Sales support ELP

Consideration of the cumulative costs

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Consideration of the cumulative cost over the lifetime

1) Relevant pool of costs

2) Consideration of the cumulative cost of a single linear module using the example of ELP

3) Consideration of the cumulative cost of a single linear module using the example of a complete assembly machine

Consideration of the cumulative cost over lifetime

Acquisition cost

- Expenses for module/s
- Expenses for periphery

Commissioning cost

- Working hours of start-up engineer

High relevance for customers in **machinery** and **plant engineering**

Operating cost

- Running energy cost

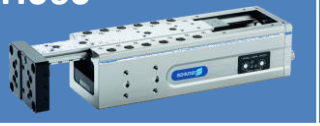
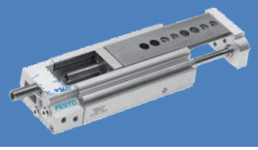
Maitenance cost

- Working hours of maintenance worker
- Expenses for wear parts
- Cost for loss of production because of machine downtime

High relevance for end customers

Acquisition cost

- Expenses for module/s
- Expenses for periphery

	Electrical linear module ELP 50-H060 	Pneumatic linear module 
Acquisition cost for module	1.044 €	500 €
Acquisition cost for periphery (Valves/Cables)	100 €	80 €
Cumulative acquisition cost	**1.144 €**	**580 €**

Commissioning cost

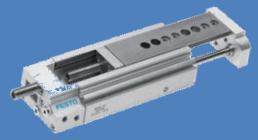
- Working hours of start-up engineer

Expenses for the working time during commissioning: approx. **70 € per hour**

	Electrical linear module ELP 50-H060 	Pneumatic linear module 
Time for commissioning	**5 min** ⟺ Factor 3	**15 min**
Because of afjustment of shock absorbers and throttles, the time for commissioning is **3 times** higher.		
Commissioning cost per module	6 €	17,50 €

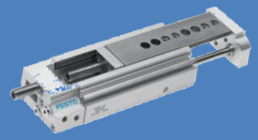
Operating cost

- Running energy cost

	Electrical linear module ELP 50-H060 	Pneumatic linear module 
Energy cost per cycle	**Electrical work per cycle x Energy cost per kWh**	**Air consumption per cycle x energy cost per m³ compressed air**

Operating cost

- Running energy cost

	Electrical linear module ELP 50-H060	Pneumatic linear module
		
Energy cost per cycle	Electrical work per cycle x Energy cost per kWh	**Air consumption per cycle x energy cost per m³ compressed air**

Electrical work = **W_{el}** = Electrical power **P_{el}** x Time **t**

With Pel = U * I

Wel = Wel retract + Wel extending + Wel retracted + Wel extended

Cycle time = 3 sek.*
Extending/Retracting each 0,25 s
and waiting time in end positions each 1,25 s.

Pel movement = 13,33 W
Pel end position = 17,88 W

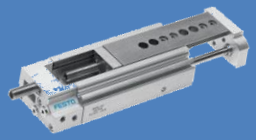
Wel = 0,25 s x (13,33 W + 13,33 W) + 1,25 s x (17,88 W + 17,88 W) = 51,36 Ws = **0,000014 kWh**

Energy cost = 0,1285 €/kWh (lt. German Federal statistic office)

** Values can vary for different applications and customers*

Operating cost

- Running energy cost

	Electrical linear module ELP 50-H060 	Pneumatic linear module 
Energy cost per cycle	**Electrical work per cycle x Energy cost per kWh**	**Air consumption per cycle x energy cost per m³ compressed air**

Air consumption per cycle = $Consumption_{extending}$ + $Consumption_{retract}$

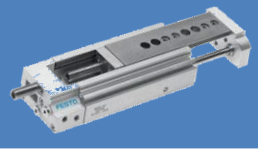
Air consumption = piston area x stroke x ($Pressure_{absolut}$ / $Pressure_{atmospheric}$)

