

Renewable Energy Integration

Solar Photovoltaic panels



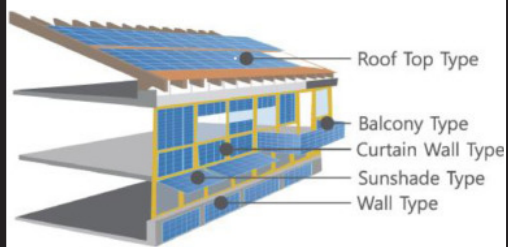
Generates clean electricity from sunlight



Building scale
Functional energy systems

Renewable Energy Integration

Building-integrated photovoltaics (BIPV)



Architectural integration of solar panels into building design



Building scale
Functional energy systems

Renewable Energy Integration

Solar thermal systems (for hot water)



Heats water using sunlight, reducing gas or electricity use

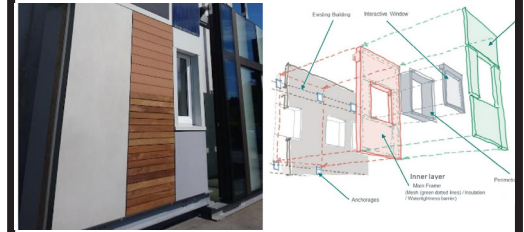


Building scale
Functional energy systems

Building Envelope Improvements

Facade redesign

Plug-and-play façade



Prefabricated façade modules that combine insulation, windows, and finishes

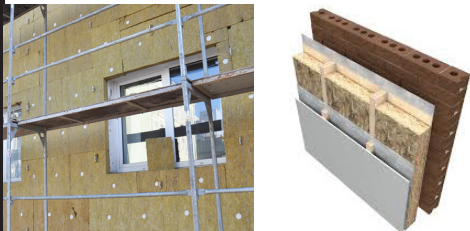


Building scale
Envelope

Building Envelope Improvements

Facade redesign

External wall insulation



Wrap outside walls with insulation and a protective cladding layer



Building scale
Envelope

Building Envelope Improvements

Roof insulation and waterproofing



Add insulation materials and a waterproof membrane on the roof to reduce heat loss



Building scale
Envelope

Building Envelope Improvements

Cavity wall insulation



Fills the cavity between external and internal wall layers to improve thermal performance



