Presenter	Questions:		Answers:
Ulrika Jansson:	Er dette med omløpstid snakk om all hogst, eller kun flatehogst?	Does the lifecycle emissions relate to all approaches to logging, or only clearing of larger areas?	I Norge er den aller vanligste hogstformen etter 1940-tallet flatehogst med omløpstid på 60-120 år. I en skog som forvaltes med plukkhost der en en stor del av trærne står igjen etter hver hogst så vil ikke all sopprot-soppen dø og nedbrytningen av karbon i bakken vil bli mindre. Det vil bli økt nedbrytning i bakken likevel, sammenlignet med å la trærne stå, men de negative effektene på karbonmengd i bakken vil være mindre.
	Er regnskapet over andel som går til langtidslagring også inkludert spon og flis som blir benyttet i bygningsplater?	Does the percentage regarding long term storage of carbon also include sawdust and wood chips which are utilized in building panels?	Tallene for hvor mye som går til hvilken type materiale er ikke enkle å få tak i da det ikke lages offentelig statistikk på dette. Jeg har fått informasjonen fra resursøkonom og forsker ved NMBU Per Kristian Rørstad og dette er hans "best guess". Bruk av restprodukter fra skogbruket til "langlevde" produkter som bygningsplater er lurt, dersom du likevel hogger skogen. Men sammenlignet med livslengden til et tre i skogen forlenger man likevel ikke tiden som karbonet blir lagret i en produkt sammenlignet med i et levende tre.
	Avviker ikke det Chris sier nå om at biomaterialer, som han har undersøkt, alltid gir positiv påvirkning (drawdawn) over livsløpet med Ulrikas konklusjon? Er det bare meg eller sier de to første foredragene her det stikk motsatte av hverandre..?	What Chris explains now about biogenic materials which he has found always to give a positive effect (drawdown), doesnt that diverge regarding lifecycle compared to the conclusion presented by Ulrika? Is it only me, or don't the 2 first lectures contradict each other?	Chris starter sin livsløpshistorie med at en skog (eller annet biogent materiale) blir plantet, og anslår at innbindningen av karbon i trevirket er mye større enn utslippene ved hogsten. Som jeg viste i figur fra M-519 på side 8 i presentasjonen vil utslippene fra hogsten ta like lang tid å balanseres som den normale omløpstiden i en skog i norsk skogbruk (60-120 år). Chris figur fungerer veldig bra for biogent materiale som har stor innbindning, og lave utslipp når materialet høstes og som vil lagre karbon lenger i et bygg enn i naturen. For skog der lagringen i naturen er flere hundre år (mye lenger tid enn tiden karbonet er lagret i et bygg) og der hogsten gir store utslipp fra bakken og fra mesteparten av treet (75 % går til kortlevde produkter, kun 25 % blir byggemateriale) så er det ikke sikkert at figuren til Chris fungerer like bra. Bruk av restmateriale fra matproduksjon høres ut som en mye mer effeltiv måte å langlagre karbon enn bruk av tre.
Chris Magwood:	I "mengde karbon" lagret ser man også på mengden VOC m.m. som frigis fra bygningsmaterialene (treverk) over livstiden de benyttes?	Does the "amount of carbon" stored also include amount of VOC etc. which is released from the building materials during their in-use phase?	GHG emissions (and storage) are different than Volatile Organic Compounds. We calculate GHGs to estimate the impact on the climate, and we measure VOCs to estimate the impact on the health of building occupants. Once placed in the building, carbon storing materials do not release meaningful amounts of GHGs, as the carbon

			is durably stored in the material and will only be released when burned or rotted. There is some close relationship between these two concerns, as most carbon storing materials have very low (or zero) chemical content that will release into the building as harmful VOCs.
	Er hamp og stampeleire like plasskrevende som halmballer?	Is hemp and/or rammed earth just as space demanding as straw bales?	There is not set amount of space required for any particular material. The amount of insulation value required by the building design will determine how much of a particular material is needed. Rammed earth is not used for insulation, but for structure, so the space requirements are different. In general, straw walls are 400mm because of the size of a straw bale, but chopped or compressed straw can be scaled to any size requirement.
Martin Rauch:	Hva er det som binder sammen leirbruken som benyttes innvendig slik at den ikke smitter/støver fine partikler?	What is it which binds the clay inside so it doesnt rub off, or become dusty?	Det er leire(!). Leire har en fysikalsk egenskap at det kan binde mye vann til seg, dermed opplever vi det som klebrig når det er fuktig. Om leiren da blir mettet med sand, grus, stein og får lov å tørke, da fungerer leire reelt som mørtel mellom murstein. Det du opplever som smitter er enten eksponert tør leire, eller (mer sansynlig) fin sand. I stampe jords vegger benyttes større partikler, så støv er ikke et problem. Om det er leirepuss du mener, da er det et litt lengere svar, her kan kort nevnes at det kan fikseres.
	Jeg undres slagregn og ytelser for stampejordfasader når det regner som verst og snør horisontalt?	I wonder about the durability of rammed earth facades when exposed for driving (battering) rain or snow horisontal?	En stor del av den visuelle fasade er vannbestandig; det er stein aggregater av forskjellig størrelse, og om bygget ellers har "bra støvler og hatt", da holder fasaden til det meste. Men Water flowing down the wall surface washes out clay particles over time. The higher the velocity of the water, the greater the erosion. To reduce this, erosion checks are introduced that form a hard lip to channel water away from the surface, dripping away onto the ground. These checks can be a layer of trass-lime concrete or embedded tiles and should be placed every 40-50 cm.
	I wonder in European Technical approval its is nessecary to meet the requirements. How is this handled with all these new building blocks?	I wonder in European Technical approval its is nessecary to meet the requirements. How is this handle with all these new building blocks?	You will find the best overall answer in regards to standards of earthen construction in this presentation from "International Conference on Building with Earth": https://www.dachverband-lehm.de/lehm2020_online/pdf/lehm2020_b_ziegert-roehlen-schroeder_en.pdf
	Finnes det produktdokumentasjon på stampet jord som er godkjent for	Does product documentation exist on rammed earth, which is	Good question. We are aware that is was possible at least until 1993, when rammed earth was used on kretsløpshuset which was built in Vestby. Please contact our Norwegian

