
Resilient Ridgewood

**Spring 2024 Capstone
Village of Ridgewood, New Jersey**

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AGENDA

01

BACKGROUND

Climate Change and Urban
Environments

02

The Problem

Our Approach

03

ANALYSIS

Possible Solutions & Their
Feasibility

04

RECOMMENDATIONS

Timeline & Recommended Solutions

05

NEXT STEPS

Budgeting & Organization



Climate Change and Urban Environments: The Case of Ridgewood, NJ

Ridgewood: Town Characteristics & Key Issues



Population:
26,202



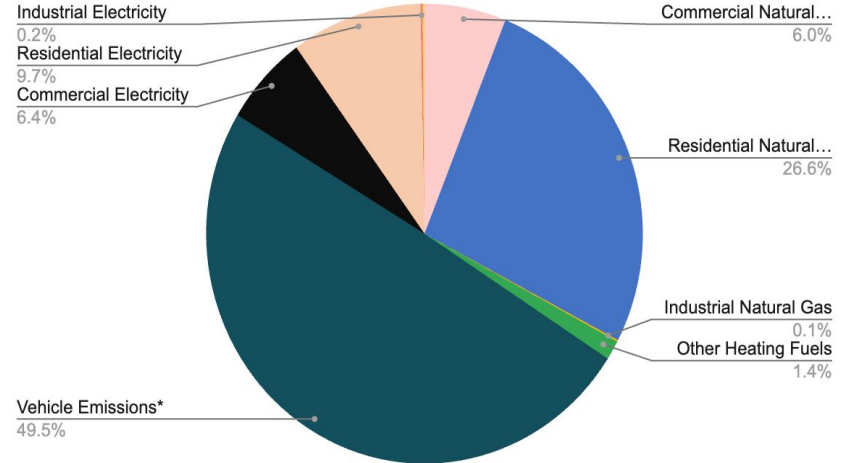
Household
income:
\$200,00



Terrain: Steep Hills,
impermeable surfaces,
flood prone

21% of Homes at Risk of
Flood Damage

Ridgewood's Emissions Profile (%MTCO₂e)



High **Residential Electricity** &
Gasoline Consumption

THE ASK: A STRATEGIC SUSTAINABILITY ROADMAP

To support Green Ridgewood's efforts in Flood Mitigation and Decarbonization

Project Teams & Tasks



Flooding



Decarbonization



Funding

KEY TASKS: Flood Risk Modeling, Emissions Evaluation, Budget Evaluation, Expert and Local Stakeholder Interviews, and Literature Review

