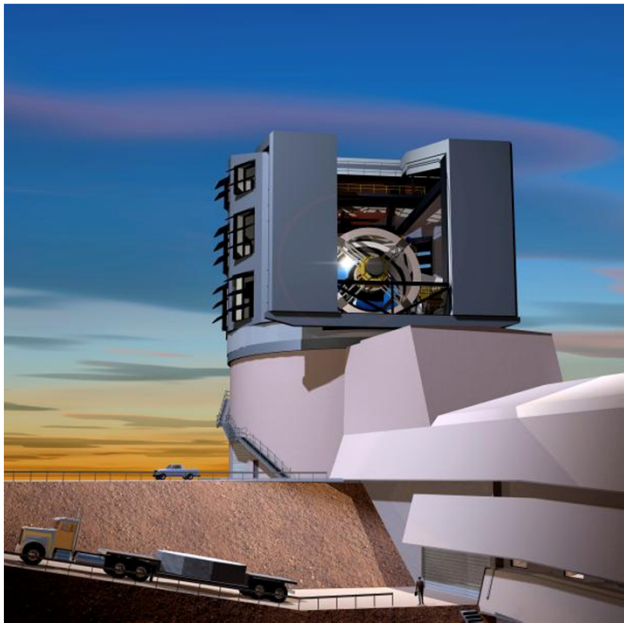
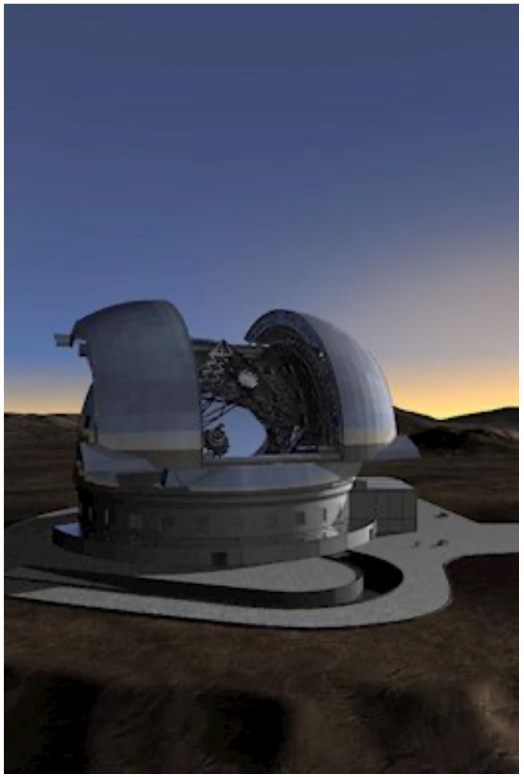
Light Pollution: The Chilean Norm

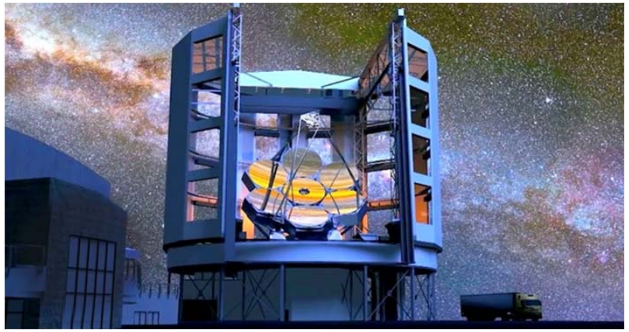
Pedro Sanhueza, Office for the Protection of the Quality of the Night Sky of Northern Chile

