

GreenDeLTA

sustainability consulting + software

A photograph of an industrial facility, likely a refinery or chemical plant, with tall distillation columns and complex piping. The image is dark and serves as a background for the lower half of the slide.

Using social LCA databases for support of policy and business decisions: Where and how

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70th LCA Discussion Forum , ETH Zürich
Social LCA – Challenges and solutions in application and implementation
November 22, 2018

Starting points

1 life cycles are literally infinite, and global



Kit-Kat supply chain, Created on February 5, 2013 by benperkins3136 on free.sourcemap.com

Starting points

2 In social LCA, it is difficult to predict where most contributing parts are in a life cycle

- outside of sphere of influence
- harsh impacts like forced child work – even small occurrences are important

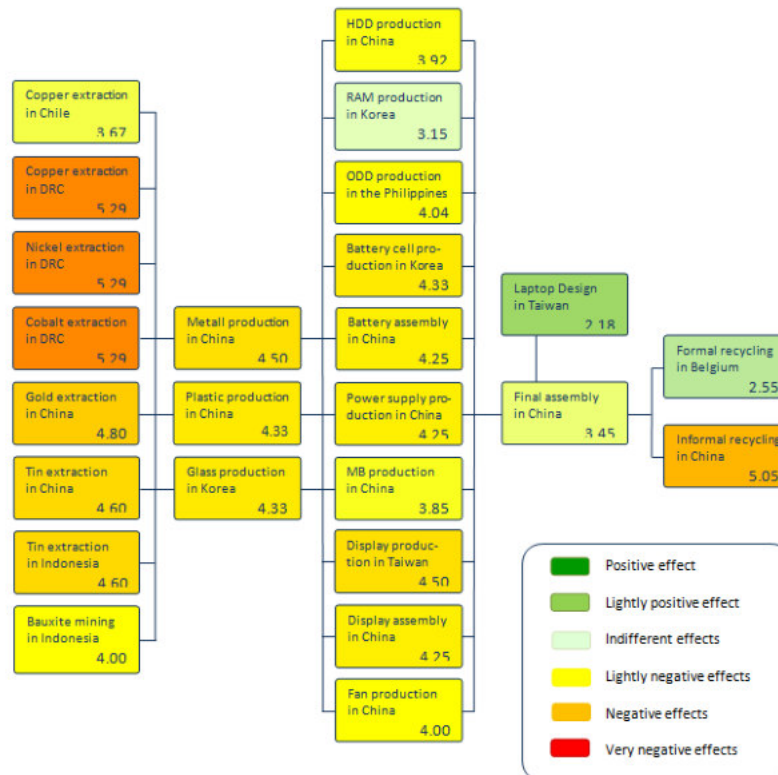
e.g.,

Finish mines, indicator ‘fatal accidents in the workplace’: most important is the Chinese machinery sector (delivering to the mines).

Starting points

3 Collecting the entire life cycle information in the course of one case study is practically impossible

- notebook computer study, GreenDelta, 2010: 6 months, 450 pages report, ~ 50 processes



Starting points

4 There is more “volatility” in social LCA information compared to other LC approaches

- severe violators of OSHA (occ. safety & health administration), USA, public quarterly log

