



The Second Edition of European NO DIG Conference

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New environmental level

A-plast/ Managing director A-liner, Älghult Sweden

ABSTRACT: We all know that No-Dig solutions, most times, are more environmentally friendly than Open Cut. But still we struggle to convince our customers, and No Dig solutions are mostly used in cases where Open Cut has practically challenges. Last month's there have been a development on material for conventional digging and will increase the environmental gap between No-Dig solution and Open Cut in smaller dimensions.

1. INTRODUCTION

Daily we hear news about climate change. "Extreme temperatures, winds, dryings, precipitation etc. etc." But it is really news? Since years the climate experts are convinced that the ongoing climate change is caused by CO2 emissions. Can we, in our business, do something?

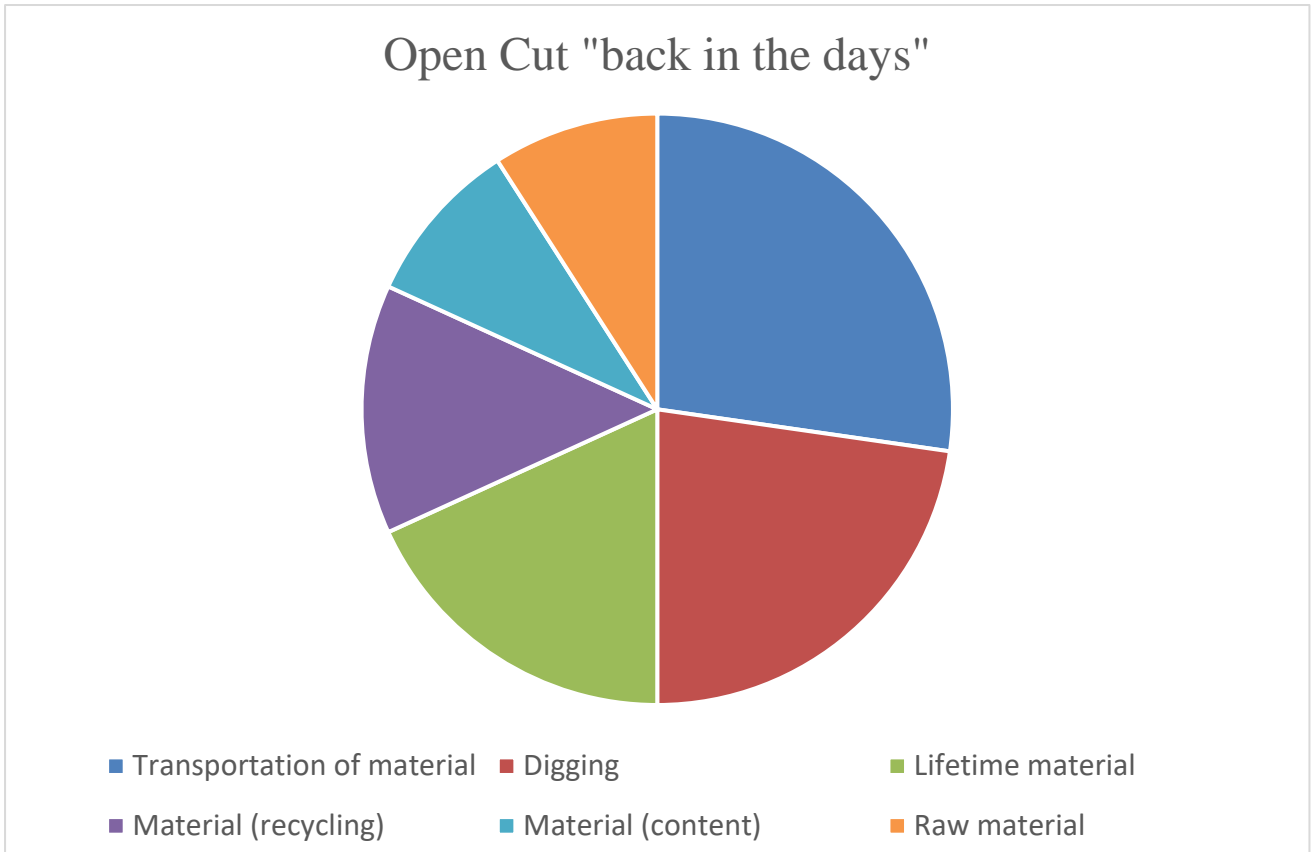


Figure 1. Open Cut old "footprint"

"Open Cut" for some years ago have big challenges due to fact that diesel fuel (no bio content). The digging and transportation material caused big CO2 impact.
 The recycling level/possibilities was limited, content of raw material was not environmentally friendly.

