ESG Calculator

Company Parameters (Profile) – Setup Once

These are **not** annual inputs. They configure factors/benchmarks.

Missing:

-Fiscal year starts

Annual ESG Inputs 3.1 Environmental (E)

3.1.1 GHG Emissions (Scopes 1, 2, 3, GHG Protocol)

Input	Unit	Scope	CSV/Manual Column
Diesel consumed	L	S1	Diesel_Liters
Gasoline consumed	L	S1	Gasoline_Liters
Natural gas	kWh	S1	Gas_kWh
Refrigerant leaks (by gas)	kg (per gas type)	S1	Refrigerant_{GasCode}_kg
Electricity consumed	kWh	S2	Electricity_kWh
Purchased heat/steam	kWh	S2	Heat_kWh
Business travel (mode)	km	S3	Travel_{mode}_km
Freight transport	ton·km	S3	Freight_tonkm
Purchased goods/services	€ by category	S3	Spend_{cat}_EUR
Waste to disposal	kg by type	S3	Waste_{type}_kg
Employee commuting	km	S3	Commuting_km
% Renewable electricity	%	S2	Improves emissions score

Formulas

tCO2e = Activity_Data * Emission_Factor / 1000

Scope1 = Σ(fuels + refrigerants)

Scope2 = Σ(electricity + heat/steam)
Scope3 = Σ(travel + freight + spend + waste + commuting)
Total_GHG = S1 + S2 + S3
All EF must be kgCO2e per activity unit (or convert). Store EF_version, EF_source, country.

Derived Intensities

IC_revenue = Total_GHG / Annual_Revenue_€
IC_employee = Total_GHG / Headcount
Emissions Score (0–100, lower intensity is better)

score_emissions = 100 * (IC_ref_max - IC_revenue) / (IC_ref_max - IC_ref_min)
if Renewable_% > 0: score_emissions += min(10, Renewable_% / 10)
clamp 0..100

3.1.2 Energy

Inputs:

- Energy_total_kWh (sum electricity + heat + fuels converted to kWh)

- Renewable_% (from CompanyProfile, but allow annual override)

Conversions (if needed):

- Diesel to kWh: Liters * LHV_kWh_per_Liter (use standard LHV constants)

- Gasoline to kWh: idem

Formulas:

Energy_intensity = Energy_total_kWh / Annual_Revenue_€
score_energy = 0.6 * linear_minmax(Energy_intensity) + 0.4 * (Renewable_%)
(linear_minmax(x) = 100*(max_ref - x)/(max_ref - min_ref), clamp 0..100)

3.1.3 Water

Inputs:

- Water_m3_total

- Water_reuse_% (optional)

Formulas:

Water_intensity = Water_m3_total / Annual_Revenue_€
score_water = 0.8 * linear_minmax(Water_intensity) + 0.2 * Water_reuse_%

3.1.4 Waste & Circularity

Inputs:

- Waste_total_kg

- Recycled_%

- Hazardous_% (optional; may trigger warnings)

- Sustainable_materials_% (optional)

- Recycled_materials_% (optional)

Formulas:

Waste_intensity = Waste_total_kg / Annual_Revenue_€
score_waste = 0.5 * linear_minmax(Waste_intensity) + 0.5 * Recycled_%
score_materials = average(Recycled_materials_%, Sustainable_materials_%) # if both present

3.1.5 Biodiversity

Inputs (if company has projects):

- GreenArea_restored_m2

- Species_supported_count

Formula (simple proxy):

score_biodiversity = min(100, (GreenArea_restored_m2 / Sector_Target_m2) * 100)

3.1.6 Environmental Pillar Aggregation

E_total = 0.45*score_emissions + 0.20*score_energy +
      0.15*score_water + 0.15*score_waste +
      0.05*score_materials # redistribute if missing
clamp 0..100

3.2 Social (S)

3.2.1 Diversity

Inputs:

- Employees_total

- Women_total_%

- Women_management_%

Formula:

score_diversity = average(Women_total_%, min(100, (Women_management_%/40%)*100))

