz und zur Energieeinsparung in diesen Bereichen, Projektnummer 28/01, Karlsruhe/Zürich 2003.

Sector/Year	Usage time (Hours per Year)			
	Normal use	Stand-by	Pseudo-Off	No use of electricity
Households				
2001	370	671	5.286	2.433
2005	425	667	5.251	2.417
2010	480	662	5.216	2.402
Offices				
2001	1.430	770	3.280	3.280
2005	1.430	770	3.280	3.280
2010	1.430	770	3.280	3.280

Figure 3: *average business use for laptops (Data sources: cepe, ISI)*

Due to the differing usage data from households and offices, one must differentiate between private consumers and professional consumers to realise the emissions data. As long as there is no market data available the private and professional sectors should be estimated. The following data is available:

Sectors/Year	Usage time (Hours per Year)			
	Normal use	Stand-by	Pseudo-Off	No use of electricity
Sector Private 25%				
2001	1.165	745	3.782	3.068
2005	1.179	744	3.773	3.064
2010	1.193	743	3.764	3.061
Sector Private 50%				
2001	900	721	4.283	2.857
2005	928	719	4.266	2.849
2010	955	716	4.248	2.841
Sector Private 75%				
2001	635	696	4.785	2.645
2005	676	693	4.758	2.633
2010	718	689	4.732	2.622

Figure 4: *Past usage data in consumer sectors (Calculations by Sustainable Partner GmbH)*

d. Usage Data for Laptops

i. How they are used

The use of electricity for laptops does not just depend on the type of usage but also on the trend towards professional use. Due to the increased use of laptops in the office electricity use is changing, as the battery sector network is pushed out in favour of the in-house network. The trend is towards an increase in laptop usage. There can be no allowance for use as a single business user given the constant demands on the laptop's time.

Due to better pricing and different opportunities for use the laptops will replace desktop home computers. As laptops in the private sector do not tend to be run on battery power the use of electricity is different in this sector.

Below are examples of average usage:

Sector/Year	Usage data for laptops (Watt)			
	Normal use	Stand-by	Pseudo-Off	No use of electricity
Households				
2001	18,0	6,0	4,0	0,0
2005	21,0	6,0	2,5	0,0
2010	25,0	6,0	1,5	0,0
Offices				
2001	18,0	6,0	4,0	0,0
2005	20,0	6,0	2,5	0,0
2010	22,0	6,0	1,5	0,0

Figure 5: *average usage for laptops (Data sources: cepe, ISI)*

With regard to the private and business sector the following usage data is available:

Sectors/Year	Usage time (Hours per Year)			
	Normal use	Stand-by	Pseudo-Off	No use of electricity
Sector Private 25%				
2001	18,0	6,0	4,0	0,0
2005	20,3	6,0	2,5	0,0
2010	22,8	6,0	1,5	0,0
Sector Private 50%				
2001	18,0	6,0	4,0	0,0
2005	20,5	6,0	2,5	0,0
2010	23,5	6,0	1,5	0,0
Sector Private 75%				
2001	18,0	6,0	4,0	0,0
2005	20,8	6,0	2,5	0,0
2010	24,3	6,0	1,5	0,0

Figure 6: *Usage data dependent upon Consumer sectors (Calculations by Sustainable Partner GmbH)*

ii. Yearly use of electricity

If one combines usage data with type of use we get the following consumption:

Sector/Year	Electricity consumption (Kilowatthours)			
	Normal use	Stand-by	Pseudo-Off	**total**
Households				
2001	6,7	4,0	21,1	31,8
2005	8,9	4,0	13,1	26,1
2010	12,0	4,0	7,8	23,8
Offices				
2001	25,7	4,6	13,1	43,5
2005	28,6	4,6	8,2	41,4
2010	31,5	4,6	4,9	41,0

Figure 7: *yearly electricity usage for laptops (Calculations by Sustainable Partner GmbH)*

The following yearly electricity figures are available for the private and business sectors:

Sector/Year	Electricity consumption (Kilowatthours)			
	Normal use	Stand-by	Pseudo-Off	**total**
Sector Private 25%				
2001	21,0	4,5	15,1	40,6
2005	23,7	4,5	9,4	37,6
2010	26,6	4,5	5,6	36,7
Sector Private 50%				
2001	16,2	4,3	17,1	37,7
2005	18,8	4,3	10,7	33,7
2010	21,7	4,3	6,4	32,4
Sector Private 75%				
2001	11,4	4,2	19,1	34,7
2005	13,8	4,2	11,9	29,9
2010	16,9	4,1	7,1	28,1

Figure 8: *yearly electricity consumption dependent upon Consumer sectors (Calculations by Sustainable Partner GmbH)*

iii. Total electricity use for a laptop

If the climate neutrality of laptops does not just span a certain time but is spread over its total average lifespan, it is possible to assess its average electricity usage.

For accounting purposes the useful life of a laptop accepted by German tax authorities is three years.[2]

Up to now there have been no studies made regarding privately owned laptops. Due to the short product lifestyle cycle, it is reasonable to assume that a new purchase would be made on average every three years.

As electricity use since 2005 has declined slightly, below is a chart calculating the estimated decreased rates in yearly electricity usage:

Sector/Year	Electricity use total in kWh
Households	
2005	26,1
2006	25,6
2007	25,2
2008	24,7
2009	24,3
2010	23,8
Offices	
2005	41,4
2006	41,3
2007	41,2
2008	41,2
2009	41,1
2010	41,0

Figure 9: *Estimated yearly electricity use (Calculations by Sustainable Partner GmbH)*

[2] See amtliche AfA-Tabellen, see http://www.bundesfinanzministerium.de.

The following figures are for electricity consumption for private and business users:

Private sector 25%	Total electricity consumption in kWh
2005	37,6
2006	37,4
2007	37,2
2008	37,1
2009	36,9
2010	36,7
Private sector 50%	
2005	33,7
2006	33,5
2007	33,2
2008	33,0
2009	32,7
2010	32,4
Private sector 75%	
2005	29,9
2006	29,5
2007	29,2
2008	28,8
2009	28,5
2010	28,1

Figure 10: *Electricity consumption per year dependent upon Consumer sectors (Calculations by Sustainable Partner GmbH)*

The following total electricity consumption is available from laptops first sold in 2006, which were for use in private homes or businesses:

Sector	2006	2007	2008	Total Electricity consumption in kWh
Households	25,6	25,2	24,7	**75,5**
Offices	41,3	41,2	41,2	**123,7**

Figure 11: *Estimated electricity consumptions for laptops sold in 2006 (Calculations by Sustainable Partner GmbH)*

The following examples of total electricity consumption are for laptops first sold in 2006 to the private and business sectors.

Sector	2006	2007	2008	Total Electricity consumption in kWh
Private Sector 25%	37,4	37,2	37,1	**111,7**
Private Sector 50%	33,5	33,2	33,0	**99,6**
Private Sector 75%	29,5	29,2	28,8	**87,6**

Figure 12: *Estimated total for electricity consumption for lapotops sold in 2006 according to buying sector (Calculations by Sustainable Partner GmbH)*

e. Emissions data from power generation

The huge emissions created by power generation depend on the power station whence the power is utilised. Given the huge number of laptop users and the complex nature of power generation systems it is difficult to work out the data at reasonable cost. Therefore Sustainable Partner has cautiously estimated a figure for Germany at 640 kg CO_2 pro 1.000 kWh Strom.[3]

[3] Internal calculation by Sustainable Partner GmbH.

f. Average greenhouse gas emissions for a laptop computer

The following figures are for emissions values for laptops first used in 2006:

Sector	2006	2007	2008	Emissions in $kgCO_2$
Households	16,4	16,1	15,8	**48,3**
Offices	26,4	26,4	26,4	**79,2**

