

Low current series circuit with LED

-Real life performance

IESALC, St Pete Beach 2012
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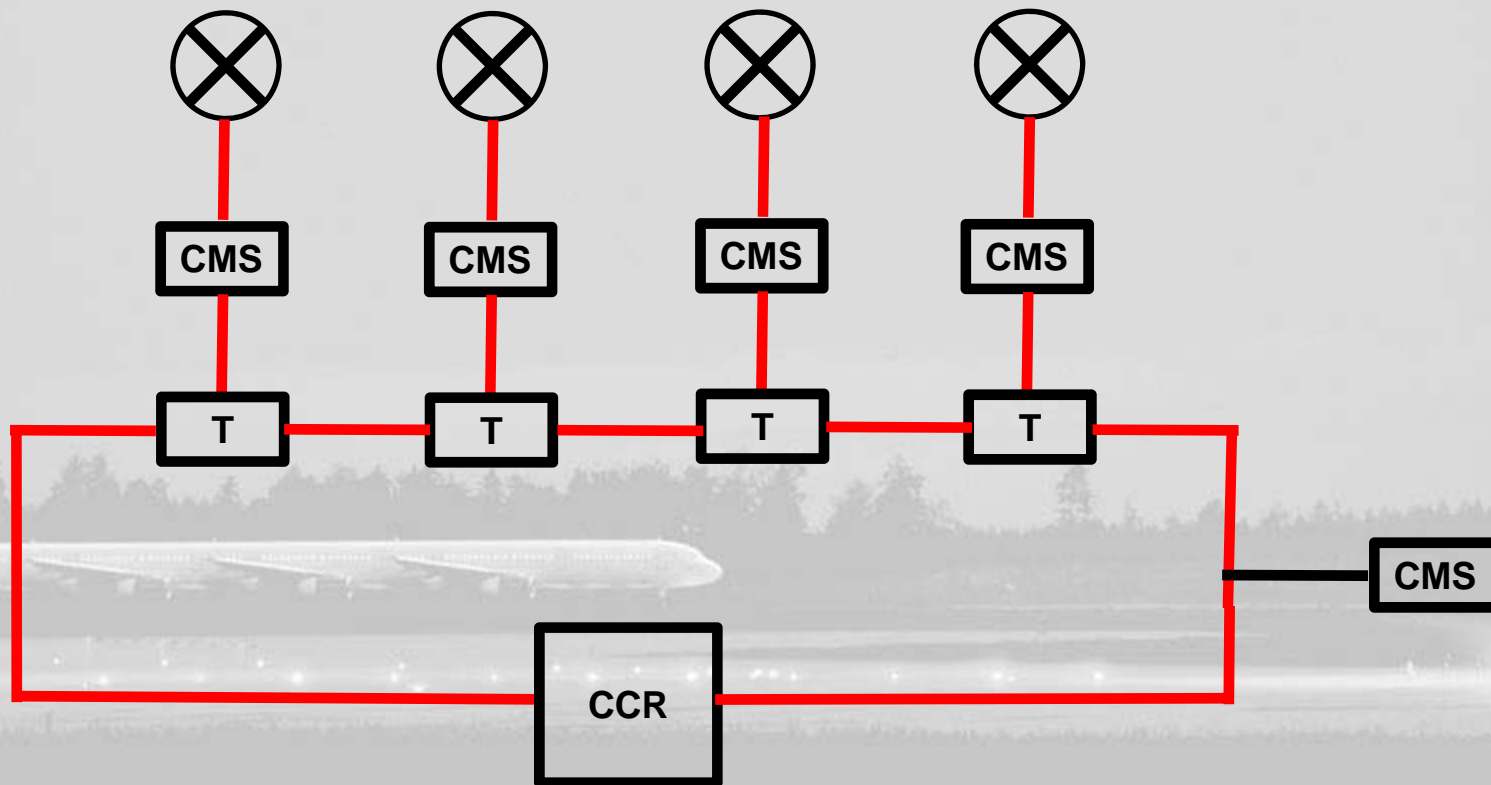
- Decrease power losses in cables

