Table des matières

First restitution of the proposals resulting from the LOCEAN-CLIMACTIONS retreat 4-5 November 2019

The proposals below are sorted according to the themes listed below, then in no significant order at this stage:

- Missions and transport
- Field campaigns (at sea)
- High Performance Computing
- Life in the laboratory
- Purchasing
- Others

Missions and transport:

Description :	Systematisation of a carbon footprint box to be filled in in the mission order application
Theme(s) :	MISSIONS AND TRANSPORT
Terms and conditions :	When filling out the mission order request, indicate the carbon footprint of the journey, calculated on a common basis in the lab using, for example, Joël Thanwerdas' tool that is under development (individual carbon calculator). Mandatory box to be completed along with the rest of the essential information on the Mission Form. The individual carbon calculator could be used by everyone to do their own carbon accounting for missions (calculation of their individual mission footprint on a common calculation basis). In a second step, the individual calculator could be linked to mission order requests. The mission order box would then automatically call up the individual calculator.
Tools for annual **measurement of** the expected result: what should be measured in the balance sheets and how to check that the estimated objective is achieved?	Individual carbon calculator (Joël Thanwerdas tool) Allows you to enter each of your journeys and to have an estimate of the carbon footprint based solely on the city of departure, arrival and mode of transport.
Points "in favour" of this measure: arguments that can help to get it adopted in subsequent discussions	Allows for an accurate assessment and follow-up for each person This allows an accurate assessment of the lab carbon footprint.
Additional elements, questions and answers from the initial discussions:	• Requests additional information to be registered by the administrative team. However, if in the long run the entry of mission orders becomes automatic, this would not cause any overload. • Would you consider using the carbon calculator tool developed by Joël Thanwerdas to calculate the carbon footprint in mission order requests? This has to do with the supervisory authorities, as the mission orders are different. • For the calculator itself, it is important to use a common base (that of Ademe) for the estimate, as estimates from online calculators vary almost twofold.

Description :	Individual carbon quota for travel
Theme(s) :	MISSIONS AND TRANSPORT
Terms and conditions :	Proposed decarbonation trajectory by ceiling for all staff over the next 5 years, to be re-evaluated according to the results and objectives. ● 2020 : No ceiling but mandatory individual estimate of the carbon footprint of his or her journeys. ● 2021 : Ceiling at 10 tCO2e/person (which would have an impact for 5% of staff based on the 2018 footprint calculation) ● 2022: Ceiling 8t ● 2023: Ceiling 6t ● 2024: Ceiling 5t ● 2025: Ceiling 4t Possibility of carrying over a maximum of 4 tCO2e from one year to the next Proposal of exceptions for long term missions (>= 1 month e.g.) and for cases such as embarkation for campaign at sea, Community missions, i.e. IPCC, (explicit list of exceptions to be established)
Estimated reduction achieved by this proposal (for 2020 and each year until 2030)	On the basis of IRD travel (cf. 2018 footprint), allows a minimum 13% reduction in carbon footprint with a threshold of 10 tCO2e (2021), 17% threshold 8 tCO2e (2022), 23% threshold 6 tCO2e (2023), 32% threshold 4 tCO2e (2025) Threshold 2 tCO2e allows a 57% reduction Calculation to be carried out on the total number of missions if possible. For the CNRS, we cannot currently group the missions and therefore the footprints per missionary because there is no individualised identifier. It is therefore impossible to know what impact an individual quota would have. For SU, no information at present.
Tools for annual **measurement of** the expected result: what should be measured in the balance sheets and how to check that the estimated objective is achieved?	Common carbon calculator – cf. tool developed by Joel Thanwerdas Annual personal carbon balance in an administration file for monitoring - if the annual ceiling is reached, the OdM is not signed
Points "in favour" of this measure: arguments that can help to get it adopted in subsequent discussions	● Effective reduction because it targets large emitters first - aims for "carbon equity". ● Not very restrictive in the early years for the vast majority of staff. ● Gentle decreasing trajectory, allows for adaptability ● Simple rule ● Freedom of individual management (the possibility of team management was raised and rejected: it must remain individual, otherwise there will be a rebound effect, see histograms). ● Possibility of re-evaluating and modulating the trajectory along the way

