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UPDATED 12 09

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EMBARGO till
14 09 14:00 CET

# Greener from Above ?

## Assessing the Carbon & Energy impacts of Satellite TV delivery

Presentation at IBC GOS Session
Amsterdam, Sept 14 2025

*Vincent GRIVET – The LoCaT Project*

IBC2025

# About the LoCaT Project

- Light collaborative initiative started in 2020
- Goal = identify and promote climate-friendly methods for the delivery of TV content ( live & on-demand)
- Focus on **DELIVERY** of TV, ignoring production, play-out and TV set
- Scope 2 at this time ( = usage phase)
- Start with an holistic assessment to answer the key question :

## How green is the **delivery** of TV content across Europe ?

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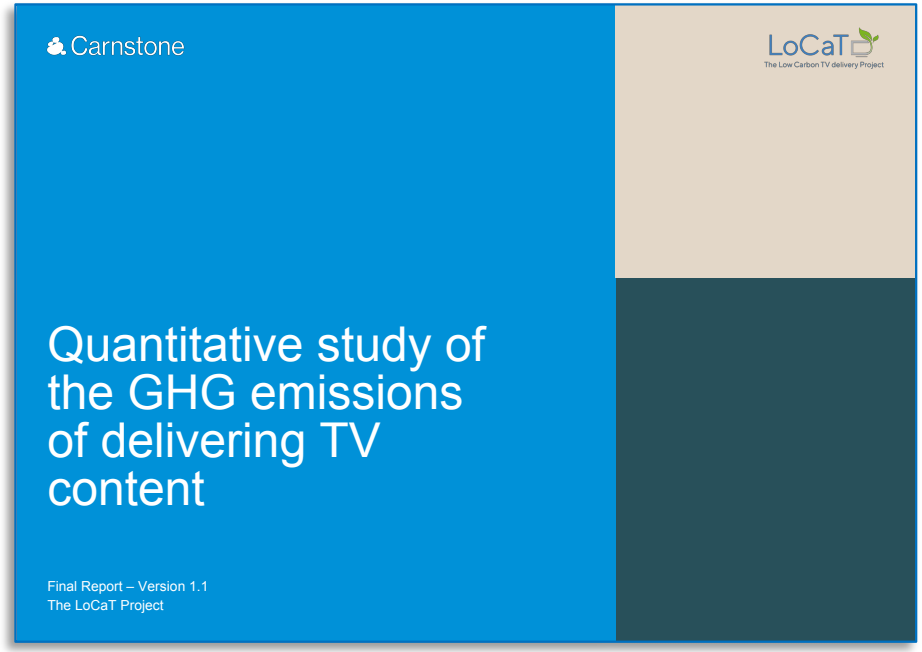
# 2021 : LoCaT Founding Study (“LoCaT Original”)




ATET
Association Technique des Editeurs de la TNT

broadcast networks europe

ors group

Quadrille

SALTO

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# LoCaT Sat : the 2025 Update

- Extend LoCaT Original study to now also include Satellite
- Modified sponsor set
- Study completed by Carbone 4
- Keep same methodology , scope and source data