Building scale
Envelope

Building Envelope Improvements

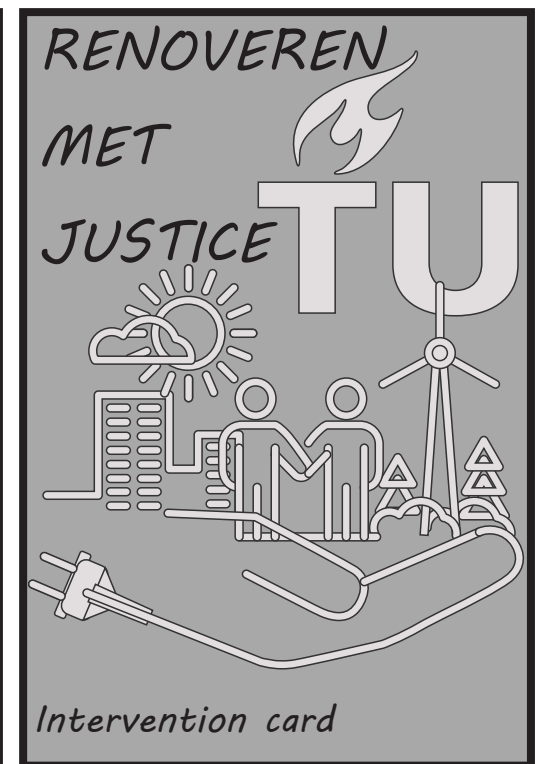
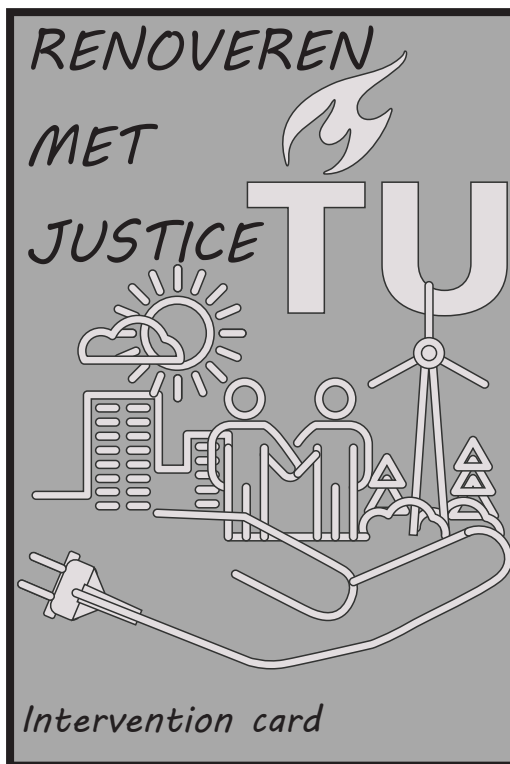
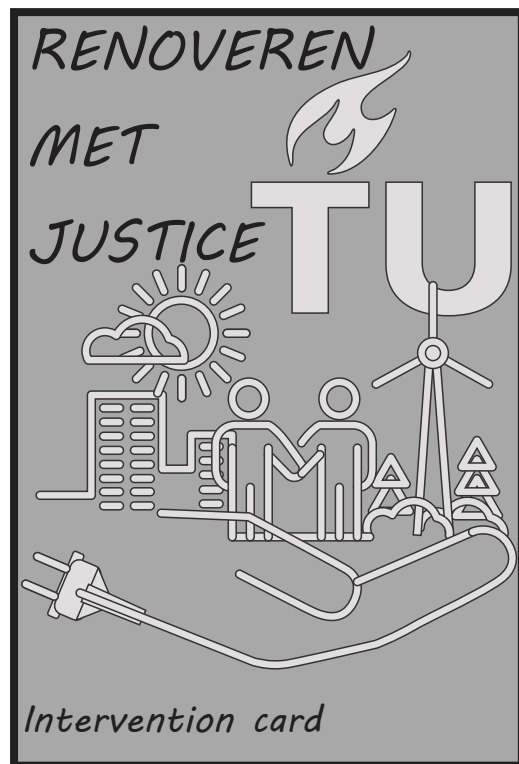
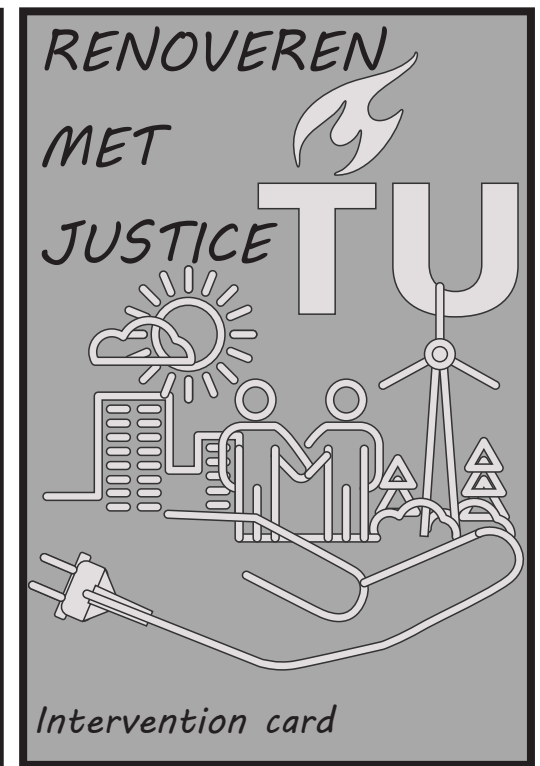
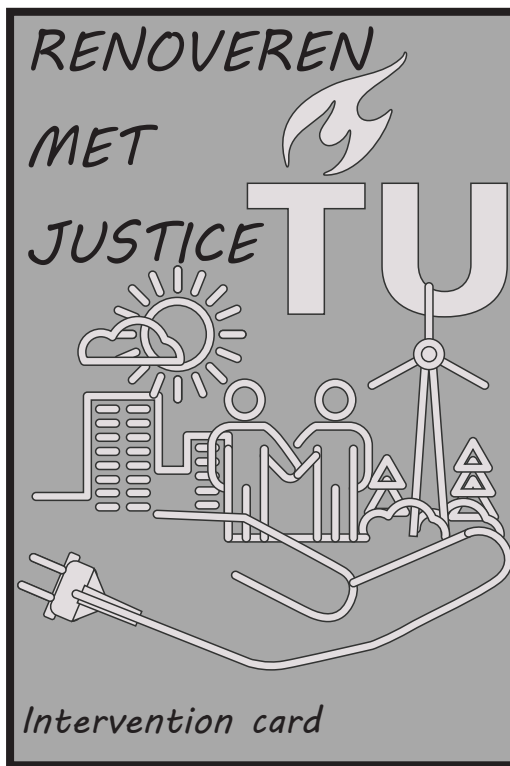
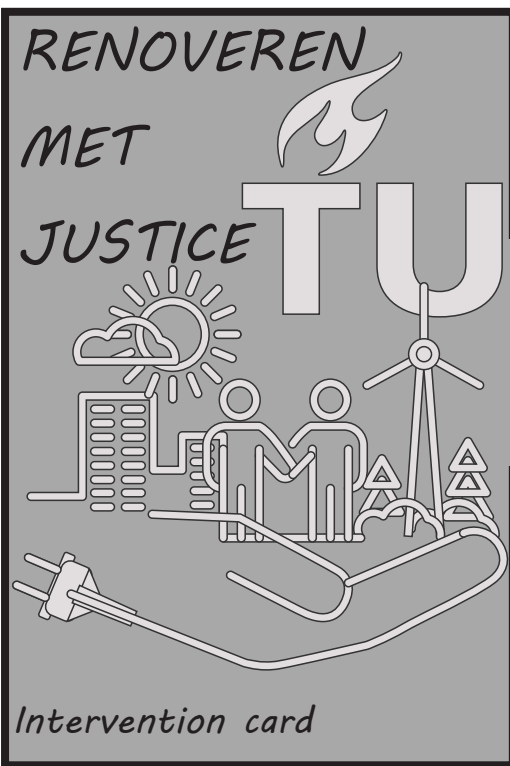
Internal wall insulation