- Arlanda airport, Sweden 

- Hobart airport, Australia 

- LED
- Replace halogen with LED - good enough?
- Transitional approach
 - Save more power
 - Keep existing infrastructure
 - Low current series circuit

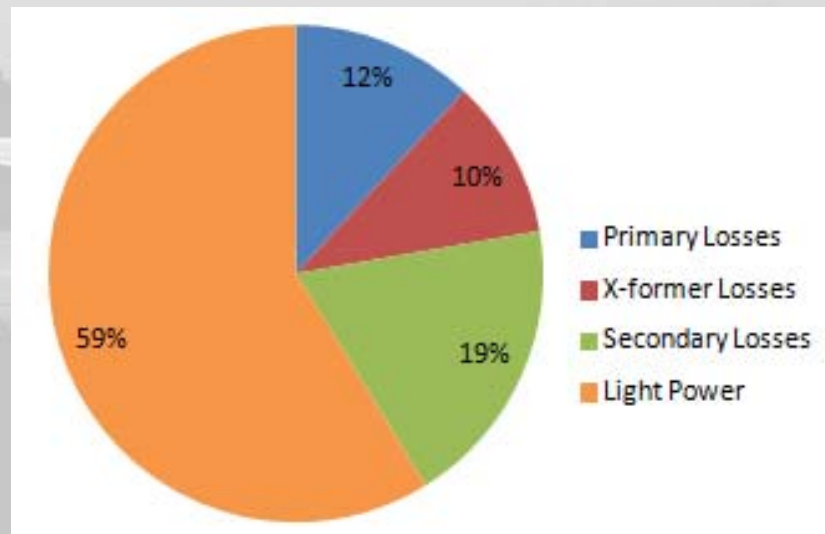
- Traditional AGL circuit (2.8-6.6A)



- Losses in cabling proportional to I^2

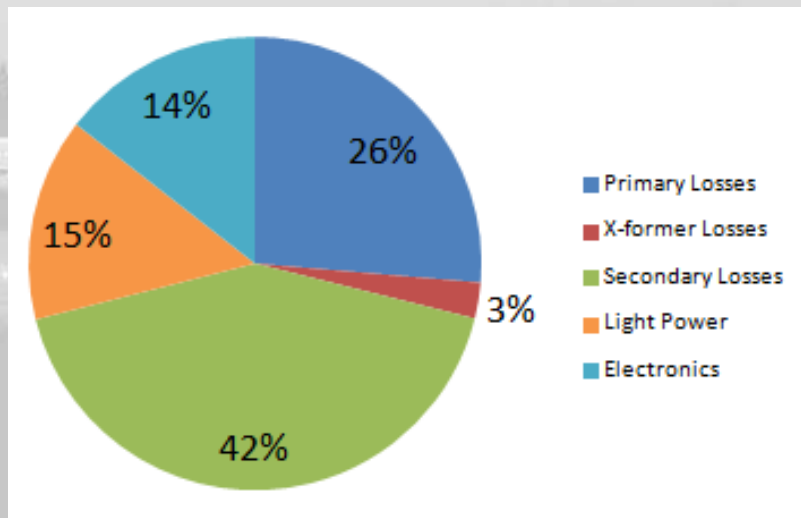
- TWY-circuit
 - 100 lights unidirectional
 - 45 W halogen
 - 7.5 km (6 mm²)
 - 40 m secondary average (4 mm²)

- Total Power
 - 7.6 kW @ 6.6 A
 - Reference level
 - Efficiency 59%



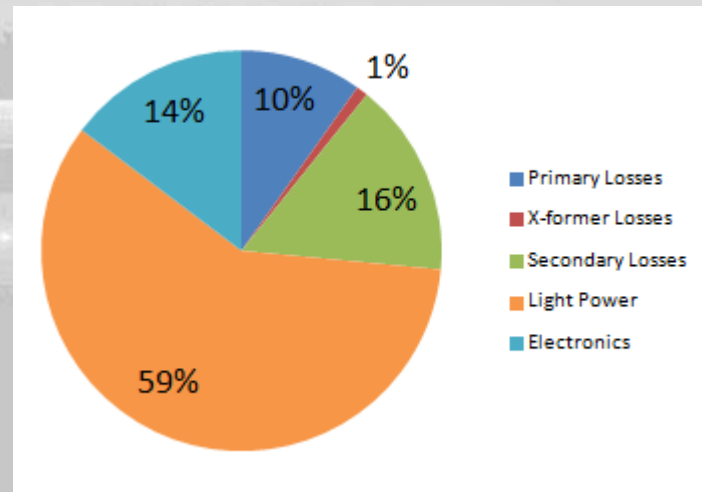
- TWY-circuit
 - 100 lights unidirectional
 - 5 W LED
 - 7.5 km (6 mm²)
 - 40 m secondary average (4 mm²)