Additional elements, questions and answers from the initial discussions:	● To be coupled with a strong awareness campaign to reduce emissions so as not to fall into the opposite effect, which would be to say "I have the right to 10 tCO2e and want to spend it all''. ● Case of new arrivals (thesis/post-docs): possibility of obtaining a larger quota on arrival from 2024 for example (< 5 tCO2e) to be able to plan one or more trips in the year of arrival. ● Who decides on the trajectory (thresholds)? ● Personal responsibility (dodging, dissatisfaction) -> need to raise the awareness of the whole laboratory from the first year without quota ● Coupling with an abandonment of short-haul flights in France and Europe to be replaced by the train in order to target all scales in parallel? ● Can the lab legally impose such measures? If so, by what means?

Description :	Support for short-haul air travel and its replacement by train journeys
Theme(s) :	MISSIONS AND TRANSPORT
Terms and conditions :	● Train only possible when journey time is less than 5 hours (threshold to be discussed again if necessary), with 1st class authorised from 3 hours of train travel. Exception to be justified to the management (there is no consensus on the need to make exceptions). ● European journeys > 5 hours: limit of 2 return trips per year by plane, beyond that take the train. Exception to be justified to the management (no consensus on the need to make exceptions). ● Campaign to encourage the train, make the journey more comfortable + facilitation on the booking platforms
Estimated reduction achieved by this proposal (for 2020 and each year until 2030)	Possibility of reducing the total travel footprint by around 15% by replacing short-haul flights with rail. More by including European journeys > 1,000 km.
Tools for annual **measurement of** the expected result: what should be measured in the balance sheets and how to check that the estimated objective is achieved?	Common carbon calculator - cf tool Joel Thanwerdas Personal carbon account in an administration file for monitoring + mode of transportation - if this account is exceeded, the OdM is not signed
Points "in favour" of this measure: arguments that can help to get it adopted in subsequent discussions	● Net reduction of short flights (significant footprint) ● Thresholds that change over time ● Leaves some flexibility
Additional elements, questions and answers from the initial discussions:	● Potential overload of administrative work ● Acceptability of the limitation (i.e., constraints) ● Additional cost of trains: the idea of a carbon tax had emerged to recover money from the budget for air travel in order to supplement the additional cost of train journeys. However, it seems difficult to implement it in budgetary and especially administrative terms. ● Definition of thresholds ● Whether it is worth pushing this proposal along with the proposal for personal carbon quotas remains to be seen - it should be kept relatively simple. Strong incentive on domestic journeys instead of an "obligation" to take the train?

Description :	Encouraging virtual networking
Theme(s) :	MISSIONS AND TRANSPORT
Terms and conditions :	● Establish a good practice guide for seminars and virtual networking ● Encourage staff to use these options ● Encouraging the seminar leader to propose the video to the speakers. ● Encourage thesis supervisors to organise a video seminar with a researcher from their high-level network (open to the lab), followed by an hour of discussion with students. New way of introducing students into the network of supervisors. ● Encourage the setting up of thematic webinars on the EBUS format (discussions are underway for the Southern Ocean)
Tools for annual **measurement of** the expected result: what should be measured in the balance sheets and how to check that the estimated objective is achieved?	Counting the number of virtual/non-virtual seminars
Points "in favour" of this measure: arguments that can help to get it adopted in subsequent discussions	● Positive measure that counterbalances travel constraints ● Contributes to building the network of young researchers - main reason for travelling to major conferences
Additional elements, questions and answers from the initial discussions:	● Cultural change to be propagated by example

Field campaigns (at sea):

