

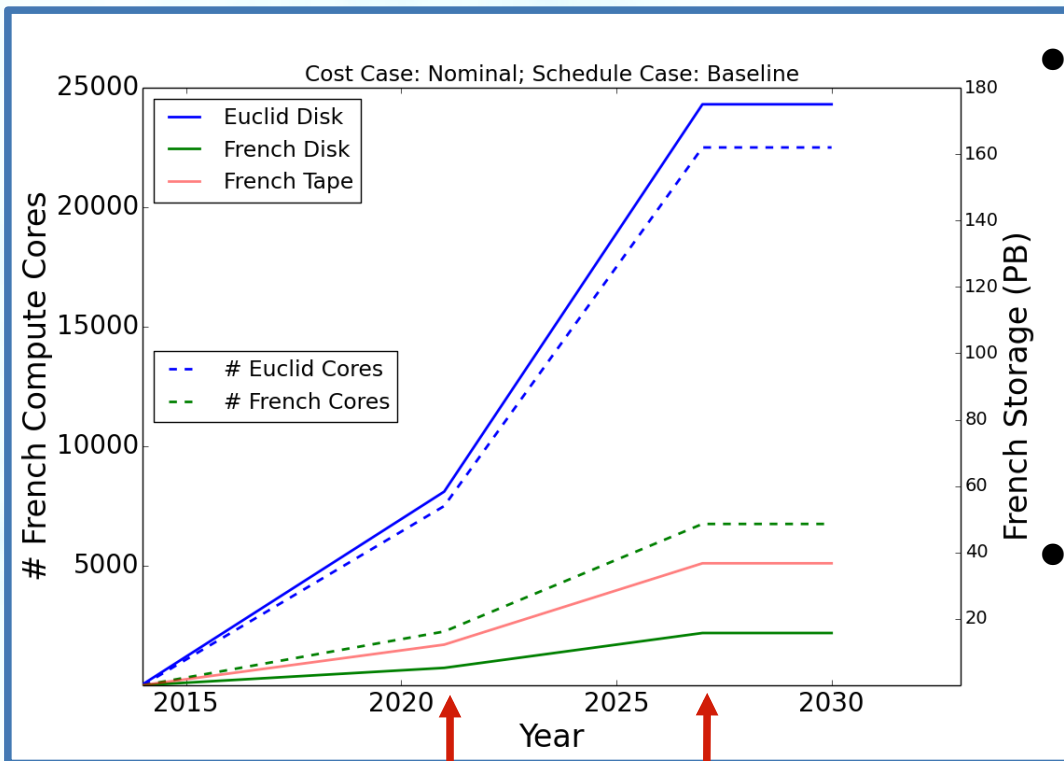
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# Computing Hardware/ Estimation de Ressources

The IN2P3's Centre de Calcul will serve as the basic computing infrastructure for the French SDC. Here we present some of the work done to try to estimate the amount of resources needed and implied costs.

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# « Top-Down » Estimates



One year before DR1      One year before DR3

Bottom Line for All Euclid :

170 PB Storage

25000 Cores

French Contribution : 20-30 %

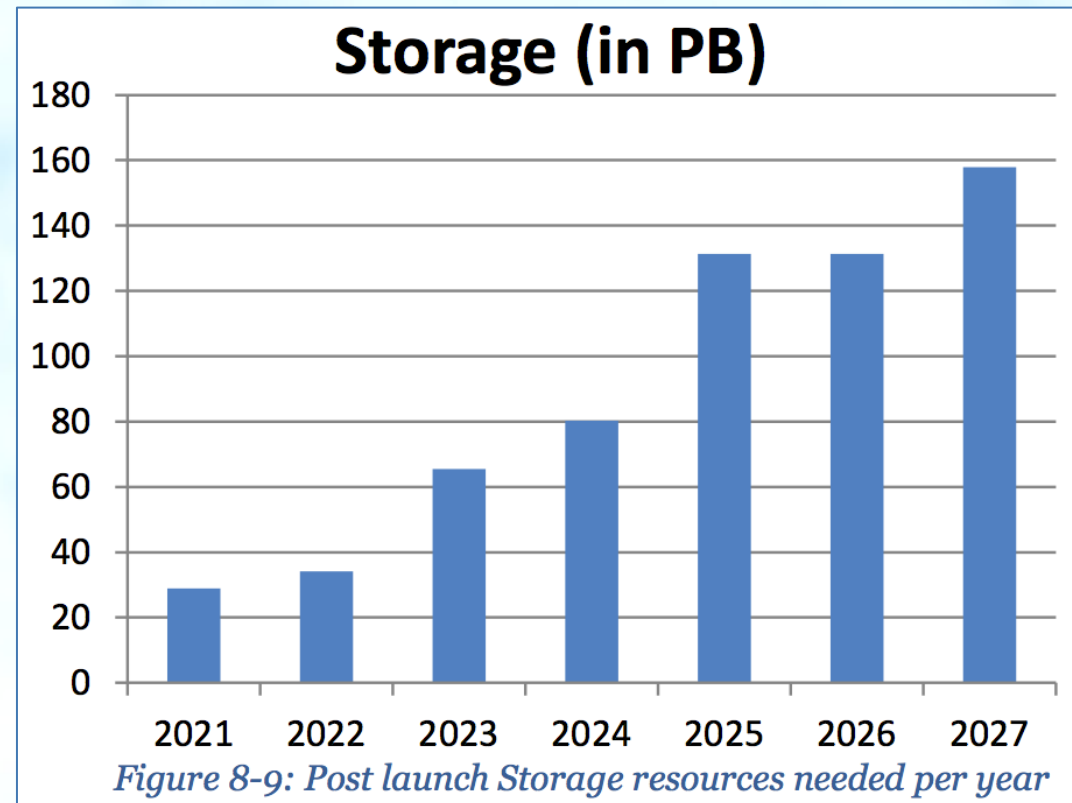
- These are based on what Planck used at IAP, and scaling by the amount of raw Euclid data compared to the amount of raw Planck data.

