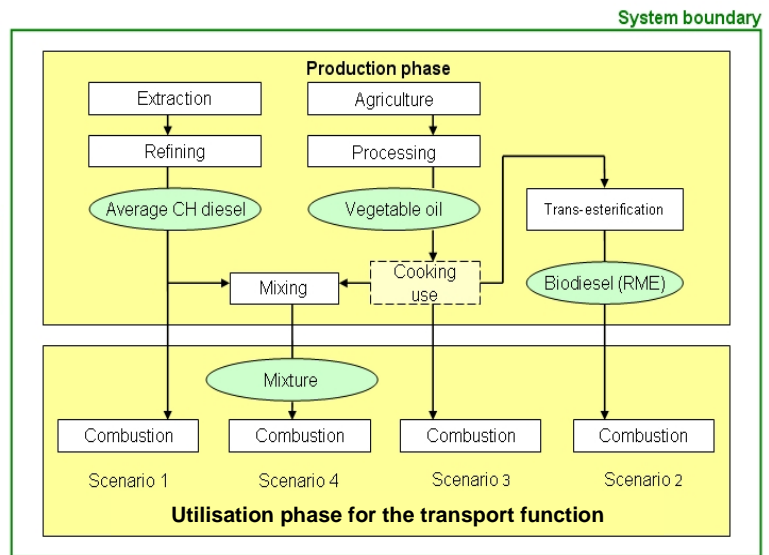
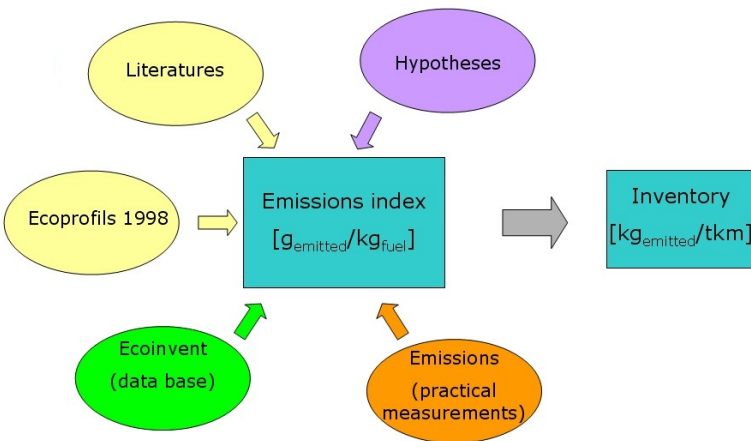
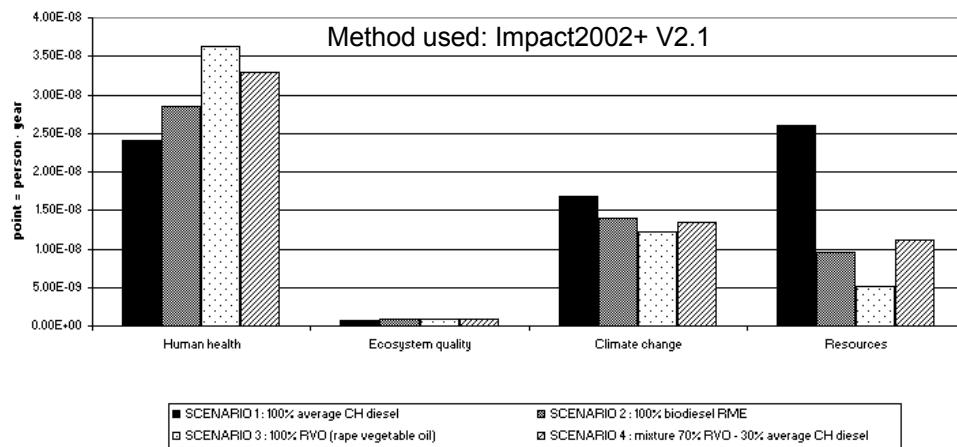


Lifecycle analysis aspects of biofuels



Normalised Damage score S_{DM} for the different fuels that can be used for the push boat of the SIG
 Note: the unit "point" are reported to a tonne kilometer [t km]



- **Human health**
 - High level of NO_x (nitrogen oxides) and PM (particles matters)
- **Climate change**
 - Lower impact with biofuels but not as much as one could expected due to agriculture (1 kg $N_2O \equiv 156 \text{ kg}_{eq} CO_2$)
- **Resources**
 - Lower impact ~ -50% with biofuels on the non-renewable energy

Conclusion

- Influent parameter: the type of agriculture (rape vs other oil plants).
- Climate change and resources: in this study we use straight vegetable oil (SVO) but lower impact can be achieved in these two categories with waste vegetable oil (WVO).
- Human health: recommendation has been made to use a particles filter.