



plug'n'leen.

Energy Efficiency Networks: Getting measures implemented

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LEEN GmbH



- Founded 2009 (spin off of Fraunhofer society)
- 10 employees
- Three business areas
 - International projects on energy efficiency networks: Ukraine, Jordan, Nigeria, Tunisia, China, Balkan region ...
 - Energy management software leenize
 - Services and support for leenize



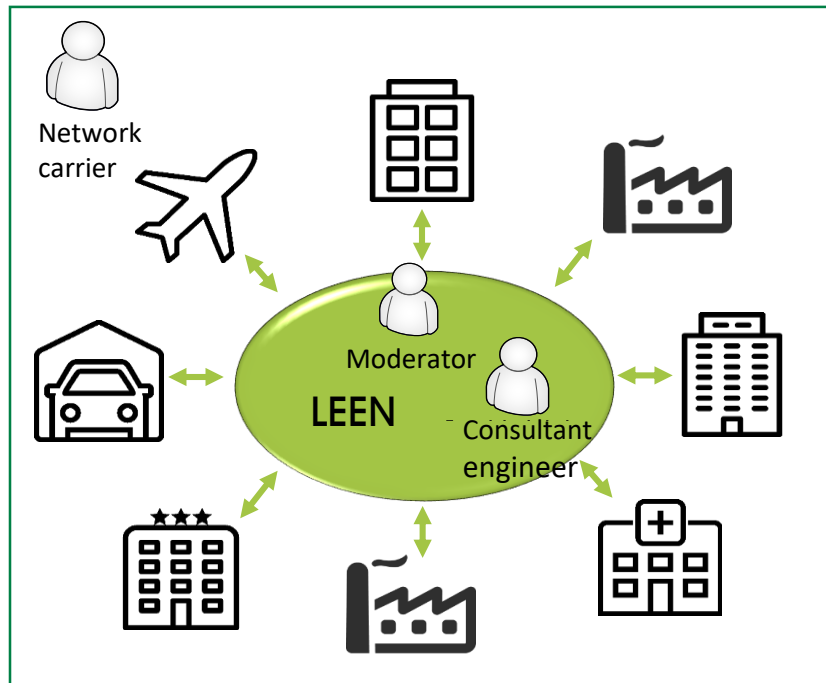
From audit to implementation

- **Audit: Identifying and evaluating energy efficiency measures (if required: according to ISO 50001)**
 - Consumption and cost structure
 - Identification of measures and profitability evaluation
 - **Networks: Experience exchange with other participants to get measures implemented effectively**
 - Team building process
 - Exchange experience and know how
 - Learn from each other
 - Practical examples regarding implementation of measures
- => Increased implementation of **profitable** measures by more than factor 2 (Germany)



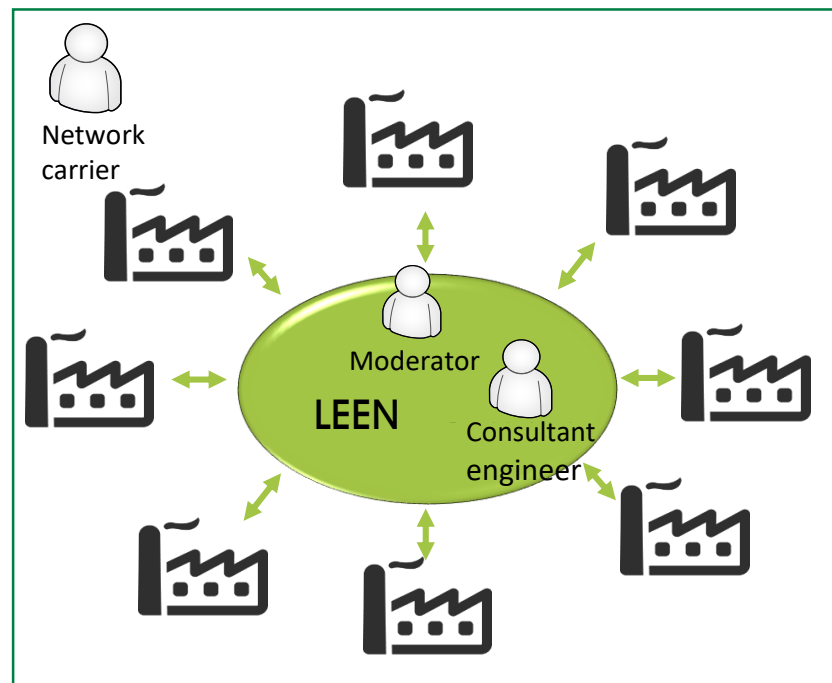
Typical network types

Regional



Typical cases: Industry

Sectoral (including in-house)



Typical cases: Service sector, Industry in-house only



Network team

- **Network carrier**
 - Organizes the network (contracts)
 - Offers organizational support for moderator and consultant engineer
 - Potential network carriers: SON, Universities, NGOs, Energy Conversation Center
- **Consultant engineer**
 - Conducts energy audit, if a participant has not yet one (if necessary in accordance to ISO 50001)
 - Conducts the monitoring to document the effects of implemented measures
 - Supports the network with technical expertise
- **Moderator**
 - Prepares and conducts network meetings
 - Leads the team building process
 - Supports the network carrier in public relation
 - Potential moderators: SON, Universities, NGOs, Energy Conversation Center