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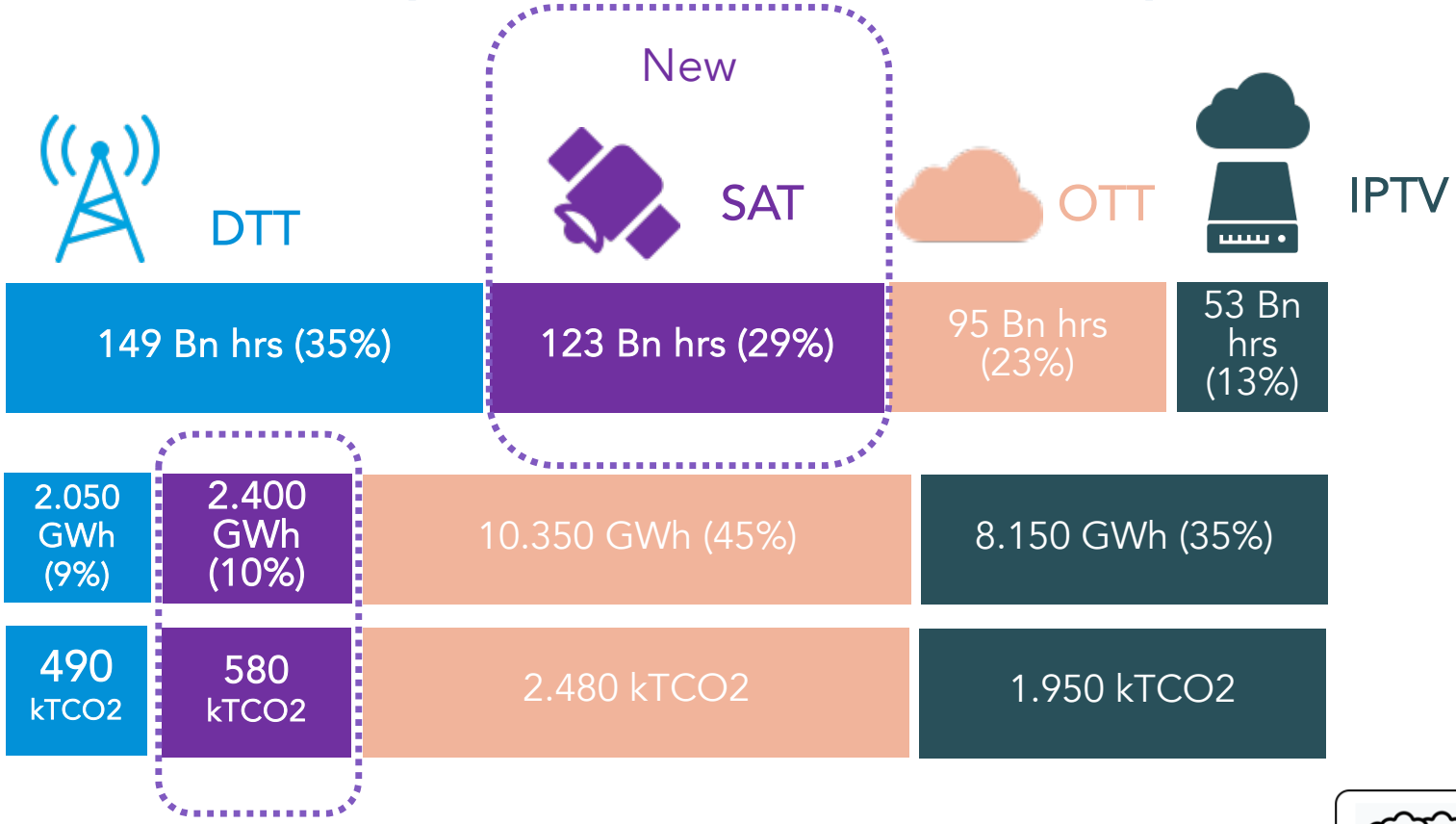
***NB*** : *Quadrille , who was part of LoCaT Original consortium now is part of INVERTO; INTELSAT is now part of SES*

# Total European Volumes & Impacts




∑= 420 Bn hrs

∑= 22.950 GWh

∑=5.500 kTCO2

6.600 GWh
Average production of nuclear reactor in France 2020

55.000 GWh
Electricity from COAL in Germany 2022

***Source*** : *DTT,OTT and IPTV numbers from LoCaT Original (2021) – Sat numbers from LoCaT Sat (2025) . Some rounding applied. All numbers apply to 2020 situation to allow consolidation / comparability of LoCaT Sat and LoCaT Original.*