Severe Violator Enforcement Cases																				
Fiscal Year	SVEP Log No.	Region	Area Office	Employer	City, State	Inspection No.	Open Date	Issuance Date	SIC	NAICS	SVEP Criteria	SVEP Actions Conducted	Follow Ups and Related Sites	Construction or non-construction	Number of EEs	Number Controlled	11 (b) Cases	Follow-up Not Conducted	Contested (Y/N)	If Contested - Final Order Date
2010	21	2	Parsippany	313 Jefferson Trust, LLC	Hoboken, NJ	314309253	19.04.2010	15.07.2010	1522	236116	NF-2WRF			C	4	10		1	Y	17.12.2010
2014	611	6	El Paso	A&A Plastering	El Paso, TX	910058	05.06.2013	29.11.2013		238310	NF-2WRF	Co. HQ sent citation		C	6	8			N	
2012	286	2	Manhattan	A&B Iron Works, LLC dba A&B, LLC	New York, NY	315676890	14.07.2011	06.12.2011	1741	238140	NF-2WRF			C	6	20		2	N	
2011	213	5	Chicago North	A&V Masonry	Niles, IL	315512079	19.05.2011	11.08.2011	1741	238140	NF-2WRF	ENHSA		C	8	8		3	N	
2011	69	5	Cleveland	A. Bagnoli and Sons	Hudson, OH	314382672	07.04.2010	01.10.2010	1794	238910	Fatality	Co. HQ sent citation, ENHSA		C	4	4		2	Y	11.04.2011
2011	171	3	Charleston	A.L. Solutions, Inc.	New Cumberland, WV	313378242	09.12.2010	08.06.2011	3341	331492	Fatality		GIE-R = 316	NC	24	24			Y	
2013	437	2	Buffalo	A.M. Stern, Inc.	Fairport, NY	511438	10.07.2012	14.01.2013		238160	NF-2WRF			C	12	35			Y	
2011	221	2	Parsippany	A-Absolute Construction, Inc.	Parsippany, NJ	315438598	14.03.2011	09.09.2011	1711	238220	NF-2WRF			C	4	12			Y	24.06.2013
2012	371	8	Bismarck	Adams Thermal Systems, Inc.	Canton, SD	108985	08.11.2011	26.04.2012	3443	333415	Fatality			NC	750	1,010			Y	27.10.2013
2014	587	6	Little Rock	Advanced Environmental Recycling Techn	Springdale, Arkansas	921908	25.07.2013	16.01.2014		321219	Fatality			NC	120	500			N	
2011	200	5	Toledo	Advantage Powder Coating Co.	Defiance, OH	313786618	24.01.2011	15.07.2011	3479	332812	Fatality	Co. HQ sent citation; ENHSA	FU = 466	NC	10	64			Y	17.12.2012
2014	532	2	Manhattan	Adventure Masonry Corp.	Brooklyn, NY	917483	10.07.2013	20.09.2013		238140	NF-2WRF			C	3	15			N	
2011	98	7	Wichita	Aerospace Manufacturing Ct Systems, LLC.	Fredonia, KS	314027947	06.07.2010	17.12.2010	3718	332710	Fatality			NC	58	58			Y	16.05.2012
2012	409	6	Baton Rouge	Airport Road Welding Services	New Orleans, LA	461733	17.05.2012	09.07.2012		811490	Fatality			C	5	8			N	
2014	598	3	Baltimore	AJG Inc	Lothian, MD	493178	28.06.2012	13.11.2012	1751	238130	Fatality			C	6	6			N	
2011	158	5	Calumet City	Albin-Carlson	Chicago, IL	315154013	15.12.2010	17.05.2011	1622	237310	NF-2WRF	Co. HQ sent citation, ENHSA		C	8	150		3	N	

Starting points

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Starting points

5 social indicators are diverse

- they are qualitative, semi-quantitative, and quantitative
- they can be positive or (most of them are) negative

Challenges – social issues

- **Dynamic**, cause-effect relations among social and socio-economic risks and impacts
- How to understand the **local context**
- **Complementarity** with the other sustainability dimensions
- How to measure issues expressed in a **qualitative** way
- **Data quality**

Consequences

1 Indicator risks

are reported instead of blunt values to quantify social impacts

(“risk” here is not the technical term in risk management, i.e. not occurrence impact times chance, but more “layman’s language”)

intentionally more vague than potential impacts in environmental

Consequences

Social LCA databases

- cannot be predictive,
- cannot contain fully correct assessment models that directly determine decisions..

Consequences

Social LCA databases

- cannot be predictive,
- cannot contain fully correct assessment models that directly determine decisions..

..but they are an important, and I think the only, way to obtain full life cycle information in social LCA.

