Goal and "process" to agree on a LC strategy:

- Aim to leave the meeting with common ideas of what are the main areas for LC activities 2020-5, and the goals of these activities
- Follow the structure of ESPP document - a few sentences (statement) followed by a clarifying paragraph for the statement (if possible)
- Given its purpose related to the ESPP it will therefore also have a "European" bias, but it aims for a fully international perspective
- Send an outline of such a document to the participant asking for community comments/suggestions (3 min/speaker Monday evening of the workshop)

Main strategy point:
The highest scientific priority [for Europe] is a linear e+e- collider (LC) facility starting from an initial energy and luminosity sufficient to explore the Standard Model processes and in particular the Higgs boson in great detail. The facility should lay the foundation for a long term e+e- programme and hence be upgradable in the future with the same, improved or new technologies to much higher energies. The LC should be pursued for construction start-up in a 3-5 year timeframe.

Background and justifications for main point [in general shortening is needed]:
Electron-positron collisions provide clean and well-defined collisions for very precise studies of the Higgs and other SM particles, and direct searches for BSM physics in a completely new experimental environment. [FROM MP: The goal of a precision study of the Higgs boson is to discovery violations of the Standard Model predictions for the Higgs boson that point to new physics.]

Higher energy e+e- collisions would improve significantly the precision tests of the SM parameters and the indirect sensitivity to BSM physics. The reach of direct searches for BSM physics would increase dramatically, and the higher energies allow the unrivaled accuracy direct measurement of the Higgs self-coupling - a critical fundamental property of the Higgs field.

A LC can be upgraded to reach higher energies, and the next phases could be adapted depending on the obtained results. Beyond increasing the linac-lengths, R&D is ongoing for higher gradients, for example by improving SCRF cavities or X-band accelerating structures. [Shorten: Longer term a linear collider basic infrastructure, can be adapted or reused to reduce in important ways the cost, risk and implementation time of a future linear collider using a different technology. For example, new accelerator technologies, such as plasma wakefield or di-electric based acceleration, promise more compact particle accelerators. It not yet clear whether these technologies can reliably accelerate low emittance electron-positron beams, or deliver sufficient power efficiency, and hence achieve luminosities for a general-purpose electron-positron collider. However, the promise to reduce the size and energy footprints, and importantly also cost, indicates that in the long term such technologies might provide new and affordable upgrade paths to much higher energies for a LC facility.]

A particular strength of linear colliders is their link to general accelerator advances and construction of smaller high-performance systems, such as FELs and other light sources used in various applications. The investments in these smaller accelerators world-wide are significant and the benefits of having many areas of science pursuing the developments of similar tools cannot be overstated. The E-XFEL and LCLS-II are prime examples for SCRF, the SwissFEL using normal conducting C-band structures is also a relevant example.

Beyond the initial stage of a LC the future possibilities and flexibility for our field extend to implementations of other types of colliders. A rapid cost optimized implementation of a first stage LC can provide guidance for future machines that can be run in parallel with future higher energy LC stages, as hadron and even muon colliders where R&D and developments are on-going but further work is needed for realistic and optimized implementation proposals.

Both ILC and CLIC are now projects that can move forward towards implementation, and be ready for continuing the Higgs studies and Standard Model precision measurements within ~15 years, possibly overlapping with the HiLumi programme.

From a resource point of view ILC is likely to bring in significant fresh resources into international particle physics, and in principle the machine implementation can start within 3-4 year, profiting from the existing large scale SCRF cryomodule production lines in Europe, the US and Asia. However, it not yet clear if ILC will be hosted by Japan and negotiations between potential international stakeholders to resolve this is of great urgency.

CLIC can be implemented at and hosted by CERN and its timescale for initial operation is also around 2035, provided the necessary effort is put in to make it construction ready by ~2025. For example, building smaller machines with X-band facilities in this timeframe should be pursued with high priority and would move the technology efficiently towards large scale industrial readiness in this timeframe.

An essential point for the realism of a LC is that both initial projects are affordable and can be constructed and operated within resource frameworks similar to those mobilised for LHC, and hence there is today a unique opportunity to move ahead quickly towards constructing a LC, ILC in Japan, or alternatively CLIC at CERN.

For our internal planning: the following concrete actions are needed (not worked on):

- Pursue the planning for a European participation in ILC (comment: mention KEK WG?), and proactively discuss and negotiate sharing models with Japan (comment: specify who?), aiming for a resolution by end 2020 (comment: what if we are still in the mist?)
- Prepare CLIC for a future implementation at CERN with a construction readiness around 2025
    - In both cases above a focused European accelerator preparation programme towards linear collider construction will be needed in next phase, co-ordinated by CERN (comment: in practise we need more resources from 2021, 2020 is already partly lost)

- Continue work for physics studies and luminosity performance for the initial LC.
- Pursue - including also NAT community - high end energy physics potential to guide studies of future reaches
- Detector R&D, prototypes and pre-series, as well as TDRs (some part of the R&D can be done in collaboration with R&D for other detectors for other purposes).
- Increase link to NAT community for high end energy accelerator implementations in an existing (adapted) LC facility
- Work actively with smaller machines for verifications and system development (e.g. FELs and LS) in next phase – across disciplinary boundaries

(comment: we can add many links to documents ….)