

# FaStGO – Facilitating Standards for Guarantees of Origin

**Task 3 : Developing IT Systems Specification**

**Task 3.1 : Develop a Vision for the Future IT Infrastructure**

**Phil Moody, AIB Advisor**



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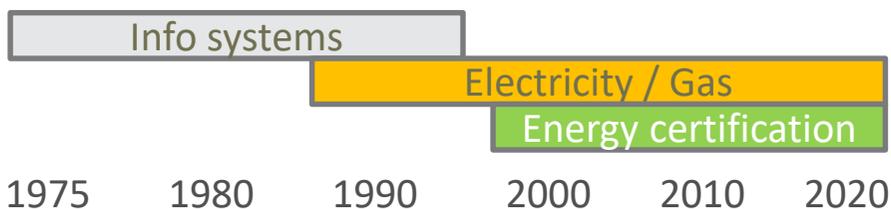
## Phil Moody



## Marko Lehtovaara



- Outgoing AIB Secretary General



- Founder of the AIB (2001)
- Co-author of EECS (2000 – ongoing)
- Co-author of initial version of CEN GO standard EN16325 (2008-2014)

- CEO, Grexel Systems Oy
- 20 years' experience on energy certificates
- GO System implementation in 10+ countries



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# Information Systems Strategy – common basic issues

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Central or distributed?



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# Options

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1. Peer-to-peer

*= registry to registry, not account holder – to - account holder*

2. Centralised single registry

3. Hub-centric

4. Hybrid



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# Lessons from EU-ETS

- Evolution

- V1: Peer-to-peer

- V2: Hub-centric

- *Big difference in level of sophistication of MS registries*

- *Hacking, theft of allowances and VAT fraud*

- V3: Centralised (2009 Directive)

- *Strongly resisted by MS, and would need strong justification – and legal compulsion*

- *Accounting unfriendly to some users, so their MS built systems to interface to central registry*

- *Software provided under 5 year contract with possible 5 year extension*

- Low level of coupling with national systems – main coupling with Kyoto

- Quality Assurance provided by DG CLIMA

- Coordination / MS wish-lists provided by DG CLIMA via quarterly consultation

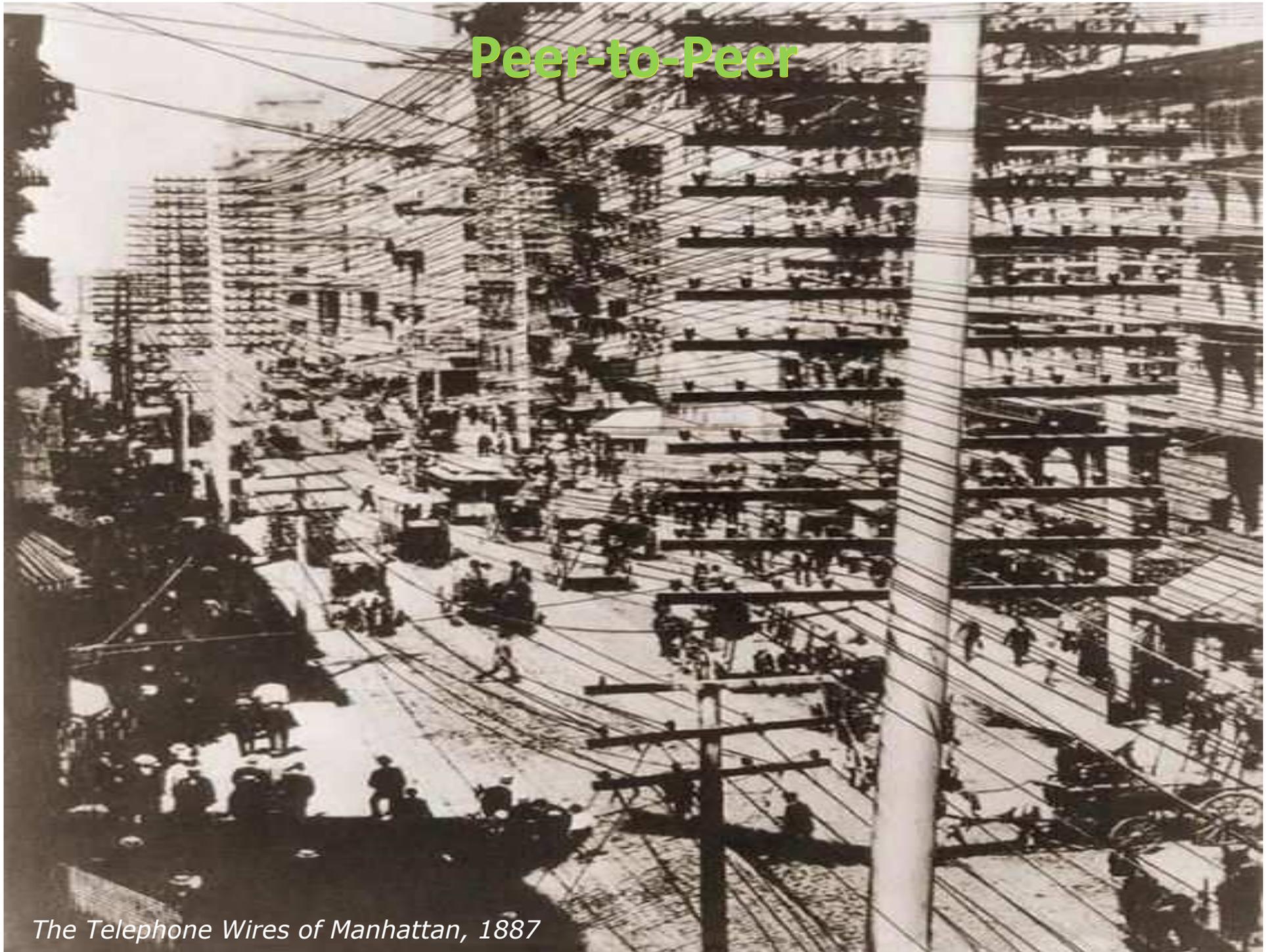
- Q: “Would you go back to a Hub?” A: “No possible – too much data / complexity!”



