



**INTERNATIONAL  
ITC TOWER  
CRANES  
CONFERENCE & RECEPTION**

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CFO of Neuron Soundware

**What is it worth?**

**Determining the residual value of tower cranes.**

# JVS Cranes – Czech rental company

- 2<sup>nd</sup> generation family business
- established 27 years ago
- 75 cranes (Liebherr & Terex),  
2 depots
- EBITDA 1.5 mil. EUR
- local innovator
- invested in Neuron Soundware  
– AI predictive maintenance



# Example: Residual value of 2006 Liebherr 110ECB-6

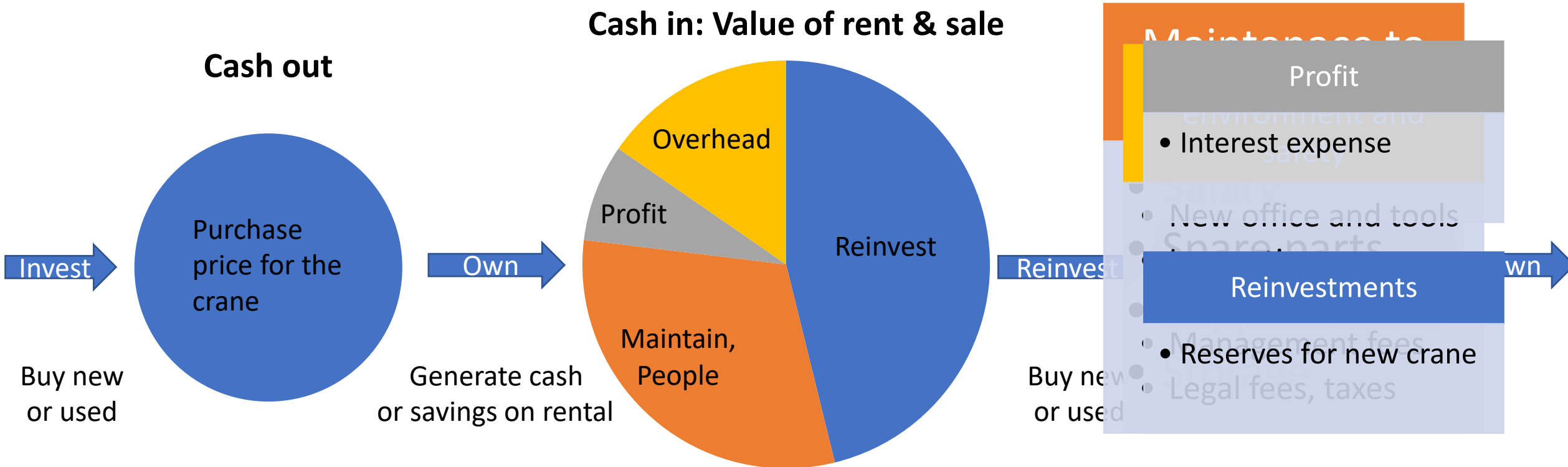
complete jib with cab, pinned tower sections 44m, 4,5m chassis

## Residual value – typical/wrong approach:

- Purchase price 11/2008 : - 185 th. EUR
- Rent till May/19: + 244 th. EUR
- Costs till May/19: - 98 th. EUR
- Remaining value: - 39 th. EUR
- With Inflation ( $39 \times 1.19$ ): - 46 th. EUR
- With Margin 40% = - **65 th. EUR**

# Valuation is about cash flows

How much I put in vs. how much I get back.