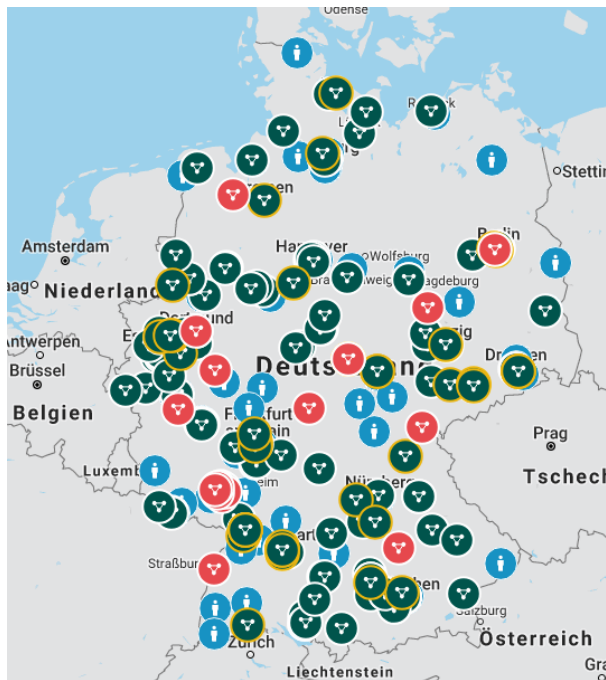
Advantages to participate in a network

- Audit: identify optimum investment options
- Network meetings: use the whole know how pool of the network to implement measures more easy and faster
- Avoid expensive repetitive learning by doing (on your own)
- Reduce the risk of decision failures

- All in all: Participating in a LEEN is a means to earn money with efficiency.



500 network initiative



- lead by German associations
- 500 networks until 2020
- Currently: 250 networks operational



Energy savings in the networks

Ravensburg:	12.7 % (after 5 years)	
Franken-Oberpfalz:	8.7 % (after 4 years)	
Süd-West:	7.6 % (after 3 years)	
Hanse:	7.5 % (after 3 years)	
Heilbronn-Franken:	6.9 % (after 3 years)	
Karlsruhe:	6.1 % (after 3 years)	
Networks, average annual efficiency increase:		2.2%/a
German industry, average annual efficiency increase:		0.9%/a



Profitability of realized measures

- Total investment 10 companies 2.4
million €
- Annual energy savings 10 companies 1.4
million €/a
- Average pay back period 1.7 years

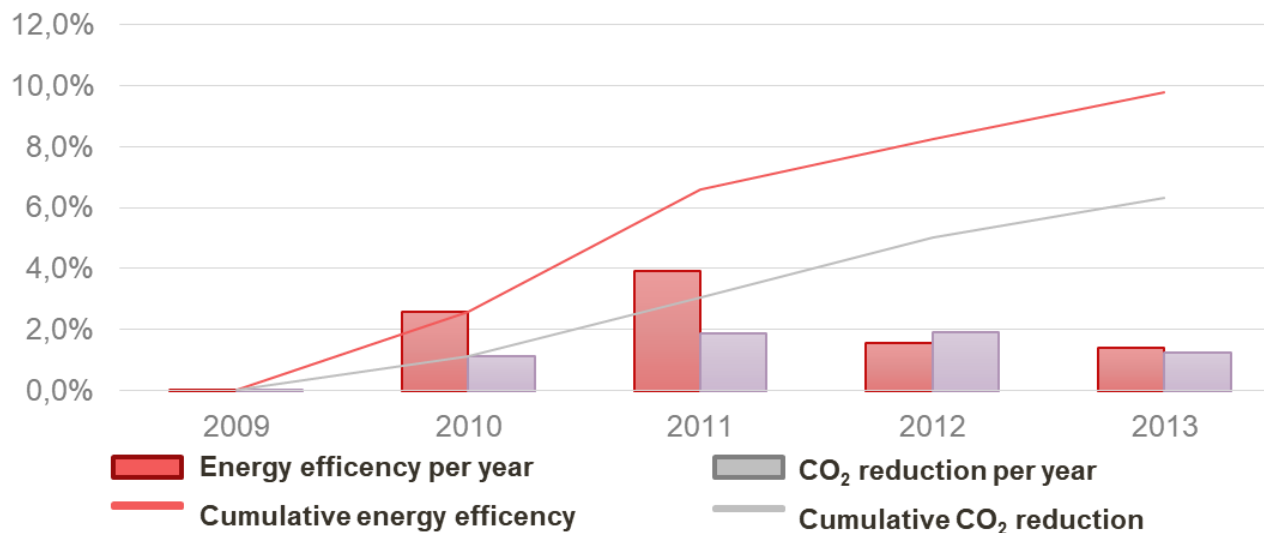
Source: EnBW Sales GmbH

Case study tire manufacturer: monitoring results (2009 – 2013)