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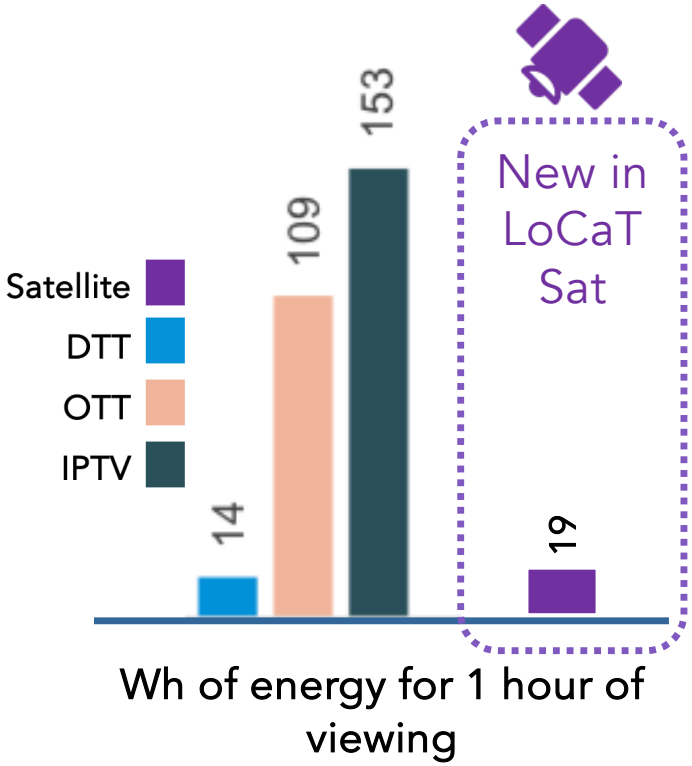
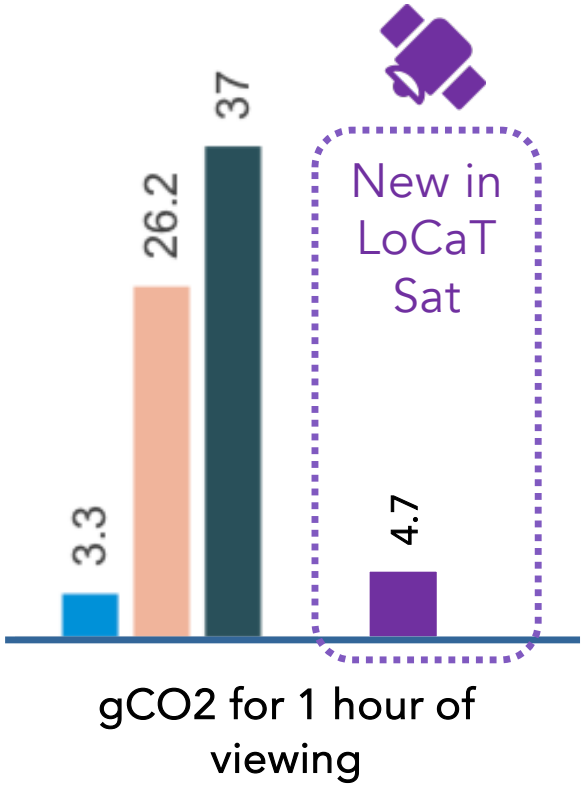
# Satellite Unit Impacts




Wh of energy for 1 hour of viewing




gCO2 for 1 hour of viewing

- Satellite N° 2, slightly behind DTT
- Almost 6 x more efficient than OTT
- Almost 8x more efficient than IPTV