The generic use case of social LCA databases

The generic use case of social LCA databases

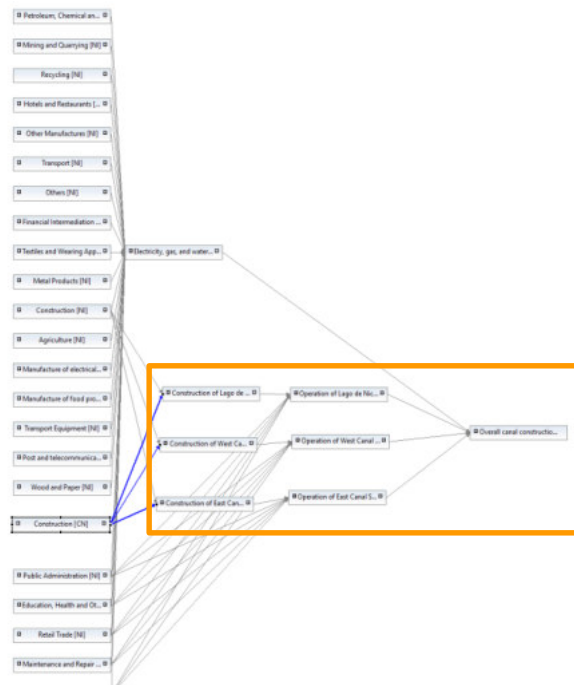
The use case for social LCA databases is different from environmental LCA databases, and has different requirements on the database.

The generic use case of social LCA databases

- provide information in a screening about hot spots that then need to be further investigated
- typically a database is added to a foreground system model where more specific information is collected

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Ciroth, A., Eisfeldt, F. (2016): Social Life Cycle Impact Assessment & S-LCA of the Nicaragua Canal Project, presentation, sLCA 2016, Cambridge MA, 14.06.2016

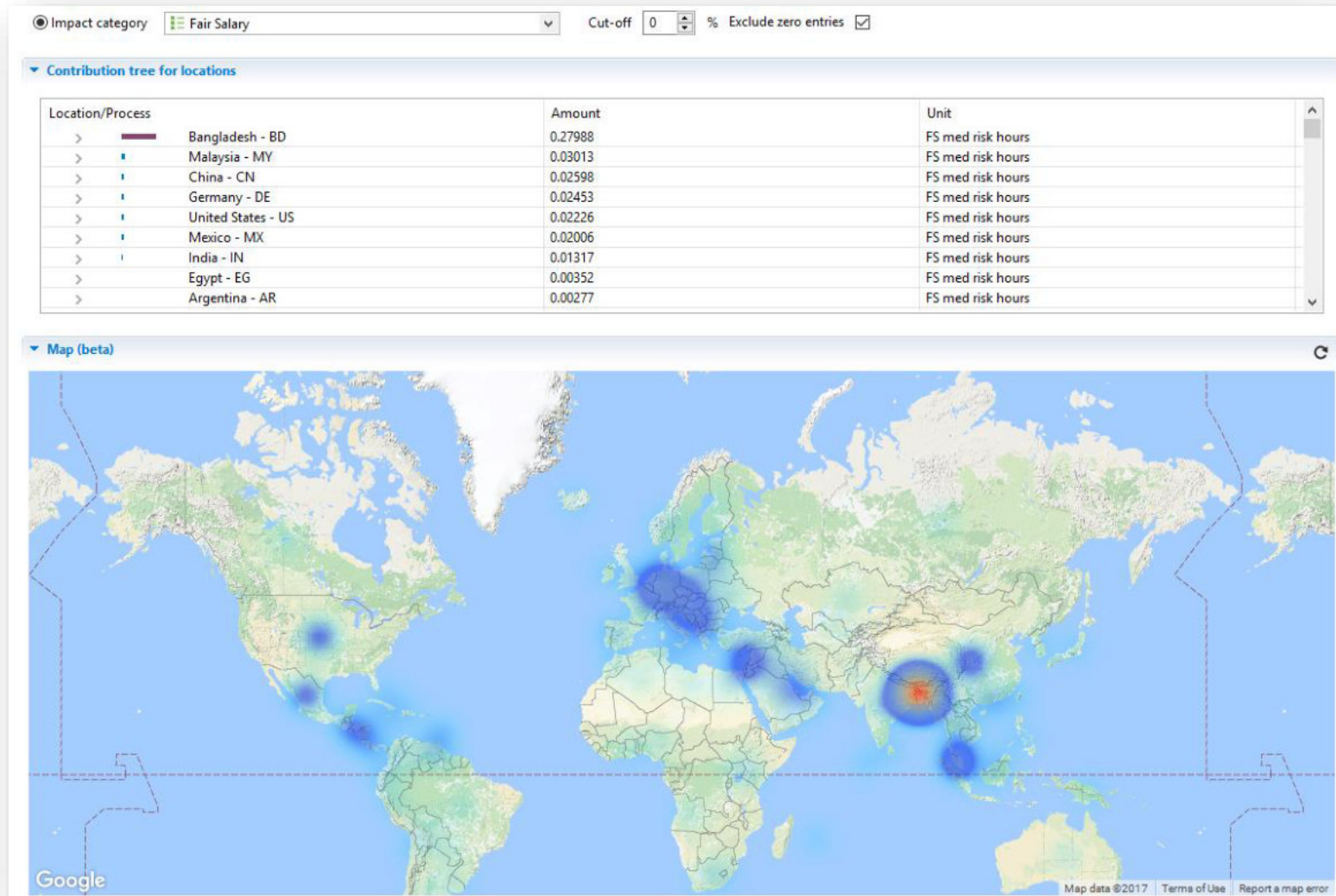
The generic use case of social LCA databases