Description :	Improve footprint calculation and annual monitoring for field campaigns	
Theme(s) :	FIELD CAMPAIGNS	
Terms and conditions :	● Add a box with a keyword identifying "field campaign" missions on the mission order requests ● The answer to this box will be required for the OM to be taken into account. ● Setting up by the supervisory authorities of a shared accounting system to find out the number of days at sea per laboratory (to be filled in by each leader of sea cruises).	
Estimated reduction achieved by this proposal (for 2020 and each year until 2030)	NOT APPLICABLE here Carbon footprint **Amount (TeCO2) in 2020 =** **Subsequent years up to 2030 =** **Percentage (of total balance sheet) :**	NOT APPLICABLE here Energy footprint **Amount (GW) in 2020 =** **Subsequent years up to 2030 =** **Percentage (of total balance sheet) :**
Tools for annual **measurement of** the expected result: what should be measured in the balance sheets and how to check that the estimated objective is achieved?	● Monitoring for each laboratory of its carbon footprint "field missions".	
Points "in favour" of this measure: arguments that can help to get it adopted in subsequent discussions	Better quantification of the footprint and its evolution	
Additional elements, questions and answers from the initial discussions:	Possibly an additional administrative burden? Need for follow-up and implementation of monitoring sharing tools (-> IPSL Transition Project Manager?)	

Description :	Better pooling and enhancement of field measurements	
Theme(s) :	FIELD CAMPAIGNS (and lab/calculation)	
Terms and conditions :	● Ensure public access to observation data no later than 2 years after the campaign (3 years in the case of a thesis or post-doc) ● Do not redo data processing and simulations that have already been done.	
Estimated reduction achieved by this proposal (for 2020 and each year until 2030)	Carbon footprint **Amount (TeCO2) in 2020 =** **Subsequent years up to 2030 =** **Percentage (of total balance sheet) :**	Energy footprint **Amount (GW) in 2020 =** **Subsequent years up to 2030 =** **Percentage (of total balance sheet) :**
Tools for annual **measurement of** the expected result: what should be measured in the balance sheets and how to check that the estimated objective is achieved?		
Points "in favour" of this measure: arguments that can help to get it adopted in subsequent discussions	More collective operation	
Additional elements, questions and answers from the initial discussions:		

<table>
<tr><td>Description :</td><td colspan="2">Reduction of the CO2 footprint of missions at sea: creation of a think tank including scientists, users, operators (GENAVIR), the Fleet Commission, regulators and naval architects to refine and implement the identified reduction options.</td></tr>
<tr><td>Theme(s) :</td><td colspan="2">FIELD CAMPAIGNS (sea)</td></tr>
<tr><td>Terms and conditions :</td><td colspan="2">Work on several levels:
Pooling of observations: increasing the number of measurement actions over a campaign and pooling of boats
Optimisation of vessel transits through better optimisation/planning of campaigns
Improving the efficiency of the propulsion system, paying more attention to fuel consumption during campaigns.
Development of lighter in situ observation practices (sailing boats, etc.).</td></tr>
<tr><td>Estimated reduction achieved by this proposal (for 2020 and each year until 2030)</td><td>Carbon footprint
Amount (TeCO2) in 2020 =
Subsequent years up to 2030 =

Percentage (of total balance sheet) :</td><td>Energy footprint
Amount (GW) in 2020 =
Subsequent years up to 2030 =

Percentage (of total balance sheet) :</td></tr>
<tr><td>Tools for annual measurement of the expected result: what should be measured in the balance sheets and how to check that the estimated objective is achieved?</td><td colspan="2">Consumption of heavy fuel oil by GENAVIR
List of "light" campaigns and sharing of expertise</td></tr>
<tr><td>Points "in favour" of this measure: arguments that can help to get it adopted in subsequent discussions</td><td colspan="2">More collective operation</td></tr>
<tr><td>Additional elements, questions and answers from the initial discussions:</td><td colspan="2">This proposal requires a great deal of prior coordination work with national actors.
Some proposals will have long time scales for implementation.
Beware of false economies (take into account the entire CO2 balance of the campaigns, including for example the rotation of sailors by plane, which is not taken into account for the moment).
Proposed implementation plan:
Identify a binomial in Brest ready to work with a binomial at the LOCEAN (JB Sallée + X Capet)
Email CS + FOF</td></tr>
</table>

	● Email Direction FOF ● Contact external experts (naval architects, ...)

