



SRIP KROŽNO
GOSPODARSTVO



Osnovno usposabljanje OpenLCA

Damjan Krajnc
damjan.krajnc@stajerskagz.si



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UVODNE INFORMACIJE

Na splošno

- Naj se predstavimo
- Usposabljanje bo mešanica predavanj in vaj z uporabo programske opreme (študija primera)
- Usposabljanje je interaktivno! Postavite kolikor želite vprašanj. Prepričajte se, da lahko sledite 😊
- Kako bomo ravnali z odmori?
- Rezultati morda niso vedno takšni, kot so pričakovani - pogosti razlogi vključujejo enote, vnos podatkov ali druge razloge, ki jih lahko raziščemo skupaj
- Rešitve **vseh vaj** in prosojnice prejmete **po treningu**



Osnovno usposabljanje

- Predstavitev Štejske gospodarske zbornice
- Pregled LCA in osnove
- Uvod v openLCA
- Uvoz in izvoz podatkovnih baz in nizov podatkov
- Ustvarjanje tokov in procesov
- Ustvarjanje proizvodnih sistemov in projektov (primerjalna LCA)
- Analiza in interpretacija rezultatov
- Metode
- Viri za openLCA

Silviculture and Forest Management

openLCA



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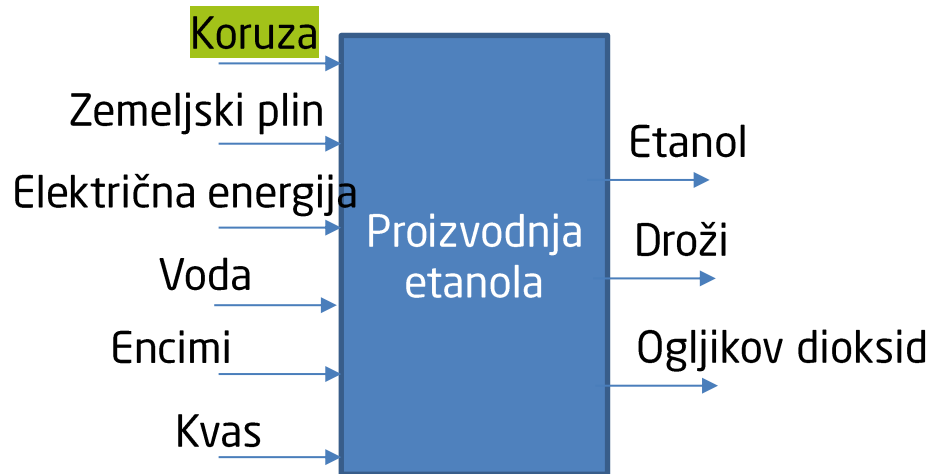


Sistem, meje sistema in alokacija

Procesi in sistem produkta

Proces

“Niz medsebojno povezanih ali medsebojno delujočih dejavnosti, ki pretvarja vložke v rezultate.”*



PRODUKTNI SISTEM:

Zbirka procesnih enot z osnovnimi in proizvodnimi tokovi, ki opravljajo eno ali več definiranih funkcij

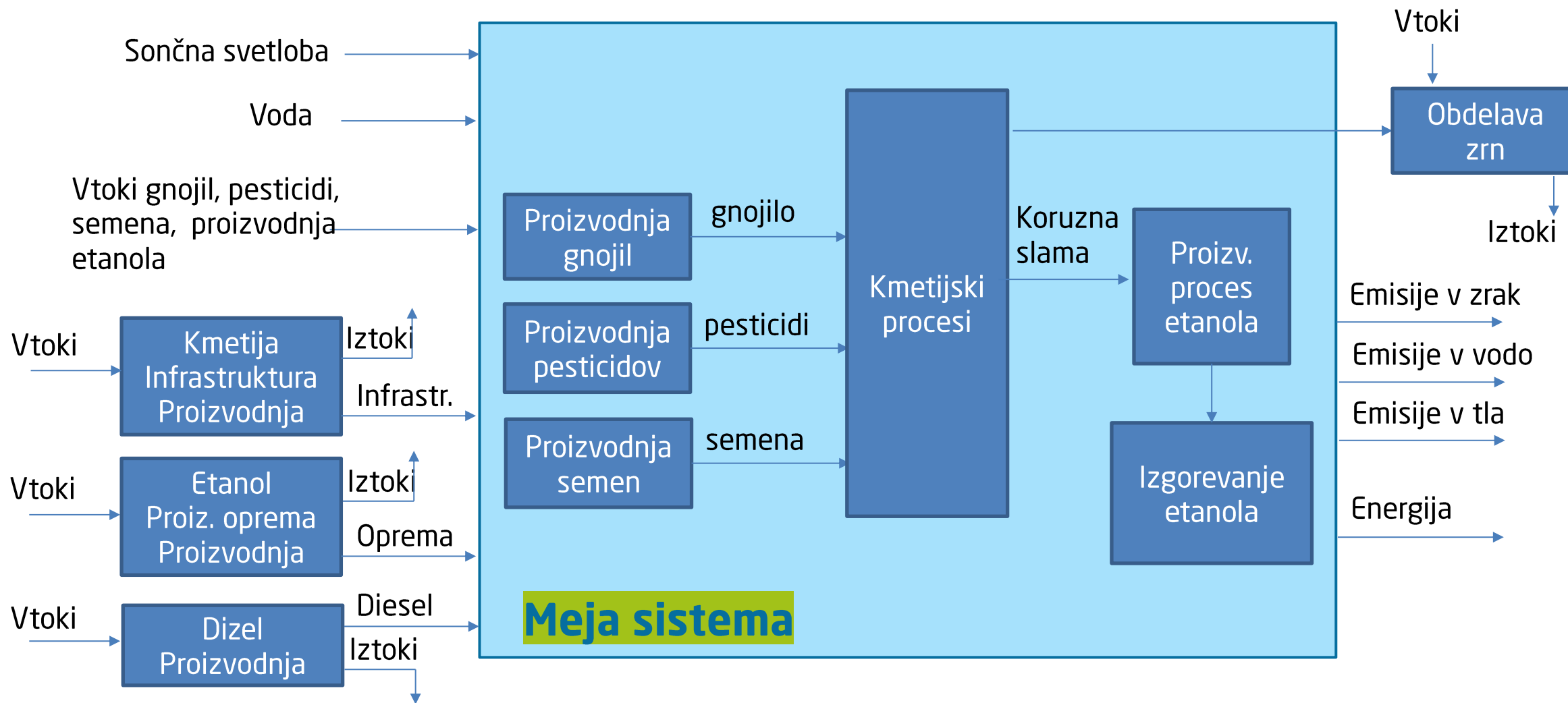
Procesna enota

“Najmanjši element, upoštevan v analizi inventarizacije življenjskega cikla, za katerega so vhodni in izhodni podatki količinsko opredeljeni.”*



Meja sistema

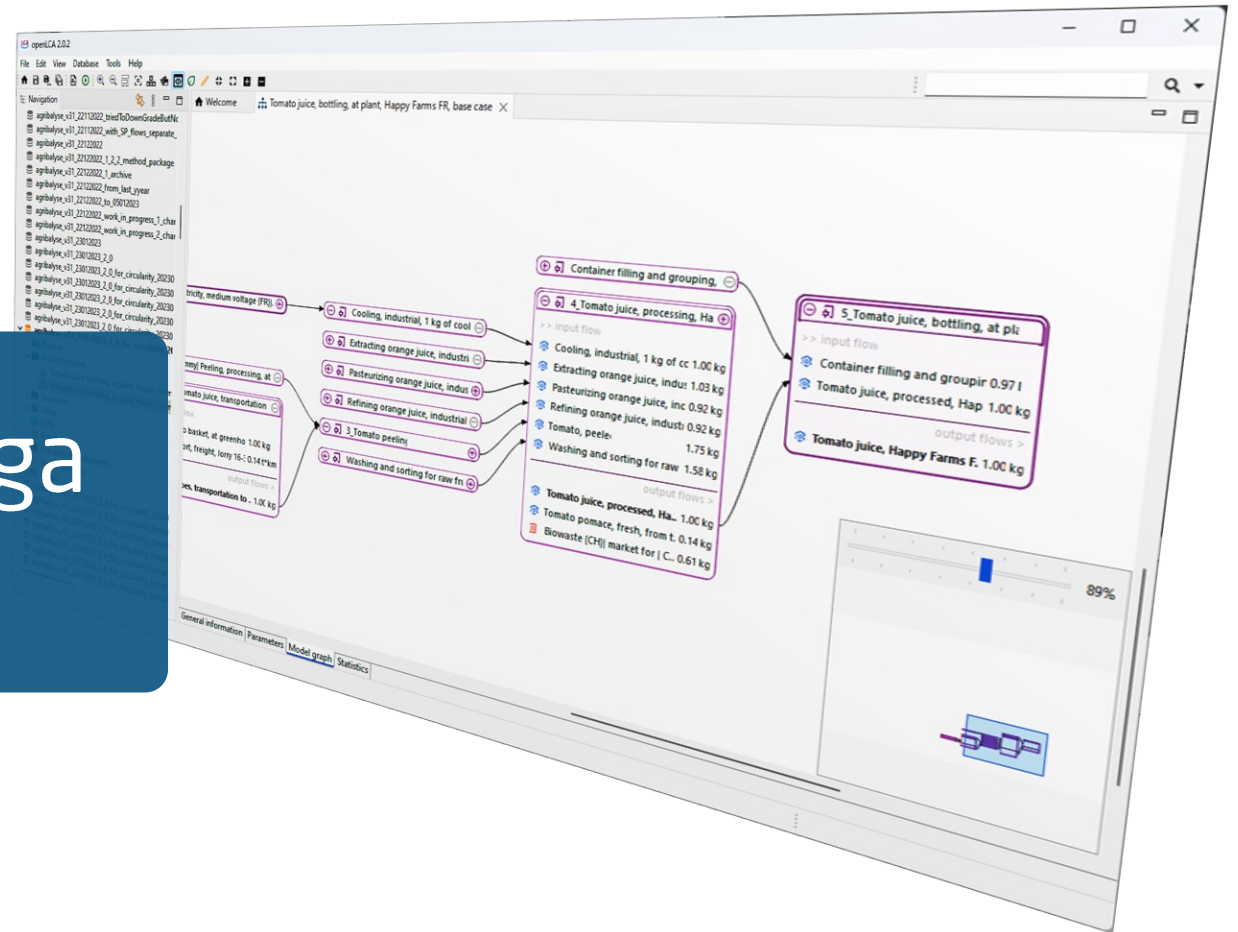
Koruzni etanol



Kriterij zgornje meje (cut-off)

- Kriterij zgornje meje (cut-off) v uporablja za **odločanje, katere podatke vključiti ali izključiti** iz analize.
- Gre za **pragovno vrednost**, ki določa, koliko določen prispevek k celotnemu sistemu mora biti pomemben (na primer glede mase, stroškov ali vpliva na okolje), da ga vključimo v analizo.
- Prispevki, ki so **pod to vrednostjo, se lahko izločijo**, saj so zanemarljivi glede na celoten rezultat.
- Možne posledice kriterija zgornje meje je **potrebno oceniti in opisati**

Ocena življenjskega cikla



Predstavitev

Damjan Krajnc

- Izvajalec študij LCA
- področju trajnostnega razvoja in ocenjevanja okoljskih vplivov. Diplomiral in doktoriral na Fakulteti za kemijo in kemijsko tehnologijo Univerze v Mariboru
- Sodeloval pri nacionalnih in mednarodnih projektih, kjer je prispeval k razvoju in implementaciji okolju prijaznih tehnologij.
- Zaposlen na Štajerski gospodarski zbornici kot strokovni sodelavec za ocenjevanje življenjskega cikla (LCA) produktov in procesov.
- Ekspertiza:
 - ocenjevanje okoljskih vplivov
 - ogljičnega odtisa
 - načrtovanje trajnostnih procesov
 - uvajanje principov krožnega gospodarstva.
 - s svojim znanjem in izkušnjami pomaga podjetjem prepoznati priložnosti za zmanjšanje okoljskih vplivov, optimizacijo virov in doseganje trajnostnih ciljev.

OCENA ŽIVLJENJSKEGA CIKLA

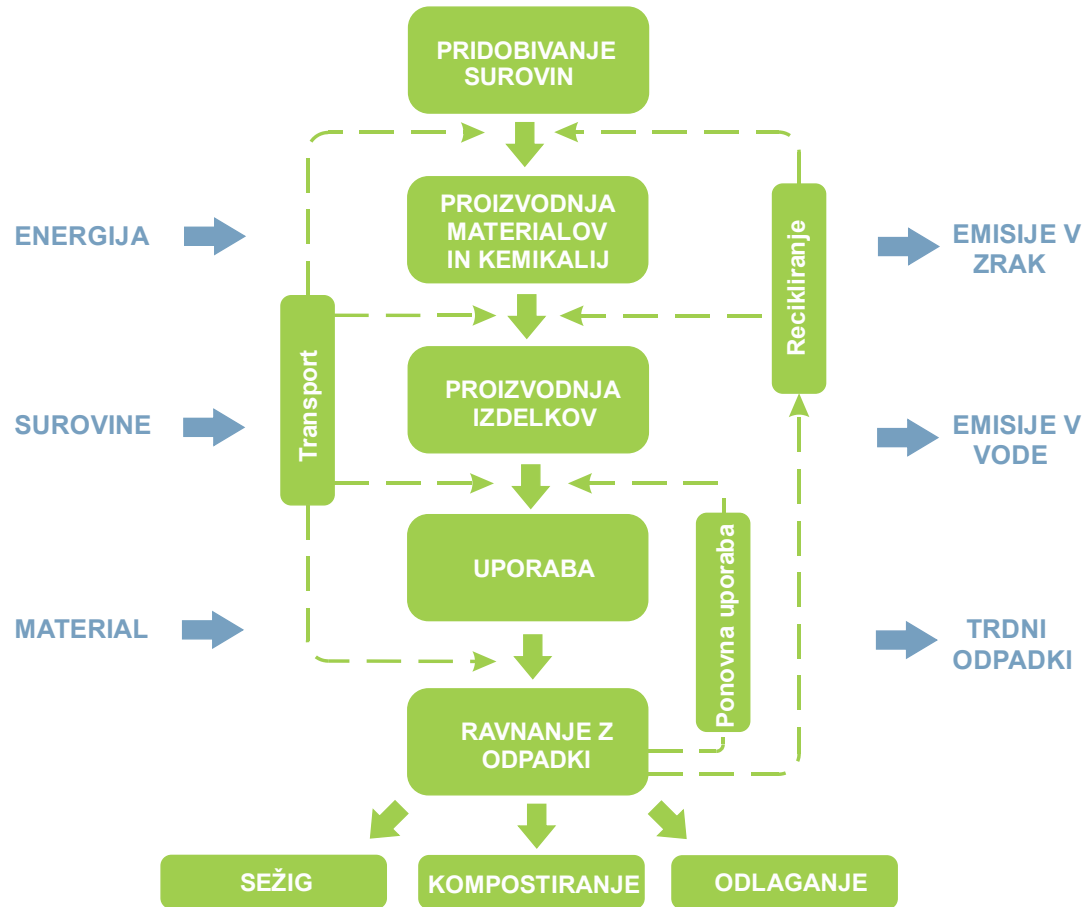
Life Cycle Assessment - LCA

Kaj je ocena življenjskega cikla?

Metoda za zbiranje in vrednotenje vtokov, iztokov in potencialnih okoljskih vplivov proizvodnega sistema skozi njegov življenjski cikel*

OCENA ŽIVLJENJSKEGA CIKLA

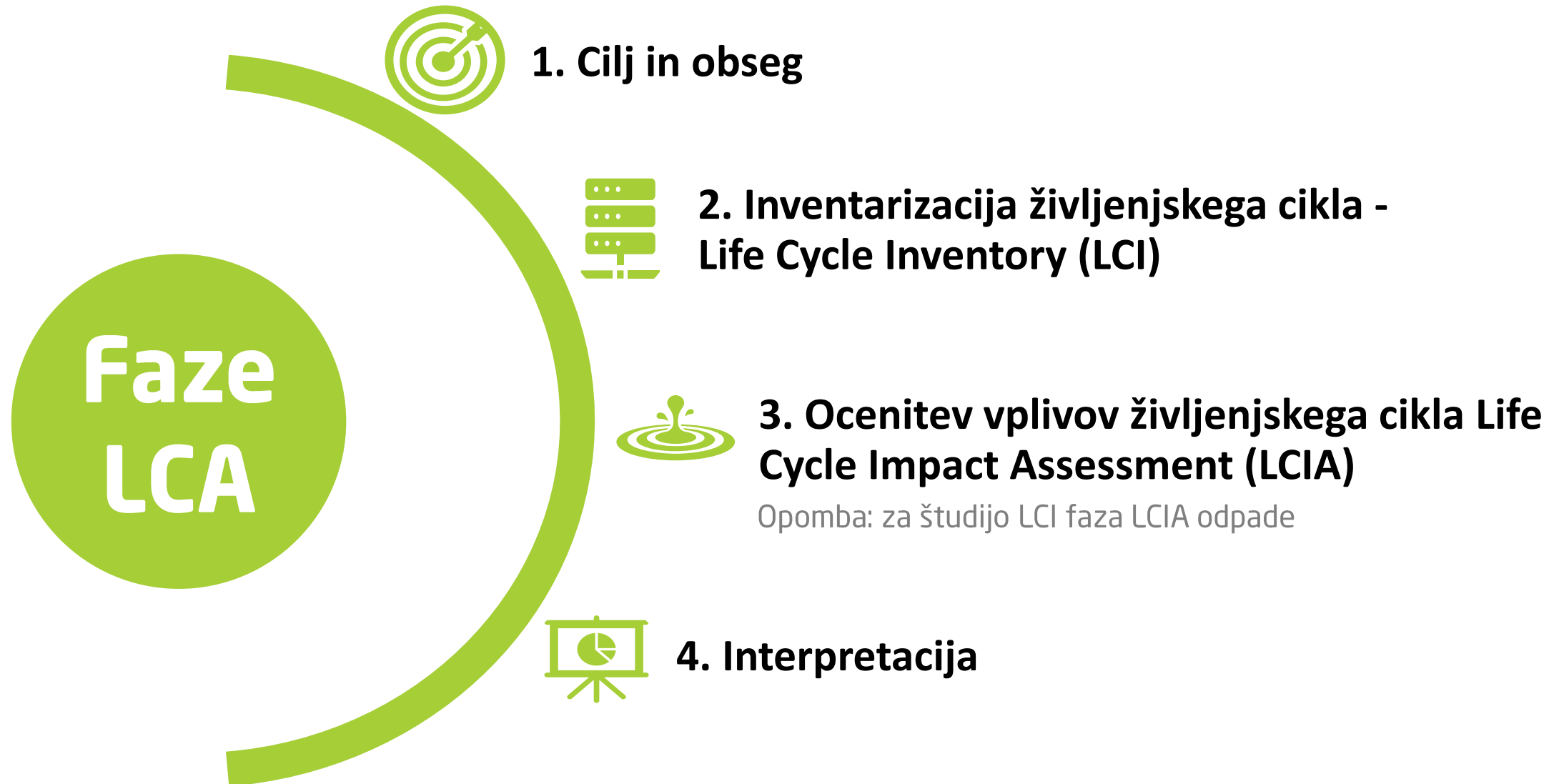
Life Cycle Assessment - LCA



- **Metodologija** za oceno okoljskih vplivov skozi celoten življenjski cikel izdelka ali storitve.
- Osredotoča se na **vse faze življenjskega cikla**: od surovin, proizvodnje, uporabe, do konca življenjske dobe.
- Poudarja **trajnostno upravljanje virov** in zmanjševanje okoljskih vplivov.

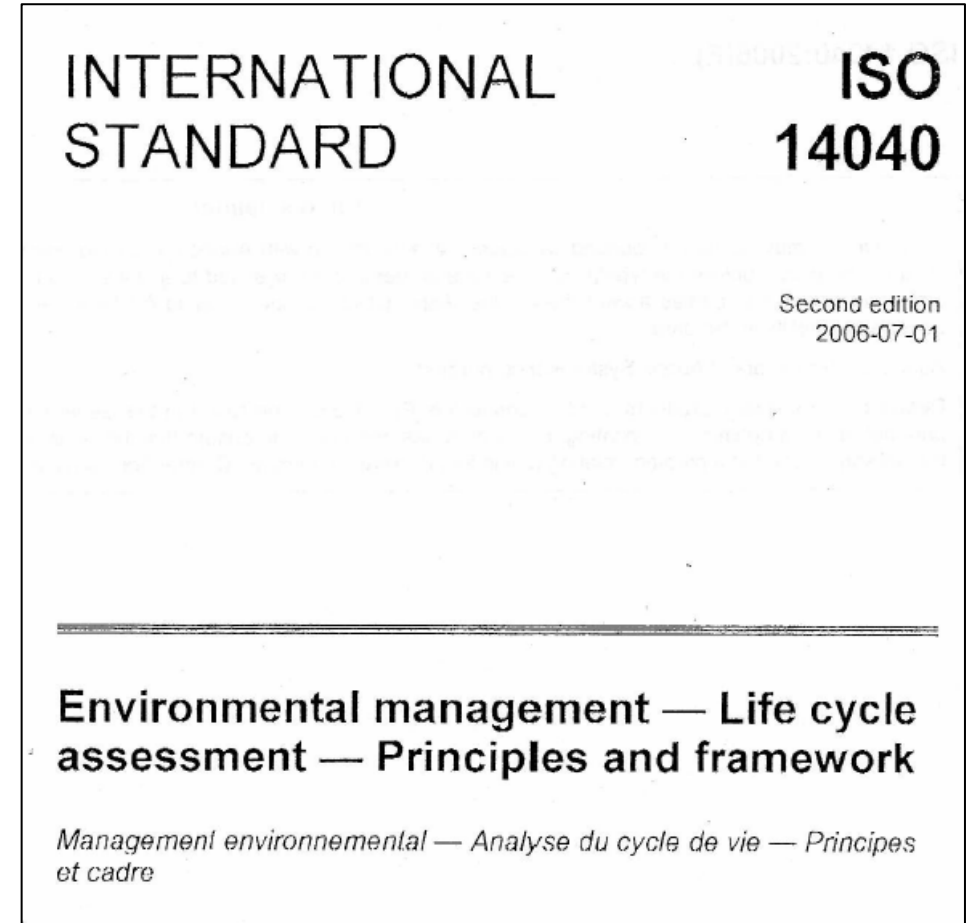
Narišimo diagram poteka
življenjskega cikla ...?

Štiri faze LCA



Ozadje ISO 14040

- Razvila **Mednarodna organizacija za standardizacijo (ISO)** leta 1996.
 - Posodobljeno v drugi izdaji leta 2006
- **Vodilni dokument** za osnovne postopke za ocenjevanje življenjskega cikla.
- Potrebno uporabiti 14044, da bi izvedli 14040.



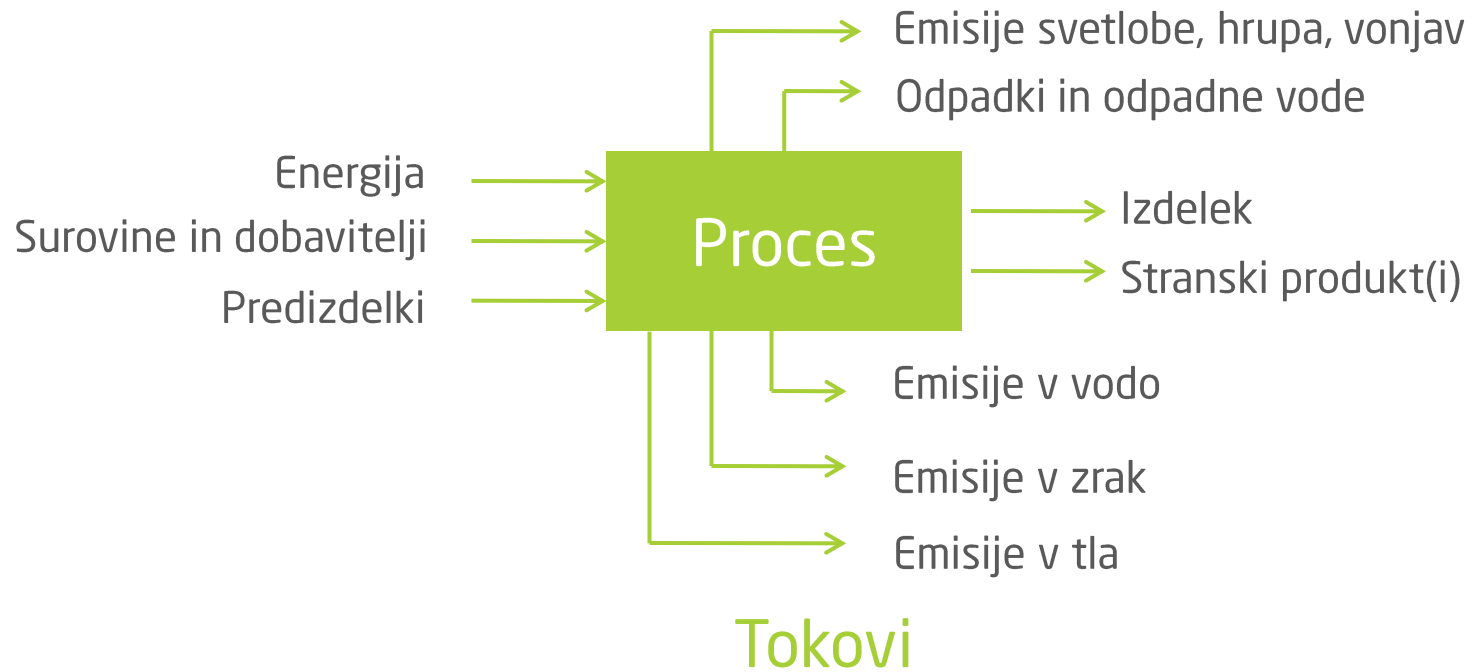
Zakaj izvesti LCA?

- **razumevanje** proizvodnega sistema,
- izpostavitve **priložnosti** za učinkovitost vzdolž vrednostne verige,
- **identifikacijo** tistih procesov, ki imajo največjo možnost za izboljšanje (žarišča),
- zagotovilo, da spremembe, narejene za izboljšavo enega dela industrijskega sistema, **ne bodo »preusmerile bremena«** na drug del verige,
- **primerjava dveh sistemov**, ki nudita enako storitev/proizvod,
- **zagotavljanje podatkov za okoljski odtis (ogljčni odtis)**,
- podprtje okoljskih trditev z rezultati analize LCA za **okoljsko izjavo izdelka** (EPD - Environmental Product Declaration).

Kazalci, ki se uporabljajo v analizi LCA



Vrste podatkov





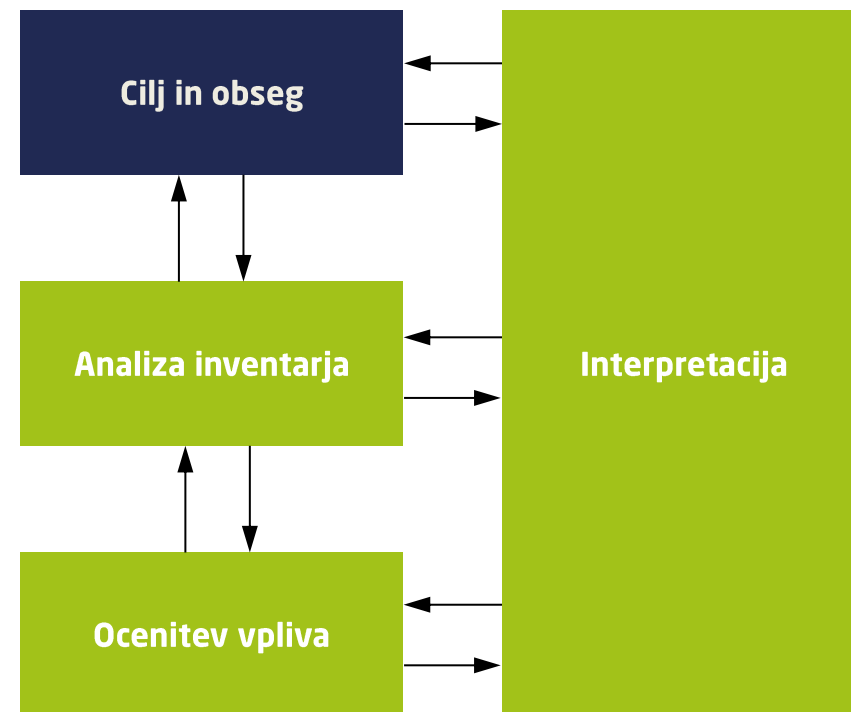
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Cilj in obseg analize

Cilj analize

- Prvi sestavni del LCA v skladu z zahtevami standarda ISO 14044
- **Cilj mora navajati:**
 - Razlogi za študijo
 - Cilj analize
 - Predvidena uporaba
 - Ciljno skupino
 - Ali gre za primerjalno ocenjevanje in bo razkrito javnosti



Obseg analize

Določitev obsega nudi osnovne informacije, podrobnosti metodološke izbire in določa obliko poročila

- **Funkcija in funkcijska enota**
 - Opredeljujejo funkcijsko značilnosti produktnega sistema
 - Funkcijska enota uporabna kot referenčno merilo
- **Meje sistema**
 - Definirajo, kateri procesi so vključeni v analizo
 - Koristno vključiti shemo tehnološkega postopka
- **Metodologija LCIA**
 - Podamo, katere kategorije vplivov in kategorijski kazalniki so uporabljeni
 - Podamo, katera metodologija karakterizacije vplivov je uporabljena
- **Invetarizacijski podatki**
 - Pridobimo bodisi z neposrednim merjenjem procesov ali iz sekundarnih virov (ali kombinacijo obeh)
 - Vključujejo vtoke in iztoke v zrak, vodo in tla

Obseg analize (nad.)

- **Kakovost podatkov**
 - starost, geografsko pokritost, tehnološko pokritost, natančnost, popolnost, reprezentativnost, doslednost, ponovljivost, vire, minimalna količina časa za zbir uporabljeno tehnologijo in pojasnilanje in negotovost.
- **Primerjave med sistemi**
 - javno objavljene študije morajo vključevati kritično oceno in LCIA fazo
- **Kritični pregled**
 - Podamo, ali bo kritični pregled izveden ali ne
 - Določimo, kako in kdo bo kritični pregled izvedel

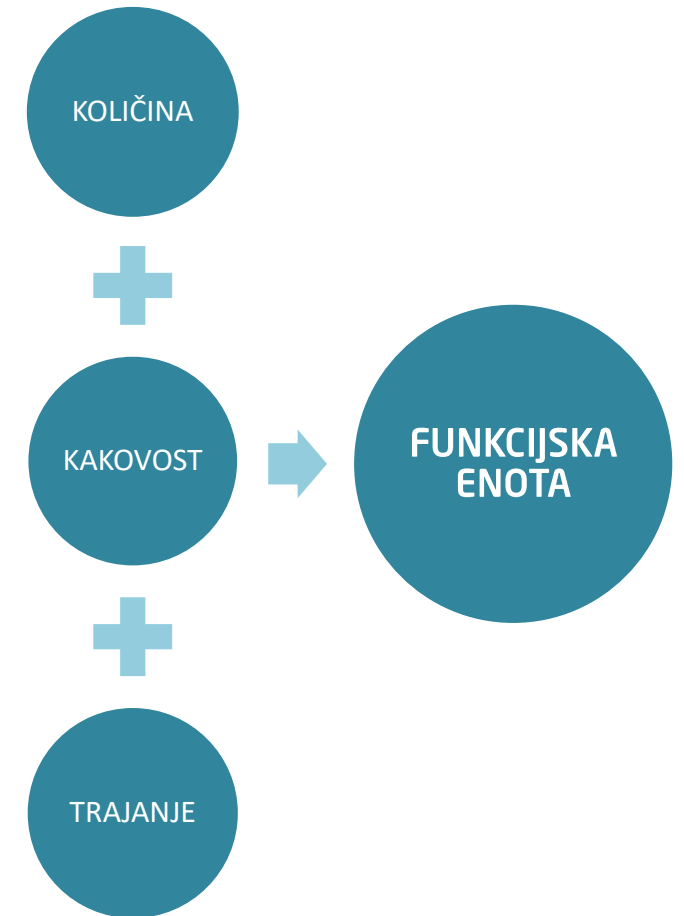
Primer opredelitve cilja

Uvod	<i>Analiza življenjskega cikla (LCA) PET plastenke je izvedena z namenom celovite ocene okoljskih vplivov, povezanih s proizvodnjo, uporabo in odstranjevanjem tega izdelka. PET plastenke so široko uporabljane v industriji pijač, zato je razumevanje njihovega vpliva na okolje ključnega pomena za spodbujanje trajnostnih praks.</i>
Razlog za izvedbo	<i>Rast povpraševanja po embalažnih rešitvah in naraščajoča skrb za vpliv plastike na okolje sta spodbudila potrebo po analizi življenjskega cikla PET plastenk.</i>
Cilj analize	<i>Cilj analize je identificirati ključne vire emisij toplogrednih plinov (TGP) v življenjskem ciklu plastenke. Prepoznati možnosti za izboljšave v procesih, kot so proizvodnja, reciklaža in odstranjevanje.</i>
Predvidena uporaba	<i>Rezultati analize bodo uporabljeni za primerjavo PET plastenk z alternativnimi materiali, kot so steklo, aluminij ali bioplastika, za presojo njihove trajnosti.</i>
Ciljna skupina	<i>Ciljna skupina za rezultate te analize vključuje proizvajalce PET plastenk in polnilce pijač, ki želijo izboljšati okoljsko učinkovitost svojih izdelkov.</i>
Javno, primerjalno	<i>Analiza bo namenjena primerjalni oceni med konvencionalno PET plastenko in naslednjimi alternativami: Steklenica iz stekla in aluminijasta pločevinka za oceno vplivov reciklaže in trajnosti surovin. Analiza bo razkrita javnosti.</i>

Kaj je funkcijska enota?

Funkcijska enota

“Funkcijska enota je **merljiva referenca**, ki določa **količinsko osnovo** za analizo življenjskega cikla. Predstavlja funkcijo izdelka ali storitve in omogoča, da se okoljski vplivi ocenijo in primerjajo **na enoten in objektiven način.**”



Funkcijska enota

- Evropska komisija podaja nekatera smernice za opredelitev, pri čemer obravnava ključne vidike s pomočjo vprašanj:

Vidik	Primer
Kaj (funkcija(e) ali storitev(e), ki se zagotavlja)	Prenašanje nakupov iz supermarketa domov
Koliko (obseg funkcije ali storitve, ki se zagotavlja)	Povprečna prostornina 22 litrov in povprečna teža 12 kg kupljenega blaga
Kako dobro (pričakovana raven kakovosti funkcije ali storitve)	Brez trganja, prebadanja ali pretiranega deformiranja med nakupovanjem
Kako dolgo (trajanje funkcije ali življenjska doba izdelka)	Najmanj desetkrat/uporab
Kje (lokacija/geografija funkcije ali storitve)	Na celotnem trgu EU-28
Za koga (koristnik funkcije ali storitve)	Za vse potrošnike skupaj



Primeri funkcijske enote



Embalaža
(npr. PET plastenka)

Dostava 0.5 litra tekočine končnemu uporabniku brez izgube vsebine.



Tekstilni izdelek
(npr. bombažna majica)

Proizvodnja in uporaba ene bombažne majice z življenjsko dobo 100 pranj.



Električna energija

Dobava 1 kilovatne ure (kWh) električne energije iz določenega vira (npr. sončne elektrarne, termoelektrarne).



Transportno sredstvo
(npr. električni avto)

Prevoz 1 potnika na razdaljo 1 kilometra.

Primer pravilno opredeljene FE

Funkcijska enota:

"Dostava 1 litra brezalkoholne pijače do končnega uporabnika brez izgube vsebine."

Količina:

Enota mora pokrivati enak obseg funkcije za vse tri alternative (PET plastenka, aluminijasta pločevinka, steklenica). V tem primeru: dostava 1 litra pijače.

Kakovost:

Zagotavljanje, da je pijača varna za uživanje, brez kontaminacije, izgube vsebine ali okvare embalaže. Vse alternative morajo izpolnjevati enake standarde varnosti in kakovosti.

Trajanje:

Embalaža mora zagotoviti dostavo brezalkoholne pijače od proizvodnje do trenutka porabe. Vključuje enkratno uporabo (za PET plastenko in aluminijasto pločevinko) ali večkratno uporabo (za steklenico, če se uporablja kot povratna embalaža).

Zakaj je ta funkcijska enota ustrezna?

Primerljivost:

Funkcijska enota je enaka za vse tri vrste embalaže, kar zagotavlja nepristransko primerjavo.

Pokriva celotno funkcijo:

Embalaža služi dostavi pijače, kar je jasno opredeljeno.

Upošteva kontekst uporabe:

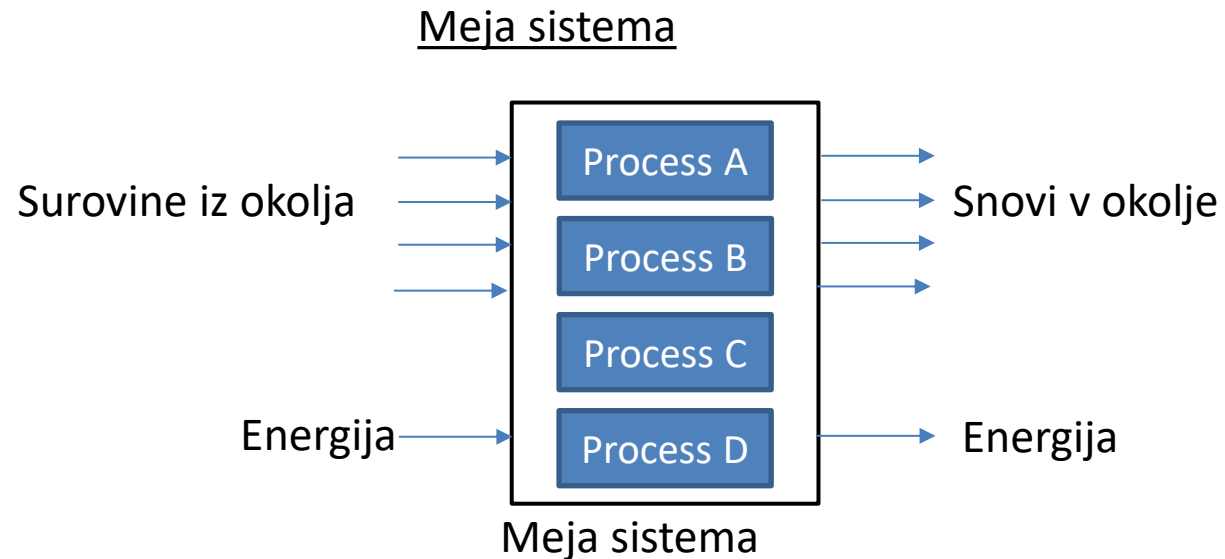
Enkratna ali večkratna uporaba je zajeta glede na specifično embalažo.

Meja sistema

Meja sistema: Meja med proučevanim proizvodnim sistemom, naravnim okoljem in drugimi produktnimi sistemi:

Set meril, ki določajo, katere procesne enote so del sistema proizvoda*

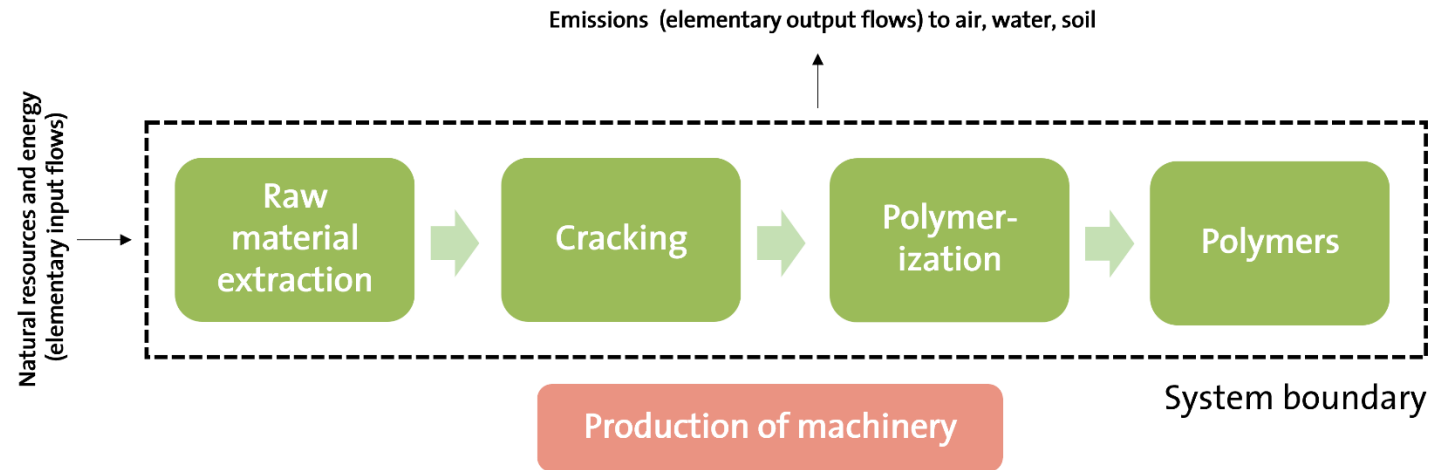
- Izbira meje sistema bo vplivala na rezultat



Meja sistema



Primer:



Kaj je

FUNKCIONALNA ENOTA?
OBSEG IN MEJA SISTEMA?
OSPREDJE proti OZADJU?

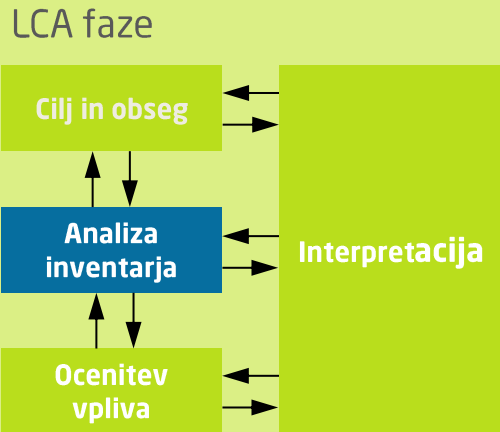


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Inventarizacija življenjskega cikla

Zbiranje podatkov



Zbiranje za vsako procesno enoto in referenčne vire, potreben čas, kakovost itd.

Jasno **opredeliti vsako procesno enoto**, da bi preprečili prekrivanje pri zbiranju podatkov

Navesti naslednje podatke:

- Splošni **procesni diagrami poteka**
- **Opis** vsake procesne enote z vhodi in izhodi
- **Tokovi** in obratovalni pogoji vsake procesne enote
- Uporabljene enote
- Opis **tehnike zbiranja** podatkov
- Navodila za dokumentiranje nepravilnosti in vseh podrobnosti

2. Inventarizacija življenjskega cikla

LCA faze

1. Cilj in obseg
2. **Inventarizacija življenjskega cikla**
3. Ocenitev vplivov življenjskega cikla
4. Interpretacija

- Zbiranje podatkov
- Kar vodi v sestavo vhodov/izhodov
- količinsko opredelitev teh vhodov in izhodov:
 - Zbiranje vseh materialnih in energetskega tokov za vse procese, ki so zajeti v obsegu in izmenjujejo proizvode
 - Po potrebi prilagoditev ciljev in obsega
- Koristno je razlikovati med primarnimi (foreground) in sekundarnimi (background) podatki

Zbiranje podatkov (Primarni)

- Razpoložljive baze podatkov
- Podatki dobaviteljev
- Napredni seznam materialov in njihove mase
- Obratno inženirstvo
- Literatura
- Primarno zbiranje podatkov



POLITECNICO DI TORINO
 Dipartimento di Ingegneria Industriale
 Corso Duca degli Abruzzi, 24 - 10129 Torino, Italia

_____ Anno 2, equidistribuzione in energia

Nome dell'azienda _____
 Luogo dell'azienda _____
 Liturgico estratto _____

_____ Desidero che non sia pubblicato il nome dell'azienda _____ Desidero che l'azienda sia citata come collaboratrice del progetto di ricerca

NB: In entrambi i casi i valori numerici pubblicati saranno quelli medi del settore tipico italiano

L'azienda utilizza le seguenti tecniche di estrazione (inserire una X):

La tecnica _____

Taglio laserizzato con estruso _____
 Perforazione a taglio laserizzato con filo diamantato _____
 Rabbattimento con strumenti standard _____
 Taglio a blocchi con filo diamantato _____
 Anonaggio _____
 Cune di espansione _____
 Lubi-filigranata _____
 Altre (specificare): _____

Prestazioni 2015

Volume totale di materiale estratto (m³ a⁻¹) _____
 Volume totale di blocchi per produzione (tonni a⁻¹) _____
 Volume totale di blocchi estratti (m³ a⁻¹) _____
 Volume totale di scorie e residui (m³ a⁻¹) _____
 Luce (rendimento di recupero) (m³ a⁻¹) _____
 Volume totale di tagli dopo trattamento con litografia (m³ a⁻¹) _____
 Altre (specificare) (specificare): _____

Consumi 2014

Elementi (t) _____
 Energia (kWh) _____
 Costo (€) _____
 Qual è la fonte di approvvigionamento dell'acqua? (per pozzi, _____)

_____ Anno 2, equidistribuzione in trasformazione elettrica

Nome dell'azienda _____
 Luogo dell'azienda _____
 Liturgico lavorato _____

_____ Desidero che non sia pubblicato il nome dell'azienda _____ Desidero che l'azienda sia citata come collaboratrice del progetto di ricerca

NB: In entrambi i casi i valori numerici pubblicati saranno quelli medi del settore tipico italiano

Utilizzare sempre le seguenti convenzioni (inserire una X e indicare la percentuale media di utilizzo della tecnica per ogni categoria):

• **Spostamento blocco**

X	Tornitura	% utilizzo della tecnica
	Squadratura blocco con filo diamantato	%
	Squadratura blocco con filo diamantato	%
	Squadratura blocco con disco pappato	%
	Altre (specificare):	%

• **Taglio in blocco**

	Taglio in blocco con filo multi-lama	%
	Taglio in blocco con multi filo diamantato	%
	Taglio in blocco con multi filo diamantato	%
	Altre (specificare):	%

• **Taglio di precisione**

	Taglio in parallelo con trincea a ponte	%
	Taglio in parallelo con multi trincea	%
	Altre (specificare):	%

• **Riliscio e asidat**

	Lunghezza	%
	Larghezza	%
	Spessore	%
	Costo filigranata	%
	Altre (specificare):	%

Produzione, consumi e sottoprodotti

Efficienza per i due sottoprodotti volume _____

Dipartimento di Ingegneria Industriale, del Politecnico di Torino
 Palazzo 4 Torre 4 - Corso Duca degli Abruzzi, 24 - 10129 Torino, Italia

Equipaggiamento di Ingegneria Industriale, del Politecnico di Torino
 Via Sommariva 11 - 10129 Torino, Italia

Razvrščanje podatkov

Zbiranje podatkov in razvrščanje med glavne postavke:

Vtoki energije, toki surovin, vtoki pomožnih materialov, drugih fizičnih vložkov

Izpusti v zrak, vodo in prst

Proizvodi, so-proizvodi in odpadki

Drugi okoljski vidiki



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Vrste podatkov in viri

Podatki so zelo pomembni v LCA

- Analiza LCA je **modelirana na podlagi podatkov**
- **Slabi / manjkajoči podatki** bodisi
 - povečujejo **negotovost** in **zmanjšujejo uporabnost** študije
 - ostajajo neopaženi in lahko vodijo v pristranskost rezultatov
- **Kakovostni podatki** bolj pomembni za procese z **večjim vplivom**
- Podatki morajo biti **dobavljeni in / ali zbirani**
 - Lahko traja nekaj **časa** in **denarja**, da zberemo podatke, zlasti za kompleksne sisteme
- **Viri morajo biti dokumentirani**, upoštevati je treba kakovost in o njej razpravljati



Vrste in viri podatkov

➤ **Neposredno merjenje procesnih podatkov**

- Merjeno ali izračunano neposredno iz vira
- Primer: Merjenje onesnaževala v toku izpušnih plinov s plinsko kromatografijo
- Primer: določitev porabe električne energije iz števca v proizvodnem obratu

➤ **Komunikacija s podjetji / agencijami**, ki so neposredno izmerili procesne podatke

➤ **članki v revijah**

➤ Drugi **dokumenti in poročila**, kot so poročila agencij, zasebna poročila podjetij in doktorske disertacije

➤ **podatkovne baze** LCI, npr. proizvodnja surove nafte iz baze Ecoinvent

➤ **Prosti viri iz programske opreme**

➤ Izjave o **okoljskem proizvodju (EPD)**

➤ **Ocenjeni podatki**

Primarni podatki

Sekundarni podatki

Ocenjeni podatki

LCI podatkovne baze

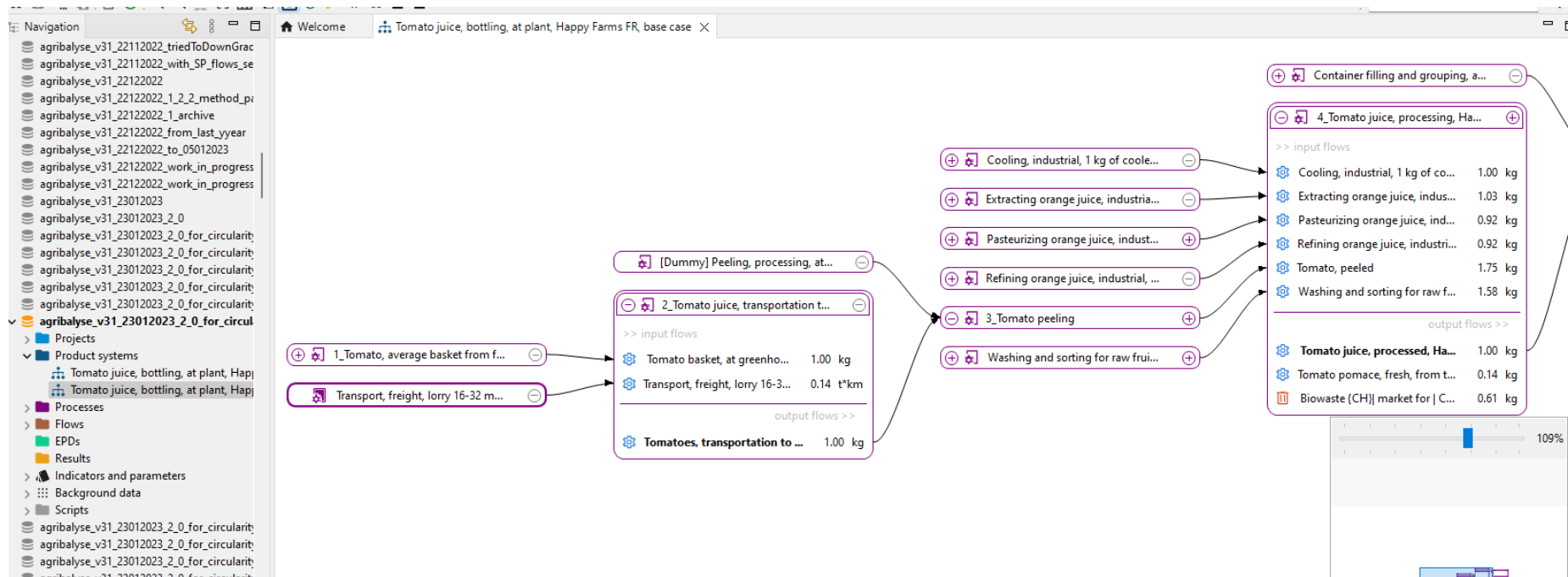
- Pogosto **najbolj izvedljiv način** za iskanje velikega števila **visoko kakovostnih podatkov** za izvedbo LCA
- LCI baze podatkov vsebujejo podatke o **vtokih in iztokih**
- Ponavadi deluje brezhibno z **LCA programsko opremo**
- Običajno vsebuje **obsežno dokumentacijo**, ki opisuje vire podatkov,
- Tako brezplačne kot plačljive različice na voljo s poudarki na:
 - geografsko regijo
 - vrsto industrije

Najbolj znane baze podatkov LCI

- **Ecoinvent**
- **GaBi** (professional and extension databases)
- **Athena Institute Database**
- **GREET** (ni baza podatkov LCI, ampak vir podatkov, ki se pogosto uporablja za LCA)
- **Agribalyse** (za kmetijske proizvode)
- in druge...