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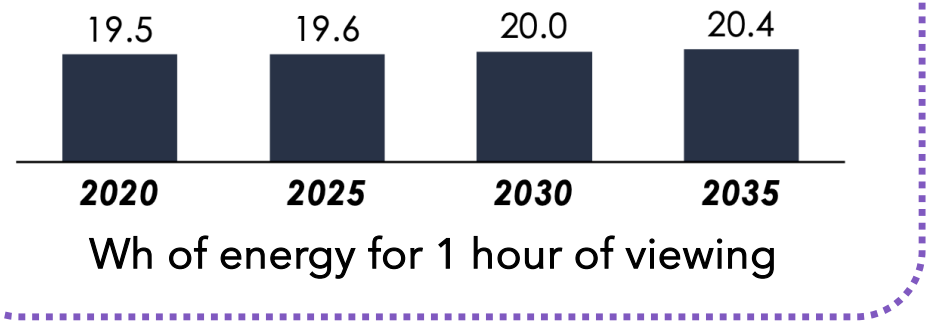
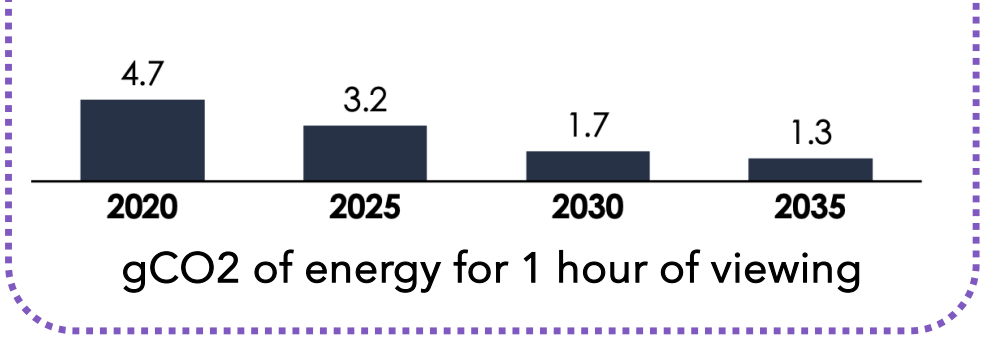
***Source*** : *DTT,OTT and IPTV numbers from LoCaT Original (2021) – Sat numbers from LoCaT Sat (2025) . Some rounding applied. All numbers apply to 2020 situation to allow consolidation / comparability of LoCaT Sat and LoCaT Original.*

# Mid Term Projections




- Unit Energy usage will modestly increase as our scenario projects a certain erosion in both linear viewing time and % of households using DTH
- Unit Emission will significantly decrease based on the generally accepted projected decrease in emission factor

**Note** : *Evolution is based on trends assumed in LoCaT Original scenarios A, B & C = continuation, at unchanged pace, of currently observed trends (differences between A B and C do not affect satellite)*

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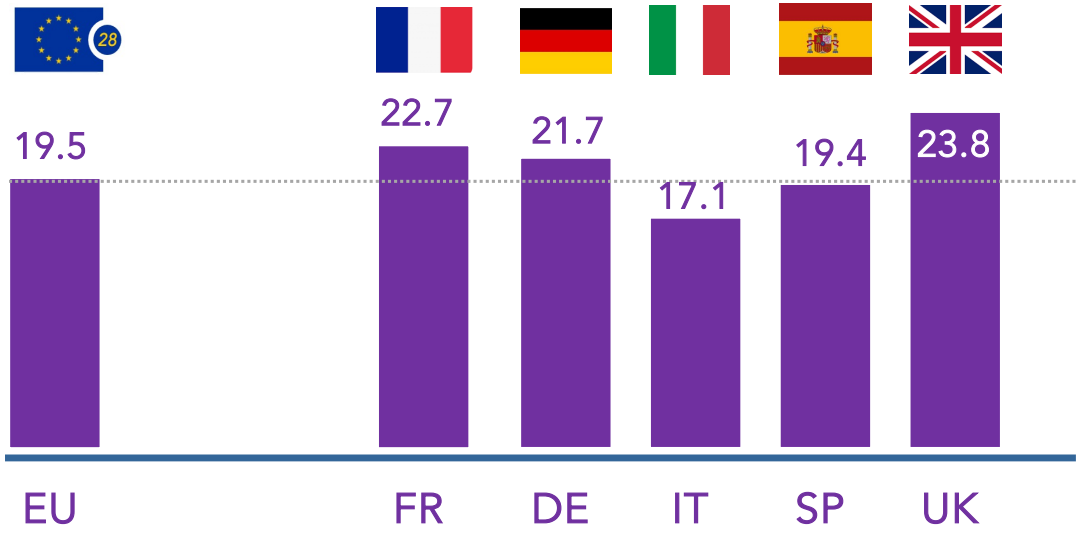
# Country Analysis (Energy)




