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Importance of Train-the-Trainer Programs on Sustainable Solutions

Daniele Pagani

COP28 – Official Side Event
08.12.2023

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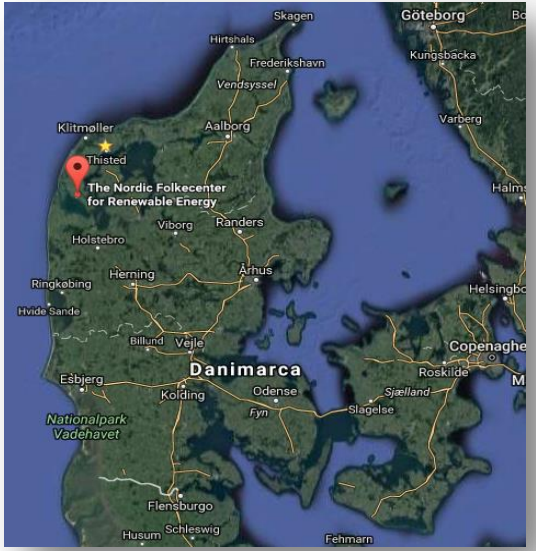
Nordic Folkecenter for Renewable Energy

- NGO founded in 1983
- Focus: Renewable Energy
- Bridge between education and industry
- Well known at international level
- Multi-cultural and multi-disciplinary environment
- Has hosted hundreds of interns, professors, researchers from different fields and from all over the world
- 4000-6000 Visitors/year



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Folkecenter's Early Activities

Technological innovation of:

- Farm biogas digesters from 50 to 1 000 m^3;
- Integrated energy systems including hydrogen and biofuels for transport;
- Excess power management (P2X);

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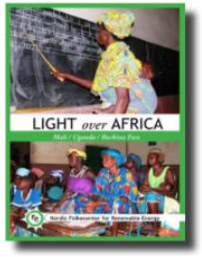
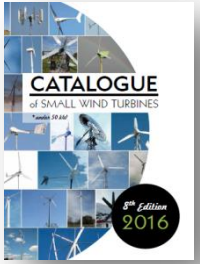
Folkecenter's Current Activities

- Collaboration with green SMEs;
- Testing of wind, solar, wave & other green technologies;
- Projects (national & international);
- Event organisation, study tours & publications;
- Education;





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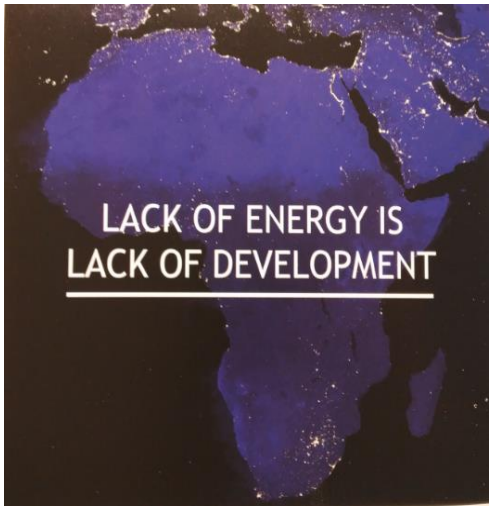
Education as the Linking Point



Country	National Electrification rate (%)	Adults Literacy rate (%)	Country	National Electrification rate (%)	Adults Literacy rate (%)
South Sudan	1	27	Angola	30	71
Liberia	2	48	Namibia	30	82
Central African Republic	3	59	Eritrea	32	73
Chad	4	39	Congo	35	79
Sierra Leone	5	48	Sudan	35	73
Democratic Republic of Congo	9	64	Gambia	35	56
Malawi	9	66	Mozambique	39	59
Burundi	10	85	Zimbabwe	40	86
Guinea	12	30	Comoros	45	78
Niger	14	36	Nigeria	45	59
Somalia	15	38	Djibouti	50	-
Madagascar	15	65	Cameroon	54	75
Uganda	15	78	Senegal	55	58
Burkina Faso	16	36	Sao Tome and Principe	59	75
Rwanda	17	70	Gabon	60	91
Guinea-Bissau	20	60	Botswana	66	87
Kenya	20	78	Equatorial Guinea	66	95
Mauritania	21	61	Ghana	72	76
Ethiopia	23	49	South Africa	85	94
Tanzania	24	71	Cabo Verde	94	87
Côte d'Ivoire	26	60	Seychelles	97	92
Zambia	26	63	Morocco	99	68
Togo	27	66	Algeria	99	80
Swaziland	27	89	Egypt	100	74
Mali	27	39	Libya	100	91
Lesotho	28	79	Mauritius	100	90
Benin	28	38	Tunisia	100	83

