GEOGRAPHIES OF POWER

Spatial Strategies for a 'just' energy transition in Tamil Nadu

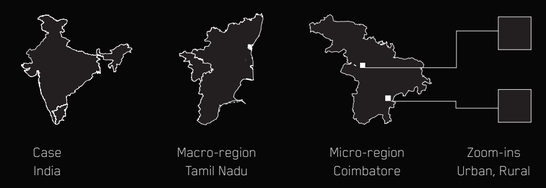


Fig 1: Geographic framework

The graduation project, **'Geographies of Power-Spatial Strategies for a 'just' energy transition in Tamil Nadu',** aims to explore the spatial dimension of energy transition in Tamil Nadu, India. Tamil Nadu's energy transition legacy, beginning from 1984, has built a vast renewable energy production capacity that contributes to 35% of India's R.E. share, despite being only 4% of the country's geographic extent.

However, the transition to renewable energy continues to operate under extractivist, capitalist energy systems of the fossil fuel era, monopolized by private energy companies and supported by a rigid top-down governance system. This has led to large scale transformation of land for energy development without spatial considerations, and acute regional inequalities in energy access and distribution of benefits of the transition.

The project argues that there is an urgent need to re-think existing systems of resource extraction and their implications on space, place and people. The shift to R.E needs to be accompanied by a transformation of spatial, societal and political structures, along with regional integration of energy landscapes, to create an **adaptive, inclusive and collaborative energy transition** in Tamil Nadu. Thus, the main research question of the project is,

> **'How can regional design of emerging geographies of energy create a framework for a 'just' energy transition in Tamil Nadu? '**

Through the analytical, normative and organizational components of the regional design, the project aims to illustrate its scope and application in national and federal planning of energy development.

By studying, mapping and analysing existing energy landscapes of the state, a framework for transitioning to renewable energy (R.E.) sources is presented. The regional design is assemblage of six context specific spatial strategies (Fig 2) that act as guidelines for energy development in Tamil Nadu. The spatial strategies range from actions to **densify existing energy landscapes to ideas for coproduction of energy with local communities**, and provide pathways for the implementation of Energy Vision for Tamil Nadu 2050. These strategies are layered to form the Strategic Plan for the macro-region, that provides guidelines on where to build renewable energy infrastructure in order to meet the energy demand of 2050. The flexibility and accessibility of the bottom-up solutions ensures that the individuals and communities can independently initiate the shift to renewables and achieve self sufficiency in energy use.

The performance of the macro-regional spatial strategies and the resulting Strategic Plan is tested by applying them to the selected micro-region- Coimbatore, and two Strategic zoom-ins at the urban and rural scale (Fig 3, Fig 4, Fig 5). Through this process, the feasibility, scope and limitations of the regional design were identified.

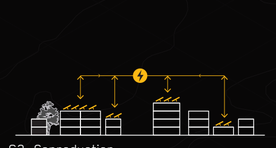
The project was an explorative research to find new ways of studying, analysing and designing emerging energy geographies in Tamil Nadu. By developing a regional design, with analytical, normative and organizational components, the project presented the **know-hows for facilitating a just energy transition in Tamil Nadu.** The potential transferability of the concepts, research methodology and design process for use in under-represented geographies of the Global South, that face similar challenges in spatial energy transition is an important outcome of the project.

TOOLBOX OF STRATEGIES FOR ENERGY TRANSITION IN TAMIL NADU

Fig 2: Micro-region: Coimbatore

S1- Densification
A: Build in the gaps

S2- Crossprogramming
A: Energy x Mobility



S3- Coproduction
A: Neighbourhood Energy Networks

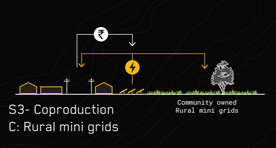
S1- Densification
B: Diversify-heterogeneous landscapes

S2- Crossprogramming
B: Energy x Waste management

S3- Coproduction
B: Energy sharing with energy vulnerable communities

S1- Densification
C: Repower old energy sites

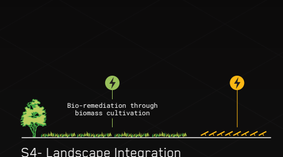
S3- Crossprogramming
C: Energy x Public Infra-structure



S3- Coproduction
C: Rural mini grids

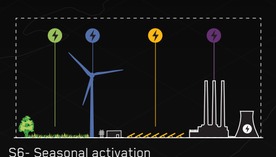
S1- Densification
D: Build R.E transmission capacity

S3- Coproduction
D: Citizen Capacitation Centres

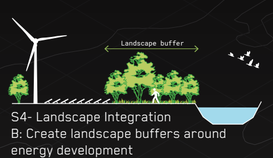


S4- Landscape Integration
A: Prioritize wastelands for energy development

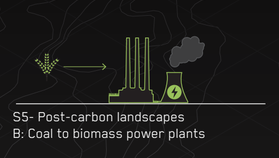
S5- Post-carbon landscapes
A: Energy saving in cities