Main observatories in Northern Chile

The new generation

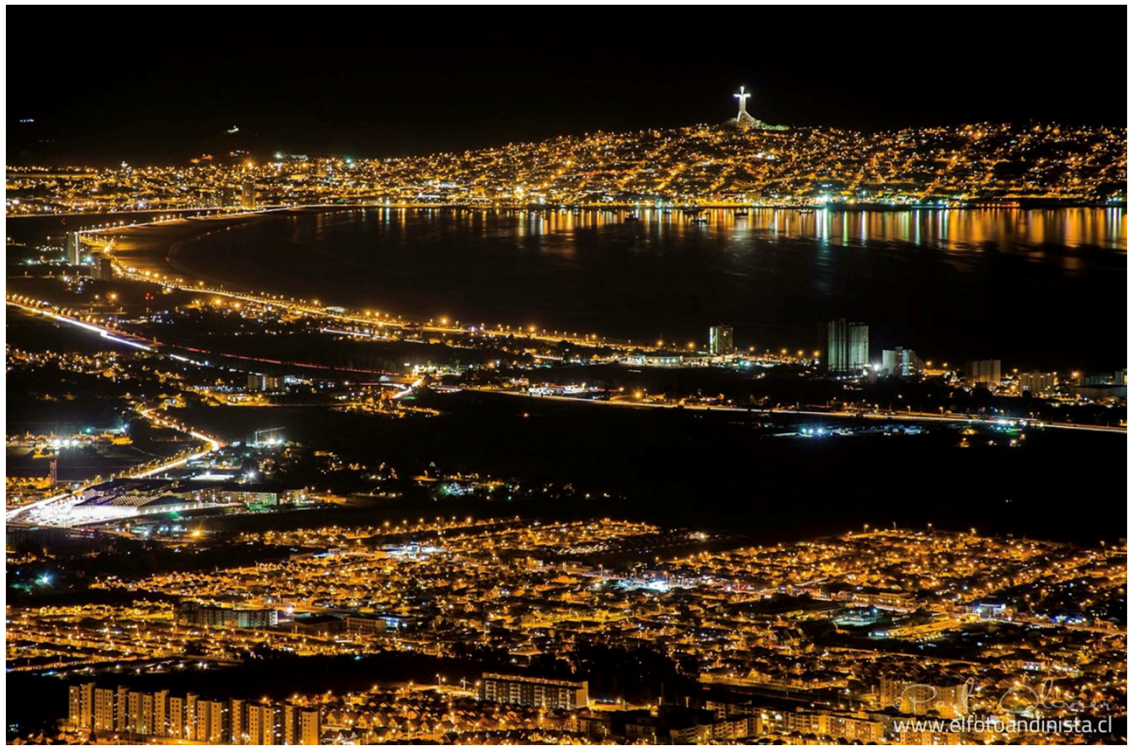






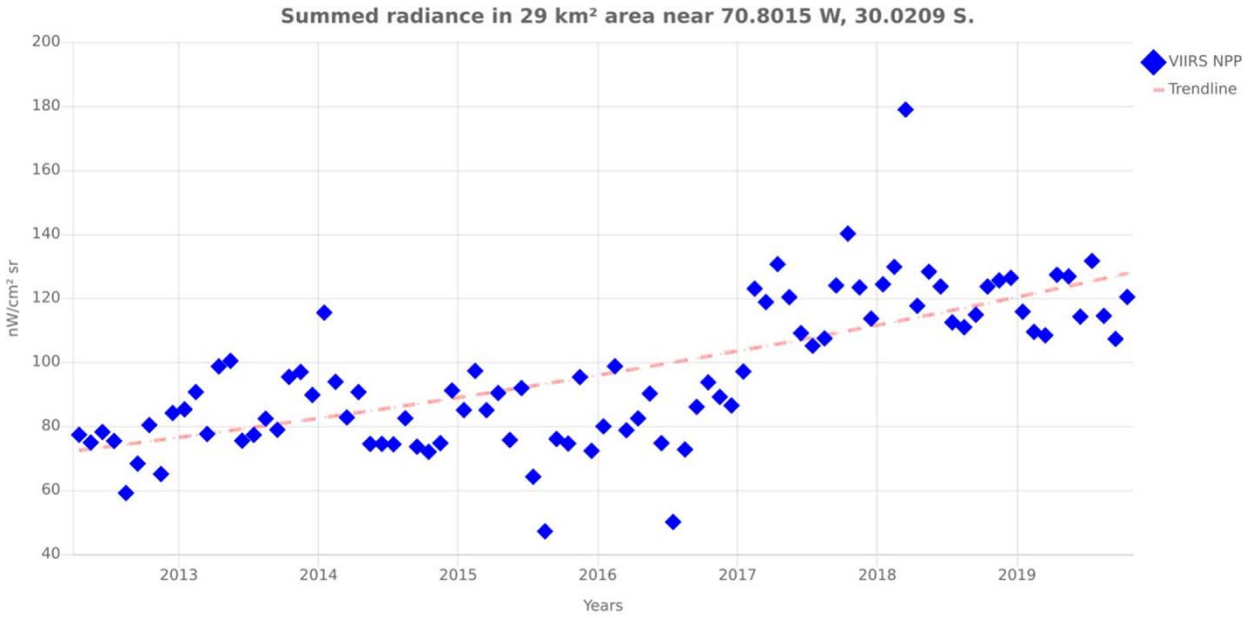
ALAN at La Serena - Coquimbo

Blue light appearing in the coastal zone, commercial districts and sport fields

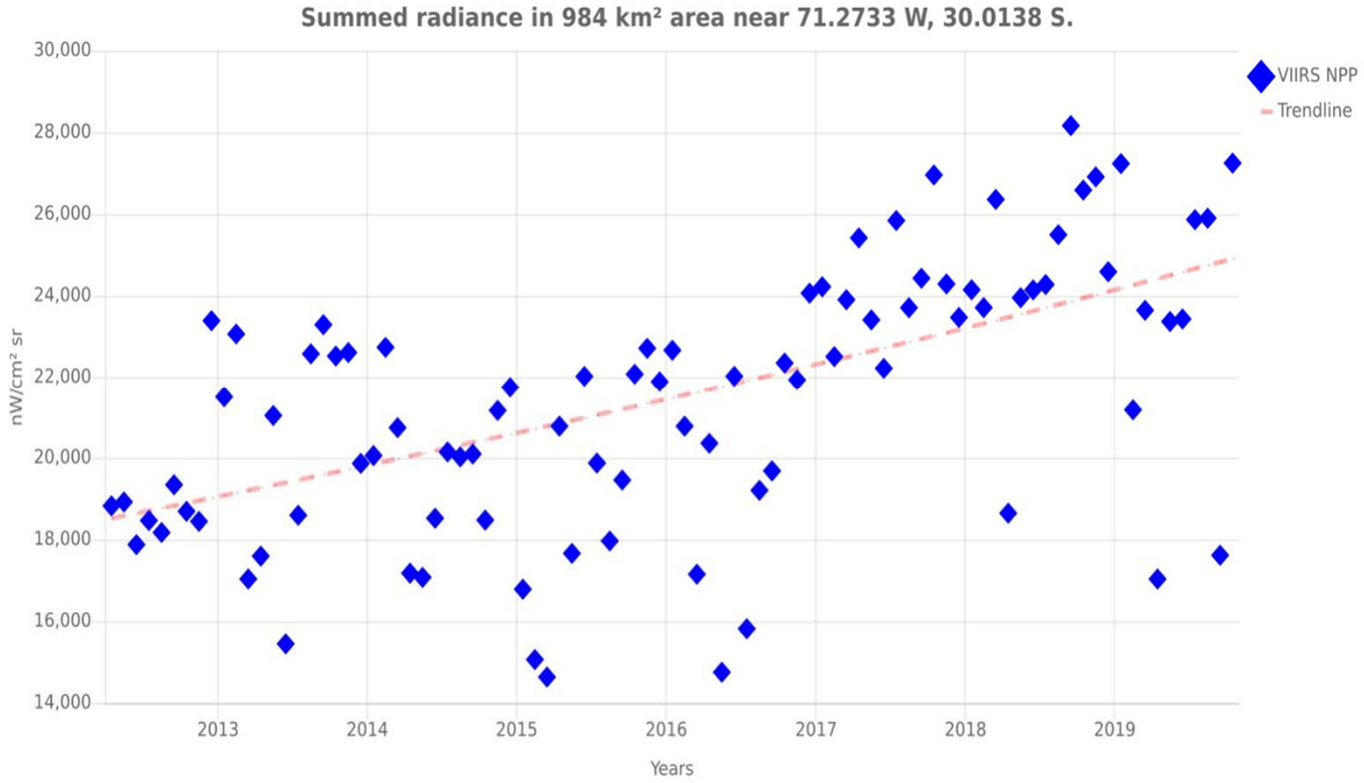


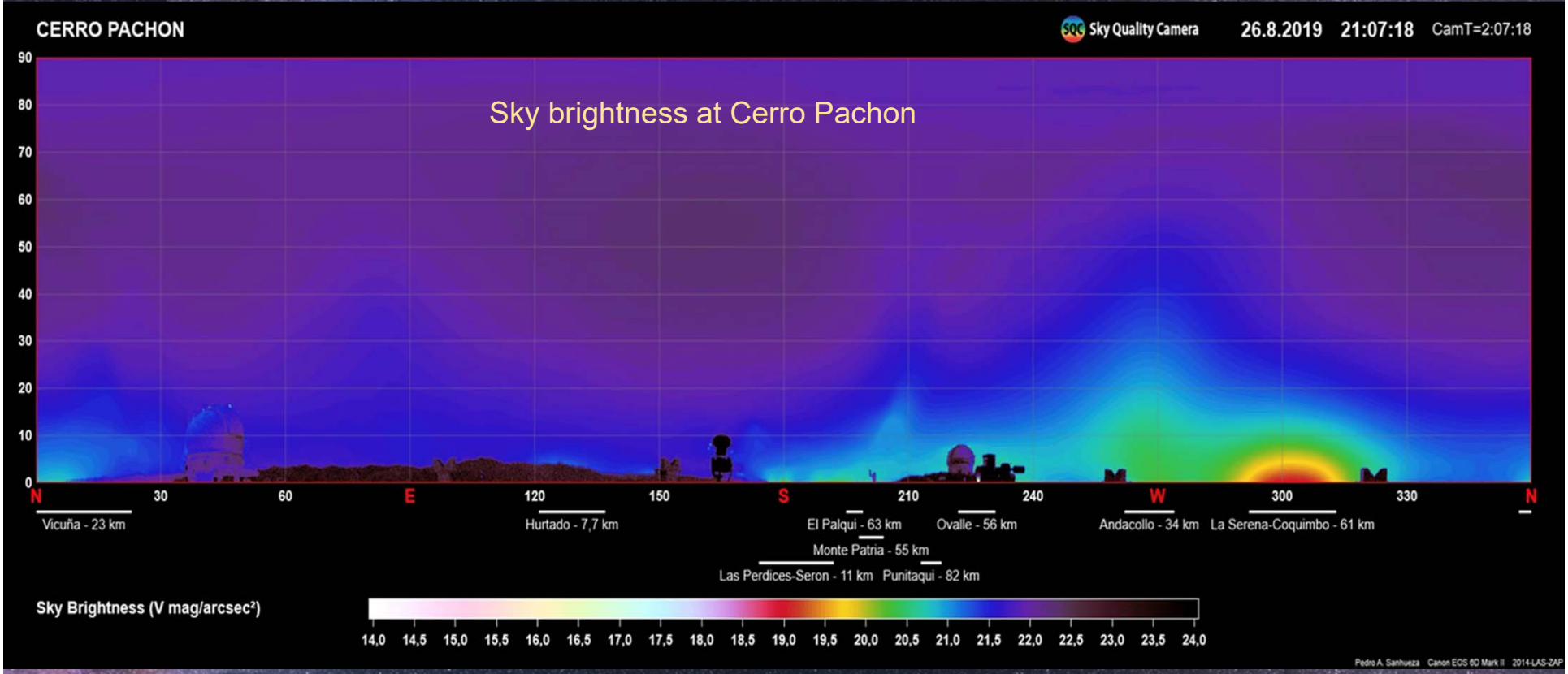
ALAN evolution Ovalle, Northern Chile

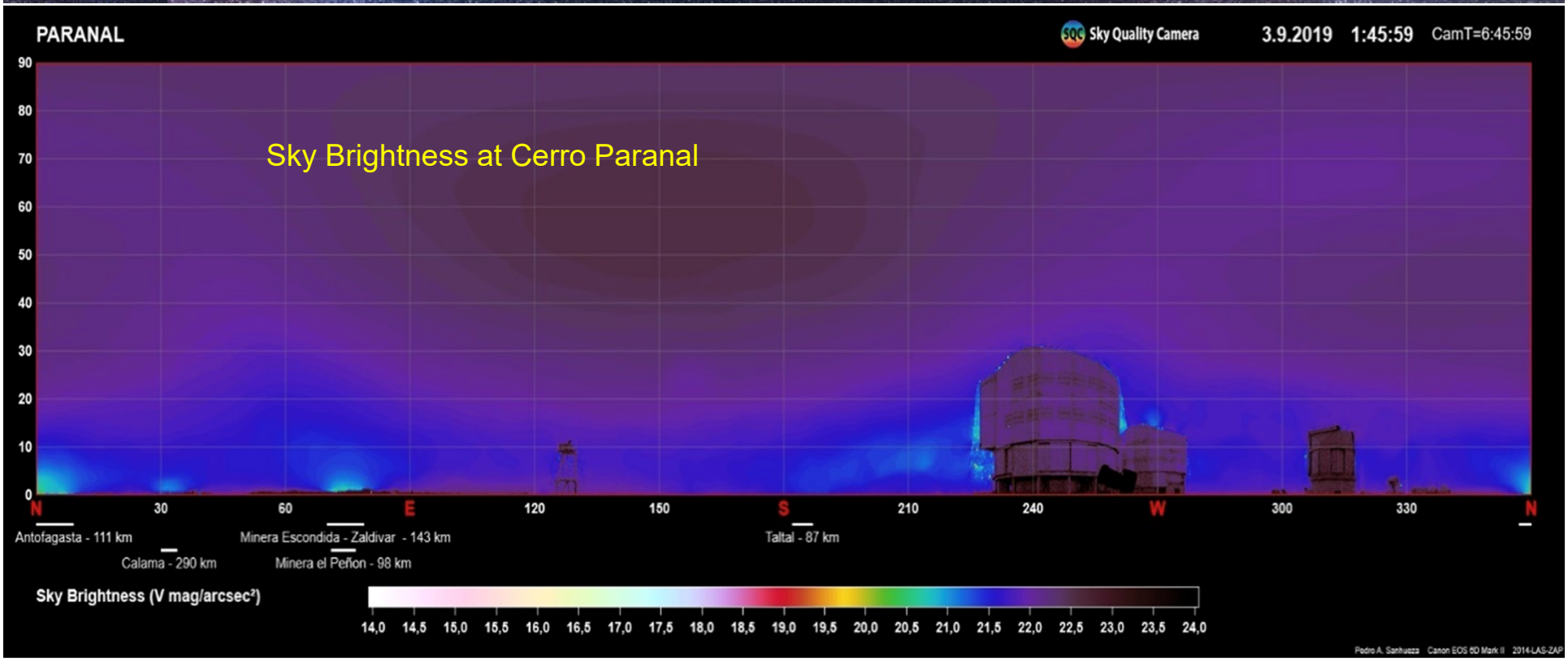
VIIRS Suomi NPP



Evolution of ALAN La Serena Coquimbo, Northern Chile