	det norske markedet?	approved for the Norwegian market?	liason, max@lavkarbonbygg.no, as he is in process of investigating this issue.
		What is the cost of material/construction for these systems compared to existing?	What is the cost of the existing? The findings for the Alnatura office was that the price was compatible, but in such scale of buildings there are too many variables to give a general answer; much depends on the design.
Bjørn Kierulf:	Er det en potensiell showstopper i brannmotstanden i disse materialene? Brannrådgivere setter strenge krav til fasader og vegger i dag.	Is limited fireretendency a potensial showstop in these materials? Fire inspectors have strict rules for facades and walls now a days.	EcoCocon straw bale wall panels plastered with earthen plaster have passed RE(I)120, in other words among the most fireresistant walls possible. This spring an unplastered Ecococon wall element passed RE(I)30, which is sufficient for residential housing.
	Finnes det produktdokumentasjon på stråløsninger som er godkjent for det norske markedet?	Does product documentation exist on straw bale building, which is approved for the Norwegian market?	Yes, please refer to www.ecococon.eu/no for numerous documentations. In Norway we estimate around 100 buildings have been constructed of straw bales during the past 20 years; a residential house made by EcoCocon panels was built on Nesodden in 2017 and a 4 story EcoCocon residential home is being planned in Høvik for 2022.
		How is the emission profile in-use for the eco cocon building materials? Regarding indoor air quality etc.	Excellent, significantly if earthen plaster is used for the interior, although that is the choice of the client.
		What is the cost of material/construction for these systems compared to existing?	Assuming you do mean in Norway(?), we have limited insight about the costs of "existing", but we feel confident in saying that we are also competetive on price.
Hagen Elert	Hvilke støybeskyttende egenskaper har lavkarbon-materialer?	What kind of noise preventive charateristics does lowcarbon materials have?	From the new rammed earth guide by Erden: Due to its material mix and clay bond property, rammed earth has a high surface area and constituents of varying hardness. This makeup offers great advantages for room acoustics. A rammed earth wall can significantly reduce reverberation and echoes within a space.

			At a recent test it was found that straw with earthen plaster meet the construction legally binding minimum sound insulation according to DIN 4109:2016 and also reach the ″ increased sound insulation ″ according to DIN 4109:1989, Supplement 2 and DIN 4109-5:2020. https://bau-mit-stroh.de/technische-unterlagen/
Max V Jensen		Does anyone know if such straw materials are available i the Norwegian market?	Yes, have a look at www.ecococon.eu/no .
			As the Norwegian partner of EcoCocon, Max V Jensen of Lavkarbonbygg AS will be able to advice you further, also in regards to other natural materials.
	Er hamp og stampeleire like plasskrevende som halmballer?	Is hemp and/or rammed earth just as space demanding as straw bales?	As the size of straw bales can vary in width from 40 to 120 cm, I suppose the essence of the question should be viewed in regards to the current TEK rules in Norway? This again depends on what the construction is intended to be used for. As you can see from the slide showing the moisture and heat sensors in the presentation of Martin Haas, the Alnatura building worked excellent with quite limited insulation and heating, but as it was a huge building, the thickness of the walls were not an issue. If your question relates to residential housing in Norway, I have been informed that a 10 cm wall of CLT (Massivtre) requires 35 cm of Hunton Nativo cellulose insulation to meet current regulation. In addition it would need a cross section of battens for ventilation and siding. I estimate such wall will be minimum 50 cm thick. A similar insulating EcoCocon straw panel wall will be 2 cm interior plaster (or T&G panel), 2,5cm EcoCocon, 6 cm Hunton Nativo + 2,5 cm exterior plaster or cladding= 51 cm.
	Avviker ikke det Chris sier nå om at biomaterialer, som han har undersøkt, alltid gir positiv påvirkning (drawdawn) over livsløpet med Ulrikas konklusjon?	What Chris explains now about biogenic materials which he has found always to give a positive effect (drawdown), doesnt that diverge regarding lifecycle compared to the conclusion presented by Ulrika?	Yes and no. I did have the same thoughts as I first watched through the presentations prior to the webinar, but I trust that you -as I- understood the larger picture as Chris progressed and clearly explained the need to not decrease the total km2 of standing forest in order to convert it into buildings. It would be adding to the climate catastrophy, unfortunately this describes the current approach in Norway. Comment from Ulrika: It is not only a problem that the forested areal gets smaller (due to infrastructur projects,

	Er det bare meg eller sier de to første foredragene her det stikk motsatte av hverandre..?	Is it only me, or don't the 2 first lectures contradict each other?	new buildings etc.) but also the fact that the timespan vi have to reduce the emissions are too short to harvest (and replant) forest for the climate now, as it will take 60-120 years to extract the same amount of carbon from the atmosphere that was released in the prosess of harvest (including not only the above ground carbon, but also the below-ground carbon). And at that point the forest is again harvested. Carbon in living and dead trees in the forest store Carbon for many hundred years, compared to 20-80 years in a normal building. The smartest thing to do in building- and construction. if the goal is to reduce the amount of carbon in the atmosphere fast and store it for long time, is to use short lived and carbon rich plantmaterial that would decompose fast in nature and store it for a long time in construction materials in buidings.