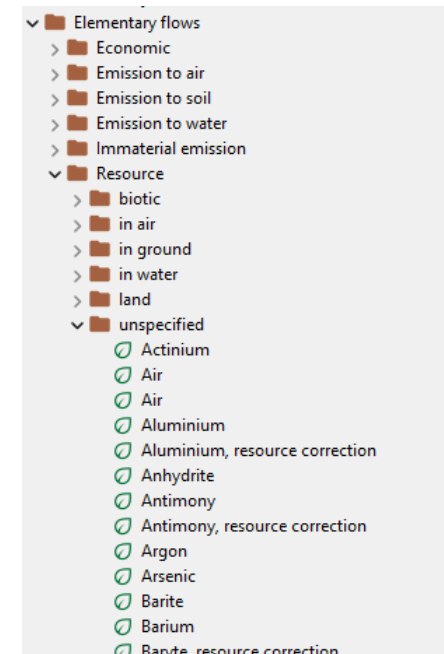
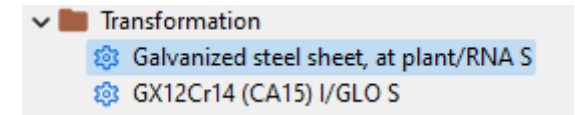
Baze podatkov in izračun LCA I

- Baza podatkov za LCA si prizadeva modelirati svet, v katerem živimo (v enem sektorju ali večih)
- Vsebuje **processe, ki se med seboj povezujejo in skupaj tvorijo dobavne verige**



Baze podatkov in izračun LCA II

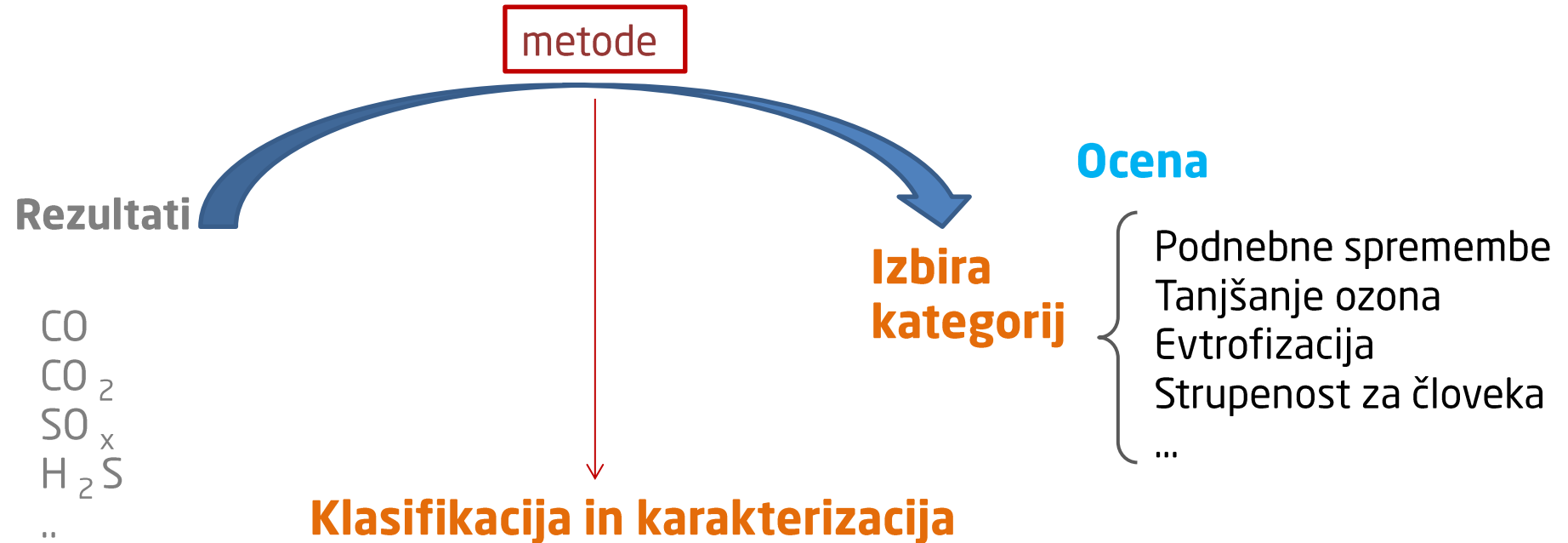
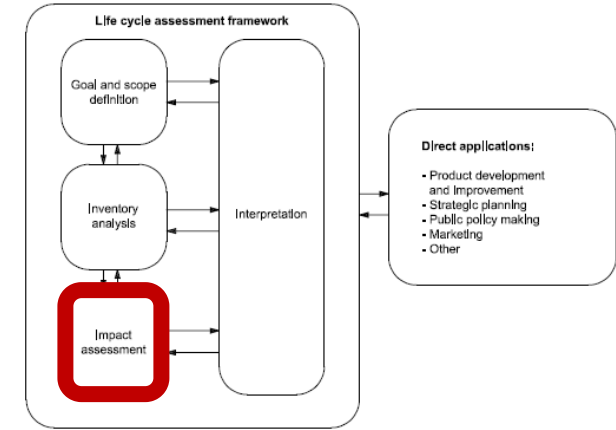
- Vsak proces je povezan z drugim prek **proizvodnih tokov**
- Obstaja še ena vrsta toka, imenovana **elementarni tok**:
 - Ti tokovi neposredno vplivajo na biosfero (naše naravno okolje)
 - Vplivajo na okolje (in lahko povzročijo škodo, npr. podnebne spremembe)



Flow	Category
Butane, perfluorocyclo-, PFC-318	Elementary flows/Emission to air/unspecified
Carbon dioxide	Elementary flows/Emission to air/low population density
Carbon dioxide	Elementary flows/Emission to air/unspecified
Carbon dioxide, fossil	Elementary flows/Emission to air/high population density
Carbon dioxide, fossil	Elementary flows/Emission to air/low population density
Carbon dioxide, fossil	Elementary flows/Emission to air/low population density, long...
Carbon dioxide, fossil	Elementary flows/Emission to air/lower stratosphere + upper tr...
Carbon dioxide, fossil	Elementary flows/Emission to air/unspecified
Carbon dioxide, land transformation	Elementary flows/Emission to air/low population density
Carbon dioxide, land transformation	Elementary flows/Emission to air/unspecified
Carbon dioxide, to soil or biomass stock	Elementary flows/Emission to soil/agricultural
Carbon dioxide, to soil or biomass stock	Elementary flows/Emission to soil/unspecified
Carbon monoxide	Elementary flows/Emission to air/low population density
Carbon monoxide	Elementary flows/Emission to air/unspecified
Carbon monoxide, fossil	Elementary flows/Emission to air/high population density
Carbon monoxide, fossil	Elementary flows/Emission to air/low population density
Carbon monoxide, fossil	Elementary flows/Emission to air/unspecified
Carbon monoxide, land transformation	Elementary flows/Emission to air/low population density
Chloroform	Elementary flows/Emission to air/high population density
Chloroform	Elementary flows/Emission to air/low population density

3. Ocena učinka

- Naš LCA model lahko povzamemo z elementarnimi tokovi, temu pravimo inventar



Klasifikacija in karakterizacija

Es. Podnebje sprememba (metoda IPCC)

- 1 kg CO₂ = 1 kg CO₂ en .
- 1 kg CO = 1,57 kg CO₂ en .
- 1 kg CH₄ = 23 kg CO₂ en .

Inventar

Rezultati popisa

▼ Inputs

Don't show < %

Name	Category	Sub-category	Amount	Unit
> Aluminium, in ground	Resource	in ground	2.18187E-5	kg
> Anhydrite, in ground	Resource	in ground	8.73608E-10	kg
> Antimony, in ground	Resource	in ground	5.62789E-11	kg
> Argon-40	Resource	in air	5.30513E-6	kg
> Arsenic, in ground	Resource	in ground	1.56264E-9	kg
> Barium, in ground	Resource	in ground	2.93139E-5	kg
> Basalt, in ground	Resource	in ground	2.69687E-6	kg
> Beryllium, in ground	Resource	in ground	7.05021E-8	kg

▼ Outputs

Don't show < %

Name	Category	Sub-category	Amount	Unit
> 1,3-Dioxolan-2-one	Emission to water	unspecified	5.90055E-10	kg
> 1,4-Butanediol	Emission to air	high population density	4.96771E-9	kg
> 1,4-Butanediol	Emission to water	surface water	1.14257E-8	kg
> 1-Pentanol	Emission to water	surface water	8.56226E-14	kg
> 1-Pentanol	Emission to air	high population density	3.56756E-14	kg
> 1-Pentene	Emission to air	high population density	2.70759E-12	kg
> 1-Pentene	Emission to water	surface water	6.47037E-14	kg
> 2,2,4-Trimethylpentane	Emission to air	unspecified	4.22855E-12	kg

Koraki ocene učinka

≡ Characterization factors: IPCC GWP 100a

▼ Characterization factors

Flow	Category	Factor	Unit
☑ (E)-1,2,3,3,3-Pentafluoroprop-1-ene	Elementary flows/Emission to air/unsp...	0.079	kg CO2 eq/kg
☑ (E)-1-Chloro-3,3,3-trifluoroprop-1-e...	Elementary flows/Emission to air/unsp...	1.0	kg CO2 eq/kg
☑ (Perfluorobutyl)ethylene	Elementary flows/Emission to air/unsp...	0.136	kg CO2 eq/kg
☑ (Perfluorooctyl)ethylene	Elementary flows/Emission to air/unsp...	0.0929	kg CO2 eq/kg
☑ (Perfluorohexyl)ethylene	Elementary flows/Emission to air/unsp...	0.108	kg CO2 eq/kg
☑ (Z)-1,1,1,4,4,4-Hexafluorobut-2-ene	Elementary flows/Emission to air/unsp...	2.0	kg CO2 eq/kg
☑ (Z)-1,2,3,3,3-Pentafluoroprop-1-ene	Elementary flows/Emission to air/unsp...	0.233	kg CO2 eq/kg
☑ (Z)-1,3,3,3-Tetrafluoroprop-1-ene	Elementary flows/Emission to air/unsp...	0.285	kg CO2 eq/kg
☑ 1,1,1,3,3,3-Hexafluoropropan-2-ol	Elementary flows/Emission to air/high...	182.0	kg CO2 eq/kg
☑ 1,1,1,3,3,3-Hexafluoropropan-2-ol	Elementary flows/Emission to air/indo...	182.0	kg CO2 eq/kg
☑ 1,1,1,3,3,3-Hexafluoropropan-2-ol	Elementary flows/Emission to air/low ...	182.0	kg CO2 eq/kg
☑ 1,1,1,3,3,3-Hexafluoropropan-2-ol	Elementary flows/Emission to air/low ...	182.0	kg CO2 eq/kg
☑ 1,1,1,3,3,3-Hexafluoropropan-2-ol	Elementary flows/Emission to air/low...	182.0	kg CO2 eq/kg
☑ 1,1,1,3,3,3-Hexafluoropropan-2-ol	Elementary flows/Emission to air/unsp...	182.0	kg CO2 eq/kg
☑ 1,2,2-Trichloro-1,1-difluoroethane	Elementary flows/Emission to air/unsp...	59.0	kg CO2 eq/kg
☑ 1-Propanol, 3,3,3-trifluoro-2,2-bis(tri...	Elementary flows/air/high population ...	421.0	kg CO2 eq/kg
☑ 1-Propanol, 3,3,3-trifluoro-2,2-bis(tri...	Elementary flows/air/low population ...	421.0	kg CO2 eq/kg
☑ 1-Propanol, 3,3,3-trifluoro-2,2-bis(tri...	Elementary flows/air/low population ...	421.0	kg CO2 eq/kg
☑ 1-Propanol, 3,3,3-trifluoro-2,2-bis(tri...	Elementary flows/air/lower stratosphe...	421.0	kg CO2 eq/kg
☑ 1-Propanol, 3,3,3-trifluoro-2,2-bis(tri...	Elementary flows/air/unspecified	421.0	kg CO2 eq/kg
☑ 1-Propanol, i-3,3,3-trifluoro-2,2-bis(t...	Elementary flows/Emission to air/unsp...	407.0	kg CO2 eq/kg
☑ 1-Propanol, n-3,3,3-trifluoro-2,2-bis(...	Elementary flows/Emission to air/unsp...	486.0	kg CO2 eq/kg

↓
Razvrstitev

↓
Karakterizacija

Koraki ocene učinka

Karakterizacija - Primer

$$\text{Podnebne spremembe} = \sum GWP_i \cdot masa_i$$

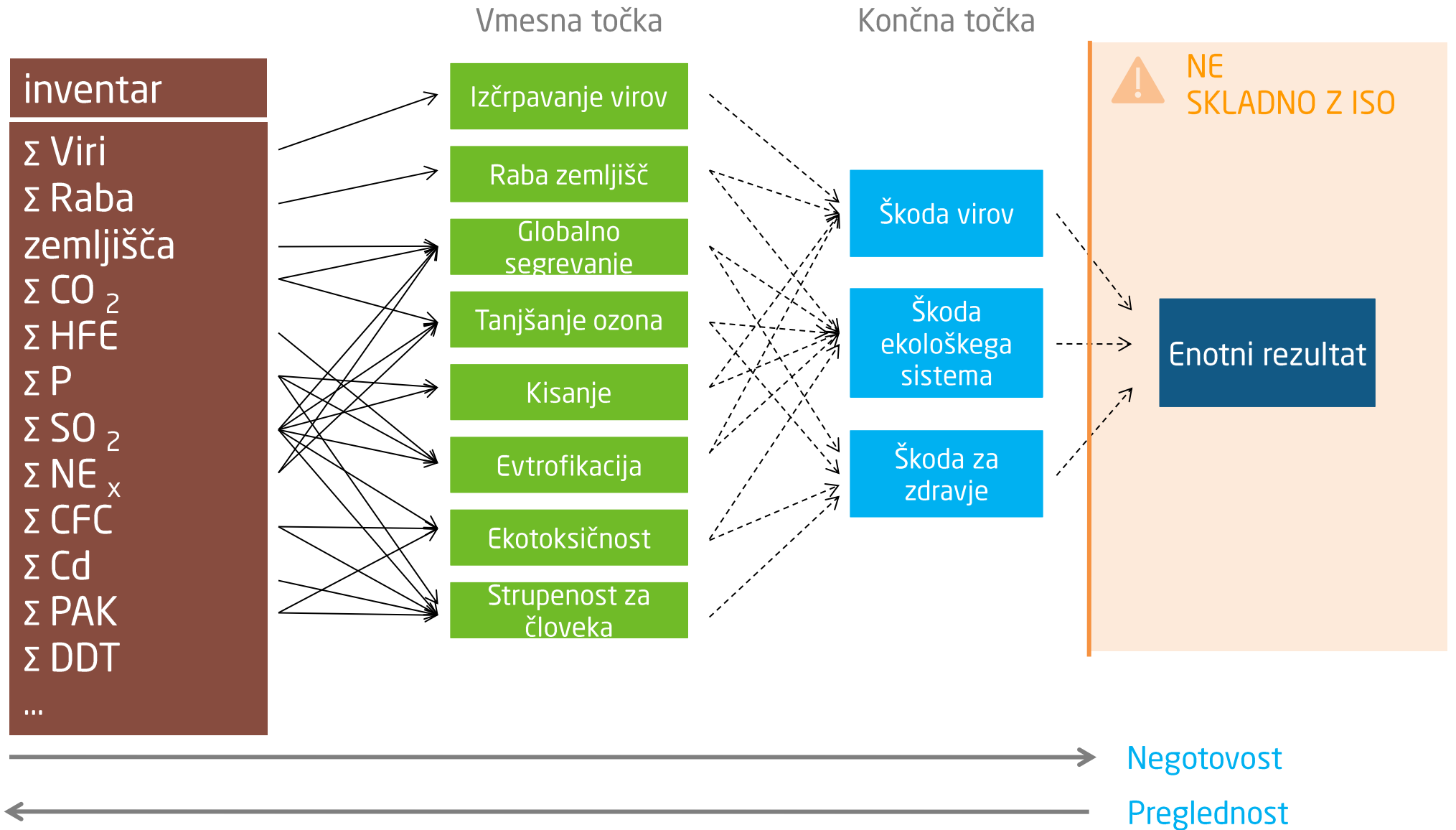
Emisije v zrak na 1 kWh mešanice električne energije (IT)

Tok	Faktor (IPCC 2007)	Količina [g]
Ogljikov dioksid (CO ₂)	1	1.55
Metan (CH ₄)	25	0,0033
Dinitrogen monoksid (N ₂ O)	298	2.38 E-5
Tok _i	GWP _i	masa _i

ILCD 2011, srednja točka [v1.0.10, avgust 2016];
Podnebje sprememba - IPCC 2007; GWP100 - Referenčna enota : kg CO₂ ekv.

$$\text{GWP 1 kWh električne energije} = (1 * 1,55) \text{ g} + (25 * 0,0033) + (298 * 2.38\text{E-}5) + \sum GWP_i \cdot masa_i$$

Koraki ocene učinka



Metoda LCIA

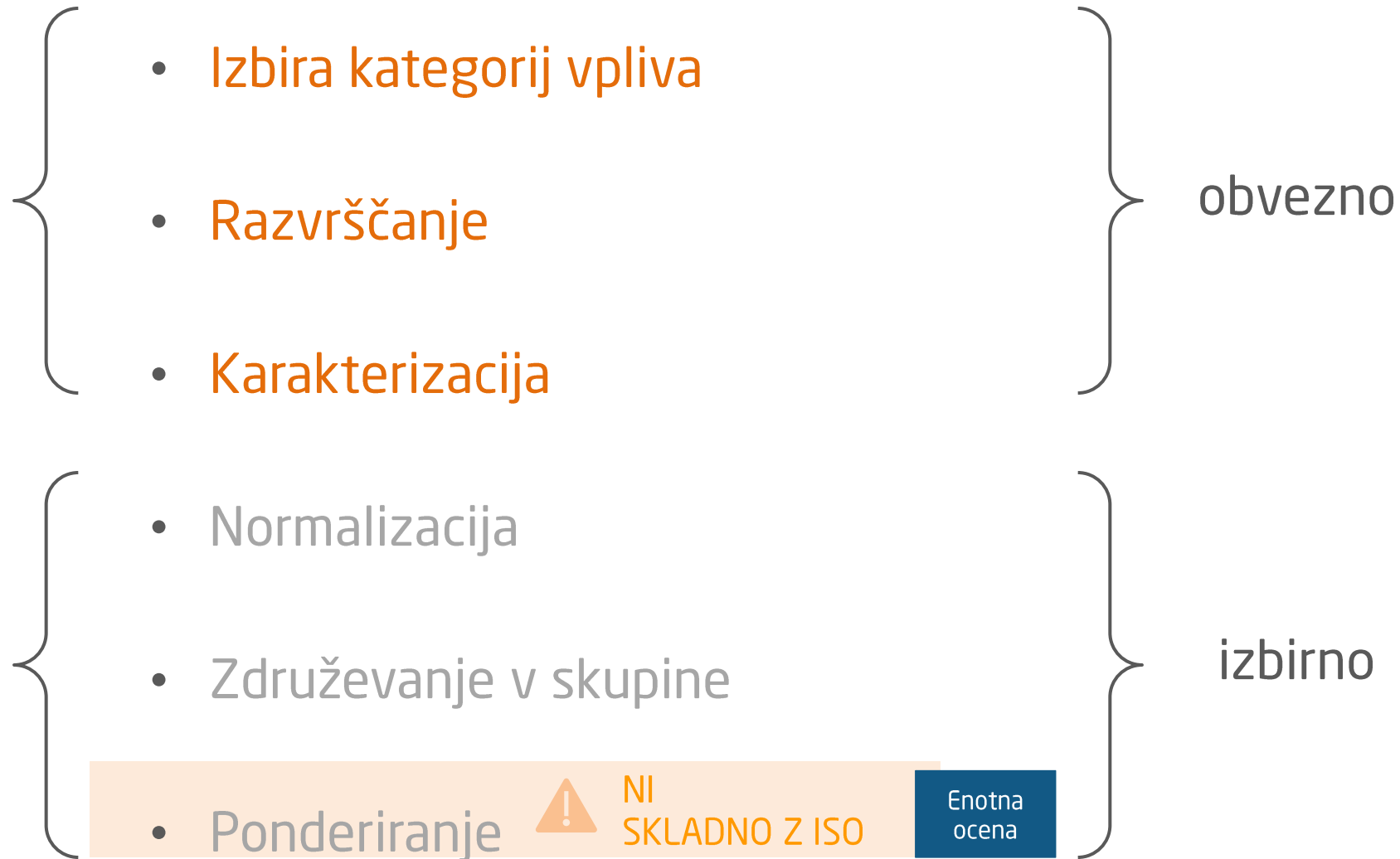
- Vsebuje informacije za razvrščanje in karakterizacijo
- Na voljo je veliko različnih metod
(na to temo se bomo še vrnili kasneje)

The screenshot displays the openLCA software interface. On the left, a navigation pane shows a tree view of LCIA methods under the folder 'openLCA LCIA methods 2_1_5'. The 'EF 3.0 Method (adapted)' method is selected and highlighted. The main area on the right shows the 'General information' tab for this method. The 'Name' is 'EF 3.0 Method (adapted)', the 'Category' is 'openLCA LCIA methods 2_1_5', and the 'Description' states it is included in the openLCA LCIA method package 2.1.3. It lists compatible software versions: ecoinvent v3.6, v3.7, v3.8; Eugeos; Agribalyse v3; and Δarifootprint v5. The version number is 00.00.057 and the last change was on 2022-12-08 at 11:17:35. There is an 'Add a tag' button and a 'Source' dropdown set to '- none -'. Below the general information, the 'Impact categories' section lists various categories such as 'Climate change - Fossil', 'Climate change - Land use and LU change', and several 'Ecotoxicity' and 'Eutrophication' categories.

General information: EF 3.0 Method (adapted)	
General information	
Name	EF 3.0 Method (adapted)
Category	openLCA LCIA methods 2_1_5
Description	Method included in openLCA LCIA method package 2.1.3 Compatible with - ecoinvent v3.6, v3.7, v3.8 - Eugeos - Agribalyse v3 - Δarifootprint v5
Version	00.00.057
Last change	2022-12-08 11:17:35
Tags	<input type="button" value="Add a tag"/>
Source	- none -
Code	
Impact categories	
Name	
Climate change - Fossil	
Climate change - Land use and LU change	
Ecotoxicity, freshwater	
Ecotoxicity, freshwater - inorganics	
Ecotoxicity, freshwater - metals	
Ecotoxicity, freshwater - organics	
Eutrophication, freshwater	
Eutrophication, marine	
Eutrophication, terrestrial	

Koraki ocene vplivov

Po standardu ISO 14040-44



Koraki ocenjevanja vplivov

V skladu s standardom ISO 14040-44

Normalizacija

Izračun velikosti rezultatov kazalnikov vplivov glede na referenčno informacijo.
Sestavljena je iz **delitve vrednosti kazalnika vpliva s sklicevanjem na referenčno vrednost.**

Primer:

JRC EU 27, 2010, skupaj [leto]

JRC EU 27, 2010, na osebo [oseba / leto]



▼ Normalization	
Impact category	Amount
Photochemical ozone formation	5.62583E-7
Climate change	3.18929E-7
Acidification	2.49808E-7
Human toxicity, cancer effects	1.62521E-7
Human toxicity, non-cancer effects	1.29386E-7
Particulate matter	1.29264E-7
Freshwater ecotoxicity	1.16271E-7
Terrestrial eutrophication	5.31915E-8
Marine eutrophication	5.07706E-8
Ozone depletion	1.77056E-12
Water resource depletion	3.03691E-13
Mineral, fossil & ren resource depletion	0.00000
Ionizing radiation HH	0.00000

Koraki ocenjevanja vplivov

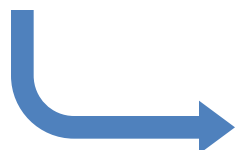
Po standardu ISO 14040-44

Združevanje in ponderiranje

Združevanje pomeni, da so različne kategorije vplivov organizirane (razvrščene) in razporejene.

Pri uteževanju se (tipično normalizirani) rezultati kazalnikov za različne kategorije vplivov ali škod pomnožijo s specifičnim uteževalnim faktorjem. Ta naj bi odražal relativno pomembnost posameznih kategorij vplivov med seboj.

- Rezultati se postavijo v širši kontekst z drugimi vplivi
 - Rezultati nimajo enot, zato jih lahko združimo v enotno primerjavo
- Pri združevanju so različne kategorije vpliva organizirane (razvrščene) in razvrščene.



Tako postane možno sešteti kazalnike in dobiti enotno vrednost vpliva (single score) ali prikaz v grafu.



**NI
SKLADNO Z ISO**

Ne moreš dobiti objektivnih faktorjev - „uteževanje vključuje vrednostne odločitve“ (po ISO)

Koraki ocenjevanja vplivov

Po ISO 14040-44

Združevanje in ponderiranje

EF 3.0 Method (adapted) ×

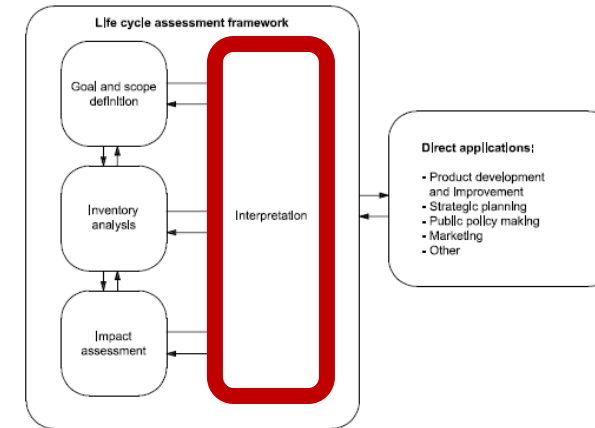
Normalization and weighting: EF 3.0 Method (adapted)

▼ Normalization and weighting sets

Normalization and weighting set	Reference unit	Impact category	Normalization value	Weighting factor
EF 3.0 normalization and weigh...		Acidification	55.5555555555556	0.062
		Climate change	8097.165991902834	0.2106
		Climate change - Biogenic	0.0	0.0
		Climate change - Fossil	0.0	0.0
		Climate change - Land use and LU change	0.0	0.0
		Ecotoxicity, freshwater	42680.32437046521	0.0192
		Ecotoxicity, freshwater - inorganics	0.0	0.0
		Ecotoxicity, freshwater - metals	0.0	0.0
		Ecotoxicity, freshwater - organics	0.0	0.0
		Eutrophication, freshwater	1.606941989394183	0.028
		Eutrophication, marine	19.546520719311964	0.0296
		Eutrophication, terrestrial	176.74089784376105	0.0371
		Human toxicity, cancer	1.6899599479492335E-5	0.0213
		Human toxicity, cancer - inorganics	0.0	0.0
		Human toxicity, cancer - metals	0.0	0.0
		Human toxicity, cancer - organics	0.0	0.0
		Human toxicity, non-cancer	2.2967386311437759E-4	0.0184
		Human toxicity, non-cancer - inorganics	0.0	0.0
		Human toxicity, non-cancer - metals	0.0	0.0
		Human toxicity, non-cancer - organics	0.0	0.0
		Ionising radiation	4219.409282700422	0.0501
		Land use	819672.131147541	0.0794
		Ozone depletion	0.0536480686695279	0.0631
		Particulate matter	5.952380952380953E-4	0.0896
		Photochemical ozone formation	40.600893219650835	0.04780000000000001
		Resource use, fossils	65019.50585175553	0.0832
		Resource use, minerals and metals	0.06365372374283895	0.0755
		Water use	11469.205184080743	0.0851

4. Interpretacija

- Identifikacija pomembnih težav / žarišč na podlagi rezultatov LCI in LCIA
- Analiza občutljivosti
- Preverjanja popolnosti in doslednosti
- Zaključki/Omejitve/Priporočila



Nekatere ključne točke modeliranja

- Nekatere ključne točke modeliranja
- Zbiranje podatkov
- Določitev systemske meje
- Ocena okoljskih in družbenih vplivov
 - Določitev ekvivalentov (npr. CO₂ ekvivalenti / metoda ocenjevanja vplivov)
 - Upoštevanje regionalnih posebnosti
 - Vrednotenje rezultatov (npr. podnebne spremembe v primerjavi z ekotoksičnostjo)
- Obravnava stranskih proizvodov

Izzivi modeliranja v LCA

- Implementacija je dolgotrajna (odvisna od meja sistema, števila procesov v ospredju, intenzivnosti zbiranja podatkov ipd.)
→ A vendar: pojavljajo se možnosti avtomatizacije
- Obravnavajo se le možni vplivi
- Potrebno je sprejeti številne predpostavke in odločitve (funkcionalna enota, meje sistema, metode dodelitve, življenjska doba strojev, vedenje uporabnikov - pravilna uporaba, odlaganje?)
→ Posledično: omejena primerljivost med študijami, a hkrati prednost v modelni prilagodljivosti
- Rezultate je pogosto težko učinkovito komunicirati

Prednosti LCA

- Dober pregled okoljskih in družbenih vplivov skozi celoten življenjski cikel – odvisno od uporabljene metode ocenjevanja vplivov in izbranih kategorij
- Identifikacija pomanjkljivosti, možnosti za optimizacijo (npr. družbeni žariščni vplivi), pa tudi priložnosti za analizirani izdelek
- Možnost primerjave procesov, izdelkov, podjetij ali lokacij
- Možna kombinacija LCA in S-LCA z analizo stroškov življenjskega cikla (LCC) → celovita študija trajnosti

Predstavitev OpenLCA

Predstavljamo openLCA



openLCA

- Brezplačen in (kljub temu) profesionalen pristop k oceni življenjskega cikla: zmogljiv, bogat s funkcijami, (sorazmerno) enostaven za uporabo, tehnično posodobljen
- Razvija ga podjetje GreenDelta od leta 2006
- Popolnoma odprtokoden (Mozilla Public License)



openLCA

- Na voljo za Windows, Mac OS in Linux
- Uveljavljena in rastoča skupnost uporabnikov; več kot 20.000 prenosov letno
- Najširši izbor relevantnih in usklajenih LCI ter trajnostnih podatkovnih baz, dostopnih po vsem svetu (!)



<https://nexus.openlca.org/>

Uporaba openLCA (splošno)

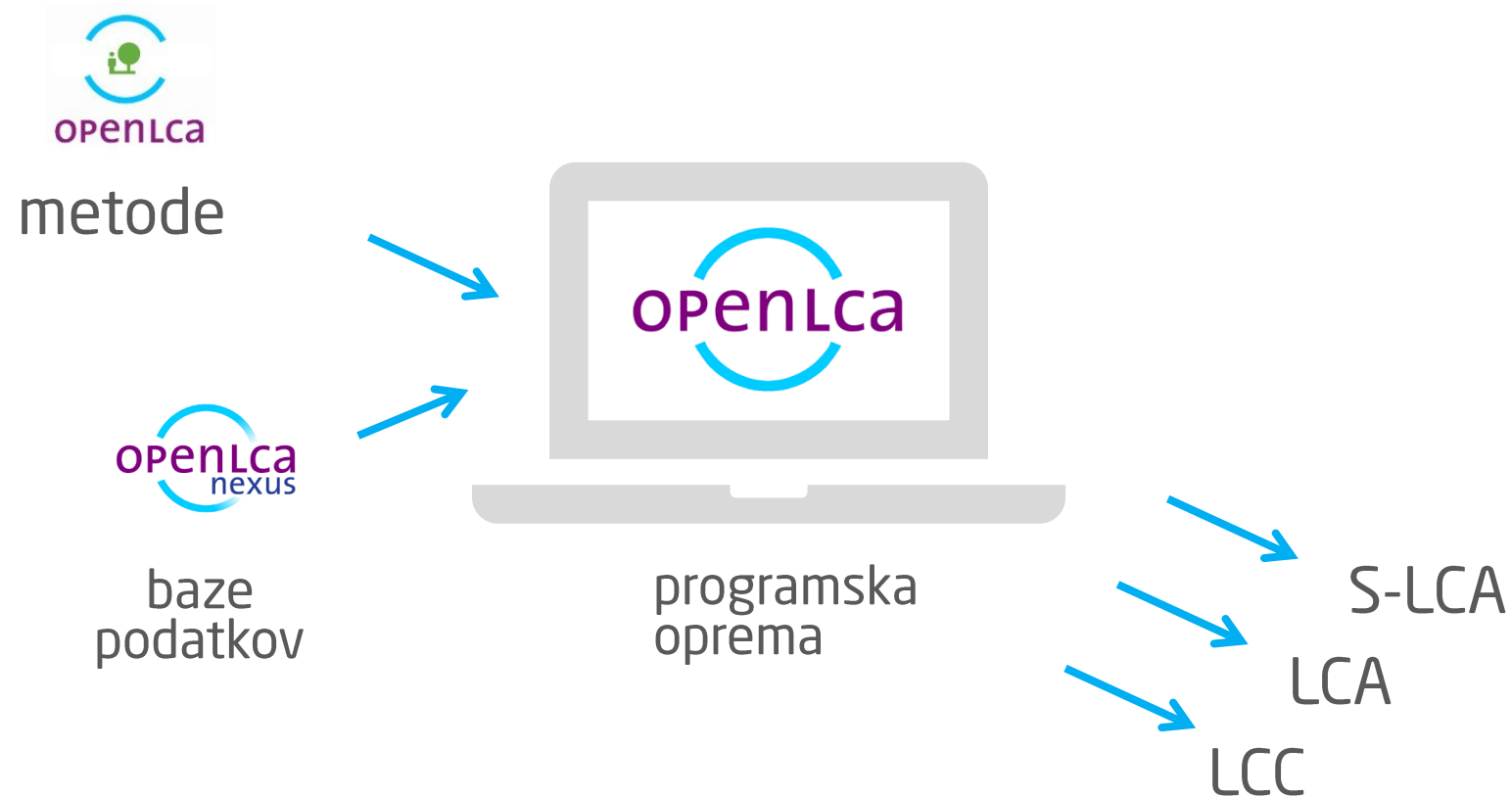
- Ocena življenjskega cikla (LCA), stroški življenjskega cikla (LCC), družbena analiza življenjskega cikla (S-LCA)
- Ogljični in vodni odtis
- Okoljski odtis izdelka
- Okoljske deklaracije o izdelkih (EPD)
- Okoljska oznaka »Design for the Environment« ameriške EPA
- Integrirana politika izdelkov (IPP)

Pregled funkcij openLCA

Vse funkcionalnosti, ki jih pričakuješ za profesionalno modeliranje in analizo LCA:

- Delo z manjšimi in zelo velikimi produktnimi sistemi
- Funkcija »samodejne povezave« (kot v SimaPro) ali ročna povezava (kot v GaBi)
- Parametri
- Analiza občutljivosti
- Skriptiranje (Javascript, Python, SQL)
- Razširjanje sistema in dodeljevanje vplivov
- Kakovost podatkov
- Ocena negotovosti, Monte Carlo simulacija
- Izračun LCIA z možnostjo normalizacije in uteževanja
- Napredne funkcije za analizo rezultatov
- Integracija z GIS
- Najboljše v razredu za uvoz/izvoz podatkov
- Skupinsko sodelovanje - "LCA Collaboration Server"
- Analiza stroškov življenjskega cikla (LCC)...

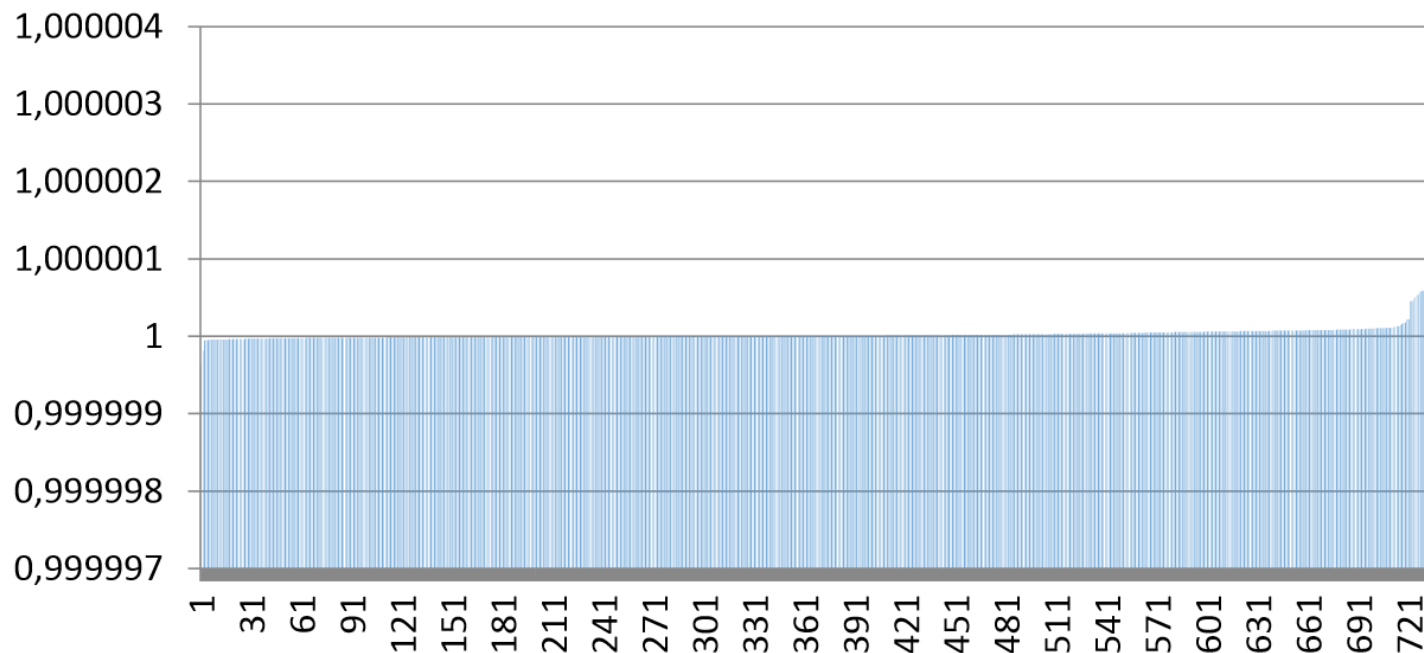
openLCA: kaj je potrebno izvajati LCA v openLCA?



Zagotavljanje kakovosti v openLCA

- Zunanji in notranji preizkuševalci
- Beta različice pred končno objavo → več povratnih informacij uporabnikov

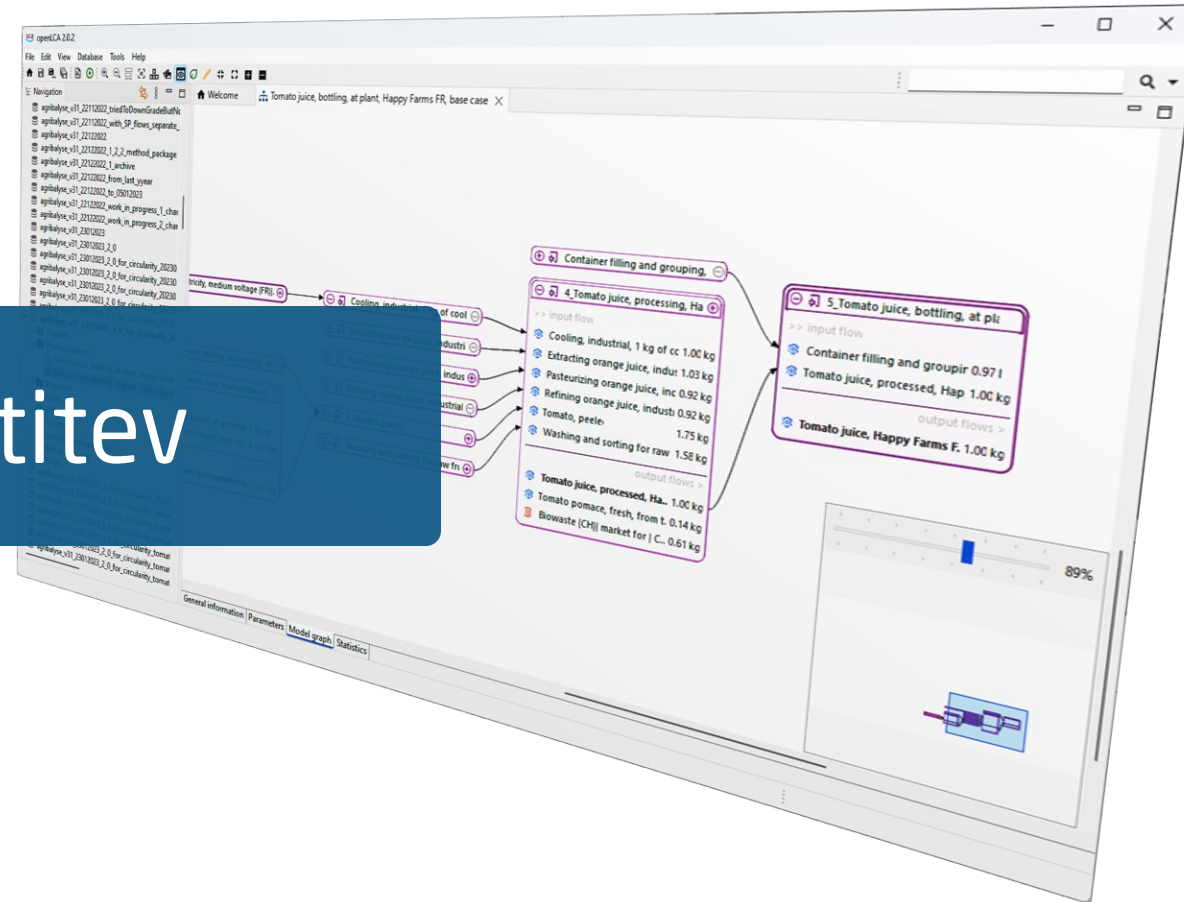
(Graf prikazuje razmerje med rezultati v SimaPro in openLCA za tokove električne energije - skoraj popolno ujemanje)



openLCA: Zakaj odprtokodni?

- Fleksibilnost in svoboda, tako za uporabnika kot razvijalca
- Varnost, odgovornost in visoka kakovost – slog programiranja je vsem viden; »hitre in površne« rešitve niso skrite
- Stroškovna učinkovitost, kljub stroškom vzdrževanja, konfiguracije in podpore za razvijalca v ozadju
- Odprtokodna narava programske opreme omogoča varno uporabo z občutljivimi podatki (to je poudaril tudi Lockheed Martin, uporabnik openLCA)
- Brez dodatnih obveznosti za uporabnike – zlasti ni obveznosti za deljenje ali distribucijo ustvarjenih LCA procesov in sistemov

Namestitev



Sistemske zahteve

Strojna oprema:

- 10 GB za optimalno delovanje
- 500 MB prostega prostora na disku + prostor za baze podatkov (npr.ecoinvent 3 zahteva ~250 MB)

Prenos in namestititev openLCA

Prenesite openLCA na <http://openlca.org/downloads>

Downloads



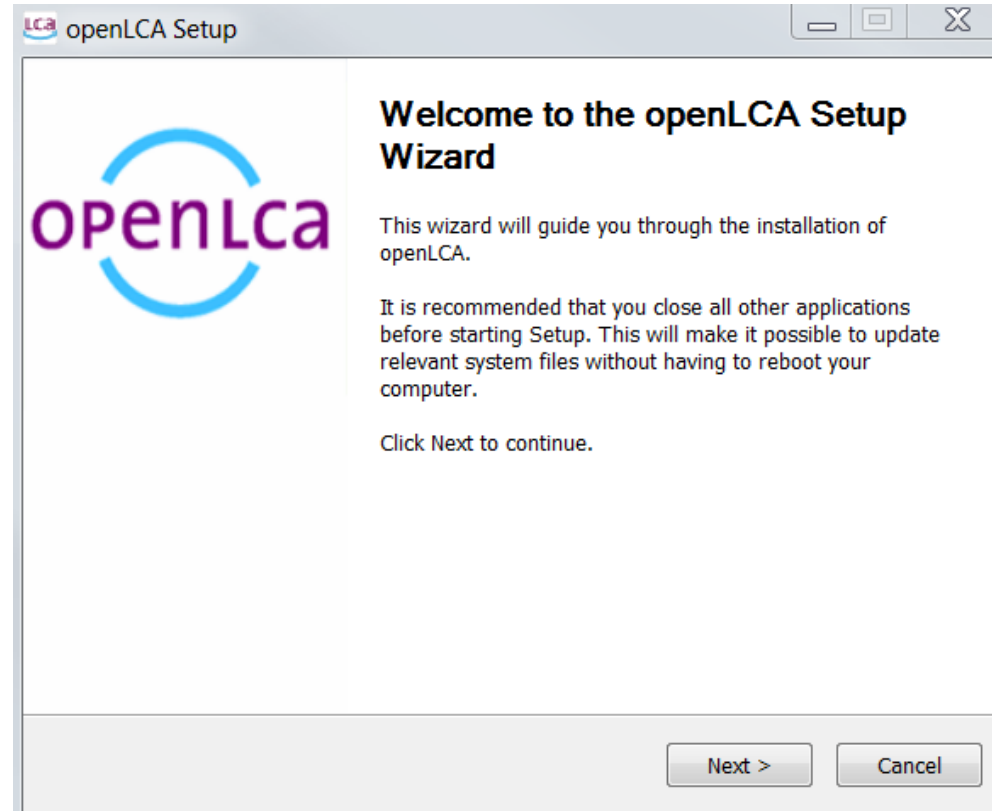
openLCA

Here's presenting the latest version 1.11.0 (release date: February 09th, 2022). We recommend using this version. Our tests have not shown any issues, but should you run into any, please let us know. Thanks in advance!

Windows	Mac	Linux	Sources	Latest builds
<p>To use openLCA in windows, download the zip-archive below: Just unzip the archive and start openLCA.exe. To uninstall it, just delete the created folder. You can have several versions of openLCA in different folders on the same computer.</p> <p>openLCA 1.11.0 zip-archive: openLCA_win64_1.11.0_2022-02-09.zip</p> <p>Alternatively, you can install openLCA with the installer below. If you have an older openLCA version installed (via the installer) you should uninstall it first.</p> <p>openLCA 1.11.0 installer: openLCA_win64_1.11.0_2022-02-09.exe</p>				

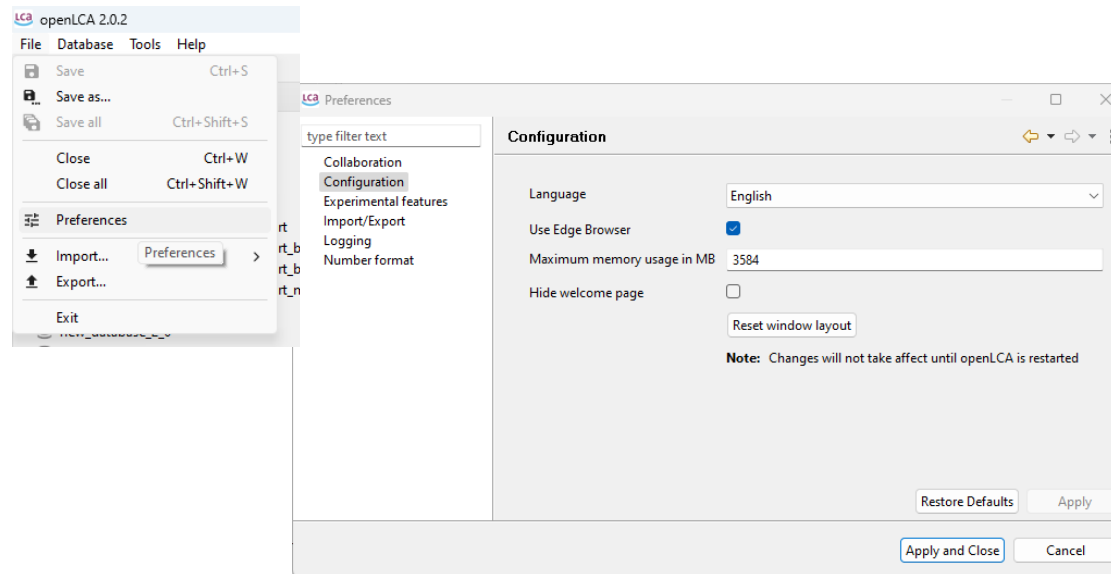
Dve možnosti: različica namestitvenega programa in datoteka zip

namestitveni program



Naslednji koraki takoj po prenosu

- Povečajte prostor, namenjen izvajanju izračunov:



IN

- Prenesite »Knjižnice« (Libraries) preko začetne strani aplikacije openLCA

Vaja 1: Zagon openLCA

- Namestite openLCA na svoj računalnik in ga zaženite
- 5 min

Najprej si oglejmo
programsko opremo



Dobrodošli v openLCA!

