

SnowMass2021

Snowmass Community Engagement Frontier 07: Societal and Environmental Impacts

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ROYAL
HOLLOWAY
UNIVERSITY
OF LONDON

All info [here!](#)

Ken Bloom (University of Nebraska)



Mike Headley (SDSTA-SURF)



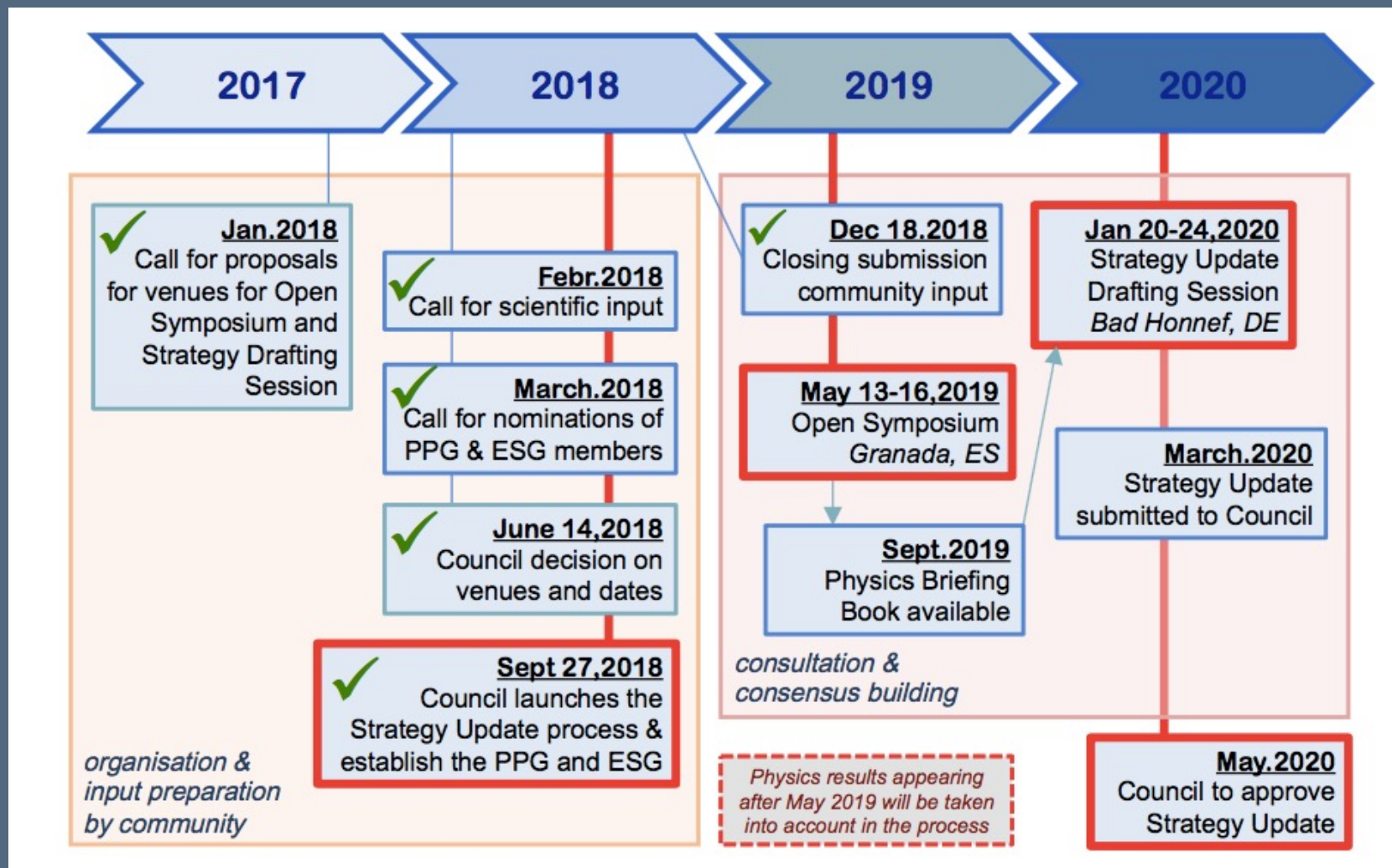
9th November 2021 (414.96 CO₂ ppm)

Introduction

- Welcome to this workshop on **carbon emissions at future facilities!**
- Given emissions reduction pledges from most countries would expect that large infrastructure projects will be evaluated also based on emissions/carbon footprint
- We believe that the field of PP should be ready for this and implement this as soon as possible
- Recommendations in a Snowmass White Paper

European Strategy Update

- “The Strategy is due to be updated by May 2020 to guide the direction of the field to the mid-2020s and beyond.”