Insulates walls from the inside: saves energy, but reduces room space and needs careful detailing to avoid moisture issues



Building scale
Envelope



Heating Energy Systems

Connection to low/medium/high-temperature district heating



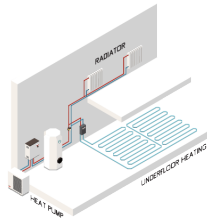
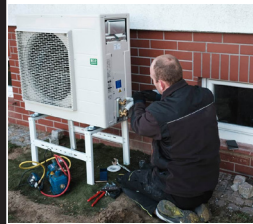
Switch to centralized heat supply, reducing fossil fuel dependence



Building scale
Functional energy systems

Heating Energy Systems

Heat pump installation



Efficient electric heating using ambient air or ground heat



Building scale
Functional energy systems

Spatial and Functional Adaptations

Connection with sidewalk and street-level redesign



Improving the transition between building and street at ground level



Building-street scale
spatial design

Ventilation Systems

Mechanical ventilation with heat recovery



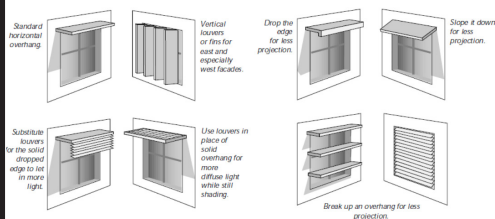
Provides continuous ventilation by mechanically extracting humid or polluted air