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# Peer-to-Peer

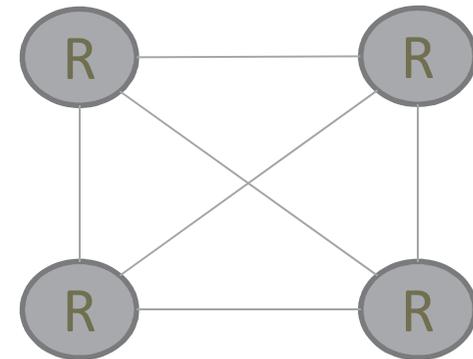


*The Telephone Wires of Manhattan, 1887*

# Peer-to-peer

- Each registry communicates directly with every other registry
- Needs common standard for message format, data transfer, testing
- Issuing bodies must re-test the connection between their registry and another registry whenever either registry changes → means a lot of testing
- No central coordination, so difficult to resolve disputes, prevent fraud etc.
- Best for <5 registries: > 40 registries, so inappropriate

**REJECTED**



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# Peer-to-peer: blockchain?

- Acknowledged: blockchain has advantages (smart contracts, chain-of-custody, simple for small producers ...) ... but ...
- REDII:
  - Places responsibility on individual member states
  - Does not provide basis for a centralised support facility
  - Blockchain omits the role of a central authority (European GO system is built on central monitoring authority in each country)
- May not be sustainable under older EU legislation (e.g. financial services)
- Would require legislative change
- Need for flexibility to support constant legislative change
- Competent bodies in all member states have invested a lot in current systems
- Blockchain does not seem to offer any substantial gains or relieve shortcomings
- Further questions (e.g. energy consumption, effect on energy markets ... ) remain open
- May be applications for blockchain in management of small production devices



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# Central registry

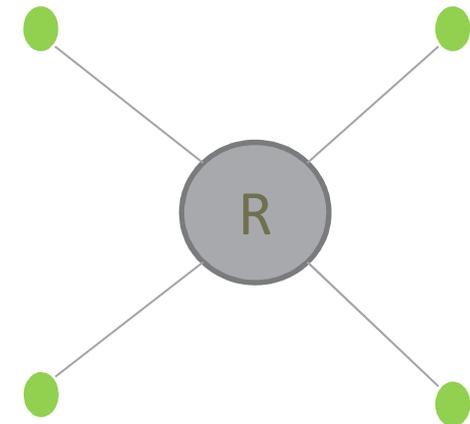


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# Centralised single registry