- Estimates depend on launch date and release dates

- These would change with delays of launch, delivery dates, etc.
- All resources follows the same pattern, just with different scaling (i.e., curves are the same)

# Estimation de Stockage « Bottom-Up »

- Euclid-Wide
  - 160 PB in 2027
  - This ties to assemble the resource needs for each OU independently
- France
  - We generically assume that France will be responsible for 30 % of the computing resources.
    - This needs to be reconciled with the SGS figure of 20 % for France

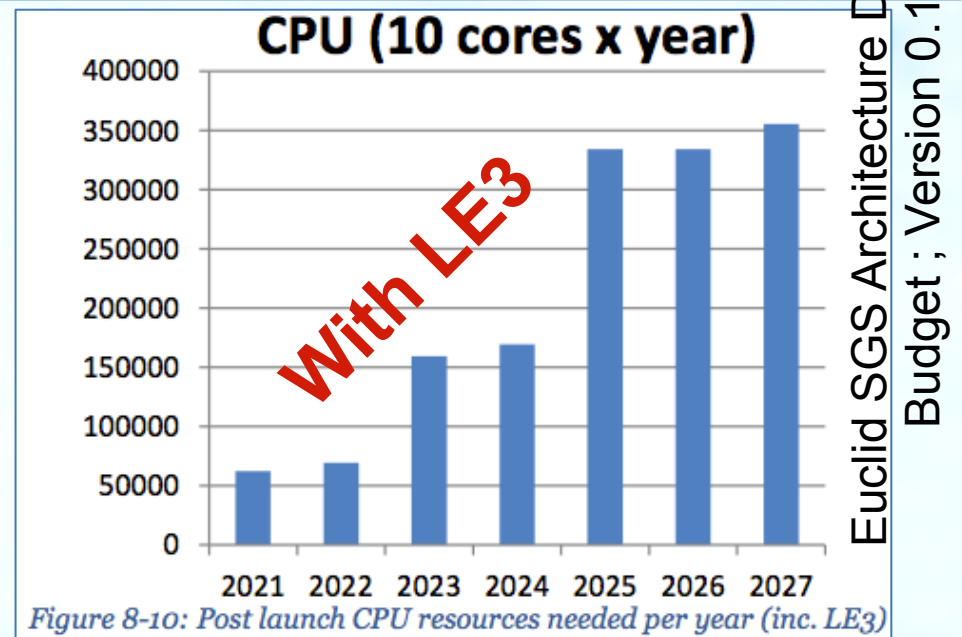
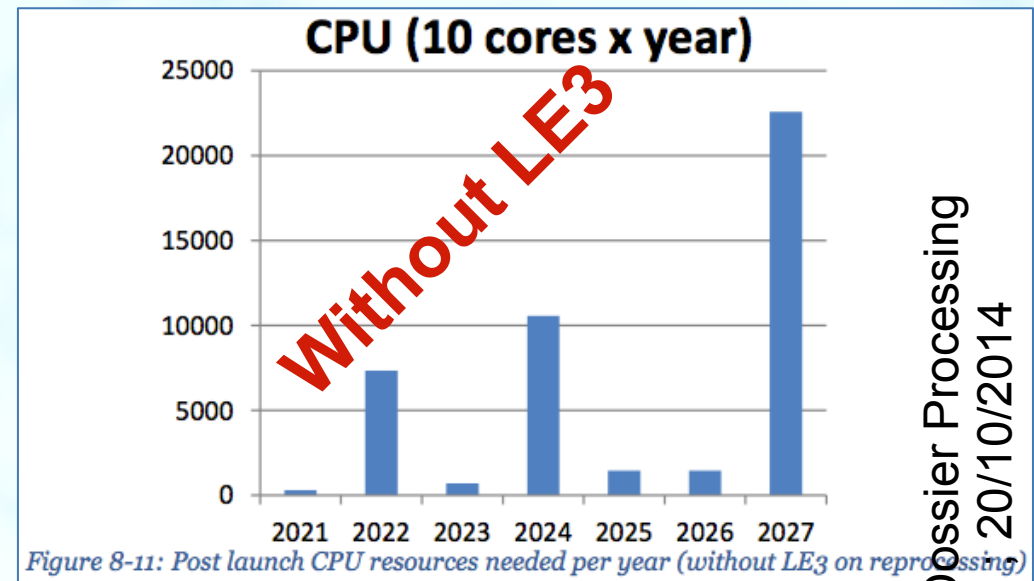