Everybody knows, but....

With "No-Dig"

- No transportation of material (CO₂)
- No digging impacts (CO₂)
- Less traffic problems- less extra traffic

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Example

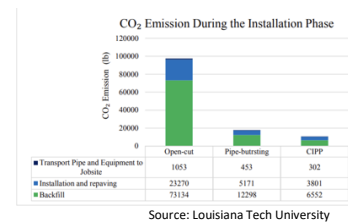


Figure 2. Example of investigation

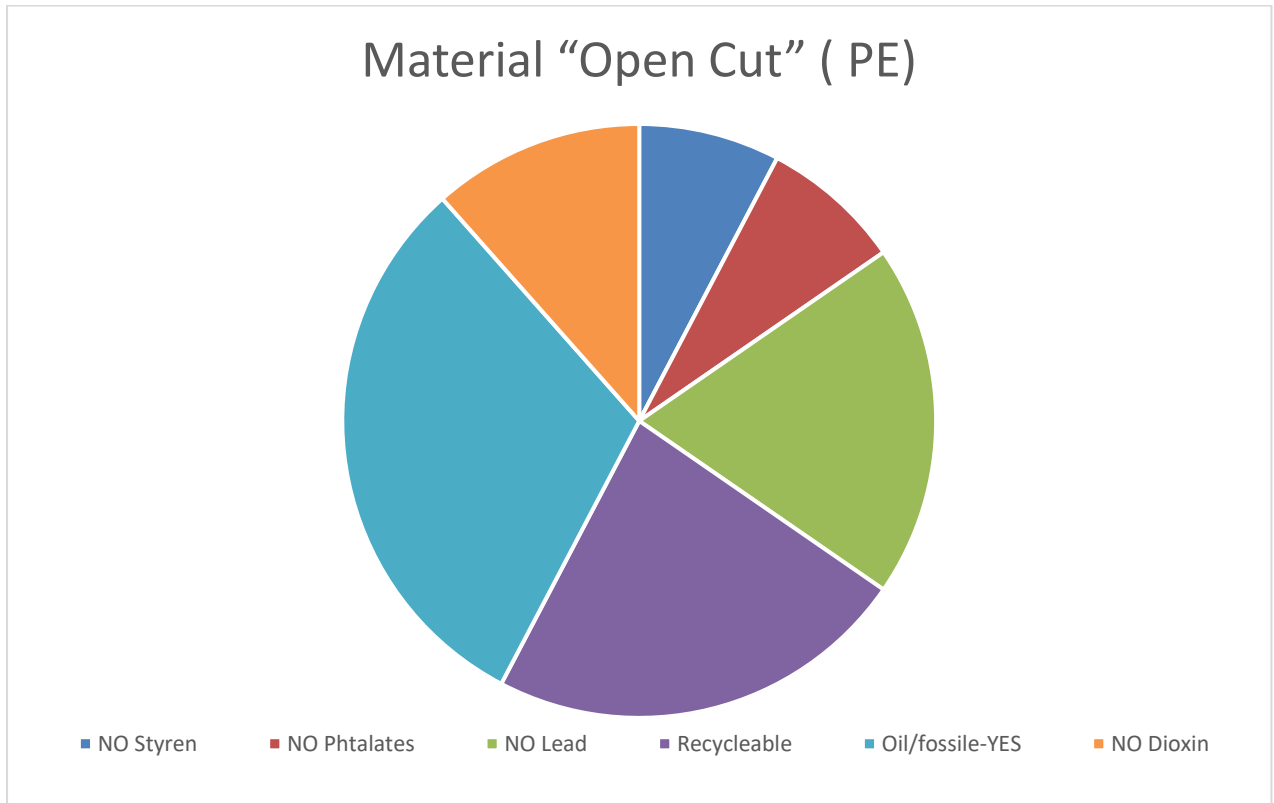
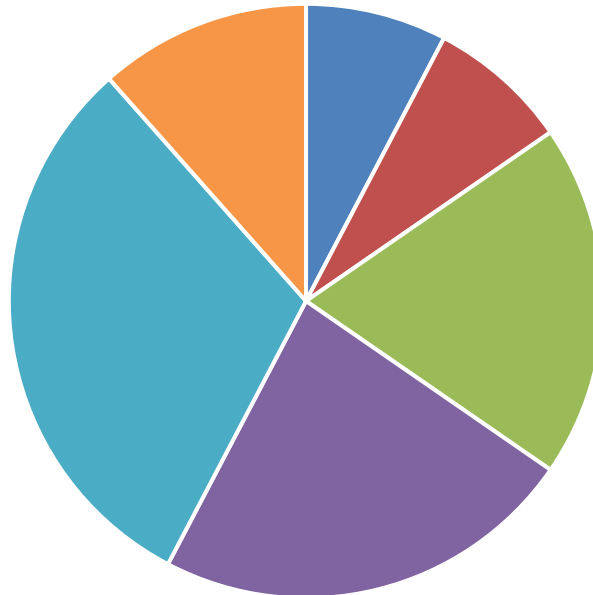


Figure 3. Material for installation "Open Cut"

The Open Cut installations with PP pipes are more environmentally friendly.

