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Reproducibility Package

Project-Level Learning Lowers Conflict Cost Premium of Energy Access

Companion manuscript (Word):

../PRWP/Yemen_Paper_Energy_Access_Conflict_Final.docx

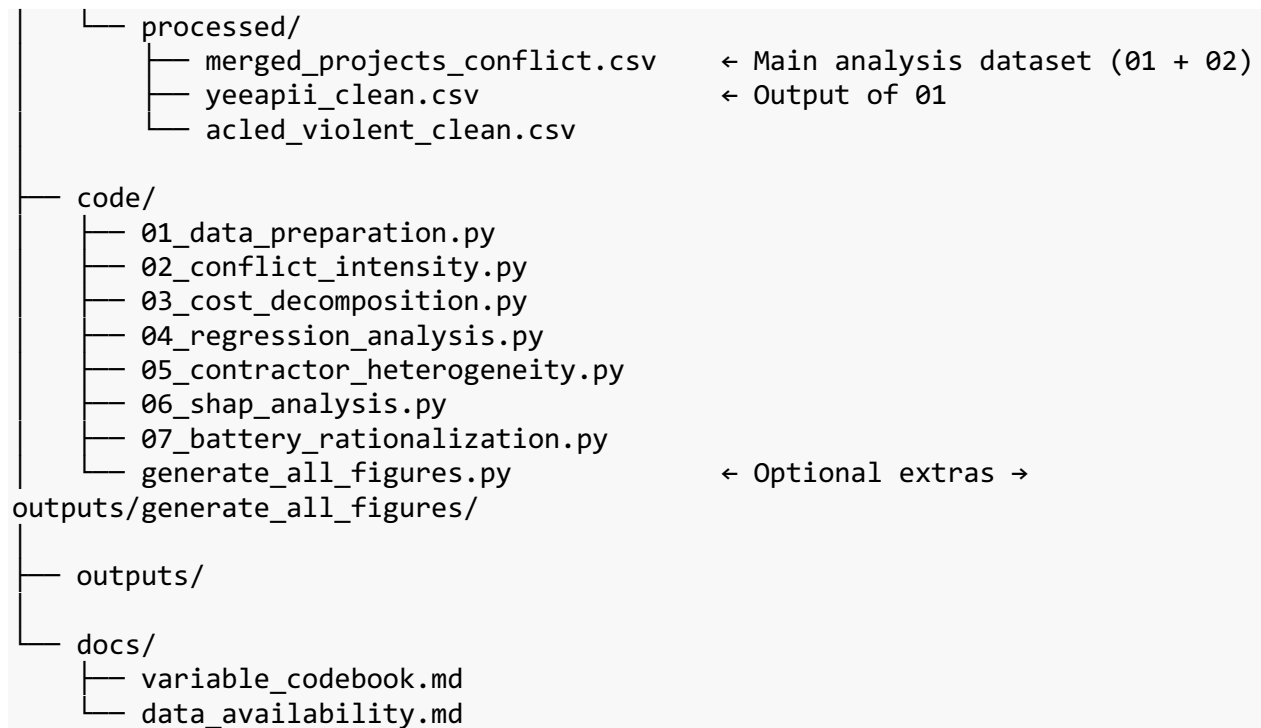
Overview

The paper studies **energy access in conflict-affected Yemen** using project-level data from the **Yemen Emergency Electricity Access Project Phases I and II (YEEAP-I & YEEAP-II)**. The manuscript reports **923 World Bank–financed solar PV installations (June 2019–December 2025, about US\$ 150 million total financing)**, implemented with **UNOPS** oversight. Main claims include: a **price decomposition** attributing **16.8 percentage points** of cost reduction to **project-level factors**; a **SHAP** decomposition in which **project-level learning** explains **45.2%** of project-level cost variation; **evolution of the conflict–cost relationship** across procurement cycles; and **converging cost trajectories** across governorates with **escalating vs. de-escalating** violence.

