

Step 1: Create /clean ecocosts worksheet

Start

1. Open the Excel Tool
2. Delete the database names and eco-intensity values in column C and D
3. Delete the tab "Volvo C40 R.. Eco-costs" (this tab will be recreated later in this procedure)

Automatisch opslaan Volvo_case_2023.xlsx Zoeken

Bestand Start Invoegen Tekenen Pagina-indeling Formules Gegevens Controleren Beeld Help

Verdana 10 A A

Plakken Klembord Lettertype Uitlijning Terugloop Samenvoegen en centreren Standaard Getal Stijlen

A8 eco-costs (euro)

1

2 **Do-It-Yourself LCA Estimation From Idemat Lookup Tables**

3 **Purpose:** Estimate biggest impacts to set design priorities

4 **Boundaries:** Scope 3 cradle to grave (materials & mfg, transport, & end of life)

5 **Impact unit:** kg CO2 eq. and eco-costs

6 Uncertainty rubric: 10% for database perfect match, 30% for plausible substitution, 100% for huge differences of production facilities

7

8 **Eco-costs (euro)**

9 **Volvo C40 recharge (weight data are estimates)**

10 **Design options:**

11 **Functional unit:** Life span 200.000 km

Manu item	database name	Eco-intensity (impacts per kg)	Mass per item (kg)	Items per func.unit (#)	Uncertainty %	Notes	Calculated Impact
Steel, primary	Idemat2023 Steel (21% sec	0.21	1000	1.3	105%	a factor 1.3 to cop	272.38833
steel, rolling	Idemat2023 Rolling steel	0.15	1000	1	33%	includes mfg proce	154.0896
aluminum, primary	Idemat2023 Aluminium trad	2.21	700	1.3	30%	a factor 1.3 to cop	2011.13
Aluminium, processing	Idemat2023 Forging alumin	0.04	700	1	30%	data in IDEMAT, b	26.51274
polymers (take PP)	Idemat2023 PP (Polypropyl	1.13	100	1	30%	type of polymer ne	113.35841
polymer extrusion	Idemat2023 extrusion, incl p	0.06	100	1	10%	assumption	5.7589341
li-ion battery (take NMC811) excl ele	Idemat2023 Lithium NMC 81	6.79	375	1	10%	exact data in IDEM	2547.3849
electronics	Idemat2023 Computer deskt	159.44	5	1	30%	assumption	797.21402
copper	Idemat2023 Copper wire, pla	2.28	20	1	30%	for wires this is th	45.593676
magnets	Idemat2023 Neodymium ma	76.45	2	1	30%	weight is estimate	152.90832
others (tyres, glass, etc)							0
subtotal							6126
Manufacturing		Eco-intensity (impacts per MJ)	Energy per activity (MJ)	Items per func.unit (#)	Uncertainty %	Notes	
electricity dummy	demat2023 .Electricity Gene	0.02	40,000	1	30%	to match carbon fo	941.00231
heat dummy	demat2023 Industrial Heat	0.02	40,000	1	30%	to match carbon fo	642.03999
subtotal							1583
total manufacturing							7709

Volvo C40 recharge CO2kg Volvo C40 recharge eco-costs Idemat2026 db (simple) Idemat2026db (detailed) Explanations +

Toegankelijkheid: onderzoeken

Link data (1)

1. Create a link to the database by typing '='
2. Go to the Idemat2026 (simple) tab

The screenshot shows an Excel spreadsheet with the following content:


Go-It-Yourself LCA Estimation From Idemat Lookup Tables
Purpose: Estimate biggest impacts to set design priorities
Boundaries: Scope 3 cradle to grave (materials & mfg, transport, & end of life)
Impact unit: kg CO2 eq. and eco-costs
Uncertainty rules: 10% for database perfect match, 30% for plausible substitution, 100% for huge differences of production facilities

eco-costs (euro)
Volvo C40 recharge (weight data are estimates)
Design option:
Functional unit: life span 200.000 km