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Light over Africa: Bringing Light to 10.000 schools!

Drawings by Anna Krenz

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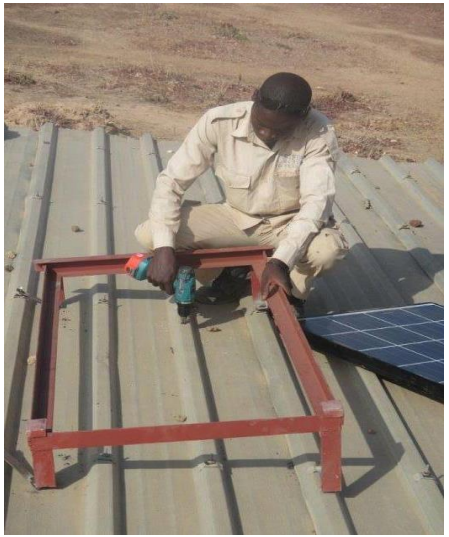
Light over Africa: Bringing Light to 10.000 schools!



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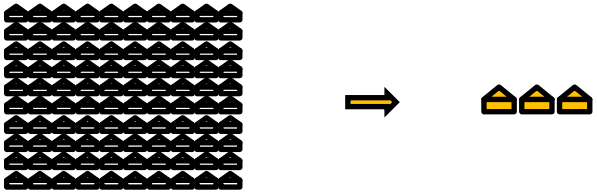
Many Good Hearts...