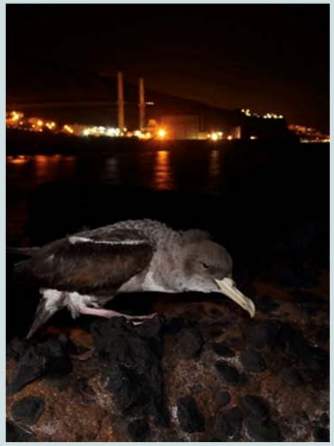


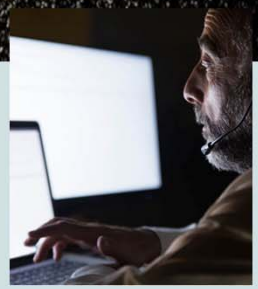

CERRO PACHON
Sky Quality Camera
26.8.2019 21:07:18 CamT=2:07:18
Sky brightness at Cerro Pachon
90
80
70
60
50
40
30
20
10
0
N 30 60 E 120 150 S 210 240 W 300 330 N
Vicuña - 23 km
Hurtado - 7,7 km
El Palqui - 63 km
Ovalle - 56 km
Andacollo - 34 km
La Serena-Coquimbo - 61 km
Monte Patria - 55 km
Las Perdices-Seron - 11 km
Punitaqui - 82 km
Sky Brightness (V mag/arcsec²)
