Tools are just tools
...risk is the main concern...and data

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Why am I here?

- Master in Construction and sustainability at NTNU
- Senior advisor – Products and sustainability at Skanska Technology
  - LCA, LCC, Emissions to the indoor environment, Hazardous substances, Sustainable procurement etc.

<table>
<thead>
<tr>
<th>Project</th>
<th>Status</th>
<th>Version of VegLCA used</th>
</tr>
</thead>
<tbody>
<tr>
<td>E18 Bommestad-Sky</td>
<td>Finished</td>
<td>v 1.02/ v 2.01</td>
</tr>
<tr>
<td>Rv 3/rv25 Løten-Elverum</td>
<td>As-built remaining</td>
<td>v 2.01</td>
</tr>
<tr>
<td>D12 Kronstad-Fløen</td>
<td>In progress</td>
<td>v 2.04</td>
</tr>
<tr>
<td>Fv. 659 Nordøyvegen</td>
<td>In progress</td>
<td>v 2.04</td>
</tr>
</tbody>
</table>
1. Project example
2. Takeaways
3. The critical implication of managing innovation and risk
Rv3/rv25 Løten-Elverum

15,2 km
4 felt veg

10,4 km
2/3 felt veg

7,1 km
gang- og sykkelveg

Mindre veger
Fylkesveger
Kommunale veger

Konstruksjoner
9 bruer
18 over-/underganger
2 fauna passerasjerer

Kryss i nye
riksveger:
3 planefylte
2 rundkjøringar
2 T-kryss

Ånestad
Kontroll- og
trafikkstasjon
Reduction of GHG emissions (metric ton CO2 eq)

- Optimization of distribution of soil/rock; 16211 metric ton CO2 eq
- Low-temperature asphalt and low-water content in aggregates; 14678 metric ton CO2 eq
- Optimization of road build-up and asphalt recipe; 13235 metric ton CO2 eq
- LED roadlights with dimmers; 7691 metric ton CO2 eq
- Low-carbon concrete; 1980 metric ton CO2 eq
- EPD Glueleam; 604 metric ton CO2 eq
- Euro 6 trucks; 693 metric ton CO2 eq
- Waste reduction; 635 metric ton CO2 eq
- EPD Piling; 87 metric ton CO2 eq
- EPD Explosives; 6 metric ton CO2 eq
- Aneastad Control Station; 457 metric ton CO2 eq
- EPD Reinforcement; 677 metric ton CO2 eq
- EPD Explosives; 6 metric ton CO2 eq
- Bustransport for workers; 176 metric ton CO2 eq
- Geothermal heat pump at Åneastad Control Station; 87 metric ton CO2 eq
- Bustransport for workers; 176 metric ton CO2 eq
GET ALL THE DATA!!!
ENTER
ALL THE DATA!
memegenerator.net
clean *all the data?*
Summary of the process with VegLCA

- More than 1600 cells for data entry
- More than 5000 lines in excel which had to be checked for correct unit and correct process-code level for data entry
- More than 2000 lines had to be changed as their properties did not match VegLCA directly
- 2700 additional cells to calculate the effects of the measures to reduce the environmental impact

If you are unlucky even one error could be decisive for the end results
Source: https://thore.no/stikkord/kart/
Workload

Flexibility/correctness

?
Takeways

- Civil projects are big contributors to global warming
  - and there are many opportunities for improvement

- Using the process codes as the framework is a good idea
  - but the unit and level for the output from estimations does not necessarily match what is used in VegLCA

- LCA calculations are very data- and labour intensive especially for bids
  - but maybe not enough?

- It is difficult to get a thorough overview and make fair comparisons of calculations from different sources
  - Standardisation
- Asphalt – production and service-life
- Low-carbon concrete
- Remove sheet piling after use
- Effective and maintained machinery
- Dimmable LED-lighting
- Washing regime for tunnels
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- Electrification of machinery
- Project concept that reduces LUC
- Low carbon materials on the horizon
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- Digitalization combined with safety measures?
Radically different solutions are needed - fast

The process-perspective

- The important decisions are made in the early phases
- Emphazise the importance of environmental issues in evaluation criteria
- Mitigate the risk by sharing it between the different project participants
  - Integrated project development
Powerhouse Kjørbo -
An example from the building sector

Photo: Ivar Kvaal
Summary

- The civil sector is important in an environmental perspective
- Calculations are labour- and data-intensive (at the moment)
- Management of innovation related risk is critical
- Standardization