Euclid SGS Architecture Dossier Processing Budget ; Version 0.1 ; 20/10/2014

This agrees fairly well with the « top-down » estimate (which was a nice surprise!)

# Estimation de CPU « Bottom-Up »

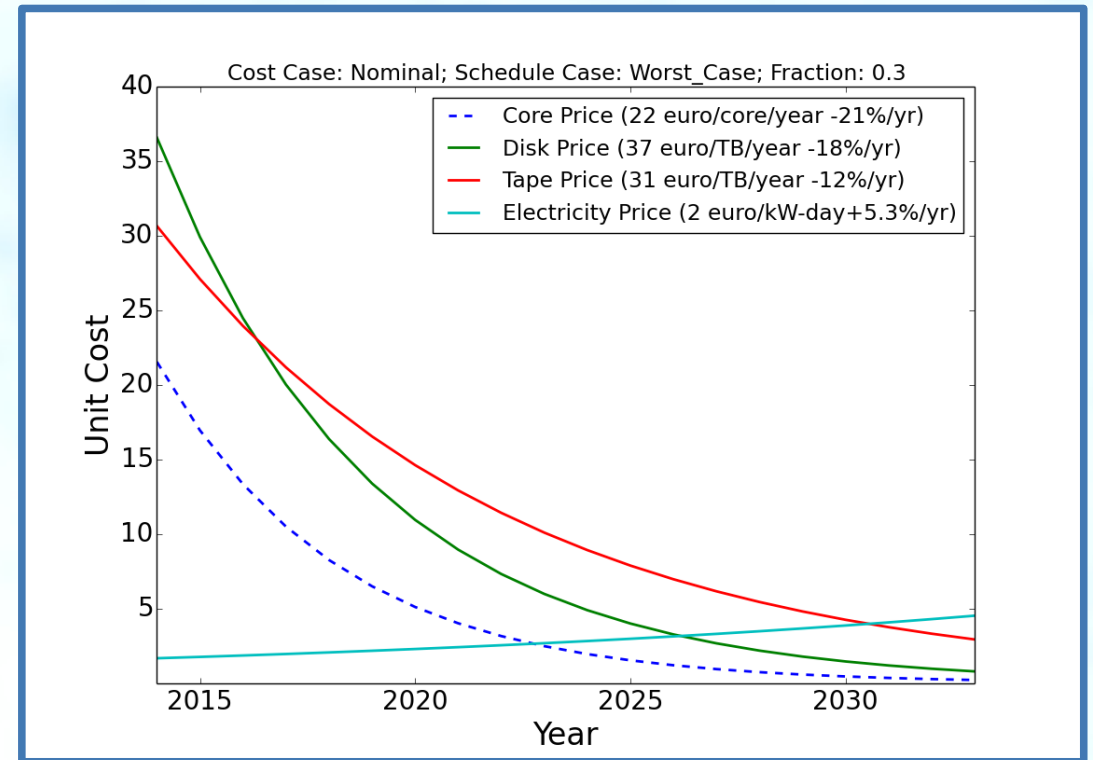
- Without LE3, Bottom-Up estimates are two orders of magnitude bigger than the Planck-based « top-down » estimate
- With LE3, they are three orders of magnitude larger than the « top-down » estimate
- This needs to be reconciled (or at least understood by all)



Euclid SGS Architecture Dossier Processing  
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20/10/2014