This folder provides code and sample data to reproduce the **YEEAP-II project-level pipeline: 472 sites (P10–P17, ~July 2023–August 2025)**, plus ACLED-based conflict exposure and package-level fields from **YEEAP-data.xlsx**. Optional script **generate_all_figures.py** builds additional paper-style visuals using **Macro-data** and **Project-level data** (YEEAP-I and II). It does not replace the numbered pipeline for Tables 1–2 / fig1–fig8.

Directory Structure

```
yeeap_reproducibility/
├── README.md                                ← This file
├── data/
│   ├── raw/
│   │   ├── YEEAPII_Projects.xlsx           ← Project-level YEEAP-II (sheet:
YEEAPII Projects)
│   │   ├── YEEAP-data.xlsx                 ← Macro-data + Project-level data
(see scripts)
│   │   ├── YEEAP_data_contractors.xlsx     ← Sheet: YEEAP-II
│   │   └── acled_counts_by_governorate_month_event_type.csv
```



Data Sources

Dataset	Description	Access
YEEAP-II project data	472 installations; facility type, governorate, capacity, package, cost	Programme / World Bank per manuscript
YEEAP workbook	Macro-data: package dates, costs, batteries (I & II); Project-level data: for optional figures	UNOPS / programme per manuscript
Contractor file	Engagements & Rollout-* F / package labels on sheet YEEAP-II	Programme per manuscript
ACLED	Governorate × month × event type	https://acleddata.com

Workbook sheets: Main pipeline uses **Macro-data** (not a tab named YEEAP-II).
generate_all_figures.py also needs **Project-level data**.

Software Requirements

Python 3.9+

```
pip install pandas numpy scipy statsmodels xgboost shap matplotlib openpyxl
```

Execution Order

From code/:

```
cd code/  
python 01_data_preparation.py  
python 02_conflict_intensity.py  
python 03_cost_decomposition.py  
python 04_regression_analysis.py  
python 05_contractor_heterogeneity.py  
python 06_shap_analysis.py  
python 07_battery_rationalization.py
```

Optional (extra PNGs under outputs/generate_all_figures/):

```
python generate_all_figures.py
```

Approximate runtime: **3–5 minutes** for the main pipeline; a bit longer with generate_all_figures.py.

Mapping: manuscript → scripts

Paper element	Reproduced by
Fig 1–2: YEEAP-II cost trends & waterfall	03_cost_decomposition.py
Fig 3–4: conflict premium by phase; DiD	04_regression_analysis.py
Fig 5: contractor learning (PV-adjusted)	05_contractor_heterogeneity.py
Fig 6: SHAP	06_shap_analysis.py
Fig 7–8: battery autonomy & channels	07_battery_rationalization.py
Table 1: OLS	04_regression_analysis.py
Table 2: contractors	05_contractor_heterogeneity.py
Abstract: 45.2% learning (SHAP)	06_shap_analysis.py → table_shap_importance.csv
Abstract: 16.8 pp decomposition	Tie to 03 + manuscript; confirm wording in latest draft
Early / late conflict premium	04_regression_analysis.py (use printed coefficients)
Autonomy ~8.6 h → ~5.1 h (P10–P17)	07_battery_rationalization.py
Extra I + II / heatmap-style figures	generate_all_figures.py (optional)

Conflict Data (ACLED)

- **Country:** Yemen
 - **Disaggregation:** Admin1, month, event type
 - **Include:** Battles; Explosions/Remote violence; Violence against civilians; Riots
 - **Exclude:** Protests; Strategic developments (manuscript §3.2)
 - **Weights:** Battles 3, Explosions/Remote violence 3, Violence against civilians 2, Riots 1
 - **Project variable:** weighted sum in **six months before** award date
(02_conflict_intensity.py)
-

Citation: Ali Ahmad. (2026). Project-Level Learning Lowers Conflict Cost Premium of Energy Access.

Contact

For questions about data access, code, or citation, please contact the Ali Ahmad.