3.2.2 Employment & Stability

Inputs:

- Permanent_contracts_%

- Turnover_rate_%

Formula:

score_stability = 0.6*Permanent_% + 0.4*(100 - Turnover_%)

3.2.3 Training & Development

Inputs:

- Training_hours_per_employee

- Employees_trained_% (optional)

Formula:

score_training = min(100, (Training_hours_per_employee / 15) * 100)

3.2.4 Health & Safety

Inputs:

- Incidents_count (annual)

- Safety_plan_active (Y/N)

Formula:

frequency_rate = Incidents_count / Employees_total * 100
score_safety = max(0, 100 - frequency_rate*10)
if not Safety_plan_active: score_safety -= 20
clamp 0..100

3.2.5 Community & Local Suppliers

Inputs:

- CSR_spend_EUR

- Volunteer_hours

- Local_suppliers_%

Formula:

score_community = min(100, (Local_suppliers_%/70)*100)
if Volunteer_hours > 50: score_community += 5
clamp 0..100

Social Pillar Aggregation

S_total = 0.25*score_diversity + 0.20*score_stability +
     0.15*score_training + 0.25*score_safety +
     0.15*score_community   # redistribute if missing
clamp 0..100

3.3 Governance (G)

Ethics & Compliance

Input	Type	Formula
Code of ethics	Y/N	
Anti-corruption policy	Y/N	
Ethics training (annual)	Y/N	

Score

score_ethics = (positives / 3) * 100

Transparency & Reporting

Input	Type	Formula
ESG report published	Y/N	
External audit performed	Y/N	
ESG data on website	Y/N	
Financial statement disclosed	Y/N	

Score

score_transparency = (positives / 4) * 100

Board Composition & Diversity

Input	Unit	Formula
Total board members	#	—
Women on board	#	(women_board / total_board)*100
Independent members	#	(independent / total_board)*100

Scores

score_board_gender = min(100, (board_gender_% / 40)*100)
score_board_independence = min(100, (independent_% / 50)*100)
score_board = 0.6*score_board_gender + 0.4*score_board_independence

ESG Risk Management

Input	Type	Formula
ESG risks identified	Y/N	
ESG manager/committee	Y/N	
ESG policy reviewed annually	Y/N	
ESG KPIs integrated	Y/N	

Score

score_risks = (positives / 4) * 100

Data Protection & Whistleblowing

Input	Type	Formula
GDPR compliant	Y/N	
Active whistleblowing channel	Y/N	
Incidents reported	#	Penalty

Score

score_data = (positives / 2)*100
if incidents > 0: score_data -= min(10, incidents*5)

G Pillar aggregation

G_total = 0.20*score_ethics + 0.20*score_transparency +
     0.20*score_board + 0.20*score_risks +
     0.20*score_data

ESG Total Score

ESG_total = 0.40*E_total + 0.30*S_total + 0.30*G_total
clamp 0..100
Classification

- 0–39: High Risk

- 40–69: In Transition

- 70–100: Advanced / Sustainable

Compliance Mapping (inside ESG → "Compliance" tab)

No new data; it translates ESG results to each framework:

Framework	Logic
CSRD/ESRS	% of relevant ESG disclosures available with evidence
GRI	% of matching indicators completed
Ecovadis	Weighted ESG average + % auditable evidence
BCorp	Threshold (e.g., ESG_total > 80) + additional verification

Implement as: list of required indicators per standard, mark **Covered / Missing / Estimated** and compute %Compliance.

Normalization, Benchmarks & Functions

Min–Max Normalization

$\text{linear\_minmax}(x; \text{min\_ref}, \text{max\_ref}) = 100 * (\text{max\_ref} - x) / (\text{max\_ref} - \text{min\_ref})$
$\text{linear\_minmax\_pos}(x; \text{min\_ref}, \text{max\_ref}) = 100 * (x - \text{min\_ref}) / (\text{max\_ref} - \text{min\_ref})$
clamp 0..100
- Use SectorBenchmarks per country/sector. If absent, use platform percentiles.