# Valuation

= determining today's value of cash flows

Compare market prices

- Market value
- Assumes normalized market prices

Past cash flows

- Residual value
- Assumes I have enough normalized data

Future cash flows

- The real value
- Assumes I can predict lifetime of the crane

# Valuation in detail

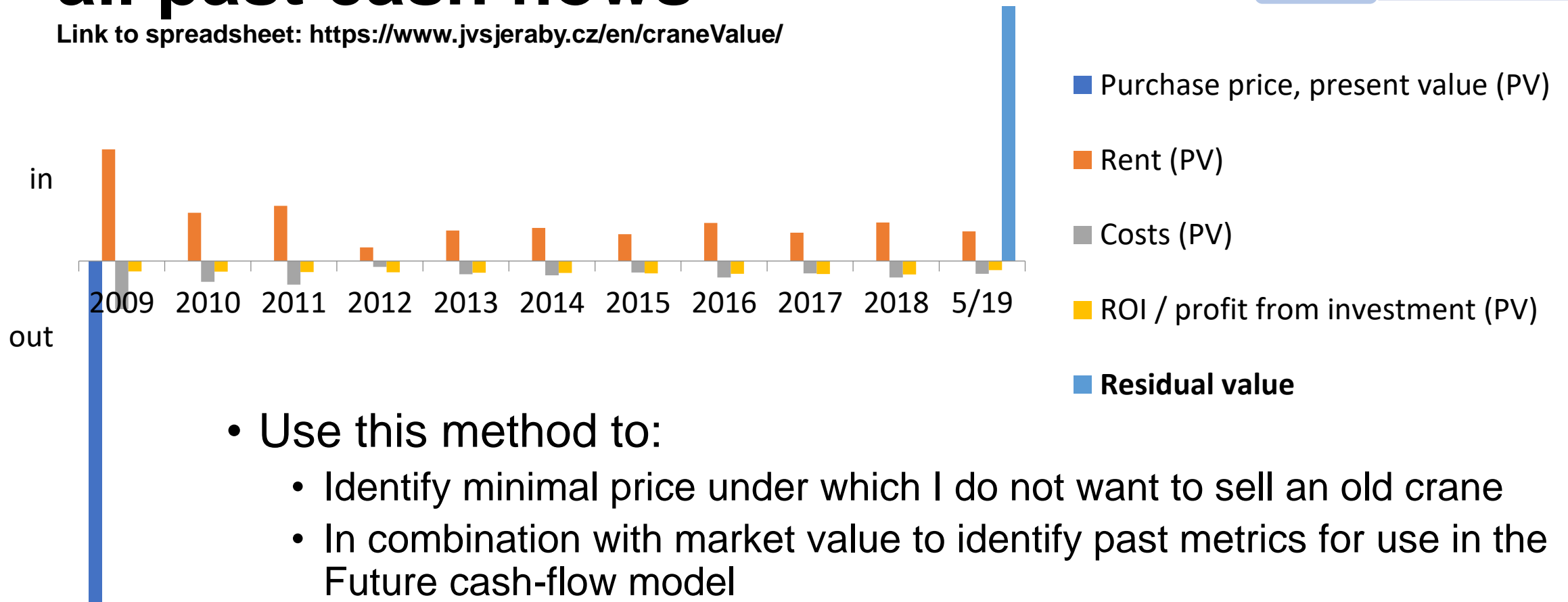
<https://www.jvsjeraby.cz/en/craneValue/>

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Investment	185,008												
2	Required return (ROI) above ir	3.0%												
3	Purchased in	2008	31.10.08											
4	Sold in	2019	30.06.19											
5	Years of ownership	10.66119097												
6														
7		31.10.08	31.10.09	31.10.10	31.10.11	31.10.12	31.10.13	31.10.14	31.10.15	31.10.16	31.10.17	31.10.18	30.06.19	
8		0	1	2	3	4	5	6	7	8	9	10	10.66301	
9	Expected value of investment	185,008	190,558	196,275	202,163	208,228	214,475	220,909	227,537	234,363	241,394	248,635	253,581	
10												check	253,556	
11	Real cash flows													
12	Purchase	- 185,008												
13	Rent		60,054	25,925	29,653	7,354	16,467	17,785	14,474	20,534	15,313	20,678	15,910	
14	Costs, incl. overhead		- 9,129	- 9,301	- 9,433	- 9,605	- 9,900	- 9,940	- 9,971	- 10,034	- 10,255	- 10,477	- 7,144	
15			15%	36%	32%	131%	60%	56%	69%	49%	67%	51%	45%	
16														
17	Total cash flow	- 185,008	50,925	16,624	20,221	- 2,252	6,567	7,845	4,503	10,500	5,058	10,201	8,765	
18	Effective tax rate		19%	19%	19%	19%	19%	19%	19%	19%	19%	19%	19%	
19	EBIT (1-t)	- 185,008	50,925	16,624	20,221	- 2,252	6,567	7,845	4,503	10,500	5,058	10,201	8,765	
20	- Reinvestment													- 220,315
21	Free cash flow	- 185,008	50,925	16,624	20,221	- 2,252	6,567	7,845	4,503	10,500	5,058	10,201	8,765	
22	Loss of prev. year	- 185,008	- 134,083	- 117,459	- 97,239	- 99,490	- 92,924	- 85,079	- 80,576	- 70,076	- 65,018	- 54,817	- 46,051	
23														
24	Inflation		0%	2%	1%	2%	3%	1%	0%	0%	1%	2%	2%	3%