Figure 13: *Estimated total greenhouse gas emissions for laptops sold in 2006 (Calculations by Sustainable Partner GmbH)*

The following figures are for emissions values for laptops first sold in the private business sector in 2006:

Sector	2006	2007	2008	Emissions in $kgCO_2$
Private Sector25%	23,9	23,8	23,7	**71,5**
Private Sector50%	21,4	21,2	21,1	**63,7**
Private Sector75%	18,9	18,7	18,4	**56,0**

Figure 14: *Estimated total greenhouse gas emissions for laptops sold in 2006 according to consumer sector (Calculations by Sustainable Partner GmbH)*

3. Emissions reduction certificates from hydro-electric power

a. Reasons for emissions reduction certificates

To make the lifespan of an Averatec-Notebook and its accompanying CO_2-Emissions climate neutral here were two options available:

1. Emissions reduction certificates from a recognised climate protection project
2. Purchase and guarantee of origin of CO_2-free electricity

While the first option aims to compensate the damage caused, the second option allows the future avoidance of emissions. To visualise the latter, one imagines that each individual laptop is connected via its own power cable to a hydro-electric power station. The claim that the electricity used by the appliance is CO_2-free[4] cannot be denied. The financial transaction is made to the Hydro-electric company.

In practice however, since there are no individual connections between power stations and individual consumers, more a complex European network that assures connection between user and supplier, another way was needed to establish a clear association between electrical consumption and a CO_2-free power station.

This happens through the CO_2-free electricity provision from hydro-electric power.[5] Consumers will receive written confirmation that the electricity they need will be produced by a defined Hydro-electric power station and fed into the network within a certain time limit (not more than one calendar year.

The more electricity consumption assigned to Hydro-electric power stations, the more CO_2-free products can be offered via such a system. One must imagine the European electricity network as a lake with the incoming tide as the power stations and the outgoing tide as the electricity consumption, setting the hydro-electric power stations against the CO_2 emitting power stations. These purchases of hydro-electric power can also create a pressure group in favour of such power generation.

The Guarantee of Origin from Hydro-electric power has a monetary value based on supply and demand that corresponds to the price that the market pays for hydro-electric power. For the producers the Guarantee of Origin for Hydro-electric power presents a means to increase profitability as its economic standing grows. Through this project existing hydro-electric power stations will enjoy long-term security instead of the dangers it might have experienced in the deregulated electricity markets.[6] There is the potential to attract new investors and for building new power stations to be connected to the hydro-electric power network.

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[4] The objection that the building and operation of a hydro-electric power plant emits CO_2-Emissions is a legitimate, however in practice these emissions are negligible. Therefore the Schweizerische Energieagentur der Wirtschaft für regenerierbare Energien measures the emissions at 0.

[5] Colloquially known as „Water power certificates“

[6] On the basis of competitive pressure through cheaper and at the same time more harmful production methods.

According to the description found on the German Homepage of the European "Renewable Energy Certificates System" (short: RECS)[7] this is how Electricity consumption from a hydro-electric power station works in practice:

The issuing of the RECS Guarantee of Origin is done by a so-called "Issuing Body", that has responsibility for a certain area and oversees and presides over the whole process of certification. The Issuing Body issues the RECS Guarantee of Origin to the Hydro-electric power supplier per unit of electricity produced, monitors the stock/reserve and values these in the case of a sale of green electricity to an end user. Issuing, monitoring and valuing of the RECS Guarantee of Origin is managed electronically.

If necessary statements of value for RECS Guarantee of Origin, so-called "redemption declarations" can be issued in paper format to the end user. Through this process the end user is directed to a specific power station and the connection of end user to supplier is a success. The producer must also guarantee to the buyer that he keeps his green energy books up to date and that he does not sell the product twice.