The screenshot shows the openLCA 2.0.0 application window. The title bar reads "openLCA 2.0.0" and the menu bar includes "File", "Database", "Tools", and "Help". The interface is split into a left navigation pane and a main content area. The navigation pane lists "agribalyse_v301_exam" and "ecoinvent_38_cutoff_3011_with_methods". The main content area displays the "openLCA" logo, a "Getting Started" link, and a list of resources: "What's new in openLCA 2.0", "Collaboration tool for openLCA", "Community forum", "Comprehensive databases", "Case studies", "Certified trainings", and "Working with the developers of openLCA". A dark text box on the right contains the following text: "openLCA is a powerful, open source, feature-rich software for LCA and Sustainability modelling. Create, import existing databases which contain life cycle processes, import assessment methods, create your own processes, build your own life cycle models, calculate and analyse it. These steps are explained on YouTube, and in the openLCA handbook." The Greendelta logo is visible in the bottom right corner of the main content area.

openLCA 2.0.0

File Database Tools Help

Navigation

agribalyse_v301_exam

ecoinvent_38_cutoff_3011_with_methods

Welcome

openLCA

[Getting Started](#)

What's new in openLCA 2.0

Collaboration tool for openLCA

Community forum

Comprehensive databases

Case studies

Certified trainings

Working with the developers of openLCA

openLCA is a powerful, open source, feature-rich software for LCA and Sustainability modelling. Create, import existing databases which contain life cycle processes, import assessment methods, create your own processes, build your own life cycle models, calculate and analyse it. These steps are explained on [YouTube](#), and in the openLCA [handbook](#).

Greendelta

Welcome

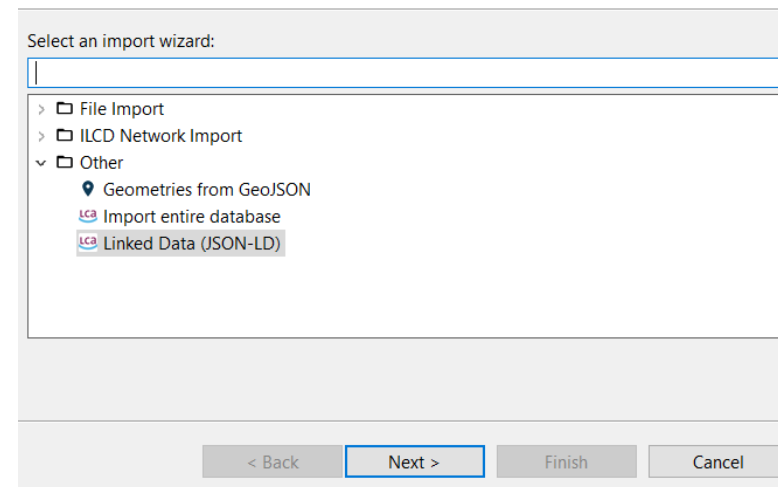
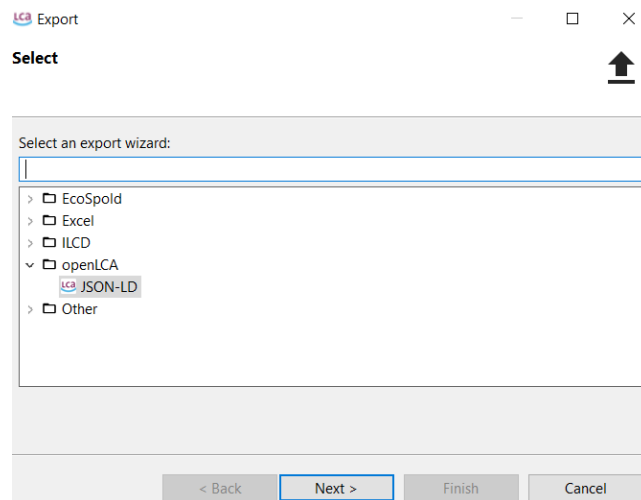
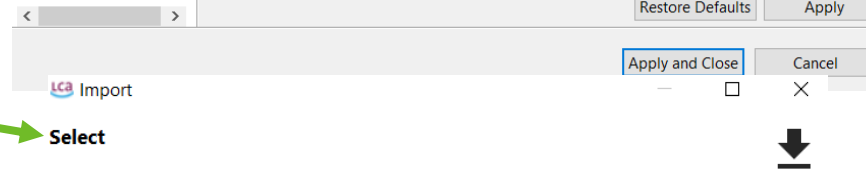
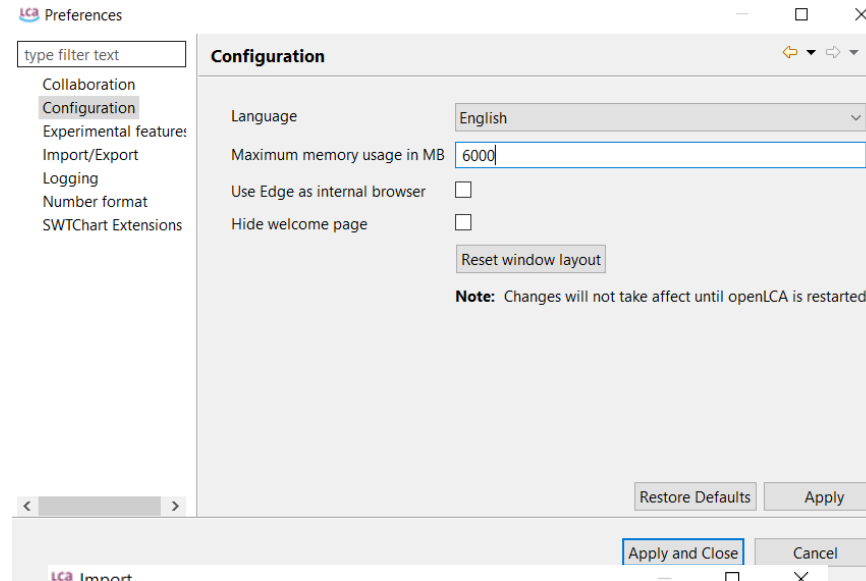
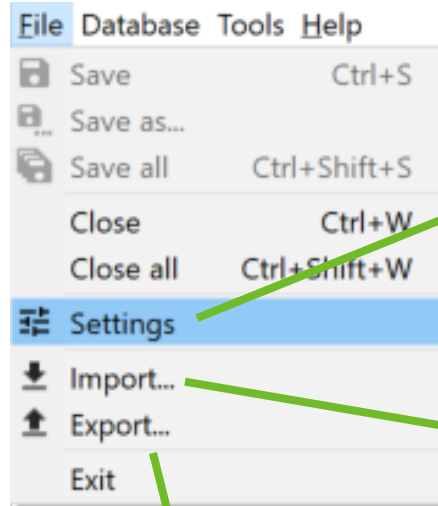
pregled

The screenshot displays a software interface for managing product systems. The interface is divided into several sections:

- Navigation:** A tree view on the left side of the window, listing various product systems and processes. A green callout box labeled "Glavni meni" points to this area.
- General information: Transport, aircraft, freight - RNA:** The main content area, which is currently in edit mode. A green callout box labeled "Urednik" points to the description field. A green callout box labeled "Iskanje" points to the search icon in the top right corner of the main area.
- Time:** A section containing fields for "Start date" (01/01/2003) and "End date" (01/01/2010).
- Geography:** A section containing a "Location" field (Northern America) and a "Description" field (United States).
- Technology:** A section containing a "Description" field (Typical).

At the bottom of the interface, there is a tabbed navigation bar with the following tabs: General information, Inputs/Outputs, Administrative information, Modeling and validation, Parameters, Allocation, Social aspects, and Impact analysis. A green callout box labeled "Navigacija" points to the "Navigation" tree view on the left.

Glavni meni funkcije



Podatkovni nizi in zbirke podatkov

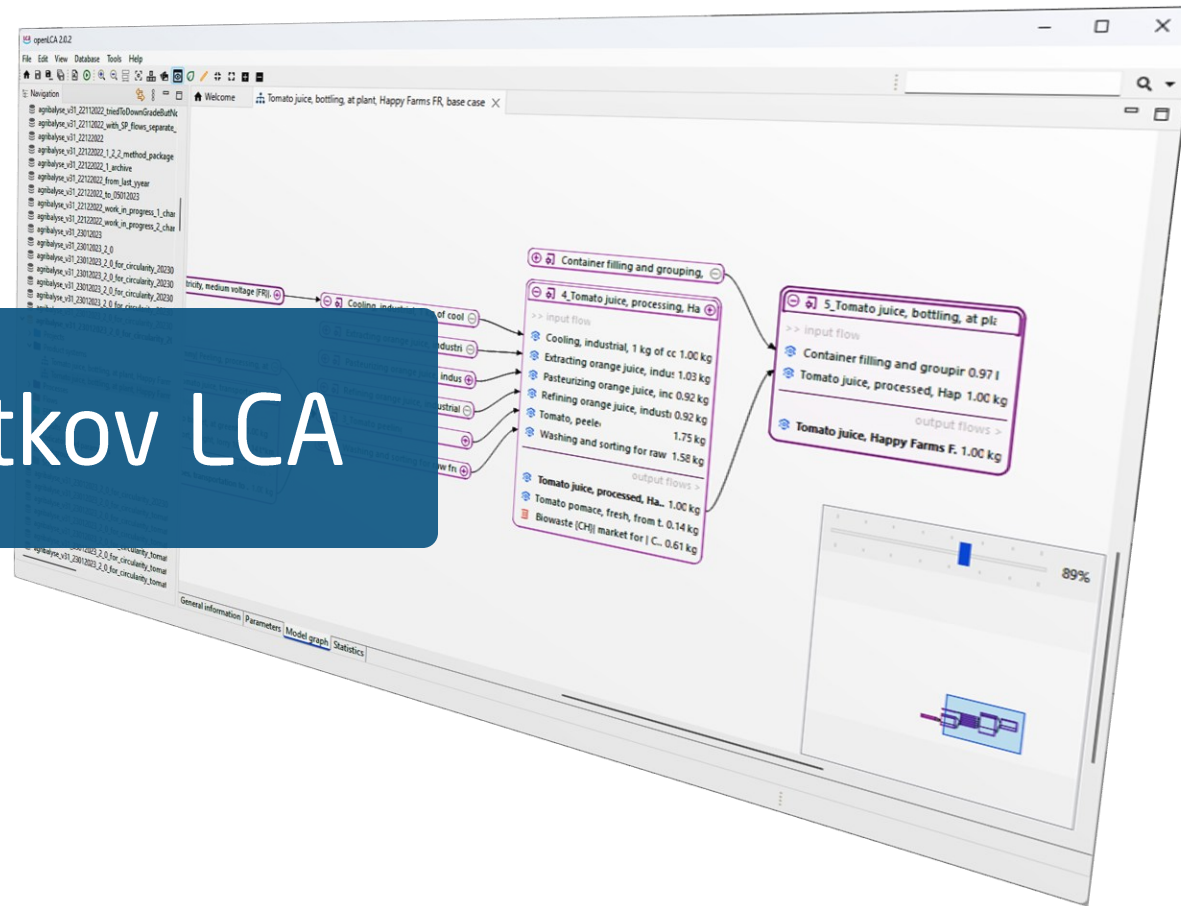
- **Baza podatkov** je **organizirana zbirka naborov podatkov LCI**, ki v celoti ali delno ustreza skupnemu naboru meril - **vkjučno z metodologijo, obliko, preglednostjo in nomenklaturo** (Shonan Vodilna načela, UNEP/SETAC 2011)

```
graph TD; A[openlca4teachers_2022] --> B[Projects]; A --> C[Product systems]; A --> D[Processes]; D --> E[Air Transportation]; D --> F[Allocation]; D --> G[biomass]; G --> H[fuels]; H --> I1[Ethanol, 85%, at blending terminal, 2022 - RNA]; H --> I2[Ethanol, 85%, blended, at service station, 2022 - RNA]; H --> I3[Ethanol, denatured, at refueling station, 2022 - RNA]; H --> I4[Ethanol, denatured, corn dry mill - RNA]; H --> I5[Ethanol, denatured, corn stover, biochemical - RNA]; H --> I6[Ethanol, denatured, forest residues, thermochem - RNA]; H --> I7[ethanol, denatured, mixed feedstocks, at conversion facility, 2022 - RNA]; H --> I8[Ethanol, denatured, switchgrass, biochemical - RNA];
```

← zbirka podatkov

← nabor podatkov

Uvoz podatkov LCA



Pridobivanje baze podatkov v openLCA

Dve možnosti:

1. Obnovitev celotne baze podatkov

Format: .zolca

Desni klik v navigacijski plošči → Restore database

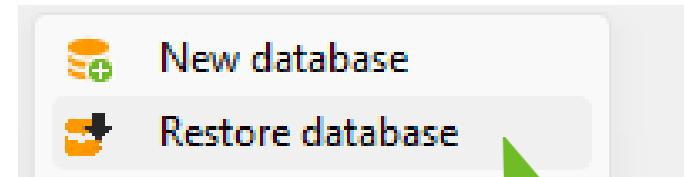
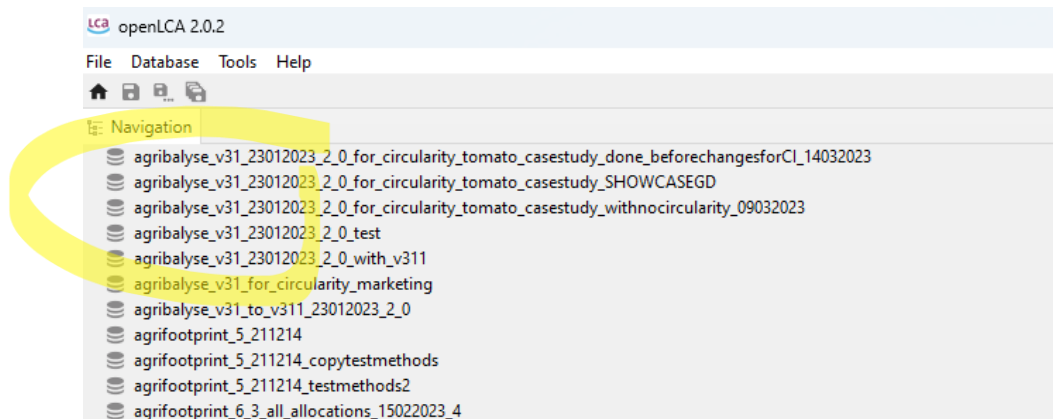
2. Uvoz celotne baze podatkov

Format: .zolca

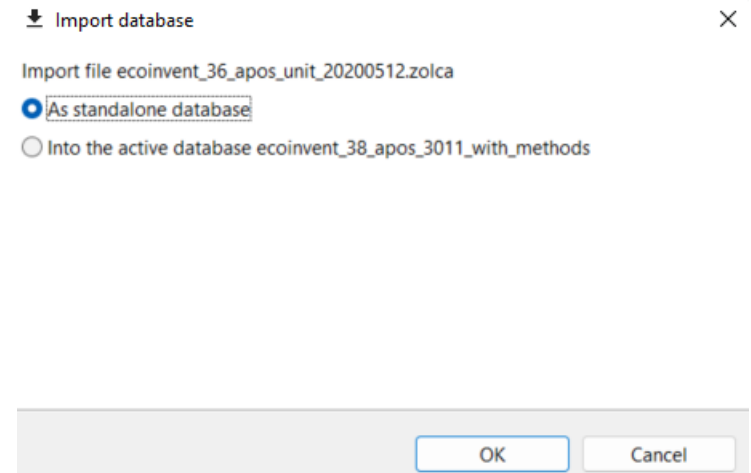
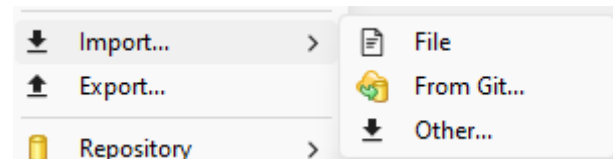
Izberite: Import → File

Možnost uvoza kot samostojna baza

rezultat :



Right-click on
Navigation, select
"Restore database"



Lahko tudi: ustvarimo **novo** bazo podatkov

openLCA 2.0.0

File Database Tools Help

Navigation

- agribalyse_v301_exam
- ecoinvent_38_cutoff_3011_with_meth

Welcome

openLCA

Getting Started

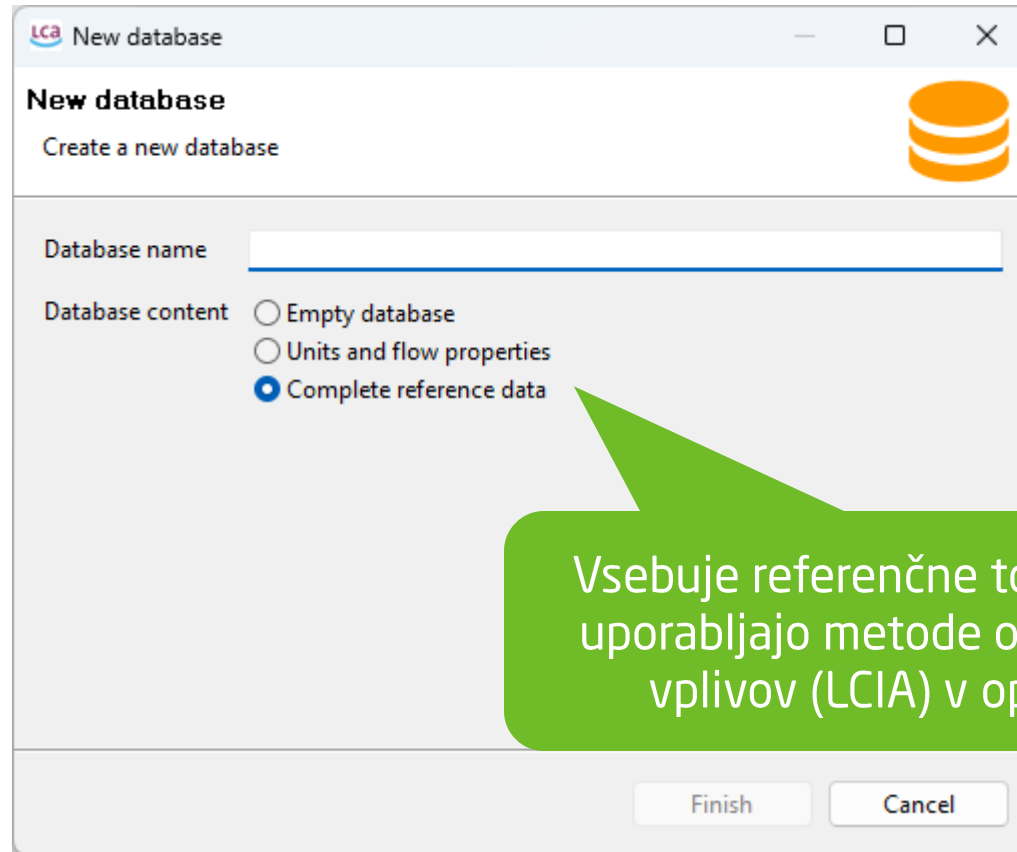
- What's new in openLCA 2.0
- Collaboration tool for openLCA
- Community forum
- Comprehensive databases
- Case studies
- Certified trainings
- Working with the developers of openLCA

Desni klik na navigaciji, izberite "Nova baza podatkov"

openLCA is a powerful, [open source](#), feature-rich software for LCA and Sustainability modelling. Create, import existing databases which contain life cycle processes, import assessment methods, create your own processes, build your own life cycle models, calculate and analyse it. These steps are explained on [YouTube](#), and in the [openLCA handbook](#).

Greendelta

Ustvari novo zbirko podatkov



New database
Create a new database

Database name

Database content

- Empty database
- Units and flow properties
- Complete reference data

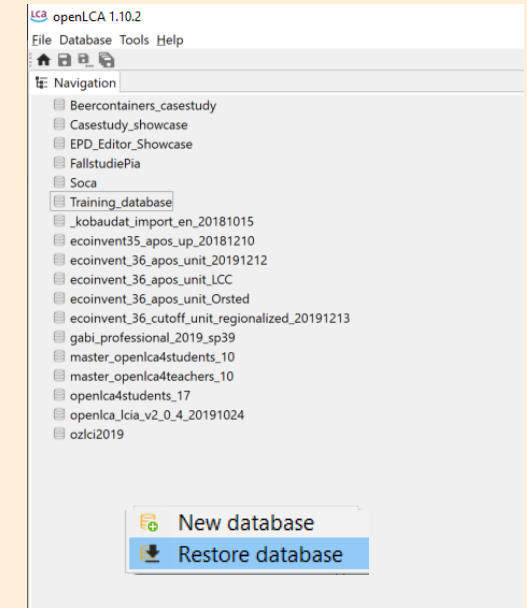
Finish Cancel

Vsebuje referenčne tokove, ki jih uporabljajo metode ocenjevanja vplivov (LCIA) v openLCA.

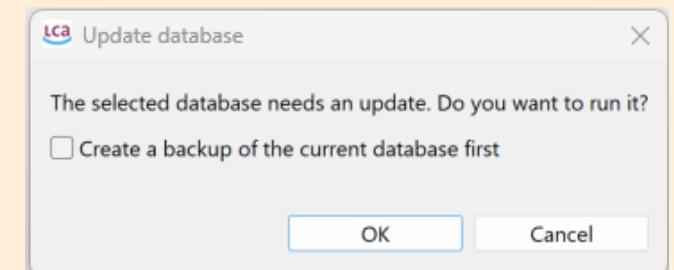
Vaja 2a: Uvoz baze podatkov

- Uvozite datoteko baze podatkov openLCA "openlca4students_2_0.zolca" v openLCA s funkcijo obnovitve baze (restore database).
- Ko je baza obnovljena, jo odprite in posodobite, da zagotovite združljivost z vašo različico openLCA.
- 🕒 5 minut

- Z desnim klikom na Navigacijo izberite "Restore database"



- Posodobite bazo brez varnostne kopije



Tri možnosti za uvoz podatkov

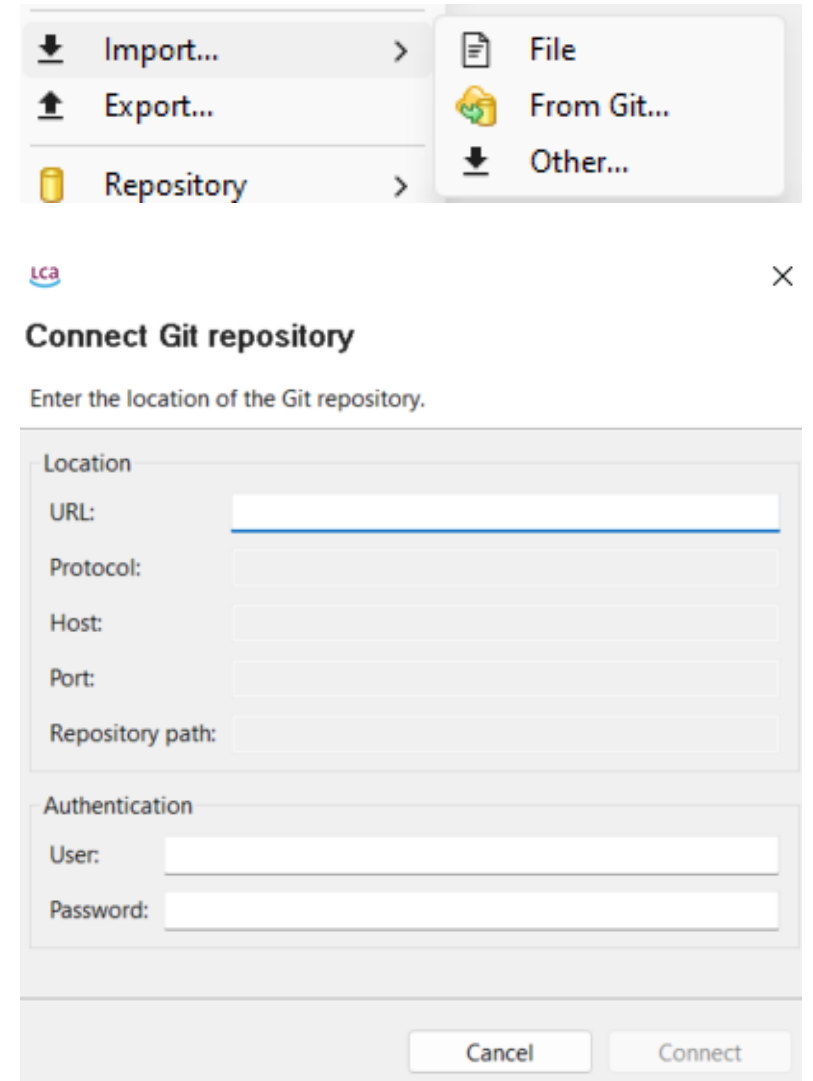
Običajno uvažamo podatkovne nize v obstoječo bazo podatkov ali v metode LCIA.

1. Uvoz datoteke:

- Lahko izberete katerokoli datoteko iz svoje naprave
- Datoteka mora biti v formatu, ki ga podpira openLCA
- Po izbiri datoteke se bo odprl čarovnik za uvoz
- Program bo samodejno prepoznal format datoteke

2. Uvoz iz Git

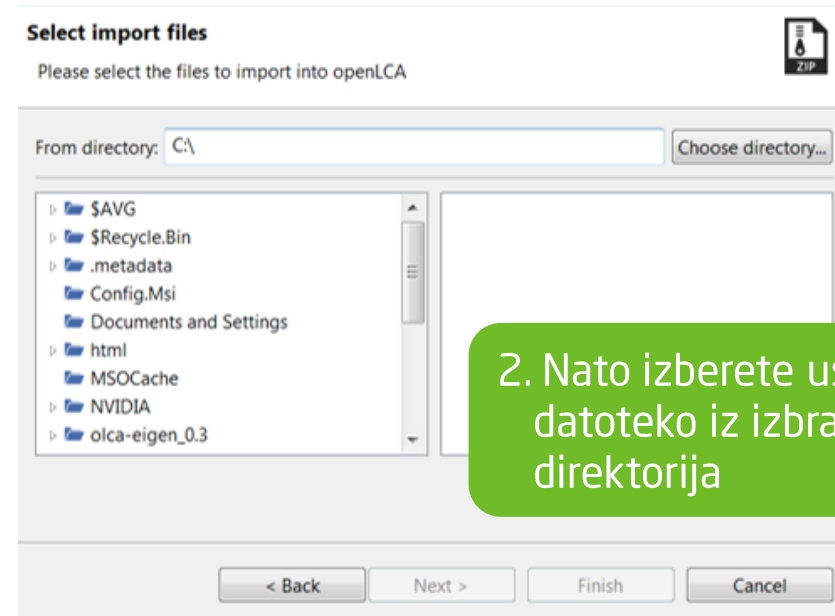
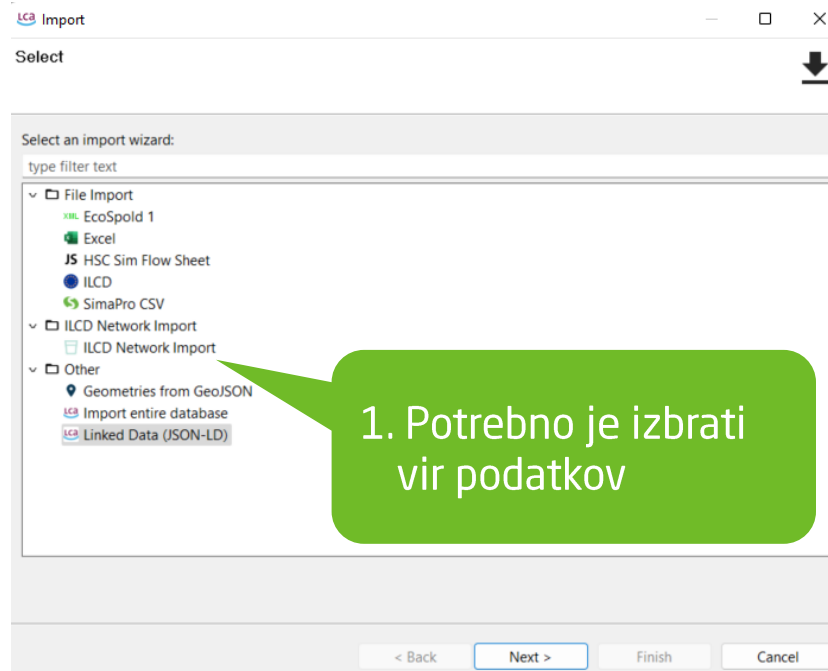
- Odprl se bo čarovnik za uvoz
- Potrebna je povezava z Git repozitorijem



Tri možnosti za uvoz

3. Uvoz iz drugih virov

- Odpre se čarovnik za uvoz
- Potrebno je izbrati vir podatkov
- Nato izberete ustrezno datoteko iz izbranega direktorija



Vaja 2b: Uvoz metod za oceno vplivov

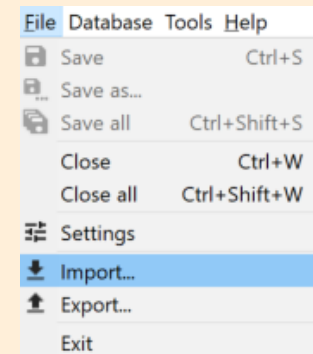
Namig!

- Uvozite datoteko JSON-LD
»openlca_lcia_methods_18_10_22.zip« v uvoženo bazo podatkov

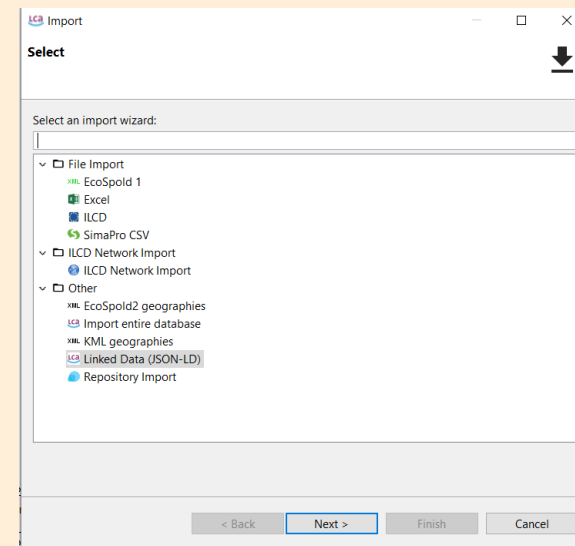
Opomba: Ne odpakirajte datoteke zip!

- Čas izvedbe: približno 5 minut
- Lahko traja nekoliko dlje - brez skrbi

- Pojdite na »Datoteka« in izberite »Import«.



- Izberite vrsto datoteke (JSON-LD).

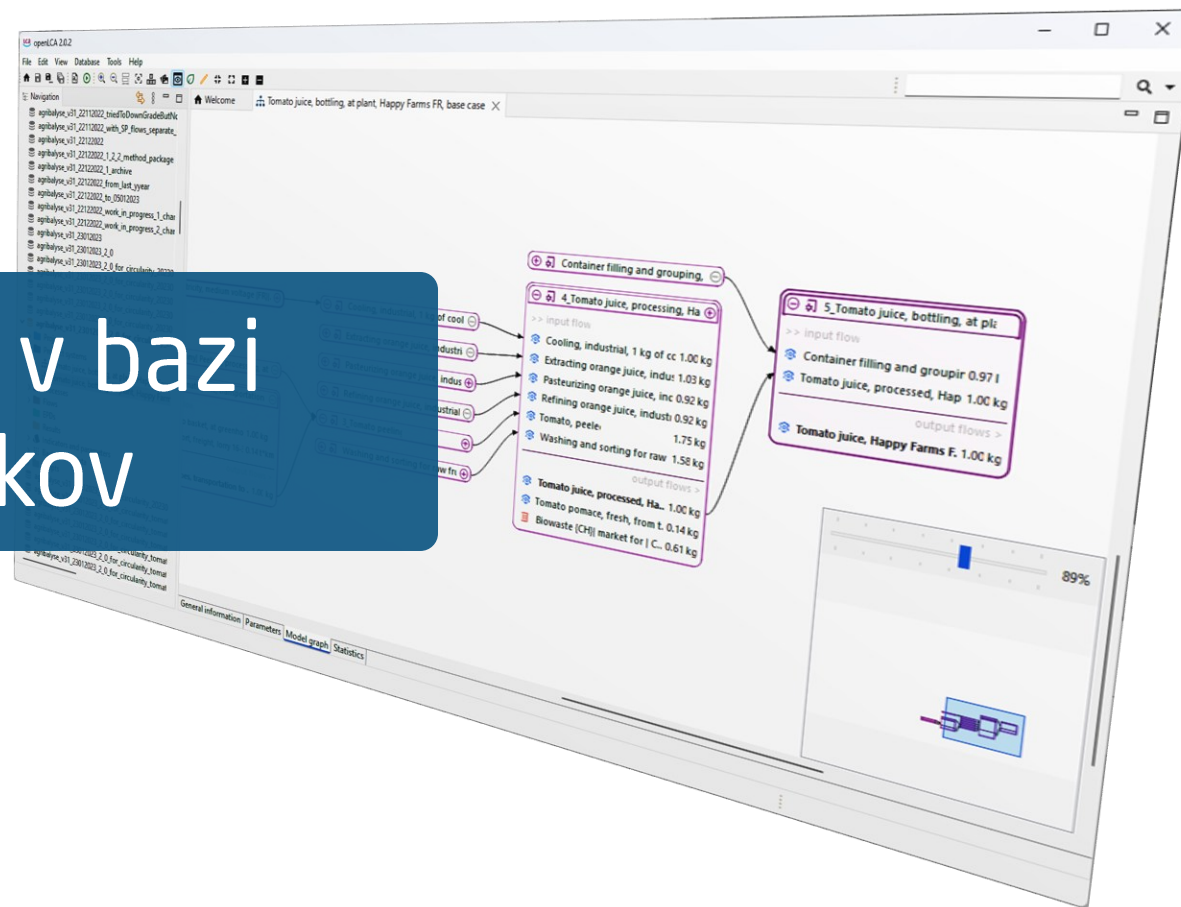


- Določite pot do datoteke (brez razpakiranja)
- V možnosti uvoza izberite:
"Never update a dataset that already exists"

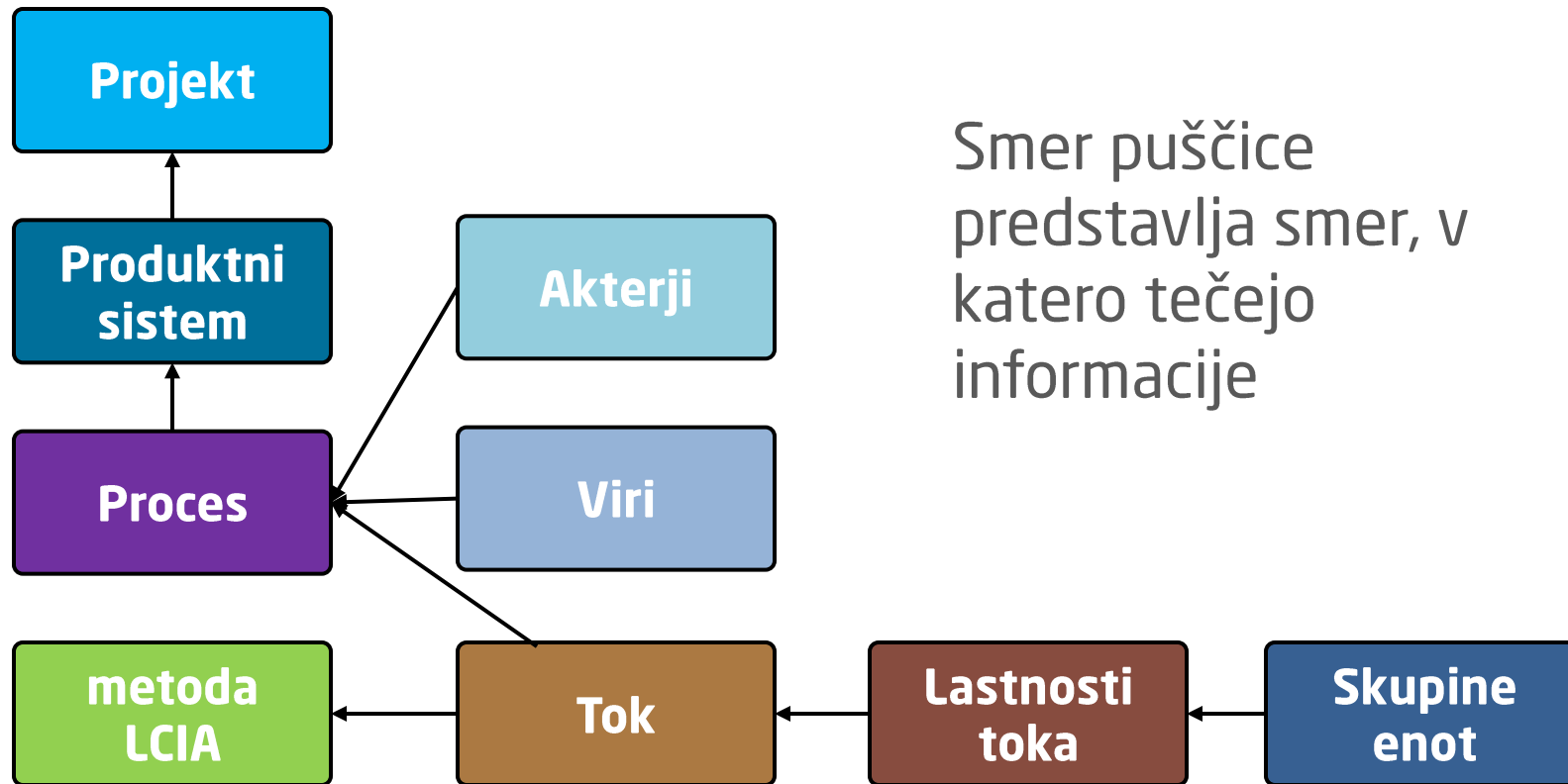
Podprti formati podatkov v openLCA

- Podprti formati za uvoz:
 - EcoSpold1
 - ILCD (ne odpirajte!)
 - Excel
 - SimaPro CSV
 - Zolca
 - JSON-LD (ne odpakirajte!)
- Možna je uporaba več kot ene baze podatkov; baze podatkov so neodvisne ena od druge in samo ena baza podatkov je hkrati "aktivna", vse ostale so "deaktivirane"

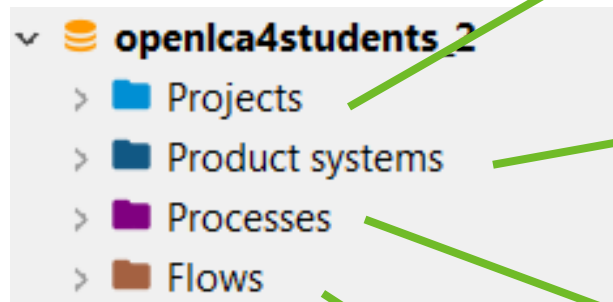
Elementi v bazi podatkov



Struktura elementov v openLCA



Baza podatkov elementi (I)



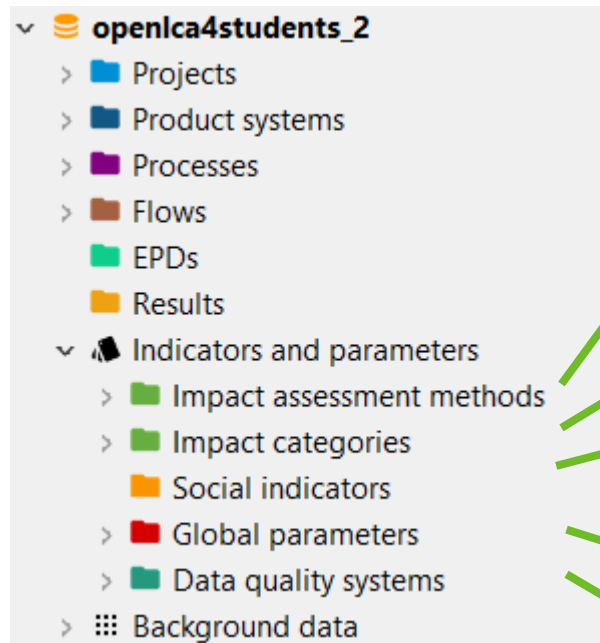
Projekti: primerjava številnih proizvodnih sistemov

Sistemi izdelkov: procesna omrežja (potrebna za izračun rezultatov popisa in oceno učinka)

Procesi: Proizvodnja ali modifikacija materialov/izdelkov

tokovi: Tok izdelkov in materialov ter elementarni tokovi

Baza podatkov elementi (II)



LCIA metode

Metode ocenjevanja vplivov v življenjskem ciklu (Life Cycle Impact Assessment - LCIA), ki jih lahko prenesete s spletne strani openlca.org/downloads.

Kategorije vpliva: Uporabljajo se znotraj LCIA metod za razvrščanje in kvantificiranje vplivov (npr. globalno segrevanje, zakisljevanje, toksičnost ipd.).

Socialni kazalniki

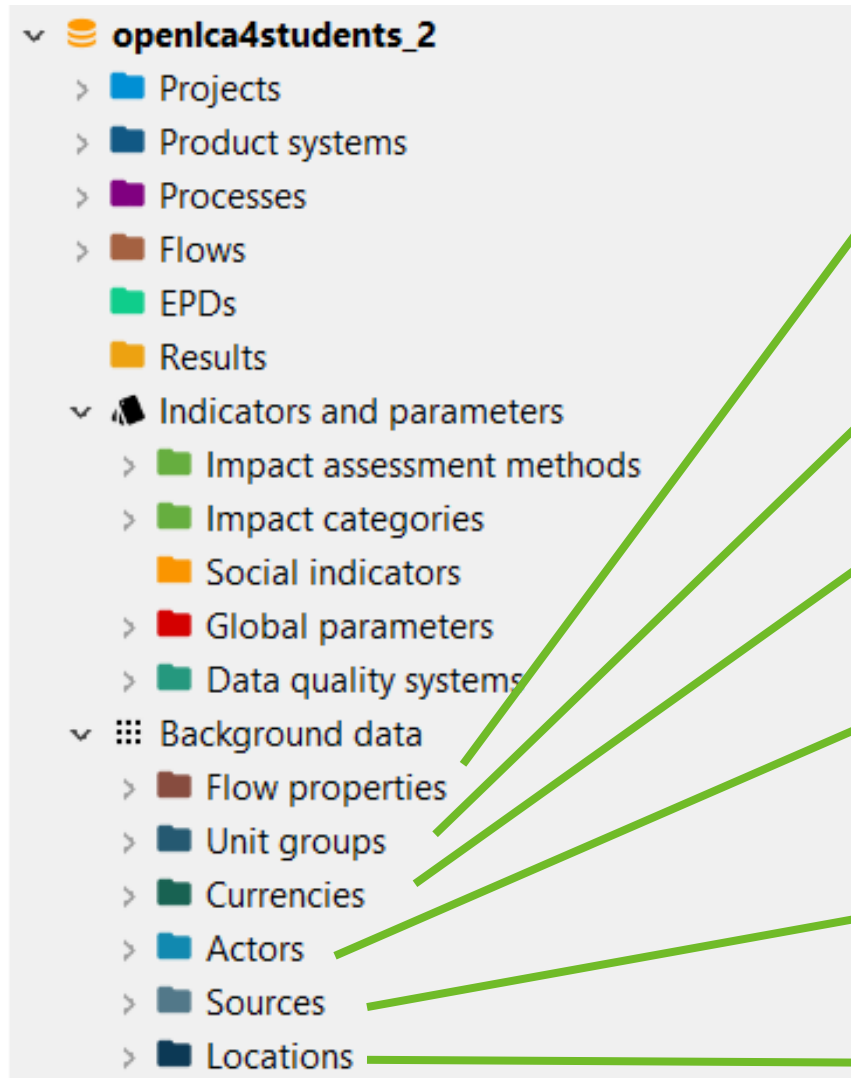
Indikatorji, ki se uporabljajo za izvajanje socialne analize življenjskega cikla (S-LCA), kot so delovni pogoji, človekove pravice, vplivi na skupnosti itd.

Globalni parametri : Parametri, ki so na voljo in uporabljeni v celotni podatkovni zbirki (npr. povprečna cena električne energije, faktor CO₂ na kWh ipd.).

Sistemi za kakovost podatkov

Sistemi, ki definirajo kakovost podatkov procesov in tokov (npr. glede na izvor, popolnost, geografsko veljavnost itd.).

Elementi baze podatkov: Podatki v ozadju (Background data)



Lastnosti tokov (Flow properties): npr. dolžina, masa, količina – osnovne fizikalne lastnosti tokov.

Skupine enot (Unit groups): skupine merskih enot, npr. kilogram, meter, liter ipd.

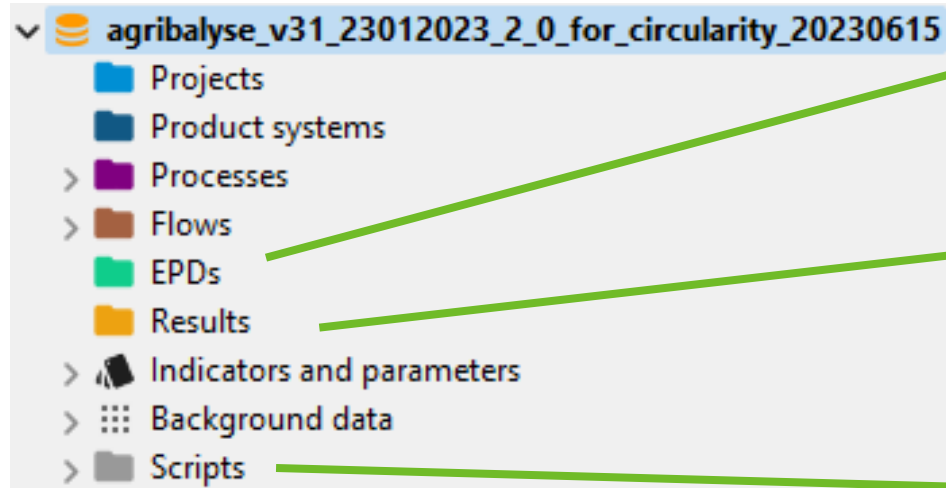
Valute (Currencies): vključujejo denarne enote in menjalne tečaje (npr. evro, ameriški dolar).

Akterji (Actors): osebe, ki so prispevale podatke ali prilagodile modele.

Viri (Sources): uporabljena literatura, referenčni dokumenti.

Lokacije (Locations): geografske lokacije, kjer potekajo procesi (npr. EU, ZDA, Kitajska).

Elementi baze podatkov: novi elementi



EPD-ji (EPDs): omogočajo enostaven uvoz, ustvarjanje in upravljanje okoljskih deklaracij za izdelke (Environmental Product Declarations).

Rezultati: Results): omogočajo shranjevanje rezultatov analiz in njihov izvoz za nadaljnjo uporabo ali poročanje.

Skripte (Scripts): skripte je mogoče shraniti lokalno ali globalno – uporabno za avtomatizacijo in ponovljivost analiz.

Za več informacij si oglejte naš spletni priročnik

Elementi baze podatkov: koraki modeliranja v openLCA

- ▼ openlca4students_2
 - > Projects
 - > Product systems
 - > Processes
 - > Flows
 - EPDs
 - Results
- ▼ Indicators and parameters
 - > Impact assessment methods
 - > Impact categories
 - Social indicators
 - > Global parameters
 - > Data quality systems
- ▼ Background data
 - > Flow properties
 - > Unit groups
 - > Currencies
 - > Actors
 - > Sources
 - > Locations

1. Ustvarjanje tokov in procesov

Definiranje osnovnih gradnikov sistema: vhodnih/izhodnih tokov in procesnih enot.

2. Vnašanje podatkov o dejavnosti (*analiza zalog*)

Izpolnjevanje vhodno-izhodnih podatkov za posamezne procese.

3. Gradnja modela življenjskega cikla

Povezovanje procesov v smiselne sisteme in izdelke.

4. Uvoz ali izbira metode LCIA

Uporaba metod ocenjevanja vplivov na okolje (LCIA) za kvantifikacijo okoljskih vplivov.

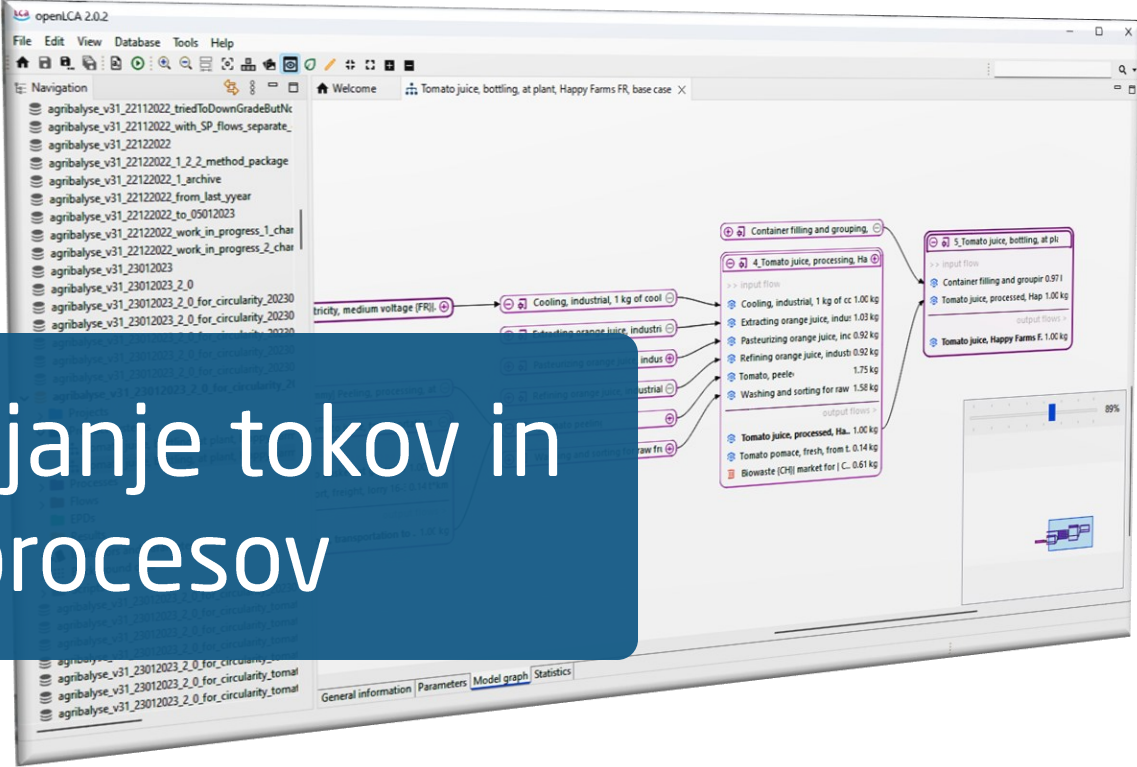
5. Izračun rezultatov vpliva

Pridobitev rezultatov LCA za izdelke ali storitve.