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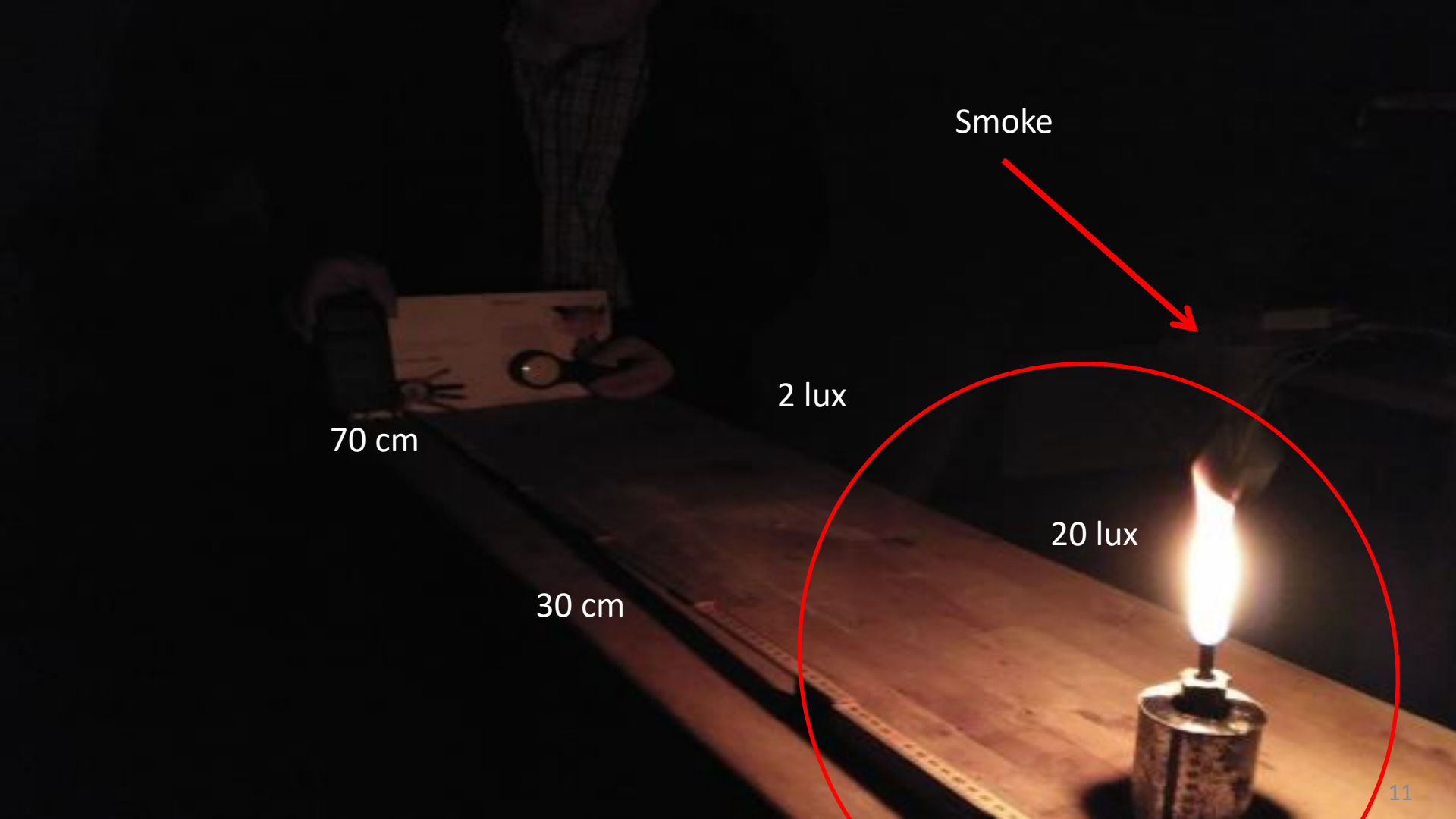
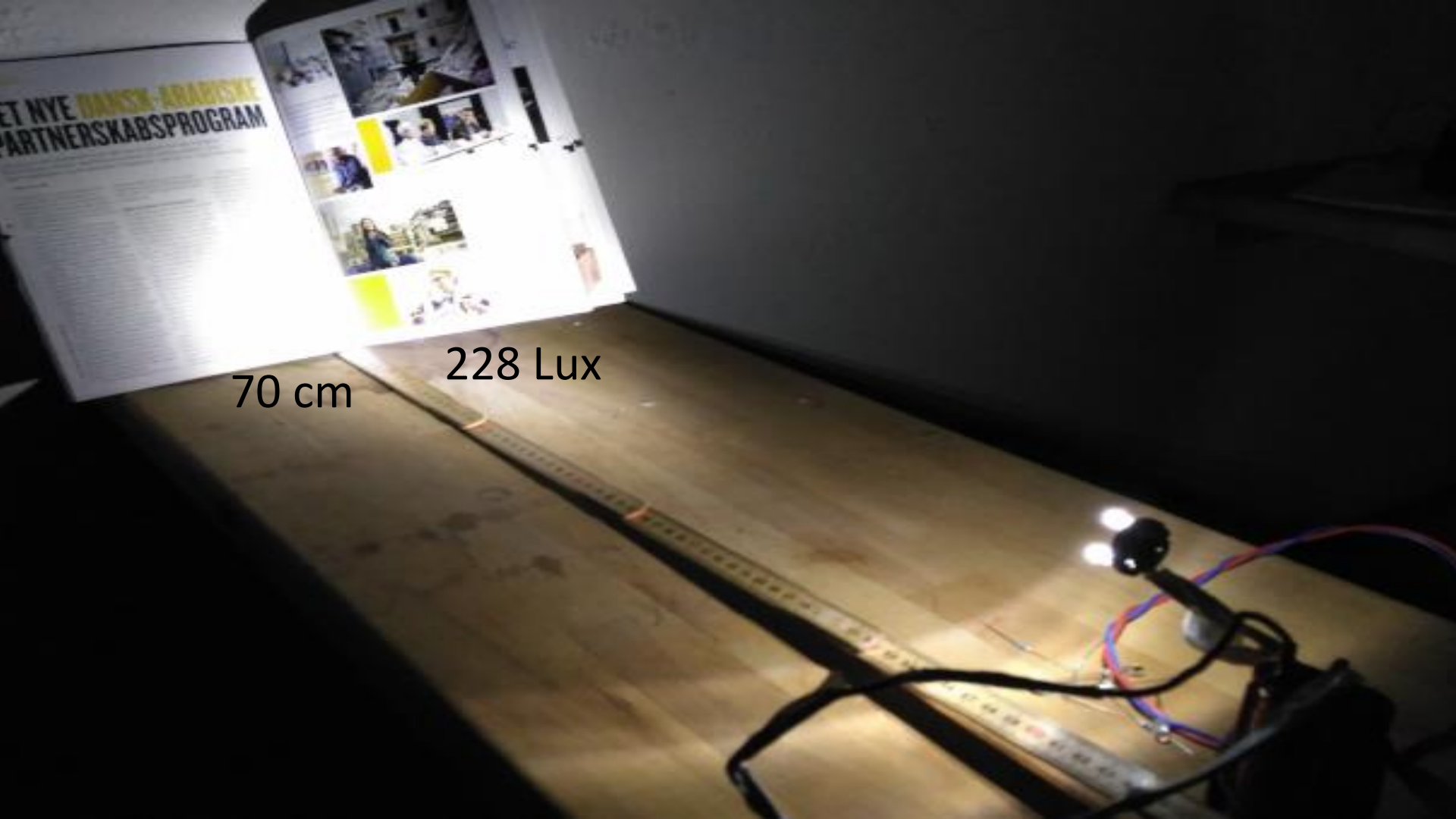
Light over Africa: Bringing Light to 10.000 schools!