- provide information in a screening about hot spots that then need to be further investigated
- typically a database is added to a foreground system model where more specific information is collected
- indicators between foreground and background system must be aligned

The generic use case of social LCA databases

- provide information in a screening about hot spots that then need to be further investigated
 - **hot spot detected – further action**

The generic use case of social LCA databases, hot spot: fair salary, t-shirt supply chain



The generic use case of social LCA databases

- provide information in a screening about hot spots that then need to be further investigated
 - hot spot detected – further action
 - no hot spot detected - does not mean certainty that “all is good”
 - positive impacts: hot spot detected -> does not necessarily mean that “all is good”

The generic use case of social LCA databases

Hot spot detected -> actions, 1

- get further information
 - more specific information
(sector -> specific supplier)
 - check also data quality of the database if available
(reported case more important than “extrapolated estimation”)
- if hot spot is confirmed -> take action (2)

The generic use case of social LCA databases

Hot spot detected -> actions, 2

Rose cutting & packaging, Ecuador

			health and safety	socio-economic repercussions	human rights	indigenous rights	development of the country	assessment
social conditions		status						
workers	freedom of association	no	✓	✓	✓	✓	✓	
	discrimination	yes	✓	✓	✓	-	-	
	child labour	yes	✓	✓	✓	✓	✓	
	fair salary	no	✓	✓	✓	✓	✓	
	working hours	72-84h/week	✓	✓	✓	✓	✓	
	forced labour	no						
	health and safety	is at low risks	✓	✓	-	-	-	
	social benefits	no	✓	✓	✓	-	✓	
supply chain actors	fair competition	yes	-	-	-	-	✓	
	promoting social responsibility	no	✓	✓	-	-	✓	
local community	indigenous rights	are harmed	-	✓	-	✓	✓	
	net migration rate	is negative	-	✓	-	✓	✓	
	safe and healthy living conditions	are degraded	✓	✓	✓	✓	✓	
	local employment	is promoted	✓	✓	✓	✓	✓	
society	contribution to economic development	is given, but unfair allocation: contrasting impacts	✓	✓	✓	✓	✓	
	corruption	is promoted by unfair conditions	✓	✓	✓	-	✓	
	technology development	is not promoted	-	-	-	-	-	
	prevention of armed conflicts	is not promoted	-	-	-	-	-	
consumer	health and safety	is not at risk	✓	-	✓	-	✓	
	transparency	is not given	✓	-	✓	-	✓	