# Residual value = Present value of all past cash flows

Link to spreadsheet: <https://www.jvsjeraby.cz/en/craneValue/>

Compare	<input type="text"/>
Past cash flow based	<input type="text"/>
Future cash flow based	<input type="text"/>



# Real value = Present value of all Future free cash flows

Link to spreadsheet: <https://www.jvsjeraby.cz/en/craneValue/>

Compare	
Past cash flow based	
Future cash flow based	

- I need to assume future **yearly profit** from crane:
  - If I don't know, I use 60% of rent, or subtract 90EUR / tm / year
- Subtract **reinvestment reserves**, get Free cash flow
- Also I need to decide on my strategy – **lifetime of crane**
- Lastly set a reasonable expected **Return on Investment**



# The real value

Link to spreadsheet: <https://www.jvsjeraby.cz/en/craneValue/>

Compare

Past cash flow based

Future cash flow based

- Then calculate the Free cash flow to net present value
- And sum all net present values
- Example is in spreadsheet

	0	1	2	3	4	5	6	7	8	9
4 Years of ownership										
5 Revenue growth rate		3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
6 Revenue from rent	30,800	31,724	32,676	33,656	34,666	35,706	36,777	37,880	39,017	40,187
7 Operating margin	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%
8 Operating income	18,480	19,034	19,605	20,194	20,799	21,423	22,066	22,728	23,410	24,112
9 Major repairs						-10,000				
10 CF from crane sale										
11 EBIT	18,480	19,034	19,605	20,194	20,799	11,423	22,066	22,728	23,410	24,112
12 Effective tax rate	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
13 Tax	-3,696	-3,807	-3,921	-4,039	-4,160	-2,285	-4,413	-4,546	-4,682	-4,822
14 After tax operating income	14,784	15,228	15,684	16,155	16,640	9,139	17,653	18,182	18,728	19,290
15 - Reinvestment	4,869	5,015	5,165	5,320	5,480	5,644	5,813	5,988	6,167	6,352
16 Free cash flow		10,213	10,519	10,835	11,160	3,495	11,839	12,195	12,560	12,937
17 PV of FCF		9,680	9,451	9,227	9,008	2,674	8,587	8,383	8,184	7,990
18										
19 Cost of capital (WACC)	5.5%	5.5%	5.5%	5.5%	5.5%	5.5%	5.5%	5.5%	5.5%	5.5%
20 Cumulated CoC		1.0550	1.1130	1.1742	1.2388	1.3070	1.3788	1.4547	1.5347	1.6191
21										
22 Value of crane	144,039									

# Compare market values

Link to spreadsheet: <https://www.jvsjeraby.cz/en/craneValue/>

Compare	
Past cash flow based	
Future cash flow based	

- Simple. Ideal for dealers and regular buyers.
- Compare the prices on market
- Must normalize the prices for:
  - Differences in configurations: compare just upper parts price
  - Age: recalculate today's offered price to the time when the crane was new (depreciation function)