Building scale
Functional energy systems

Building Envelope Improvements

Passive Cooling Solutions
Shading elements (for overheating protection)



Fixed or movable elements that blocks direct sunlight to reduce indoor overheating



Building scale
Envelope

Building Envelope Improvements

Windows replacement
Double-Glazed Windows



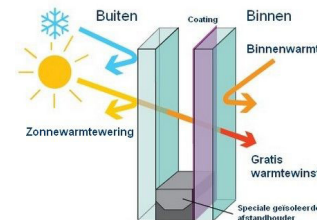
Replacement with windows made of two layers of glass and a sealed air gap.



Building scale
Envelope

Building Envelope Improvements

Windows replacement
HR++ Windows



Double-glazed windows with a low-emissivity coating and gas-filled cavity.



Building scale
Envelope

Building Envelope Improvements

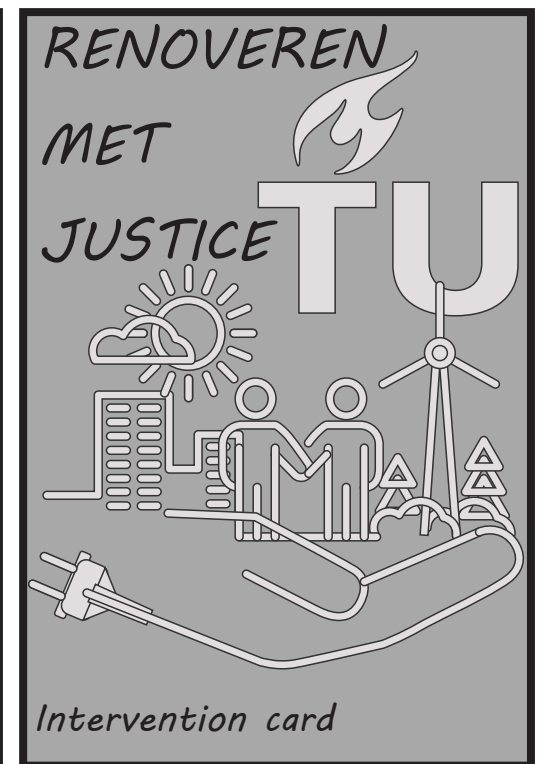
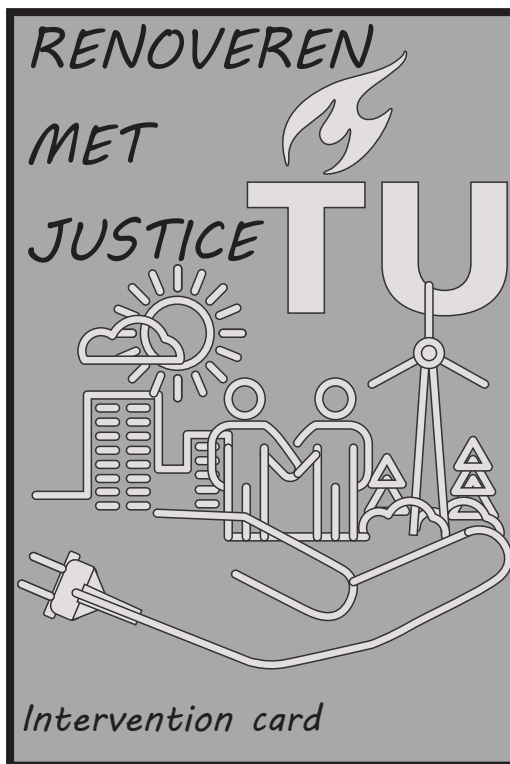
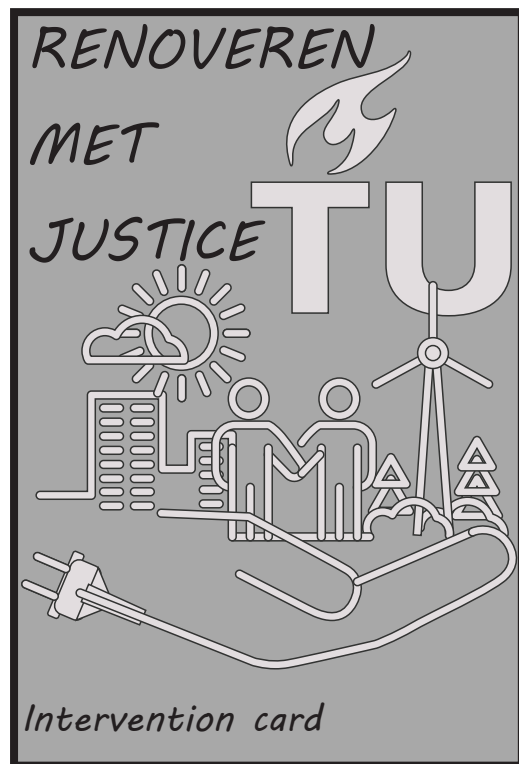
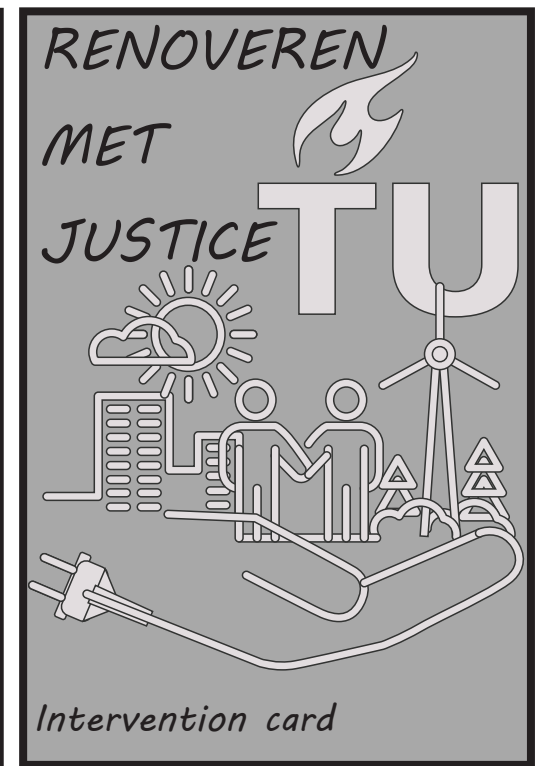
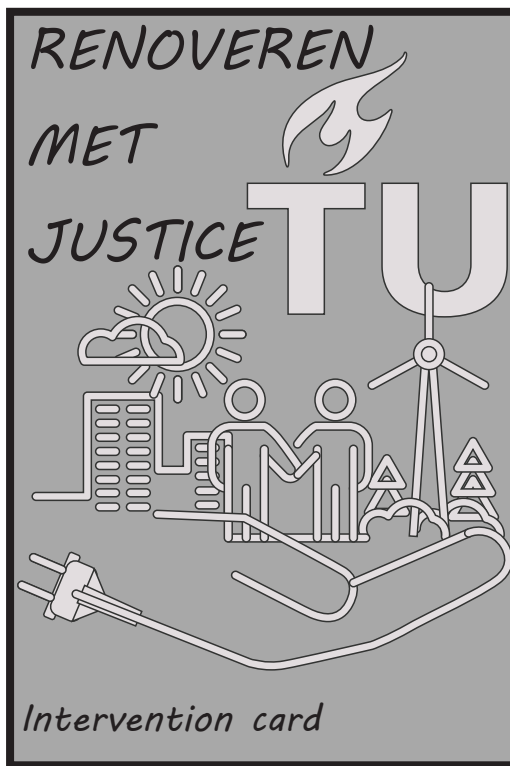
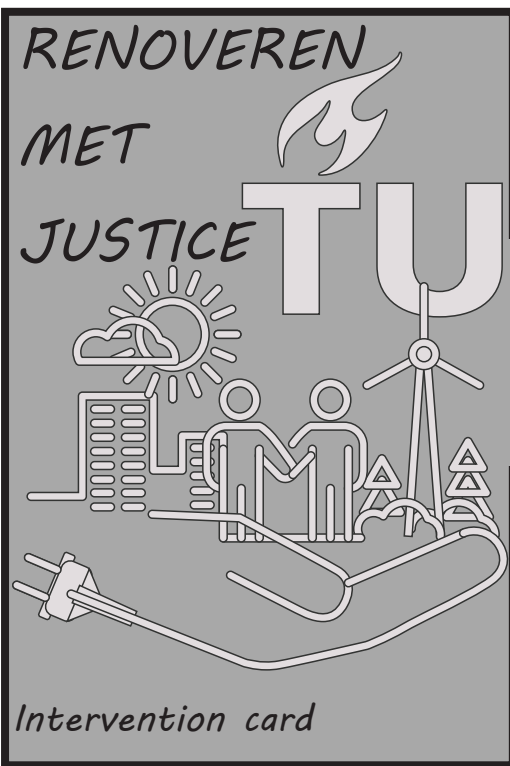
Windows replacement
Triple-Glazed Windows