14,0 14,5 15,0 15,5 16,0 16,5 17,0 17,5 18,0 18,5 19,0 19,5 20,0 20,5 21,0 21,5 22,0 22,5 23,0 23,5 24,0
Pedro A. Sanhueza Canon EOS 6D Mark II 2014-LAS-ZAP


PARANAL
Sky Quality Camera
3.9.2019 1:45:59 CamT=6:45:59
Sky Brightness at Cerro Paranal
90
80
70
60
50
40
30
20
10
0
N 30 60 E 120 150 S 210 240 W 300 330 N
Antofagasta - 111 km
Calama - 290 km
Minera Escondida - Zaldivar - 143 km
Minera el Peñon - 98 km
Taltal - 87 km
Sky Brightness (V mag/arcsec²)
14,0 14,5 15,0 15,5 16,0 16,5 17,0 17,5 18,0 18,5 19,0 19,5 20,0 20,5 21,0 21,5 22,0 22,5 23,0 23,5 24,0
Pedro A. Sanhueza Canon EOS 5D Mark II 2014-LAS-ZAP

CONSEQUENCES

The negative effects of the loss of this inspirational natural resource might seem intangible. But a growing body of evidence links the brightening night sky directly to measurable negative impacts including





Increasing energy consumption

Disrupting the ecosystem and wildlife

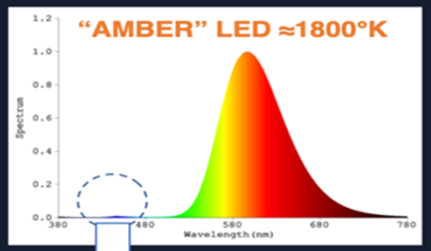
Harming human health

Astronomy

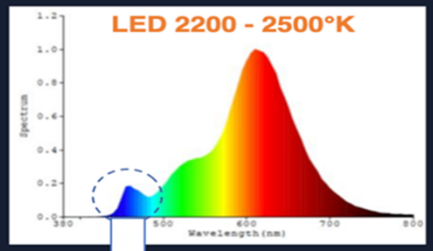
Previous situation	SD 686/1998 Semi Cut - Off Curfew for sport fields and advertisment	SD 043/2012 Fully shielded Limit of 15% of blue light Luminance limit for publicity	SD XX/2021 No blue light in Northern Chile Industry and sport fields must accomplish UNE restrictions National norma with ultra warm white

Content [%] 380-499nm (blue) in function of TC [°K]

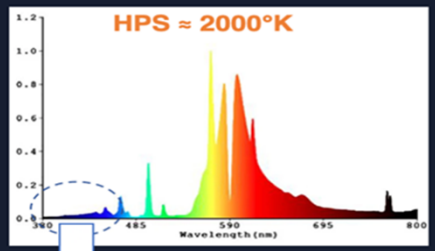
Typical spectral graphs of luminaries used in outdoor lighting (LED y HPS):