Renewable Bonus (E)

$\text{bonus} = \min(10, \text{Renewable\_\%} / 10)$

Data Quality & Missing Data

Quality flags per field: Measured | Estimated | Missing

Rules:

- **Critical fields** (Electricity_kWh, Fuels, Employees, Revenue): allow **Estimated** (via IA or sector averages) but apply penalty.

- **Penalty** (global):

$\text{penalty} = \min(10, 2 * \text{number\_of\_critical\_estimated\_fields})$
$\text{ESG\_total} = \max(0, \text{ESG\_total} - \text{penalty})$

- If a sub-indicator is missing (non-critical), **redistribute its weight** proportionally.

Show quality badges in UI per indicator and in the PDF report.

CSV/Excel Templates (for companies without ERP)

Single-sheet template (must be recognized by importer):

Column name	Type	Example
Year	int	2025
Country	text	Spain
Sector	text	Manufacturing
Revenue_EUR	number	2000000
Employees	int	25
Electricity_kWh	number	120000
Renewable_pct	number(0–100)	40
Diesel_Liters	number	12000
Gasoline_Liters	number	3000
Gas_kWh	number	10000
Refrigerant_R134a_kg	number	5
Heat_kWh	number	2000
Travel_air_km	number	15000
Travel_train_km	number	4000
Travel_car_km	number	8000
Freight_tonkm	number	120000
Spend_rawmaterials_EUR	number	300000
Spend_services_EUR	number	150000
Waste_total_kg	number	18000
Waste_recycled_pct	number	60
Water_m3	number	2500
Water_reused_pct	number	10
Women_total_pct	number	45
Women_management_pct	number	35
Permanent_contracts_pct	number	85
Turnover_pct	number	10
Training_hours_per_employee	number	12
Safety_plan_active	Yes/No	Yes

Incidents_count	int		1
Local_suppliers_pct	number		50
CSR_spend_EUR	number		3000
Code_of_ethics	Yes/No	Yes	
Anti_corruption_policy	Yes/No	Yes	
Ethics_training	Yes/No	No	
ESG_report_published	Yes/No	Yes	
External_audit	Yes/No	No	
ESG_data_on_website	Yes/No	Yes	
ESG_risk_assessment	Yes/No	No	
ESG_manager_assigned	Yes/No	Yes	
ESG_plan_reviewed	Yes/No	No	
GDPR_compliant	Yes/No	Yes	
Whistleblowing_channel	Yes/No	Yes	
Incidents_reported	int		0

Importer behavior

- Validate headers & types; show mapping UI if columns differ.

- Units: kWh, L, kg, m³, €, %, km, ton·km.

- After import → run calculation and show quality flags (CSV counts as *Measured* unless user tags differently).

Manual Forms (section & fields)

Environmental

- Electricity_kWh, Renewable_%

- Diesel_Liters, Gasoline_Liters, Gas_kWh, Heat_kWh

- Refrigerant_{gas}_kg

- Water_m3, Water_reused_%

- Waste_total_kg, Waste_recycled_%, Hazardous_%

- Travel_air_km, Travel_train_km, Travel_car_km

- Freight_tonkm

- Spend_rawmaterials_EUR, Spend_services_EUR (extendable categories)

