
Electricity Emission Factors and Environmental Attributes

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Study overview

Explore implications of changing SA landscape for reporting of electricity sector emissions for reporting and policymaking

Provide insights into different kinds of electricity emissions factors used for different applications

Consider how trade in Environmental Attributes is treated in emissions calculations

Identify and describe systems, roles and responsibilities for robust EA measurement, verification and reporting, and grid emission factor calculations



Full report on Meridian website

Independent public benefit funded project, conducted in consultation with DFFE Steering Group



Uses of electricity emission factors

Policymaking and tracking of policy implementation at national and sub-national level:

- Establishment and tracking of decarbonisation policies
- Assessing emissions reductions from efficiency projects

Compliance with mandatory reporting and targets:

- International policies and regulations (e.g. CBAM)
- Domestic renewable energy targets at national, regional or local level could be mandated in SA in future, as in other jurisdictions

Voluntary entity-level reporting:

- Private sector companies and governments, including sub-national governments under pressure to track and mitigate GHG emissions
- Entities signing up to voluntary targets and reporting frameworks (RE100, REN21)



Ensuring accuracy of emission factors: accounting for EA markets

Accurate accounting for electricity-related emissions requires quantification and attribution of:

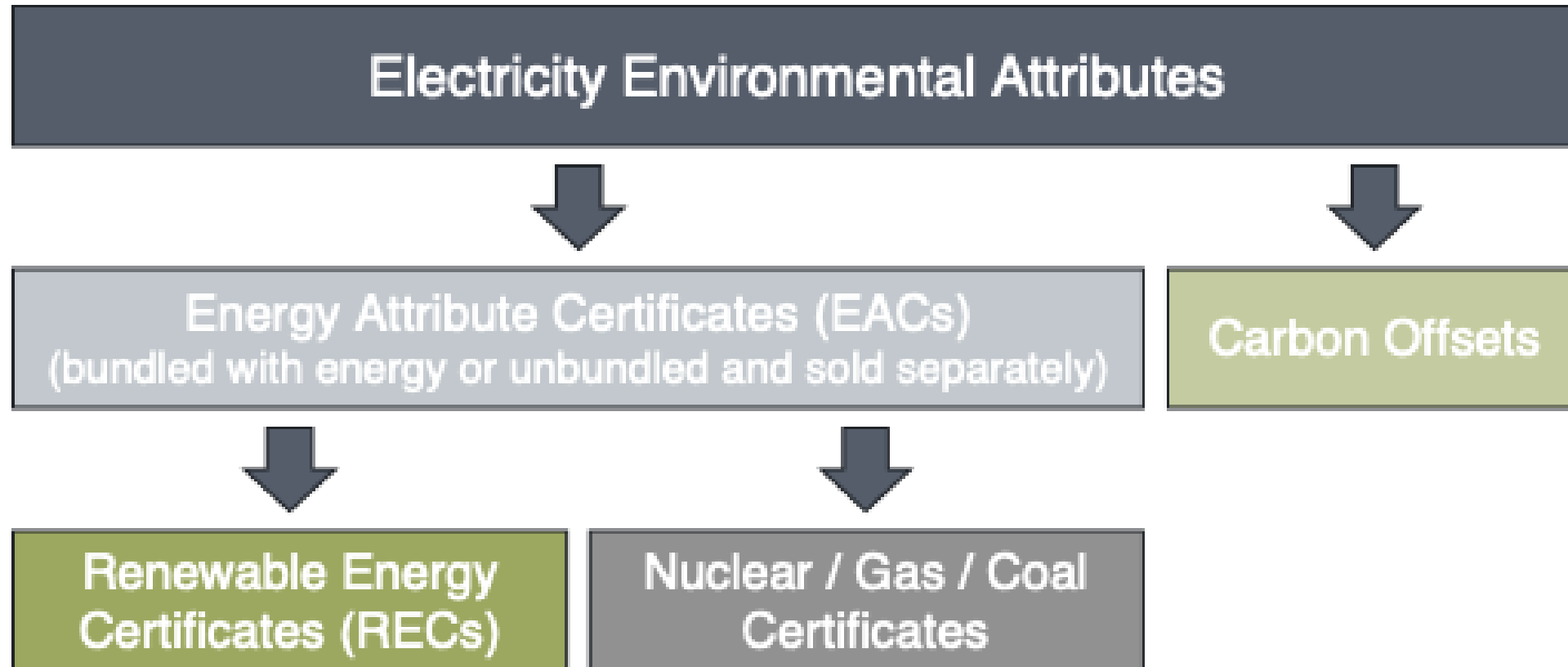
- emissions associated with each unit of electricity - **electricity emission factors**
- claims made to “greenness” or **environmental attributes**