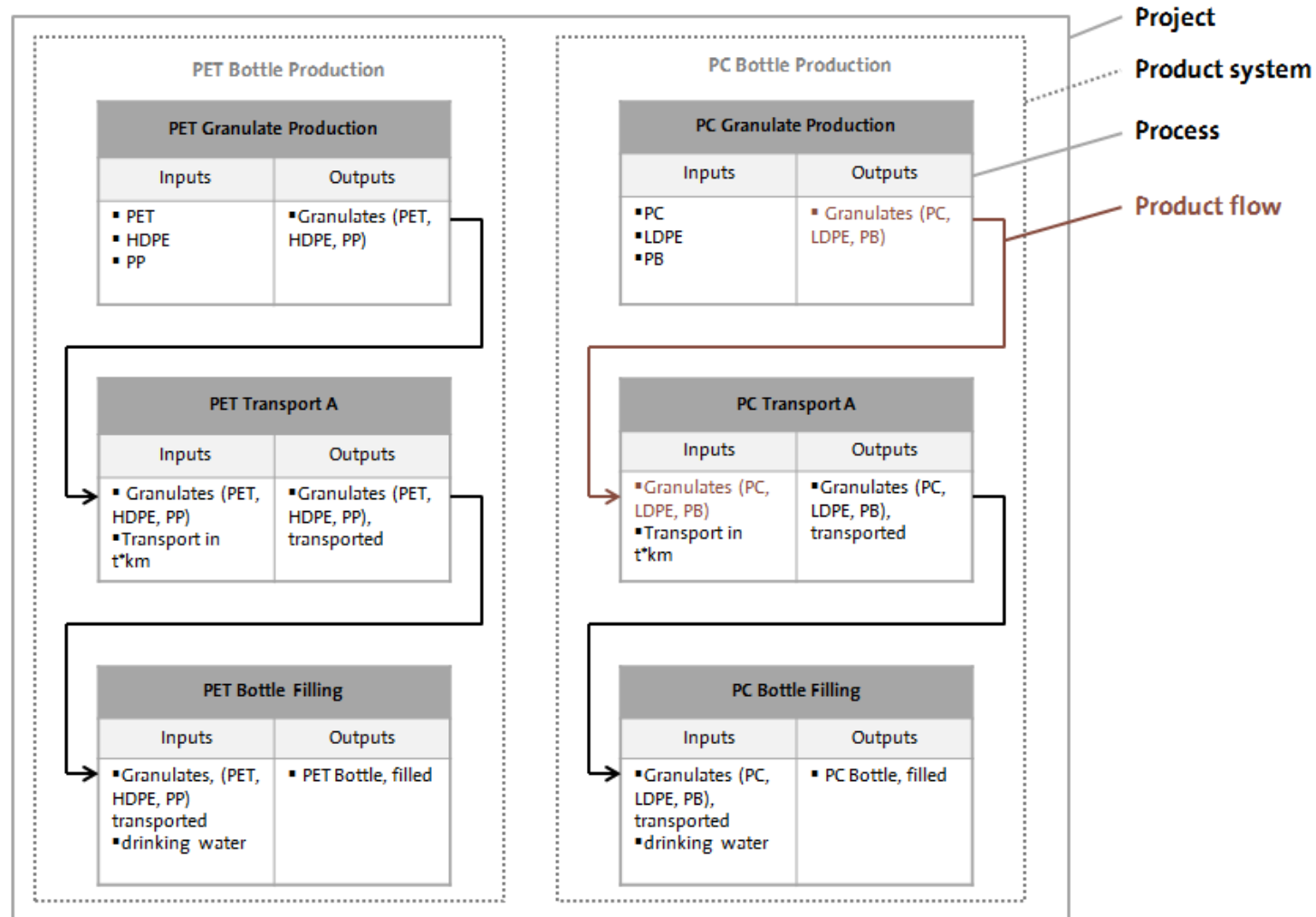
6. Primerjava in analiza

1. Primerjava različnih proizvodnih sistemov
2. Izvedba analize občutljivosti v projektih

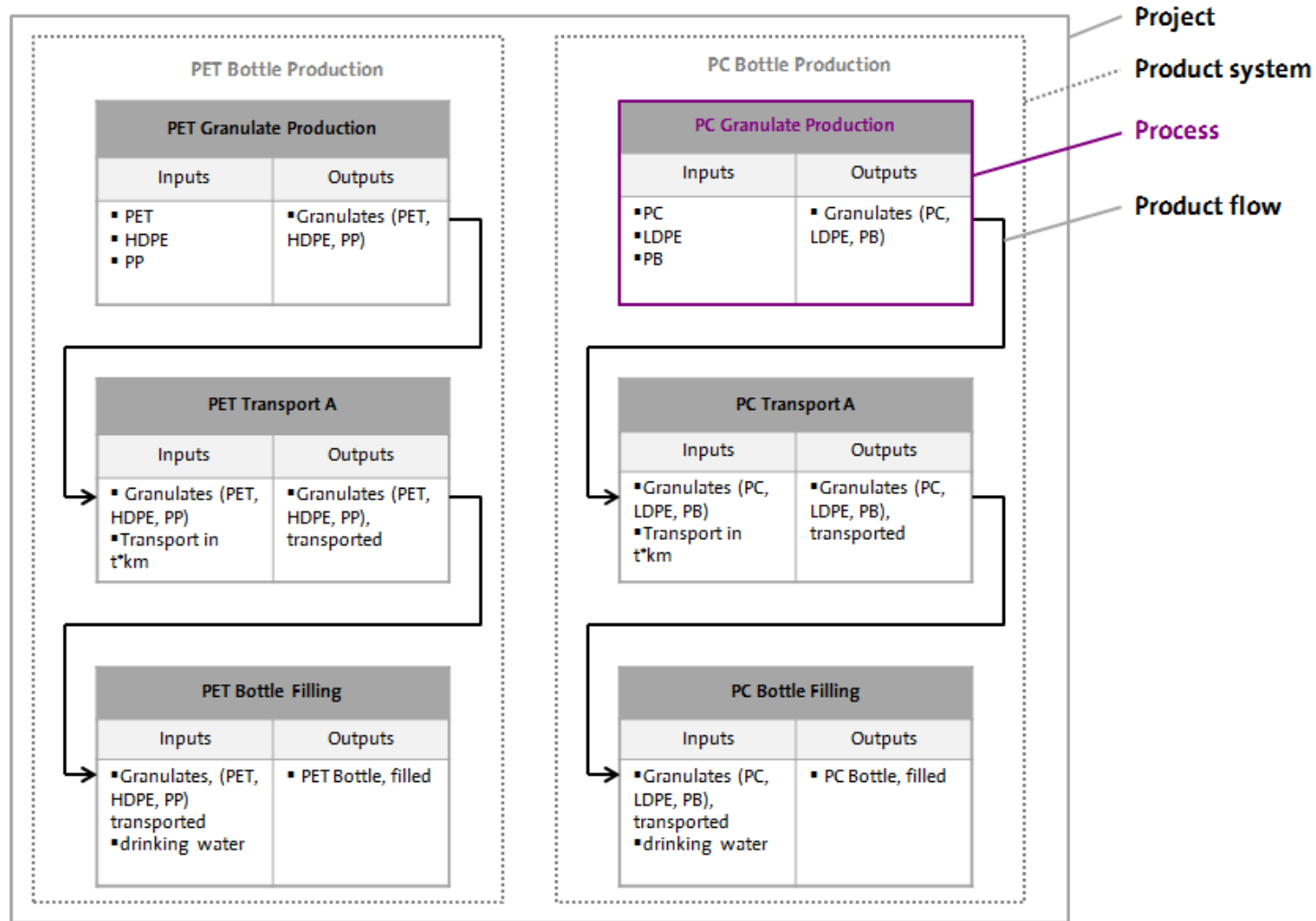
Ustvarjanje tokov in procesov



Modeliranje v openLCA: Tokovi



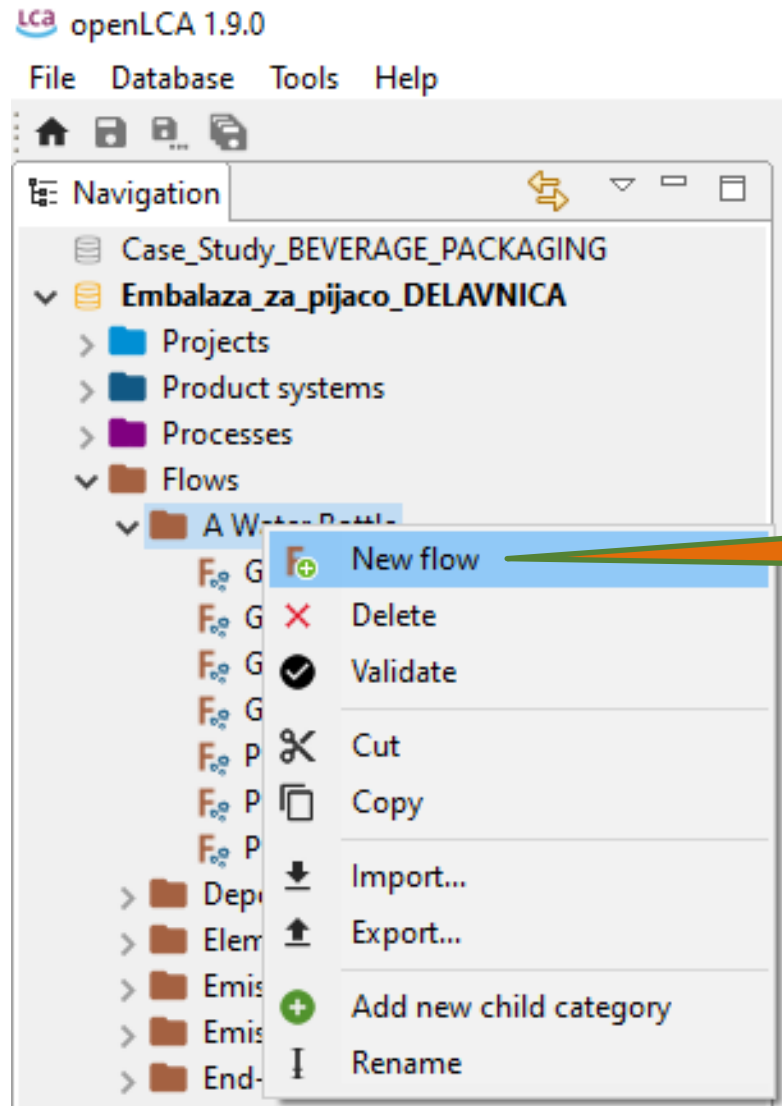
Modeliranje v openLCA: Procesi



Ustvarjanje tokov



Tokovi: ustvarjanje novega toka (I)



1. z desno miškino tipko kliknite mapo „Flow“, izberite „Create new flow“.

Tokovi: ustvarjanje novega toka (II)

The screenshot shows the openLCA 1.9.0 interface. On the left is a navigation tree with 'Embalaza_za_pijaco_DELAVNICA' expanded to 'A Water Bottle', where 'Granulates (PC, LDPE, PB)' is selected. The main window displays the 'General information' panel for this flow. A 'New flow' dialog box is open, with a green border. It contains the following fields:

- Name: Ime toka
- Description: Tukaj se lahko vnese poljubna informacija
- Flow type: Product
- Reference flow property: Mass

Buttons for 'Finish' and 'Cancel' are at the bottom of the dialog. An orange callout box on the right contains the text: '2. Poimenujte tok in določite vrsto toka in lastnost referenčnega toka. Nato kliknite „Finish“.'

Tokovi: Ustvari nov tok (II)

- Tri različne vrste tokov

Elementary flow

Elementarni tokovi

- Elementarni tokovi
 - Emisije v zrak
 - Emisije v tla
 - Emisije v vodo
 - Nematerialne emisije
 - Viri

Waste

Tokovi odpadkov

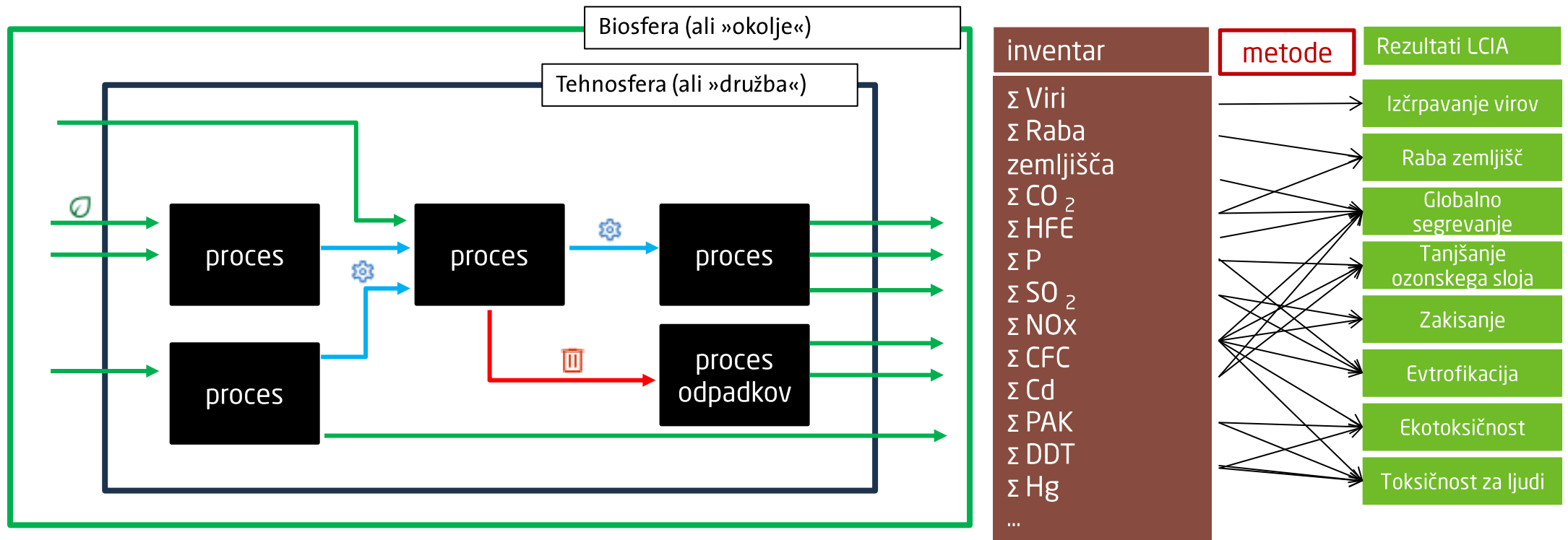
- Trdni odpadki
- Odpadne vode

Product

Produktni tokovi

- Vse druge dejavnosti
 - Materiali
 - Procesi
 - Električna
 - Transport
 - Lahko predstavlja tudi odpadke (sekundarne surovine)

Tokovi: Logika poteka v openLCA



Osnovni tokovi so uporabljeni okoljski viri ali sproščene emisije, ki povzročajo vplive na okolje.

Produktne tokovi povezujejo procese znotraj tehnosfere in izvirajo ali postanejo osnovni tokovi. Na začetku (zibelka) verige se viri vzamejo iz okolja in se kasneje vrnejo (grob).

Tokovi odpadkov Tokovi odpadkov so vse snovi ali predmeti, ki jih mora imetnik odstraniti (brez tržne vrednosti ali stroškovno intenzivni).

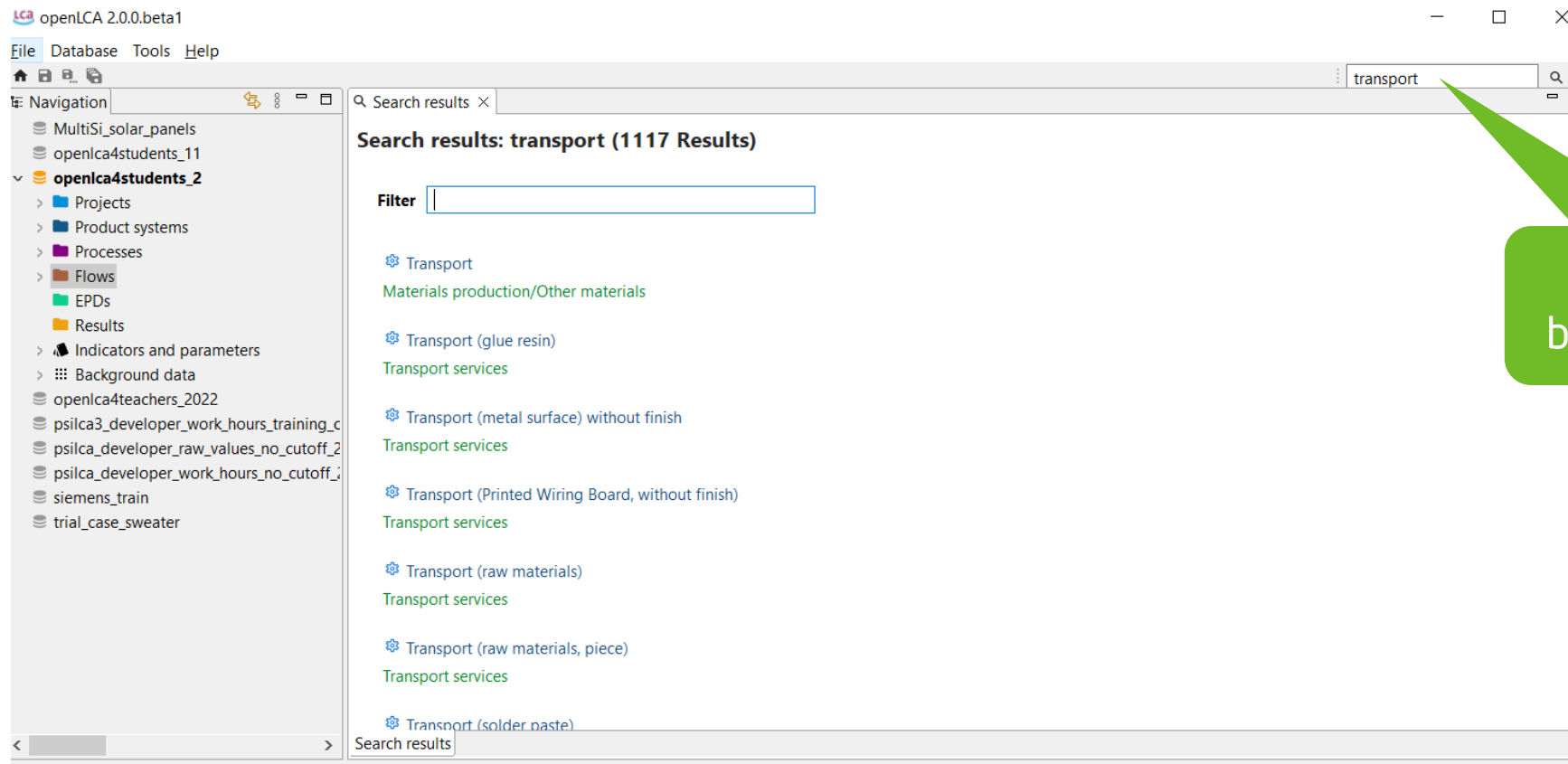
Tokovi: ustvarjanje novega toka (III)

The screenshot displays the openLCA 1.9.0 interface. On the left, the 'Navigation' pane shows a tree view with 'Embalaza_za_pijaco_DELAVNICA' expanded, and the 'New flow' option highlighted in the context menu. The main window shows the 'General information' form for a new flow named 'Ime toka'. The form includes fields for Name, Description, Category, Version, UUID, Last change, Infrastructure flow, and Flow type. The 'Flow type' is set to 'Product'. Below the form, there are tabs for 'General information' and 'Flow properties'. An orange callout box points to the 'Description' field.

3. V urejevalniku se bo odprlo novo okno toka. Dodatne lastnosti toka lahko dodate v zavihku »Flow Properties«, vendar ne pozabite na faktor pretvorbe!

Iskanje

- Poiščite kateri koli element iz baze podatkov

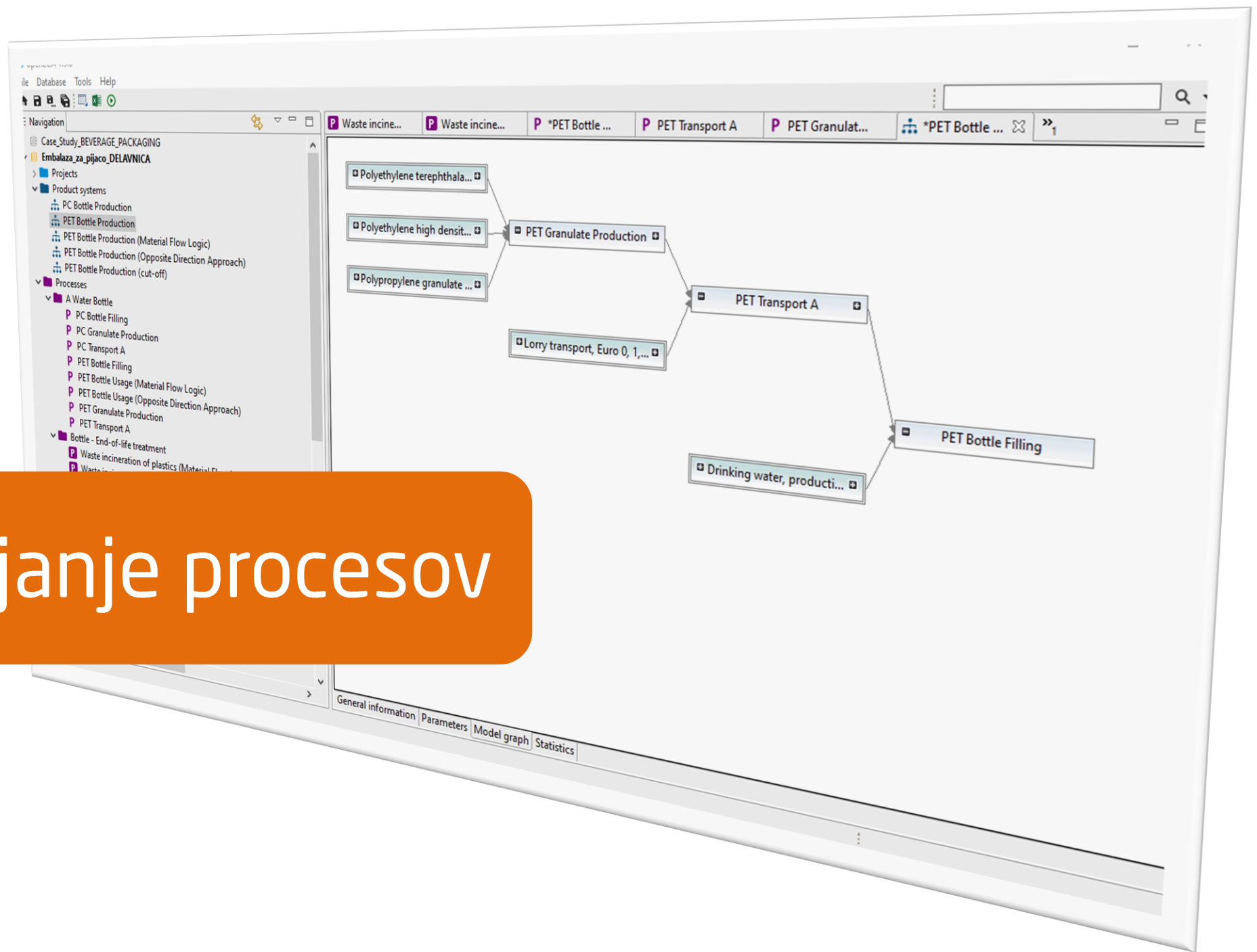


Vpišite ključne besede za iskanje

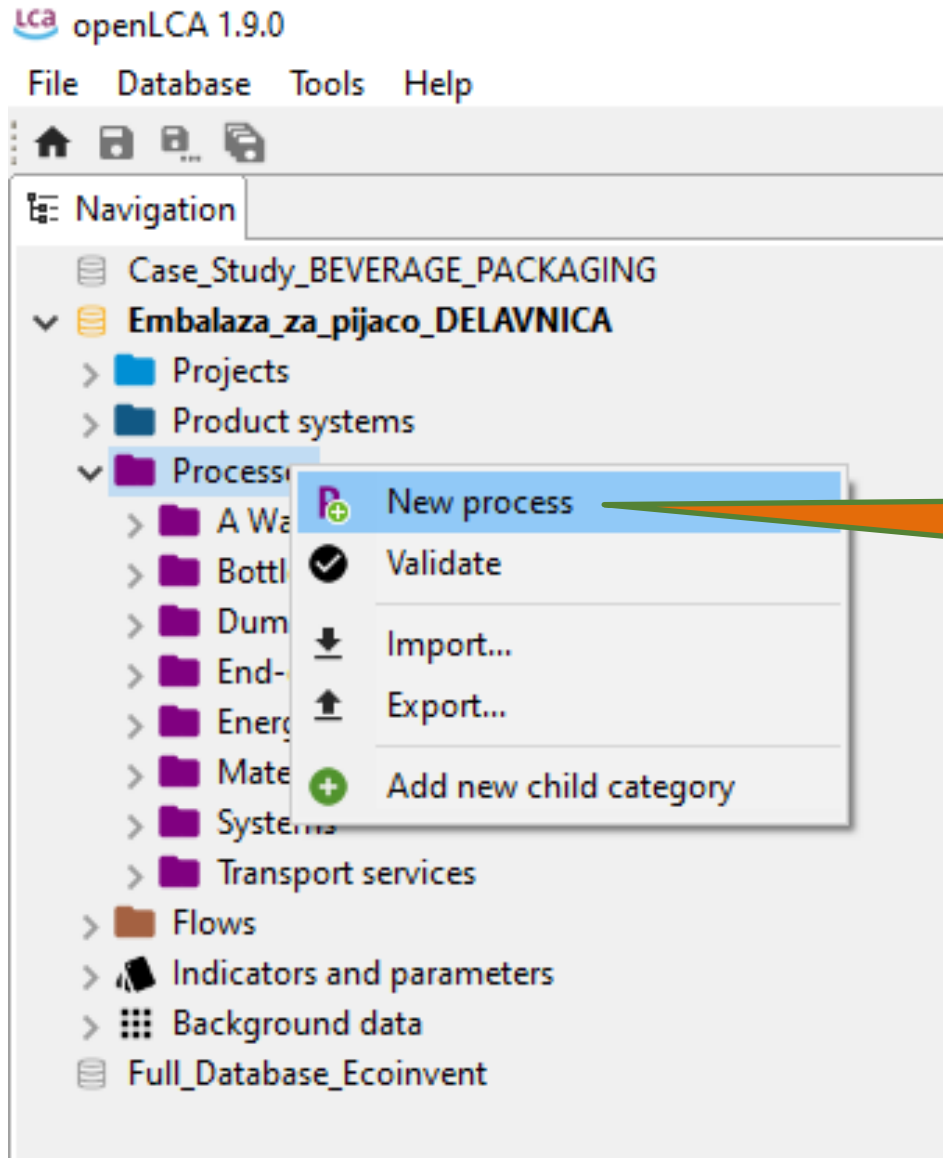
Vaja 3: Podatki o toku

- Odprite produktni tok "Acetic acid, at plant".
- V katerih procesih znotraj vaše aktivne baze podatkov je ta tok vhodni tok?
- V katerih procesih je izhodni tok?
- 5 minut

Ustvarjanje procesov



Procesi: ustvarjanje novega procesa (I)



1. z desno miškino tipko kliknite mapo „Processes“, izberite „create new process“.

Procesi: ustvarjanje novega procesa (II)

New process

No quantitative reference selected

Name

Ime Procesa

Create a waste treatment process

Create a new flow for the process

Quantitative reference

- ▼ A Water Bottle
 - F Granulates (PC, LDPE, PB)
 - F Granulates (PC, LDPE, PB), transported
 - F Granulates (PET, HDPE, PP), transported
 - F Granulates (PET, HDPE,PP)
 - F Ime toka
 - F PC Bottle, filled
 - F PET Bottle, disposed
 - F PET Bottle, filled
- > Deposited goods
- > End-of-life treatment

Finish Cancel

2. Poimenujte proces in izberite količinsko referenco

Procesi: ustvarjanje novega procesa (III)

openLCA 1.9.0

File Database Tools Help

Navigation

- Case_Study_BEVERAGE_PACKAGING
- Embalaza_za_pijaco_DELAVNICA
 - Projects
 - Product systems
 - Processes
 - A Water Bottle
 - Bottle - End-of-life treatment
 - Dummy processes
 - End-of-life treatment
 - Energy carriers and technologies
 - Materials production
 - Systems
 - Transport services
 - Ime Procesa**
 - Flows
 - Indicators and parameters
 - Background data
 - Full_Database_Ecoinvent

Ime Procesa

General information: Ime Procesa

General information

Name: Ime Procesa

Description:

Version: 00.00.000

UUID: 465e4311-4897-4e7d-8a2d-d57bab7af93c

Last change: 2019-10-03T12:08:05+0200

Infrastructure process:

Create product system Export to Excel

Time

Start date: 10/ 3/2019

End date: 10/ 3/2019

Description:

General information Inputs/Outputs Administrative in... Modeling and vali... Parameters Allocation Social aspects

3. V urejevalniku se bo odprlo novo okno procesa. Podatki o opisu, času, geografiji, tehnologiji ipd. so v zavihku „General information“.

Proces: splošne informacije

The screenshot displays the openLCA 1.9.0 interface. On the left is a navigation tree with the following structure:

- Case_Study_BEVERAGE_PACKAGING
 - Embalaza_za_pijaco_DELAVNICA
 - Projects
 - Product systems
 - Processes
 - A Water Bottle
 - Bottle - End-of-life treatment
 - Dummy processes
 - End-of-life treatment
 - Energy carriers and technologies
 - Materials production
 - Systems
 - Transport services
 - Ime Procesa**
 - Flows
 - Indicators and parameters
 - Background data
 - Full_Database_Ecoinvent

The main window shows the 'General information' tab for the selected process 'Ime Procesa'. The data is as follows:

Field	Value
Name	Ime Procesa
Description	
Version	00.00.000
UUID	465e4311-4897-4e7d-8a2d-d57bab7af93c
Last change	2019-10-03T12:08:05+0200
Infrastructure process	<input type="checkbox"/>

Below the 'General information' section, there are two buttons: 'Create product system' and 'Export to Excel'. The 'Time' section contains the following data:

Field	Value
Start date	10/ 3/2019
End date	10/ 3/2019
Description	

At the bottom, a tabbed interface shows the following tabs: 'General information' (highlighted with a green box), 'Inputs/Outputs', 'Administrative in...', 'Modeling and vali...', 'Parameters', 'Allocation', and 'Social aspects'.

Proces: vtoki / iztoki

openLCA 1.9.0

File Database Tools Help

Navigation

- Case_Study_BEVERAGE_PACKAGING
 - Embalaza_za_pijaco_DELAVNICA
 - Projects
 - Product systems
 - Processes
 - A Water Bottle
 - PC Bottle Filling
 - PC Granulate Production
 - PC Transport A
 - PET Bottle Filling
 - PET Bottle Usage (Material Flow Logi...
 - PET Bottle Usage (Opposite Direction...
 - PET Granulate Production
 - PET Transport A
 - Bottle - End-of-life treatment
 - Dummy processes
 - End-of-life treatment
 - Energy carriers and technologies
 - Materials production
 - Glass and ceramics
 - Inorganic chemicals
 - Metals and semimetals
 - Organic chemicals
 - Other mineral materials
 - Paper and cardboards
 - Plastics
 - Water

PET Granulate Production | Aluminium sheet, production mix, at plant, primary production, aluminium...

Inputs/Outputs: Aluminium sheet, production mix, at plant, primary production, aluminium semi-finished sheet product, including primary production, transformation and recycling

Inputs

Flow	Category	Amount	Unit	Costs/...	Uncert...	Avoide...	Provider	Data q...	Descr...
Aggregate, natural	Resource/in gro...	43.69161	kg		none				
Air	Resource/in air	1.28544E4	kg		none				
Barite	Resource/in gro...	2.74405	kg		none				
Barite	Resource/in gro...	6.29399E...	kg		none				
Basalt	Resource/in gro...	2.18389	kg		none				
Bauxite	Resource/in gro...	1066.37602	kg		none				
biomass; 14.7 MJ/kg	Resource/biotic	3.06900E-6	MJ		none				

Outputs

Flow	Category	Amount	Unit	Costs/...	Uncert...	Avoide...	Provider	Data q...	Descr...
Acenaphthene	Emission to wat...	4.27340E-8	kg		none				
Acenaphthene	Emission to wat...	1.77515E-6	kg		none				
Acenaphthylene	Emission to wat...	1.68939E-8	kg		none				
Acenaphthylene	Emission to wat...	6.71076E-7	kg		none				
Acetaldehyde	Emission to air/...	0.00086	kg		none				
Acetic acid	Emission to air/...	0.00427	kg		none				
Acetic acid	Emission to wat...	9.91654E-5	kg		none				

General information | **Inputs/Outputs** | Administrative information | Modeling and validation | Parameters | Allocation | Social aspects | Impact analysis

4. Dodatne tokove lahko dodate v zavihku „Vtoki / iztoki“

Proces: "Administrative information" in "Modeling and validation"

5. Dodatni metapodatki so lahko vključeni v zavihka »Administrativne informacije« in »Modeliranje in validacija«

The image displays two screenshots of the openLCA 1.9.0 software interface. The left screenshot shows the 'Administrative information' tab for the process 'PET Granulate Production'. The right screenshot shows the 'Modeling and validation' tab for the same process. Both tabs are highlighted with green boxes. The interface includes a navigation tree on the left, a main content area, and a bottom status bar with various tabs.

Administrative information tab:

- Intended application: The European aluminium Association (EAA) has collected LCI data representative for aluminium in Europe. Whenever organisations are doing LCA for aluminium products in which it is appropriate to use European data, EAA is happy to contribute in supplying information and data, making its best to provide information in line with the study goal and scope. EAA can deliver data sets related to the following processes: - Alumina production - Aluminium electrolysis and ingot casting - Aluminium rolling - Aluminium extrusion - Aluminium process scrap remelting - Recycling of aluminium end-of-life products
- Data set owner: European Aluminium Association
- Data generator: European Aluminium Association
- Data documentor: Dept. Life Cycle Engineering (GaBi), LBP (Chair for Building Physics), Universitaet Stuttgart
- Publication: ELCD database 2.0
- Access and use restrictions: The data set can be used free of charge by anybody to perform LCA studies, to distribute it to convert it to other formats, to develop own data sets etc. as long as the copyright and license conditions for the ELCD data sets and the ILCD format are met that can be accessed via <http://lca.jrc.ec.europa.eu>. Please note e.g. that reference must be given to the 'Owner of data the 'ELCD database' plus version number, when using the data set or parts thereof. Please note any modifications/omissions of the data set results in invalidity of any existing 'Official approval set by producer/operator' that the impression must be avoided that this would still be a com...
- Project: The Environmental profile report for the European Aluminium Industry (April 2008) can be downloaded from the EAA website.
- Creation date: 2/13/13 11:13 AM
- Copyright:

Modeling and validation tab:

- Process type: System process
- LCI method: None
- Modeling constants: The data set includes the burden and credit associated with the recycling of aluminium scrap produced at casting, rolling and end-of-life process steps. For end-of-life recycling, an average recycling rate of 78 % is used for aluminium sheets. For primary production, a country-based electricity grid mix model is used including...
- Data completeness: According to ISO14040: 99% cut-off criteria (mass) applied for non-hazardous inputs and outputs except alloying elements which are not considered. No cut-off criteria for hazardous products or emissions (e.g. PAH, PFC, BaP, etc.) Infrastructure is not included. All ancillary processes (electricity, caustic soda, etc.) are included.
- Data selection: Data set based on average site-specific data - on an annual basis. Horizontal aggregation is used to calculate European average per process. A modular modelling of processes is used for easy vertical combination. LCI modelling is fully consistent.
- Data treatment: LCI data are based on European averages calculated from site-specific data. Unallocated data have been distributed on processes by linear extrapolation. Aluminium imports to Europe have been considered for the calculation of the LCI data for primary production. Worldwide average data have been considered for bauite...

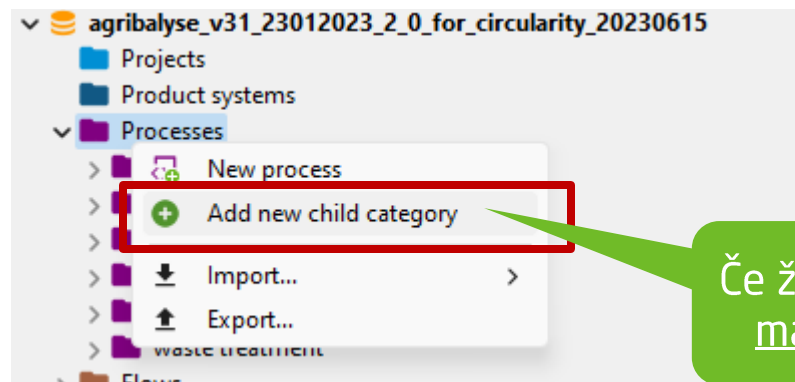
Data source information:

- Sampling procedure: [Empty field]
- Data collection period: [Empty field]

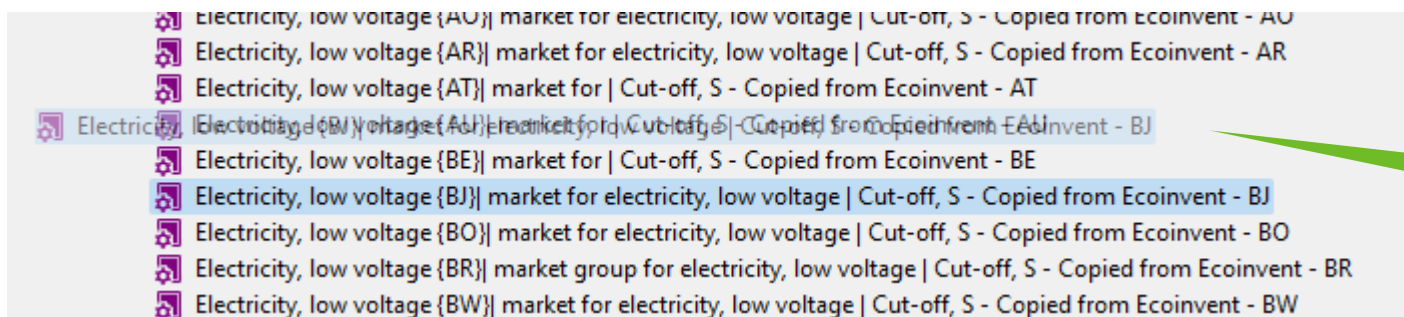
Process evaluation and validation:

- [Empty field]

★ Dodatna funkcionalnost



Če želite ustvariti novu mapo



Nabore podatkov

Kako se bo vaja nadaljevala?

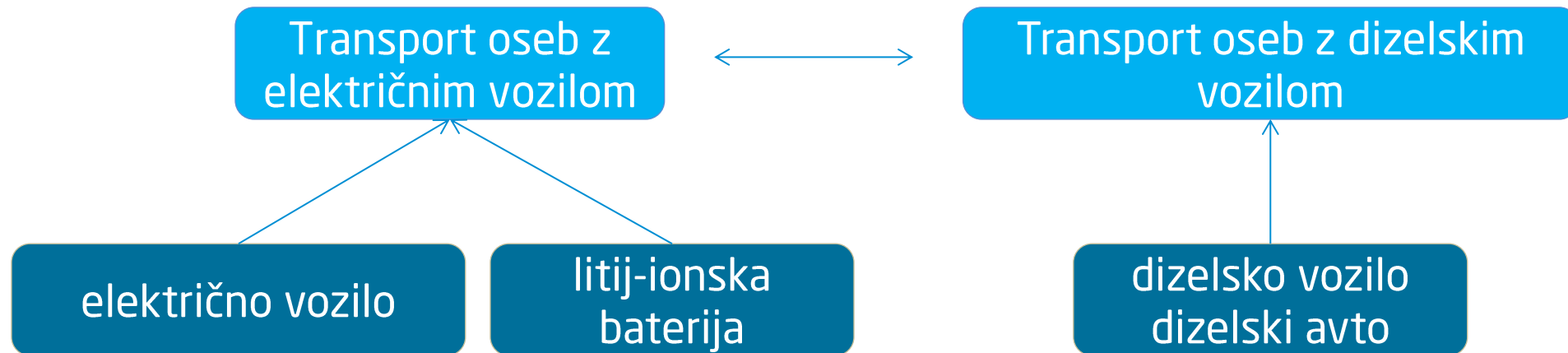
Pregledali bomo študijo o električnem vozilu, kjer bomo:

- ustvarili proces za proizvodnjo baterije,
- izračunali rezultate in jih analizirali,
- na koncu primerjali električno vozilo z dizelskim vozilom.

Med vsemi temi diapozitivi bomo raziskali kar nekaj učnih vsebin, prosimo za potrpljenje!

Študija primera: Litij-ionske baterije v električnih vozilih

- FE: 100.000 p km



Primerjava dveh sistemov:

• **Transport oseb z električnim vozilom**

- električno vozilo
- litij-ionska baterija

• **Transport oseb z dizelskim vozilom**

- dizelsko vozilo

Študija primera : Predpostavke

Li- ion baterija :

Značilnosti baterije

Teža	326 kg
Količina celic	192p do 1,45 kg
Gostota energije	70 Wh /kg
Življenjska doba izdelka	1500 ciklov obremenitve
Poraba	17,115 kWh/100 km
Domet križarjenja	134,12 km/cikel obremenitve
Skupni doseg križarjenja	200.000 km
Potrebna količina baterije za 100.000 km	0,5 predmeta

Avtomobili:

Lastnosti avtomobila

e-avto

dizelski avto

Teža	1.381 kg	1.384 kg
Življenjska doba izdelka	400.000 km	400.000 km

Vaja 4a:

Faza proizvodnje baterije - Ustvarjanje procesa

Ustvarite **proces** »Proizvodnja paketa baterij« za proizvodnjo 1 paketa baterij s funkcijami, določenimi v predpostavkah:



preveri enote!

Vhodni tok

Količina

Elektrika, v omrežju, CN

35.208 kWh

Baterijska celica, litij-ionska baterija

192 predmetov

Vroče valjana pločevina, jeklo, v obratu - ZDA

47 kg

Transport, čezoceanska tovorna ladja, povprečna mešanica goriva - RNA

2546,06 tkm

Tiskana ožična plošča

537,6 g

transport, kombinirani tovornjak, na dizelski pogon - US

332,52 tkm

Izhodni tok

Količina

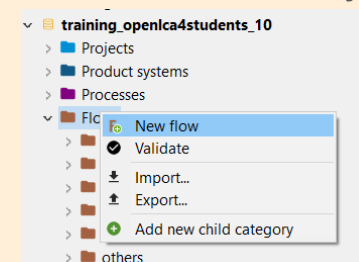
Baterijski paket

1 element

Toplota, odpadki (osnovni tok -> zrak -> nedoločeno)

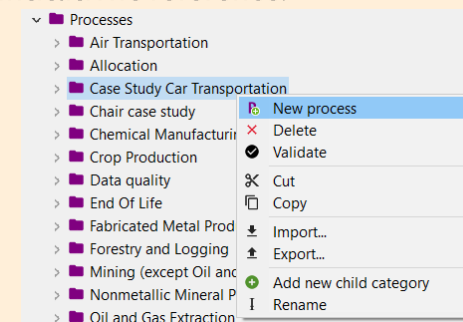
126.162 MJ

- Najprej ustvarite tok izdelka »baterija«



Lastnost referenčnega toka: število elementov

- Ustvarite **proces** v mapi »Case Study Car Transportation« z uporabo toka »Battery pack« kot kvantitativne reference.



- procesu** dodajte preostale vhode in izhode.
- Dodajte količine in prilagodite enote.

Modeliranje z openLCA



Modeliranje s produktnimi tokovi

- Privzeti dobavitelj je lahko nastavljen za vsako menjavo (Exchange)
- Dobavitelj je proces, ki zagotavlja ta produkt (kot izhod)

Inputs/Outputs: transport, passenger train | transport, passenger train | Cutoff, U - BE



▼ Inputs

+ × 1.23

Flow	Category	Amount	Unit	Co...	Unc...	Avoided wa...	Provider	Data quality...	Location	Description
diesel	192:Ma...	0.00111	kg		logn...		market for diesel diesel Cutoff, U - Europe without Switzerland	(2; 3; 5; 3; 1)		Energy use ...
electricity, high voltage	351:Ele...	0.11287	k...		logn...		diesel production, petroleum refinery operation diesel Cutoff, U - RoW			Energy use ...
maintenance, train, passe...	331:Re...	4.06240E-10	l...		logn...		diesel production, petroleum refinery operation diesel Cutoff, U - ZA			culated v...
railway track	421:Co...	0.00010	m...		logn...		diesel, import from RoW diesel Cutoff, U - BR			Spold01...
train, passenger, long-dis...	302:Ma...	4.06240E-10	l...		logn...		diesel, import from RoW diesel Cutoff, U - CO			culated v...
							diesel, import from RoW diesel Cutoff, U - IN			
							diesel, import from RoW diesel Cutoff, U - PE			
							diesel, import from RoW diesel Cutoff, U - ZA			
							market for diesel diesel Cutoff, U - BR			
							market for diesel diesel Cutoff, U - CH			
							market for diesel diesel Cutoff, U - CO			
							market for diesel diesel Cutoff, U - Europe without Switzerland			

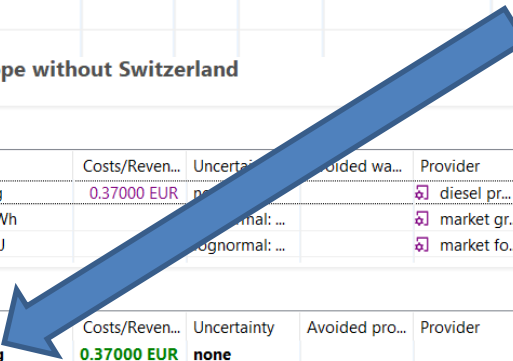
Inputs/Outputs: market for diesel | diesel | Cutoff, U - Europe without Switzerland

▼ Inputs

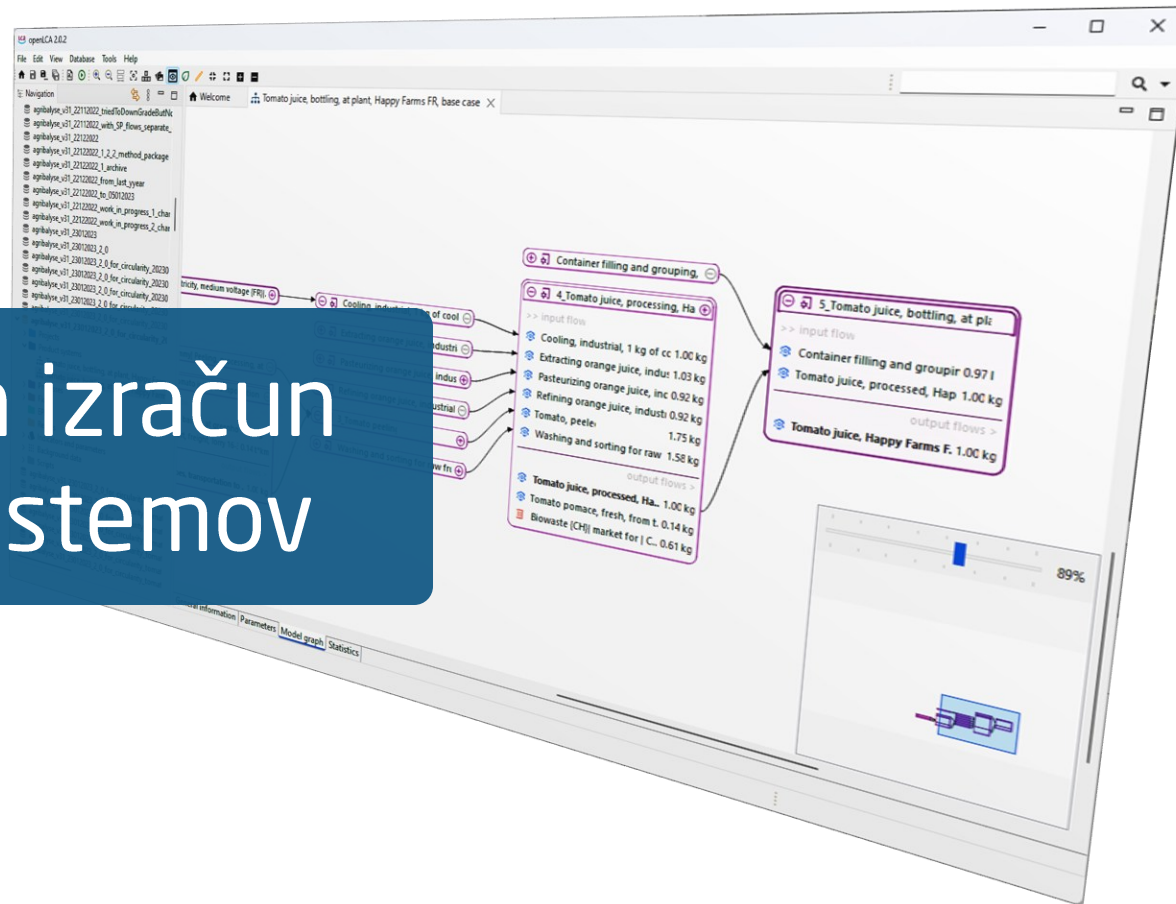
Flow	Category	Amount	Unit	Costs/Reven...	Uncertainty	Avoided wa...	Provider	De
diesel	192:Manufacture of refined...	1.00000	kg	0.37000 EUR	normal: ...		diesel pr...	
electricity, low voltage	351:Electric power generati...	0.00670	kWh		lognormal: ...		market gr... (2;	
heat, central or small-scal...	353:Steam and air conditio...	0.00058	MJ		lognormal: ...		market fo... (2;	

▼ Outputs

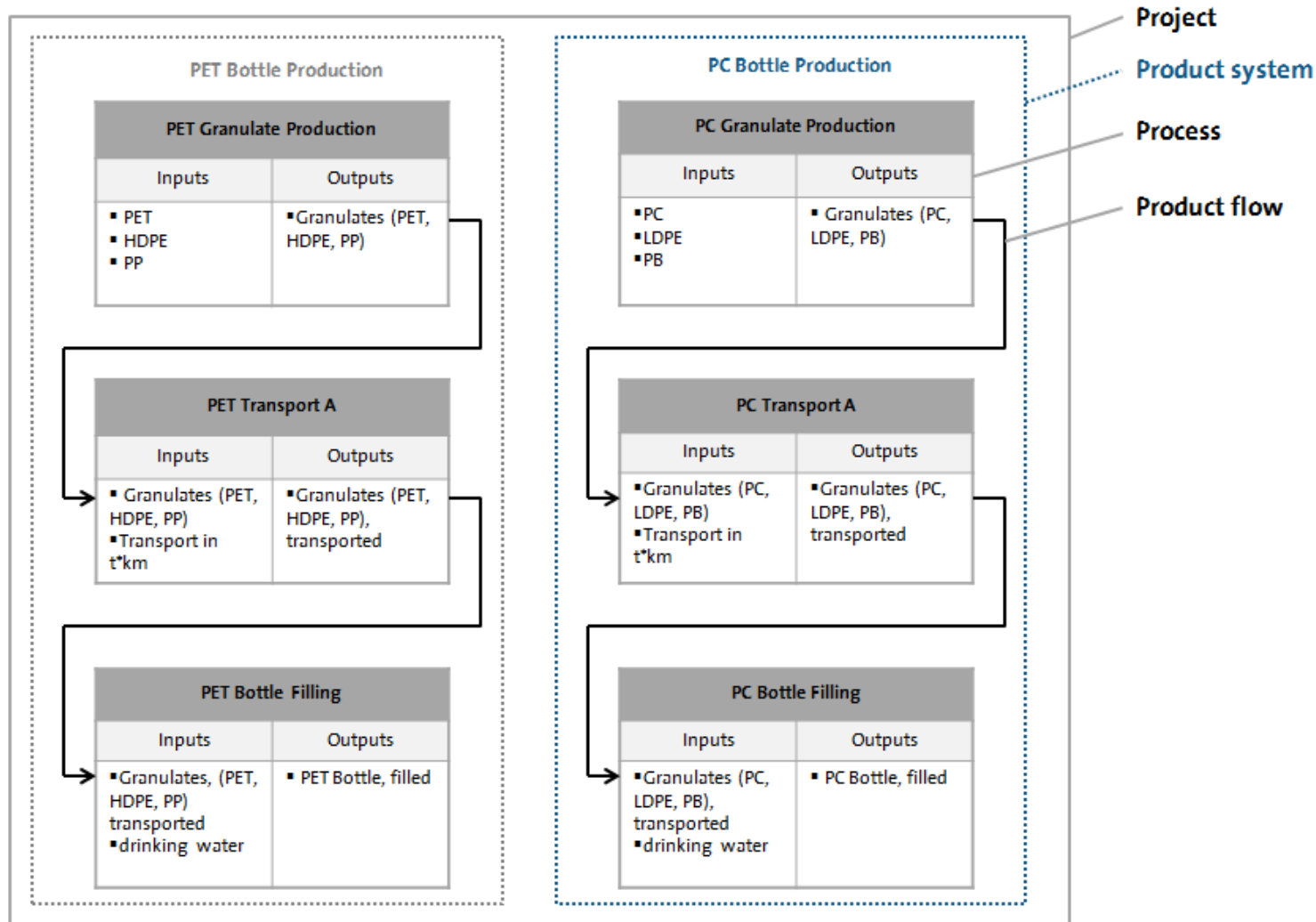
Flow	Category	Amount	Unit	Costs/Reven...	Uncertainty	Avoided pro...	Provider	De
diesel	192:Manufacture of refin...	1.00000	kg	0.37000 EUR	none			
fly ash and scrubber slud...	382:Waste treatment and d...	0.00017	kg		lognormal: ...		market fo... (2;	
municipal solid waste	382:Waste treatment and d...	6.27000E-6	kg		lognormal: ...		market gr... (2;	
rainwater mineral oil stor...	370:Sewerage/3700:Sewera...	7.50000E-5	m3	-6.97199F-6...	lognormal: ...		market fo... (4;	



Ustvarjanje in izračun produktnih sistemov



Modeliranje v openLCA: produktni sistem



Produktni sistem: Ustvarjanje

Produktni sistem: Ustvarjanje

1. Kliknite na »Ustvari produktni sistem« v zavihku Splošne informacije

The screenshot displays the ecoinvent software interface. On the left is a navigation tree with categories like 'Projects', 'Product systems', and 'Processes'. The main window shows the 'General information' tab for a product system named 'coconut oil production, crude | coconut oil, crude | Cutoff, U - PH'. The 'Description' field contains detailed text about the dataset's origin and updates. Below the description, there are buttons for 'Create product system', 'Direct calculation', and 'Export to Excel'. A green callout box with a white arrow points to the 'Create product system' button, containing the text: '1. Kliknite na » Create product system« v zavihku Splošne informacije'.