Franze, J., Citroth, A. (2011): A comparison of cut roses from Ecuador and the Netherlands, in: The International Journal of Life Cycle Assessment, 16/4 (2011), p. 366 – 379,

The generic use case of social LCA databases

Hot spot detected -> actions, 2

Rose cutting & packaging, Ecuador

“Social conditions considered, it could make sense to produce roses in Ecuador: Plantations generate jobs in rural regions with high poverty, where one third of the population lives. If these jobs were paid in a fair manner and if working conditions were improved in general, living conditions in Ecuador could be greatly improved. For example, with the aid of better payment, child labour would be avoided and a better education enabled. Education reduces poverty and generates a higher income. Increased buying power fosters local economy, which in turn enables the government to invest in welfare system, health care, education, and so on. Hence, flower production could contribute to the development of the whole country.”

The generic use case of social LCA databases

Hot spot detected -> actions, 2

- if hot spot is confirmed -> take action
 - switch supplier, or
 - improve situation at supplier

The generic use case of social LCA databases

Hot spot confirmed -> take action

this requires:

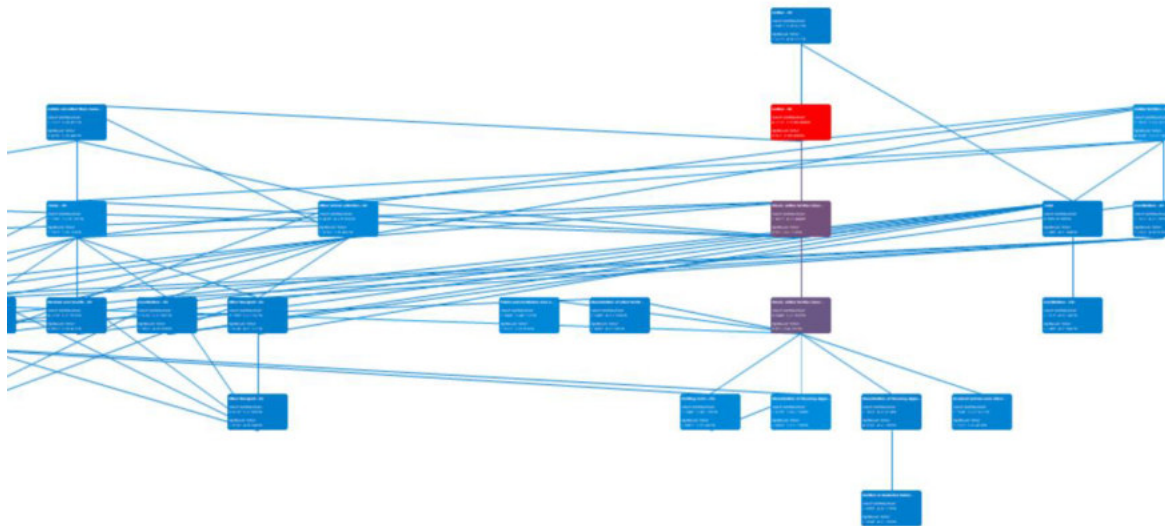
- a unit process based database (otherwise it is not clear where to get further information, where to take action)

The generic use case of social LCA databases

Hot spot confirmed -> take action

this requires:

- a unit process based database (otherwise it is not clear where to get further information, where to take action)



The generic use case of social LCA databases

Hot spot confirmed -> take action

this requires:

- a unit process based database (otherwise it is not clear where to get further information, where to take action)
- data quality is helpful

