Adriano Grilli
Lightdesigner for Filmshooting
Master for event technik

Guidelines

Goal: Optimizing the energy consumption on shooting and shows

Approach: Not looking for the **right** solution, but for the **properly** one.

State of the art:

/ LEDs are very often the real eco-friendly lighting solution: not always.

/ Batterie-systems are often a very good power supply option, not always.

LED-World in one (maybe two) minute(s)

Light-**e**mitting **d**iode

excellent ratio light/current („Lumen/Watt“)

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Ingredients: basically, Gallium compounds
(e.g. with aluminium, zinc, phosphorus)

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Bottom line: the lamp needs a suitable cooling system

Tungsten vs **Metal-halide** („HMI“) vs **LED**

Nature of the Tungsten

(using heat)

=

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Nature of the gas discharge

(using electric arcs)

=

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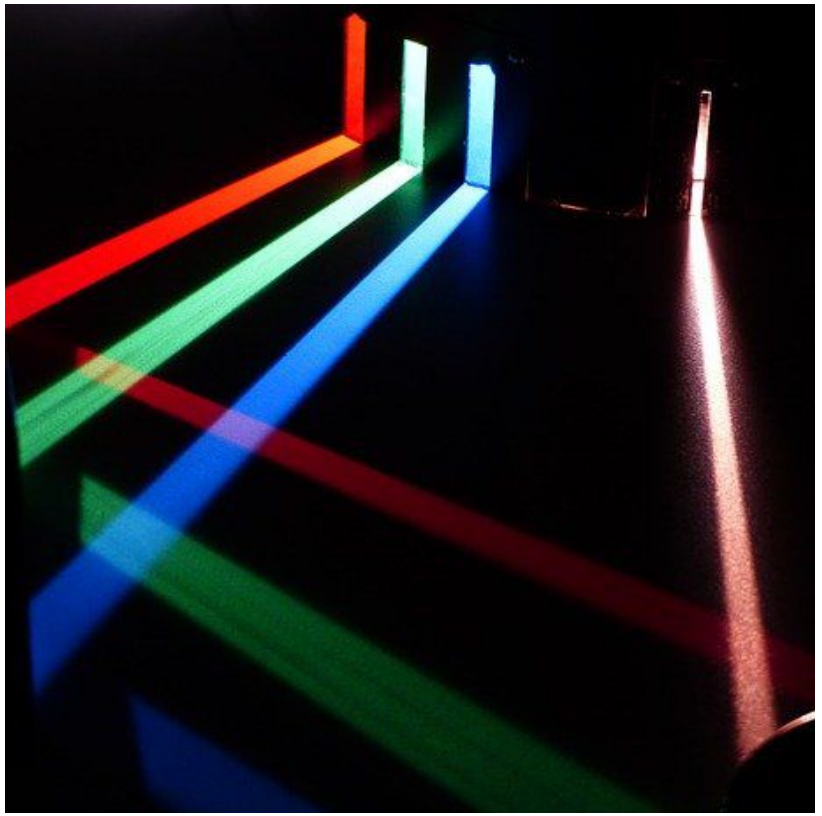
Nature of the LED (RGBW)

(converting electrical in electromagnetical energy)



