Placing Green DCs

The case of PARASOL

Centres de Processament de Dades

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Placing a Green DC network

- Approach:

    - Build a network of data-centers of a given size (in watts)

    - Each data-center has its own green power station (wind and / or solar)

    - A confidence on the availability of green energy is given.

- Example:

    - We need a set of DCs providing 10MW of computation power

    - Our set of DCs must grant a chance C of being powered at each time with green energy

- Problem to solve:

    - Where do we place our data-centers? Which size each one? Which size of wind and solar each one?

Costs and Conditions

- Data-Center costs:
    - Building and maintenance cost of the DC
    - Building the wind farm or photovoltaic station
    - Buying the land for the DC
    - Cooling the DC
    - Connecting the DC to an internet backbone

- Conditions
    - Each DC must have a neighbor at a minimal latency
    - Each DC must be able to host each punctual computation demand

Green Energy Power Plants

- Wind Power
  - Wind can happen at each hour of the day
  - ...but is almost completely random/very hard to predict with high confidence
  - Windmills are cheaper than solar installations

- Solar Power
  - Solar happens regularly (each day, 5-7 efficient hours)
  - ...very reliable and power predictive in sunny places
  - Solar panels are more expensive than windmills

Green Energy Capacity Factor
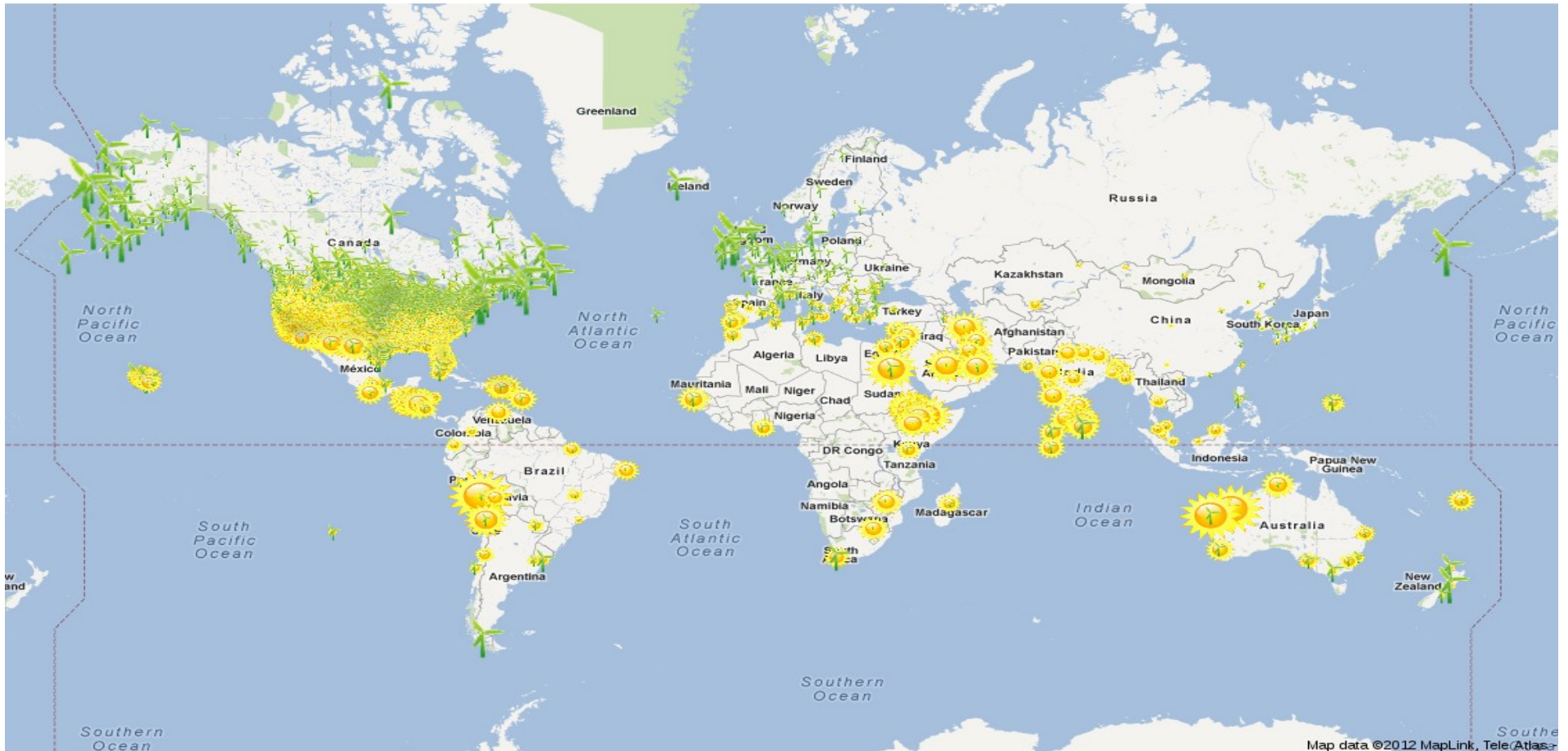
Indications where solar or wind power have better CF

- Sun is better on tropical zones, while wind is better on northern and oceanic shores
- [some data unavailable from points in the world]

PARASOL Project

- Parasol Project, University of Rutgers (NJ, USA): Link PARASOL Rutgers

- Article at "Datacenter Knowledge": Link HERE

- Video of R.Bianchini at PARASOL: Youtube Video