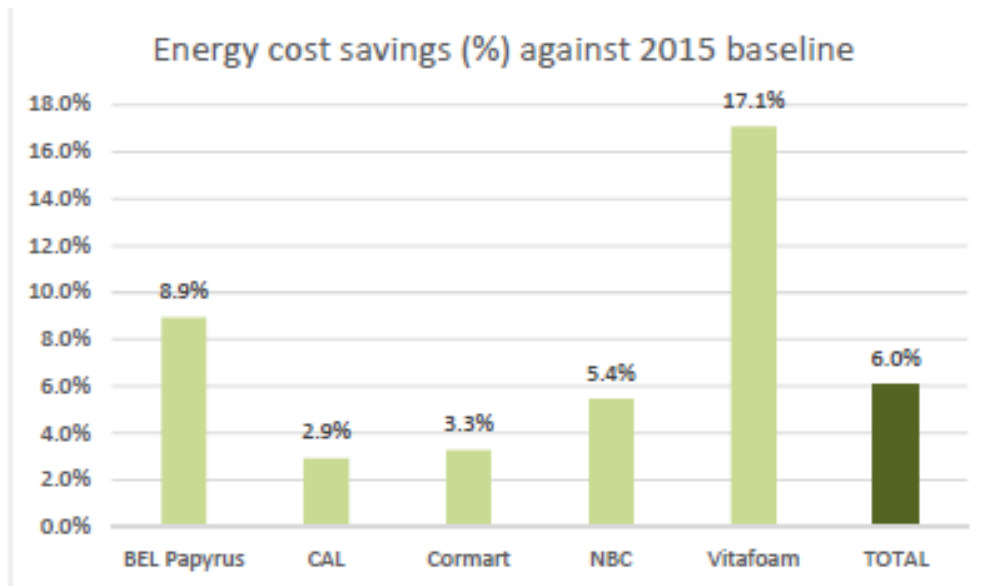


Energy & CO ₂ saved until 2013		Profitability	
▪ Electricity:	2,370 MWh/a	▪ Total investment:	940,000 EUR
▪ Natural gas:	1,770 MWh/a	▪ Savings:	490,000 EUR/a
▪ District heat:	2,890 MWh/a	▪ Payback:	1.9 years
▪ CO ₂ reduction:	1,560 t/a	▪ IRR:	52%

37 measures implemented



Overall results of the 1st Nigerian network (6/2017 – 12/2018)



24 measures implemented

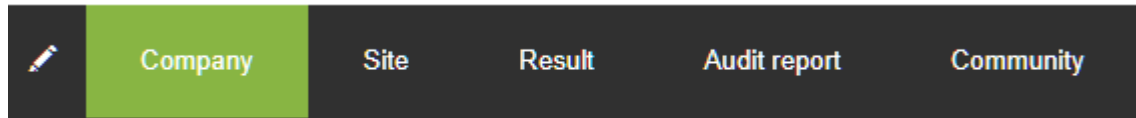
- 8 steam systems
- 8 compressed air systems
- 3 water pumps
- 2 lighting
- 3 various

- Total investment 330 million Naira
- Annual energy savings 280 million Naira/a
- Average payback period 1.2 years

Source: GIZ, NESP I



leenize: documentation of the whole network process



- Pen:** Network target setting
- Company:** Master data for companies and their sites
- Site:** Measures, energy carriers, energy breakdown ...
- Result:** Result on different levels: network, company, site
- Audit report:** Writing an audit report (in accordance with ISO 50002)
- Community:** Network communication (agenda, minutes, news ...)





Network overview – saving potentials

		Open	Projected	In progress	Finished	Rejected
€/a	<p>108.783 74.28% 146.456</p>	NaN	2.454	35.219	108.783	NaN
MWh/a	<p>284 54.6% 521</p>	NaN	14	223	284	NaN
t/a CO ₂	<p>395 88.08% 449</p>	NaN	8	45	395	NaN
MWh/a Primary energy	<p>1.011 77.22% 1.310</p>	NaN	25	274	1.011	NaN



Tracking measures

<input checked="" type="checkbox"/>	Status	ID	Net present value (€)	Internal rate of return (%)	Static payback (a)
<input checked="" type="checkbox"/>	In progress	M 01 Condensing Boiler	20.058	21,94	4,8
<input checked="" type="checkbox"/>	Open	M 02 Steam boiler	85.559	17,51	5,9
<input checked="" type="checkbox"/>	Open	M 02 Steam boiler	73.319	16,49	6,3
<input checked="" type="checkbox"/>	Open	M 03 Thermostatic valves	371	12,81	8,0
<input checked="" type="checkbox"/>	In progress	M 04 Insulation of tank	5.639	620,24	0,2
<input checked="" type="checkbox"/>	Finished	M 06 Recuperation	17.723	30,90	3,3
<input checked="" type="checkbox"/>	In progress	M 07 Insulation	19.986	96,50	1,0
<input checked="" type="checkbox"/>	Open	M 08 Heat recovery	25.190	144,29	0,7



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Q&A

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