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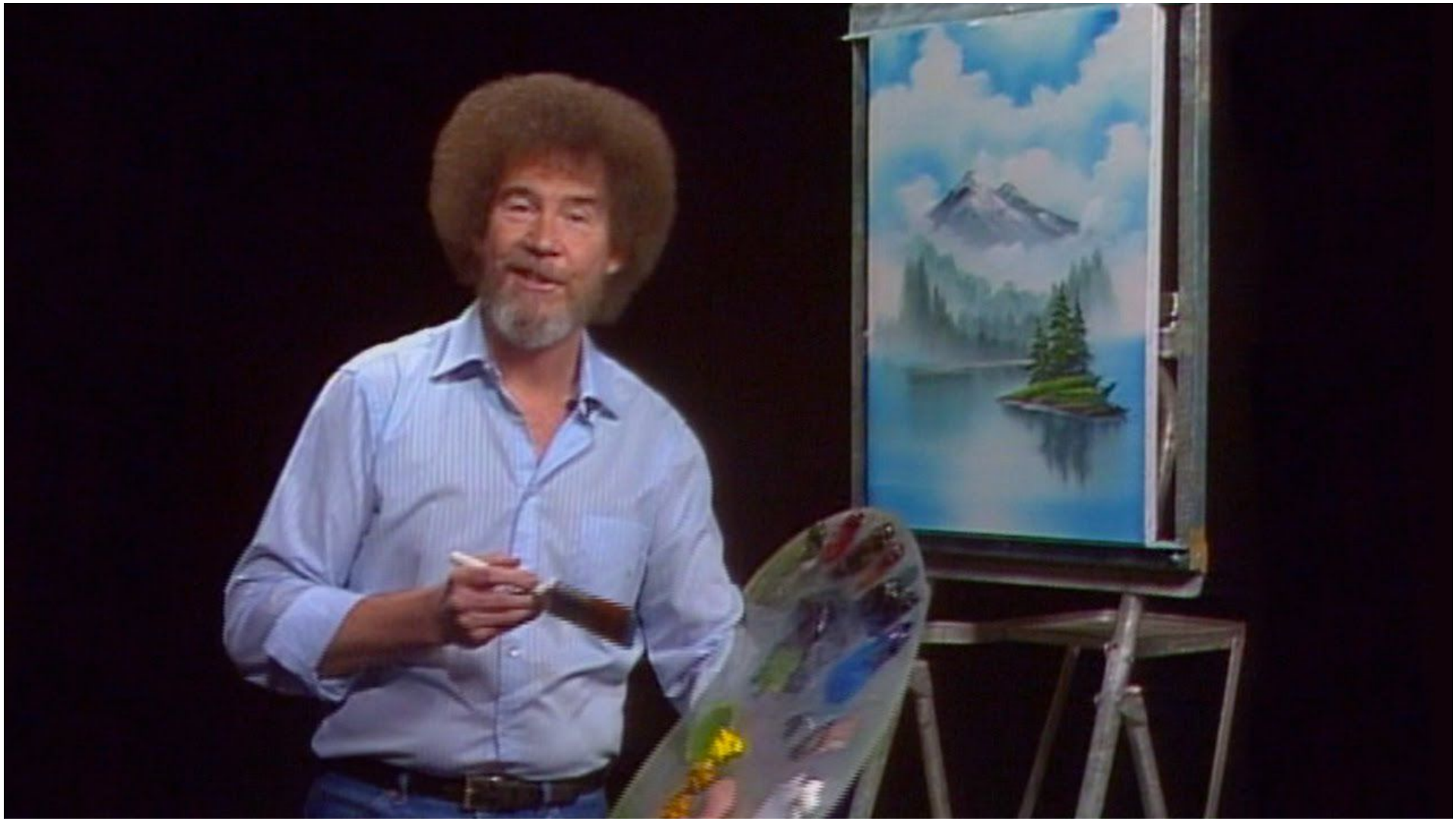
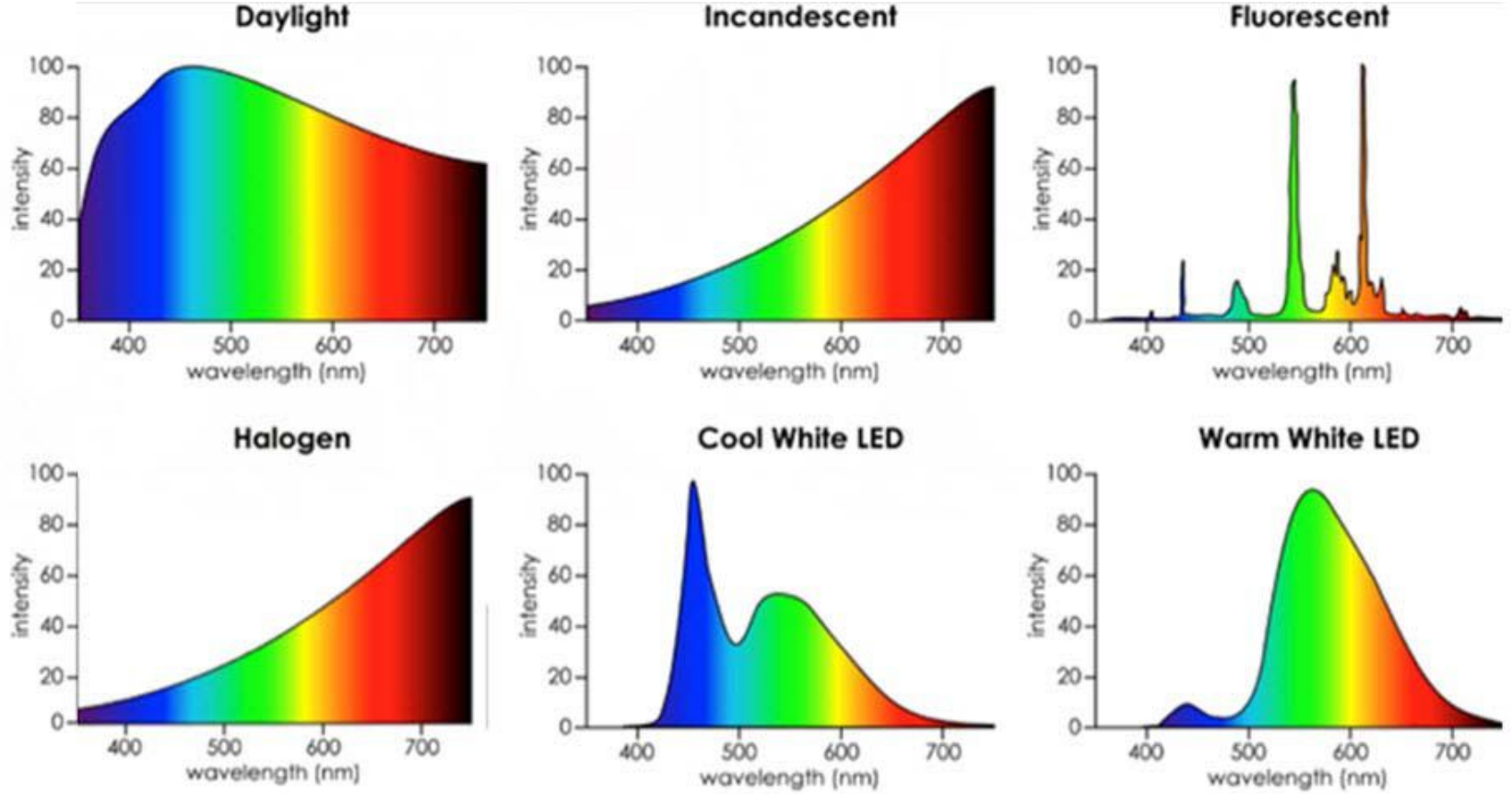
oder