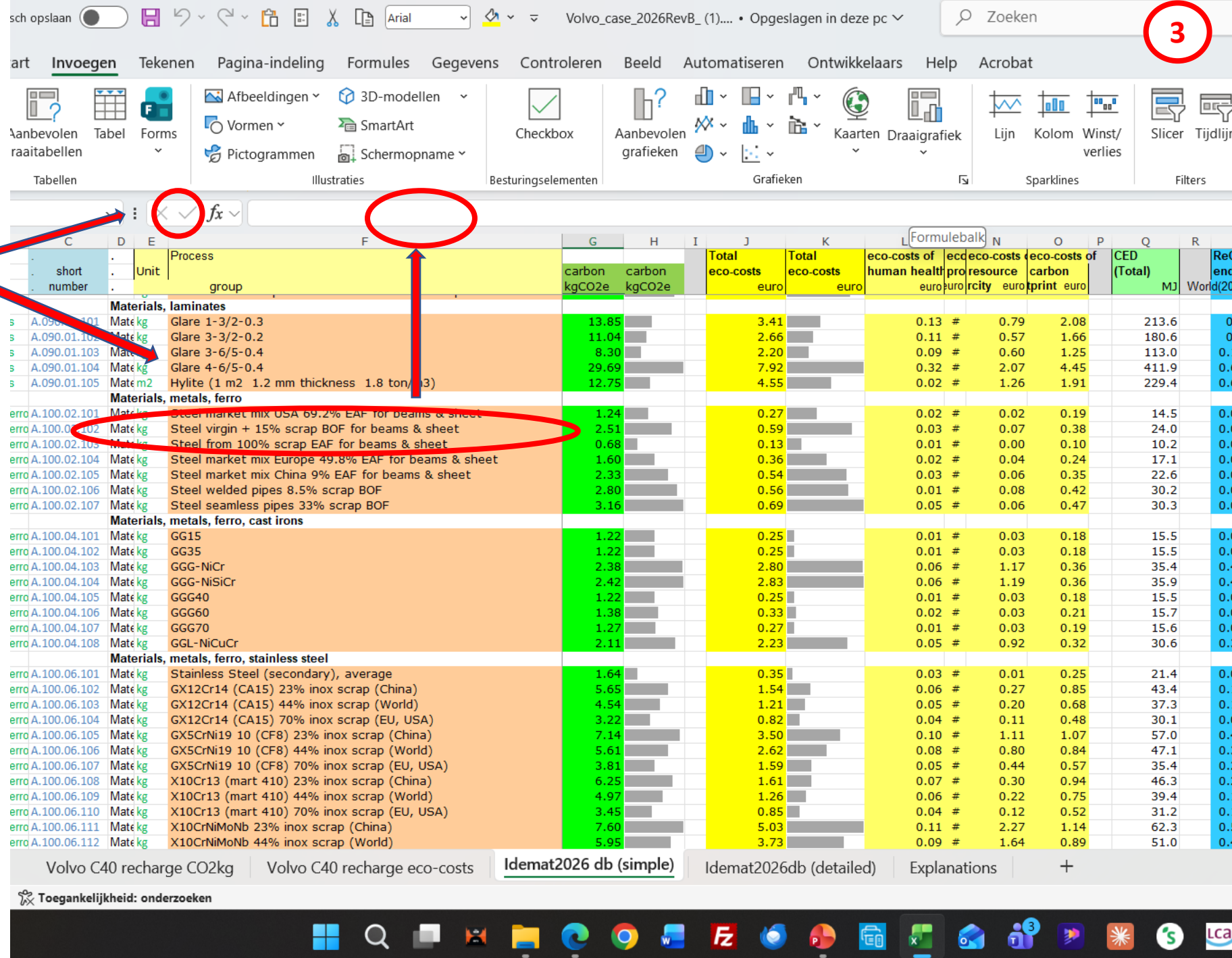
Manu	Item	database name	Eco-intensity (impacts per kg)	Mass per item (kg)	Items per func.unit (#)	Uncertainty %	Notes
	Steel, primary			1000	1.3	105%	a factor 1.3 to cop
	steel, rolling			1000	1	33%	includes mfg proc
	Aluminum, primary			700	1.3	30%	a factor 1.3 to cop
	Aluminium, processing			700	1	30%	data in IDEMAT, b
	polymers (take PP)			100	1	30%	type of polymer n
	polymers extrusion			100	1	10%	assumption
	li-ion battery (take NMC811) excl electronics			375	1	10%	exact data in IDEM
	electronics			5	1	30%	assumption
	copper			20	1	30%	for wires this is th
	magnets			2	1	30%	weight is estimate
	others (tyres, glass, etc)						
	subtotal						0
Manufacturing			Eco-intensity (impacts per MJ)	Energy per activity (MJ)	Items per func.unit (#)	Uncertainty %	Notes
	electricity dummy	Idemat2023 .Electricity Gene	0.02	40,000	1	30%	to match carbon f
	heat dummy	Idemat2023 Industrial Heat	0.02	40,000	1	30%	to match carbon f
	subtotal						1583
	total manufacturing						1583

At the bottom of the spreadsheet, the following tabs are visible: Volvo C40 recharge CO2kg, Volvo C40 recharge eco-costs, **Idemat2026 db (simple)**, Idemat2026db (detailed), Explanations, and +.

