

How to assess the Carbon Footprint Forecast

Does this statement make sense?
Is it clear what the idea is and what it does?
Do you believe the quantity is realistic?

2. How is the idea different from the business as usual?

production	use	end-of-life
same transport	no yield	same recycling
same energy	less energy	same composting
more materials	same materials	more incineration
		same landfill

Are the key differences to business as usual identified here?
Is the end-of-life scenario realistic?

3. Which Life Cycle Inventory processes (LCI's) can quantify the differences?

Difference	Category	LCI process	kg CO ₂ eq	per

Are the database entries here good approximations of the real materials or energy sources?

4. What's the carbon footprint of each impact factor, per 1/3 of a smartphone's energy?

Quantity per BU	Unit	Difference and LCI	LCI kg CO ₂ eq	scalar	kg CO ₂ eq per BU

Are the quantities here realistic?
Are they in the appropriate unit?

5. What is the overall footprint? (negative footprints are good; impact reduction)

Carbon Footprint Forecast for 1/3 of a smartphone's energy:			kgC
Other	Are these fields green? = is there overall impact reduction? (one red field can be acceptable)		euro
per			euro
			euro

Total Carbon Footprint of

	1	8	15	3	1	1
carbon footprint of	times driving a car around the world	passengers flying London-New York	barrels of oil burnt	EU households annual electricity	elephants mass of CO ₂	hot air balloons filled with CO ₂

Are none of these numbers zero? (if there are any zeros, the impact is insignificant)

This box is optional to use. Are there assumptions in the forecast that should be declared here? Are the declared assumptions any good?

Bad example (poor definition and too optimistic)

Human power? How is it generated?

This fictional group made a few common errors. Their idea provides phone charging with human power instead of grid electricity. It's total carbon footprint per year is calculated below for 10000 times one bike.

2. How business as usual?

production	use	end-of-life
same transport	prevention	more recycling
same energy	less energy	composting
more materials	same materials	incineration
same processes		

Do I believe they will sell 10.000 pc/year?

Will this really prevent people to use their car less often?

It is more likely that people throw this in municipal waste. How do you plan to organize recycling?

3. Differences (LCI's) can quantify the differences?

Difference	Category	LCI process	kg CO ₂ eq	per
more materials in production:	electronics	Electric cord, 6A (132(W), 3x0.75 mm2, domestic	+ 0,1788	m
during use it prevents:	car	Car (petrol)	- 0,0002	m
less energy during use:	electricity country mix	Electricity Low Voltage	- 0,1469	MJ
more recycling of:	metals recycling		+ -1,2625	kg

Electric cord is not a good proxy for a charging device.

4. Impact factor, per one bike?

Quantity	Unit and LCI	LCI kg CO ₂ eq	scalar	kg CO ₂ eq per BU
10000 (kilometre)	more materials in production: Electric cord, 6A (132(W), 3x0.75 mm2, domestic	0,179 per m	2	0,36
10000 (kilometre)	during use it prevents: Car (petrol)	0,000 per m	-1000000	-201,78
20,0 kWh (kilowatt)	less energy during use: Electricity Low Voltage, domestic	0,147 per MJ	-72	-10,57
1,0 kg (kilogram)	more recycling of: Copper, recycling credit closec	-1,263 per kg	1	-1,26

A phone uses only ~1 kWh per year, so how are 20 kWh saved?

1 kg seems a large weight for a charger.

5. What is the overall footprint? (negative footprints are good; impact reduction)

Carbon Footprint Forecast for one bike:	impact reduction of:	kg CO ₂ eq
	impact reduction of:	-213,25
Other impacts than per one bike	impact reduction of:	-2,15 euro
	impact reduction of:	-5,43 euro
	impact reduction of:	-39,08 euro

Impressive numbers, but the forecast assumptions are too optimistic.

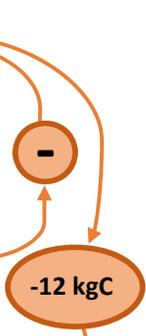
Total Carbon Footprint of This fictional group

Category	Value	Unit
car	264	kg CO ₂ eq
airplane	2152	kg CO ₂ eq
oil	4142	kg CO ₂ eq
EU household electricity	896	kg CO ₂ eq
elephants mass of CO ₂	406	kg CO ₂ eq
hot air balloons filled with CO ₂	385	kg CO ₂ eq

Charging a phone costs only about 50 cents per year. Hardly a motivation to take a bike and not a car.

Our gadget will motivate people to take the bike, so they can charge their phone. Per bike there could be 1000 of car km saved.

For the errors made, this forecast should be graded insufficient. The impact should be graded high if you believe the gadget will prevent car use, or medium if you decide to ignore the car component.



Good example (in this case showing that the idea is not so good)

This fictional group made a correct forecast for the same idea; it provides phone charging with dynamo instead of grid electricity. It's total carbon footprint per 5 years is calculated below for 10000 times 1/3 of a smartphone's energy.

2. How is business as usual?

Production	Use	End-of-life
<ul style="list-style-type: none"> same transport same energy more materials same processes 	<ul style="list-style-type: none"> no yield less energy same materials 	<ul style="list-style-type: none"> same recycling same composting more incineration landfill

The product generates power with a dynamo.

Why 5 years is answered in the assumption field.

Realistically, unfortunately, most small electronics are thrown in the garbage bin.

3. Which Life Cycle Inventory processes (LCI's) can quantify the differences?

Difference	Category	LCI process	kg CO ₂ eq	per
more materials in production:	electronics	Electric motor, less than 500 W, estimate	+ 4,0463	kg
less energy during use:	electricity country mix	Electricity Low Voltage, domestic use General	- 0,1469	MJ
more incineration of:			+ 1,4268	kg

Electric motor is the most similar LCI to a dynamo, as noted in the assumption field.

4. What's the carbon footprint of each impact factor, per 1/3 of a smartphone's energy?

Quantity per BU	Unit	Difference and LCI	LCI kg CO ₂ eq	scalar	kg CO ₂ eq per BU
300,0	g (gram)	more materials in production: Electric motor, less	4,046 per kg	0,3	1,21
1,7	kWh (kilowatt)	less energy during use: Electricity Low Voltage, domestic use General	0,147 per MJ		-0,88
300,0	g (gram)	more incineration of: average municipal waste		0,3	0,43

The material impact alone is more than what is offset by the electricity generation, which is usually the case for phone chargers.

5. What is the carbon footprint forecast for 1/3 of a smartphone's energy:

Carbon Footprint Forecast for 1/3 of a smartphone's energy:	additional impact of:	0,76 kgC
Other impacts than carbon footprint per 1/3 of a smartphone's energy	human health: additional impact of:	0,17 euro
	eco-toxicity: additional impact of:	0,23 euro
	acidification: additional impact of:	0,33 euro

Now that this idea is forecast with better assumptions, it turns out that it generates additional impact, albeit almost insignificant.

Carbon footprint of	1	8	15	3	1	1
times driving a car around the world						
passengers flying London-New York						
barrels of oil burnt						
EU households annual electricity						
elephants mass of CO ₂						
hot air balloons filled with CO ₂						

5 years is the expected lifetime of the gadget, weighing about 300 gram and mostly consisting of a dynamo, similar to an electromotor.

This forecast should be graded high, as it considers the key elements in adequate detail. The impact should be graded very low, as it is additional and near insignificant impact.