Wh of energy for 1 hour of viewing

✓ UPDATE 12 09 DONE

- Minor differences between countries when usage of electricity is considered
- Differences stem principally from
  - Linear TV viewing time
  - Number of people / home

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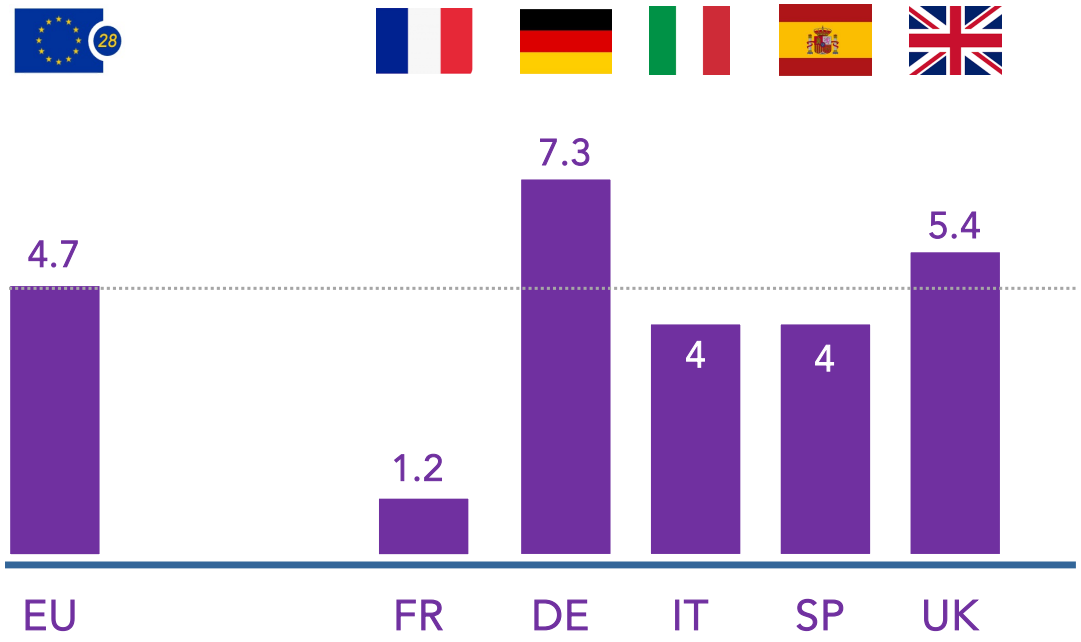
***Source*** : *LoCaT Sat (2025). Numbers apply to 2020 situation to allow comparability with LoCaT Original*

# Country Analysis (Emissions)




gCO2 for 1 hour of viewing

- MAJOR differences between countries when EMISSIONS are considered
- Differences stem principally from difference in national emission factors

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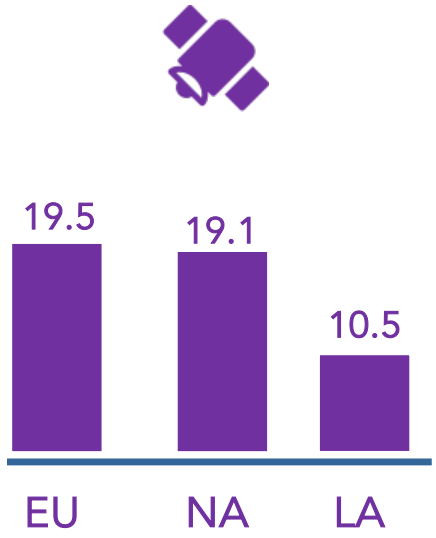
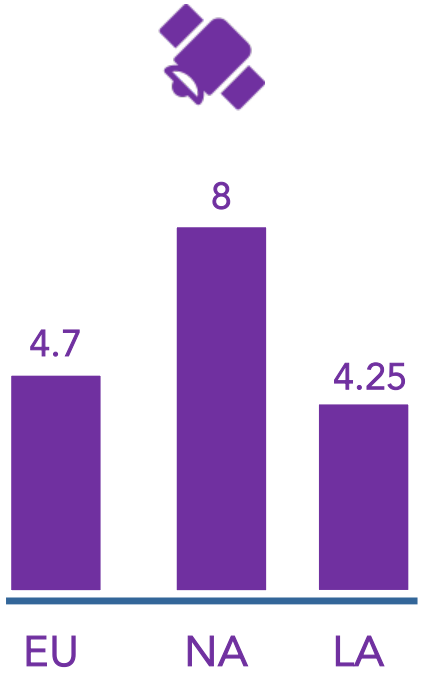
***Source*** : *LoCaT Sat (2025). Numbers apply to 2020 situation to allow comparability with LoCaT Original*