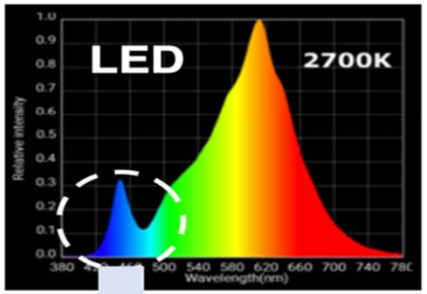
< 1% Blue



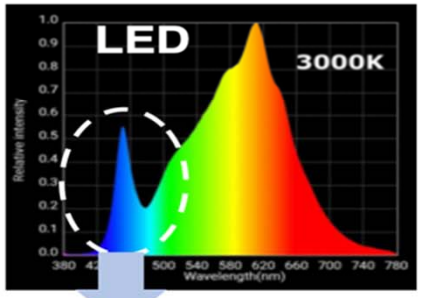
< 7 % Blue



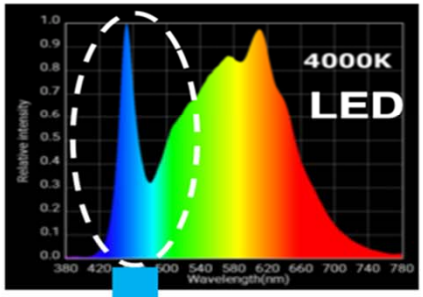
< 7 % Blue



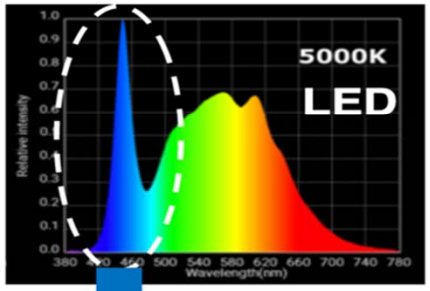
≈10% Blue



≈12-15% Blue



≈15-20% Blue



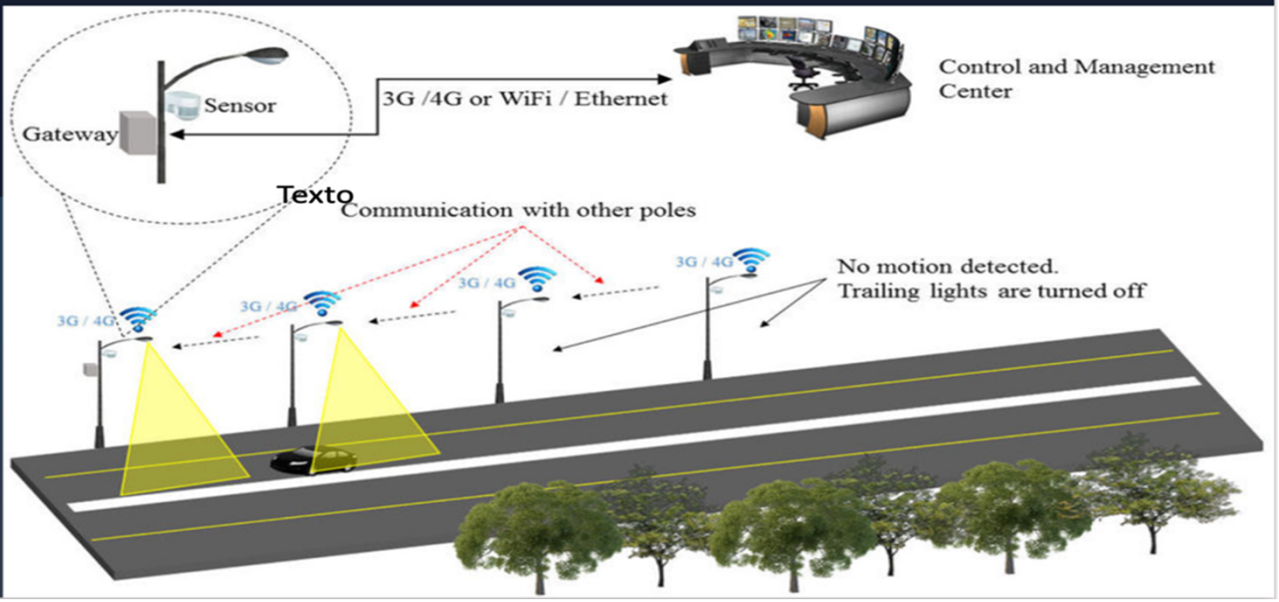
>20% Blue

Near Future Perspectives:

Adaptive lighting: We need a massive use of environmentally oriented lighting engineering