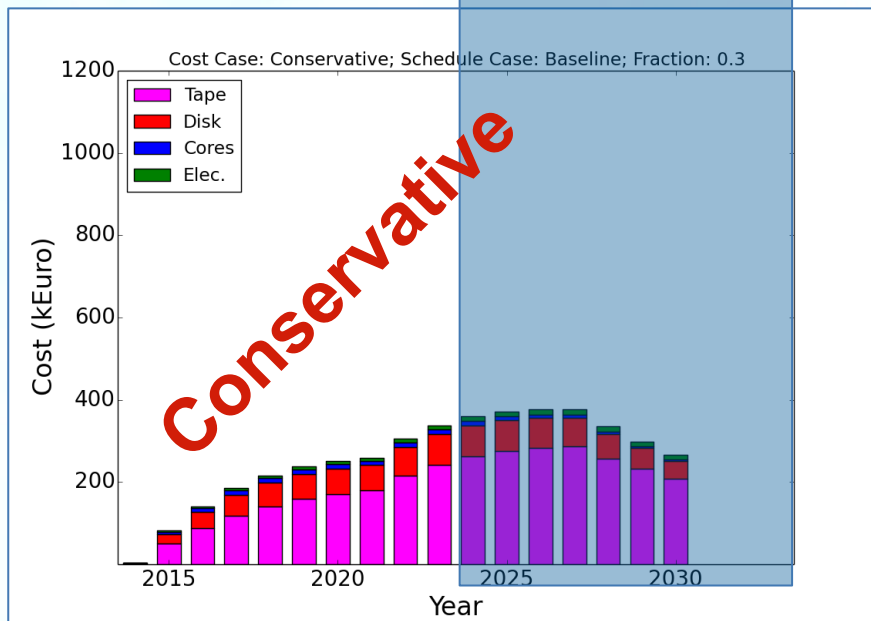
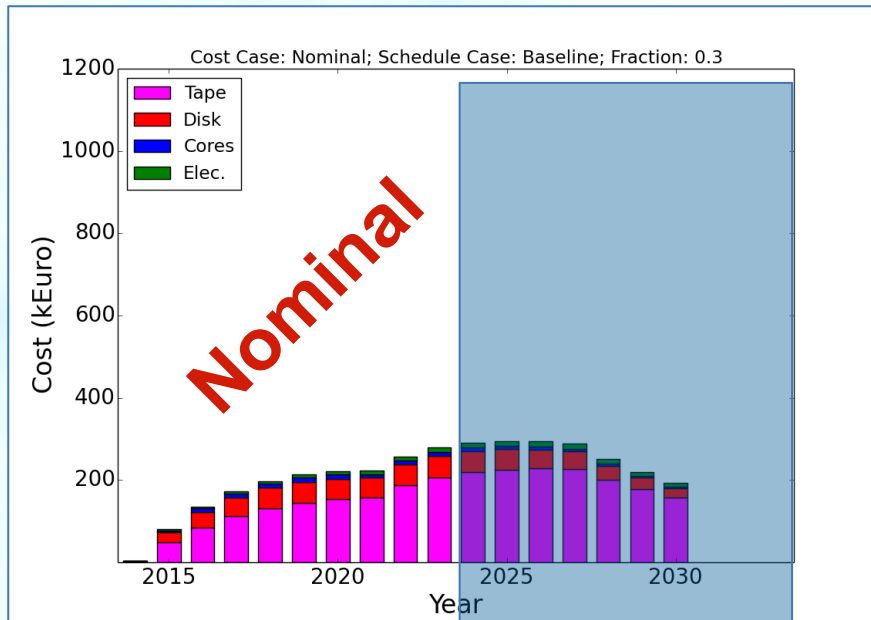
# Nominal Unit Cost Estimates

- These are very uncertain
- Notice the disk/tape « cross ». This is a « reflection » of the uncertainties in this exercise.
- Storage and cores are assumed to be used for five years



These are the cost assumptions for a single core, disk, tape and/or electricity (without how many will be purchased)

# Nominal/Conservative French Cost Cases



- Optimistic, Nominal and Conservative cost estimates differ in the **change** in price for Tapes, Disks, Cores and Electricity as a function of time.
- These assume a 2020 launch
- At the moment, IN2P3 plans are to 2023 (inclusive), but CNES assumes « phases ».
  - These need to be reconciled.



# Schedule and Other Work

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- A schedule slip, if known well in advance, does not change costs « too much », as we can delay purchases, and therefore pay less for the material.
  - *If the delay is known well in advance.*
- If possible, agreements should be based on milestones being completed, not dates
- Estimations here do **not** include significant work which might need to be done for additional surveys such as CFHT or LSST.

# Caveats, Issues, etc.

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- Large-memory tasks require using shared memory shared by multiple cores – this means that the most memory-intensive tasks will effectively require **even more** compute cores than these estimates.



# Near-Term Work

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- Finish IN2P3-CNES Convention
- Refine estimates accounting for combined memory and computing needs
- Understand implications of larger-than-expected resource estimates from OU-LE3 (e.g., a Tbyte of RAM for a single job will be difficult at the CC).
- More work to understand how the requirements of the processing functions can be fulfilled at the CC (virtualization, « chaining » of sub-processes, memory, parallelization, etc.)
  - If not, how can we adapt the processing functions or the CC ?