# Use this function to account for age difference

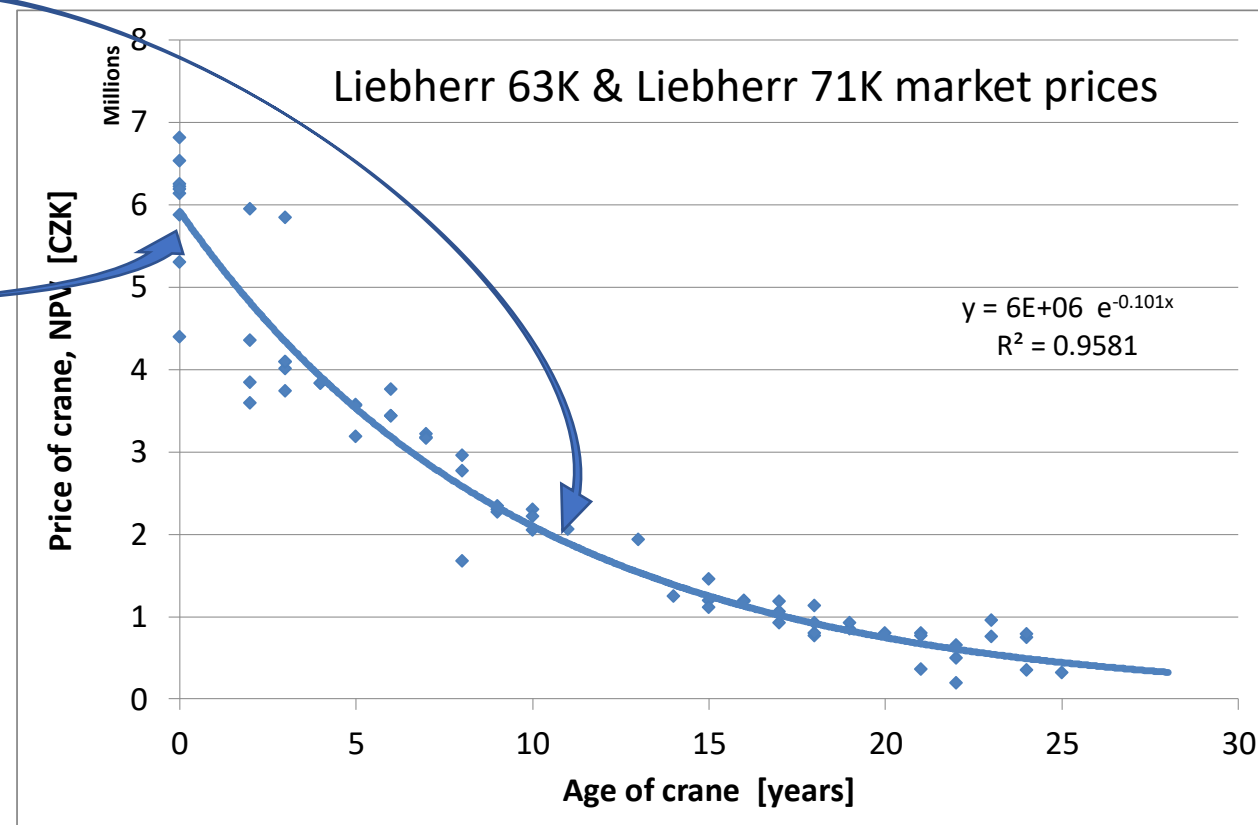
Compare

Past cash flow based

Future cash flow based

$$\text{Implied purchase price} = \frac{\text{Current price}}{e^{\text{Crane\_age} \times \text{koef}}}$$

- Where *koef* is depreciation rate:
  - For lower part: -4% to -6%
  - For upper part -7% to -10%
  - Depends on the market state and producer.
- Option: Compare this with price of new crane



# Example: Residual value of 2006 Liebherr 110ECB-6

complete jib with cab, pinned tower sections 44m, 4,5m chassis

## Residual value – typical/wrong approach:

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# Residual value of 2006 Liebherr 110ECB-6

complete jib with cab, pinned tower sections 44m, 4,5m chassis

## Residual value – the right approach:

- Purchase price: 185 th. EUR
- With Inflation 19%, PV of purch. price - 220 th. EUR
- Rent till May/19: 244 th. EUR, PV = + 270 th EUR
- Costs till May/19 (PV): - 108 th. EUR
- ROI for investor: 3% p.a. 10.6 years = - 75 th. EUR
- Residual value of this crane: **133 th. EUR - tax**
- Residual value of other 110ECB in my fleet: 120 th. EUR

# Real value of 2006 Liebherr 110ECB-6

complete jib with cab, pinned tower sections 44m, 4,5m chassis

**Real value is 145 th. EUR:**

- Under same assumptions:
  - Average estimated yearly rent: 32 th. EUR growing at 3% p.a.
  - Minus 40% yearly costs and every 5<sup>th</sup> year general repair for 5k EUR
  - Years of ownership: until the crane is 30 years old (17 years)
  - Estimated Inflation 2.5% p.a. + ROI 3% = 5.5% p.a.