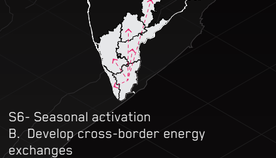
S6- Seasonal activation
A. Increase the diversity and multi-functionality



S4- Landscape Integration
B: Create landscape buffers around energy development

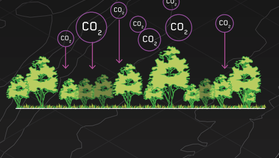


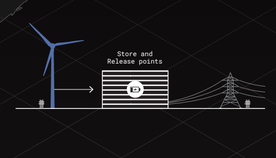
S5- Post-carbon landscapes
B: Coal to biomass power plants



S6- Seasonal activation
B. Develop cross-border energy exchanges

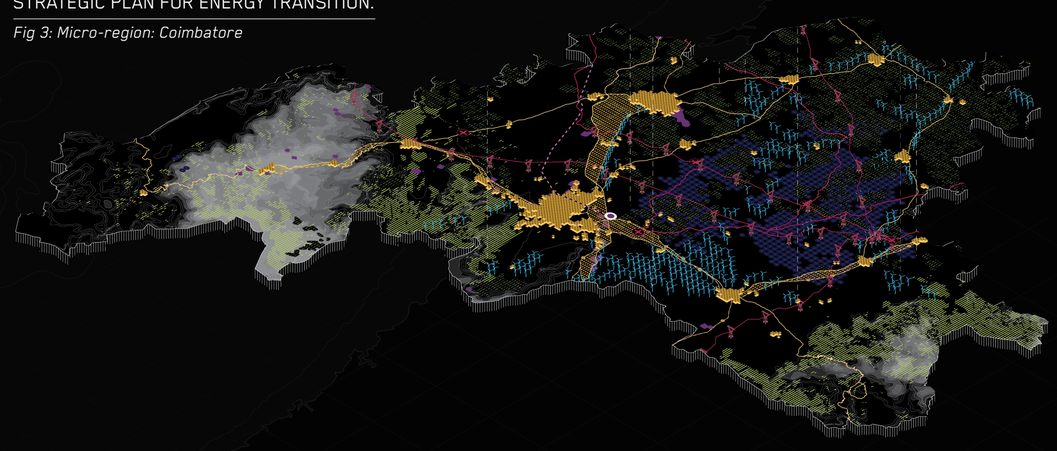
The set of six spatial strategies and the toolbox of design interventions, solutions, policies, and regulations act as guiding principles to create an adaptive, inclusive and collaborative energy transition in Tamil Nadu. The strategies are meant to be adjusted based on the conditions of the local context.





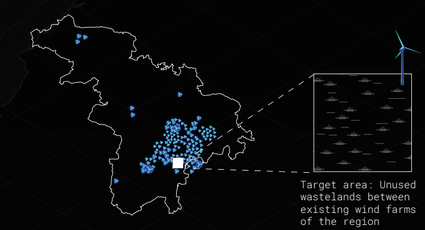
STRATEGIC PLAN FOR ENERGY TRANSITION.

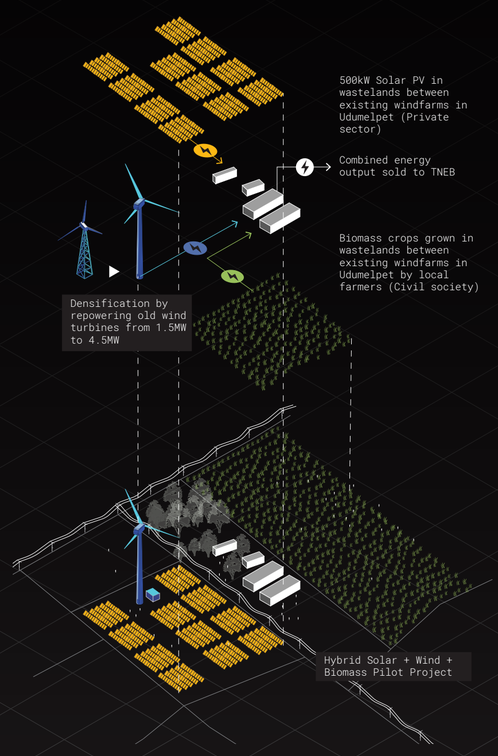
Fig 3: Micro-region: Coimbatore



DESIGN INTERVENTIONS FOR ENERGY DENSIFICATION

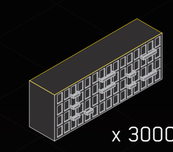
Fig 4: Zoom-in: Rural- Udumelpet energy hub