- **Fully central system:** assumes that all national functionality is the same. However, national law and practice differ - so this is unlikely
- **Centralised single registry,** replacing national registries - might require:
  - a. National creation of GO datasets, sent to central certificate system for transfer and cancellation; and/or
  - b. Multiple central registries, each for certificates for a different purpose/energy carrier, and inter-communicating for sector integration



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# Evaluation of central registry

Centralised service facility theoretically best cost / quality efficiency, as:

- Infrastructure and transactions implemented **only once** - no inter-registry transactions, guaranteeing data integrity
- Immediate and predictable transfers, uniform calculations & business rules for issuance
- Standard protocol for cost-effective, efficient & reliable transfer of GOs across borders
- Can swiftly change data model and business rules: no need to coordinate registries
- Simplify GO cancellation by multinationals and link to account holder/facilitator systems
- VAT fraud detection and dispute resolution
- Shared effort and cost



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## Centralised single registry

But - concerns about:

- 1) **National policy and legislation** must be built into adaptable central registry
- 2) **National claims for data ownership** must be established and data protection laws applied
- 3) **National requirements for functionality** due to differing laws and practices
- 4) **Division of responsibilities and liabilities** to be agreed among parties
- 5) **Integration with local systems** – these will change independent of central registry (includes meter data acquisition, energy settlements, public support, target monitoring ...). Centralisation could be very expensive
- 6) **Conflicting system design requirements** - may lead to long discussions limiting freedom of individual member states
- 7) Standardisation comes at a cost: **flexibility**
- 8) MS requirements must be **coordinated**: need for central agency – not possible under REDII as it is



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Hub Centric

Hub Centric

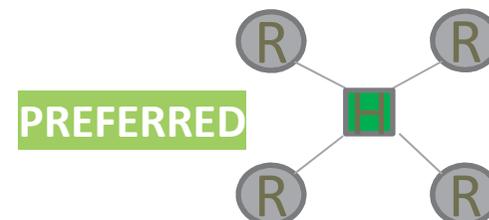
*Sunderland GPO telephone exchange, 1949*



# Hub-centric: the status quo

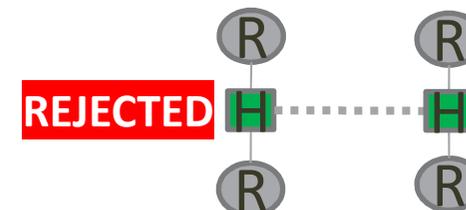
Registries all communicate via a central hub

a. **Simple:** registries for all energy carriers connect to one hub



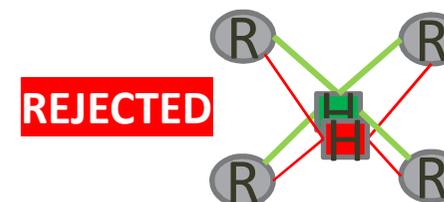
b. **Communicating:** several hubs, each supporting certificates for different energy carriers (electricity, gases, heating & cooling)

*Registries for each type of certificate connect to their own hub, and travel to registries for other types of certificate. Certificates must be able to travel through hubs for other types of certificate. Hubs must be compatible, and change to (or imperfections in) one might affect the other. Introduces inefficiency and risk of error*



c. **Non-communicating:** each registry communicates via a hub for a specific energy carrier

*Each energy carrier has its own hub, connecting to GO registries for this energy carrier. Hubs are not interconnected - registries must connect to several hubs. Allows energy carriers to specialise, but high overall cost*



# Hub-centric – competing hubs? **REJECTED**

- Difficult tracking chain of custody and resolving inter-party disputes
- Systems upgrades need to be carefully coordinated across registries and hub
- Need for common approach to detecting/preventing fraud
  - Conflicts/gap between security provisions can enable fraudsters to penetrate security by using another registries' hub
- Administrative / commercial challenges
  - Coordination across energy sectors and certificate purposes, involving different ministries is essential and time-consuming
  - Conflicting requirements must be carefully resolved
  - Changes affecting several hubs must be carefully planned, executed, and tested so certificates are not lost, damaged, duplicated, or misrouted
  - Rapid growth in one market may impact another market due to market coupling and challenges data storage and/or processing capacity
  - Avoidance of cross-subsidy between energy sectors
  - Avoidance of dominance by a major hub