Intensive computing:

Description :	Establish by the end of 2019 an accounting of the CO2 and/or energy consumption of intensive computing at the IPSL and in the labs.	
Theme(s) :	Intensive calculation	
Terms and conditions :	1. Juliette and Vincent? List the DARI projects managed at IPSL (on the basis of Arnaud's list) 2. Arnaud? And Claire collects information from GENCI on the consumption of machines (current and past if possible) of the 3 centres (support from the supervisors and/or the IPSL CD may be necessary) and the consumption of projects (support from project leaders may be necessary). 3. Eliott +? Develops an account and monitoring tool for each project.	
Estimated reduction achieved by this proposal (for 2020 and each year until 2030)	Carbon footprint **Amount (TeCO2) in 2020 =** **Subsequent years up to 2030 =** **Percentage (of total balance sheet) :**	Energy footprint **Amount (GW) in 2020 =** **Subsequent years up to 2030 =** **Percentage (of total balance sheet) :**
Tools for annual **measurement of** the expected result: what should be measured in the balance sheets and how to check that the estimated objective is achieved?		
Points "in favour" of this measure: arguments that can help to get it adopted in subsequent discussions	Quantification, essential prior to any attempt at reduction Awareness	
Additional elements, questions and answers from the initial discussions:	Obtaining the agreement of the computer centres may be difficult. May need support from the CD and/or lab directors to obtain the information.	

Description :	How can we develop a collective strategy around supercomputing at the IPSL in the context of a transition?	
Theme(s) :	High Performance Computing	
Terms and conditions :	Set up a think tank including DARI project leaders, technical managers, +? To reflect by June 2020 on - Which reduction path: active sobriety via a reduction in the number of hours or an alignment with technological developments, which are a priori favourable to a reduction in energy consumption for a constant number of calculation hours? This trajectory can be reflected in the horizon of 2030 (-30%) or 2050 (neutrality). - Where to act? (i) Optimisation of codes and parameterisation, (ii) scientific choice (resolution, machine learning...), (iii) machine evolution? - Acting on (iii) above might require a more top-down approach: what lobbying actions should be taken with DARI and GENCI? Moreover, in the short term, our efforts might be a bit vain because, given the pressure on DARI, our savings would be very quickly used by other communities. Can we all sit around the table?	
Estimated reduction achieved by this proposal (for 2020 and each year until 2030)	Carbon footprint **Amount (TeCO2) in 2020 =** **Subsequent years up to 2030 =** **Percentage (of total balance sheet) :**	Energy footprint **Amount (GW) in 2020 =** **Subsequent years up to 2030 =** **Percentage (of total balance sheet) :**
Tools for annual **measurement of** the expected result: what should be measured in the balance sheets and how to check that the estimated objective is achieved?	Reduction/trend can be measured using the footprint tool developed by Eliott et al. (see related sheet). Report of the reflection group expected before the end of June 2020.	
Points "in favour" of this measure: arguments that can help to get it adopted in subsequent discussions	Global strategic reflection on the opportunity and possibilities to reduce the footprint of HPC at IPSL	

Additional elements, questions and answers from the initial discussions:	Contextual elements 1. What is our current consumption and its trend i. Machine consumption tends (so far) to decrease with technological developments. For example Curie (2012) consumes 2 MW, Irene (2019) consumes 1 MW. ii. Our hour demands are increasing -> What has been the trend for the IPSL Group over the last 5-6 years? See figures sheet 2. National Strategy / Climeri i. The computing power available in France is 1/4 of what is available in Germany. The climate modelling community and the CLIMERI group have been using this argument for nearly 20 years to push the computing centres and the Ministry to invest in more power. Let's change our discourse? ii. EuroHPC: transition to exascale in 2022-23 in France. Is this compatible with the climate change objectives? Moreover, there is a risk that this would eliminate the national level of demand for calculation in France and paradoxically lead to shortcomings. A sheet drawn up at the retreat, and the summary produced for the General Assembly, also mention a better use of the data produced and fewer simulations used from time to time (good practices). This point was not elaborated further. At the retreat, one group immediately proposed a roadmap with a ~6%/year reduction in consumption. There was no time to reach a consensus on this point during the synthesis. For the time being, we are sticking to the figures and reflections above.