Name	Category	Inventory result	Impact factor	Impact result	Unit	R	C	T	G	F
>  Youth illiteracy, total				9.206703327910516	YI med...	2	2	2	1	
>  Presence of business practices deceptive or				0.29948347897865973	CONS ...	3	3	2	5	2
>  Safety measures				7.191063160911547	SM me...	1	3	1	4	3
>  Certified environmental management syste				88.37108763419793	CMS ...	1	5	2	1	4
>  Child Labour, total				0.02138510986873792	CL me...	2	4	5	3	5
>  Biomass consumption				92.08339985226297	BM m...	2	1	4	1	5
>  Association and bargaining rights				0.40534291154578406	ACB m...	2	3	4	1	3
>  Violations of employment laws and regulat				1.2013157453833347	VL me...	2	1	1	5	5
>  Youth illiteracy, male				9.206810858724522	YI med...	2	2	2	1	
>  Illiteracy, female				92.0685333419442	I med r...	2	2	2	1	
▼  Fair Salary				79.1392586095196	FS me...	2	2	3	1	1
▼  P Cotton - IN	India / Commodities			46.34986454131556	FS me...	2	2	3	1	1
 F Sector average wage, per month; ve	Workers / Fair Salary	0.4213241027298...	100.0 FS med risk...	42.13241027298933	FS me...	2	2	3	1	1
 F Minimum wage, per month; very hi	Workers / Fair Salary	0.4213241027298...	10.0 FS med risk ...	4.213241027298933	FS me...	2	3	1	1	
>  P Trade - IN	India / Commodities			13.162059893456856	FS me...	2	2	3	1	1
>  P Other service activities - IN	India / Commodities			9.295931501338918	FS me...	2	2	3	1	1
>  P Cotton textiles - IN	India / Industries			2.767551559169124	FS me...	2	2	2	1	1
>  P Construction - IN	India / Commodities			1.487289991186084	FS me...	2	2	3	1	1
> P Trade - IN	India / Industries			1.2040919662724876	FS me...	2	2	3	1	1

The generic use case of social LCA databases

Hot spot confirmed -> take action

this requires:

- a unit process based database (otherwise it is not clear where to get further information, where to take action)
- data quality is helpful
- raw data is helpful in case you do not fully support risk-assessments performed for the database (also for transparency reasons)

Use cases

Environmental LCA (ILCD handbook, 2010)

Decision support?		Kind of process-changes in background system / other systems	
		None or small-scale	Large-scale
	Yes	Situation A	Situation B
		"Micro-level decision support"	"Meso/macro-level decision support"
No		Situation C	
		"Accounting"	
		(with C1: including interactions with other systems, C2: excluding interactions with other systems)	

Use cases

for social LCA & databases

- product comparisons
- organization comparisons
- full country or region comparisons
- product accounting (descriptive)
- organization accounting (descriptive)
- fully country or region accounting (descriptive)
- hot spot identification, in supply chains
- hot spot identification, in regions
- supply chain due diligence (parts of)
- supply chain improvements
- calculation of decision effects, policy
- calculation of decision effects, businesses

Use cases

Calculation of decision effects, businesses

- location of a new plant
 - procurement
 - product design
 - ...
-
- decision about reporting measures, supplier programs,
.. -> “where to pay attention”

Summary & conclusions

Collaboration needed: What are use cases for social LCA, and their requirements

Databases are one important puzzle piece but not able to provide the “final answer” in social LCA decision support












Social LCA databases are not a measurement system but a screening tool; using the databases requires some expertise..

..and is (maybe) somewhat different from environmental LCA results and databases

Summary & conclusions

(and maybe also not – also in env. databases, no strict measurements?)

Water Footprint for Food Items

1 tomato  4.76 Gallons	1 orange  13 Gallons	1 apple  18 Gallons	1 banana  20 Gallons
1 egg  52 Gallons	1 ear of corn  118 Gallons	1 package  171 Gallons	
10oz:  309 gallons	 317 gallons	 372 gallons	 1228 gallons

<https://348shotwellwaterchallenge.wordpress.com/2015/02/26/answers-to-first-days-questions-about-water-footprint/>

Summary & conclusions

Mandatory features of a social LCA database

- unit process based
- supports indicators of interest

A database is better suited if

- it is recent, complete
- transparent
- shows sources and raw values

And overall, it would be very interesting to further explore the use case side of social LCA databases more in detail

Thank you!



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