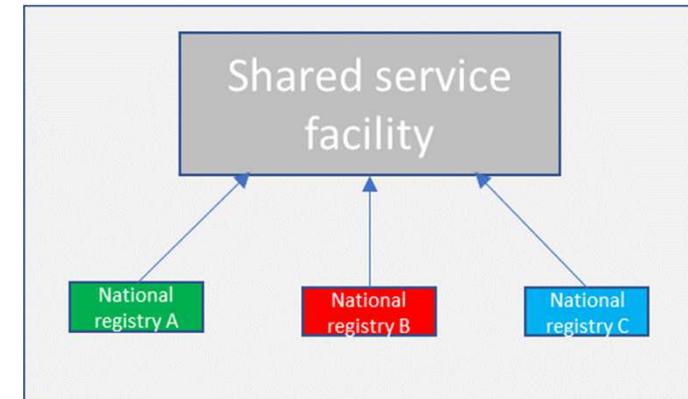
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# Hybrid centralised

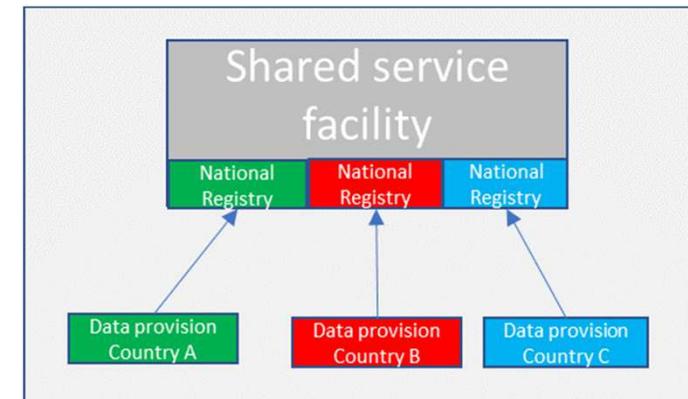
- **National data collection and registries, and shared service facility**

- a. National registration of production devices, collection of metering data and calculation of no. of certificates to be issued
- b. Shared means of transferring certificates
- c. Shared access to list of account holders



- **National data collection, central national registries and shared service facility**

- a. Allows national issuing bodies to select preferred option: their own national registry, or central registry
- b. A hub to link (semi-)central registry and remaining national registries



- **But not everyone wants to do it the same way ...**



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# Preferred way forward

1. Retain local systems at local level – measurement, account administration, plant registration, support etc.
2. Implement a facility to provide central coordination (aka a “hub”)
  - NOT competing hubs or separate hubs for different energy carriers ...
  - ... these simply complicate matters
3. Member States to decide which features of overall system to centralise
4. Institute a voluntary framework to manage this
5. Allow the overall system to evolve

MS free to manage their systems as they wish

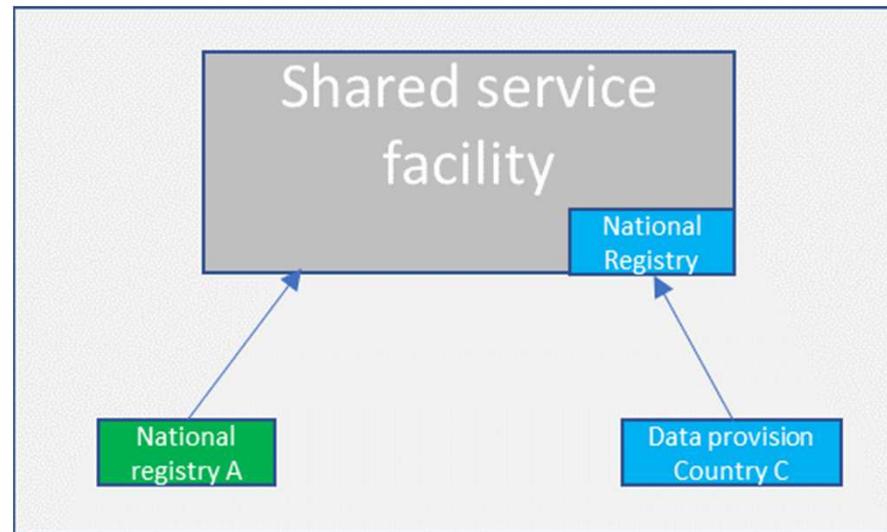
COM can decide over time whether to formalise the coordinating body



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# Proposed way forward



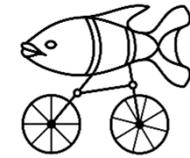
- National facilities for those who want them
- Central facilities for new issuers and other energy carriers
- Shared facilities (Hub, accounts database ...) for everyone
- But ... what shared facilities?