- 1 x 100 W PV panel;
- 1 x charge controller;
- 1 x 100 Ah sealed battery;
- 10 x 10 W LED Lighting armaturers with special sockets;
- 1 x on/off switch in each classroom (2 classrooms)
- Men hours to train the people

1.000 €


Smoke
2 lux
70 cm
20 lux
30 cm


ET NYE
PARTNERSKABSPROGRAM
70 cm
228 Lux

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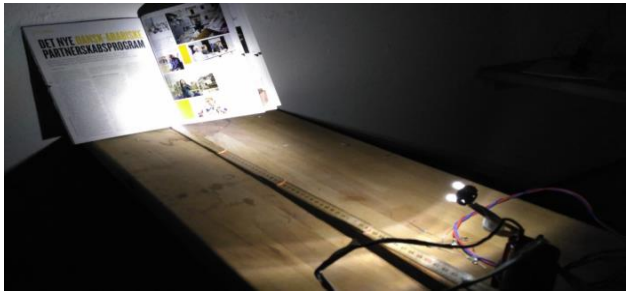
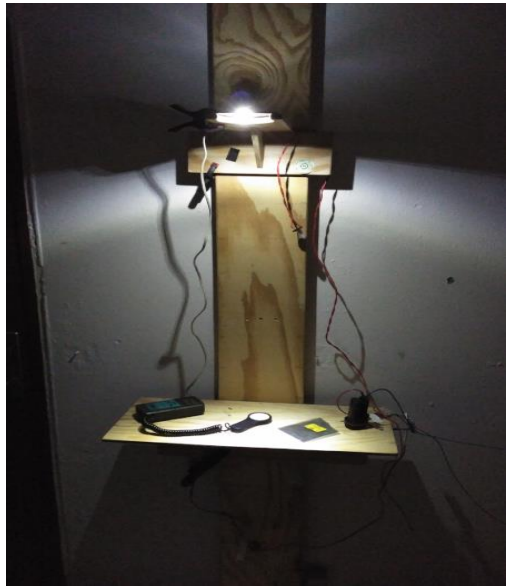
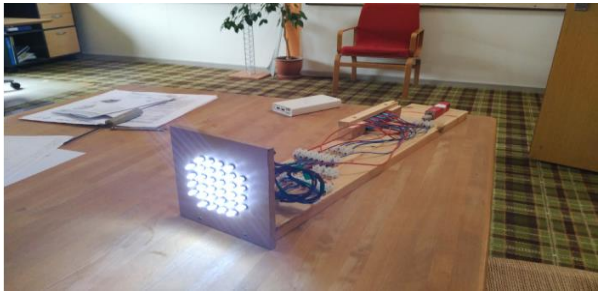
More Light! Making Illumination Better & Cheaper!