[7] For more Informationen visit www.recs-deutschland.de.

b. Renewable energy source Hydro-electric power

i. Opportunities and risks

No-one can deny that we must soon find renewable sources of energy to fulfil our energy requirements. With its Directive 2001/77 the European union set the target of massively increasing the renewable energy sector's production capacity. Only hydro-electric power from the group of renewable energy providers can prove itself as a long-term proven technology whose risks are well known. A meaningful summary of the situation was given by Limnologie Research Centre[8]:

> *„Hydro-electric power is a far-reaching, emissions free, renewable energy source acknowledged globally as a desirable system of energy production. Compared to other means of renewable energy production it is highly effective and can according to demand produce alot of power comparatively cheaply.*
>
> *On the other hand, the use of hydro-electric power impacts massively on local water eco-systems and landscapes. Flooded mountain landscapes, dried our riverbeds, or continuous flooding in recent years brought arguments for or against the use of hydro-electric power that hardle ever occur over other renewable energy sources.*
>
> *This means that eco-electricity from Hydro-electric power can only be acceptable when global and local environmental concerns are met.*

Mentioning the global and local environmental criteria would have been a requirement of this report. The decision as to whether these criteria can be met or not will be left to the experts. With regard to business, Quality Seals/logos are now being developed for electricity products throughout Europe. For example in Germany the TÜV Süd[9] or Verein Energievision e.V.[10] labels have been introduced. Both organizations cite in their catalogues certain minimum requirements for Hydro-electric power stations if it is to be used as an eco-electric product.

[8] A part of the Water Research Institute of the ETH Zürich.
[9] See www.tuev-sued.de/industrieleistungen/umweltservice/energie-zertifizierung.
[10] See www.energie-vision.de.

ii. Advisable Projects

As mentioned earlier, the CO_2-Emissions for a laptop can be neutralised by the use of hydro-electric power no matter where this comes from. For this project, to counter arguments that using electricity from older Hydro-electric power stations affords no climate protection[11] only energy from a Hydro-electric power station classified as new and whose energy use can be measured will be used. Then the desired removal of CO_2-emitting electricity production will be guaranteed.

On this point the strict requirements of the Vereins Energievision Quality Seal demand that for the production of eco-electricity a new power stations should feed into the network for a maximum of six years. Investment in maintenance will be reckoned more fairly in a newer plant. Electricity from Hydro-electric power stations (also newly built) that are part of the current legislated energy provision „Einspeisevergütung"[12] will not be recognised.

Sustainable Partner recommends the project „Climate Neutral Laptops through hydro-electric power" and to include its Guarantee of Origin from new power stations, as well as production capacity that in 2002 or thereafter was introduced into the network provided that it did not come from the already legislated guaranteed "Einspeisevergütung" process.

The Norwegian company *Hydro's* power station Tyin meets with these conditions. It had a complete re-build (200 Mio. EUR investment) and entered the network in 2004 since when it has produced approximately 15 % or 210 Mio. kWh more electricity than its predecessor. The Hydro-electric power station is in Western Norway at Sogn og Fjordane. Close to the small town Øvre Årdal it is around 1.000 metres above sea-level on the southern shore between the Jotunheimen-mountain and Tyin Lake. The lake is fed by the springs and currents from the surrounding mountains that in turn feed the Tya River and via waterfalls into the Sognefjord. Part of this water is fed tunnel over the turbines of the power station 1000 metres below and these produces ec-electricity. The Nye Tyin power station has been dveloped in such a way as not to affect either the water levels of the Tyin-See , the river Tya or the Sognefjord nor to reduce or negatively affect the energy and water requirements of the local inhabitants and surrounding areas. Living conditions, animals and plants have not been affected by the production of eco-electricity. It follows that excellent maintenance of the water turbines has led to less fluctuations in the provision of green electricity to the European network.

The power staion is certified according to EE[13] crieria by TÜV Süd. Over and above this as a new power station Verein Energievision according to its own criteria approves a yearly electricity provision of 200 Mio. kWh. The energy provider offers its RECS-Guarantee of Origin and guarantees there will be no duplicate selling by the direction and auditing of a special green bookkeeping system.