Link data (2)

1. Click on Steel virgin +15% scrap BOF for beams and sheet
2. Klik on 

Note. You may use the filter in column B to find materials or processes (click the filter first, prior to '=' in the previous step)



The screenshot shows the Microsoft Excel interface with the following elements highlighted:

- Top Right:** A red circle containing the number '3'.
- Formulebalk:** A red circle around the 'fx' icon.
- Table:** A table with columns: short number, Unit, Process, carbon kgCO2e, carbon kgCO2e, Total eco-costs euro, Total eco-costs euro, eco-costs of human health euro, eco-costs of resource euro, eco-costs of carbon print euro, CED (Total) MJ, and World(20...). The row for 'Steel virgin + 15% scrap BOF for beams & sheet' is circled in red.
- Column B:** A red circle around the filter icon in column B.
- Bottom:** A red circle around the 'Idemat2026 db (simple)' tab.

short number	Unit	Process	carbon kgCO2e	carbon kgCO2e	Total eco-costs euro	Total eco-costs euro	eco-costs of human health euro	eco-costs of resource euro	eco-costs of carbon print euro	CED (Total) MJ	World(20...
A.090.01.101	Mate kg	Glare 1-3/2-0.3	13.85		3.41		0.13	0.79	2.08	213.6	0.
A.090.01.102	Mate kg	Glare 3-3/2-0.2	11.04		2.66		0.11	0.57	1.66	180.6	0.
A.090.01.103	Mate kg	Glare 3-6/5-0.4	8.30		2.20		0.09	0.60	1.25	113.0	0.
A.090.01.104	Mate kg	Glare 4-6/5-0.4	29.69		7.92		0.32	2.07	4.45	411.9	0.
A.090.01.105	Mate m2	Hylite (1 m2 1.2 mm thickness 1.8 ton/m3)	12.75		4.55		0.02	1.26	1.91	229.4	0.
A.100.02.101	Mate kg	Steel market mix USA 69.2% EAF for beams & sheet	1.24		0.27		0.02	0.02	0.19	14.5	0.
A.100.02.102	Mate kg	Steel virgin + 15% scrap BOF for beams & sheet	2.51		0.59		0.03	0.07	0.38	24.0	0.
A.100.02.105	Mate kg	Steel from 100% scrap EAF for beams & sheet	0.68		0.13		0.01	0.00	0.10	10.2	0.
A.100.02.104	Mate kg	Steel market mix Europe 49.8% EAF for beams & sheet	1.60		0.36		0.02	0.04	0.24	17.1	0.
A.100.02.105	Mate kg	Steel market mix China 9% EAF for beams & sheet	2.33		0.54		0.03	0.06	0.35	22.6	0.
A.100.02.106	Mate kg	Steel welded pipes 8.5% scrap BOF	2.80		0.56		0.01	0.08	0.42	30.2	0.
A.100.02.107	Mate kg	Steel seamless pipes 33% scrap BOF	3.16		0.69		0.05	0.06	0.47	30.3	0.
A.100.04.101	Mate kg	GG15	1.22		0.25		0.01	0.03	0.18	15.5	0.
A.100.04.102	Mate kg	GG35	1.22		0.25		0.01	0.03	0.18	15.5	0.
A.100.04.103	Mate kg	GGG-NiCr	2.38		2.80		0.06	1.17	0.36	35.4	0.
A.100.04.104	Mate kg	GGG-NiSiCr	2.42		2.83		0.06	1.19	0.36	35.9	0.
A.100.04.105	Mate kg	GGG40	1.22		0.25		0.01	0.03	0.18	15.5	0.
A.100.04.106	Mate kg	GGG60	1.38		0.33		0.02	0.03	0.21	15.7	0.
A.100.04.107	Mate kg	GGG70	1.27		0.27		0.01	0.03	0.19	15.6	0.
A.100.04.108	Mate kg	GGL-NiCuCr	2.11		2.23		0.05	0.92	0.32	30.6	0.
A.100.06.101	Mate kg	Stainless Steel (secondary), average	1.64		0.35		0.03	0.01	0.25	21.4	0.
A.100.06.102	Mate kg	GX12Cr14 (CA15) 23% inox scrap (China)	5.65		1.54		0.06	0.27	0.85	43.4	0.
A.100.06.103	Mate kg	GX12Cr14 (CA15) 44% inox scrap (World)	4.54		1.21		0.05	0.20	0.68	37.3	0.
A.100.06.104	Mate kg	GX12Cr14 (CA15) 70% inox scrap (EU, USA)	3.22		0.82		0.04	0.11	0.48	30.1	0.
A.100.06.105	Mate kg	GX5CrNi19 10 (CF8) 23% inox scrap (China)	7.14		3.50		0.10	1.11	1.07	57.0	0.
A.100.06.106	Mate kg	GX5CrNi19 10 (CF8) 44% inox scrap (World)	5.61		2.62		0.08	0.80	0.84	47.1	0.
A.100.06.107	Mate kg	GX5CrNi19 10 (CF8) 70% inox scrap (EU, USA)	3.81		1.59		0.05	0.44	0.57	35.4	0.
A.100.06.108	Mate kg	X10Cr13 (mart 410) 23% inox scrap (China)	6.25		1.61		0.07	0.30	0.94	46.3	0.
A.100.06.109	Mate kg	X10Cr13 (mart 410) 44% inox scrap (World)	4.97		1.26		0.06	0.22	0.75	39.4	0.
A.100.06.110	Mate kg	X10Cr13 (mart 410) 70% inox scrap (EU, USA)	3.45		0.85		0.04	0.12	0.52	31.2	0.
A.100.06.111	Mate kg	X10CrNiMoNb 23% inox scrap (China)	7.60		5.03		0.11	2.27	1.14	62.3	0.
A.100.06.112	Mate kg	X10CrNiMoNb 44% inox scrap (World)	5.95		3.73		0.09	1.64	0.89	51.0	0.