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More Light! Making Illumination Better & Cheaper!

2200 mAh = 4 hours of light!

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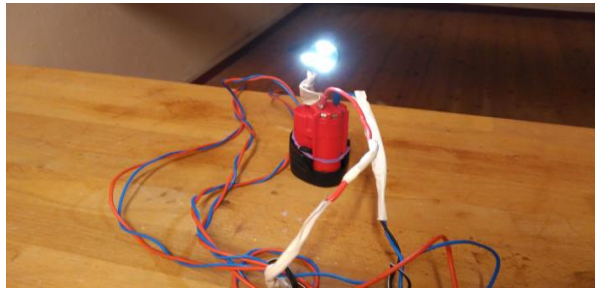
More Light! Making Illumination Better & Cheaper!

10 W



0,36 W

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More Light! Making Illumination Better & Cheaper!

100 W

10 W

...and more!

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Light over Africa: Bringing Light to 10.000 schools!

- ~~1 x 100 W PV panel~~; => 10 W (approx. 10-20 €)
- ~~1 x charge controller;~~
- ~~1 x 100 Ah sealed battery~~; => Powerbank(s) (1-50 €?)
- ~~10 x 10 W LED Lighting armaturers with special sockets;~~ => 72 diodes + cables + resistors (0,01 €/diode => approx. 20-50 €?)
- 1 x on/off switch in each classroom (2 classrooms)
- Men hours to train the people

200€

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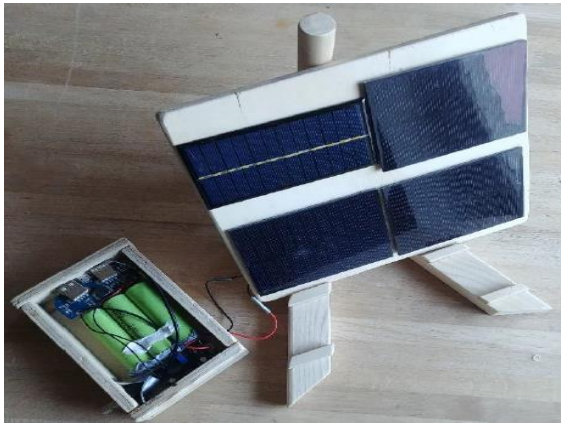
Produce your own Energy - Alternatives



DIY Solar Power-bank

Static bike for charging power banks

DIY wind turbine


Problem solved!