EA is a **contractual instrument** that represents proof of renewable or environmental attributes of electricity

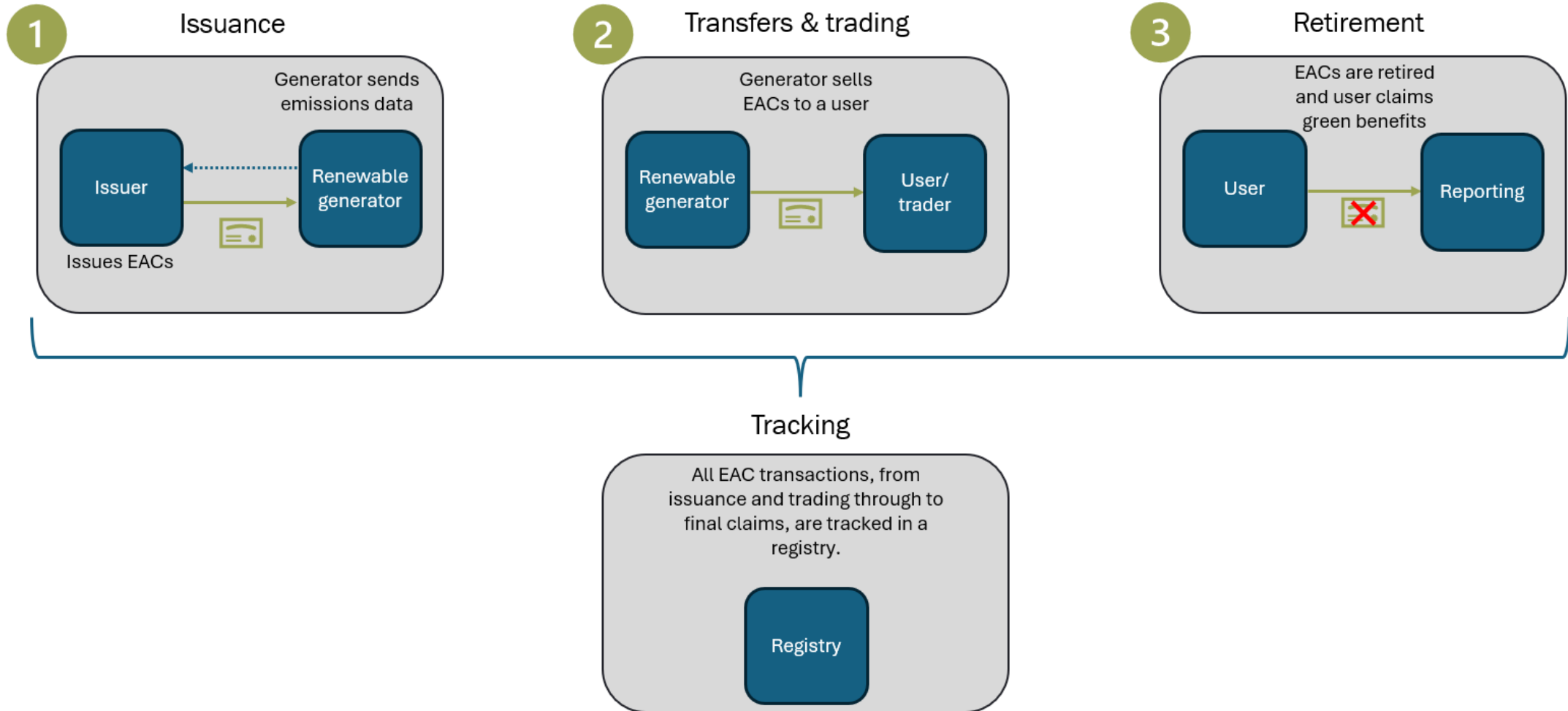
- Used to track, substantiate and trade claims of renewable energy consumption or emissions reductions
- Compliance with mandatory or voluntary energy attribute policies, schemes and targets