Life in the laboratory:

Description :	Energy audit of buildings with a view to thermal insulation work and in particular heat wave resistance	
Theme(s) :	Life in the laboratory	
Terms and conditions :	● Calling on expertise via SU's bodies and other laboratories ● Search for information on existing projects in SU for thermal insulation ● Check that the insulation is included in the forthcoming work to fit out the Fork Room.	
Estimated reduction achieved by this proposal (for 2020 and each year until 2030)	NOT APPLICABLE here: no discount Carbon footprint **Amount (TeCO2) in 2020 =** **Subsequent years up to 2030 =** **Percentage (of total balance sheet) :**	NOT APPLICABLE here: no discount Energy footprint **Amount (GW) in 2020 =** **Subsequent years up to 2030 =** **Percentage (of total balance sheet) :**
Tools for annual **measurement of** the expected result: what should be measured in the balance sheets and how to check that the estimated objective is achieved?	● Expert report by an energy specialist (internship or service?) ● Information provided by SU	
Points "in favour" of this measure: arguments that can help to get it adopted in subsequent discussions	This audit is useful, even necessary, in order to be able to then ● Justify and implement insulation work that is likely to meet with a consensus in the laboratory because of improved working conditions. ● Avoid buying equipment with high electricity and energy consumption such as electric heaters, air conditioners, etc. ● To contribute to the reduction of the laboratory's energy consumption.	
Additional elements, questions and answers from the initial discussions:	It is necessary to find the right contacts at SU, to provide information quickly and to evaluate the costs. You need the help of the laboratory management to do this. It takes expertise and working time to carry out this action. To be entrusted to the IPSL Transition Project Manager?	

Description :	Evaluation of the laboratory's electricity consumption to refine the 2018 estimate based on ADEME figures and identify effective transition actions.	
Theme(s) :	Life in the laboratory	
Terms and conditions :	• Identify external expertise and tools to establish consumption per corridor, machine room, measurement lab room, etc. • Proposed measurement protocols: distinguish day and night, holidays and working days...	
Estimated reduction achieved by this proposal (for 2020 and each year until 2030)	NOT APPLICABLE here: no discount Carbon footprint **Amount (TeCO2) in 2020 =** **Subsequent years up to 2030 =** **Percentage (of total balance sheet) :**	NOT APPLICABLE here: no discount Energy footprint **Amount (GW) in 2020 =** **Subsequent years up to 2030 =** **Percentage (of total balance sheet) :**
Tools for annual **measurement of** the expected result: what should be measured in the balance sheets and how to check that the estimated objective is achieved?	• To be defined by the expert • Publication of results and first analyses by mid 2020	
Points "in favour" of this measure: arguments that can help to get it adopted in subsequent discussions	• A more accurate estimate of consumption, which will then make it possible to reduce it.	
Additional elements, questions and answers from the initial discussions:	It is necessary to be able to find volunteers at the level of the lab, the IPSL and the provider and to ensure an efficient and rapid dialogue with SU. To be entrusted to the IPSL Transition Project Manager?	