Finalise eco-costs worksheet (1)

1. Copy/paste the cell from column C to column D
2. Continue with other cells by repeating the steps from Link data (1) on slide 2, and copy/paste from cell C to cell D

Note 1

When you see that an item has negligible impact, you can remove that item from the list to keep the list short

Note 2

You may use column F to take manufacturing waste into account

Do-It-Yourself LCA Estimation From Idemat Lookup Tables
Purpose: Estimate biggest impacts to set design priorities
Boundaries: Scope 3 cradle to grave (materials & mfg, transport, & end of life)
Impact unit: kg CO2 eq. and eco-costs
 Uncertainty rubric: 10% for database perfect match, 30% for plausible substitution, 100% for huge differences of production facilities

eco-costs (euro)
Volvo C40 recharge (weight data are estimates)
Design option:
Functional unit: life span 200.000 km

Material	item	database name	Eco-intensity (impacts per kg)	Mass per item (kg)	Items per func.unit (#)	Uncertainty %	Notes
Steel, primary		Idemat2023 Steel (21% sec	0.21	1000	1.3	105%	a factor 1.3 to cop
steel, rolling				1000	1	33%	includes mfg proce
Aluminum, primary				700	1.3	30%	a factor 1.3 to cop
Aluminium, processing				700	1	30%	data in IDEMAT, b
polymers (take PP)				100	1	30%	type of polymer no
polymers extrusion				100	1	10%	assumption
li-ion battery (take NMC811) excl electronics				375	1	10%	exact data in IDEM
electronics				5	1	30%	assumption
copper				20	1	30%	for wires this is th
magnets				2	1	30%	weight is estimate
others (tyres, glass, etc)							
subtotal							272
Manufacturing			Eco-intensity (impacts per MJ)	Energy per activity (MJ)	Items per func.unit (#)	Uncertainty %	Notes
	electricity dummy	Idemat2023 .Electricity Gene	0.02	40,000	1	30%	to match carbon fo
	heat dummy	Idemat2023 Industrial Heat	0.02	40,000	1	30%	to match carbon fo
subtotal							1583
total manufacturing							1855

Annotations: Red arrows point from column C to column D. Text "copy/paste" and "continue with other cells" is written in red.

Finalise eco-costs worksheet (2)

Give both bar charts the appropriate horizontal scale (double click the scale and redefine the maximum)

The screenshot shows the Microsoft Excel interface with the 'Grafiekontwerp' (Chart Design) ribbon active. Two bar charts are displayed side-by-side. The left chart, 'Impacts by Component', has an x-axis scale from 0 to 4000. The right chart, 'Impacts by Life Cycle Stage', has an x-axis scale from 0 to 12000. Two red arrows point to these scales, indicating they need to be adjusted. The 'Impacts by Life Cycle Stage' chart is currently set to 'As: , horizontaal , (waarde)'. The taskbar at the bottom shows various application icons and the system clock indicating 15:11 on 24/12/2022.