Izdelek sistem: Stvarjenje (II)

LCA

New product system

Name

Reference process

Auto-link processes
 Check multi-provider links (experimental)

Provider linking

Ignore default providers
 Prefer default providers
 Only link default providers

Preferred process type

Unit process
 System process

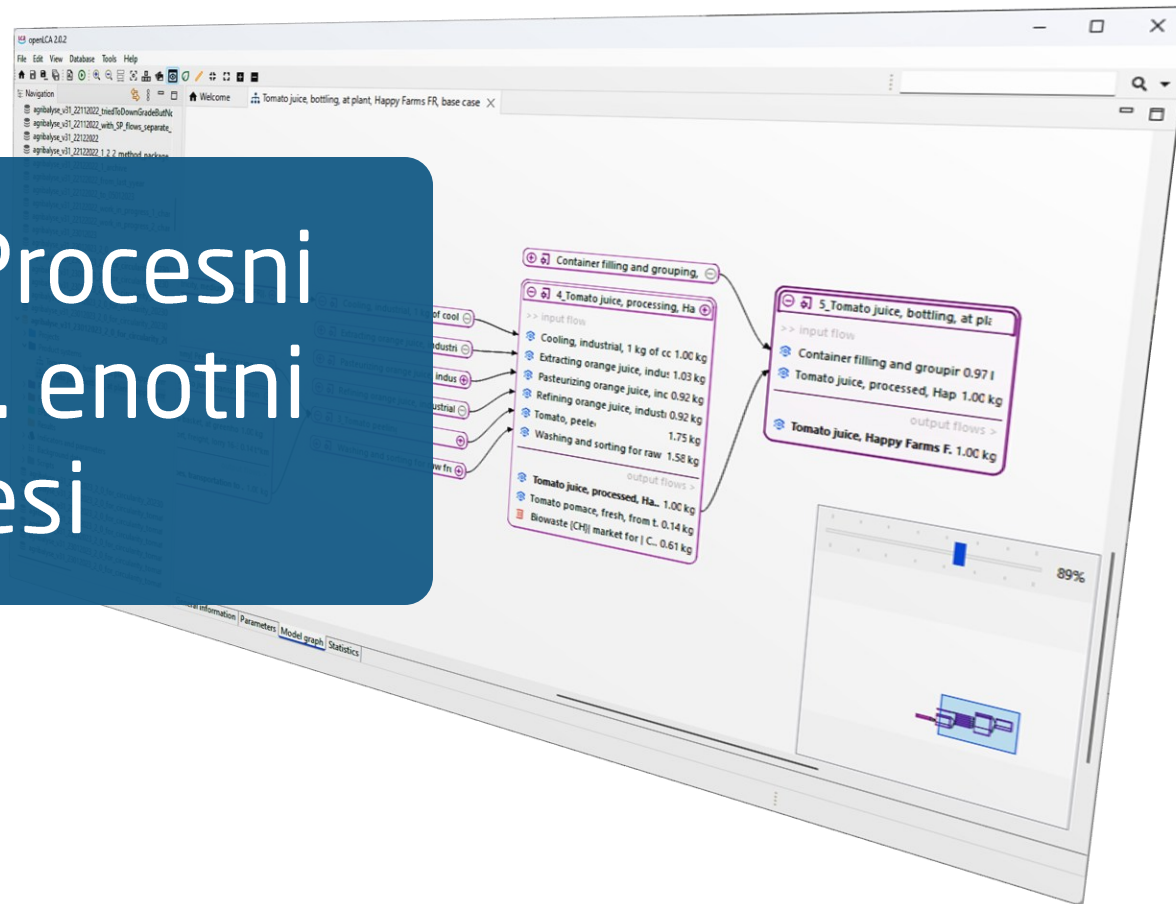
Start-off

Finish Cancel

2. Poimenujte produktni sistem in izberite referenčni proces

3. Izberite zelene možnosti modeliranja

Dodatek: Procesni sistemi vs. enotni procesi



Kakšna je razlika?

Oba procesa sta namenjena proizvodnji koles

Inputs/Outputs: bicycle production | bicycle | Cutoff, U - RER

Inputs

Flow	Category	Amount	Unit	Costs/Re...	Uncertai...	Avoidec
Aluminium	Resource/in ground	6.22153	kg		none	
Anhydrite	Resource/in ground	1.31351E...	kg		none	
Antimony	Resource/in ground	2.24515E...	kg		none	
Argon-40	Resource/in air	0.02252	kg		none	
Arsenic	Resource/in ground	7.53473E...	kg		none	
Barium	Resource/in ground	0.06701	kg		none	
Basalt	Resource/in ground	0.00900	kg		none	
Borax	Resource/in ground	1.04062E...	kg		none	
Boron	Resource/in ground	8.36654E...	kg		none	
Bromine	Resource/in water	1.35318E...	kg		none	
Cadmium	Resource/in ground	1.50582E...	kg		none	
Calcite	Resource/in ground	4.12170	kg		none	

Outputs

Flow	Category	Amount	Unit	Costs/Re...	Uncertai...	Avoidec
1,2-Dichlorobenze...	Emission to air/high ...	2.98856E...	kg		none	
1,2-Dichlorobenze...	Emission to water/su...	9.07175E...	kg		none	
1,3-Dioxolan-2-one	Emission to water/u...	1.35174E...	kg		none	
1,4-Butanediol	Emission to air/high ...	2.17547E...	kg		none	
1,4-Butanediol	Emission to water/su...	5.00358E...	kg		none	
1-Pentanol	Emission to air/high ...	1.43931E...	kg		none	
1-Pentanol	Emission to water/su...	3.45437E...	kg		none	
1-Pentene	Emission to air/high ...	1.67038E...	kg		none	
1-Pentene	Emission to water/su...	2.61042E...	kg		none	
2,2,4-Trimethyl pe...	Emission to air/unspe...	9.16497E...	kg		none	
2,4-D	Emission to air/low ...	6.56607E...	kg		none	
2,4-D	Emission to soil/agri...	7.32983E...	kg		none	

Inputs/Outputs: bicycle production | bicycle | Cutoff, U - RER

Inputs

Flow	Category	Amount	Unit	C
aluminium, wrought alloy	242:Manufacture of ...	7.53250	kg	
chromium steel removed by turning, average, co...	259:Manufacture of ...	0.15900	kg	
electricity, medium voltage	351:Electric power g...	6.89020	kWh	
heat, district or industrial, natural gas	353:Steam and air co...	13.58025	MJ	
heat, district or industrial, other than natural gas	353:Steam and air co...	0.19270	MJ	
injection moulding	222:Manufacture of ...	1.95750	kg	
polyethylene, high density, granulate	201:Manufacture of ...	1.95750	kg	
polyurethane, flexible foam	201:Manufacture of ...	0.03000	kg	
powder coat, aluminium sheet	259:Manufacture of ...	0.35000	m2	
road vehicle factory	410:Construction of ...	9.36930E...	Item(s)	
section bar extrusion, aluminium	242:Manufacture of ...	3.76630	kg	

Outputs

Flow	Category	Amount	Unit	C
bicycle	309:Manufacture o...	1.00000	Item...	1
municipal solid waste	382:Waste treatment...	4.50000	kg	
used bicycle	383:Materials recove...	1.00000	Item(s)	
wastewater, average	370:Sewerage/3700:S...	0.00073	m3	
wastewater, average	370:Sewerage/3700:S...	1.82394E...	m3	
Water	Emission to air/unspe...	0.00011	m3	

Oba procesa sta namenjena proizvodnji koles

Inputs/Outputs: bicycle production | bicycle | Cutoff, U - RER

Inputs

Flow	Category	Amount	Unit	Costs/Re...	Uncertai...	Avoidec
Aluminium	Resource/in ground	6.22153	kg		none	
Anhydrite	Resource/in ground	1.31351E...	kg		none	
Antimony	Resource/in ground	2.24515E...	kg		none	
Argon-40	Resource/in air	0.02252	kg		none	
Arsenic	Resource/in ground	7.53473E...	kg		none	
Barium	Resource/in ground	0.06701	kg		none	
Basalt	Resource/in ground	0.00900	kg		none	
Borax	Resource/in ground	1.04062E...	kg		none	
Boron	Resource/in ground	8.36654E...	kg		none	
Bromine	Resource/in water	1.35318E...	kg		none	
Cadmium	Resource/in ground	1.50582E...	kg		none	
Calcite	Resource/in ground	4.12170	kg		none	

Outputs

Flow	Category	Amount	Unit	Costs/Re...	Uncertai...	Avoidec
1,2-Dichlorobenze...	Emission to air/high ...	2.98856E...	kg		none	
1,2-Dichlorobenze...	Emission to water/su...	9.07175E...	kg		none	
1,3-Dioxolan-2-one	Emission to water/u...	1.35174E...	kg		none	
1,4-Butanediol	Emission to air/high ...	2.17547E...	kg		none	
1,4-Butanediol	Emission to water/su...	5.00358E...	kg		none	
1-Pentanol	Emission to air/high ...	1.43931E...	kg		none	
1-Pentanol	Emission to water/su...	3.45437E...	kg		none	
1-Pentene					none	
1-Pentene					none	
1-Pentene					none	
2,2,4-Trimethyl...					none	
2,4-D					none	
2,4-D					none	

Sistemski proces

Inputs/Outputs: bicycle production | bicycle | Cutoff, U - RER

Inputs

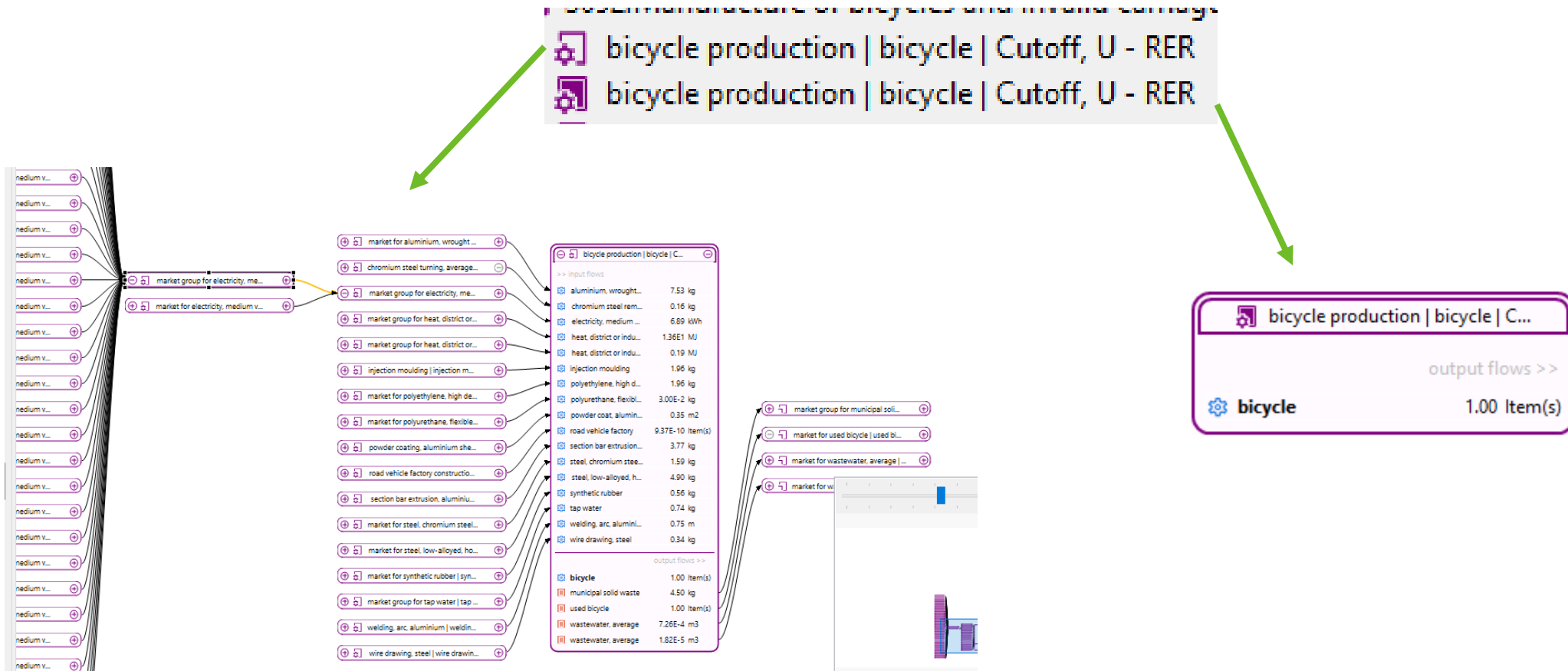
Flow	Category	Amount	Unit	C
aluminium, wrought alloy	242:Manufacture of ...	7.53250	kg	
chromium steel removed by turning, average, co...	259:Manufacture of ...	0.15900	kg	
electricity, medium voltage	351:Electric power g...	6.89020	kWh	
heat, district or industrial, natural gas	353:Steam and air co...	13.58025	MJ	
heat, district or industrial, other than natural gas	353:Steam and air co...	0.19270	MJ	
injection moulding	222:Manufacture of ...	1.95750	kg	
polyethylene, high density, granulate	201:Manufacture of ...	1.95750	kg	
polyurethane, flexible foam	201:Manufacture of ...	0.03000	kg	
powder coat, aluminium sheet	259:Manufacture of ...	0.35000	m2	
road vehicle factory	410:Construction of ...	9.36930E...	Item(s)	
section bar extrusion, aluminium	242:Manufacture of ...	3.76630	kg	

Outputs

Flow	Category	Amount	Unit	C
09:Manufacture o...		1.00000	Item...	
2:Waste treatment...		4.50000	kg	
3:Materials recove...		1.00000	Item(s)	
0:Sewerage/3700:S...		0.00073	m3	
0:Sewerage/3700:S...		1.82394E...	m3	
Water	Emission to air/unsp...	0.00011	m3	

Enotni (unit) proces

Oba procesa sta namenjena proizvodnji koles (modelni graf)



Podatkovni nizi v LCI bazah podatkov

- Sistemski procesi v primerjavi z enotnimi procesi v modelnem grafu openLCA

Sistemski proces

Enotni proces

esters of versatic acid, at ...

acrylic binder, 34% in H2O, at plant - RER

>> input flows

Butyl acrylate, at plant/RER U	7.40E-2 kg
Chemical plant, organics/RER/I U	4.00E-10 Item(s)
Disposal, paint remains, 0% water,...	3.00E-2 kg
electricity, medium voltage, produ...	0.10 kWh
Esters of versatic acid, at plant/RE...	0.12 kg
Hard coal, burned in industrial fur...	0.37 MJ
Heat, heavy fuel oil, at industrial f...	0.22 MJ
Heat, light fuel oil, at industrial fur...	5.00E-2 MJ
Natural gas, burned in industrial f...	0.55 MJ
transport, freight, lorry, fleet avera...	4.72E-2 t*km
transport, freight, rail/tkm/RER U	0.28 t*km
Vinyl acetate, at plant/RER U	0.27 kg

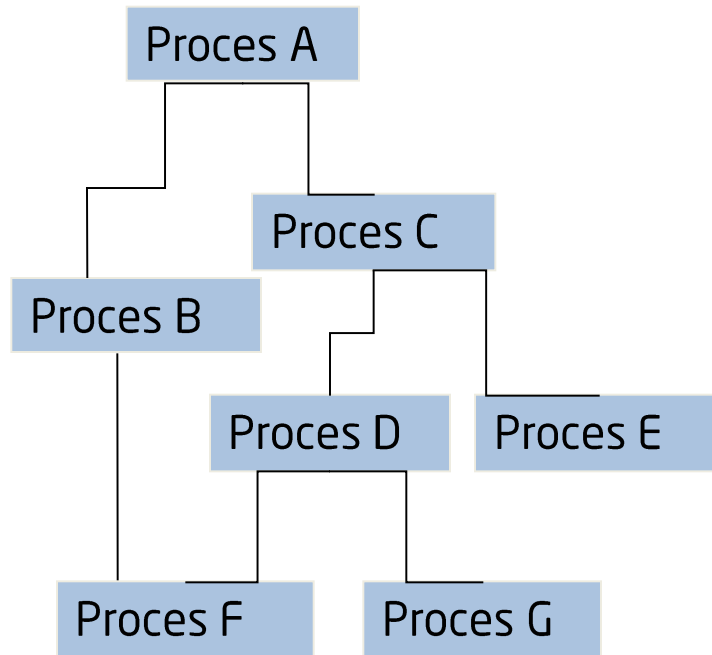
output flows >>

Acrylic binder, 34% in H2O, at plant/RER...	1.00 kg
--	----------------

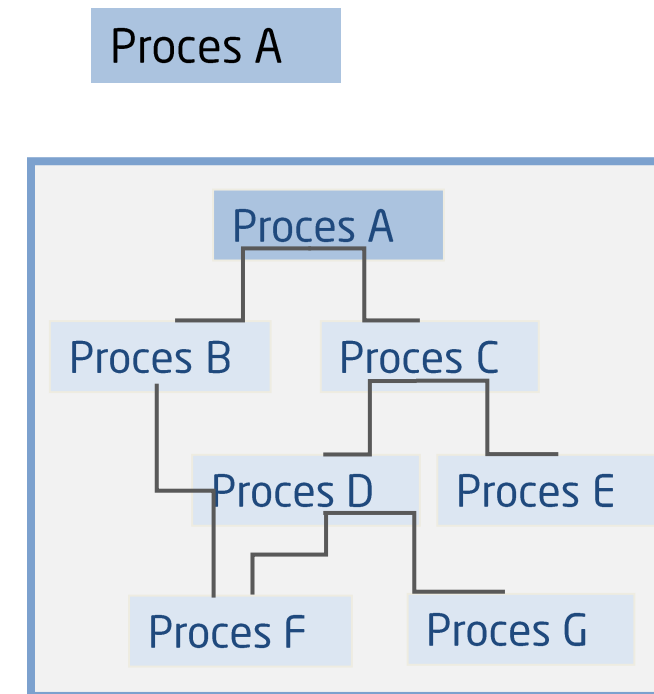
Podatkovni nizi v LCI bazah podatkov

- Baza podatkov Ecoinvent vključuje enotne in sistemske procese

Enotni procesi: omrežje (za celovite analize LCA)



Sistemske (LCI) procese: kumulativni podatki (za preliminarne ocene)



Sistem proizvod: Splošne informacije

The screenshot displays a software interface with a navigation pane on the left and a main content area on the right. The navigation pane shows a tree structure under 'ecoinvent_38_cutoff_3011_with_methods', including categories like 'Projects', 'Product systems', and 'Processes'. The main content area shows the 'General information' for a specific process.

Navigation Pane:

- agribalyse_v301_exam
 - ecoinvent_38_cutoff_3011_with_methods
 - Projects
 - Product systems
 - Processes
 - A:Agriculture, forestry and fishing
 - B:Mining and quarrying
 - C:Manufacturing
 - D:Electricity, gas, steam and air conditioning supply
 - E:Water supply; sewerage, waste management and rer
 - F:Construction
 - G:Wholesale and retail trade; repair of motor vehicles
 - H:Transportation and storage
 - I:Accommodation and food service activities
 - J:Information and communication
 - M:Professional, scientific and technical activities
 - N:Administrative and support service activities
 - S:Other service activities
 - Test - KiRRre
 - Ash treatment
 - carbon dioxide production, liquid | carbon dioxide, lic
 - Test
 - Textile
 - Flows
 - EPDs
 - Results
 - Indicators and parameters
 - Background data
 - ecoinvent_38_cutoff_3011_with_methods_1_
 - ecoinvent_38_cutoff_3011_with_methods_1__1
 - ecoinvent_38_cutoff_3011_with_methods_HR
 - ecoinvent_38_cutoff_3011_with_methods_HR_1
 - ecoinvent_38_cutoff_3011_with_methods_testoLCA2
 - ecoinvent_38_cutoff_lci_3011_with_methods
 - ecoinvent_38_cutoff_lci_3011_with_methods_1_

General information: coconut oil production, crude | coconut oil, crude | Cutoff, U

General information

Name

Category

Description

Version Last change 2023-07-07 14:49:47 UUID 6c10b918-519c-4d8f-9233-26d460ea3b0b

Tags

Reference

Process

Product

Flow property

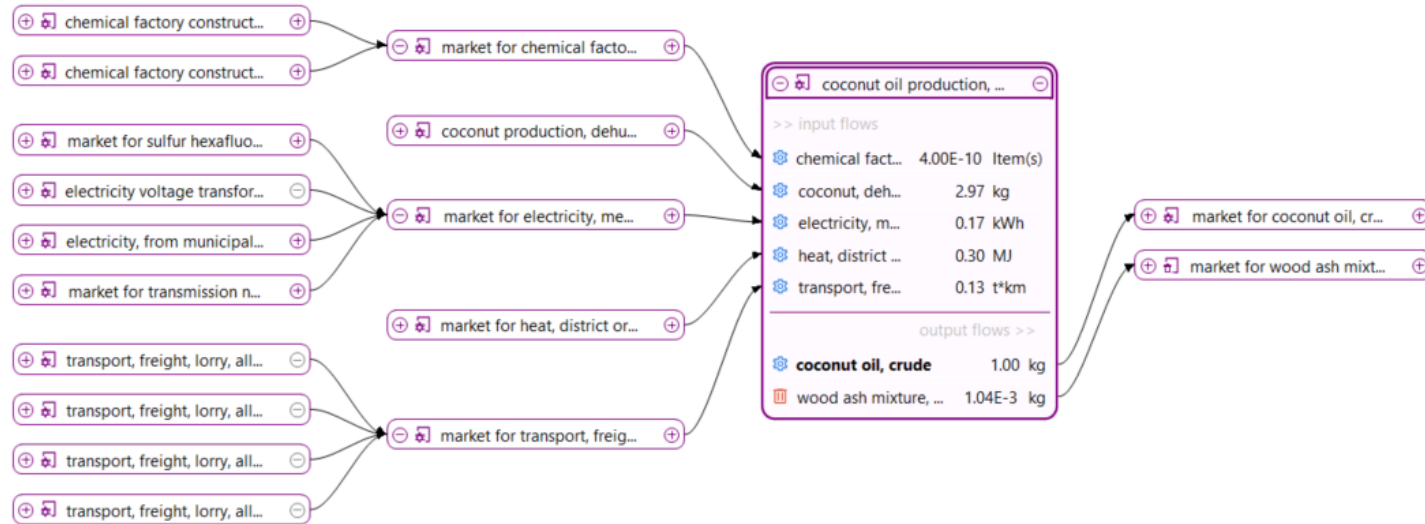
Unit

Target amount

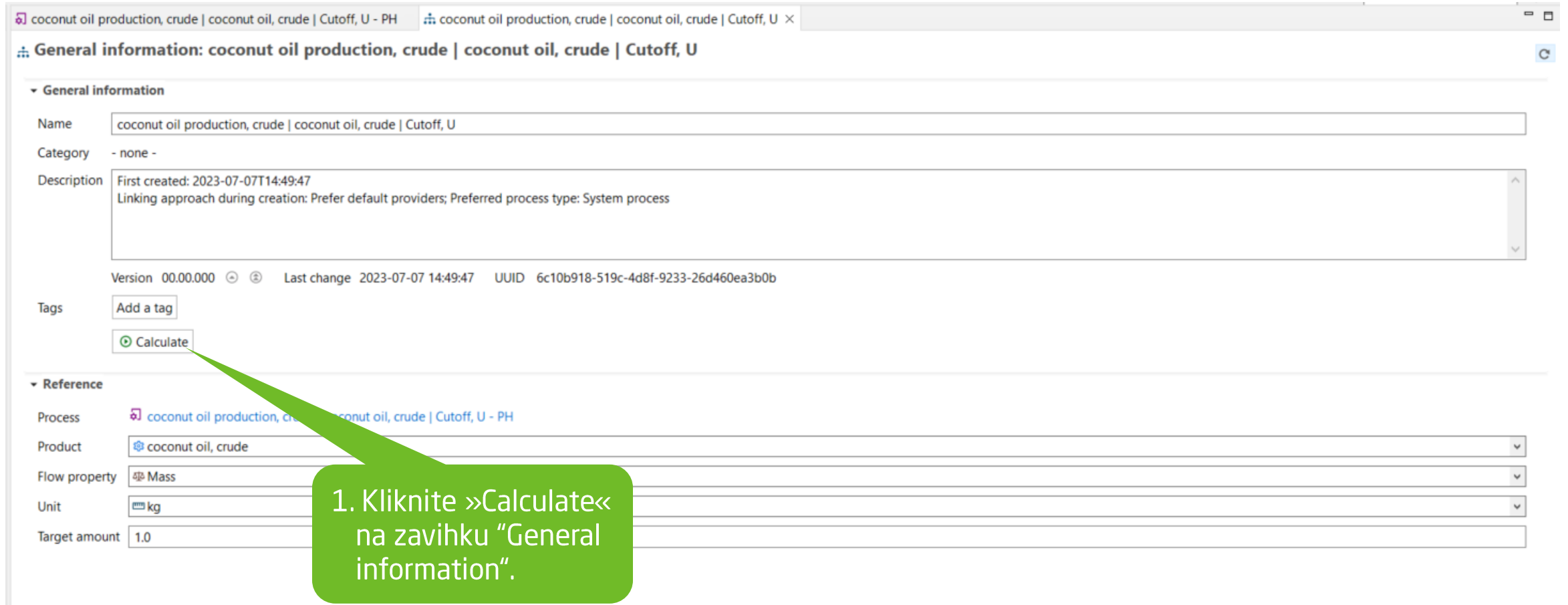
General information Parameters Model graph Statistics

Sistem proizvodnja: Modelni graf

coconut oil production, crude | coconut oil, crude | Cutoff, U - PH coconut oil production, crude | coconut oil, crude | Cutoff, U ×



Sistem proizvod: Izračun



coconut oil production, crude | coconut oil, crude | Cutoff, U - PH

coconut oil production, crude | coconut oil, crude | Cutoff, U

General information: coconut oil production, crude | coconut oil, crude | Cutoff, U

General information

Name: coconut oil production, crude | coconut oil, crude | Cutoff, U

Category: - none -

Description: First created: 2023-07-07T14:49:47
Linking approach during creation: Prefer default providers; Preferred process type: System process

Version: 00.00.000 Last change: 2023-07-07 14:49:47 UUID: 6c10b918-519c-4d8f-9233-26d460ea3b0b

Tags: Add a tag

Calculate

Reference

Process: coconut oil production, crude | coconut oil, crude | Cutoff, U - PH

Product: coconut oil, crude

Flow property: Mass

Unit: kg

Target amount: 1.0

1. Kliknite »Calculate« na zavihku "General information".

Izračun rezultatov

- »Lazy/On-demand« izračuna rezultate sproti, »Eager/All« pa omogoča več zavihkov za vizualizacijo rezultatov.

2. Končne nastavitve:
izberite metodo
razmejitve (allocation)
in metodo LCIA

Calculation properties
Please select the properties for the calculation

Allocation method: As defined in processes

Impact assessment method: CML-IA baseline

Normalization and weighting set: [empty]

Calculation type: Lazy/On-demand Eager/All Monte Carlo Simulation

Regionalized calculation
 Include cost calculation
 Assess data quality

< Back Next > **Finish** Cancel

Analiza: Rezultati inventarja

Transport person diesel car (parametrized)_new

Inputs

Name	Category	Amount	Unit
> Aluminum ingot, production mix, at plant - RNA	Product flows	0.00030	kg
Bituminous coal, at mine - US	Product flows	5.86568E-5	kg
Electricity, bituminous coal, at power plant - US	Utilities/Fossil Fuel Electric Power Generation	5.86568E-5	kg
> Bituminous coal, combusted in industrial boiler - RNA	Product flows	2.30651E-6	kg
> Carbon dioxide	Elementary flows/Resource/in air	7.00294E-7	kg
> Carbon dioxide, in air	Elementary flows/Resource/in air	2.24515E-6	kg
> Copper, at regional storage	Product flows	3.50625E-5	kg
> Diesel, at refinery - US	Product flows	5.95833E-10	m3
> Diesel, combusted in industrial boiler - RNA	Product flows	9.37111E-10	m3
> Diesel, combusted in industrial equipment - RNA	Product flows	4.36359E-10	m3

Don't show < 1 %

Če za tok produkta na vhodni strani procesa ni določenega dobavitelja, bo ta tok prikazan kot del inventarja.

Outputs

Name	Category	Amount	Unit
> 2,4-D	Elementary flows/air/low population density	1.95585E-13	kg
> 2,4-D	Elementary flows/water/unspecified	8.37038E-15	kg
2-Hexanone	Elementary flows/water/unspecified	1.75450E-11	kg
Crude oil, at production - RNA	Oil and Gas Extraction/Crude Petroleum and Natural Gas Ext.	1.66584E-11	kg
Natural gas, at extraction site - RNA	Oil and Gas Extraction/Crude Petroleum and Natural Gas Ext.	8.25477E-13	kg
> 4-Methyl-2-pentanone	Elementary flows/water/unspecified	2.20204E-14	kg
> Acenaphthene	Elementary flows/air/unspecified	1.62551E-14	kg
> Acenaphthylene	Elementary flows/air/unspecified	7.94429E-15	kg
> Acephate	Elementary flows/air/low population density	1.80668E-11	kg
> Acephate	Elementary flows/water/unspecified	7.74881E-13	kg

Don't show < 1 %

V nasprotnem primeru so prikazani samo osnovni (elementarni) tokovi.

Total requirements

Process	Product	Amount	Unit
Case Study Car Transportation			
basic processes			
Car, diesel-powered	Car, diesel-powered	2.50000E-6	Item(s)
Transport person diesel car (parametrized)	Person transport	1.00000	p*km

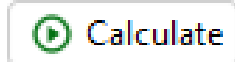
Možno je preveriti, kateri procesi prispevajo k določenemu toku.

Vaja 4b:

Proizvodna faza baterije - Modeliranje in izračun

Ustvarite sistem izdelkov »Battery pack« z referenčnim izdelkom »Battery pack«

- Izberite samodejno povezavo
- Preverite različne poglede grafa modela. Kaj lahko opazimo na grafu?
- Izračunajte inventar sistema izdelkov (uporabite gumb za izračun, ne izberite metode LCIA)

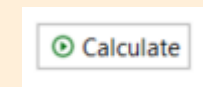


- Katere informacije lahko izpeljete iz popisa?
- 10 min

Namig!

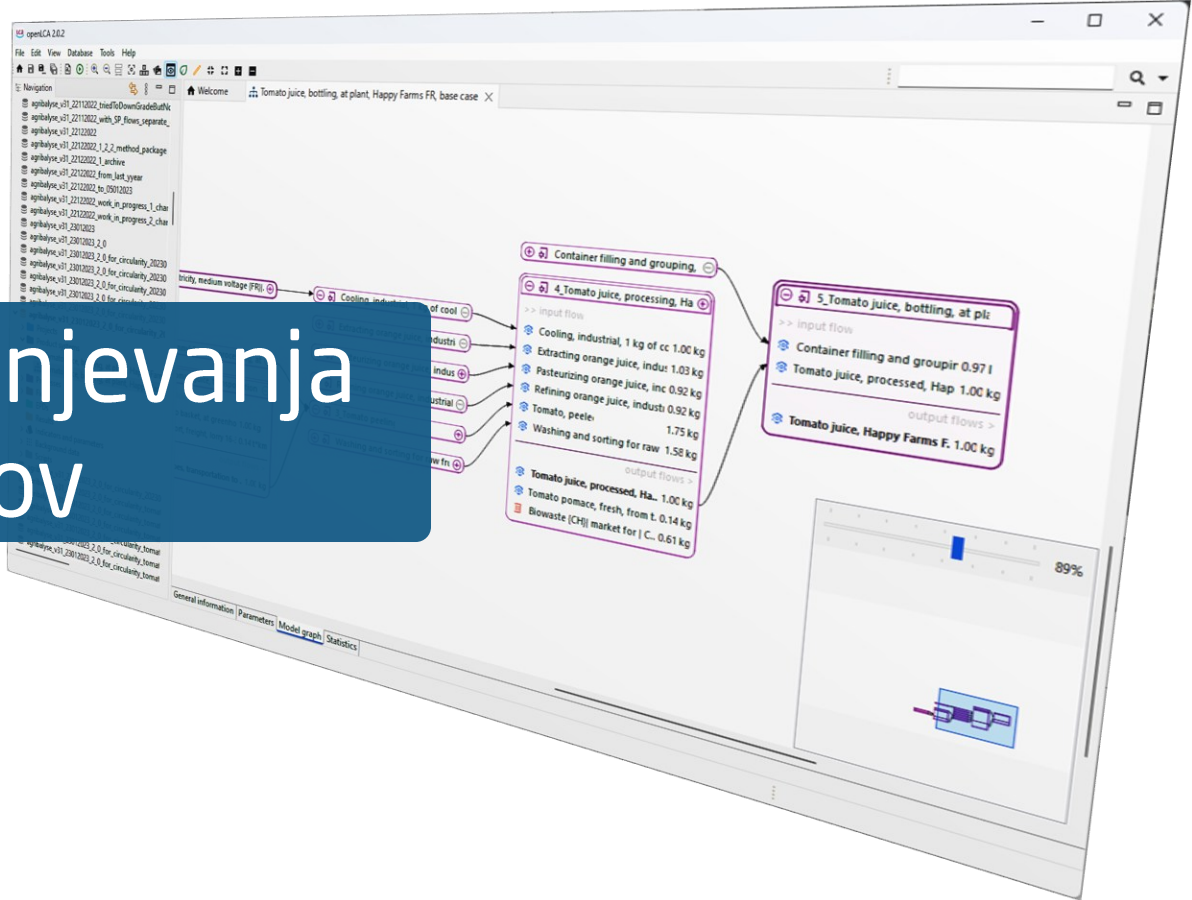
- Najprej odprite proces »Battery pack« in ustvarite sistem izdelkov.

- Odprite »Battery Pack« sistema izdelka in izberite »Izračunaj«.

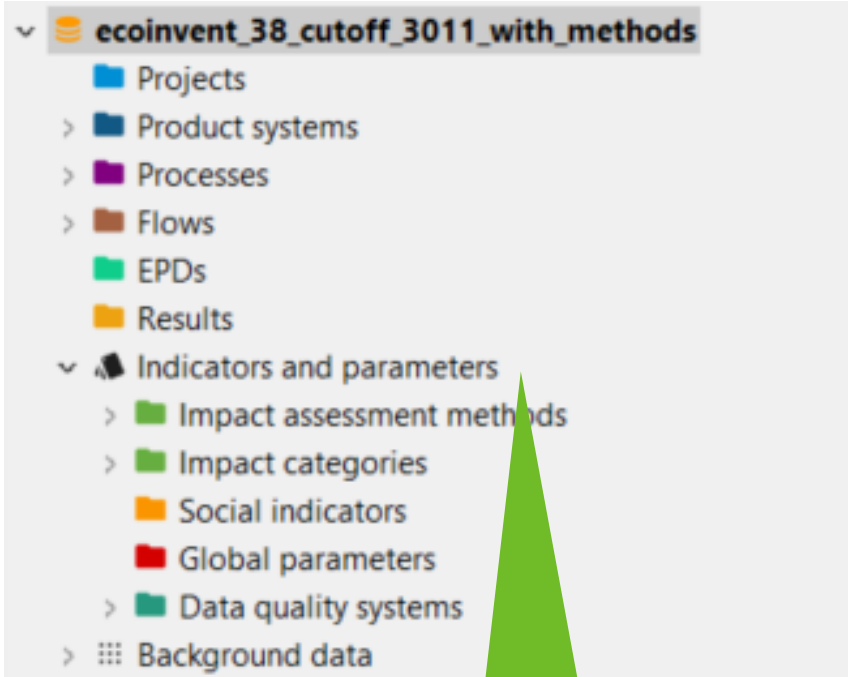


- Kliknite »Dokončaj« in preverite rezultate.

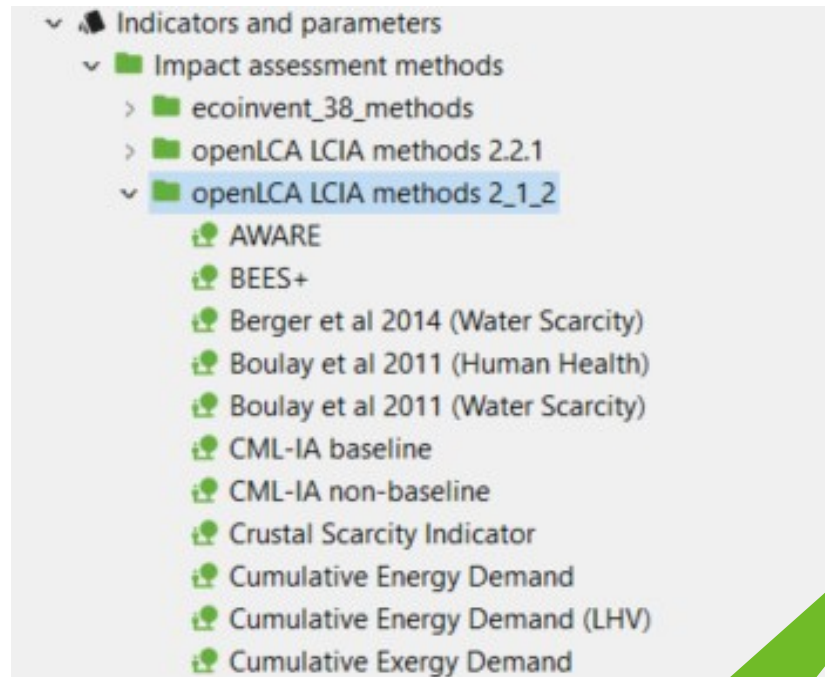
Metode ocenjevanja vplivov



Metode ocenjevanja vplivov



Metode so že na voljo za openLCA



Metode LCIA lahko vključujejo več kategorij vplivov



Metode ocenjevanja vplivov

The screenshot displays the configuration page for the 'ILCD 2011 Midpoint+' method. It is divided into two main sections: 'General information' and 'Impact categories'.

General information:

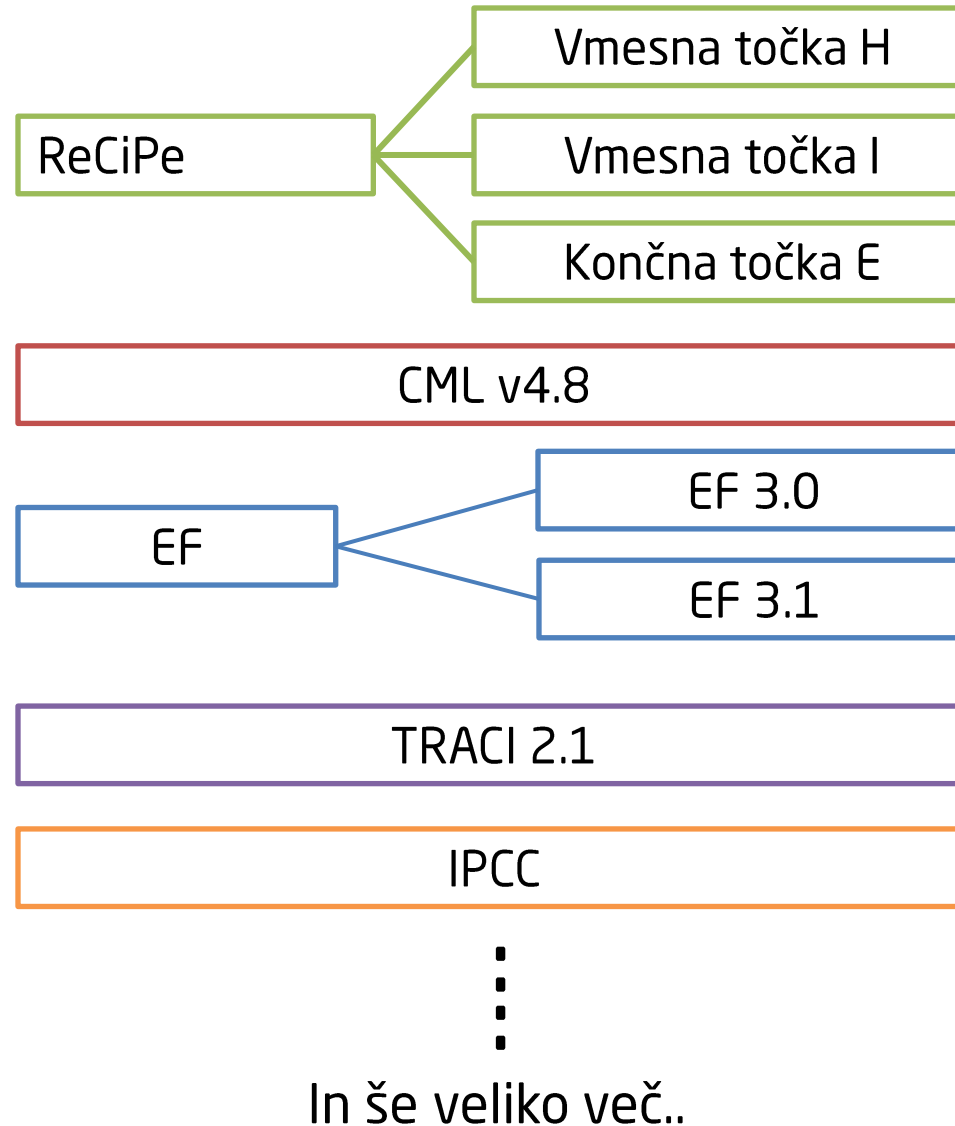
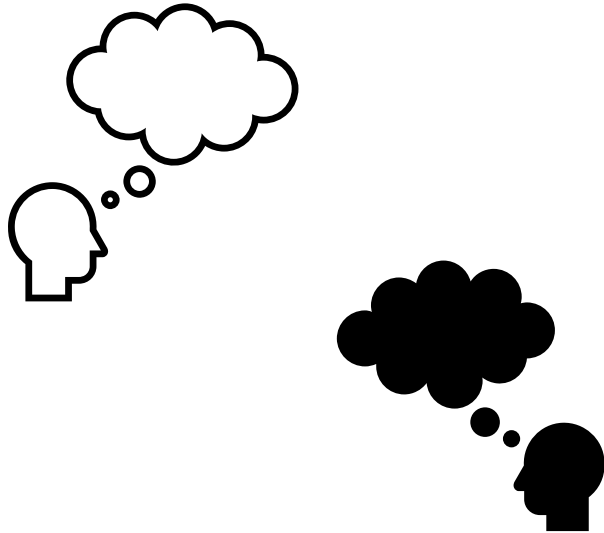
- Name:** ILCD 2011 Midpoint+
- Category:** openLCA LCIA methods 2_1_2
- Description:** Method included in openLCA LCIA method package 2.1.2
Compatible with:
 - ecoinvent v3.6, v3.7, v3.8
 - Eugeos
- Version:** 00.00.051
- Last change:** 2021-11-24 07:11:47
- UUID:** 84b7e3f4-2898-3d5a-980a-faea0b995bdb
- Tags:** Add a tag
- Source:** - none -
- Code:** (empty field)

Impact categories:

Name	Description	Reference unit		
Acidification		molc H+ eq		
Climate change		kg CO2 eq		
Freshwater ecotoxicity		CTUe		
Freshwater eutrophication		kg P eq		
Human toxicity, cancer effects		CTUh		
Human toxicity, non-cancer effects		CTUh		
Ionizing radiation E (interim)		CTUe		
Ionizing radiation HH		kBq U235 eq		
Land use		kg C deficit		
Marine eutrophication		kg N eq		
Mineral, fossil & ren resource depletion		kg Sb eq		
Ozone depletion		kg CFC-11 eq		
Particulate matter		kg PM2.5 eq		
Photochemical ozone formation		kg NMVOC eq		
Terrestrial eutrophication		molc N eq		
Water resource depletion		m3 water eq		

Navigation tabs at the bottom: General information | Normalization and weighting

Za razmislek: katero metodo za ocenjevanje vplivov bi morali uporabiti?



Dejavniki, ki jih je treba upoštevati pri izbiri metode za ocenjevanje vplivov

- Preverite, ali je za izpolnjevanje standarda zahtevana določena metoda LCIA ali kategorije vplivov
 - (npr. pravila kategorij izdelkov za EPD-je, študije PEF...)
- Združljivost z izhodiščno bazo podatkov (inventarni tokovi morajo biti zajeti z izbrano metodo)
- Vse metode ne zajemajo enakih kategorij vplivov → izberite kategorije glede na:
 - cilje in obseg študije
 - žarišča sektorja/izdelka
 - prednostne naloge podjetja in strategije trajnostnega razvoja
 - interes družbenih deležnikov
- Primerjalne LCA - kadar primerjate podobne produkte
- Prostorska in časovna pokritost: nekatere metode so lahko osredotočene na določene geografske regije ali časovna obdobja

<https://eplca.jrc.ec.europa.eu/uploads/ILCD-Recommendation-of-methods-for-LCIA-def.pdf>

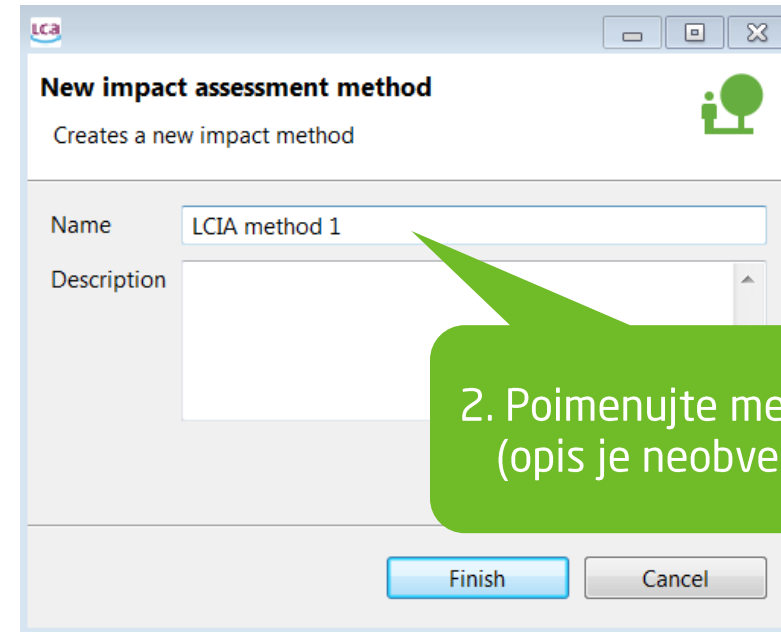
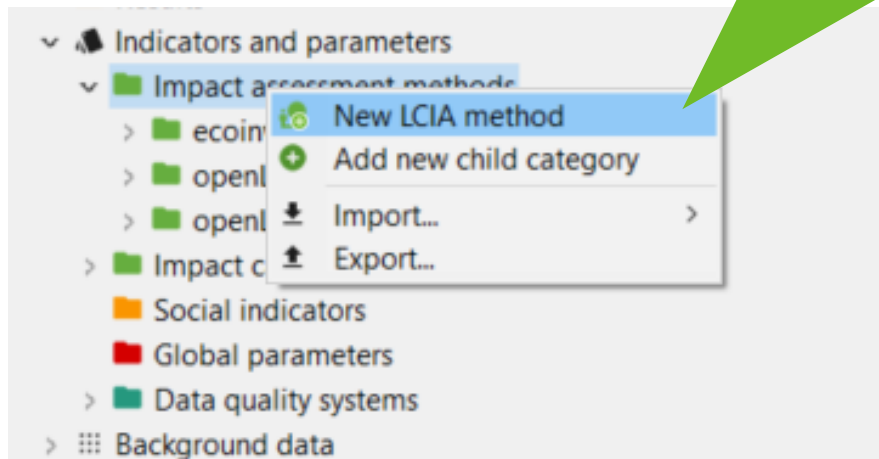
Pregled: Metode ocenjevanja vplivov

	voda Uporaba	Poraba energije	Raba zemljišč	Zakisljeva nje	Podnebne spremem be	Izčrpavanj e virov	Ecotoxi - mesto	Evtrofikac ija	Strupeno st za človeka	Ionizirajoč e sevanje	Tanjšanje ozonskeg a plašča	Trdni delci	Fotokemič na oksidacija	Najnovejši ali izvirni vir
Enkratna uporaba														
AWARE	✓	-	-	-	-	-	-	-	-	-	-	-	-	Boulay et al. (2018)
CEД	-	✓	-	-	-	-	-	-	-	-	-	-	-	Frischknecht idr. (2007)
IPCC	-	-	-	-	✓	-	-	-	-	-	-	-	-	IPCC (2021)
USEtox 2	-	-	-	-	-	-	✓	-	✓	-	-	-	-	USEtox (2016+)
Multiple Use														
ReCiPe	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Huibregts et al. (2017)
Environmental Footprint	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JRC (2022)
CML	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	Guinée et. al (2002)
TRACI	-	-	-	✓	✓	✓	✓	✓	✓	-	✓	-	✓	Goli (2021)

<https://epca.jrc.ec.europa.eu/uploads/ILCD-Handbook-LCIA-Background-analysis-online-12March2010.pdf>

Metode ocenjevanja vplivov: Ustvarjanje

1. Z desno tipko kliknite mapo
»Impact assessment methods«
in izberite »New LCIA method«



A screenshot of the 'New impact assessment method' dialog box. The title bar says 'LCA'. The main title is 'New impact assessment method' and the subtitle is 'Creates a new impact method'. There is a green icon of a person and a tree. The 'Name' field is filled with 'LCIA method 1' and the 'Description' field is empty. At the bottom, there are 'Finish' and 'Cancel' buttons.