OPTIONS: FLOOD MITIGATION

RAIN BARRELS



**NONLINEAR
WEIRS**



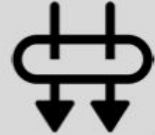
**RIVER
REDIRECTION**



**INFILTRATION
BASINS**



**PERMEABILITY
MEASURES**



**UNDERGROUND
BASINS**



**NATURAL GRASS &
WETLANDS**



BARRAGES



OPTIONS: DECARBONIZATION

**POWER PURCHASE
AGREEMENT**



**PARK & RIDE
SCHEMES**



ELECTRIC VEHICLES



**BUILDING
EFFICIENCY**



WASTE RECYCLING



**CARPOOLING
INITIATIVES**



SOLAR MICROGRIDS



**BIKE SHARE
PROJECTS**



ASSESSMENT CRITERIA



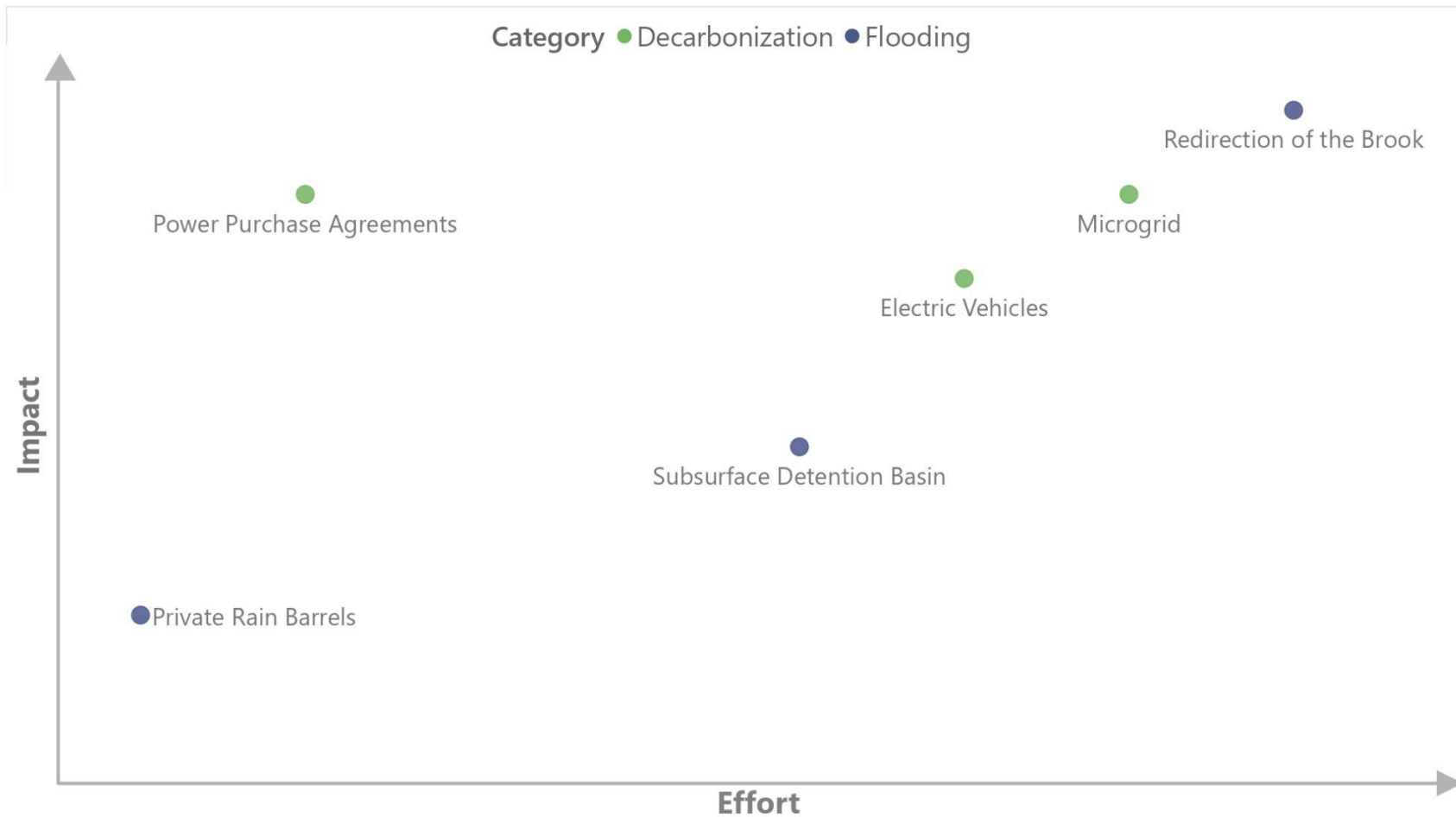
THE FOCUS:

High Impact Cost Effective Solutions

Impact-Effort Matrix of Proposed Solutions



Impact-Effort Matrix of Proposed Solutions



Flood Mitigation Recommendations



Short-Term

Rain Barrels



Medium-Term

Underground Detention Basins



Long-Term

River Redirection

PSE&G relied on these energy resources to provide this electricity product.

Coal	17.13
Gas	42.65
Hydroelectric (large)	0.95
Nuclear	33.11
Oil	0.24

Decarbonization Recommendations



Short-Term

Power Purchase
Agreements (PPA)