[11] This accusations wouldn't be fair as it negates the provocation for innovations for green energy but to be carefull we recommend to avoid all possible starting points for critic.
[12] In Germany: Erneuerbare Energien Gesetz – EEG.
[13] Production of Electricity from 100% Hydropower.

4. Setting up "The Climate Neutral Averatec Laptop Hydro-electric power project"

a. Handling the Guarantee of Origin

The following principles were followed in setting up this project:

1. For this project Laptops will still be sold with the Guarantee of Origin from Hydro-electric power. This Guarantee assures the purchaser that– in Germany- the electricity for the laptop's three year life will be provided by a newly built Hydro-electric power station. This offering will be called Green Notebook (GN).

2. The Guarantee of Origin for the Laptop producer Averatec will be supplied by Sustainable Partner GmbH, Munich („ henceforth known as SP or Sustainable Partner").

3. Obtaining the noted Guarantee of Origin for Hydro-electric power on behalf of Averatec is as follows:

   - Sustainable Partner signs an agreement with Norsk Hydro Energie AS (Hydro) for the delivery of the Guarantee of Origin for Hydro-electric power for the project.

   - Averatec announces its Green Notebook laptop sales on a yearly basis – by end March at the latest – to Sustainable Partner based on the so-called IDC-Statistik.

   - Sustainable Partner calculates the energy used for the previous year using the formula:

     Energy requirement (MWh) =
     3 x energy requirement GN (MWh/unit) x No. GN (unit)

     The Hydro-electric Guarantee of Origin can only be issued in full MWh-steps (1000 kWh), so for business purposes there is a rounding up of the figures so the figure will certainly be greater than the calculations.

   - Sustainable Partner presents its bill for the creation and delivery of the Hydro-electric Guarantee of Origin.

   - Averatec pays this account not later than 30.4 each year.

   - After Averatec's settlement of the invoice, Sustainable Partner obtains the Hydro-electric Guarantee of Origin from Hydro. Delivery is according to the agreement signed between Sustainable Partner and Hydro for payment in advance. After payment from Sustainable Partner Hydro authorizes the Norwegian Issuing Body (Stattnet) to issue the required number of RECS- Hydro-electric Guarantees of Origin und send Sustainable Partner the said docu-

ment. Sustainable Partner receives a „certificate" from Hydro. Normally, the requested certificate for the previous year's Hydro-electric Guarantee of Origin should be issued not later than 31.5.

- Sustainable Partner's administration of this process will be monitored by independent auditors.

- Sustainable Partner delivers the „Certificate" and statement of the RECS-Hydro-electric Guarantee of Origin to Averatec.

b. Handling the Guarantee of Origin

Under the in chapter 4a.) desrcibed process Averatec gets the right to declare a defined amount of electricity as being from hydro-electric power and can inform the laptop purchaser, who is now involved in this project.

It is the task of Communications to decide how to convey this information to purchasers and the general. For example software could be developed to announce this on screen at Start, it could be included in the Instructions for Use or stickers could be placed on the appliance.

For the sake of credibility it is important to make sure that only laptops involved in this project are labeled as such so that the consumers targeted fully understand the concept.

Sources

» Fraunhofer Institut für Systemtechnik und Innovationsforschung (ISI) und Centre für Energy Policy and Economies (CEPE), Der Einfluss moderner Gerätegenerationen der Informations- und Kommunikationstechnik auf den Energieverbrauch in Deutschland bis zum Jahr 2010 – Möglichkeiten zur Erhöhung der Energieeffizienz und zur Energieeinsparung in diesen Bereichen, Projektnummer 28/01, Karlsruhe/Zürich 2003

» Informationstechnologie in Unternehmen und Haushalten, Study des statistischen Bundesamts, Wiesbaden 2005

» Amtliche AfA-Tabellen, see http://www.bundesfinanzministerium.de

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