2. Poimenujte metodo
(opis je neobvezen)

Metode ocenjevanja vplivov: Ustvarjanje (II)

Climate change LCIA method 1 ×

General information: LCIA method 1

▼ General information

Name

Category - none -

Description

Version 00.00.000 Last change 2023-08-10 10:10:10 b4e4-1b6470b50b86

Tags

Source

Code

▼ Impact categories + ×

Name	Description	Reference unit		

3. Kliknite »+«, da dodate nove kategorije vpliva

Metode ocenjevanja vplivov: Ustvarjanje (III)

Climate change | LCIA method 1 × | Water use

Normalization and weighting: LCIA method 1

▼ Normalization and weighting sets

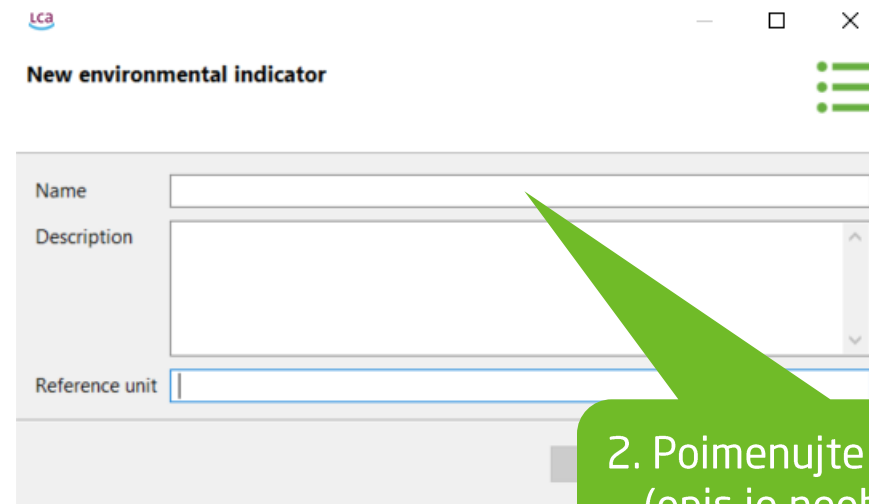
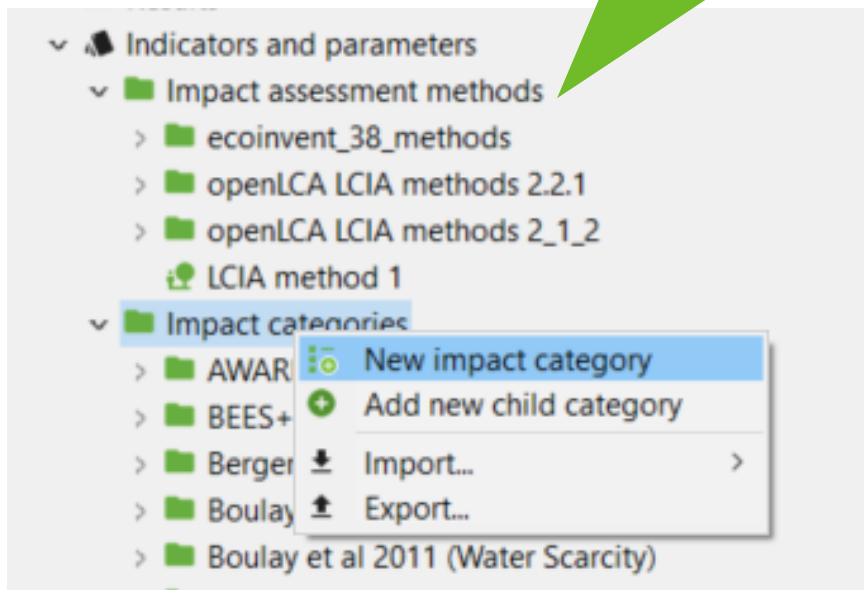
Normalization and weighting set	Reference unit	Impact category	Normalization value	Weighting factor
newSet		Acidification	-	-

4. Kliknite ime nabora, da samodejno dodate kategorije vpliva metode

5. Kliknite »+«, da dodate nov nabor za normalizacijo/uteževanje

Kategorije vpliva: Ustvarjanje

1. Z desno tipko kliknite mapo »Impact categories« in izberite »New impact category«



The screenshot shows a window titled 'New environmental indicator'. It has three input fields: 'Name', 'Description', and 'Reference unit'. The 'Description' field is a text area with a scroll bar. The window has standard OS window controls (minimize, maximize, close) and a hamburger menu icon in the top right corner.

2. Poimenujte kategorijo (opis je neobvezen) in določite referenčno enoto

Kategorije vpliva: Ustvarjanje (III)

☰ Climate change 🌱 LCIA method 1 ☰ Water use ×

☰ **Characterization factors: Water use**

▼ Characterization factors

Flow	Category	Factor	Unit	Uncertainty
🔍 Cooling water	Elementary flows/Emission to water/o...	0.0	m3/m3	none
🔍 Cooling water	Elementary flows/Emission to water/u...	-42.95	m3/m3	none
🔍 Water	Elementary flows/Emission to water/gr...	-42.95*p1	m3/m3	none

☰ Climate change 🌱 LCIA method 1 ☰ Water use ×

☰ **Parameters: Water use**

▶ Global parameters

▼ Input parameters + ×

Name	Value	Uncertainty	Description
p1	3.7E-6	none	

▼ Dependent parameters + ×

Name	Formula	Value	Description

6. Dodajte vrednost za faktor (parametre lahko uporabite enako kot v procesih!)

Študija primera: Neposredni izračun (I)

- Neposreden in pomnilniško učinkovit način izračuna inventarja
- Ni potrebe po predhodnem ustvarjanju sistema proizvoda
- Koristno pri uporabi baz PSILCA, Exiobase in GaBi (zelo obsežne baze podatkov)

The screenshot displays the ecoinvent software interface. On the left, a navigation pane shows a tree structure under 'ecoinvent_38_cutoff_3011_with_methods', with 'Processes' expanded to 'C:Manufacturing'. The main window shows the 'General information' tab for the process 'coconut oil production, crude | coconut oil, crude | Cutoff, U'. The 'Direct calculation' button is highlighted in a green callout box.

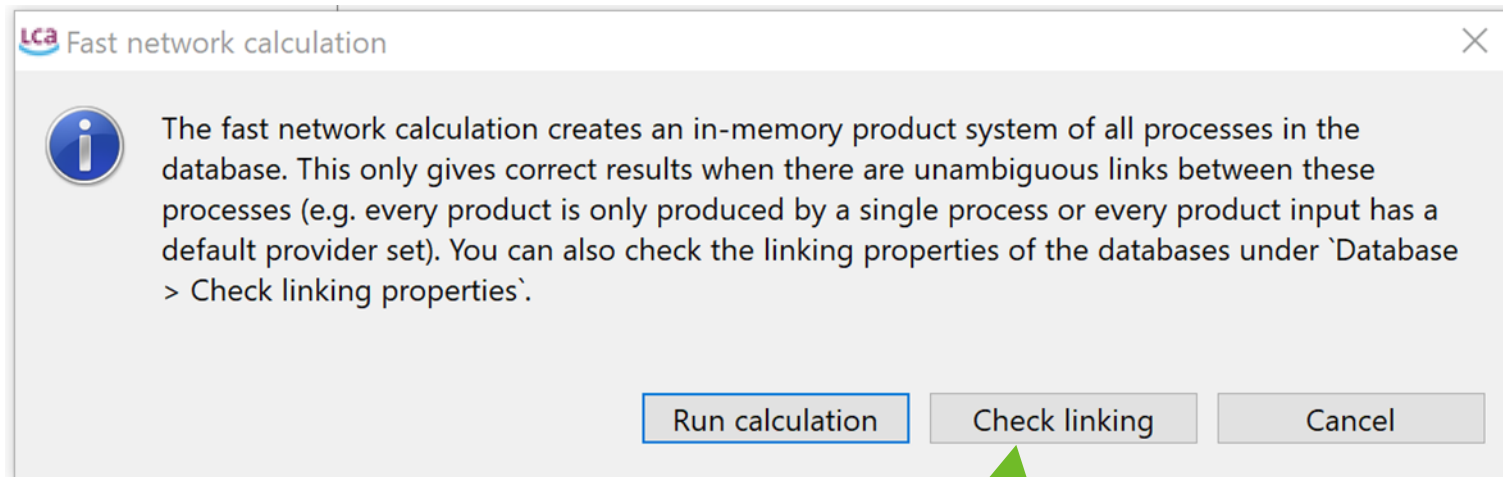
Navigation: agribalyse_v301_exam
ecoinvent_38_cutoff_3011_with_methods
Projects
Product systems
carbon dioxide production, liquid | carbon dioxide, liquid | Cutoff, U (co
coconut oil production, crude | coconut oil, crude | Cutoff, U
hardwood forestry, mixed species, sustainable forest management | clef
Test
textile production, cotton, circular knitting | textile, knit cotton | Cutoff, U
transport, freight, lorry 7.5-16 metric ton, EURO4 | transport, freight, lorry
Processes
A:Agriculture, forestry and fishing
B:Mining and quarrying
C:Manufacturing
D:Electricity, gas, steam and air conditioning supply
E:Water supply; sewerage, waste management and remediation activitie
F:Construction
G:Wholesale and retail trade; repair of motor vehicles and motorcycles
H:Transportation and storage

coconut oil production, crude | coconut oil, crude | Cutoff, U - PH ×
General information: coconut oil production, crude | coconut oil, crude
General information
Name: coconut oil production, crude | coconut oil, crude | Cutoff, U
Category: C:Manufacturing/10:Manufacture of food products/1...anufacture of vegetal
Description: data based on the ECOSOL study of the European surfactant industry. Allocati
It was not individually updated during the transfer to ecoinvent version 3. Life
following the ecoinvent quality guidelines for version 2. It may have been sub
and the results of the central updates were reviewed extensively. The changes
of version 2, which are still available via the ecoinvent website. The change re
Version 03.67.004 Last change 2021-11-26 11:08:08 UUID 7b
Tags: Add a tag
Infrastructure process:
Create product system Direct calculation Export to Excel

1. Kliknite »Direct calculation« v zavihku General information

Študija primera: Neposredni izračun (II)

- Predpogoj: povezave v procesih je treba preveriti za nedvoumnost



2. Kliknite »Check linking«

Študija primera: Neposredni izračun (III)

- Povezave bodo nedvoumne in primerne za izračun, ko...

... je za vsak tok določen dobavitelj v zavihku »input/output« procesnih podatkovnih nizov.

Inputs/Outputs: transport 2.0

▼ Inputs

Flow	Category	Amount	Unit	Costs/Rev...	Uncertainty	Avoided ...	Provider
2 building of data center	building example	1.00000	Item(s)		none		construction activities
transport concrete	building example	1.00000	Item(s)		none		transport concrete to site
transport of AHU steel struct...	building example	1.00000	Item(s)		none		transport of AHU steel structure
transport of cables	building example	1.00000	Item(s)		none		transport of cables
transport of cooling system	building example	1.00000	Item(s)		none		transport of cooling system
transport of electrical cabinets	building example	1.00000	Item(s)		none		transport of electrical cabinets
transport of emergency lights	building example	1.00000	Item(s)		none		transport of emergency lights
transport of floor insula	building example	1.00000	Item(s)		none		floor insulation
transport of humidifier	building example	1.00000	Item(s)		none		humidifier
transport of lead acid batte...	building example	1.00000	Item(s)		none		lead acid batteries from

Lca Fast network calculation



The processes in the database can be linked unambiguously

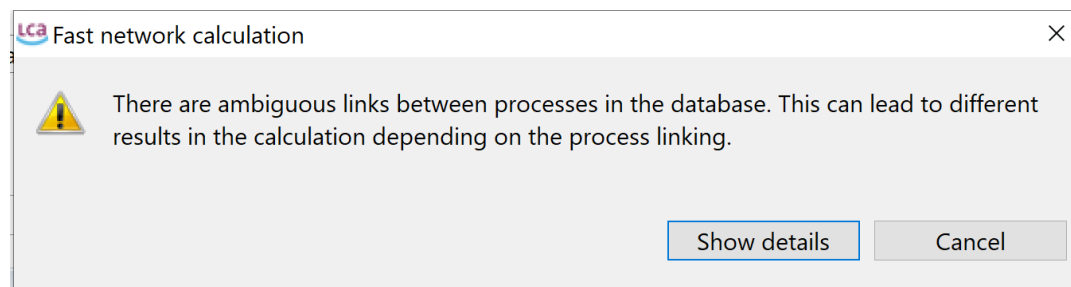
Run calculation

Show details

Cancel

3. Če so povezave nedvoumne, kliknite »Run calculation«

Študija primera: Neposredni izračun (IV)



Inputs/Outputs: coconut oil production, crude | coconut oil, crude | Cutoff, U - PH

▼ Inputs

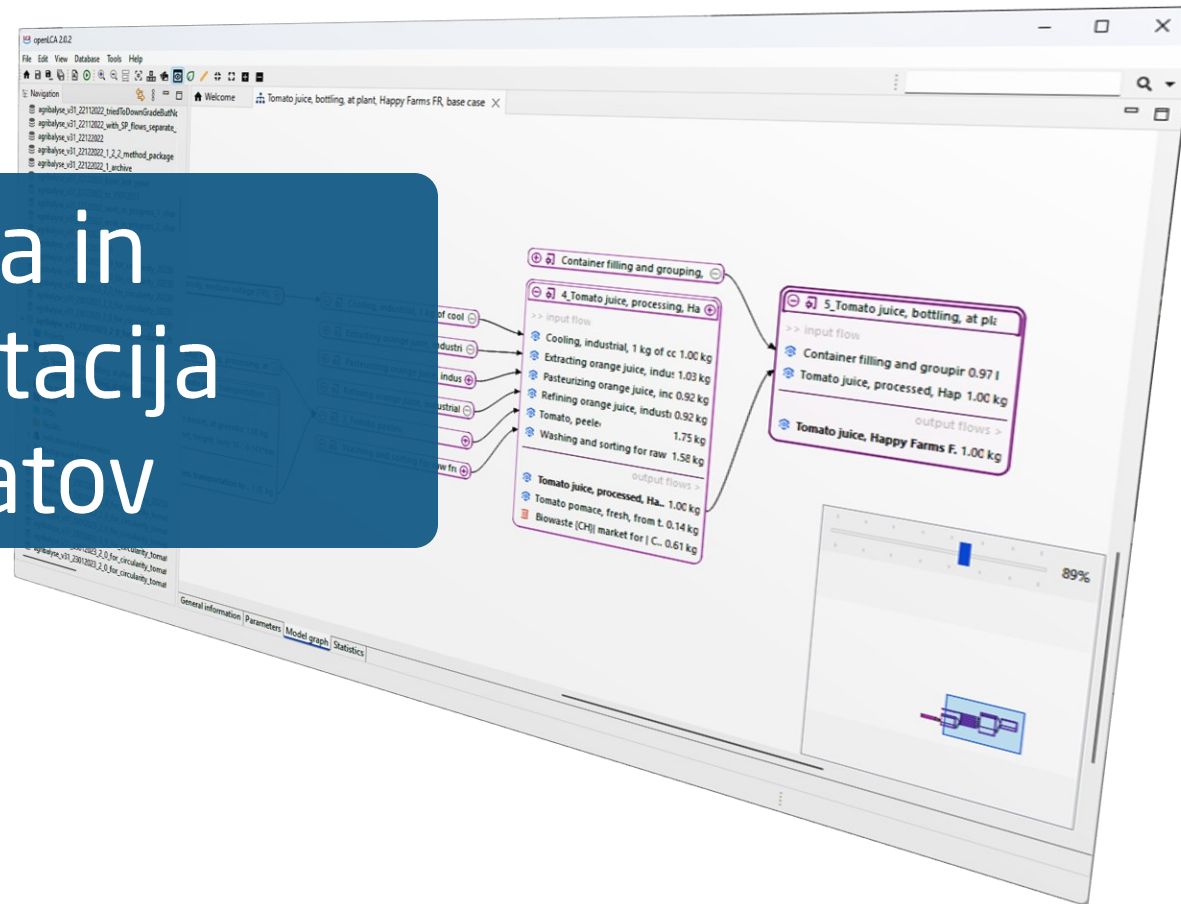
Flow	Category	Amount	Unit	Costs/Reven...	Uncertainty	Avoided wa...	Provider	Data quality...	Location
chemical factory, organics	429:Construction of other c...	4.00000E-10	Item(s)		lognormal: ...			(5; 5; 5; 4)	
coconut, dehusked	012:Growing of perennial c...	2.97000	kg		none				
electricity, medium volta...	351:Electric power generat...	0.17200	kWh		lognormal: ...		market f...	(4; 5; 5; 1; 1)	
Energy, gross calorific va...	Resource/biotic	37.50000	MJ		none				
heat, district or industrial...	351:Electric power generat...	0.29700	MJ		lognormal: ...		market f...	(4; 5; 5; 1; 1)	
transport, freight, lorry, u...	492:Other land transport/4...	0.12100	kg		lognormal: ...		market f...		
Water, cooling, unspecifi...	Resource/in water							(5; 5; 5; 5; 4)	
Water, unspecified natur...	Resource/in water							(5; 5; 5; 5; 4)	

▼ Outputs

Flow	Category	Amount	Unit	Costs/Reven...	Uncertainty	Avoided wa...	Provider	Data quality...	Location
Acidity, unspecified	Emission to water/surface ...								
BOD5, Biological Oxyge...	Emission to water/surface ...							(2; 5; 5; 1; 1)	
Carbon dioxide, non-fossil	Emission to air/high popul...		kg		lognormal: ...			(2; 5; 5; 1; 1)	
coconut oil, crude	104:Manufacture of veg...	1.00000	kg	0.59600 E...	none				
COD, Chemical Oxygen ...	Emission to water/surface ...	0.01380	kg		lognormal: ...			(2; 5; 5; 1; 1)	
Dissolved solids	Emission to water/surface ...	0.04160	kg		lognormal: ...			(2; 5; 5; 1; 1)	
DOC, Dissolved Organic	Emission to water/surface ...	0.00511	kg		lognormal: ...			(2; 5; 5; 1; 1)	

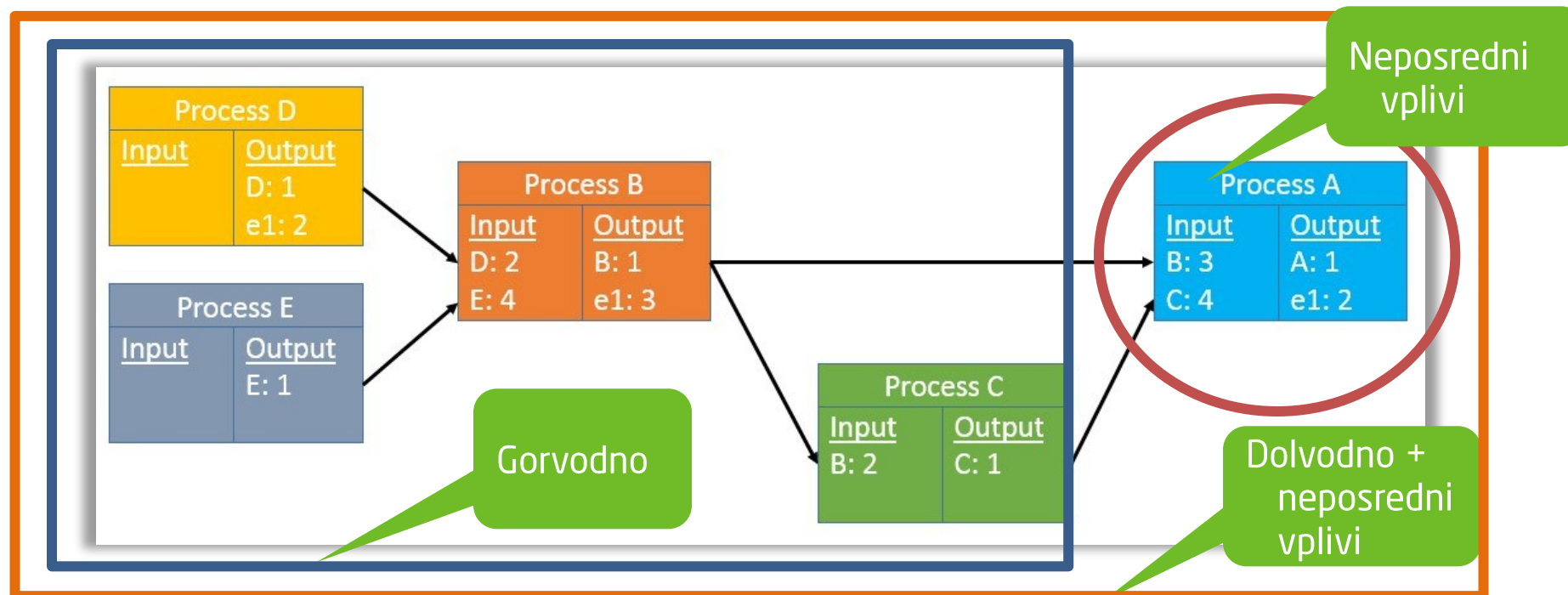
4. Če so povezave dvoumne, najprej izberite dobavitelja za svoje tokove, preden znova zaženete neposredni izračun.

Analiza in interpretacija rezultatov



Neposredni vplivi v primerjavi z vplivi iz verige oskrbe (upstream) + neposredni vplivi

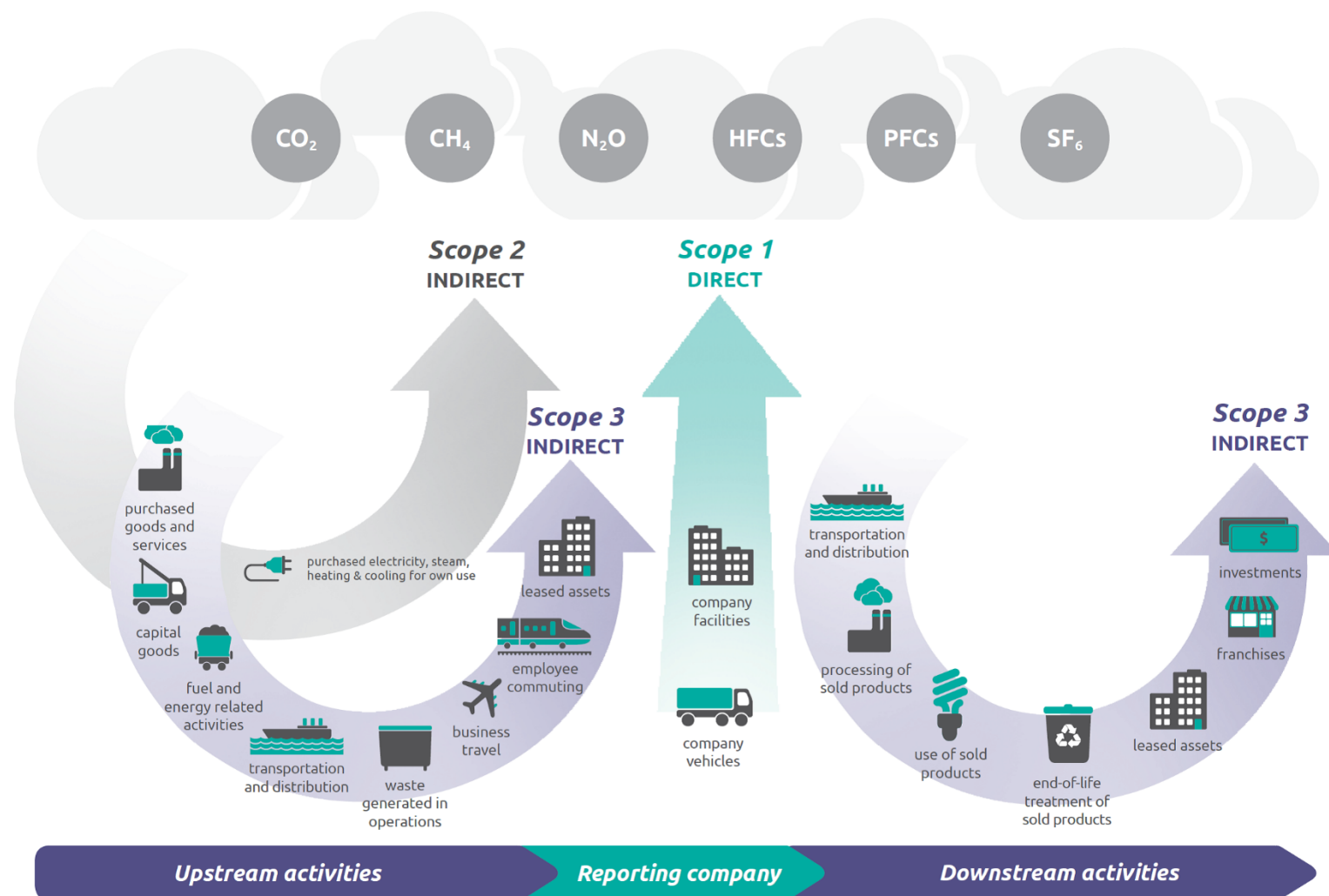
- **Neposredni** vplivi procesa A so tisti, ki jih povzročajo tokovi znotraj danega podatkovnega niza procesa.
- **Vplivi iz verige oskrbe skupaj z neposrednimi vplivi** vključujejo vplive, ki jih povzroča proces A in vsi procesi v dobavnih verigah za njegove vhodne proizvode.



Kakšni so neposredni in
predhodni gorvodni (upstream)
vplivi avtomobila?



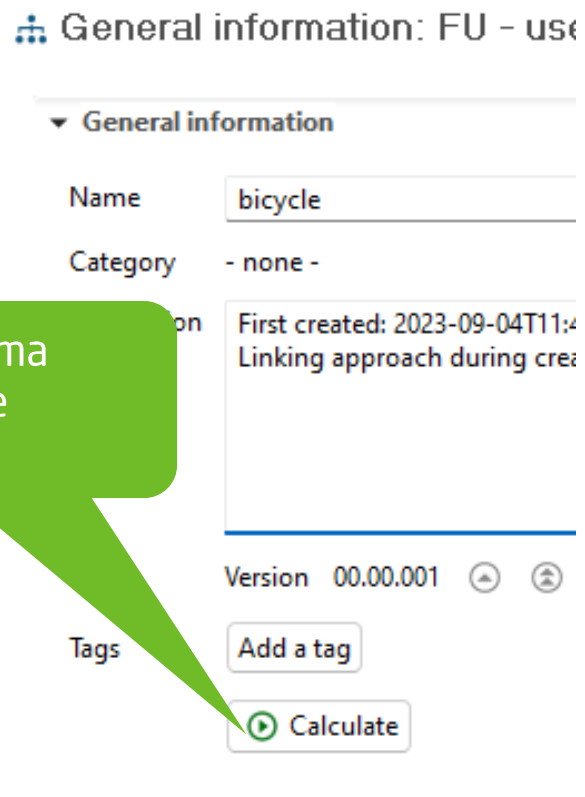
Študija primera: Obseg 1, 2 in 3 (GHG protokol)



Izračun rezultatov

- Na ravni sistema izdelka
- “Lazy/On-demand” izračuna rezultate, “Eager/All” pa prikaže več zavihkov za vizualizacijo rezultatov

1. Na ravni sistema izdelka kliknite “calculate”



General information: FU - use

General information

Name: bicycle

Category: - none -

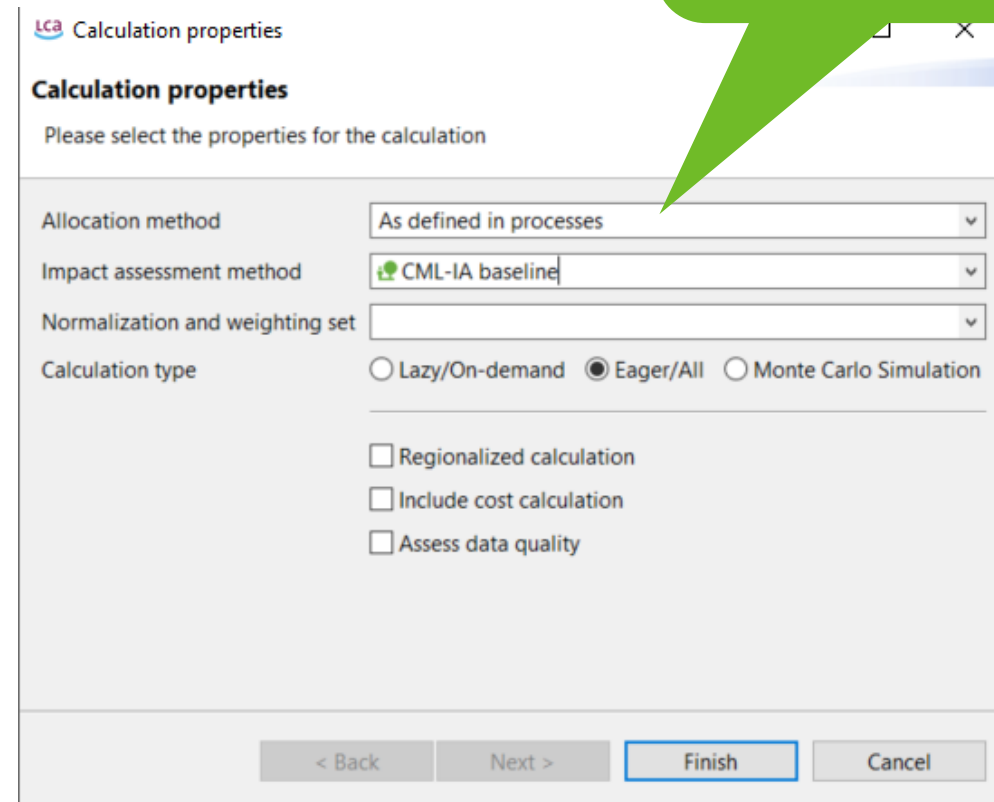
First created: 2023-09-04T11:4...
Linking approach during crea...

Version: 00.00.001

Tags: Add a tag

Calculate

2. Končne nastavitve: izberite metodo alokacije in LCIA metodo



Calculation properties

Please select the properties for the calculation

Allocation method: As defined in processes

Impact assessment method: CML-IA baseline

Normalization and weighting set:

Calculation type: Lazy/On-demand Eager/All Monte Carlo Simulation

Regionalized calculation

Include cost calculation

Assess data quality

< Back Next > Finish Cancel

Analiza: Prispevki tokov in vplivov

Transport person diesel car (parametrized)_new

General information

Product system: [Transport person diesel car \(parametrized\)_new](#)
Allocation method: As defined in processes
Target amount: 1.0 p*km Person transport
Impact assessment method: [CML-IA baseline](#)

Export to Excel

Izberite kategorijo vpliva, ki jo želite analizirati

Top 5 contributions to impact category results - overview

Impact category: Global warming (GWP100a)



Možnost ogleda neposrednih vplivov (Direct Impacts)

Top 5 contributions to flow results - overview

Flow: Benzene - water/unspecified



Določite, kateri tok vas zanima – rezultati se prikažejo v diagramu

Analiza: Rezultati popisa

Transport person diesel car (parametrized)_new

Inputs

Name	Category	Amount	Unit
> Aluminum ingot, production mix, at plant - RNA	Product flows	0.00030	kg
Bituminous coal, at mine - US	Product flows	5.86568E-5	kg
Electricity, bituminous coal, at power plant - US	Utilities/Fossil Fuel Electric Power Generation	5.86568E-5	kg
Bituminous coal, combusted in industrial boiler - RNA	Product flows	2.30651E-6	kg
Carbon dioxide	Elementary flows/Resource/in air	7.00294E-7	kg
Carbon dioxide, in air	Elementary flows/Resource/in air	2.24515E-6	kg
Copper, at regional storage	Product flows	3.50625E-5	kg
Diesel, at refinery - US	Product flows	5.95833E-10	m3
Diesel, combusted in industrial boiler - RNA	Product flows	9.37111E-10	m3
Diesel, combusted in industrial equipment - RNA	Product flows	4.36359E-10	m3

Don't show < 1 %

Če za produktni tok na vhodni strani procesa ni določenega.

Outputs

Name	Category	Amount	Unit
> 2,4-D	Elementary flows/air/low population density	1.95585E-13	kg
> 2,4-D	Elementary flows/water/unspecified	8.37038E-15	kg
2-Hexanone	Elementary flows/water/unspecified	1.75450E-11	kg
Crude oil, at production - RNA	Oil and Gas Extraction/Crude Petroleum and Natural Gas Ext.	1.66584E-11	kg
Natural gas, at extraction site - RNA	Oil and Gas Extraction/Crude Petroleum and Natural Gas Ext.	8.25477E-13	kg
4-Methyl-2-pentanone	Elementary flows/water/unspecified	2.20204E-14	kg
Acenaphthene	Elementary flows/air/unspecified	1.62551E-14	kg
Acenaphthylene	Elementary flows/air/unspecified	7.94429E-15	kg
Acephate	Elementary flows/air/low population density	1.80668E-11	kg
Acephate	Elementary flows/water/unspecified	7.74881E-13	kg

Don't show < 1 %

V nasprotnem primeru so prikazani samo elementarni tokovi.

Total requirements

Process	Product	Amount	Unit
Case Study Car Transportation			
basic processes			
Car, diesel-powered	Car, diesel-powered	2.50000E-6	Item(s)
Transport person diesel car (parametrized)	Person transport	1.00000	p*km

Možno je preveriti, kateri procesi prispevajo k določenemu toku.

Analiza: Analiza vplivov (rezultati LCIA)

☰ Transport person diesel car (parametrized)_new

▼ Impact analysis: CML-IA baseline

Sub-group by: Flows Processes | Don't show < %

Name	Category	Inventory result	Characterization factor	Impact assessment result
> <input type="checkbox"/> Abiotic depletion	CML-IA baseline			2.86695E-5 kg Sb eq
> <input type="checkbox"/> Abiotic depletion (fossil fuels)	CML-IA baseline			0.00000 MJ
▼ <input type="checkbox"/> Acidification	CML-IA baseline			2.47935E-6 kg SO2 eq
> <input checked="" type="checkbox"/> Electricity, bituminous coal, at power plant - US	Utilities/Fossil Fuel Electric Power Generation		■	1.25794E-6 kg SO2 eq
> <input checked="" type="checkbox"/> Natural gas, processed, at plant - RNA	Chemical Manufacturing/Industrial Gas Manufactu...		■	8.31633E-7 kg SO2 eq
> <input checked="" type="checkbox"/> Crude oil, in refinery - RNA	Petroleum and Coal Products Mnf./Petroleum Refi...			1.37848E-7 kg SO2 eq
> <input checked="" type="checkbox"/> Natural gas, combusted in industrial boiler, at hydrocr	Utilities/Fossil Fuel Electric Power Generation			6.78920E-8 kg SO2 eq
> <input checked="" type="checkbox"/> Natural gas, processed, for olefins production, at plan	Chemical Manufacturing/Petrochemical Manufact...			6.10653E-8 kg SO2 eq
> <input checked="" type="checkbox"/> Electricity, lignite coal, at power plant - US	Utilities/Fossil Fuel Electric Power Generation			5.37264E-8 kg SO2 eq
> <input type="checkbox"/> Eutrophication	CML-IA baseline			1.68785E-7 kg PO4--- eq
> <input type="checkbox"/> Fresh water aquatic ecotox.	CML-IA baseline			0.00074 kg 1,4-DB eq
▼ <input type="checkbox"/> Global warming (GWP100a)	CML-IA baseline			0.18140 kg CO2 eq
> <input checked="" type="checkbox"/> Transport person diesel car (parametrized)	Case Study Car Transportation		■	0.18080 kg CO2 eq
> <input type="checkbox"/> Human toxicity	CML-IA baseline			11.15405 kg 1,4-DB eq
> <input type="checkbox"/> Marine aquatic ecotoxicity	CML-IA baseline			2.86917 kg 1,4-DB eq
> <input type="checkbox"/> Ozone layer depletion (ODP)	CML-IA baseline			9.75443E-14 kg CFC-11 eq
> <input type="checkbox"/> Photochemical oxidation	CML-IA baseline			4.36144E-7 kg C2H4 eq
> <input type="checkbox"/> Terrestrial ecotoxicity	CML-IA baseline			1.89900E-7 kg 1,4-DB eq

Skupni rezultati
(Total results)

Neposredni
vplivi (Direct
Impacts)

Analiza: Rezultati procesov

Transport person diesel car (parametrized)_new

Flow contributions to process results

Process: Transport person diesel car (parametrized) Don't show < 0,01 %

Inputs					Outputs						
Contri...	Flow	Category	Upstream i...	Direct	Unit	Contri...	Flow	Category	Upstream i...	Direct	Unit
---	Aluminum ingot, product...	Product flows	0.00030	0.00000	kg	---	2,4-D	Elementary flow...	1.95585E-13	0.00000	kg
---	Bituminous coal, at mine - ...	Product flows	5.86568E-5	0.00000	kg	---	2,4-D	Elementary flow...	8.37038E-15	0.00000	kg
---	Bituminous coal, combust...	Product flows	2.30651E-6	0.00000	kg	---	2-Hexanone	Elementary flow...	1.75450E-11	0.00000	kg
---	Carbon dioxide	Elementary flow...	7.00294E-7	0.00000	kg	---	4-Methyl-2-pentanone	Elementary flow...	2.20204E-14	0.00000	kg
---	Carbon dioxide, in air	Elementary flow...	2.24515E-6	0.00000	kg	---	Acenaphthene	Elementary flow...	1.62551E-14	0.00000	kg
---	Copper, at regional storage	Product flows	3.50625E-5	0.00000	kg	---	Acenaphthylene	Elementary flow...	7.94429E-15	0.00000	kg
---	Diesel, at refinery - US	Product flows	5.95833E-10	0.00000	m3	---	Acephate	Elementary flow...	1.80668E-11	0.00000	kg
---	Diesel, combusted in indus...	Product flows	9.37111E-10	0.00000	m3	---	Acephate	Elementary flow...	7.74881E-13	0.00000	kg
---	Diesel, combusted in indus...	Product flows	4.36359E-10	0.00000	m3	---	Acetic acid	Elementary flow...	1.62563E-10	0.00000	kg
---	Dummy, Agrochemicals, at...	Product flows	3.72938E-9	0.00000	kg	---	Acetone	Elementary flow...	2.68113E-11	0.00000	kg
---	Dummy, Disposal, chemic...	Product flows	4.62443E-12	0.00000	kg	---	Acid gases, unspecified	Elementary flow...	7.65000E-14	0.00000	kg
---	Dummy, Disposal, inert sol...	Product flows	4.62443E-12	0.00000	kg	---	Acidity, unspecified	Elementary flow...	1.17446E-12	0.00000	kg
---	Dummy, Disposal, solid w...	Product flows	2.26327E-5	0.00000	kg	---	Acrolein	Elementary flow...	9.22156E-12	0.00000	kg
---	Dummy, Disposal, solid w...	Product flows	6.64020E-13	0.00000	kg	---	Aldehydes, unspecified	Elementary flow...	2.94823E-8	0.00000	kg
---	Dummy, Disposal, solid w...	Product flows	7.65660E-7	0.00000	kg	---	Aldicarb	Elementary flow...	4.55813E-11	0.00000	kg
---	Dummy, Energy, unspecifi...	Product flows	3.75092E-8	0.00000	MJ	---	Aldicarb	Elementary flow...	1.95999E-12	0.00000	kg
---	Dummy, Phosphorous Ferti...	Product flows	2.08431E-8	0.00000	kg	---	Aluminium	Elementary flow...	2.32223E-7	0.00000	kg
---	Dummy, Potash Fertilizer (...)	Product flows	2.30393E-8	0.00000	kg	---	Ammonia	Elementary flow...	5.41747E-8	0.00000	kg

Transport person diesel car (parametrized)_new

Transport person diesel car (parametrized)_new

Flow contributions to process results

Impact assessment results

Process: Petroleum refining, for olefins production, at plant - RNA Don't show < 0,01 %

Contribution	Impact category	Upstream incl. direct	Direct	Unit
00.45%	Acidification	1.12761E-8	2.04142E-9	kg SO2 eq
00.62%	Eutrophication	1.05065E-9	6.22498E-10	kg PO4--- eq
00.09%	Fresh water aquatic ecotox.	6.92414E-7	5.62571E-9	kg 1,4-DB eq
00.13%	Marine aquatic ecotoxicity	0.00384	5.40165E-6	kg 1,4-DB eq
00.09%	Ozone layer depletion (ODP)	9.00443E-17	9.00443E-17	kg CFC-11 eq
01.03%	Photochemical oxidation	4.48431E-9	3.61478E-9	kg C2H4 eq
00.33%	Terrestrial ecotoxicity	6.30015E-10	7.44268E-11	kg 1,4-DB eq

Vplivi iz predhodnih faz, vključno z neposrednimi (Upstream including direct)

Neposredni vplivi (Direct Impacts)

Analiza: Drevo prispevkov

Results of: Transport person diesel car ×

Transport person diesel car

Flow

Impact category

Contribution	Process	Required amount	Total result [kg CO2 eq]	Direct contribution [kg CO2 eq]
▼ 100.00%	✖ Transport person diesel car	1.00000 p*km	0.18145	0.18080
▼ 00.25%	✖ Car, diesel-powered	2.50000E-6 Item(s)	0.00045	
> 00.18%	✖ Polypropylene resin, at plant - RNA	0.00029 kg	0.00032	6.03893E-6
> 00.05%	✖ Polystyrene, high impact, resin, at plant - RNA	7.65000E-5 kg	8.29450E-5	4.13636E-9
> 00.02%	✖ Acrylonitrile-butadiene-styrene copolymer, resin, at...	3.18750E-5 kg	4.14546E-5	5.00438E-10
> 00.00%	✖ Polyethylene terephthalate, resin, at plant - RNA	3.18750E-6 kg	2.25406E-6	2.78350E-7
> 00.00%	✖ Cotton, whole plant, at field - RNA	4.14375E-5 kg	9.26560E-7	7.02623E-7
> 00.11%	✖ Crude oil, in refinery - RNA	8.00000E-5 m3	0.00020	1.63586E-5

Predhodne faze vključno z neposrednimi vplivi (Upstream including direct)

Analiza: Združevanje

Transport person diesel car (parametrized)_new

Groups

- Other
 - Acetic acid production - RNA
 - Acrylonitrile-butadiene-styrene copolymer, resin, at plant - RNA
 - Ammonia, steam reforming, liquid, at plant - RNA
 - Benzene, at plant - RNA
 - Butadiene, at plant - RNA
 - Car, diesel-powered
 - Cotton, whole plant, at field - RNA
 - Crude oil, at production - RNA
 - Crude oil, extracted - RNA

Results

Flows: Benzene - water/unspecified

Impact categories: Global warming (GWP100a)

Group	Amount	Unit
Other	0.18139812355320023	kg CO2 eq

Groups

- Other
 - Add
 - Delete

LCA Please enter a name

Please enter a name

Chemicals

OK Cancel

Groups

- Chemicals
- Other
 - Acetic acid production - RNA
 - Acrylonitrile-butadiene-styrene copolymer, resin, at plant - RNA
 - Ammonia, steam reforming, li
 - Benzene, at plant - RNA
 - Butadiene, at plant - RNA
 - Car, diesel-powered
 - Cotton, whole plant, at field - RNA
 - Crude oil, at production - RNA
 - Crude oil, extracted - RNA

0.181 kg CO2 eq: Other



Analiza: Združevanje

<input checked="" type="checkbox"/> Chemicals	<input type="checkbox"/> Acrylonitrile-butadiene-styrene copolymer, resin, at plant - RNA
<input checked="" type="checkbox"/> Electricity	<input type="checkbox"/> Ammonia, steam reforming, liquid, at plant - RNA
<input checked="" type="checkbox"/> Fuels	<input type="checkbox"/> Benzene, at plant - RNA
<input checked="" type="checkbox"/> Other	<input type="checkbox"/> Butadiene, at plant - RNA
<input checked="" type="checkbox"/> Transport	<input type="checkbox"/> Ethylbenzene styrene, at plant - RNA
	<input type="checkbox"/> Ethylene, at plant - RNA
	<input type="checkbox"/> Limestone, at mine - RNA
	<input type="checkbox"/> Methanol, at plant - RNA
	<input type="checkbox"/> Nitrogen fertilizer, production mix, at plant - RNA
	<input type="checkbox"/> Xylenes, mixed, at plant - RNA

Results

Flows

2,4-D - air/low population density

Impact categories

Eutrophication

Group	Amount	Unit
Fuels	9.32311E-8	kg PO4--- eq
Electricity	5.43436E-8	kg PO4--- eq
Chemicals	8.28955E-9	kg PO4--- eq
Other	7.53474E-9	kg PO4--- eq
Transport	4.54403E-9	kg PO4--- eq



Analiza: Sankeyjev diagram

coconut oil production, crude | coconut oil, crude | Cutoff, U Results of: coconut oil production, crude | coconut oil, crude | Cutoff, U ×

coconut oil production, crude | coconut oil, crude | Cutoff, U Impact category: Min. contribution share: 0.000%
CML-IA baseline Abiotic depletion Max. number of processes: 25

Kliknite tukaj za nastavitve možnosti diagrama

Diagram

oxolan-2-one - Emission to water/unspecifi

Abiotic depletion

Min. contribution share: 0,000 %

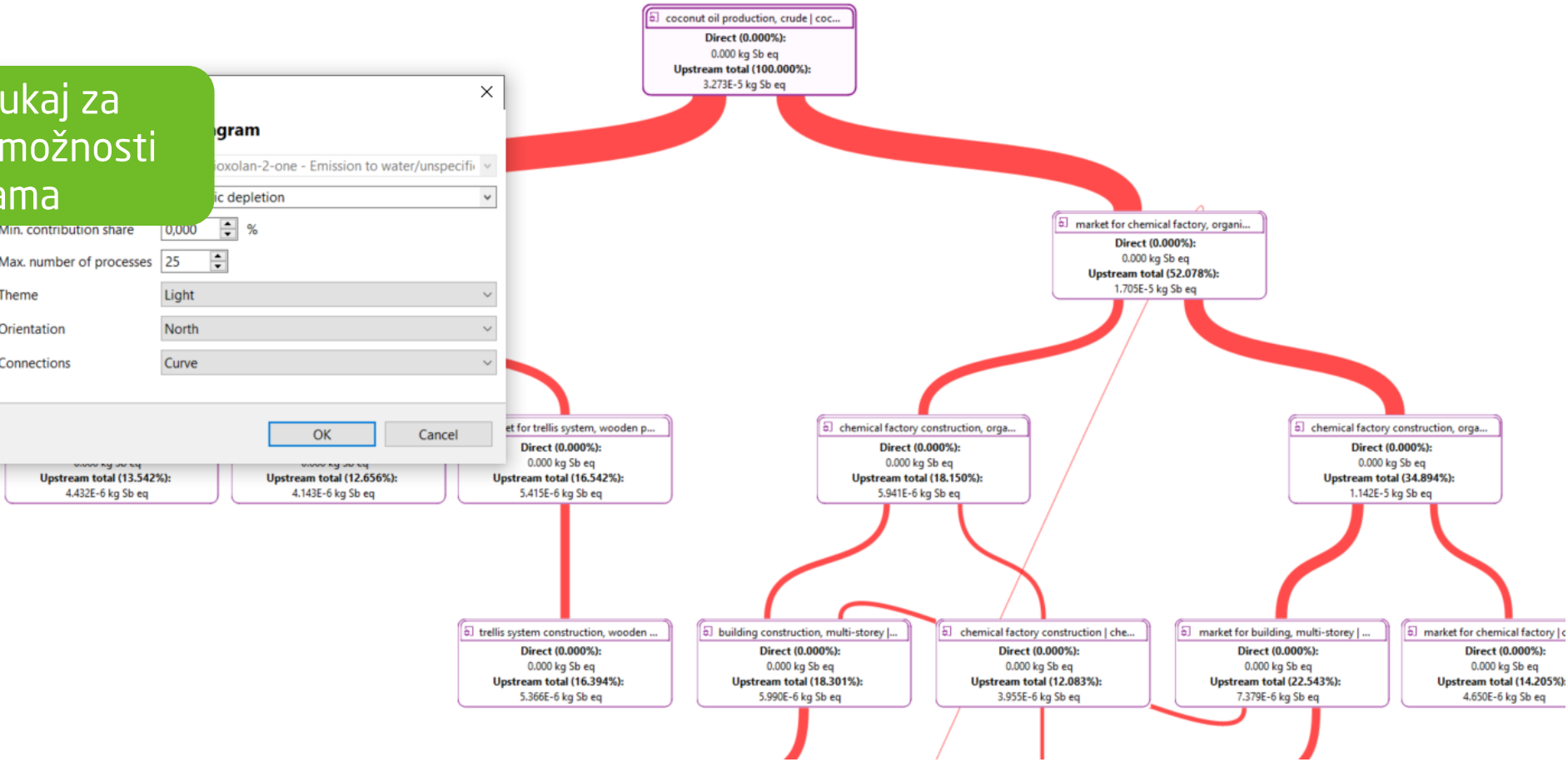
Max. number of processes: 25

Theme: Light

Orientation: North

Connections: Curve

OK Cancel



Analiza: Preverjanje metode LCIA

Results of: Transport person diesel car X

Flows that are not covered by the selected LCIA method

Group by LCIA category

Name	Category	Inventory res
> Acidification terrestrial and freshwater		
> Cancer human health effects		
▼ Climate change		
✓ 2,4-D	Elementary flows/air/low population density	1.95585E-13
✓ 2,4-D	Elementary flows/water/unspecified	8.37038E-15
✓ 2-Hexanone	Elementary flows/water/unspecified	1.74986E-11
✓ 4-Methyl-2-pentanone	Elementary flows/water/unspecified	4.11451E-15
✓ Acenaphthene	Elementary flows/air/unspecified	1.61232E-14
✓ Acenaphthylene	Elementary flows/air/unspecified	7.87980E-15
✓ Acephate	Elementary flows/air/low population density	1.80668E-11
✓ Acephate	Elementary flows/water/unspecified	7.74881E-13
✓ Acetic acid	Elementary flows/air/unspecified	1.62563E-10
✓ Acetone	Elementary flows/water/unspecified	2.67678E-11
✓ Acid gases, unspecified	Elementary flows/air/unspecified	7.65000E-14
✓ Acidity, unspecified	Elementary flows/water/unspecified	1.17431E-12
✓ Acrolein	Elementary flows/air/unspecified	9.14671E-12
✓ Aldehydes, unspecified	Elementary flows/air/unspecified	2.94821E-8
✓ Aldicarb	Elementary flows/air/low population density	4.55813E-11
✓ Aldicarb	Elementary flows/water/unspecified	1.95999E-12
✓ Aluminium	Elementary flows/water/unspecified	2.31589E-7
⚙ Aluminium ingot, production mix, at plant - RNA	Product flows	0.00030
✓ Ammonia	Elementary flows/water/unspecified	5.40270E-8
✓ Ammonia	Elementary flows/air/low population density	3.09953E-9
✓ Ammonia	Elementary flows/air/unspecified	1.79346E-8
✓ Ammonia, as N	Elementary flows/water/unspecified	1.80733E-14
✓ Ammonium ion	Elementary flows/water/unspecified	4.14375E-12
✓ Anthracene	Elementary flows/air/unspecified	6.62292E-15
✓ Antimony	Elementary flows/water/unspecified	1.44440E-7
✓ Antimony	Elementary flows/air/unspecified	5.78600E-11
✓ Arsenic	Elementary flows/air/unspecified	1.11122E-11
✓ Arsenic, ion	Elementary flows/water/unspecified	7.34184E-10

General information | Inventory results | Impact analysis | Process results | Contribution tree | Grouping | Locations | Sankey diagram | **LCIA Checks** | Tags

Tokovi, ki niso vključeni v izbrano metodo LCIA

Interpretacija rezultatov – povzetek

Legenda

- **Skupni rezultati (zelena) = Vhodni + Neposredni (celoten življenjski cikel)**
- **Neposredni rezultati (siva) = Samo kar se zgodi v izbranem procesu**

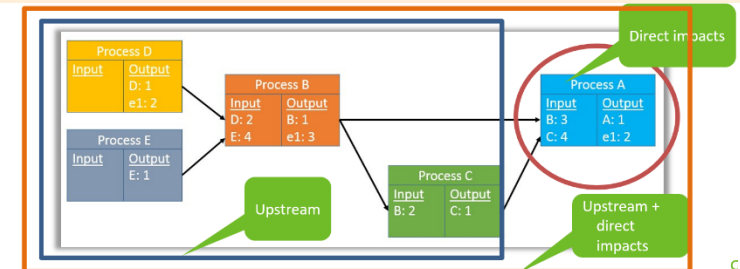
Splošne informacije (neposredni rezultati): glavni prispevajoči procesi k vplivom in k tokom (inventar)
Rezultati inventarja: skupna količina vhodnih in izhodnih tokov (neposredni rezultati, če razprete tokove);
skupna količina produktov, proizvedenih v vseh procesih v življenjskem ciklu (skupne zahteve)
Analiza vplivov: skupni rezultati (neposredni rezultati, če razprete kategorije → to ustreza splošnim informacijam)
Rezultati procesov (neposredni in skupni rezultati): prispevek tokov k procesom (inventar) in prispevek procesov k vplivom
Drevo prispevkov (skupni rezultati): prispevek tokov k procesom in procesov k vplivom (v različnih delih življenjskega cikla; ne ustreza neposredno rezultatom procesov)
Združevanje (neposredni rezultati): možnost združevanja tokov in prikaza združenih rezultatov po skupinah
Lokacije (neposredni rezultati): geografska lokalizacija vplivov
Sankeyev diagram (neposredni in skupni rezultati): prispevek tokov k procesom (inventar) in procesov k vplivom (to ustreza rezultatom procesov)
Preverjanje LCIA: tokovi, ki niso vključeni v izbrano metodo ocenjevanja vplivov

Vaja 4c: Proizvodna faza baterije - LCIA

Izračunajte okoljske vplive, ki nastanejo pri proizvodnji enega baterijskega paketa z uporabo metode LCIA CML (baseline) in interpretirajte rezultate.