Medium-Term

Municipal and Private Vehicle
Electrification



Long-Term

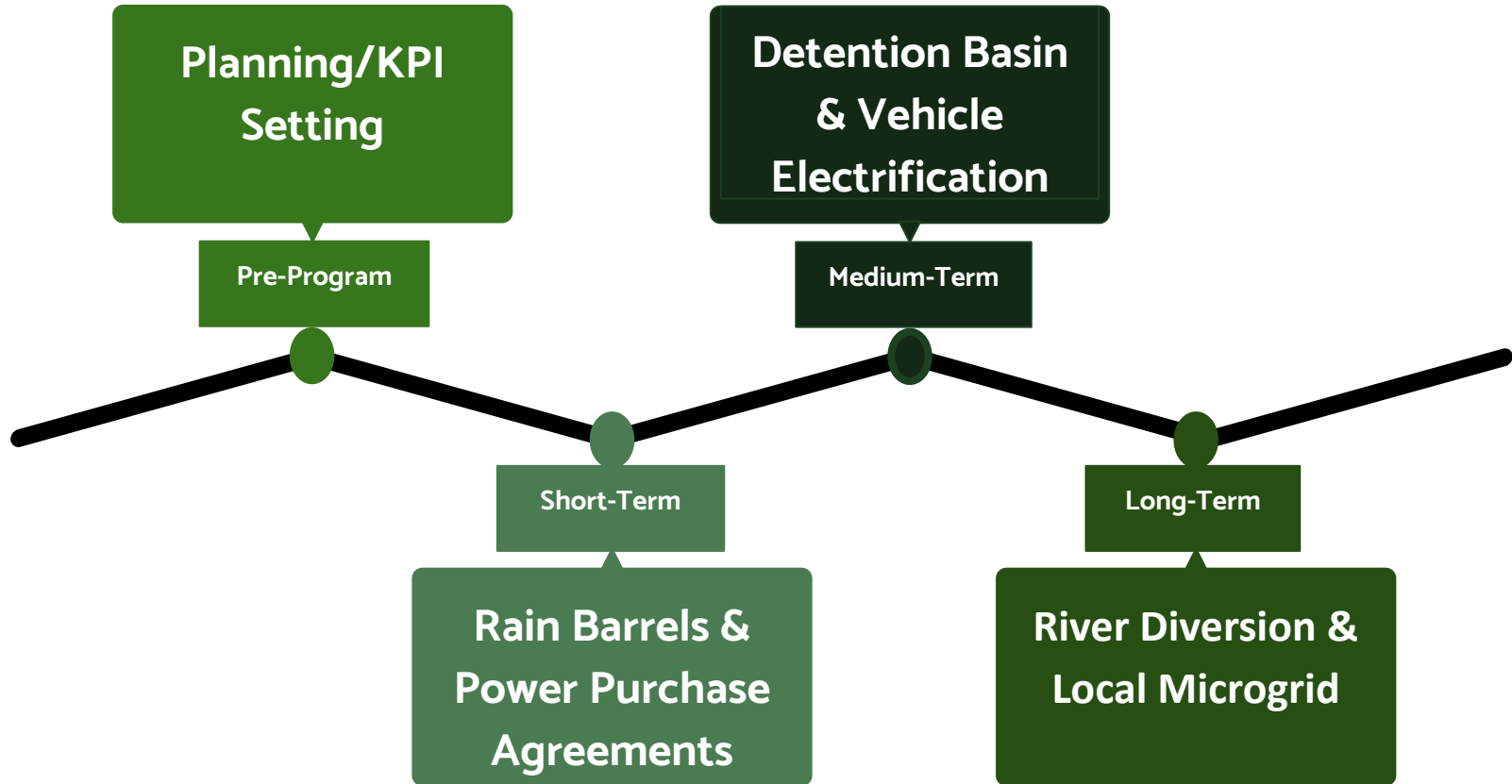
Local Renewable Energy
Generation

The amount of air pollution associated with the generation of the electricity product is shown. This amount is compared to a benchmark. The benchmark approximates the average emission rate for all electricity generation in the PJM region."

CO₂ is a "greenhouse gas" which may contribute to global climate change. SO₂ and NO_x react to form acids found in acid rain. NO_x also reacts to form ground level ozone, an unhealthy component of "smog."

Data source	CO ₂ (lb/MWh)	NO _x (lb/MWh)	SO ₂ (lb/MWh)
PJM system mix	766.35	0.29	0.37
PSE&G	766.35	0.29	0.37
	CO ₂	NO _x	SO ₂
PJM benchmark (%)	100	100	100
% of PJM emissions	100	100	100

Sustainability Roadmap





Study Limitations

01

MISSING DATA

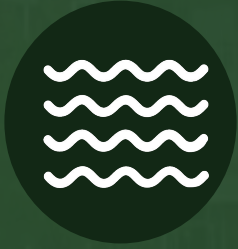
02

**EXISTING REPOSITORIES
OUTDATED**

03

**EXISTING DATA NOT
CONSOLIDATED**

Measuring Success



Flooding

- Flood Damages
- Flood Insurance Premiums
- Home Prices



Decarbonization

- Gasoline Consumption
- Electricity Consumption
- Heating Emissions

Next Steps

Formal Data Collection

Creation of data repository to monitor current and future projects and inform council decisions

Communication Between Departments

Sharing information and collaboration among the village council



Increase in Public Engagement

Improved techniques for communication about environmental initiatives within the town

Formalization of Green Ridgewood

Transition the advisory role of the committee to a coordinating one

Funding Considerations

Financial Commitment to Sustainability

At least 10% of capital budget allocated to flooding and decarbonization projects



Pursuing Alternative Funding Options

FEMA Grants
New Jersey Clean Energy Program
Army Corps of Engineers

Conclusion: Building a Resilient Ridgewood



Source: Laura Moss (NY Times)





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Lee Yaron



Menita Ranghar



Kathleen Callahan

OUR TEAM

THANK YOU

Any questions?



Source: Larry Horowitz