# Am I going to sell?

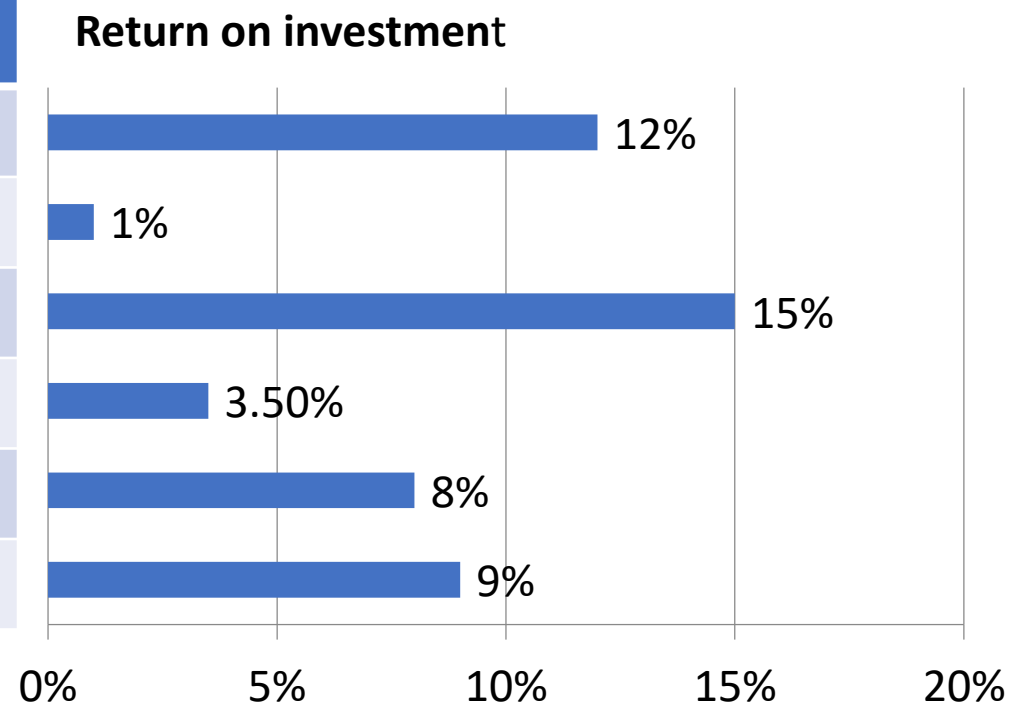
Market offers me around 125-130 th. EUR

Residual value is 133 th. EUR

Real value is 145 th. EUR

# Findings: Implied ROI in my fleet

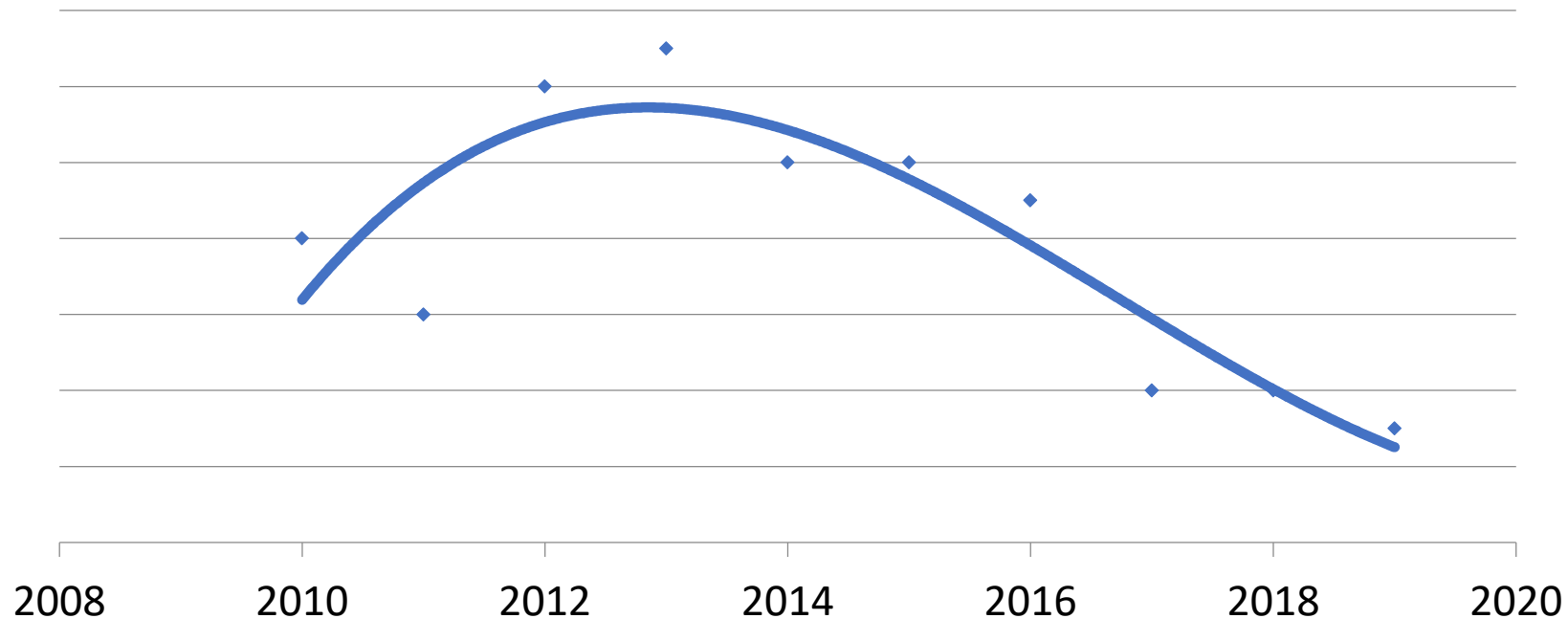
Crane type	# of units	Average age when purchased	Collected cash flow since	# of business cycles