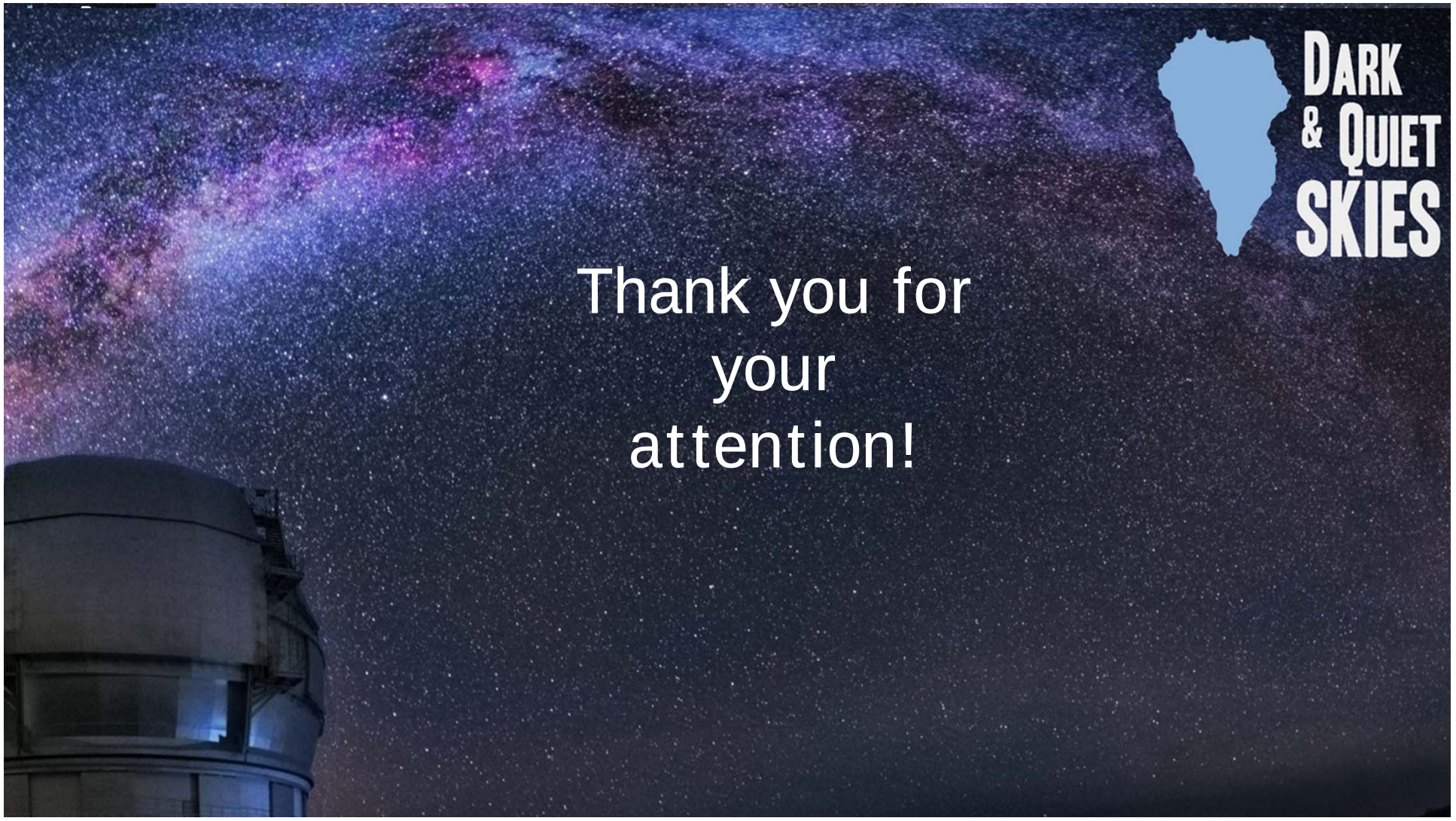
Dynamically reduce both urban and road lighting levels under low traffic conditions, even below M6 - A6 if the lighting is not immediately needed by any user.

As cars have their own light, the condition is photopic, the illumination of roads is not a general need.



Pending issues

- Enforcement
- Conflict with security
- Sense of prestige associated to lighting, even blue light
- Commercialization of bad lighting
- Public awareness


DARK
& QUIET
SKIES
Thank you for
your
attention!