A touch of colour(temperature)

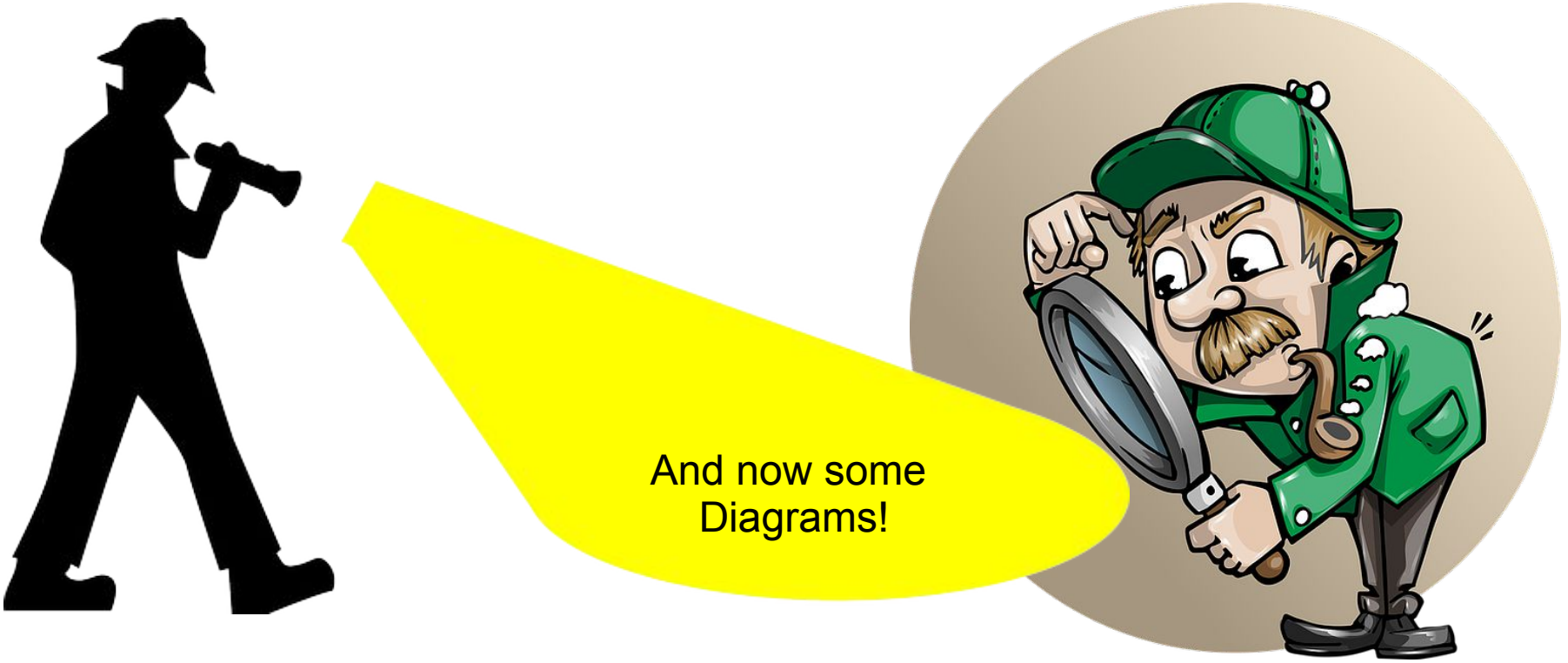


Typical spectrum



Source: Technical University of Braunschweig

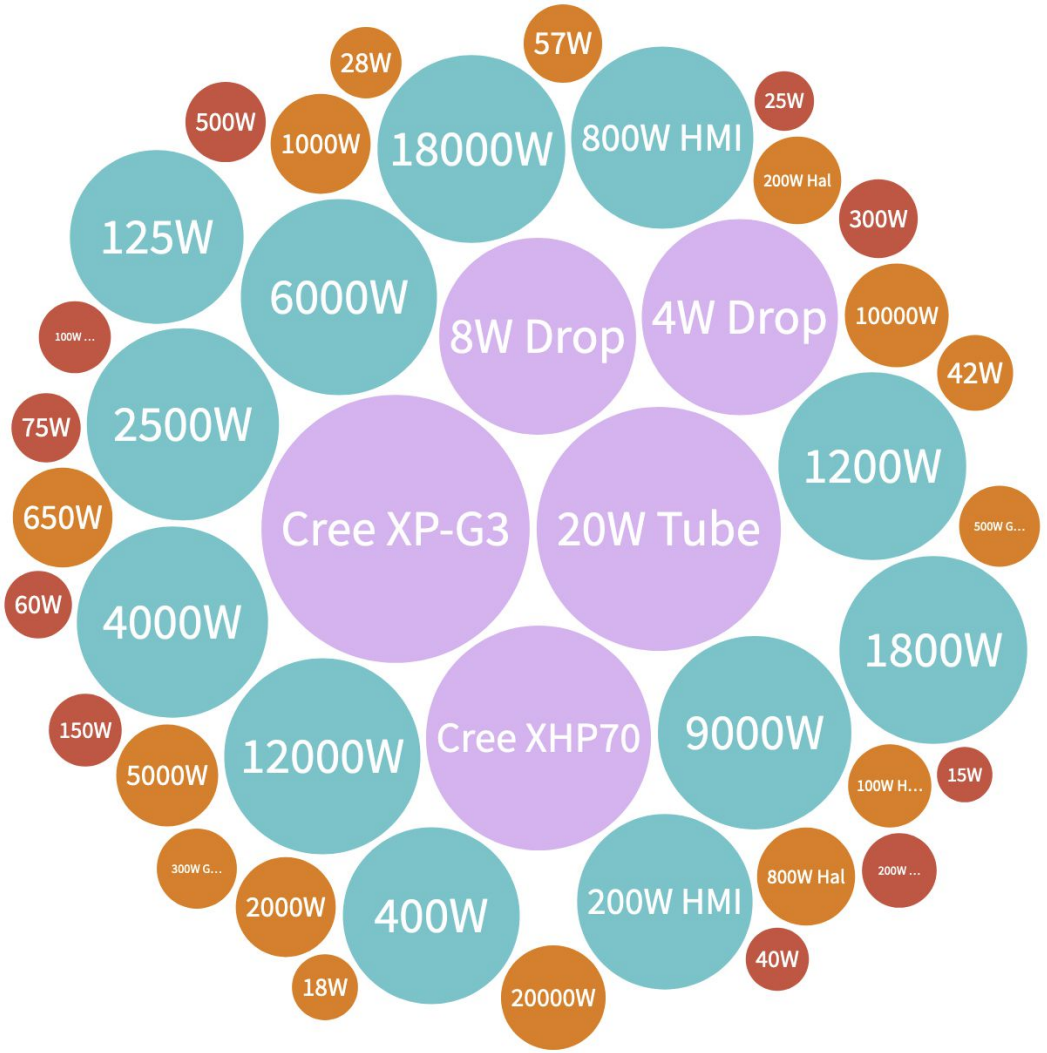
Comparing and investigating deeper



Tungsten vs **Metal-halide** („HMI“) vs **LED**

Data

	A	B	C	D	E	F	G	H
1	Leuchtmittel	Bauart	Kategorie	Lumen	Watt	Sockel	Bauform	Lumen/Watt
27	125W	HMI / MSR	Tageslicht	9800	125	GZX9.5	Brenner	78.4
28	200W HMI	HMI / MSR	Tageslicht	16000	200	GZY9.5	Brenner	80
29	400W	HMI / MSR	Tageslicht	32500	400	GZZ9.5	Brenner	81.25
30	800W HMI	HMI / MSR	Tageslicht	69000	800	G22	Brenner	86.25
31	1200W	HMI / MSR	Tageslicht	110000	1200	G38	Brenner	91.667
32	1800W	HMI / MSR	Tageslicht	165000	1800	G38	Brenner	91.667
33	2500W	HMI / MSR	Tageslicht	240000	2500	G38	Brenner	96
34	4000W	HMI / MSR	Tageslicht	380000	4000	GX38	Brenner	95
35	6000W	HMI / MSR	Tageslicht	600000	6000	GX38	Brenner	100
36	9000W	HMI / MSR	Tageslicht	875000	9000	GX38	Brenner	97.22
37	12000W	HMI / MSR	Tageslicht	1200000	12000	GY38	Brenner	100
38	18000W	HMI / MSR	Tageslicht	1650000	18000	G51	Brenner	91.667
39	20W Tube	LED T8 Tube 150cm	LED	3100	20	G13	Röhre	155
40	4W Birne	Glühbirne klar	LED	400	4	E27	Bulb	100