Liebherr 63K	12	11.4	1996	2
Liebherr 71K	14	1.2	2006	1
Liebherr 35K	10	6.1	1995	2
Liebherr 110EC-B 6	7	3.6	2006	1
Terex CTT91	15	8.7	2012	0
Terex CTT141-181	10	10	2012	0





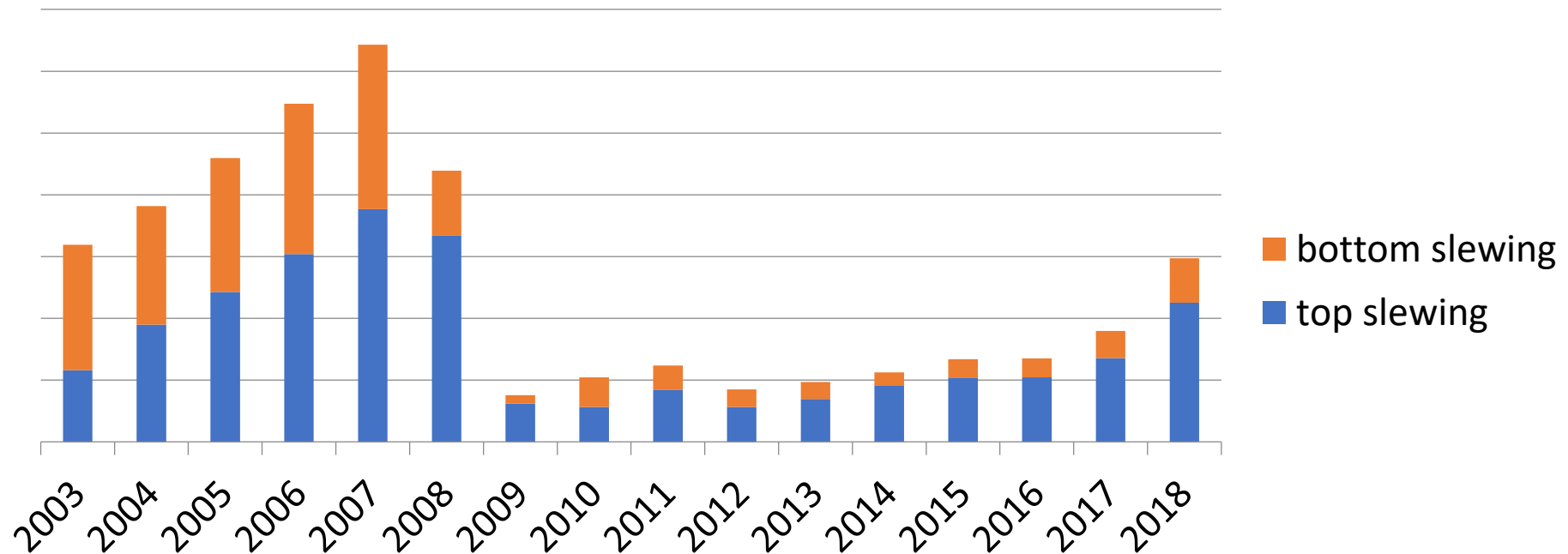
# Market supply of used cranes is weaker