- Kateri procesi največ prispevajo k vplivni kategoriji »Globalno segrevanje« (brez vplivov iz predhodnih faz)?
- Kako velik je neposreden prispevek procesa »Litijev manganov oksid« k isti vplivni kategoriji?
- Kako se ta prispevek spremeni, če upoštevamo celotno dobavno verigo litijevega manganovega oksida?
- Koliko dušika (v zraku) se porabi (vhod) v celotnem proizvodnem sistemu baterije?
- Kako k tej porabi dušika prispeva proizvodnja baterijske celice?
- Kateri drugi proces(i) pojasnjujejo preostalo količino porabljenega dušika (v zraku) v proizvodnem sistemu?

- Ponovno izračunajte rezultate za proizvodni sistem »Battery Pack«, tokrat pa izberite metodo "CML-IA baseline" in vrsto izračuna "Eager/All".
- Nato poskusite prepoznati najprimernejše zavihke, s katerimi lahko pridobite rezultate.



Vaja 4d:

Faza uporabe baterije – Ustvarjanje proces

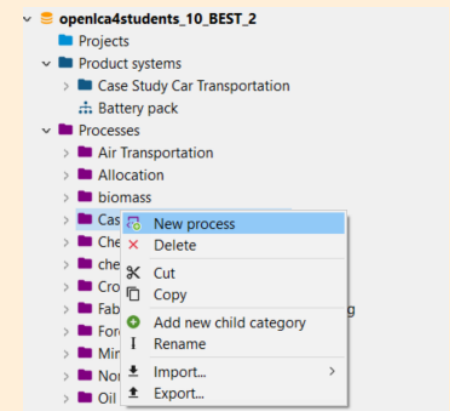
Ustvarite nov proces »Transport person e-car (average US)« s kvantitativno referenco "Person transport". Uporabite naslednje tokove in količine.

Vhodni tok	Znesek
Battery pack	0,5E-5 kosov
Car, electrically powered	0,25E-5 kosov
Electricity, at grid, US, 2008 - RNA	0,17115 kWh

Izhodni tok	Znesek
Osebni prevoz	1 pkm

- Proces ustvarite v mapi »Case Study Car Transportation«.
- Uporabite funkcijo povleci in spusti (drag and drop) v openLCA.
- Če ne uporabite povleci in spusti, morate ročno dodati ponudnike (providers).
- Čas za nalogo: 10 minut.

- Ustvarite proces »Transport osebe z e-vozilom (povprečje ZDA)« v mapi »Case Study Car Transportation« z uporabo toka »Transport osebe« kot kvantitativne reference.



- Dodajte preostale vhodne in izhodne tokove k temu procesu.
- Vnesite količine in prilagodite enote

Vaja 4e:

Faza proizvodnje + uporabe - LCIA

Izračunajte okoljske vplive in inventar proizvodne in uporabne faze električnega vozila z metodo CML (baseline).

- Ustvarite produktni sistem in nastavite ciljno količino glede na funkcionalno enoto (FU) (100.000 pkm).
- Izračunajte rezultate LCIA z uporabo metode CML (baseline).
- Kateri procesi največ prispevajo k okoljskemu vplivu (podnebne spremembe)?
- 5 min

Namig!

- Lahko ustvarite nov produktni sistem »Transport osebe z e-vozilom (povprečje ZDA) – Proizvodnja in uporaba« (proces se samodejno povežejo).
- Nastavite ciljno količino glede na FU.
- Shranite produktni sistem.
- Izračunajte rezultate z uporabo metode CML (baseline).

Vaja 4f: Uporabna faza e-avtomobila - LCIA

Zdaj izračunajte okoljske vplive uporabne faze električnega avtomobila (tj. vpliv porabljene električne energije; vplivi proizvodnje avtomobila ali baterije niso vključeni) z metodo CML (baseline).

Kako oblikovati ciljni produktni sistem za uporabno fazo avtomobila (brez proizvodnih procesov baterije/avtomobila)?

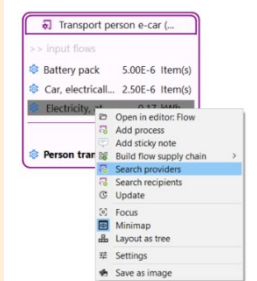
Izračunajte nove rezultate LCIA z uporabo metode CML (baseline).

Kateri procesi največ prispevajo k okoljskemu vplivu (podnebne spremembe)?

Ali več prispeva proizvodnja ali uporabna faza k kategoriji vpliva na podnebne spremembe?

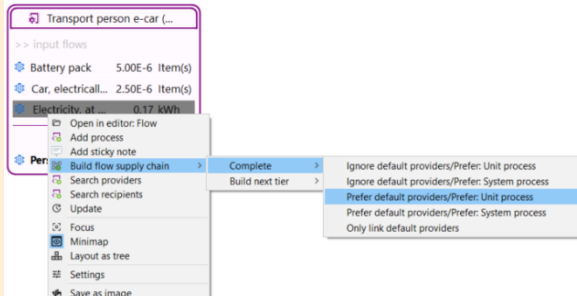
Čas za nalogo: 5 minut.

- Ustvarite nov produktni sistem »Transport osebe z e-avtom (povprečje ZDA – Uporaba« in uporabite isti proces kot referenco.
- Pri ustvarjanju produktnega sistema ne dodajte samodejno povezanih procesov.
- Nastavite ciljno količino glede na FU.
- V grafu modela ročno povežite potrebne procese za ovrednotenje vpliva porabe električne energije med uporabo.
- A) »Iskanje ponudnika« (in dodajte dobavno verigo) B) »Ustvari dobavno verigo«



• B) "Izgradite dobavno verigo"

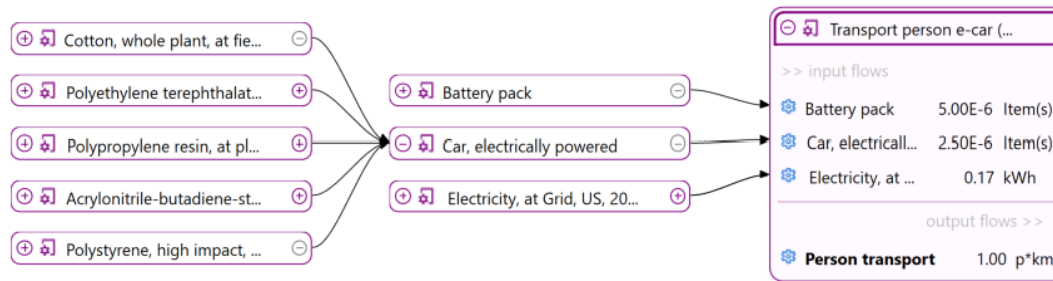
Name	Add	Con...	Already pr...	Already con...	Is default ...
Electricity, at Grid, US, 2008 - RNA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	-	<input checked="" type="checkbox"/>



Linearni življenjski cikel v primerjavi s fazami življenjskega cikla

Za prikaz prispevkov posameznih faz življenjskega cikla je primeren drugačen pristop modeliranja:
Drvo prispevkov faz življenjskega cikla

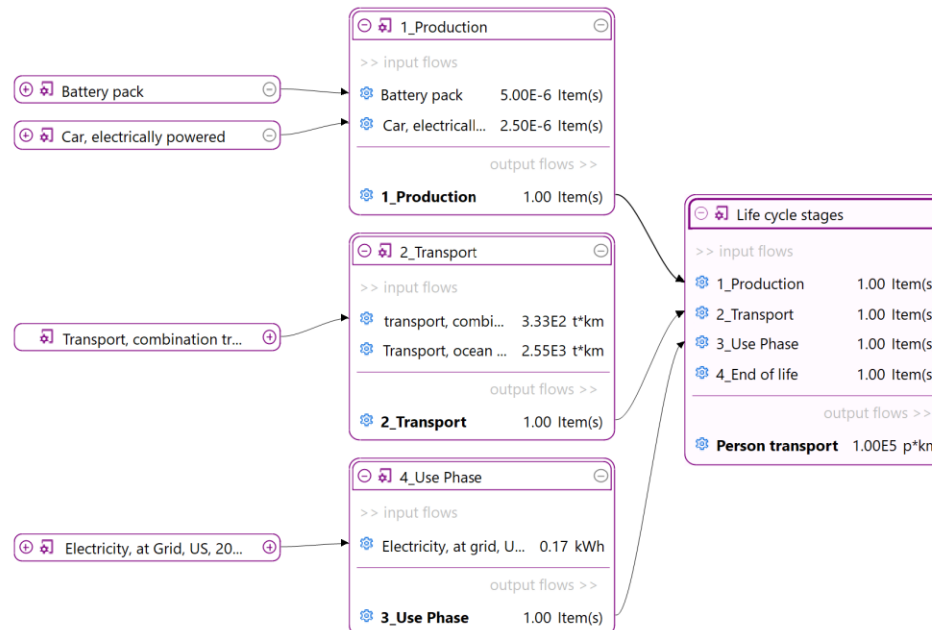
Model življenjskega cikla



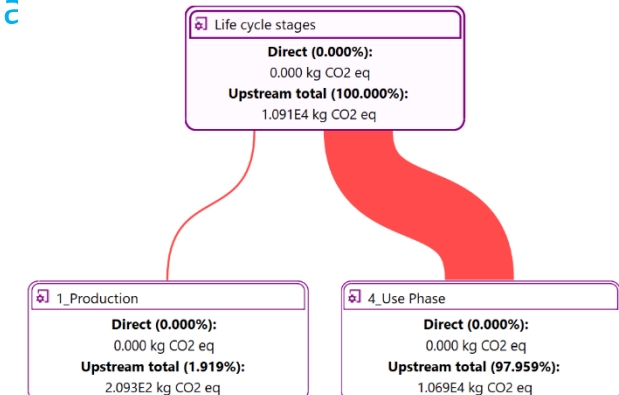
Impact category: Global warming (GWP100a)

Contribution	Process	Required amount	Total result [kg CO2 eq]
100.00%	Life cycle stages	1.00000E5 p*km	1.09077E4
> 97.96%	4_Use Phase	1.00000 Item(s)	1.06851E4
> 01.92%	1_Production	1.00000 Item(s)	209.26994
> 00.12%	2_Transport	1.00000 Item(s)	13.37443

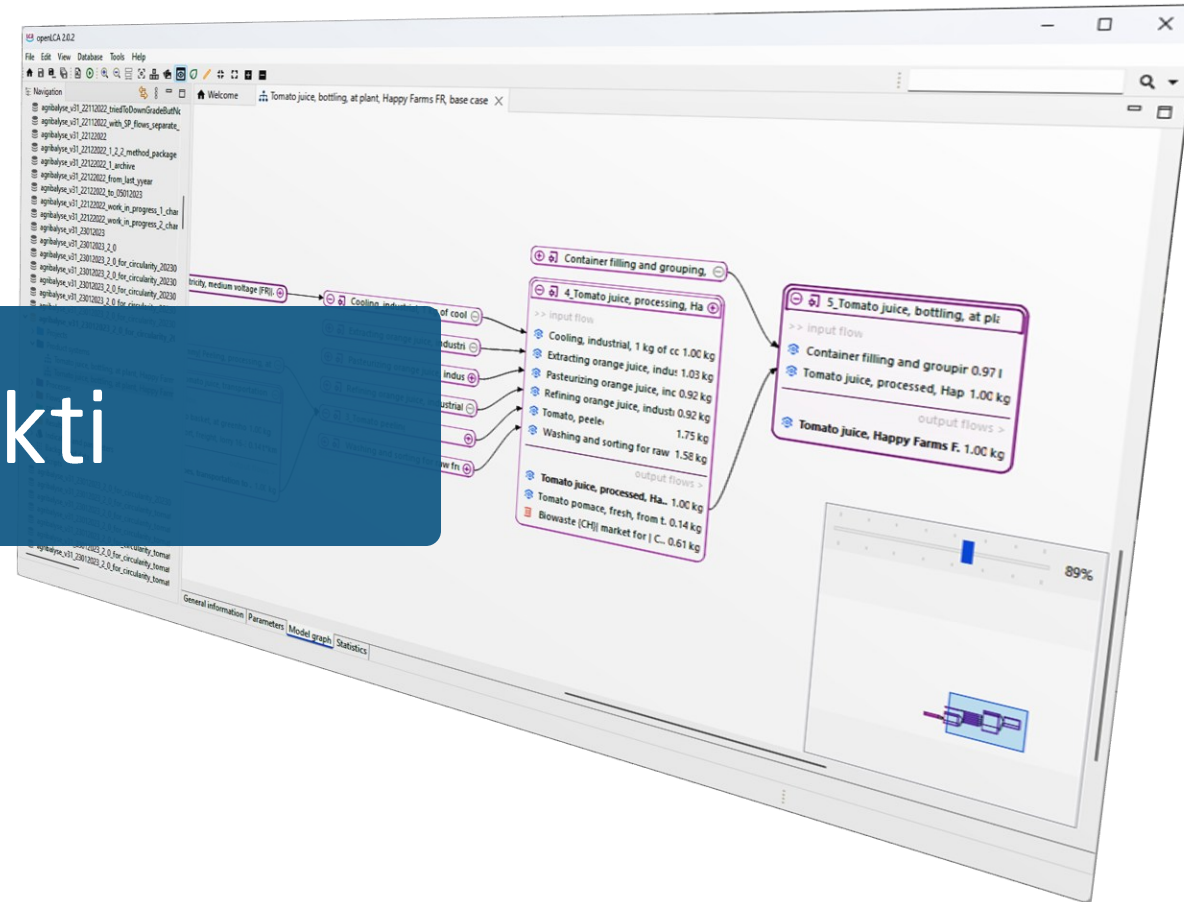
Faze življenjskega cikla



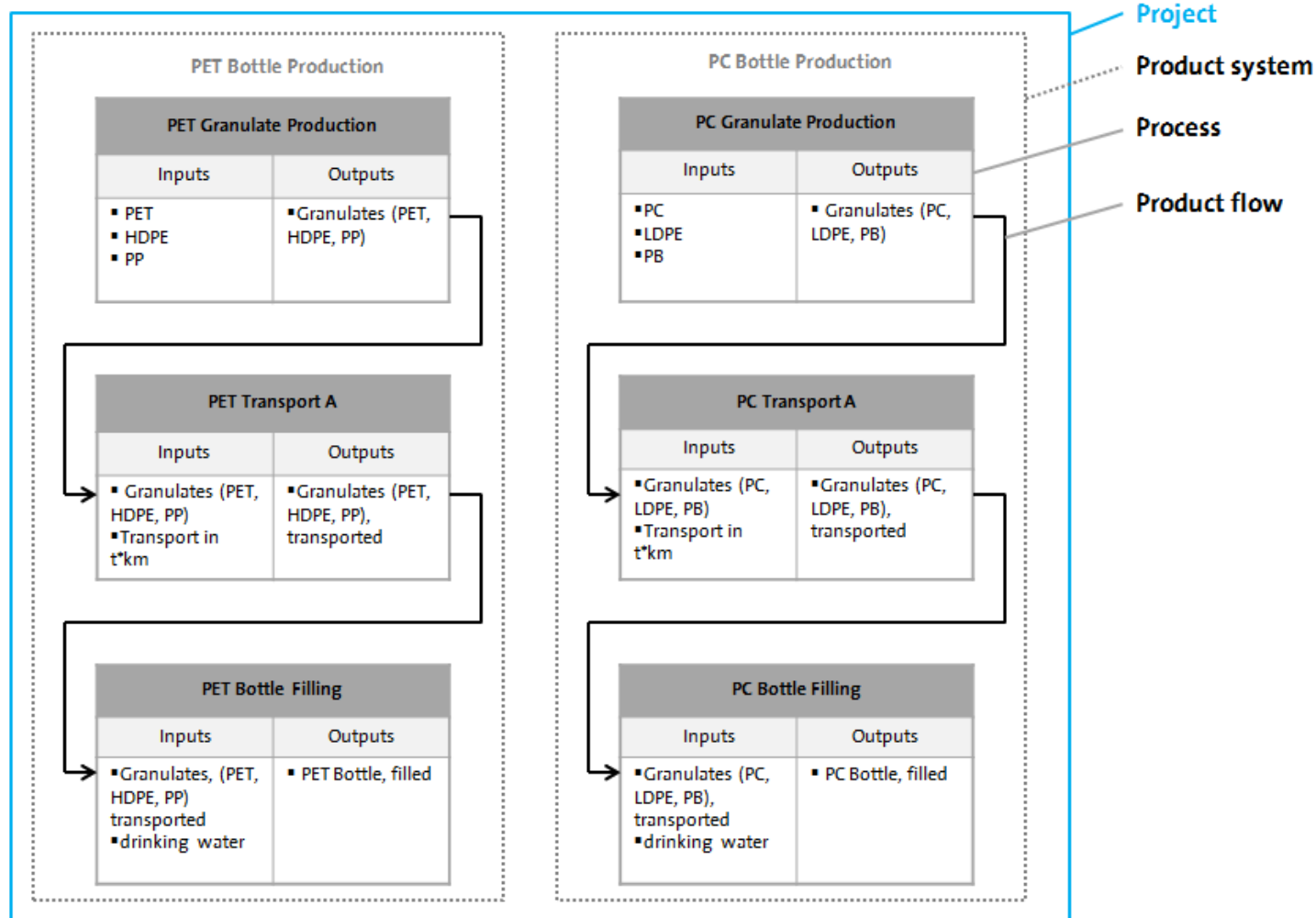
Sankeyjev diagram stopenj življenjskega cikla



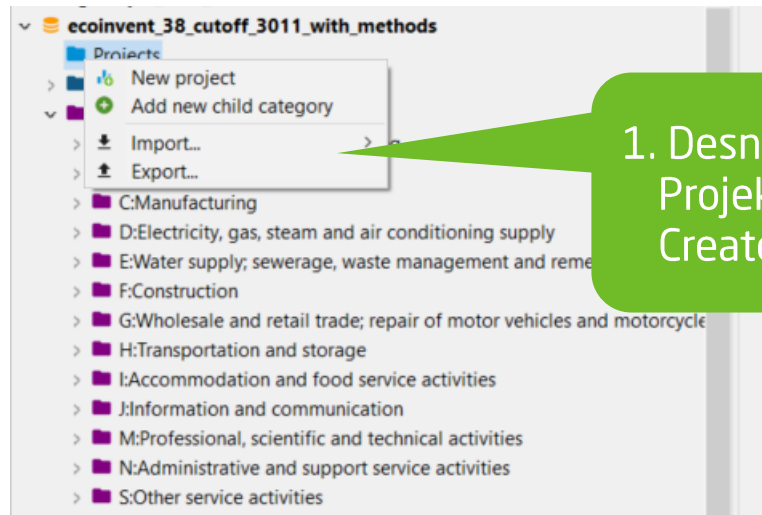
Projekti



Modeliranje v openLCA: Projekti

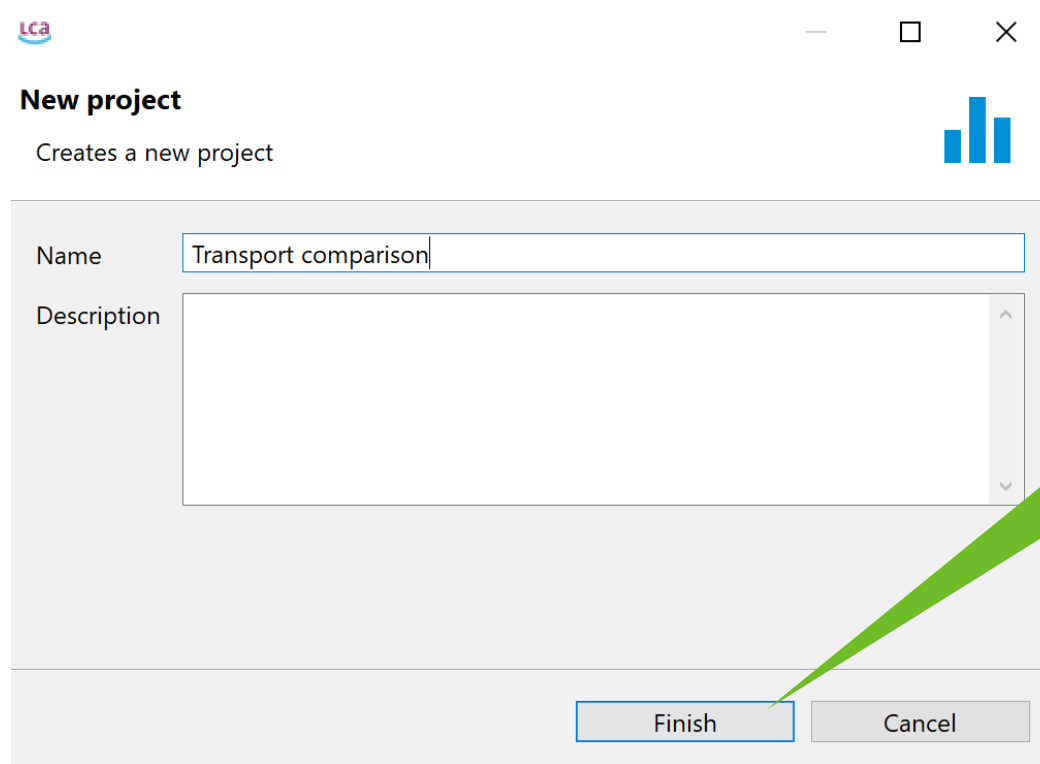


Projekt: Ustvarjanje



1. Desni klik na mapo
Projekti in izberite »
Create new project«

Projekt: Ustvarjanje (II)



Lca

New project
Creates a new project

Name

Description

2. Poimenujte projekt
in izberite »Finish«.

Projekt: Ustvarjanje (III)

EoL comparison_new ×

Project setup: EoL comparison_new

▼ General information

Name

Category ■ EoL

Description

Version 00.00.002 ⓘ ⓘ Last change 2020-03-02 10:47:49 UUID c602c077-4d43-46d3-b6f7-e6c27a0984cf

Tags

▼ Calculation setup

Impact assessment method

Normalization and weighting set

Regionalized LCIA

Include cost calculation

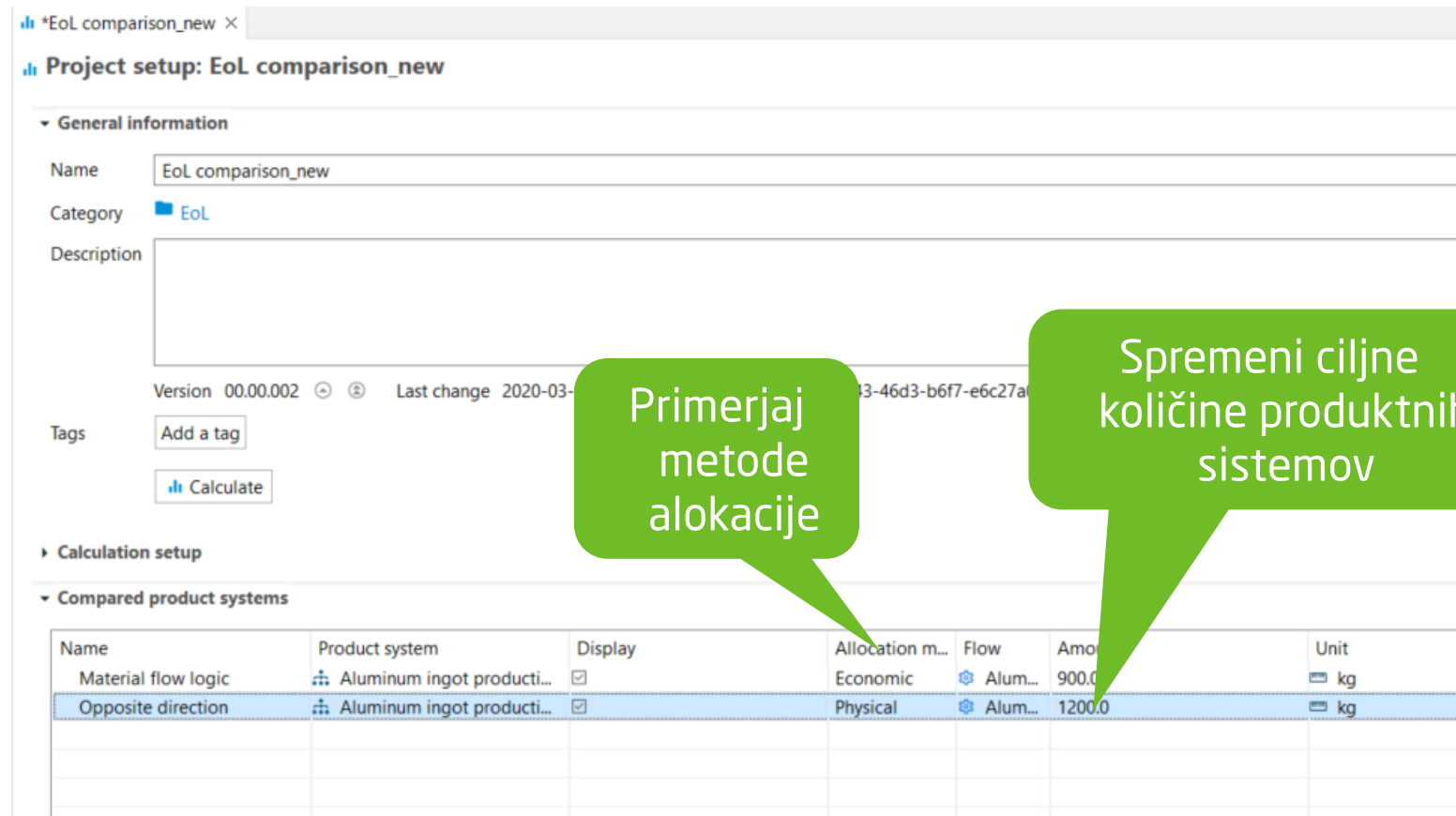
▼ Compared product systems

Name	Product system	Display	Allocation method	Flow	Amount	Unit	Description
Material flow logic	Aluminum ingot producti...	<input checked="" type="checkbox"/>	None	Aluminum ingot	900.0	kg	
Opposite direction	Aluminum ingot producti...	<input checked="" type="checkbox"/>	None	Aluminum ingot	900.0	kg	

3. V urejevalnem oknu se bo odprl nov zavihek s projektom. Kliknite na zeleni gumb za izbiro različnih produktnih sistemov za primerjavo.

Primerjalne ocene: Projekti

- Primerjati je mogoče enake ali različne produktne sisteme.



Project setup: EoL comparison_new

General information

Name: EoL comparison_new

Category: EoL

Description:

Version: 00.00.002 | Last change: 2020-03-13-46d3-b6f7-e6c27a

Tags: Add a tag, Calculate

Calculation setup

Compared product systems

Name	Product system	Display	Allocation m...	Flow	Amo	Unit
Material flow logic	Aluminum ingot producti...	<input checked="" type="checkbox"/>	Economic	Alum...	900.0	kg
Opposite direction	Aluminum ingot producti...	<input checked="" type="checkbox"/>	Physical	Alum...	1200.0	kg

Primerjaj metode alokacije

Spremeni ciljne količine produktnih sistemov

Primerjalne ocene: **Projekti**

- Primerjati je mogoče enake ali različne produktne sisteme

Project setup: bottle filling comparison

General information

Name:

Category: - none -

Description:

Version: 00.00.001 Last change: 2020-02-17 16:24:09 UUID: 467360aa-8961-41b...

Tags:

Calculation setup

Impact assessment:

Normalization and:

Compared product systems

Parameters

Parameter	Context	Description	PC	PE
p_0	PC Transport A		400.0	600.0

Project setup | Report

Spremeni vrednosti parametrov za posamezno varianto

Dodaj parametre, uporabljene v produktnem sistemu

Primerjalne ocene: Projekti

bottle filling comparison × Result of: bottle filling comparison

Project setup: bottle filling comparison

▼ **General information**

Name

Category

Description

Version Last change

Tags

▼ **Calculation setup**

Impact assessment method

Normalization and weighting set

Regionalized LCIA

Include cost calculation

▶ **Compared product systems**

Ko so vse spremenljivke nastavljene, kliknite »Calculate« za izračun rezultatov.

Primerjalne ocene: Poročilo

Project setup: Compare weights2



General information

Name Compare weights2

Category - none -

Description

Version 00.00.000 Last change 2023-07-07 19:02:31 UUID cba37a9b-255c-4900-b8b4-aca08db44dff

Tags

Add a tag

Calculate

Calculation setup

Impact assessment method CML-IA baseline

Normalization and weighting set

Regionalized LCIA

Include cost calculation

Create report

Če želite ustvariti tudi poročilo, najprej kliknite »Create report«

Projekt: Poročilo

Report sections: PET Case Study

General information

Title: Results of project: PET Case Study

+ Add section

Introduction

Section: Introduction

Text: In the following the results of the project are shown. This is a default template for the report of the project results. You can configure this template via the project editor by

Component:

- Product system description table
- LCIA category description table
- Parameter description table
- Parameter value table
- LCIA result table
- Normalisation result table
- Single score table
- Indicator bar chart
- Relative LCIA results - bar chart
- Normalisation - bar chart
- Relative LCIA results - radar chart
- Normalisation - radar chart
- Single score bar chart
- Process contribution chart
- LCC: Added values table
- LCC: Net-costs table

Project Variants

Section: Variants as defined in the report components.

Text: Variants as defined in the report components.

Component: Product system description table

Selected LCIA Categories

Project setup | Report sections

1. Za vsak razdelek je mogoče dodati besedilne opise

2. Vrsto komponente, ki se prikaže v posameznem razdelku, je mogoče izbrati (npr. tabele, grafi).

Projekt: Poročilo razdelki

Report sections

▼ **General information**

Title

▶ **Introduction**

▶ **Project Variants**

▶ **Selected LCIA Categories**

▶ **LCIA Results**

▶ **Single Indicator Results**

▶ **Process Contributions**

▶ **Relative Results**

▼ **New section**

Section

Text

Component

Project setup

Dodate lahko nove razdelke

Ali pa izbrišite obstoječe

Primer: poročilo

*PET Case Study Report viewer

Option	Description
Case 1	
Case 2	
Case 3	

Selected LCIA Categories

The table below shows the LCIA categories of the selected LCIA method of the project. Only the LCIA categories that are selected to be displayed are shown in the report. Additionally, a user friendly name and a description for the report can be provided.

Impact category	Unit	Description
Acidification pot.	kg SO2 eq.	
GWP100	kg CO2 eq.	

LCIA Results

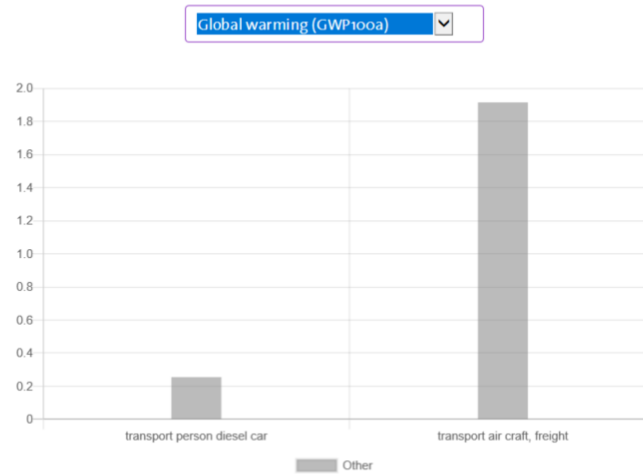
This table shows the LCIA results of the project variants. Each selected LCIA category is displayed in the rows and the project variants in the columns. The unit is the unit of the LCIA category as defined in the LCIA method.

Impact category	Case 1	Case 2	Case 3	Unit
Acidification pot.	1.07407e+0	9.54225e+0	1.20903e+2	kg SO2 eq.
GWP100	2.25725e+2	1.87004e+3	3.75859e+4	kg CO2 eq.

Primer: poročilo

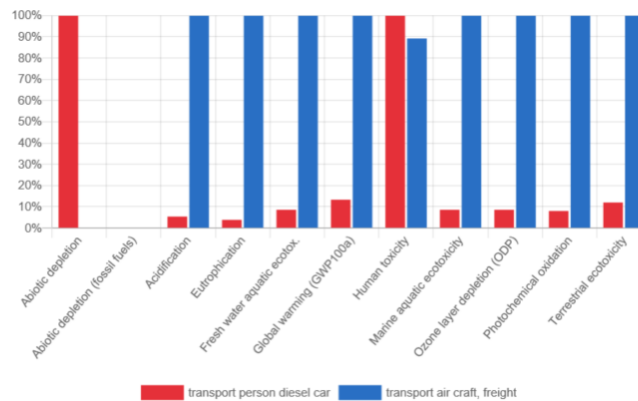
Process Contributions

This chart shows the contributions of the selected processes in the project setup to the variant results of the selected LCIA category. As for the single indicator results, you can change the selection and the chart is dynamically updated.



Relative Results

The following chart shows the relative indicator results of the respective project variants. For each indicator, the maximum result is set to 100% and the results of the other variants are displayed in relation to this result.



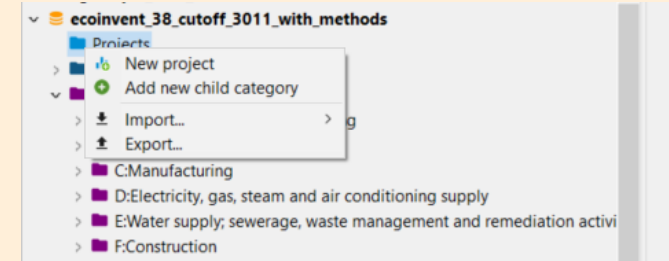
Vaja 4g:

Električni avto proti dizelskemu vozilu

Primerjajte okoljske vplive, ki jih povzroča prevoz 100.000 pkm z električnim avtomobilom, z vplivi, ki jih povzroča prevoz 100.000 pkm z dizelskim avtomobilom. Uporabite metodo za ocenjevanje vplivov ReCiPe 2016 Midpoint (H).

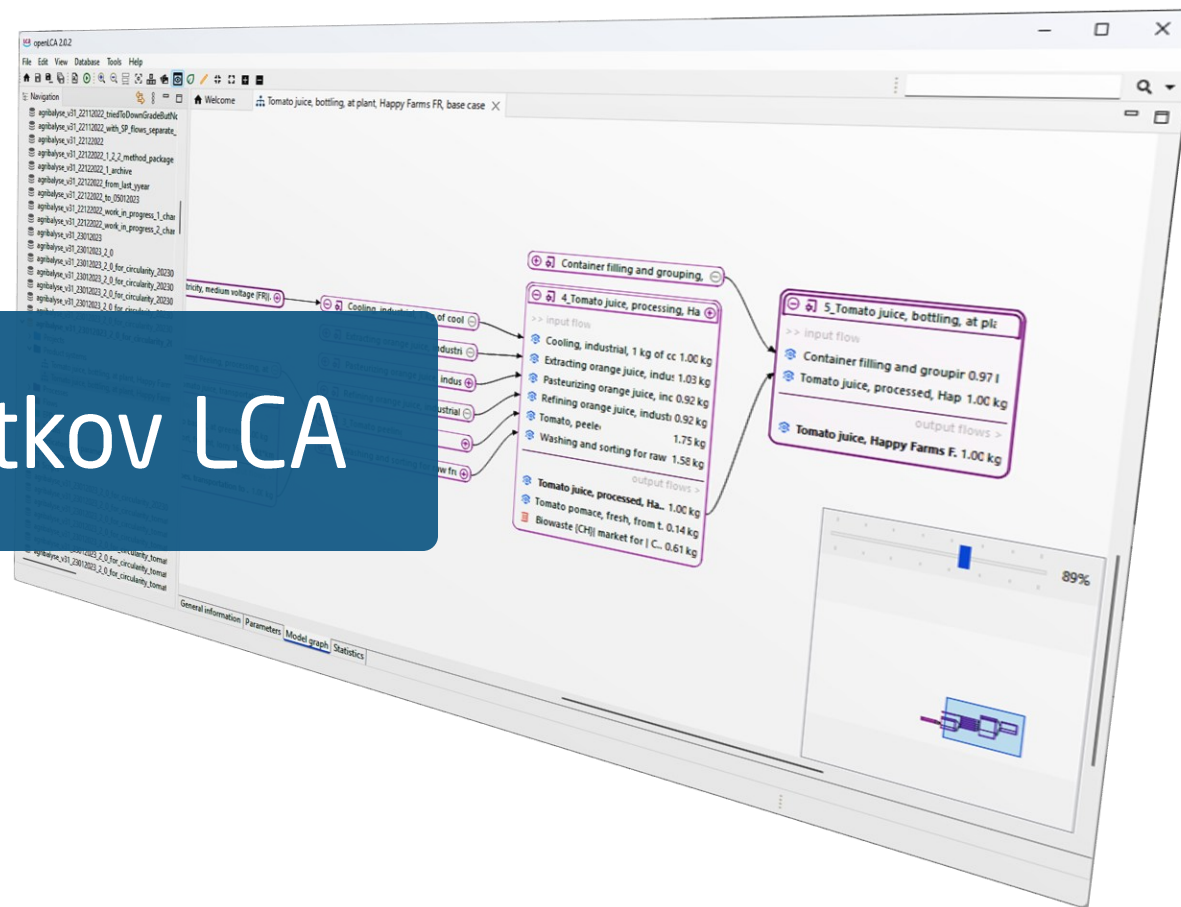
- Ustvarite nov projekt in dodajte produkta sistema »Prevoz osebe z e-vozilom (povprečje ZDA)« in »Prevoz osebe z dizelskim vozilom«.
- Analizirajte rezultate za kategoriji vplivov »Globalno segrevanje« in »Toksičnost za ljudi« (karcinogena in nekarcinogena).
- Katera vrsta prevoza je okolju prijaznejša?
- 10 minut

- Najprej ustvarite nov projekt.



- Izberite metodo LCIA.
- Izberite kategorije vpliva, omenjene v vaji.
- Povlecite in spustite sisteme izdelkov ali jih dodajte z gumbom »+«.
- Prilagodite zneske.
- Shrani.
- Izračunaj.

Izvoz podatkov LCA



UPOŠTEVAJTE!

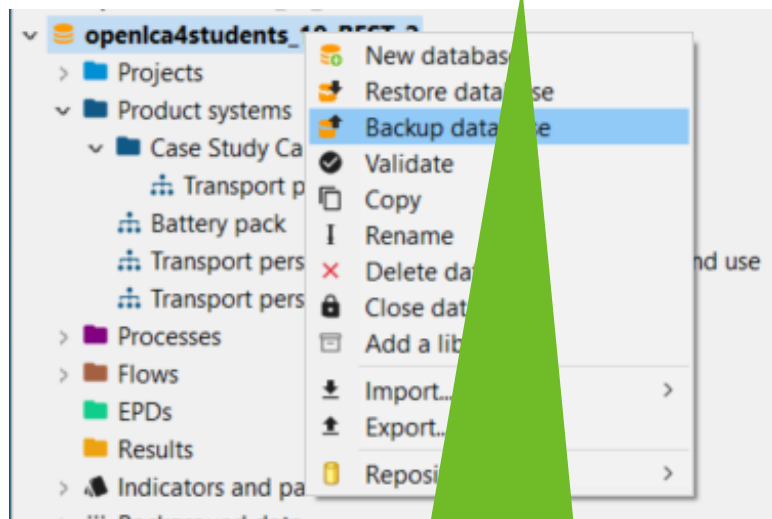
- Podatkovne baze v openLCA so lokalne na vašem računalniku!

Za Windows: C:\Users\USERNAME\openLCA-data-1.4\databases

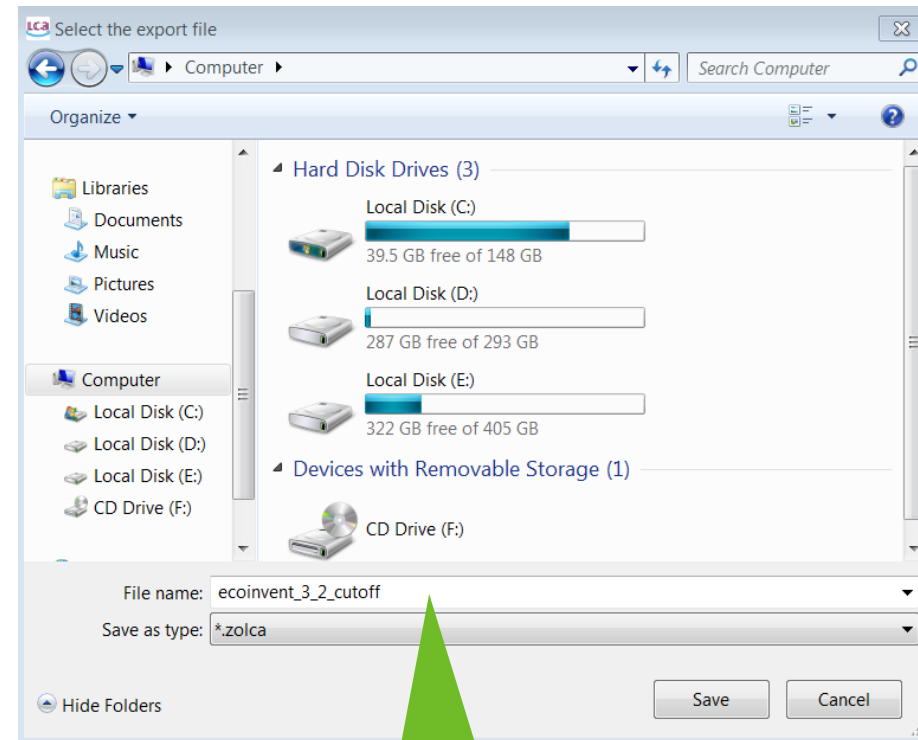
Za MacOS: /Users/USERNAME/openLCA-data-1.4/databases

- Niso samodejno varnostno kopirane drugje.
- Priporočljivo je, da svoje baze shranite na varno mesto, npr. v oblak.