Air consumption = (2,01 cm² *6 cm*7) + (1,72 cm² *6 cm*7) = 201,87 Ncm² = 22,4 cm³ = 0,0000224 m³

Energy cost = 0,168 €/m³ (Calculated value according to specifications of manufacturers of air compressors)

Operating cost

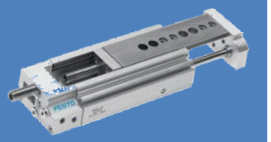
- Running energy cost

	Electrical linear module ELP 50-H060 	Pneumatic linear module 
Energy cost per cycle	0,000014 kWh x 0,1285 €/kWh = **0,000001833 €**	0,0000224 m³ x 0,168 €/m³ = **0,00000376 €**
Energy cost after 1 Mio. cycles	**1,83 €**	**3,76 €**
Energy cost after 40 mio. cycles	**73,33 €**	**150,53 €**

50 % lower

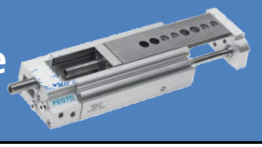
Maintenance cost

- Working hours of maintenance worker
- Cost for wear parts
- Cost for loss of production because of machine downtime

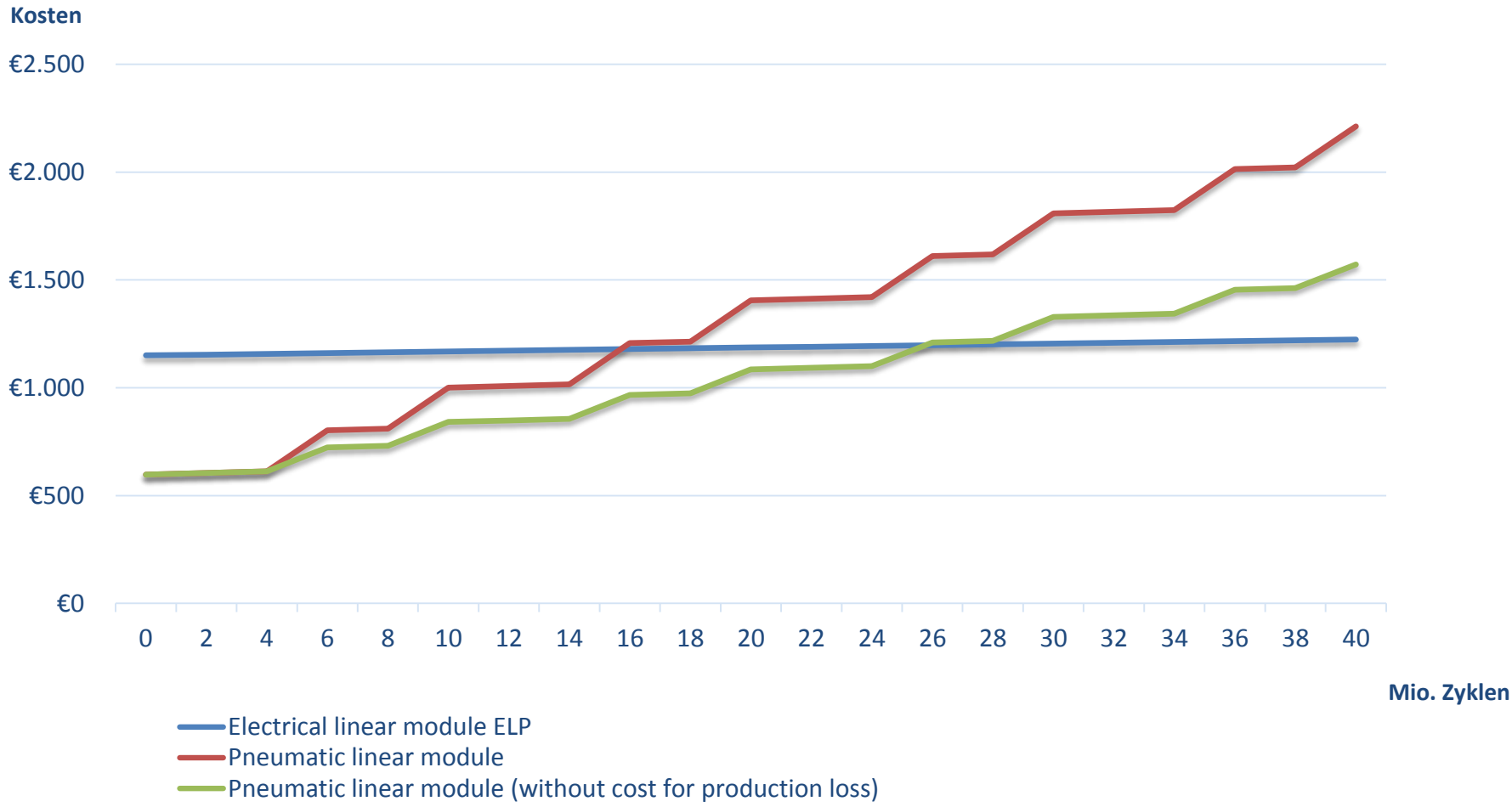
	Electrical linear module ELP 50-H060 	Pneumatic linear module 
Maintenance interval incl. Replacement of wear parts	**Maintenance-free**	**5 Mio. cycles**
Cost for wear parts (Shock absorbers)	**- €**	**2x shock absorbers 40 € each**
Working time of maintenance worker	**0 min.**	**20 min.**
Cost for loss of production during machine downtime	**- €**	**80 € * (By 20 ct./part and cycle time of 3 sec.)**
Cost for maintenance and wear parts per maintenance interval	**0 €**	**183 €**
Cost for maintenance and wear parts after 40 mio. cycles	**0 €**	**1.464 €**