Description :	Encryption and monitoring of computer data flows	
Theme(s) :	Life in the laboratory	
Terms and conditions :	Ask the system and network teams to set up follow-ups. ● Data flows by service (mail, ftp, ssh, streaming...). ● The power consumption of data storage and use (cloud versus local bays versus personal hard disk)	
Estimated reduction achieved by this proposal (for 2020 and each year until 2030)	NOT APPLICABLE here: no discount Carbon footprint **Amount (TeCO2) in 2020 =** **Subsequent years up to 2030 =** **Percentage (of total balance sheet) :**	NOT APPLICABLE here: no discount Energy footprint **Amount (GW) in 2020 =** **Subsequent years up to 2030 =** **Percentage (of total balance sheet) :**
Tools for annual **measurement of** the expected result: what should be measured in the balance sheets and how to check that the estimated objective is achieved?	● Monitoring over time to be made available to the community (network teams and IPSL transition task manager for example) ● Publication of results and first analyses mid 2020	
Points "in favour" of this measure: arguments that can help to get it adopted in subsequent discussions	● Better knowledge of the electricity consumption of the various substations, enabling more relevant choices to be made to reduce it.	
Additional elements, questions and answers from the initial discussions:	Will the network teams be able to find time for this? To be entrusted to the IPSL Transition Project Manager?	

Description :	Decreasing the carbon footprint of food (food and drinks)	
Theme(s) :	Life in the laboratory	
Terms and conditions :	● Identification and sharing of a preferred list of service providers for parties and meals organised in the laboratory or restaurant, according to criteria (CO2 footprint, vegetarian, organic, local food), reduction of disposable crockery. ● Raising awareness for a vegetarian/vegan diet ● Improvements to the common areas to facilitate the use and storage of dishes, more practical crockery area ● Ask for vegetarian dishes at the campus restaurants (canteens, Ardoise...), as well as the posting of the C cost of the dishes. ● Elimination of coffee capsules in favour of machines using bulk coffee beans	
Estimated reduction achieved by this proposal (for 2020 and each year until 2030)	Carbon footprint **Amount (TeCO2) in 2020 =** **Subsequent years up to 2030 =** **Percentage (of total balance sheet) :**	Energy footprint **Amount (GW) in 2020 =** **Subsequent years up to 2030 =** **Percentage (of total balance sheet) :**
Tools for annual **measurement of** the expected result: what should be measured in the balance sheets and how to check that the estimated objective is achieved?	● Carbon cost of meals and buffets in the lab and their annual evolution	
Points "in favour" of this measure: arguments that can help to get it adopted in subsequent discussions	● Also helps to reduce plastic waste ● Awareness-raising posters in the corridors and emails will be fun.	
Additional elements, questions and answers from the initial discussions:	Some practical aspects of implementation can be complicated ● Providers who meet the criteria are more expensive, so you have to convince them that it is worth paying this supplement. ● Information from service providers is not trivial to obtain. ● several decisions have already been taken and not implemented such as the improvement of the kitchen and dishwashing areas, the change of coffee machines, ...	

Description :	Limit paper printing	
Theme(s) :	Life in the laboratory	
Terms and conditions :	● Add a code on the printers so that printing is only carried out when the applicant is present in front of the printer, to avoid duplication and unnecessary printing. ● Default black and white prints	
Estimated reduction achieved by this proposal (for 2020 and each year until 2030)	Carbon footprint **Amount (TeCO2) in 2020 =** **Subsequent years up to 2030 =** **Percentage (of total balance sheet) :**	Energy footprint **Amount (GW) in 2020 =** **Subsequent years up to 2030 =** **Percentage (of total balance sheet) :**
Tools for annual **measurement of** the expected result: what should be measured in the balance sheets and how to check that the estimated objective is achieved?	● Savings on paper and ink cartridges for printers	
Points "in favour" of this measure: arguments that can help to get it adopted in subsequent discussions	Fair and non-binding	
Additional elements, questions and answers from the initial discussions:	This was already decided when the printers were changed to LOCEAN in early 2019 and has not yet been implemented.	