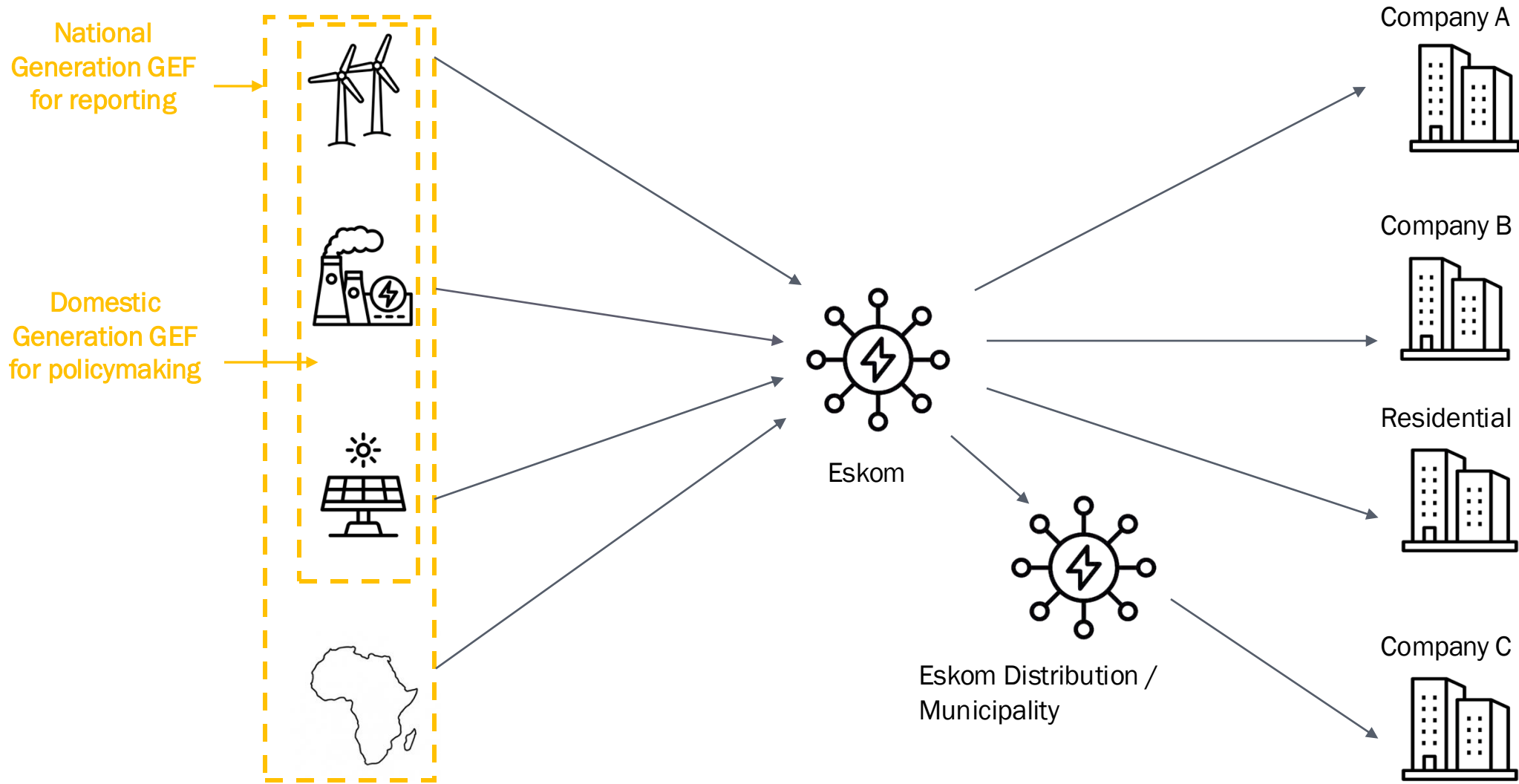
Environmental Attributes



EAC Life cycle

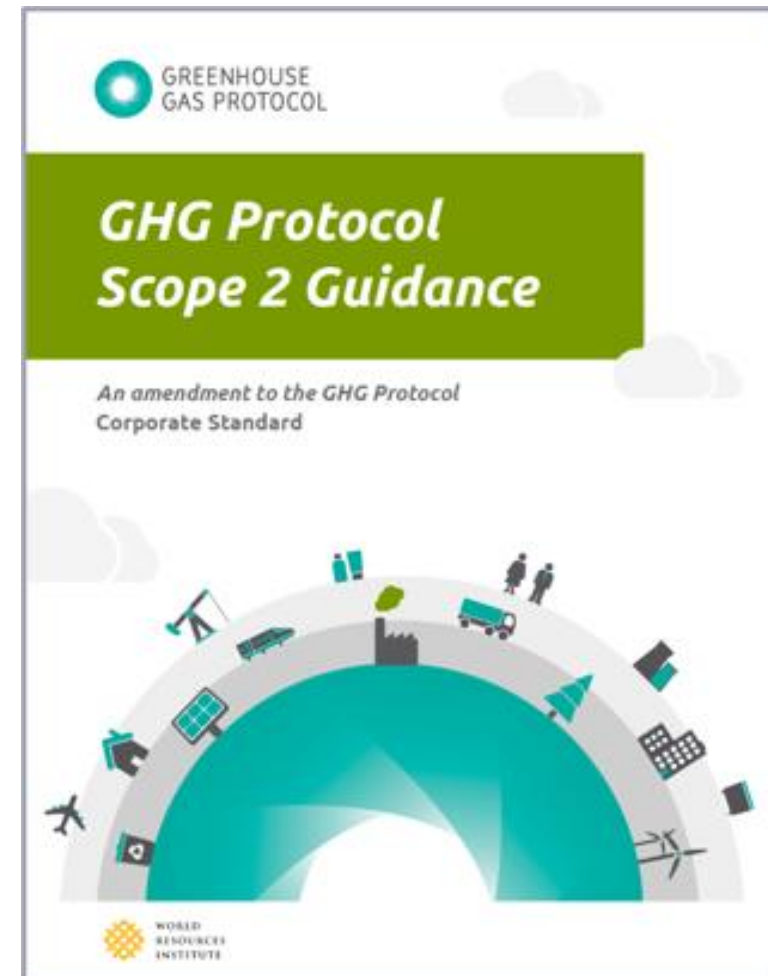


To date: Emissions factors in South Africa

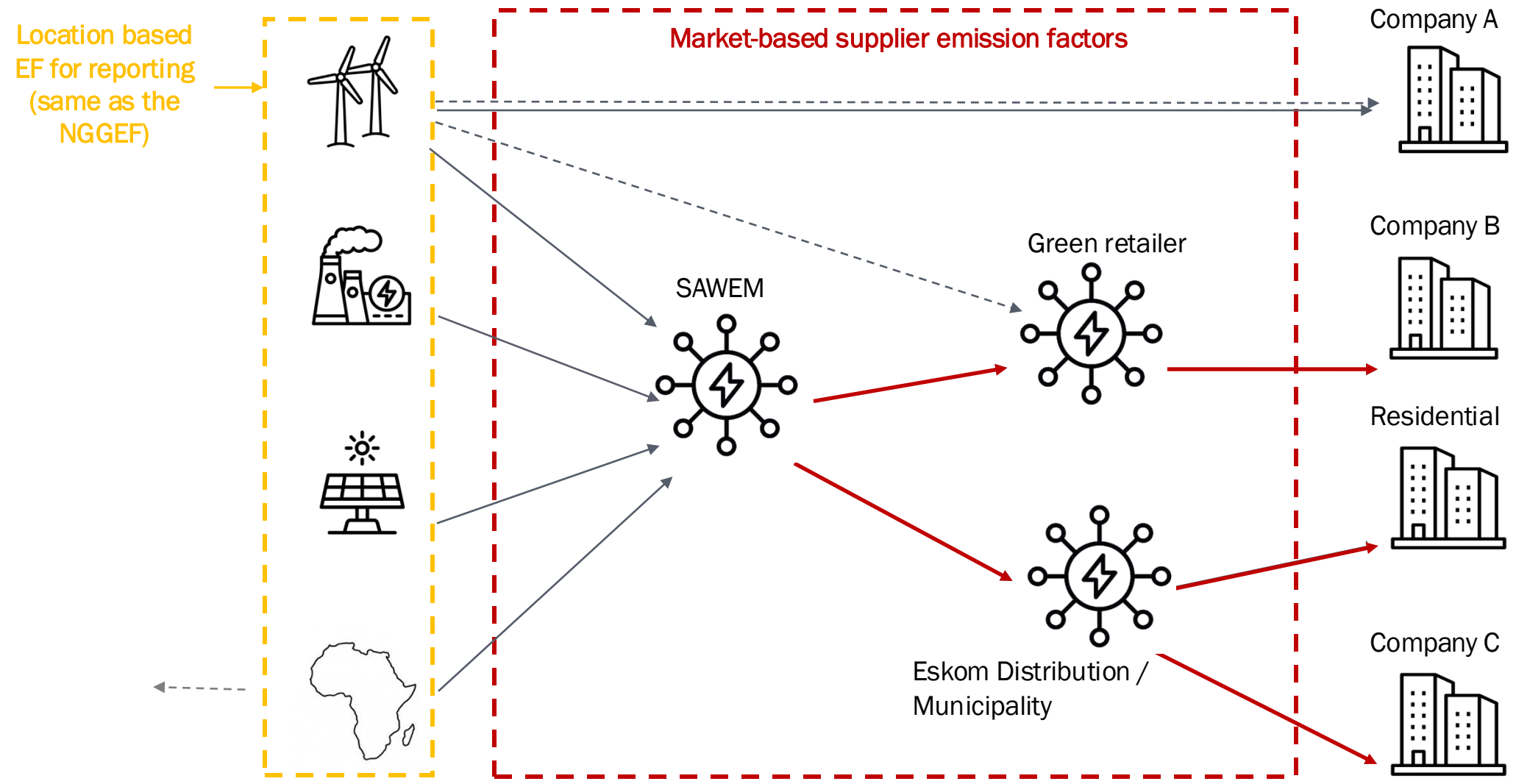


Enter EA markets and power sector reform

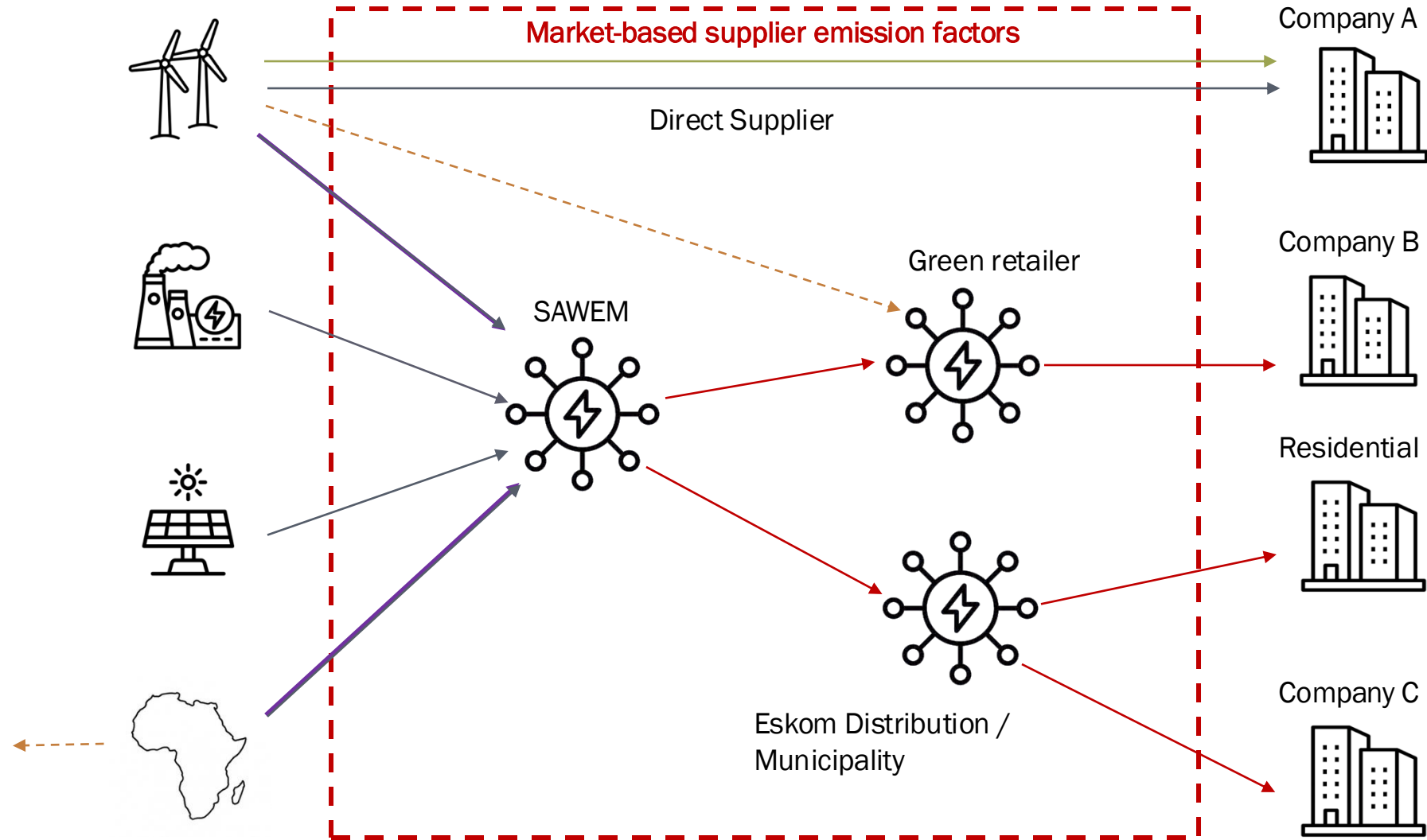
- The NGGEF and DGGEF are useful for policymaking purposes and reporting, **absent significant Environmental Attribute markets**.
- When Environmental Attributes have a value in addition to the electrons, through compliance markets or voluntary targets, **Environmental Attribute markets** allow customers to lay claim to these Attributes.
- Additional electricity emissions factors are required for **'market-based' reporting**.
- The **electricity market restructuring** presents additional complexity.
- The **GHG Protocol** is the industry standard for GHG reporting. Of relevance here is its Guidance for Scope 2 emissions.
- **Scope 2 emissions** are those emissions associated with generation of acquired and consumed electricity.