Izvoz baze podatkov

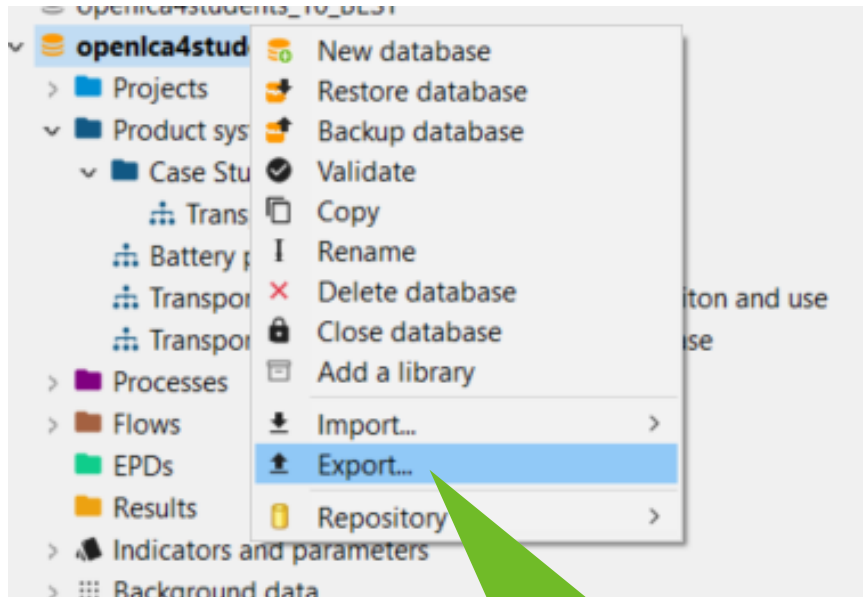


1. Z desno miškino tipko kliknite ime baze podatkov in izberite » „Backup database“

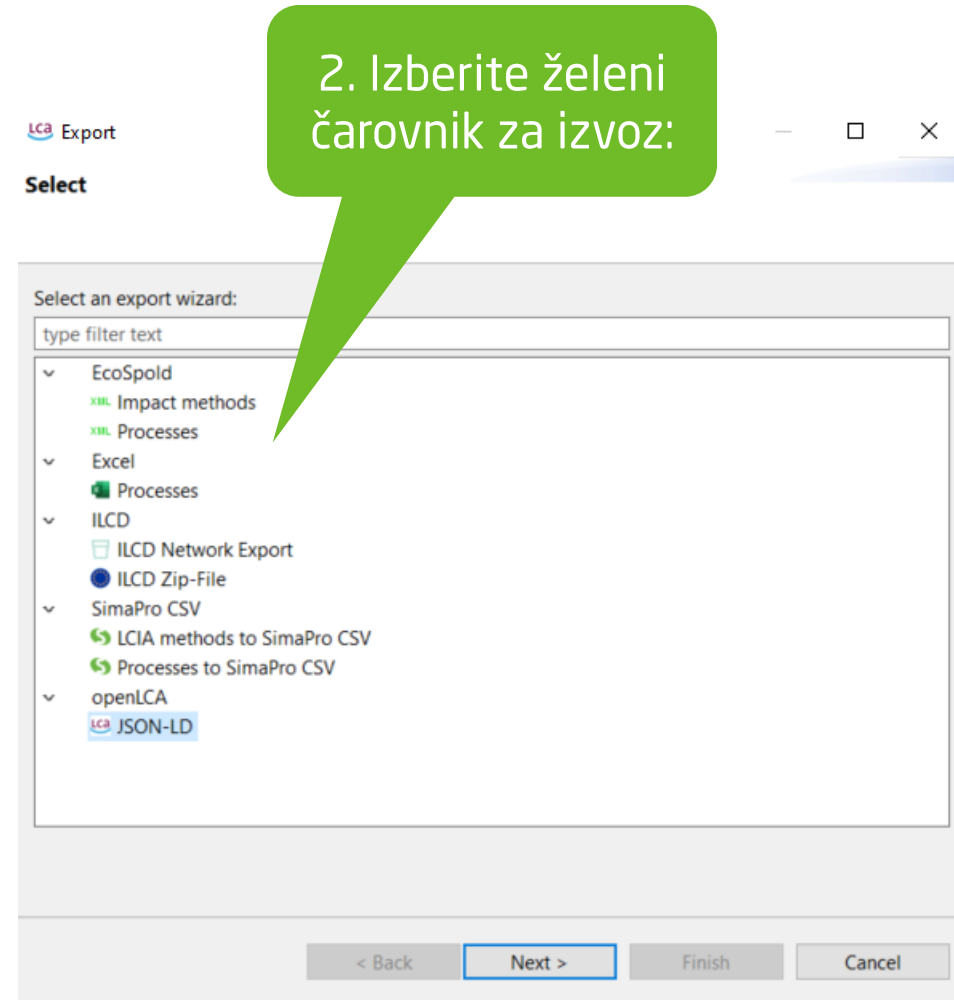


2. Izberite imenik in ime za .zolca datoteko

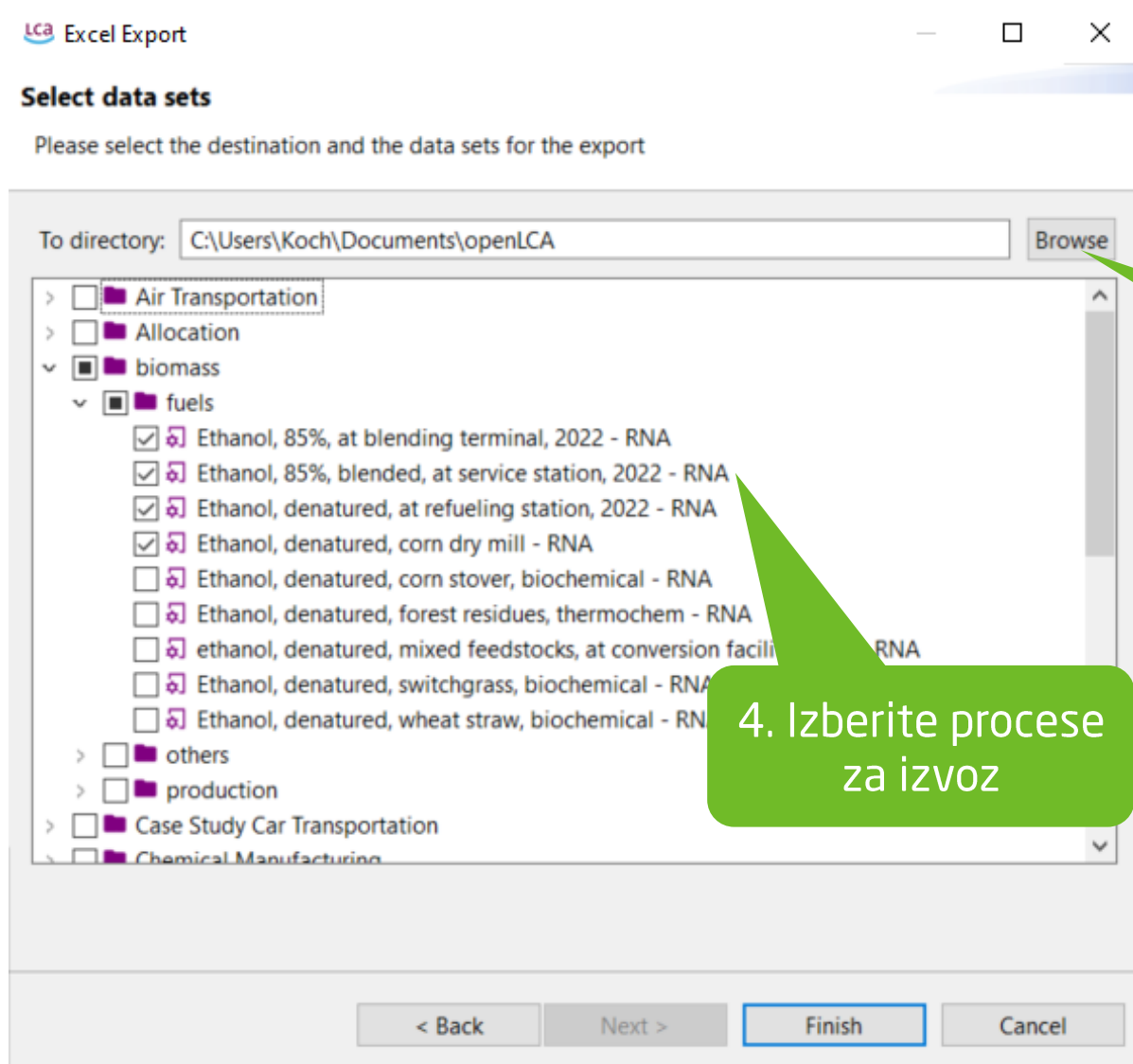
Primer : Proces izvoz (I)



1. Z desno miškino tipko kliknite bazo podatkov in izberite »Export«



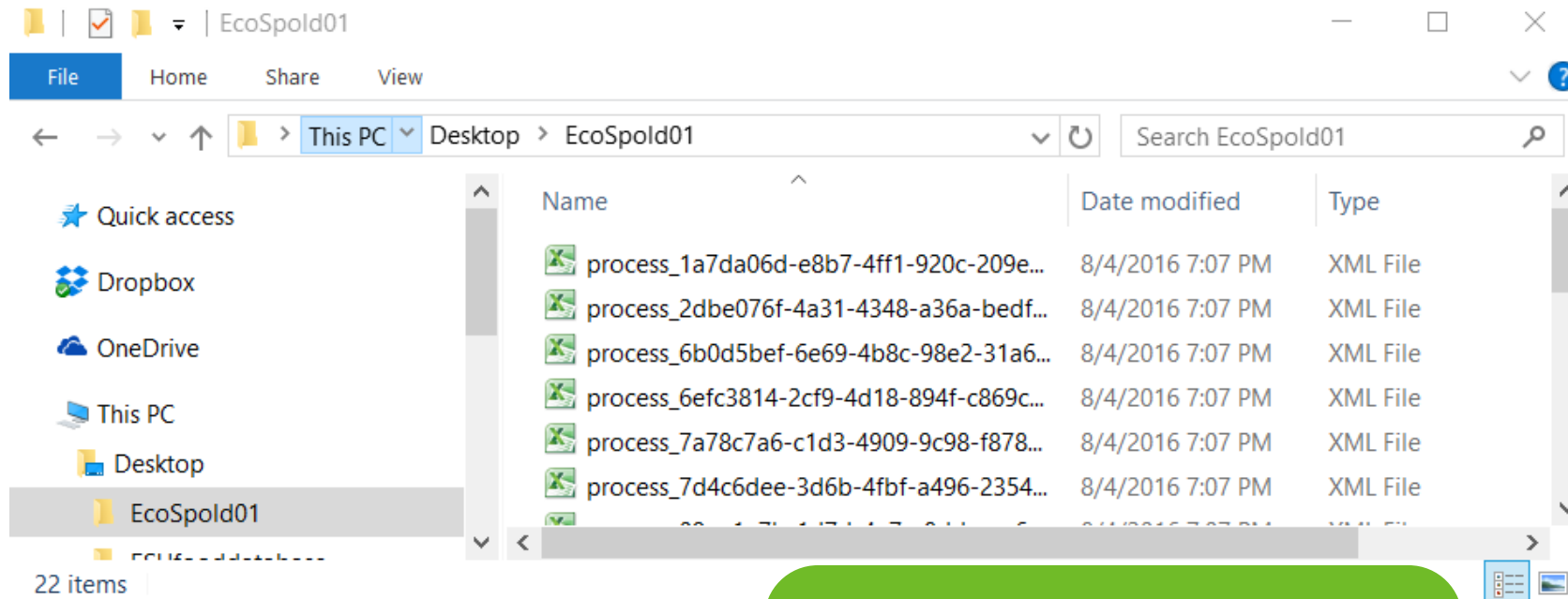
Primer: Proces izvoz (II)



3. Izberite imenik, v katerem bodo shranjeni podatki, in kliknite »Finish«

4. Izberite procese za izvoz

Primer: Proces izvoz (III)



V izbrani imenik se ustvari mapa z imenom izvozne oblike. Na primer: Namizje\EcoSpold01.

Izvozi formatov

EcoSpold

- Procesi
- Metode ocenjevanja vplivov

ILCD

- Akterji
- Lastnosti tokov
- Toki
- Metode LCIA
- Procesi
- Produktni sistemi
- Viri
- Skupine enot

Excel

- Procesi
- Hitri rezultati
- Rezultati analiz
- Rezultati simulacije Monte Carlo
- Produktni sistemi:
 - Elementarni tokovi
 - Produktni tokovi
 - Dejavniki LCIA

JSON-LD

- Vsak element v bazi podatkov openLCA

CSV-matrika

- Graf produktnega sistema

Slike

- Diagrami

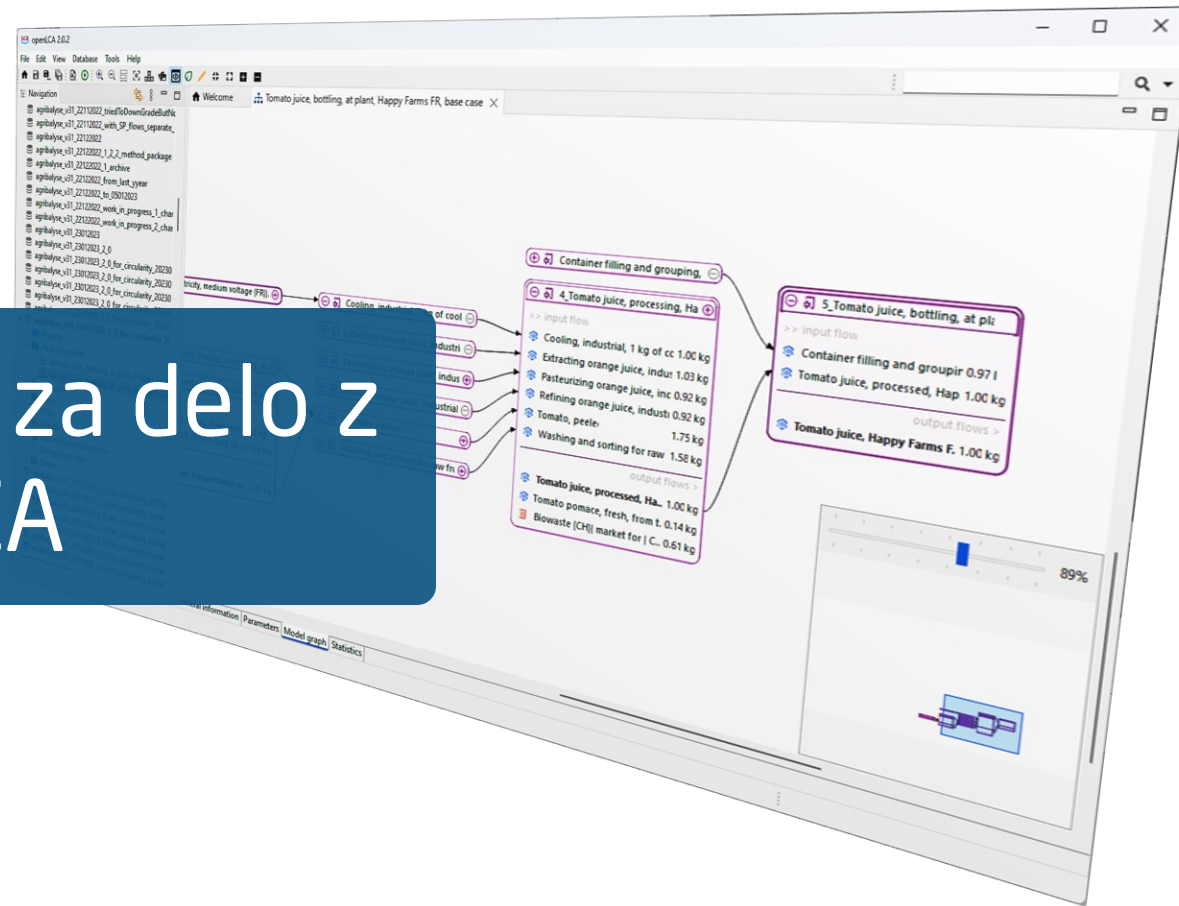
HTML

- Poročilo o projektu

skript openLCA (.zolca)

- Popolne baze podatkov

Nasveti in triki za delo z openLCA



Osnovni ukazi

- Odpri element: dvojni klik
- Kopiraj element: desni gumb miške → kopiraj
- Prilepi element: desni gumb miške → prilepi
- Izbriši element: desni gumb miške → izbriši
- Shrani element: uporabite simbol za shranjevanje v glavnem meniju
- Shrani sliko: desni gumb miške → shrani sliko
- Zmanjšaj / povečaj element:



Osnovni ukazi

- Povlecite in spustite tokove iz navigacijske plošče na zavihek Vnosi/Izhodi v urejevalniku procesov
- Povlecite in spustite procese iz navigacijske plošče na graf modela v urejevalniku produktnega sistema

The screenshot shows the openLCA 2.0.0.beta1 interface. The left sidebar is a navigation tree with the following structure:

- Navigation
 - ecoinvent_38_cutoff_3011_with_methods
 - ecoinvent_38_cutoff_3011_with_methods_2
 - MultiSI_solar_panels
 - openlca4students_11
 - openlca4students_2
 - Projects
 - Product systems
 - Processes
 - Flows
 - A Hoodie
 - A:Agriculture, forestry and fishing
 - B:Mining and quarrying
 - C:Manufacturing
 - chemicals
 - organics
 - Ethanol, denatured, forest residues, the
 - mixed Alcohols, thermochemical proce
 - sulfur, thermochemical process - RNA
 - D:Electricity, gas, steam and air conditioning :
 - Deposited goods
 - E:Water supply; sewerage, waste managemen
 - Elementary flows
 - Emissions
 - End-of-life treatment
 - Energy carriers and technologies
 - F:Construction
 - final-waste-flow
 - G:Wholesale and retail trade; repair of motor
 - H:Transportation and storage
 - I:Accommodation and food service activities
 - ILCD
 - J:Information and communication
 - L:Real estate activities
 - Land use
 - M:Professional, scientific and technical activi
 - Materials production
 - N:Administrative and support service activite
 - non-material

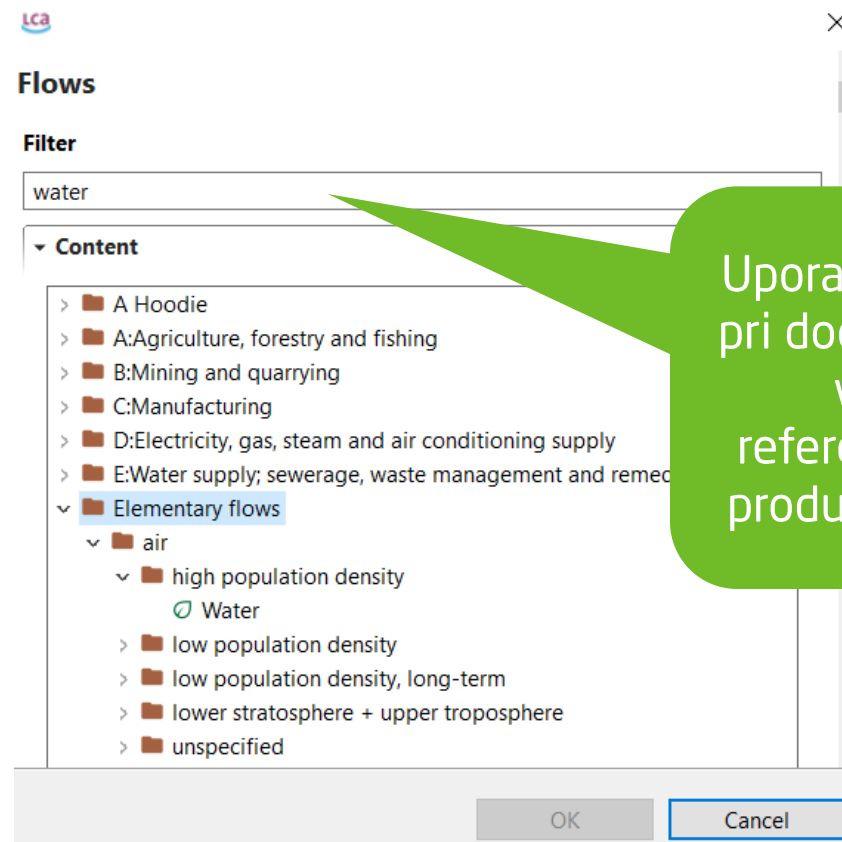
Windows

- Pogosto imajo uporabniki hkrati odprtih več elementov; priporočljivo je zapreti tiste, ki jih ne potrebujete.
- Če želite obnoviti »izgubljeno« okno, pojdite na Window → Show View → Other.
- Možno je tudi spremeniti položaj okna.

The image displays three overlapping windows from a software application, each showing the 'General information' section for a different thermochemical process. The windows are titled 'mixed Alcohols, thermochemical process - RNA', 'sulfur, thermochemical process - RNA', and 'Ethanol, denatured, forest residues, thermochem - RNA'. Each window contains a form with fields for Name, Category (set to 'chemicals/organics'), Description, Version (01.00.000), and UUID. There are also buttons for 'Add a tag', 'Infrastructure flow' (checkbox), 'Flow type' (set to 'Product'), and 'Create process'. The 'Ethanol' window also shows a 'Location' field set to 'Northern America'. The windows are layered, with the 'Ethanol' window in the foreground, partially overlapping the 'sulfur' window, which in turn overlaps the 'mixed Alcohols' window.

Filter

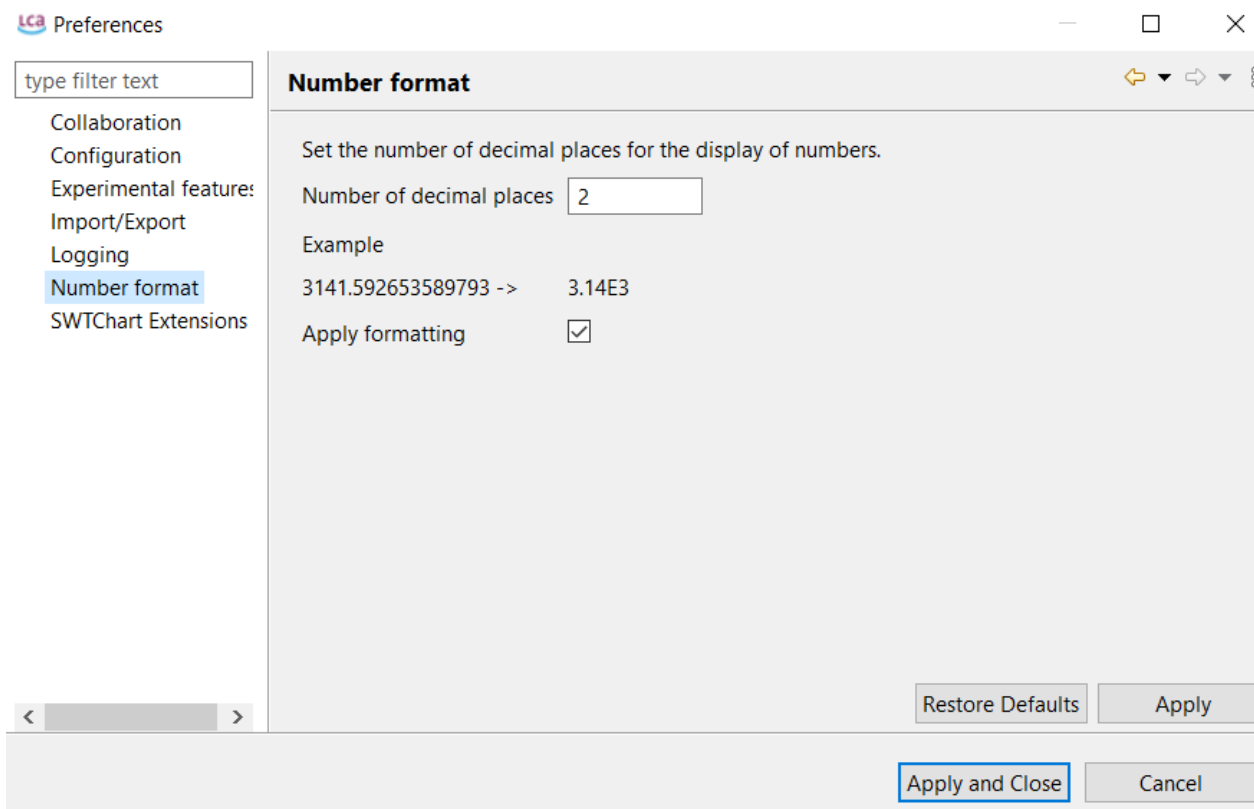
- Urejevalniki »create new« vključujejo filter za lažje iskanje želenega elementa



Uporabite možnost Filter pri dodajanju novih tokov v proces, izbiri referenčnega procesa v produktnem sistemu itd.

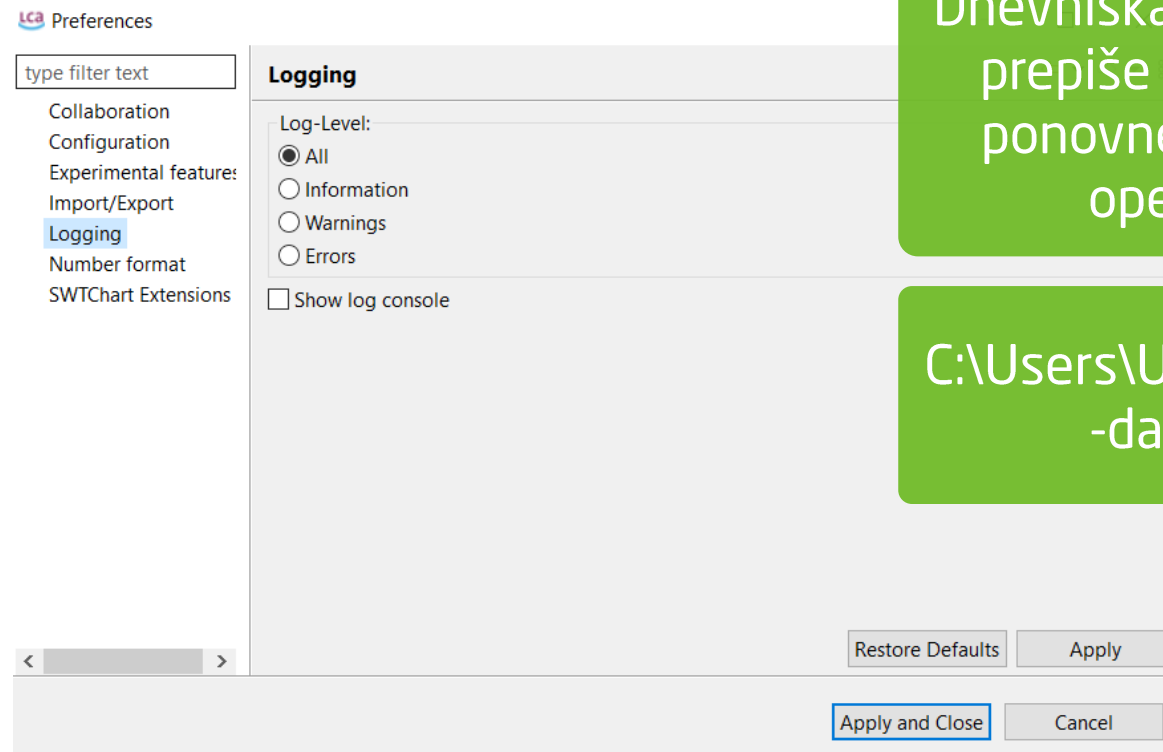
Številke

- Vedno uporabite piko za decimalna števila; vejica ni sprejeta (→ 1.5 namesto 1,5)
- Pod File/Preferences/Number format lahko izberete želeni format števil za rezultate



Napake

- Možno je samodejno poročanje o vseh napakah v dnevniški datoteki
- To storite tako, da greste na datoteko/nastavitve/beleženje in označite »All«

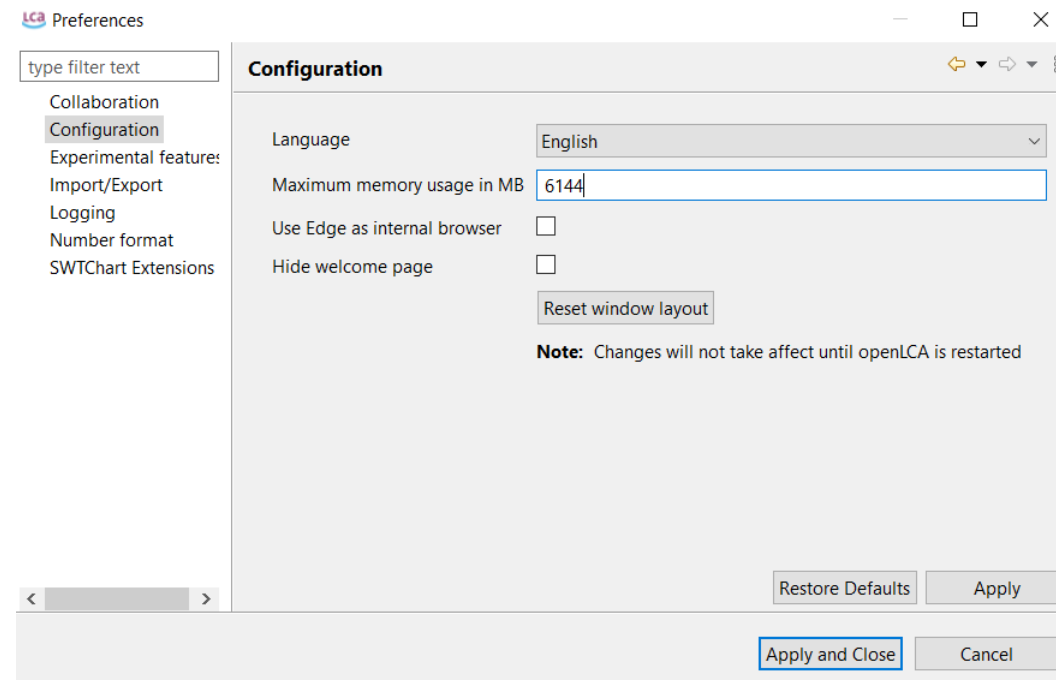


Dnevniška datoteka se
prepiše ob vsakem
ponovnem zagonu
openLCA!

C:\Users\User\openLCA
-data-1.4

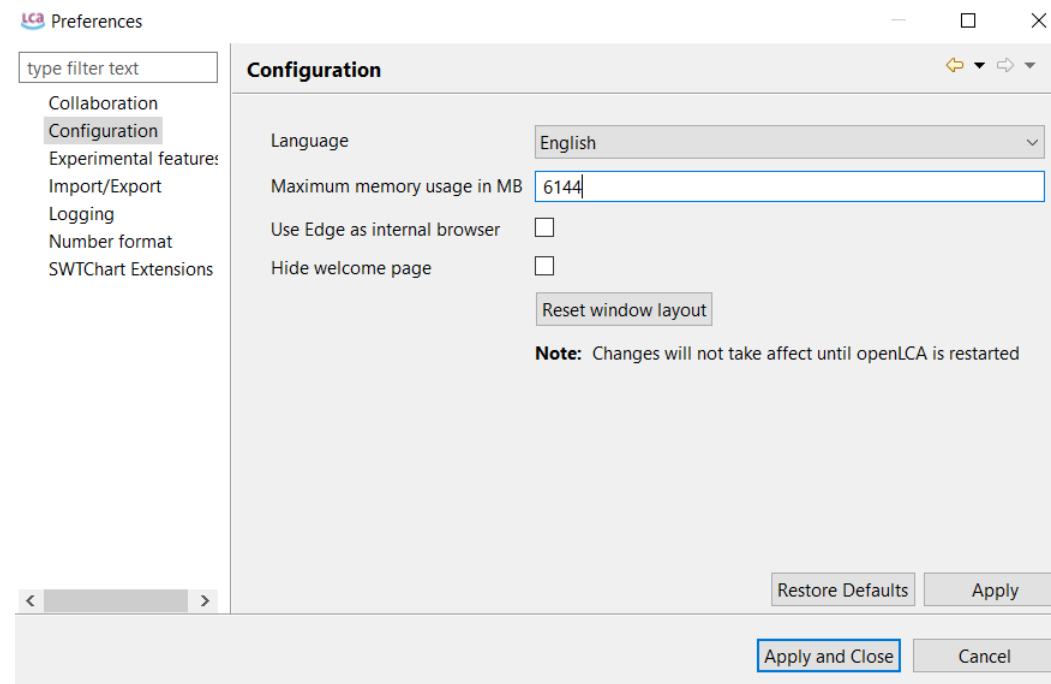
Jezik

- openLCA je na voljo v arabščini, bolgarščini, katalonščini, kitajščini, angleščini, francoščini, nemščini, italijanščini, portugalščini, španščini in turščini.
- Jezik lahko spremenite pod File > Settings > Configuration.
- Po spremembi jezika je treba program ponovno zagnati, da se sprememba aktivira.



Poraba pomnilnika

- Nekatere baze podatkov za izračune zahtevajo večjo porabo pomnilnika (npr. ecoinvent 3).
- To nastavitve lahko spremenite pod File > Settings > Configuration.



Viri za openLCA



openLCA .org



- Prenosi (programska oprema, metode LCIA, ...)
- Video posnetki, priročniki, študije primerov
- Storitve (servis pogodbe , usposabljanje , kritično ocene , gostovanje in podatki upravljanje rešitve ...)
- Forum in blog

openLCA Blog

- Naš neposredni komunikacijski kanal s skupnostjo openLCA
 - Novice o bazah podatkov, metodah in programskih izdajah
 - Popravki napak
 - Akademija openLCA trenerjev za pridobitev certifikata openLCA trenerja

Ecoinvent – new licences available in Nexus

by Julia Cilleruelo | Sep 19, 2022 | Uncategorized

Early this year ecoinvent introduced new licence types. We talked about them here: <https://www.openlca.org/ecoinvent-addition-of-new-database-licences/>. Basically, they expanded their database licences and incorporated two new licence types to cater the current data...

ELCD – fixed issues

by Julia Cilleruelo | Sep 8, 2022 | Uncategorized

It was brought up to our attention that the ELCD database was experiencing some issues regarding the impact category Resource use, fossil from the EF 3.0 (adapted) LCIA method. This impact category displayed no environmental impact even for processes where one would...

Idemat 2022RevA & eco-costs for ecoinvent databases for openLCA

by Julia Cilleruelo | Sep 7, 2022 | Uncategorized

<https://www.openlca.org/blog/>

openLCA.org/downloads



Visit our public support platform [ask.openLCA](#), – a question-and-answer (Q&A) website on Life Cycle Assessment and also the official support platform for [openLCA](#), [openLCA nexus](#) and the [LCA Collaboration Server](#).

[ask.openLCA](#)

Downloads



openLCA

Here's presenting the latest version 1.10.3 (release date: June 24th, 2020). We recommend using this version. Our tests have not shown any issues, but should you run into any, please let us know. Thanks in advance!

Windows	Mac	Linux	Sources	Latest builds
<p>To use openLCA in windows, download the zip-archive below: Just unzip the archive and start openLCA.exe. To uninstall it, just delete the created folder. You can have several versions of openLCA in different folders on the same computer.</p> <p>openLCA 1.10.3 zip-archive: openLCA_win64_1.10.3_2020-06-24.zip</p> <p>Alternatively, you can install openLCA with the installer below. If you have an older openLCA version installed (via the installer) you should uninstall it first.</p> <p>openLCA 1.10.3 installer: openLCA_win64_1.10.3_2020-06-24</p>				

Downloads

[openLCA](#)

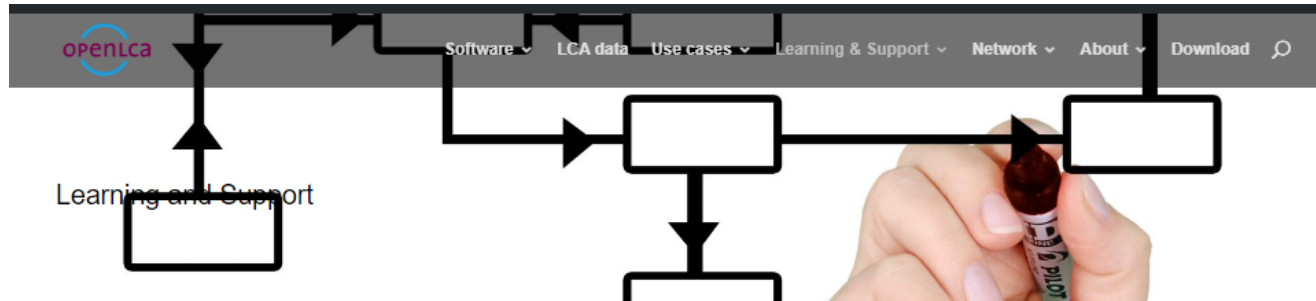
[LCA Collaboration Server](#)

[Impact methods](#)

[Data quality systems](#)

[Format converter](#)

openLCA.org/learning



Free resources

To help you get started with openLCA, we are providing many free resources, from manuals on the software to handbooks on specific topics, to guidance on impacts assessment methods and some ready to use case studies to get inspiration on modeling your own LCA study.



Manuals and presentations

Sometimes it is good to have a more comprehensive text which explains details – this section contains some manuals for different openLCA versions and related, typically more specific, topics. Also the format converter documentation is available.

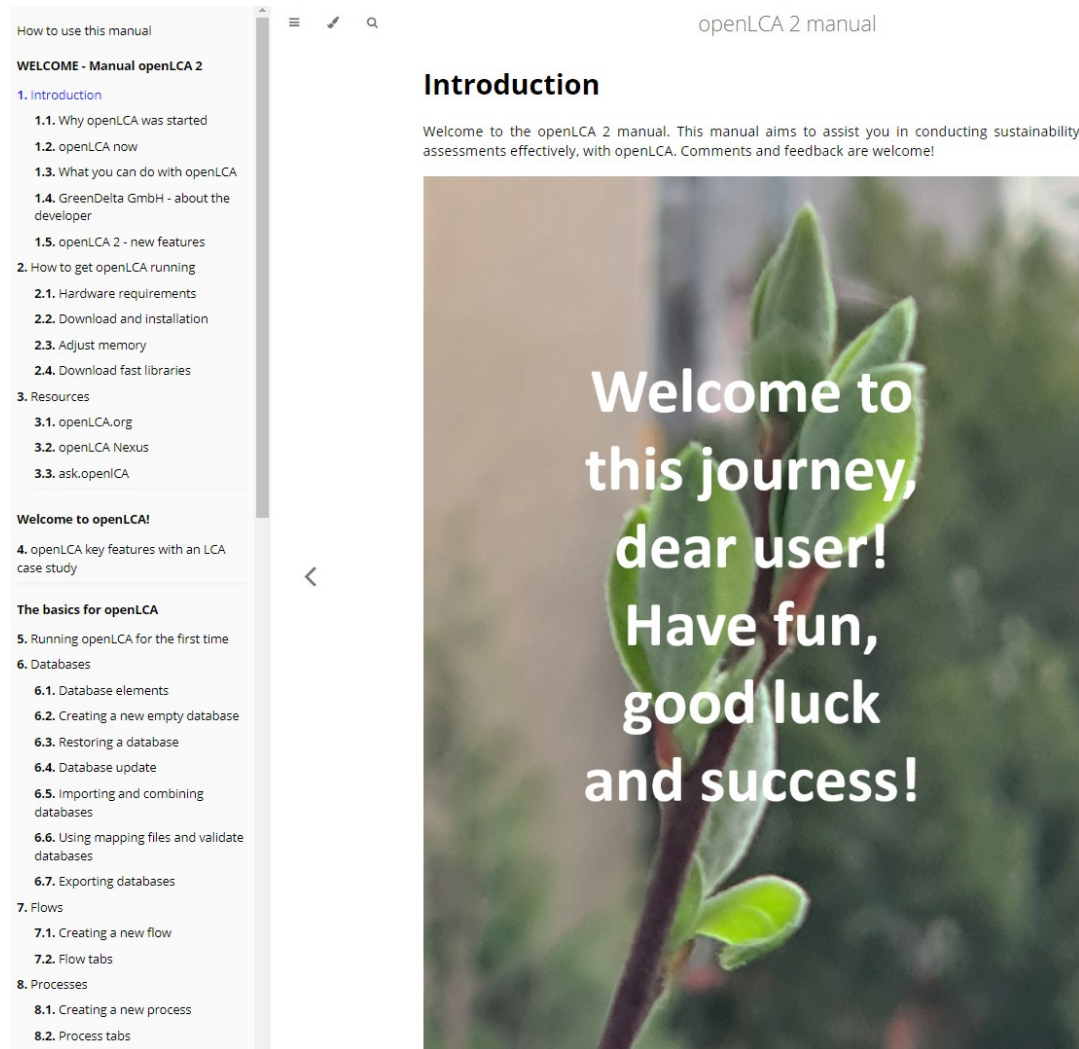
openLCA, general	Collaboration Server	Specific topics	Databases
Presentations	Format converter		
Version 2.0			
• Comprehensive openLCA manual for version 2.0, November 2023			
Version 1.10.2			
• Comprehensive openLCA manual for version 1.10, February 2020			
Version 1.9.0			
• Comprehensive openLCA manual for version 1.9.0, June 2019			

Learning and Support

[Free resources](#)

- [Manuals](#)
- [Case studies](#)
- [Videos](#)
- [Case Studies](#)
- [Trainings](#)
- [Service contracts](#)
- [More services](#)
- [LCA data](#)

manuals.openlca.org/openlca/



The image shows a screenshot of the openLCA 2 manual website. On the left is a table of contents, and on the right is the introduction page.

Table of Contents:

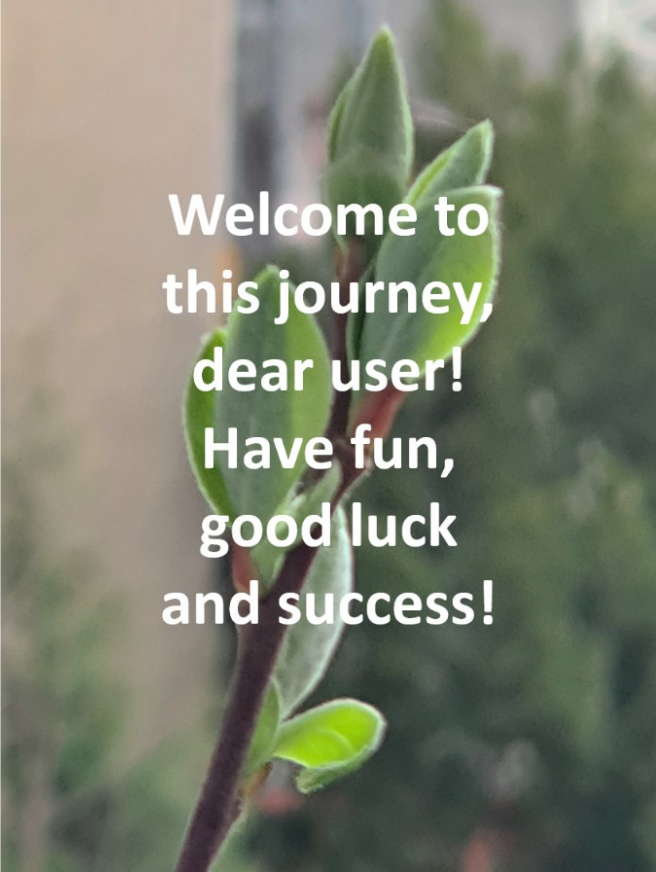
- How to use this manual
- WELCOME - Manual openLCA 2**
- 1. Introduction**
 - 1.1. Why openLCA was started
 - 1.2. openLCA now
 - 1.3. What you can do with openLCA
 - 1.4. GreenDelta GmbH - about the developer
 - 1.5. openLCA 2 - new features
- 2. How to get openLCA running**
 - 2.1. Hardware requirements
 - 2.2. Download and installation
 - 2.3. Adjust memory
 - 2.4. Download fast libraries
- 3. Resources**
 - 3.1. openLCA.org
 - 3.2. openLCA Nexus
 - 3.3. ask.openLCA
- Welcome to openLCA!**
- 4. openLCA key features with an LCA case study
- The basics for openLCA**
- 5. Running openLCA for the first time
- 6. Databases**
 - 6.1. Database elements
 - 6.2. Creating a new empty database
 - 6.3. Restoring a database
 - 6.4. Database update
 - 6.5. Importing and combining databases
 - 6.6. Using mapping files and validate databases
 - 6.7. Exporting databases
- 7. Flows**
 - 7.1. Creating a new flow
 - 7.2. Flow tabs
- 8. Processes**
 - 8.1. Creating a new process
 - 8.2. Process tabs

Introduction Page:

openLCA 2 manual

Introduction

Welcome to the openLCA 2 manual. This manual aims to assist you in conducting sustainability assessments effectively, with openLCA. Comments and feedback are welcome!



Welcome to this journey, dear user!
Have fun, good luck and success!

openlca.org/helpdesk

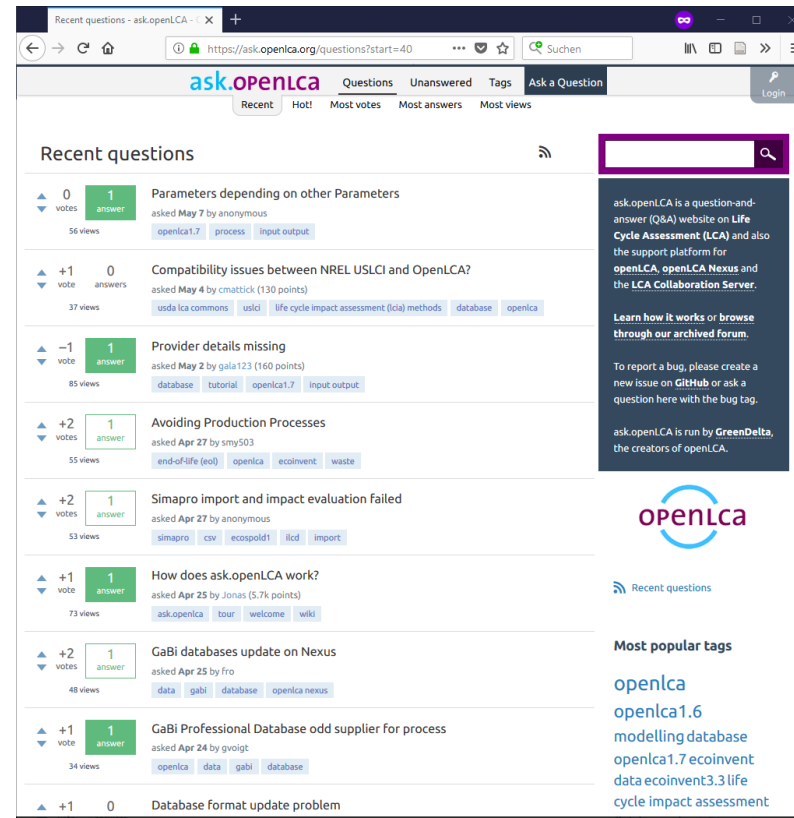
	openLCA Quick start	openLCA Modeller support	openLCA Developer support	openLCA Teaching support
Target group	openLCA beginners	Advanced openLCA users	Code developers	Teaching staff
Covered issues	Basic openLCA support: 1-hour video conference + four support tickets <i>Tip: Upgrade to Modeller support (with tickets) by paying the difference</i>	Advanced openLCA support	IT advice and feedback on code that is being written for openLCA <i>Tip: Extend this contract with additionally booked implementation days for a software developer e.g. for "getting up to speed" with own implementation tasks</i>	Answers on questions asked by course participants and teachers <i>Tip: In addition, you may request GreenDelta to support in the development of exercises and teaching material</i>
Support channel	HelpDesk, GoToMeeting	HelpDesk	HelpDesk ^[1]	HelpDesk

- Naše podporne storitve je mogoče rezervirati prek [openLCA Nexus](#)

Forum: ask.openLCA

- Podporna platforma za openLCA, openLCA nexus in openLCA Collaboration Server ... in naprej

- Spletno mesto z vprašanji in odgovori (Q&A) o oceni življenjskega cikla
- Javno znanje, ki koristi vsem izvajalcem LCA
- Uporabnike spodbujamo k uporabi ask.openLCA za nezaupne zahteve za podporo
- Za zaupne zahteve nas še naprej kontaktirajte po elektronski pošti



<https://ask.openlca.org/>

openLCA Nexus

- Spletni repozitorij podatkov za LCA: <https://nexus.openlca.org>
- Neposreden nakup/prenos podatkov predvsem za uporabo z orodjem openLCA (nekateri podatkovni nabori tudi za SimaPro)



The screenshot shows the homepage of the openLCA Nexus website. At the top, there is a navigation menu with links for "openLCA Nexus", "Databases", "Services", "Case studies", "LCA data search", "Map", "Documents", "FAQs", and "About". The main content area has a dark blue background. On the left is the openLCA Nexus logo, which consists of the text "openLca" in a light blue font above "nexus" in a white font, with a white circular graphic element behind the text. To the right of the logo, the text "openLCA Nexus" is displayed in a light blue font, followed by the tagline "Your source for LCA and sustainability data." in white. Below this is a white search input field with a purple "Search" button to its right. Underneath the search field, there is a line of text: "Overall providing ~ 250,000 data sets." followed by "ecoinvent v3.8 now available!" and "e.g. for Switzerland: 49115 data sets found."

Iskalnik openLCA Nexus

- Več možnosti filtriranja:
 - Ime
 - Baza podatkov
 - Lokacija
 - Vrsta podatkovnega nabora
 - Kategorija
 - Začetek veljavnosti
 - Cena

The screenshot shows the openLCA Nexus website interface. At the top, there is a navigation menu with links for 'openLCA Nexus', 'Databases', 'Services', 'Case studies', 'LCA data search' (which is highlighted), 'Map', 'Documents', 'FAQs', and 'About'. On the right side of the navigation bar, there are links for 'Register', 'Login', and a shopping cart icon with '0' items.

The main content area features the openLCA Nexus logo on the left and a search bar on the right. The search bar contains the text 'PET' and a purple 'Search' button, with an 'Options' link to its right. Below the search bar, the text '1629 data sets' is displayed.

The search results are listed in a vertical column. Each result starts with a purple 'P' icon, followed by a blue link to the data set name, and then a list of details:

- PET granulates, amorphous, production mix, at plant, Polymerisation of ethylene, 0.91- 0.96 g/cm3, 28 g/mol per repeating unit**
Plastics
Databases: PEF database
Location: EU-28+EFTA
Validity: 2013 - 2020
- pet (amorphous)_LCI**
Endprodukte
Databases: ProBas+
Location: Europe
- Chem-Org|PET-DE-2000_UP**
Endprodukte
Databases: ProBas+
Location: Germany
- Chem-Org|PET-DE-2000_LCI**
Endprodukte
Databases: ProBas+
Location: Germany
- pet (bottle grade)_LCI**
Endprodukte
Databases: ProBas+
Location: Europe

On the left side of the main content area, there are several filter categories with 'more' links:

- Model type** more
Process 1628
Product system 1
- (Background) Database** more
Agribalyse 905
Carbon Minds 199
EuGeos' 15804-IA 136
ESU World Food 127
ecoinvent 107
ecoinvent v2.2 & v.3.6 66
ecoinvent v2.2 & v.3.4 51
Environmental Footprints 50
IDEMAT 27
ProBas 13
more...
- Case study** more
ecoinvent case studies 94
Other free case studies 6
- Country** more
France 1075
Switzerland 285
Germany 190
Spain 186
Netherlands 183
United Kingdom 182
Belgium 180
Finland 180
Italy 180
Lithuania 180
more...

openLCA Nexus



openLCA Nexus
Your source for LCA and sustainability data.

Databases

- ecoinvent
- UVEK LCI Data
- The Evah Pigments Database
- LCA Commons (complete)
- IDEMAT
- Carbon Minds
- IMPACT World+
- Environmental Footprints
- OzLCI2019
- Idea
- Agri-footprint
- exiobase
- ARVI
- Agribalyse
- soca
- EuGeoS 15804-IA
- NEEDS
- PSILCA
- ESU World Food
- ELCD
- LC-Inventories.ch
- Social Hotspots
- ProBas
- bioenergiedat
- worldsteel
- Ökobaudat
- openLCA LCIA methods

All Free databases For purchase databases



ecoinvent

update

ecoinvent is the most famous LCA database worldwide used by around 4,500 users in more than 40 countries. The database contains international industrial life cycle inventory data on energy supply, resource extraction, material supply, chemicals, metals, agriculture, waste management services, and transport services. The database is very transparent and consistent. Each data set is provided as unit process and aggregated system process. Moreover, since version 3 of the database, processes are provided for three different system models: "allocation at the point of substitution", "allocation, cut-off by classification" and "substitution, consequential long-term". Further, reports with background information about modelling procedures and assumptions are published. If you register on the ecoinvent website, additional supporting software is available. ecoinvent is updated regularly. The most recent version is ecoinvent v.3.8, but ecoinvent v.2.2 is still in use and therefore also available via Nexus. We offer a fully valid ecoinvent licence with full access to the ecoinvent website and with databases specifically adapted to openLCA.

Browse



UVEK LCI Data

Der UVEK Ökobilanzdatenbestand DQRv2.2018 basiert auf ecoinvent v2.2 und wurde in wesentlichen Bereichen, nämlich Erdöl-, Erdgas-, Kernbrennstoff- und Strom-Bereitstellung, Transport- und Entsorgungsdienstleistungen und Forst- und Holzwirtschaft aktualisiert. Er wurde von den Schweizer Bundesämtern in Auftrag gegeben und publiziert. Diese Daten basieren auf den ecoinvent Datenqualitätsrichtlinien v2 (DQRv2) und werden auf der Webseite ecoinvent v2 angeboten. Deren Nutzung bedingt eine aktuell gültige Lizenz für ecoinvent v2. Die Hintergrundberichte dazu sind frei verfügbar. English: The UVEK LCI data DQRv2.2018 is based on ecoinvent 2.2 and was updated in relevant sections, namely crude oil, gas, nuclear fuel, electricity provision, transport and end of life and waste treatment services. The update was commissioned by Swiss Federal Authorities. Data are based on the ecoinvent data quality guidelines in version 2. Their use requires a valid license for ecoinvent 2. Background reports are freely available.

Browse



www.LC-Inventories.ch



BIOENERGIEDAT



Inventory Database for Environmental Analysis

Material Value Chains



cm carbonminds



Napredni tečaj

- Delo s parametri
- Analiza občutljivosti
- Modeliranje konca življenjske dobe
- Alokacija in razširitev sistema
- Dodatne funkcije
- Kakovost podatkov
- Razpoložljive baze podatkov v openLCA Nexus

Najlepša hvala

Damjan Krajnc
damjan.krajnc@stajerskagz.si