Input to the ESU

#83: Input to the European Strategy
Update: Ensuring the Future of Particle
Physics in a More Sustainable World:
3 recommendations

Submitted 319 signatures
Now opening signatures again
tinyurl.com/yaw523ng
Please sign!
Follow us on Twitter: @ESClimateChange



CERN Courier article

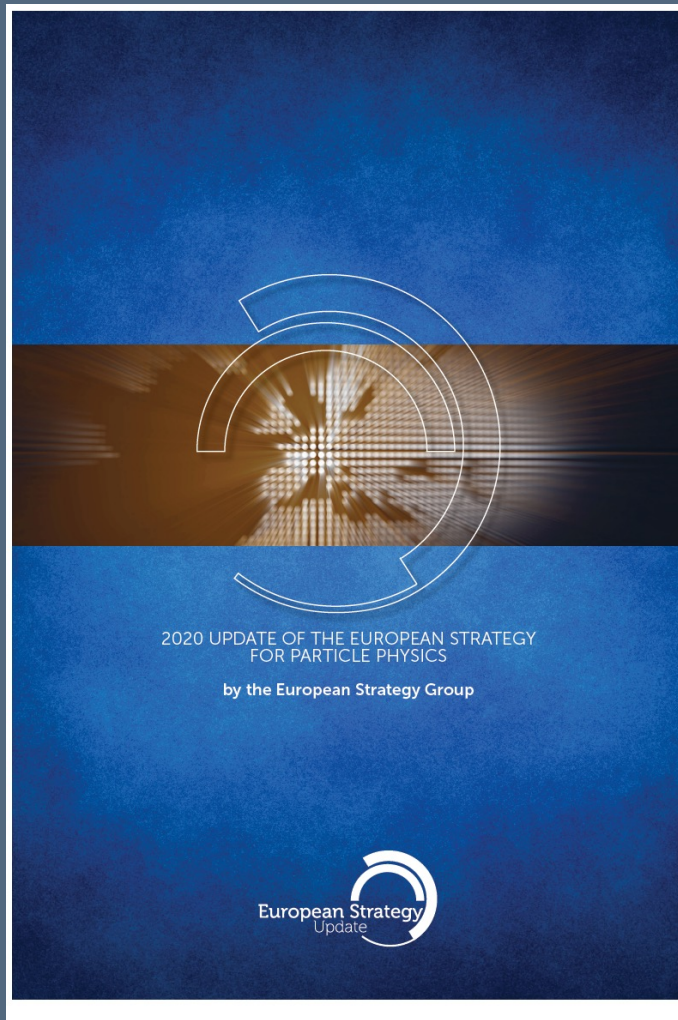
ECFA group of early career researchers asked to give input to European Strategy, [document](#) released which includes statements supporting the environmental sustainability of the field

Input to the ESU: recommendations

- Recommendation 1:
 - As part of their grant-giving process, European laboratories and funding agencies should **include criteria evaluating the energy efficiency and carbon footprint of particle physics proposals**, and should expect to see evidence that energy consumption has been properly estimated and minimised.
- Recommendation 2:
 - Any design of a major particle physics experiment should consider **plans for reduction of energy consumption, increased energy efficiency, energy recovery and carbon offset mechanisms**. Similarly, any design for new **buildings** associated with particle physics research should consider the highest building and energy efficiency standards.
- Recommendation 3:
 - European laboratories should invest in the development and affordable deployment of next-generation digital meeting spaces including virtual reality (VR) tools in order to **minimize the need for frequent travelling** to the laboratory, thereby minimizing the travel carbon and energy footprint of their users.

Outcome

- [European Strategy Update web site](#)



Annex 3: The Working Groups

- Working Group 1:** Social and career aspects for the next generation
Chair: Professor Eric Laenen (Netherlands)
- Working Group 2:** Issues related to Global Projects hosted by CERN or funded through CERN outside Europe
Chair: Professor Mark Thomson (United Kingdom)
- Working Group 3:** Relations with other groups and organisations
Chair: Professor Tatsuya Nakada (Switzerland)
- Working Group 4:** Knowledge and Technology Transfer
Chair: Professor Leander Litov (Bulgaria)
- Working Group 5:** Public engagement, Education and Communication
Chair: Professor Sijbrand de Jong (Netherlands)
- Working Group 6:** Sustainability and Environmental impact
Chair: Professor Dirk Ryckbosch (Belgium)

Outcome

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Environmental and societal impact

A. The energy efficiency of present and future accelerators, and of computing facilities, is and should remain an area requiring constant attention. Travel also represents an environmental challenge, due to the international nature of the field. ***The environmental impact of particle physics activities should continue to be carefully studied and minimised. A detailed plan for the minimisation of environmental impact and for the saving and re-use of energy should be part of the approval process for any major project. Alternatives to travel should be explored and encouraged.***