Material "No-Dig" CIPP/(OLD PVC)



■ Styren ■ Phtalates ■ Lead ■ Non-recycleable ■ Oil/fossile ■ Dioxin

Figure 3. Material for "No Dig"

The material for relining have another profile....

New tenders asks for

- Price
- Organisation
- **Environment!!**

Material has a big CO₂ impact in the total "No-Dig" project. Example below from a big Danish community

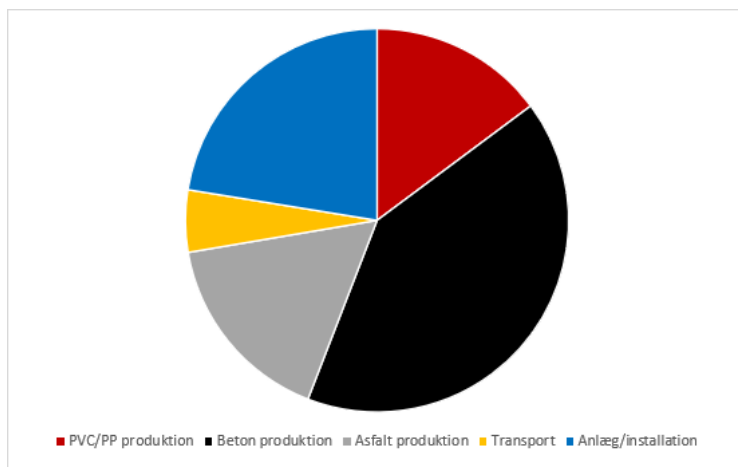


Figure 4. From Esbjerg community

PVC/PP-production (pipes <Ø500 + Ø600 chambers): 15 %

Concrete production (pipes >Ø500 + chambers > Ø600): 41 %

Asphalt production: 16 %

Transport of material (sand, pebbles and cement for concrete production + transport from production to worksite): 6 %

Produktion on site (diesel for entrepreneur): 22 %

Water organisations start to measure based on "Ecoinvent" (www.ecoinvent.org)

	Standard verdi	Dokumentert verdi	Brukt faktor	Enhet
1 PE	2,37			2,37 kg CO ₂ ekv./kg
2 PP	2,30			2,30 kg CO ₂ ekv./kg
3 PVC	2,33			2,33 kg CO ₂ ekv./kg
4 Betong	0,12			0,12 kg CO ₂ ekv./kg
5 GRP	6,32			6,32 kg CO ₂ ekv./kg
6 Støpejern	1,59			1,59 kg CO ₂ ekv./kg
7 Rustfritt stål	5,13			5,13 kg CO ₂ ekv./kg

Source "Norsk Vann" October 2022

Figure 6. Table on CO₂ "footprint"

Open cut starts to use Bio based material, PP, PE and PVC



Figure 7. "Open Cut" pitch

HOW??