- Total Power
 - 3.5 kW @ 6.6 A
 - -55%
 - Efficiency 15%

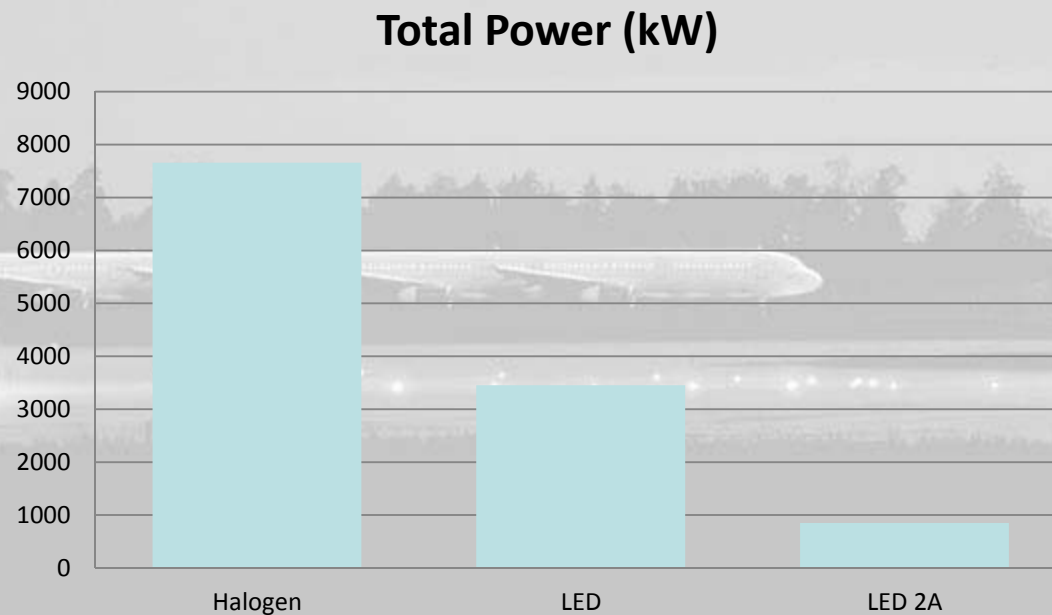


- TWY-circuit
 - 100 lights unidirectional
 - 5 W LED
 - 7.5 km (6 mm²)
 - 40 m secondary average (4 mm²)

- Total Power
 - 0.9 kW @ 2 A (100%)
 - -89%
 - Efficiency 59%



- TWY-circuit
- 100 lights unidirectional
- 7.5 km (6 mm²)
- 40 m secondary average (4 mm²)



- 3-10 % intensity most of the time
- Traditional circuit with LED
 - -55% @ 6.6A (100%)
 - -68% @ 4A (10%)
- Low current system (fixed 2A)
 - -89% @ 100%
 - -92% @ 10%

- Arlanda Airport, Stockholm, Sweden



- Total energy consumption - 25 000 residents
- -25% during the last 4 years



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- Halogen lamp fixtures (2.8-6.6A)

- Runway 1, 10 Taxiways
 - 10 pairs of runway guard Lights (100 W)
 - 10x15 Stop bar lights (45 W)
 - 3+1 interleaved circuits (up to 11 000m)

- Power consumption: 19.6 kW

- LED lamp fixtures (2.8-6.6A)
- Runway 1, 10 Taxiways
 - 10 pairs of runway Guard Lights (51 W)
 - 10x15 Stopbar lights (10 W)
 - 3 Interleaved circuits (up to 11 000m)
- Power consumption: 11.9 kW