# Looking at North-America and Latin-America




Wh of energy for 1 hour of viewing




gCO2 for 1 hour of viewing

***Source*** : *LoCaT Sat (2025). Numbers apply to 2020 situation to allow comparability with LoCaT Original*

- NA slightly lower energy usage because of higher % of individual homes, mitigated by lower (satellite) linear viewing
- Lower energy usage in LA result from
  - higher % of individual homes vs collective housing
  - more people / home and more linear TV viewing
- Higher emission factors for LA and NA offset energy benefits

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# Component Analysis Europe ( WH electricity / hour device)

| Component | DTT | OTT | IPTV | SAT |
|---|---|---|---|---|
| Distribution infrastructure (incl. data centres) | 8 | 34 | 39 | 0.1 |
| In-home network interface (e.g. amplifier, modem) | 3 | 55 | 88 | 12.6 |
| Viewing peripherals (e.g. STB, streaming devices) | 3 | 20 | 26 | 6.8 |
| **TOTAL** | **14** | **109** | **153** | **19.5** |

- Satellite energy impacts almost exclusively generated by In-Home reception equipment
- Same is true in emissions impacts, as impacts from satellite (0,02 gC02) and from Up-Link (v 0.03 gCO2) are negligible

***Source*** : *DTT,OTT and IPTV numbers from LoCaT Original (2021) – Sat numbers from LoCaT Sat (2025) . Some rounding applied. All numbers apply to 2020 situation to allow consolidation / comparability of LoCaT Sat and LoCaT Original.*

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# Some observations on In Home Reception

- Many different in-home reception models co-exist
- Large variations exist between models : from 2 to 30 Wh per hour of viewing (**1x to 15x**) with average value at 19.5 Wh
- **Individual homes in average 2.5 x more efficient** than collective housing situations;
- Homes with **External Decoders use 2.4 x more power** (vs embedded decoder), although many may not need external decoder as their TV sets have an embedded decoder ;
- **External decoders weight for 40%** of total satellite reception electricity usage
- If all in-home reception devices were smart ( ie, ON only if TV watched), **in home impacts would be divided by 3**

**➔ Substantial improvements in satellite delivery impacts could be achieved though optimization of in-home reception**

***Note*** : *estimations have been made on the respective weights of the different in-home distribution models in absence of primary data*

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# Conclusions

**(Reminder : already derived from LoCaT Original)**

- European TV delivery impacts are significant : 22.950 GWh of electricity = 3.5 nuclear reactors full time
- Major differences of efficiency between TV delivery platforms; x8 to x 11
- Broadcast (DTT) has a much higher efficiency than IP-based options

## Satellite Specific Conclusions – LoCaT Sat

- Satellite has also a very high efficiency for delivery in Europe: slightly below DTT
- 6 to 8 times more efficient than IP-based options ;
- Energy efficiency of satellite further improves in Latin-America (x2) , thanks to more individual homes and higher volumes of linear TV viewing (but energy gains do not translate into emissions gains)
- Satellite spacecraft + uplink impacts are negligible; impacts are predominantly associated to in-home reception equipment
- Major improvement potential exist if in-home reception is optimized

# Thank You !

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Full report can be downloaded on:
www.thelocatproject.org

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