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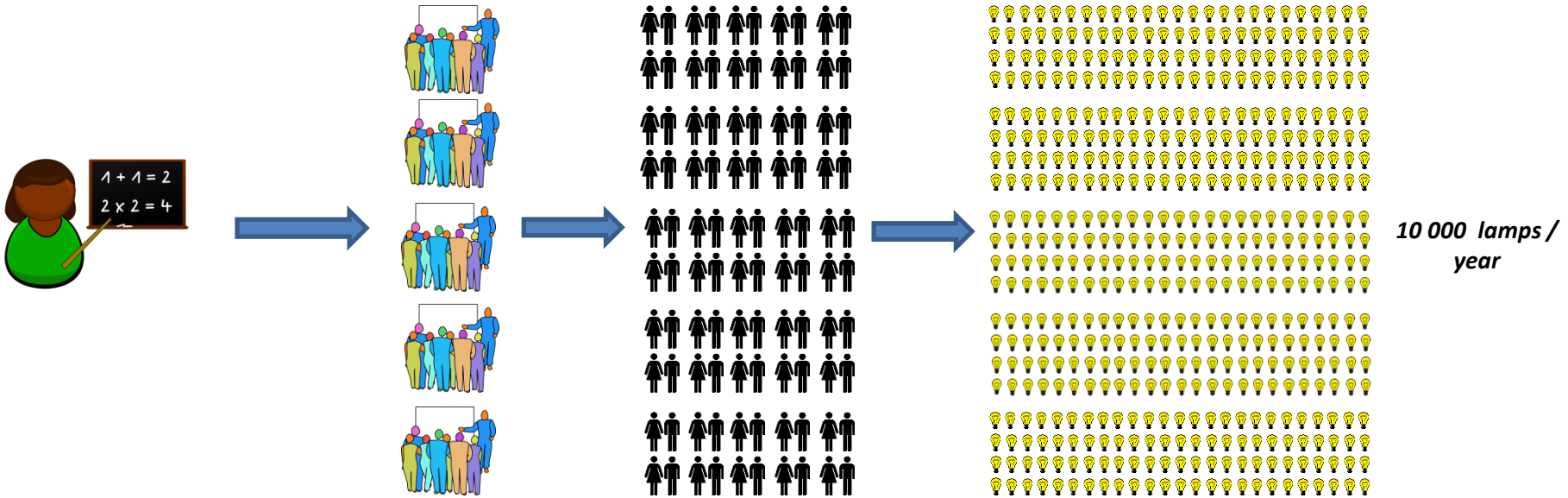
Train-the-trainer: “Small” effort, Huge Impact



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Train-the-trainer: “Small” effort, Huge Impact

Trainer	Workshops/ year	People/ Workshop	Lamps/ person/ year	Tot people trained/ year	Tot lamps/ year	Years to cover all villages	Villages in Uganda
1	5	20	100	100	10,000	582	58,197
1	12	20	100	240	24,000	242	
10	12	20	100	2400	240,000	24	
10	24	40	100	9600	960,000	6	
20	24	40	100	19200	1,920,000	3	

20 trainers can train 1 person in every village in Uganda in only 3 years!

If 1 trainer forms other trainers (5% of the yearly participants), it will take less than 5 years to reach all the villages!

Year	Trainers	Workshops	People / workshop	Tot. Trained people for that year	Newly formed local trainers (5%)	Tot trainers for that year
0	1	0	0	0	0	0
1	1	5	20	100	5	6
2	6	5	20	600	30	36
3	36	5	20	3600	180	216
4	216	5	20	21600	1080	1296
5	1296	5	20	129600	6480	7776

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Train-the-trainer: On the Way!

[Tonny Lumu Junior, Uganda, August 2021]

[Misagga Benedit Clive Zeus, Uganda, August 2023]

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Train-the-trainer: On the Way!







Name:
Atego Seed Secondary School

Sub-county:
Kucwiny

District:
Nebbi

Installed:
October 2023

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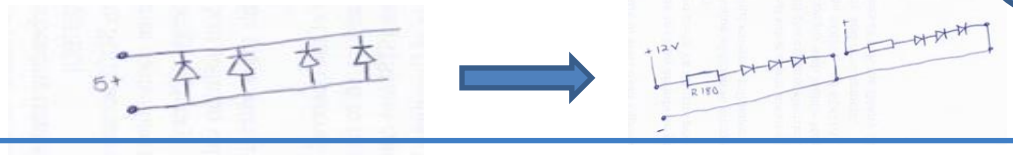
Train-the-trainer: On the Way!

*"During this installation, **we trained one TOT*** in the installation of the whole system"*

"The cost of the **LEDs procured locally are quiet expensive** making the technology expensive as well but the **solution** is to **order LED packs of 1000 from China** which is very affordable and will make the technology much more cheap"

"**The resistors heat up and fail** after a certain period of time" […]

"**This is the configuration we adopted** which provides more light, the resistors an LED don't heat up"