- LED lamp fixtures (2A)
- Runway 1, 10 Taxiways
 - 10 pairs of runway Guard Lights (48 W)
 - 10x15 Stopbar lights (10 W)
 - 3 Interleaved circuits (up to 11 000m)
- Power consumption: 3.0 kW

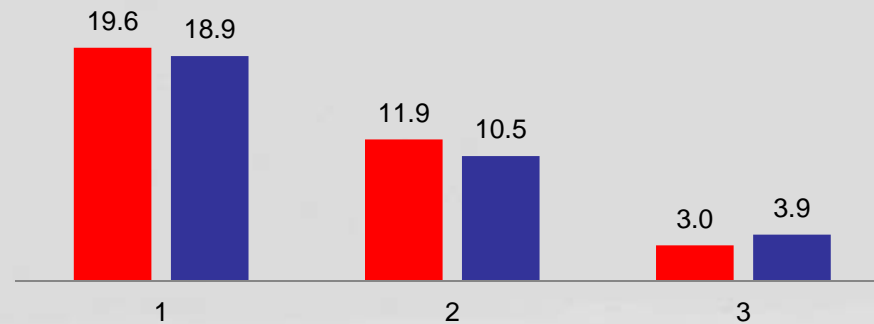


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Stop bar & RWY guard lights (kW)

■ Measured ■ Calculated



- Halogen to LED @ 6.6 A -39%
- Halogen to LED @ 100% (2A) -85%
- Cost savings 14 500 EUR/Year

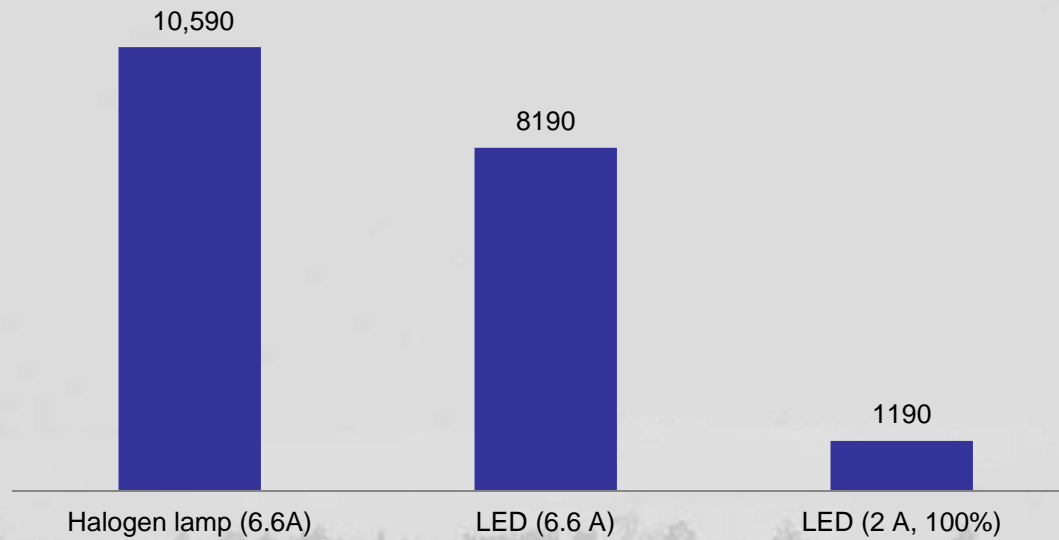
- Energy perspective Arlanda Airport
(3 RWY – 13 000+ Lights)
- Airfield lighting 2.429.376 kWh /year (2008)
- With LED (2A) 267.231 kW /year
- Savings 216 000 EUR /year

■ Hobart Airport, Australia



- LED Taxiway centre line light
- LED Approach light

TWY C & D @ 6.6 A (kW)



- Halogen to LED -23%
- Halogen to LED (2A) -89%



- 120 Approach Lights
- Halogen to LED -37%
- Halogen to LED (2A) -62%

■ Conclusions

■ Theory

- Halogen to LED -55%
- Halogen to LED (2A) -89%

■ Real life performance

- Halogen to LED 21%-39%
- Halogen to LED (2A) 85%-89%

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