Scope 2 Market-based reporting overview

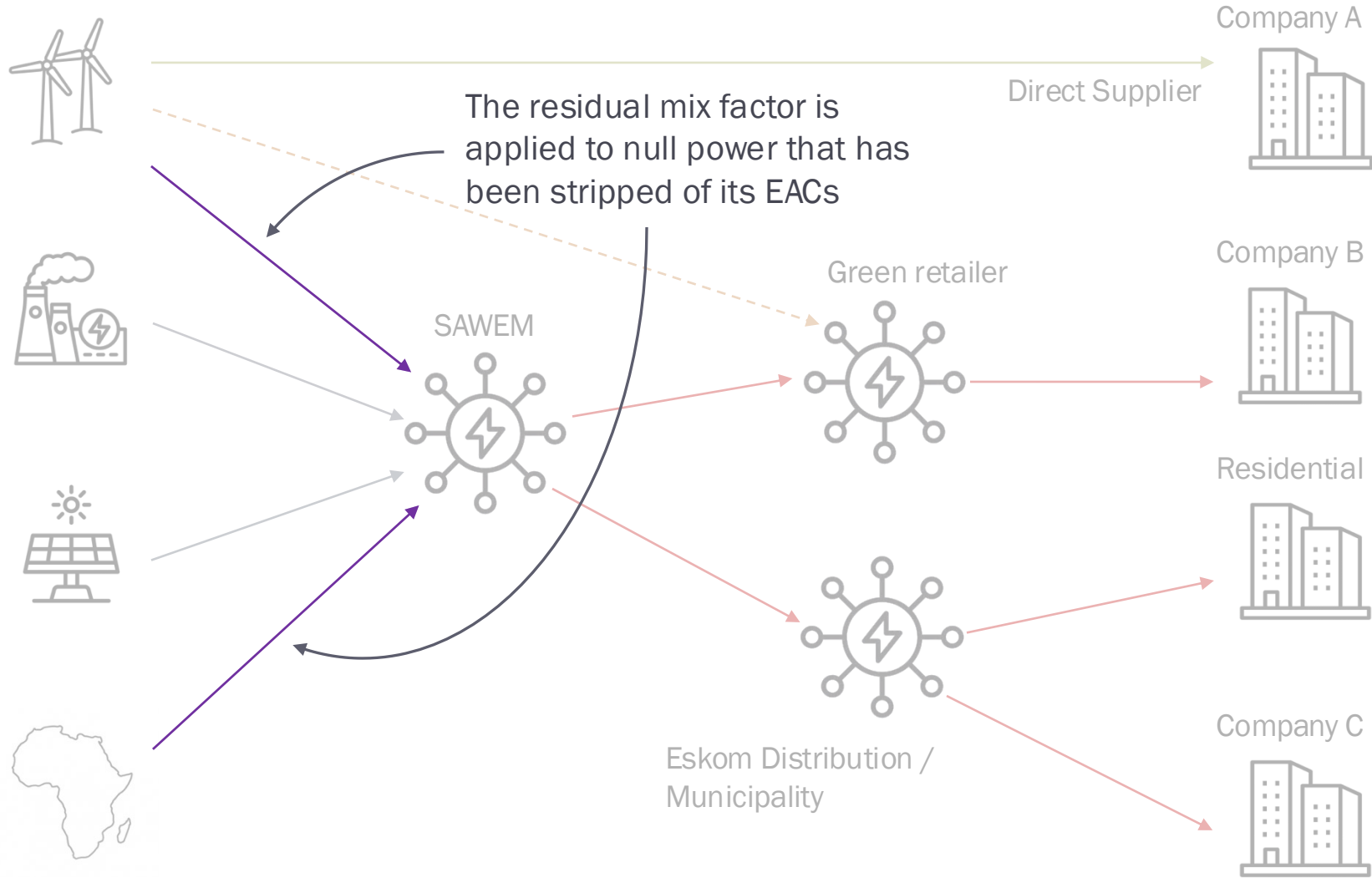


EA Contracting and supplier emissions factors



GRMEF: Emission factor for null power

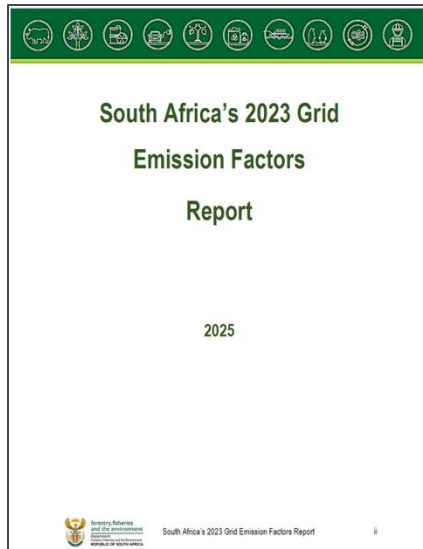