110 EC-B 6 Offers received by JVS (Supply curve)



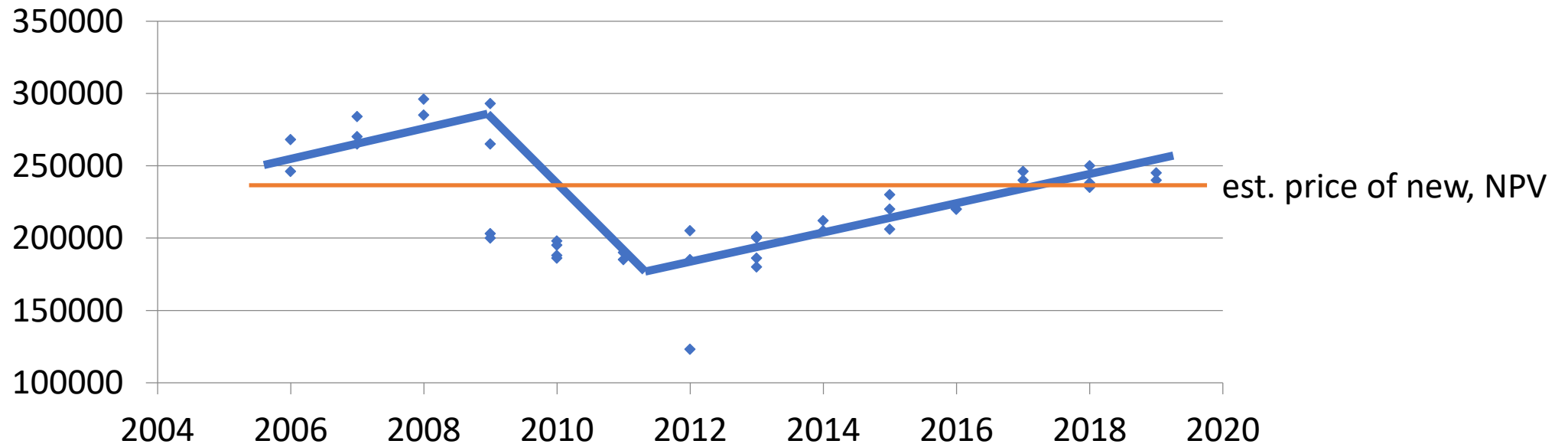
# And there were not many cranes produced either since 2009

Produced new cranes – major producer



# Used cranes are more expensive than new now

LH 110ECB6 - implied purchase price of used crane from market value NPV 2019



# What options are we left with?

## Facts:

- New cranes = low ROI
- Used cranes limited from 2009
- Used cranes expensive now
- New norms (EN) require what old cranes will never have



## Our options:

- Reconsider purchasing strategy and buy really old cranes or
- Reconsider our rental prices.

# Key takeaways

- Value of crane is sum of all **future** cash flows
- Do not forget about **inflation, reinvestment reserves** and **compound ROI**
- Use my spreadsheet :)
- Buy used cranes for better ROI
- Supply of used cranes is limited now
- Maybe it's time to reconsider rental prices or increase fleet age

# Contact me:

- to value your tower crane
- to buy our used cranes
- if you want to buy or sell a business
- to implement Neuron soundware products on your equipment and do predictive maintenance on your machines using sound and artificial intelligence
- to become partner of Neuron soundware

# Thank you.

Contact:

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