Purchases:

Description :	Improved quantification of the environmental impact of equipment purchases	
Theme(s) :	PURCHASES	
Terms and conditions :	• Ask the seller to include the environmental footprint (GHG, electricity consumption) on the estimate for the equipment offered. • Addition of a "C imprint" box on each purchase request (mandatory info) • Necessity of an environmental footprint in the specifications as soon as there is one (purchases >30Keuros) • Assembling a database of suppliers capable of providing the fingerprint data • Assembly of an in-house database on the carbon footprint of the laboratory's main equipment	
Estimated reduction achieved by this proposal (for 2020 and each year until 2030)	NOT APPLICABLE here Carbon footprint **Amount (TeCO2) in 2020 =** **Subsequent years up to 2030 =** **Percentage (of total balance sheet) :**	NOT APPLICABLE here Energy footprint **Amount (GW) in 2020 =** **Subsequent years up to 2030 =** **Percentage (of total balance sheet) :**
Tools for annual **measurement of** the expected result: what should be measured in the balance sheets and how to check that the estimated objective is achieved?	• Addition in the annual calculation of an annual environmental footprint of purchases made at the laboratory • Use of CO2e (production, use, end of life) according to ADEME standards	
Points "in favour" of this measure: arguments that can help to get it adopted in subsequent discussions	Assistance in monitoring the impacts of reduction	
Additional elements, questions and answers from the initial discussions:		

Description :	Extending the (service) life and/or selection of IT equipment	
Theme(s) :	PURCHASES	
Terms and conditions :	Go from 3 years of use (current average value in the laboratory before new purchase) to 5 or even 7 years. For this purpose: ● Preferably encourage the middle or top of the range rather than the first price, so that the equipment will be functional for a longer period of time ● Limit to 1 workstation per person (either fixed or portable with a larger screen in the lab) Reduction of the size of the screens purchased from the laboratory: limit to either 1 screen 27" maximum or 2 screens 23" maximum. Control through purchase orders	
Estimated reduction achieved by this proposal (for 2020 and each year until 2030)	Divided by 2 for X2 over the period of use Carbon footprint **Amount (TeCO2) in 2020 =** **Subsequent years up to 2030 =** **Percentage (of total balance sheet) :**	Energy footprint **Amount (GW) in 2020 =** **Subsequent years up to 2030 =** **Percentage (of total balance sheet) :**
Tools for annual **measurement of** the expected result: what should be measured in the balance sheets and how to check that the estimated objective is achieved?	● Setting up a monitoring of the age of computers (in the sense of the date of purchase) via the inventory to set up the process ● Control through purchase orders	
Points "in favour" of this measure: arguments that can help to get it adopted in subsequent discussions	The screens are large CO2 emitters (to be specified in the footprint and reduction figures). As the footprint is proportional to the surface area of the screen, the measure would be effective.	
Additional elements, questions and answers from the initial discussions:	There is no consensus at this stage on the minimum lifespan to be chosen (5 or 7 years); nor on whether to make it an incentive or a constraining action. If the choice is forced, there will be a verification/approval work for each request to order computer equipment. It is necessary to find out who and how to implement this proposal.	

Others

Setting up a medium-term think tank

Beyond the 2030 target, the aim here, as in the whole of society, is to be carbon neutral by 2050. The discussions showed that the challenges and possible solutions can be divided into two groups:

- a group of activities where reduction, once the footprint calculation has been better quantified, is possible without a radical change in the way of working. In this group, awareness and vigilance will make it possible to reduce and move towards neutrality by 2050.
- Another group of activities (e.g. campaigns at sea, intensive computing, etc.) where the objective of neutrality does not seem attainable without fundamental questioning of our practices.

For this second group, several options are conceivable a priori, from the request for derogation from the general objective ("basic research must be able to derogate from the rule of neutrality, because it is vital"), to the opposite ("basic research is not vital, we can decide to stop"). Between the two, there is a whole panorama of choices, of questioning practices... We support the setting up of a reflection group on our 10-20 year strategies, with scientists from our fields, philosophers, science historians to elaborate further on these solutions.

Compensatory actions?

Some of our activities are difficult to "de-carbonise". Are there ways to offset our residual emissions in a way that is consistent with the climate system (taking into account indirect effects and time scales)?
This may open the door to not reducing or reducing less, but that is not the intention here. This topic was discussed during the retreat and we pass it on to others (LSCE in particular) who have been thinking about these issues for longer.