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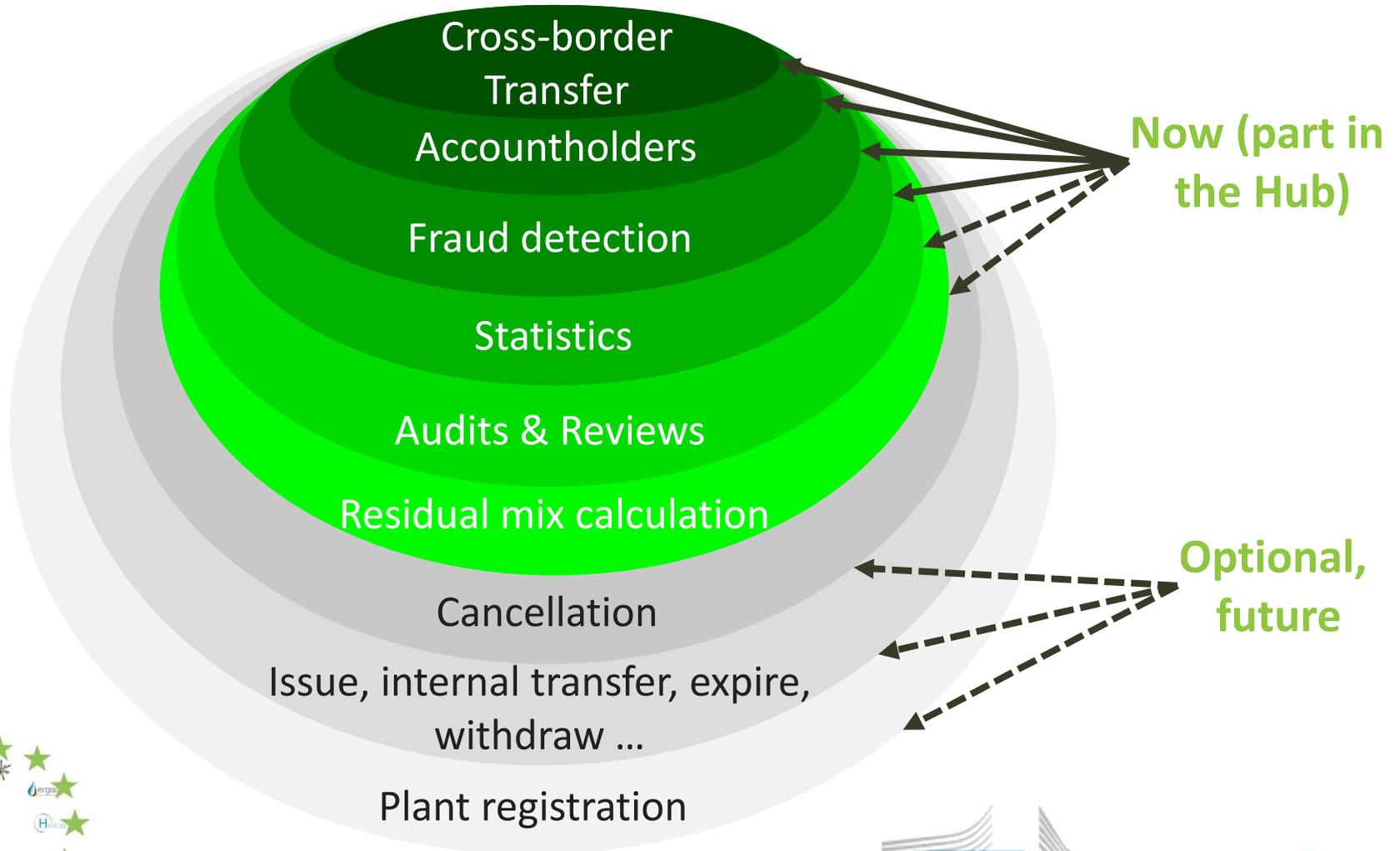


# Evolution



2006

2020+



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# Bonus .....

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A evolutionary solution means  
no need for change to EN 16325!



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# Main points

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1. Evolution, not revolution
2. Recognise that some activities are national, others are collective
  - *National authorities can organise as they wish*
3. Cooperation rather than centralisation
4. Cost allocation fair and proportional
5. Support for current and new issuing bodies and all energy carriers
6. Simplicity for account holders



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