Grid Residual Mix Emission Factor
 An adjusted grid emission factor that accounts for retired EACs.



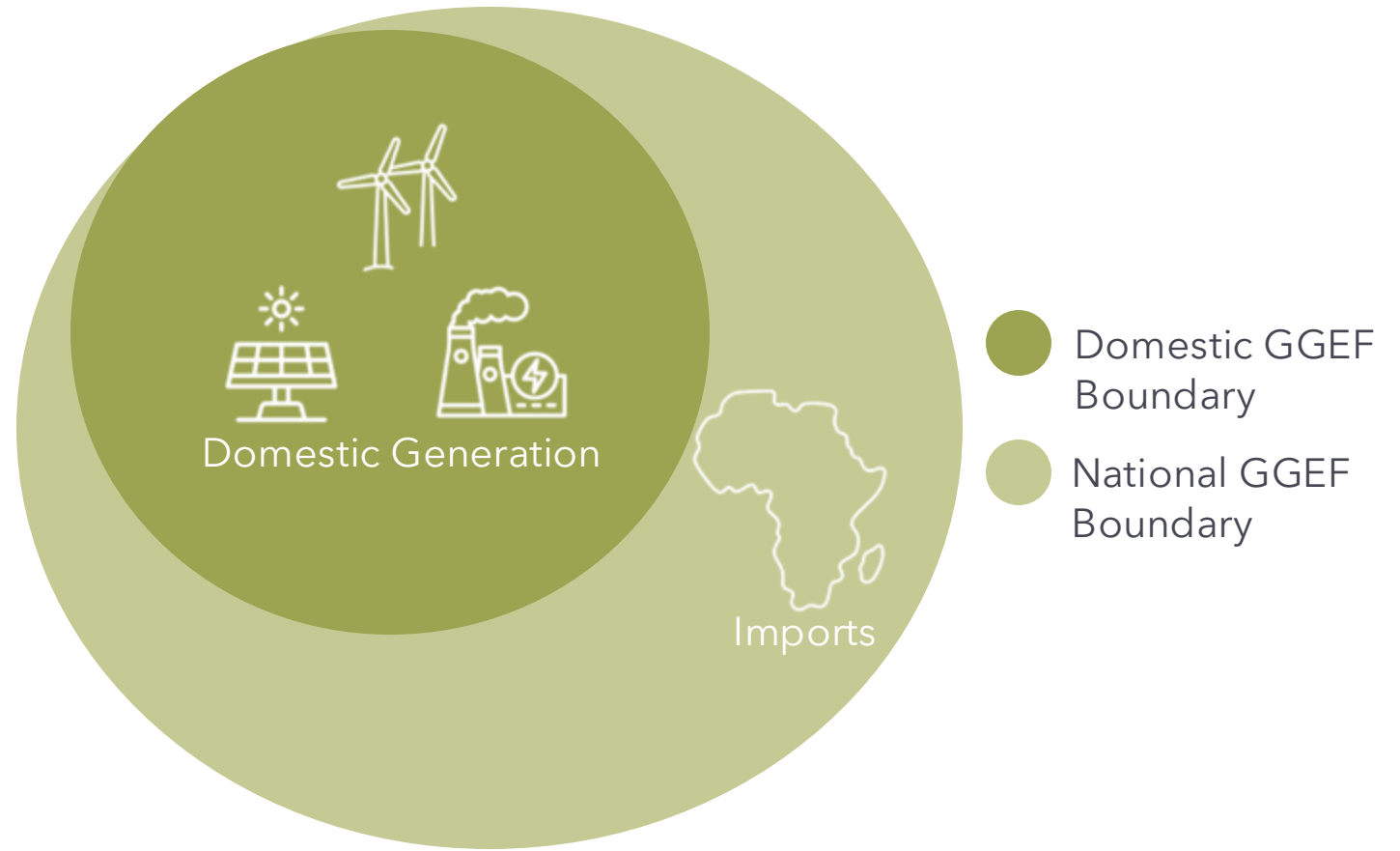
- Supplier emission factors
- Bundled EACs
- Unbundled EACs
- Null power