Windows made of three layers of glass with two insulating cavities.



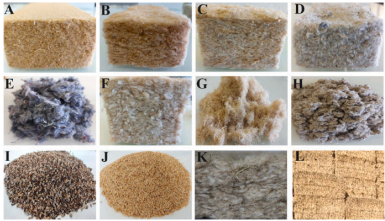
Building scale
Envelope



Building Envelope Improvements

Insulation

Bio-based insulation materials



Eco-friendly insulation from organic or recycled fibres instead of synthetic ones.



Building scale
Envelope

Building Envelope Improvements

Facade redesign

Façade Cladding Renewal



Ref: HaagWonen's Porch houses renovation Den Haag

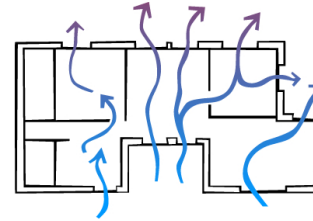
Gives the building a new, improved outer look (external cladding systems or prefab façades)



Building scale
Envelope

Ventilation / Cooling Systems

Natural Cross Ventilation Design



Design or adjust openings to allow natural air flow and night-time cooling. Provide operable windows.



Building/Dwelling scale
Interior and envelope

Building Envelope Improvements

Passive Cooling Solutions

Reflective or Cool Roofs & Facades



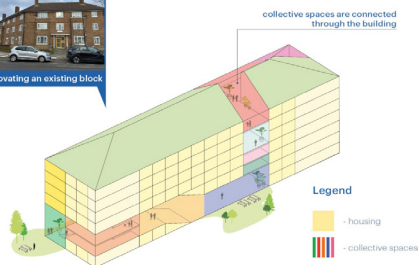
Minimize heat absorption by using reflective materials (White or cool-colored roof coatings; reflective facade cladding or paint)



Building scale
Envelope

Spatial and Functional Adaptations

Layout redesign for common spaces



Reorganizing shared indoor areas to improve usability and interactions



Building scale
spatial design

Spatial and Functional Adaptations

Accessibility Improvements



Ref: Wiltonflats, Schiedam and Langblokken Social Housing

Enhances entrances and make stairs and lifts usable for everyone



Building-street scale
spatial design

Spatial and Functional Adaptations

Reconfiguration of internal spaces



Redesigning dwelling layout to improve space use, daylight or meet housing demand.



Building/Dwelling scale
Interior

Spatial and Functional Adaptations

Enhancing and greening semi-public and public spaces



Improve shared open areas with vegetation and resident-friendly design



Neighborhood scale
Envelope