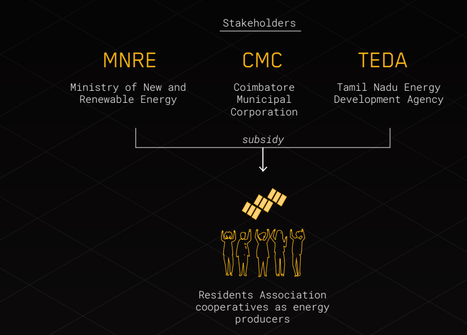
DESIGN INTERVENTIONS FOR ENERGY COPRODUCTION

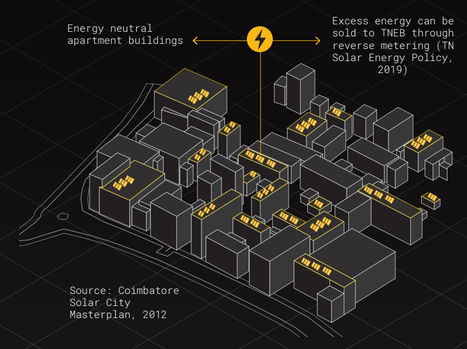
Fig 5: Zoom-in: Urban- Coimbatore city centre



In Coimbatore, there are 3000 apartments approx. each with 15kW solar PV capacity

solar energy generated in 5 years if just 10% of apartments adopt solar cities scheme

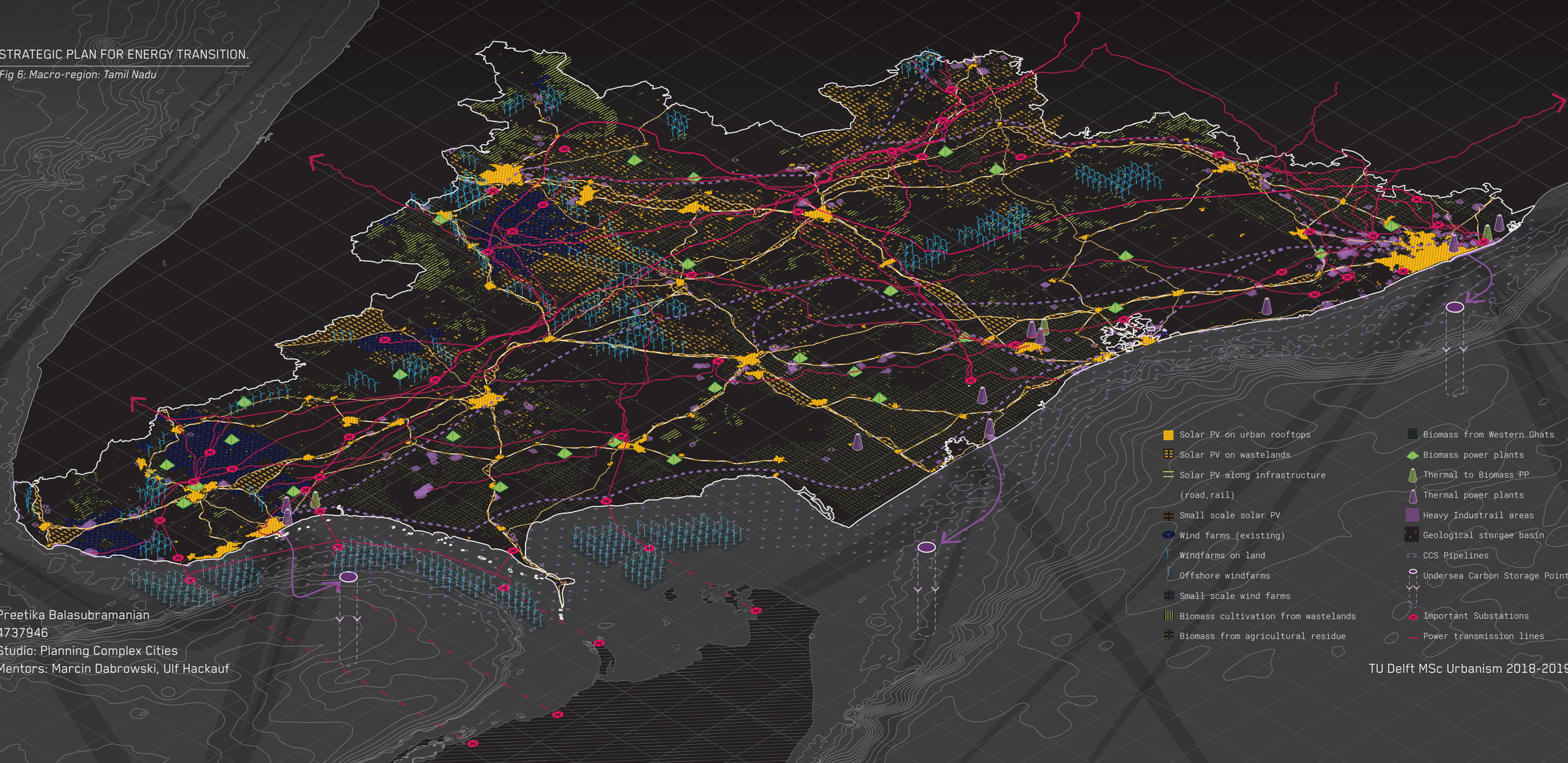




Source: Coimbatore Solar City Masterplan, 2012

STRATEGIC PLAN FOR ENERGY TRANSITION.

Fig 6: Macro-region: Tamil Nadu



Preetika Balasubramanian
4737946
Studio: Planning Complex Cities
Mentors: Marcin Dabrowski, Ulf Hackauf

TU Delft MSc Urbanism 2018-2019