- (Optional) Recycled_materials_%, Sustainable_materials_%

- (Optional) GreenArea_restored_m2

Social

- Employees, Women_total_%, Women_management_%

- Permanent_contracts_%, Turnover_%

- Training_hours_per_employee, Employees_trained_%

- Safety_plan_active (Y/N), Incidents_count

- Local_suppliers_%, Volunteer_hours, CSR_spend_EUR

Governance

- Y/N fields listed in Section 3.3 + Incidents_reported

Calculation Pseudocode

```
function calc_ESG(companyProfile, esgInputs, factors, benchmarks):
  # GHG
  s1 = fuels_to_tCO2e(esgInputs, factors) + refrigerants_to_tCO2e(esgInputs,
factors)
  s2 = electricity_to_tCO2e(esgInputs, factors) + heat_to_tCO2e(esgInputs, factors)
  s3 = travel_to_tCO2e(esgInputs, factors) + freight_to_tCO2e + spend_to_tCO2e +
waste_to_tCO2e + commuting_to_tCO2e
  total = s1 + s2 + s3

  ic_rev = total / companyProfile.revenue
  score_emissions = minmax(ic_rev, bench.IC_min, bench.IC_max) +
bonus_renewable(companyProfile.renewable_pct)

  energy_intensity = esgInputs.energy_kWh_total / companyProfile.revenue
  score_energy = 0.6*minmax(energy_intensity, bench.Energy_min, Energy_max) +
0.4*companyProfile.renewable_pct

  water_intensity = esgInputs.water_m3 / companyProfile.revenue
  score_water = 0.8*minmax(water_intensity, bench.Water_min, Water_max) +
0.2*esgInputs.water_reused_pct

  waste_intensity = esgInputs.waste_kg / companyProfile.revenue
  score_waste = 0.5*minmax(waste_intensity, bench.Waste_min, Waste_max) +
0.5*esgInputs.recycled_pct

  score_materials = avg_if_present(esgInputs.recycled_materials_pct,
esgInputs.sustainable_materials_pct)

  E = weighted_sum([score_emissions, score_energy, score_water, score_waste,
score_materials], weights_E)

  # Social
  score_div = avg(esgInputs.women_total_pct, clamp((esgInputs.women_mgmt_pct/
40)*100))
  score_stab = 0.6*esgInputs.permanent_pct + 0.4*(100 - esgInputs.turnover_pct)
  score_train = clamp((esgInputs.training_hours/15)*100)
  freq_rate = esgInputs.incidents / companyProfile.employees * 100
  score_safe = clamp(100 - freq_rate*10) - (20 if !esgInputs.safety_plan_active else
0)
```

```
  score_comm = clamp((esgInputs.local_suppliers_pct/70)*100) + (5 if
esgInputs.volunteer_hours > 50 else 0)
  S = weighted_sum([score_div, score_stab, score_train, score_safe, score_comm],
weights_S)

  # Governance
  score_ethics = ratio_yes([ethics_code, anti_corruption, ethics_training])*100
  score_transp = ratio_yes([esg_report, external_audit, web_disclosure])*100
  score_risks = ratio_yes([risk_assessment, esg_manager, annual_review])*100
  score_data = ratio_yes([gdpr, whistleblowing])*100 - (10 if incidents_reported>0
else 0)
  G = weighted_sum([score_ethics, score_transp, score_risks, score_data],
weights_G)

  ESG = clamp(0.40*E + 0.30*S + 0.30*G)

  # Quality penalty
  penalty = 2 * count_critical_estimated(esgInputs)
  ESG = max(0, ESG - min(10, penalty))

  compliance = map_to_frameworks(ESG, available_disclosures(esgInputs))
  return {E,S,G,ESG, scopes:[s1,s2,s3], compliance}
```

Outputs & Reports

- KPIs: E/S/G, ESG_total, Scopes 1/2/3, intensities (per € / per employee),
  Renewable %, Water m³, Waste kg & Recycled %.

- Charts: ESG radar, bars per sub-area, year-over-year lines, impact balance (if
  Impact module active).

- Compliance: % per framework + gaps list.

- **PDF Export**: company profile summary, methods, EF versions, results, quality
  flags.

Versioning & Auditability

- Store EF_version, Benchmark_version, Calc_version, Timestamp.

- Log raw inputs (source: ERP/CSV/Manual), units, converters, and data_quality.

- Keep yearly records (ESGRecord) for trends.

Security & Privacy

- Tenant isolation: company sees only its data.

- Role-based access: CompanyAdmin / Editor / Viewer / ExternalConsultant.

- PII minimized in ESG tables; HR breakdowns as aggregates.