Step 2: Create worksheet for eco-costs

1. Left- click at tab Volvo C40

2. Right- click at copy,

3. click at 'Volvo C40 recharge CO2'

4. tick at 'copy'

5. Then OK

Automatisch opslaan Volvo_case_2023.xlsx Zoeken

Bestand Start Invoegen Tekenen Pagina-indeling Formules Gegevens Controleren Beeld Help

Verdana 10 A⁺ A⁻ B I U Lettertype Uitlijning Terugloop Samenvoegen en centreren Standaard Getal

A1

1

2 **Do-It-Yourself LCA Estimation From Idemat Lookup Tables**

3 **Purpose:** Estimate biggest impacts to set design priorities

4 **Boundaries:** Scope 3 cradle to grave (materials & mfg, transport, & end of life)

5 **Impact unit:** kg CO2 eq. and eco-costs

6 Uncertainty rubric: 10% for database perfect match, 30% for plausible substitution, 100% for huge differences of production facilities

7

8 **eco-costs (euro)**

9 **Volvo C40 recharge (weight data are estimates)**

10 **Design option:**

11 **Functional unit:** life span 200.000 km

Manu	item	database name	Eco-intensiv (impa	Mass per item	Items per	Uncertainty	Notes
13	Steel, primary	Idemat2023 Steel (21% sec					5% a factor 1.3 to cop
14	steel, rolling	Idemat2023 Steel (21% sec					3% includes mfg proc
15	Aluminum, primary	Idemat2023 Aluminium trad					0% a factor 1.3 to cop
16	Aluminium, processing	Idemat2023 Aluminium trad					0% data in IDEMAT, b
17	polymers (take PP)	Idemat2023 Polypropyler					0% type of polymer n
18	polymers extrusion	Idemat2023 Polypropyler					0% assumption
19	li-ion battery (take NMC8:	Idemat2023 Lithium NMC 81					0% exact data in IDE
20	electronics	Idemat2023 Lithium NMC 81					0% assumption
21	Copper	Idemat2023 Copper					0% for wires this is th
22	magnets	Idemat2023 Magnesium					0% weight is estimat
23	others (tyres, glass, etc)	Idemat2023 Magnesium					
24	subtotal						6126
25	Manufacturing						
26	electricity dummy	Idemat2026 Electricity Gene					0% to match carbon f
27	heat dummy	Idemat2026 Industrial Heat					0% to match carbon f
28	subtotal						1583
29	total manufacturing						7700

Volvo C40 recharge CO2kg Volvo C40 recharge eco-costs Idemat2026 db (simple) Idemat2026db (detailed) Explanations +

Toegankelijkheid: onderzoeken

6

Change carbon footprint in eco-costs scores

1. Rename the newly created tab into "eco-costs"
2. Change all links to the database (this column) from '!'G' to '!'J'

READY

Note.
You may add some other benchmarking calculations in the empty area below

The screenshot shows the Microsoft Excel interface with the following elements:

- Search Dialog:** A "Zoeken en vervangen" dialog box is open. The "Zoeken naar" field contains "!'G" and the "Vervangen door" field contains "!'J". Both fields are circled in red. A red arrow points from the first instruction to the search dialog.
- Spreadsheet Table:** A table with columns: "item", "database name", "Eco-intensity (impacts per kg)", "Mass per item (kg)", "Items per func.unit (#)", "Uncertainty %", and "Notes". The "database name" column contains values like "Idemat2023 Steel (21% se...", "Idemat2023 Rolling steel", etc. A red circle highlights the "!'G" in the "database name" column of the first row. A red arrow points from the second instruction to this column.
- Formulas:** The formula bar shows "='Idemat2026 db (simple'!'J535", with "!'J535" circled in red.
- Taskbar:** The taskbar at the bottom shows several open tabs, including "Volvo C40 recharge CO2kg", "Volvo C40 recharge eco-costs", "Idemat2026 db (simple)", "Idemat2026db (detailed)", and "Explanations". The "Volvo C40 recharge eco-costs" tab is circled in red.
- Other UI Elements:** A red circle with the number "7" is in the top right corner. The "Beeld" tab is selected in the ribbon.