41	8W Birne	Glühbirne klar	LED	806	8	E27	Bulb	100.75
42	Cree XP-G3	SMD-LED	LED	187	1	Platine	Modul	187



Conclusion #1 (about lighting)

Consider the **power rating** of your tools

as well as

the **light beam**, the **color rendition** and the **handling**

you need.


Now, about power supply...

Power Supply

1) Power grid

2) Site power box

3) Film generator

4) Power inverter and battery-based power sources

If generator, then:

Calculation of the required power demand and then,

- how big?
- how loud? (sound recordings; residential areas; night shoots).
- how often?
- how many?
- how green?

If generator, then:

Calculation of the required power demand and then,

/ as big as needed,

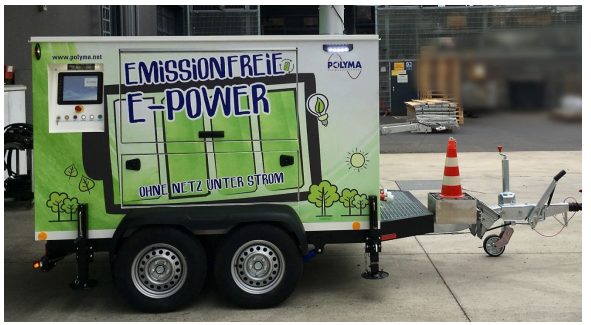
/ so silent, little and rarely as possible.

Classic diesel generator

Some alternatives nowaday

- Littler gens

- Full-battery-powered power supply



- Hybrid gens (batterypack + range extender)

The dark side of the batteries

A quantum of chemistry

Type of construction

The electrode materials determine the nominal voltage of the cell,

the quantity of materials determines the energy contained.