SA's Current Grid Emission Factors



1. Domestic Generation GEF
2. National Generation GEF
3. Transmission Losses GEF
4. Distribution Losses GEF



SA's Current Environmental Attribute Schemes

EACs



zaRECs administered by the Renewable Energy Certificates South Africa (RECSA) association based on the European EECs specifications



International Renewable Energy Certificate scheme (i-REC) used to track and claim consumption of renewable energy globally

Carbon Offsets



Carbon tax makes provision for portion of a company's tax liability to be offset using carbon offsets

International (Article 6) allows for international trade in emissions reductions



Voluntary schemes used by companies seeking to offset emissions for reporting purposes



What we need going forward

APPLICATION	ELECTRICITY EMISSION FACTOR	EAC / CARBON OFFSETS
Policymaking and tracking of policy implementation	Domestic Generation Grid Emission Factor Transmission Losses Grid Emission Factor Distribution Losses Grid Emission Factor	Carbon Offset Administration System (COAS) Article 6 registry
Compliance with mandatory and voluntary reporting and targets	National Generation Grid Emission Factor Transmission Losses Grid Emission Factor Distribution Losses Grid Emission Factor Grid residual mix emission factor Supplier EFs	Carbon Offset Administration System (COAS) Article 6 Registry Credible EAC tracking



Risks of not accurately accounting for EAs

Failing to accurately and transparently track, attribute, and incorporate **environmental attributes** into **electricity emission factors** bears risks:

- Double counting and greenwashing
- Market distortion and reduced investment
- Export penalties and trade barriers
- Risk of private sector capture of public environmental value
- Poor information for domestic climate policymaking



What needs to be resolved?

- Clarification on ownership of public EACs
- Policy mandates and legislative capabilities
- Scarce resources and prioritisation
- A strategic view of environmental attribute value in the energy transition
- In future:
 - More granular time matching of EACs
 - A distinction between the EFs of sub-grids such as provincial or municipal networks
 - Possibility domestic regulatory schemes at national, provincial or municipal levels.



Roles and responsibilities

- Report presents proposed current and future governance, compilation responsibilities, and data sources for:
 - NGGEF, DGGEF, Distribution and Transmission Grid Loss factors
 - Grid Residual Mix Emission Factor and Supplier Emissions Factors
 - RECs, nuclear and gas attributes
 - Carbon offsets
- Tracking, reporting and realising value from electricity environmental attributes is a cross-cutting issue involving range of institutions and stakeholders.
 - Key players include System Operator, DFFE, Carbon Offset and REC registries, Eskom
 - Recommend inter-departmental government working group (including DFFE, DoEE, and NT.)
 - Working group will need to engage with Eskom, NTCSA, Municipalities, EAC sector players, Industry and others.
 - Important to maintain a distinction between Government and market players



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