B. Particle physics, with its fundamental questions and technological innovations, attracts bright young minds. Their education and training are crucial for the needs of the field and of society at large. ***For early-career researchers to thrive, the particle physics community should place strong emphasis on their supervision and training. Additional measures should be taken in large collaborations to increase the recognition of individuals developing and maintaining experiments, computing and software. The particle physics community commits to placing the principles of equality, diversity and inclusion at the heart of all its activities.***

C. Particle physics has contributed to advances in many fields that have brought great benefits to society. Awareness of knowledge and technology transfer and the associated societal impact is important at all phases of particle physics projects. ***Particle physics research centres should promote knowledge and technology transfer and support their researchers in enabling it. The particle physics community should engage with industry to facilitate knowledge transfer and technological development.***

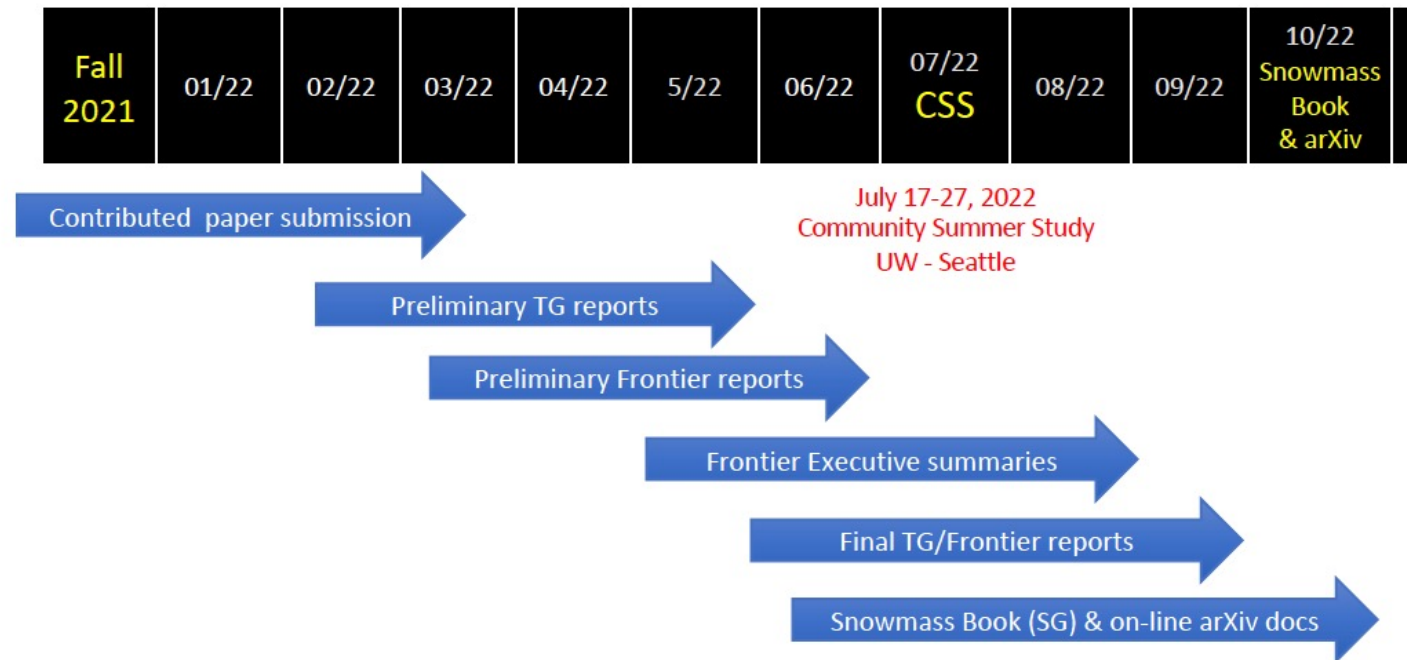
D. Exploring the fundamental properties of nature inspires and excites. It is part of the duty of researchers to share the excitement of scientific achievements with all stakeholders and the public. The concepts of the Standard Model, a well-established theory for elementary particles, are an integral part of culture. ***Public engagement, education and communication in particle physics should continue to be recognised as important components of the scientific activity and receive adequate support. Particle physicists should work with the broad community of scientists to intensify engagement between scientific disciplines. The particle physics community should work with educators and relevant authorities to explore the adoption of basic knowledge of elementary particles and their interactions in the regular school curriculum.***

To all Snowmass participants:

- Please make your work and results known by submitting contributed (white) papers!
Submission deadline March 15, 2022: <https://snowmass21.org/submissions/start>
- Document format/style file available on the submission site (optional)
- Please do not duplicate other publications. Treat them like conference proceedings
Will be documented in the Snowmass arXiv / Snowmass Book.