Naming according to materials used, including:

Lead-	(Pb)	→ Automotive
Silver-zinc	(AgZn)	
Nickel-cadmium	(NiCd)	→ banned in Germany since 2009.
Nickel-metal hydride	(NiMH)	→ small charges, ex: AA and AAA
Lithium iron phosphate	(LiFePo)	
Lithium polymer	(LiPo)	
Lithium-ion	(LiIon)	→ used with most batteries in the film industry.

Some example of battery-powered supplies

Voltstack

5600 Wh
5000W
150kg
LiIon

Instagrid

2100 Wh
3600W
19kg
LiIon

Arvey A1

480 to 1920 Wh
1000W
from 11kg
LiFePo4

Some example of battery-powered supplies

Wattsun

1400 to 7800 Wh
2000W
LiIon
17,4kg + 15,2kg/Akku

Betteries

3000 to 12000 Wh
2000 to 5000W
LiIon
(Second Life NMC-
or NCA-Akkus)
ca. 35kg pro Akku

Conclusion #2

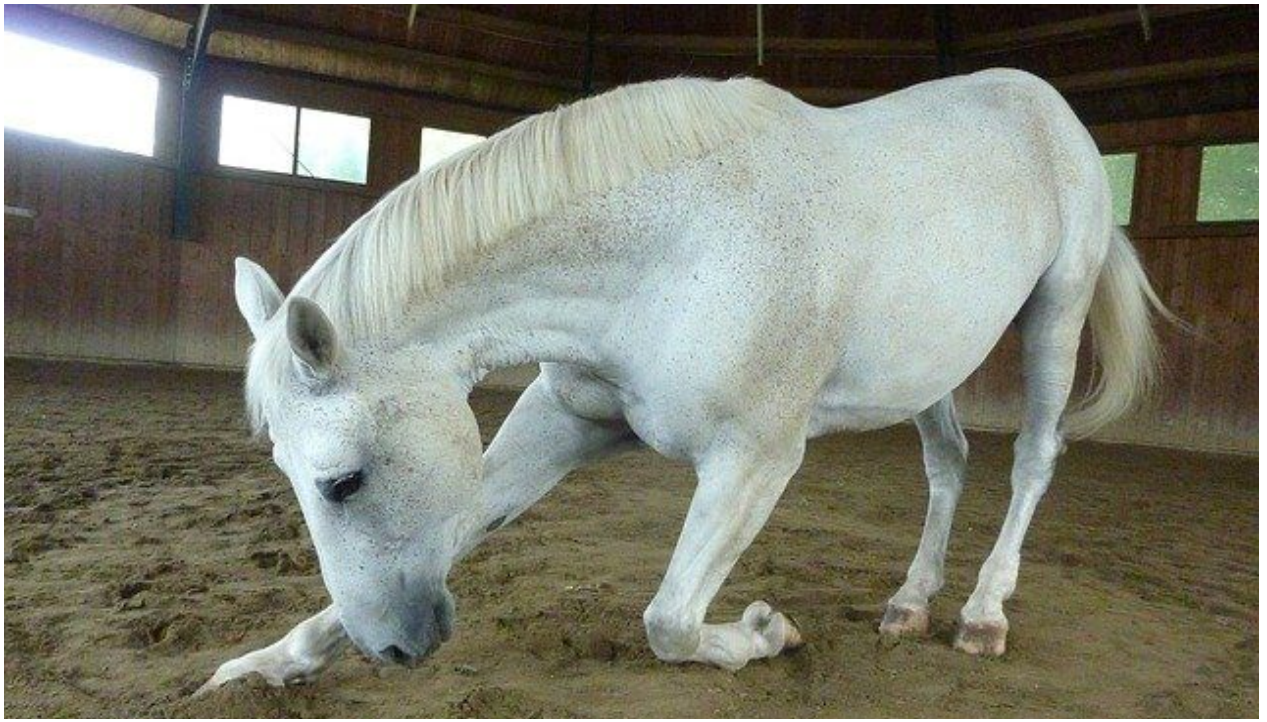
Conclusions #3

- The environmental sustainability of a film arises predominantly in the preparation phase

- The biggest factors influencing the planning are
1) script; 2) locations; 3) aesthetics.

- Environmentally sustainable work requires constant attention during filming, especially in dealing with:
/ electricity consumption
/ material consumption
/ cooperation in operation

Thank you very much!



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