*Trainer of trainers

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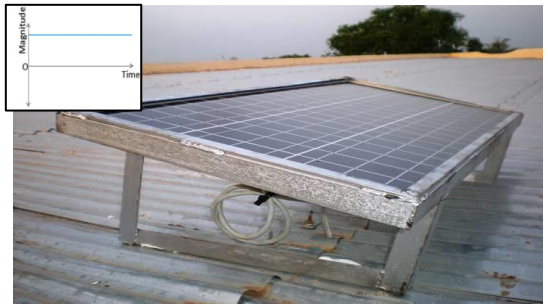
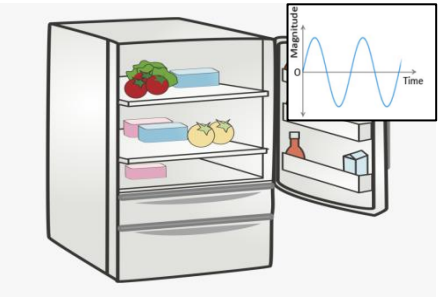
Sun Generator: Produce & Use. Directly.

National Electrification rate

Country	National Electrification rate (%)	Adults Literacy rate (%)
South Sudan	1	27
Liberia	2	48
Central African Republic	3	59
Chad	4	39
Sierra Leone	5	48
Democratic Republic of Congo	9	64
Malawi	9	66
Burundi	10	85
Guinea	12	30
Niger	14	36
Somalia	15	38



Inverter



Sensible to heat!

Not available

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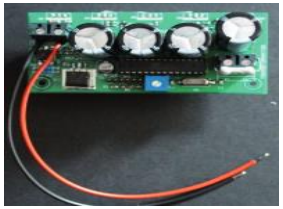
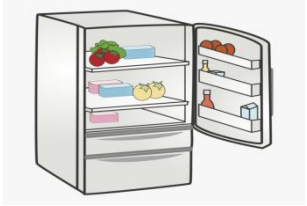
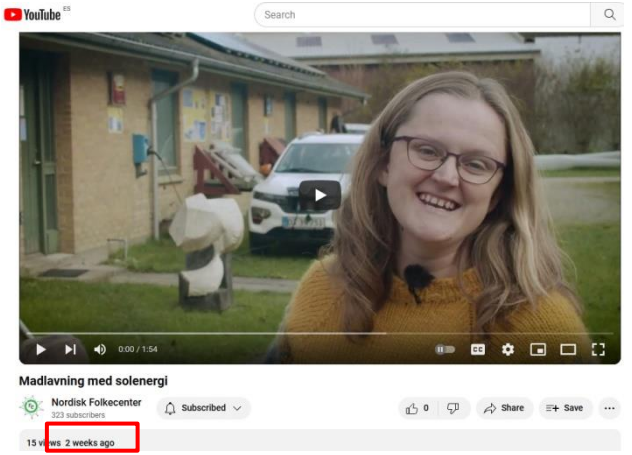
Sun Generator: Produce & Use. Directly.








The Sun Generator: Produce & Use. Directly.

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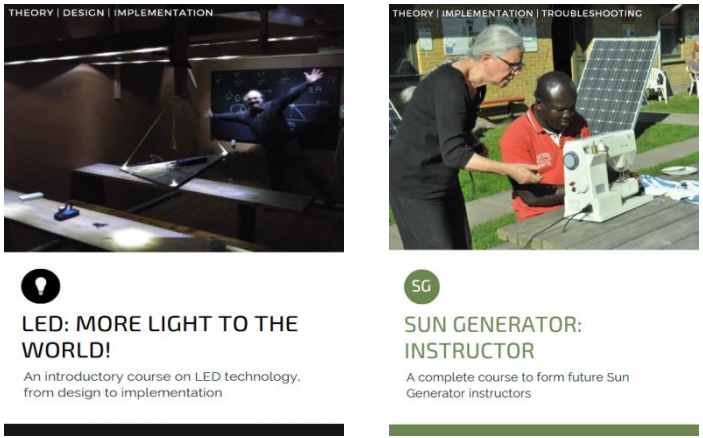
Train-the-trainer Opportunities at Folkecenter



DATES TO BE DEFINED!

www.folkecenterevents.net

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The Trainee Program: Changing the World Trainee by Trainee









Daniele Pagani
dp@folkecenter.dk

Thanks for your attention!

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