** Values can vary for different applications and customers*

Cumulative cost

	Electrical linear module ELP 50-H060 	Pneumatic linear module 
Acquisition cost	1.144 €	580 €
Commissioning cost	6 €	18 €
Operating cost	73,33 €	150,53 €
Maintenance cost	0 €	1.464 €
Cumulative cost after 40 mio. cycles	**1.223,33 €**	**2.212,53 €**

Amortisation



Cumulative cost of an assembly machine

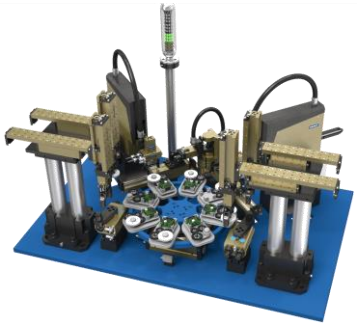
Assumption:

Rotary indexing table
with 7 assembly stations:
15 linear modules

Additionally 2 modules
for feeding:
2 linear modules

Altogether
17 linear modules

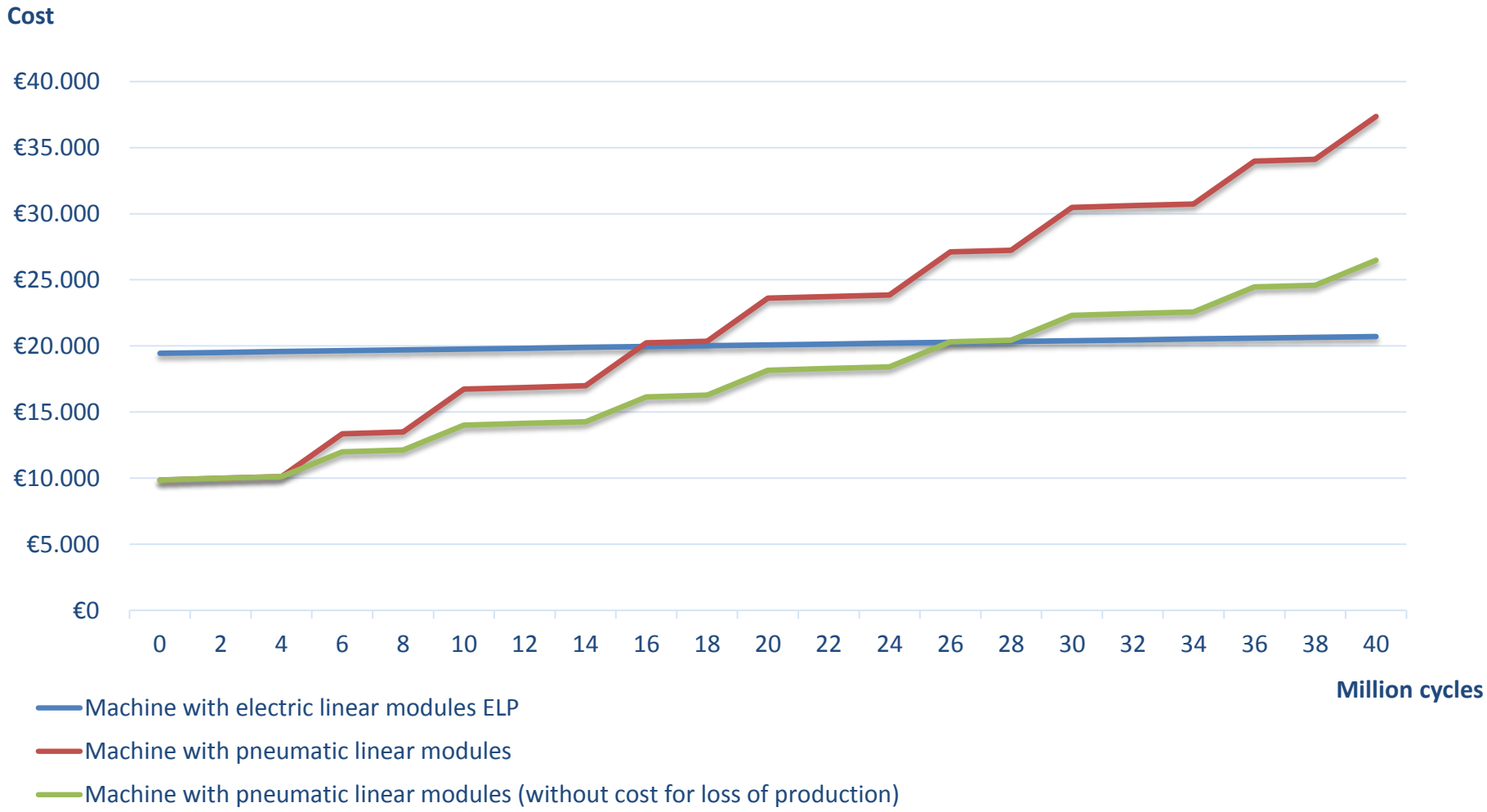
Cumulative cost



	Electric	Pneumatic	
Acquisition cost	19.450 €	9.860 €	
Commissioning cost	100 € **(= 1,5 h)**	300 € **(= 4,5 h)**	Relevant for **Machine engineering customer**
Operating cost	1.246 €	2.560 €	
Maintenance cost	0 €	24.936 €	Relevant for **End customer**
Cumulative cost after 40 mio. cycles	**20.796 €**	**37.656 €**	

Savings of nearly **17.000 €**

Amortisation



Conclusion

- During **commissioning** of linear modules, the **time saving** is approx. **67 %**
- When using eletrical linear modules ELP, **energy cost** can be **reduced** up to **more** than **50 %**
- The use of electrical linear modules ELP **is amortising** already after **15 mio. cycles (or 3 maintenance intervals)** compared with pneumatic competing products
- With the usage of electrical linear modules ELP in assembly machines, **savings** of **nearly 17.000 €** can be made after **40 mio. cycles** compared with pneumatic linear modules.

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