We have been told that white papers should be
around 10 pages long
Executive summary very important

Snowmass Timelines



Next steps for this white paper

- Today: hear and discuss about:
 - CERN's 1st environment report
 - What can we learn from this that is applicable to all US labs? Need for cooperation? Need for established standards? Does the US participate in "Energy for Sustainable Science at Research Infrastructures"?
 - Energy recovery for plasma-based colliders
 - What are emissions related with building an FCC/ILC (infrastructure, collider, detectors)? With operating such a facility? Is sustainability already part of the evaluation criteria?
 - CERN strategies to reduce GHG emissions in particle detection at the LHC experiments
 - What are emissions related with building a FCC/ILC detector? How much R&D on detector takes into account sustainability? Is it right that research facilities would be allowed to use gases banned in the private sector?
 - Climate sustainability of research operations
 - What recommendations should we make related with our research activities (food, travel, universities/labs, etc.)?

Next steps for this white paper

- Possible synopsis of this paper (10 pages):
 1. The world has to be serious about climate impacts and US plays a central role
 2. Particle physics does have climate impacts worth accounting for -> we prove this with some mini-studies that estimate some carbon footprints
 3. We can do things about it -> point to some of the ideas that will be presented in the workshop and elsewhere
 4. Here are a set of recommendations for what we should be doing in the future

Next steps for this white paper

- Use Slack channel: **#comm-7-soc-env-imp-emissions**
- Using today's attendance: we will email you a doodle poll to select a day/time of the week when we will meet every 2 weeks
- week of **15th November**: establish topics to be covered, assign people to look after those topics
- Weeks of **29th Nov, 13th Dec**: report on those topics, discuss, refine topics

Next steps for this white paper

- Week of **10th January**: finalize table of contents and likely size of each section
- Week of **24th January**: final discussion of detailed content of the paper
- Week of **7th February**: first draft
- After this: finish writing (authors) and make final editing changes (V&K)
- **March 15th: submit to ArXiv**

Next CFo7 Workshop:

- 15th November:
<https://indico.fnal.gov/event/51648/>

Workshop on Local Community Impacts 🔍

📅 Monday 15 Nov 2021, 10:00 → 13:00 US/Central

👤 Ken Bloom (University of Nebraska-Lincoln) , Mike Headley (SDSTA - SURF) , Veronique Boisvert (Royal Holloway, University of London)

Description Particle physics facilities have the potential to have a significant impact on their surrounding local communities. The Snowmass Community Engagement Frontier Topical Group on Societal and Environmental impacts is hosting a zoom workshop on local community impacts on Nov 15 from 10am to 1pm CT (<https://indico.fnal.gov/event/51648/>). This workshop is focused on discussing examples and lessons learned from impactful work being performed by particle physics laboratories to partner with local communities and regional Tribal communities and other underserved populations.

We are hopeful this workshop will inspire others to find innovative ways to work alongside the communities in which they are located including underrepresented groups. We invite Snowmass participants to join us in learning how we can foster relationships with our local communities and underrepresented groups to create innovative approaches to community engagement and develop recommendations for the field in a contributed Snowmass paper.

10:00	→ 10:10	Introduction Speaker: Mike Headley (SDSTA - SURF)	🕒 10m 🔍
10:10	→ 10:40	SURF Local Impacts Speaker: Rochelle Zens (SDSTA/SURF)	🕒 30m 🔍
10:40	→ 11:10	Fermilab Local Impacts Speakers: Alison Markovitz (Fermilab) , Rebecca Thompson (Fermilab)	🕒 30m 🔍
11:10	→ 11:30	Coffee Break	🕒 20m
11:30	→ 12:00	LBNL Local Impacts Speakers: Faith Dukes (LBNL) , Jennifer Tang (LBNL)	🕒 30m 🔍
12:00	→ 12:30	Additional Presentation (TBD) Speaker: TBD	🕒 30m 🔍
12:30	→ 13:00	Discussion	🕒 30m 🔍

BACK UP

Green premiums

Green Premiums for plastics, steel, and cement

Material	Average price per ton	Carbon emitted per ton of material made	New price after carbon capture	Green Premium range
Ethylene (plastic)	\$1,000	1.3 tons	\$1,087–\$1,155	9%–15%
Steel	\$750	1.8 tons	\$871–\$964	16%–29%
Cement	\$125	1 ton	\$219–\$300	75%–140%

From: How to avoid a climate disaster – Bill Gates