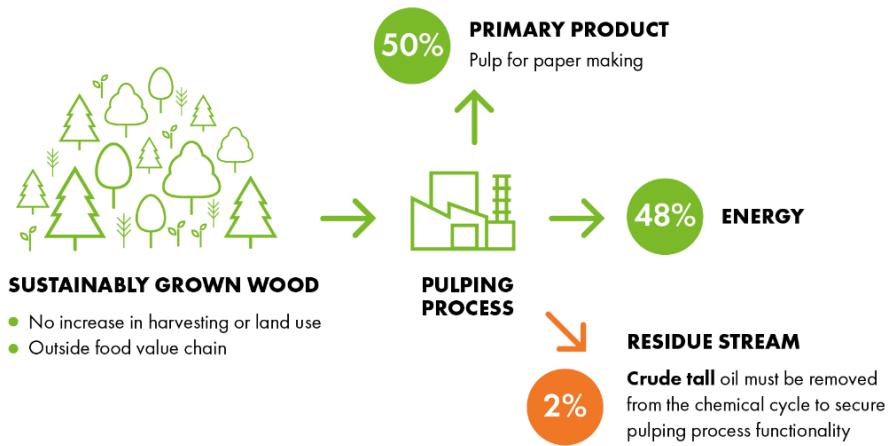
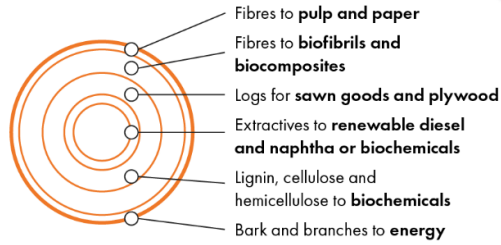
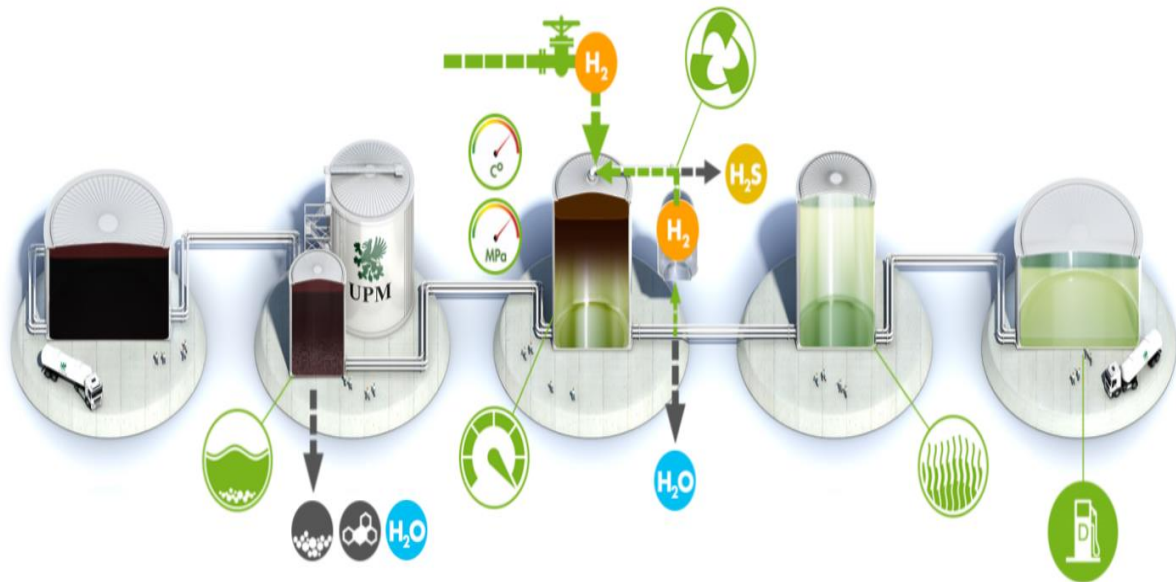


Figure 8. UPM BIOFUELS production

Only wood-based residue, scrap from paper industry, are used

HOW??



CRUDE TALL OIL	PRETREATMENT	HYDROTREATMENT	FRACTIONATION	RENEWABLE DIESEL
A residue of chemical pulping process containing natural extractive components of wood.	Crude Tall Oil is purified: salts, impurities, solid particles and water are removed.	Pretreated Crude Tall Oil is fed together with make-up and recycled hydrogen to the reactor where the chemical structure is modified. Reaction water is separated and directed to waste water treatment.	Remaining hydrogen sulfide and uncondensable gases are removed. The remaining liquid is distilled to separate renewable diesel.	High quality advanced biofuel suitable for all diesel engines.
				RENEWABLE NAPHTHA Advanced renewable biocomponent for gasoline or raw material in bioplastics.

Figure 9. UPM BIOFUELS production

Facts BIO-liner



- ▶ - 100% BIO BASED PVC raw material, SALT and WOODBASED RESIDUE
- ▶ - CO2 footprint from BIO-PVC rawmaterial **-0,158 kg/kg**, certified by RSB/ISCC+
- ▶ - CO2 from BIO-Liner 0,5 kg/kg (GRP=6 kg/kg)
- ▶ - Styren free
- ▶ - No Ftalates for softening, replaced by BIO material
- ▶ - Ring stiffnes SN 4 or SN 8 tested acc to EN ISO 9969
- ▶ - Lifetime >100 years
- ▶ - Dimension from DN 150 to DN 400
- ▶ - Recycling accordig to SS-EN ISO 11296-3:2018
- ▶ - Completly Made in Sweden with ISO 9001 and ISO 14001

Figures 9 and 10. Bio-Liner PVC

Can we do something?



Figure 12. High water because of...