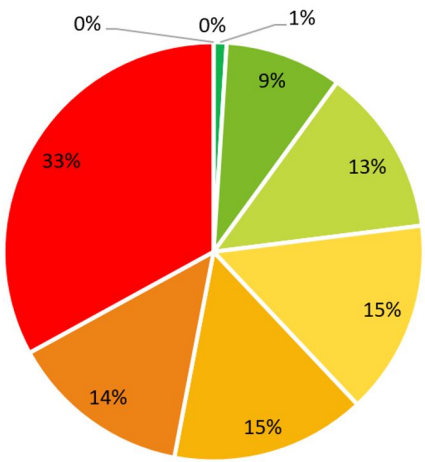
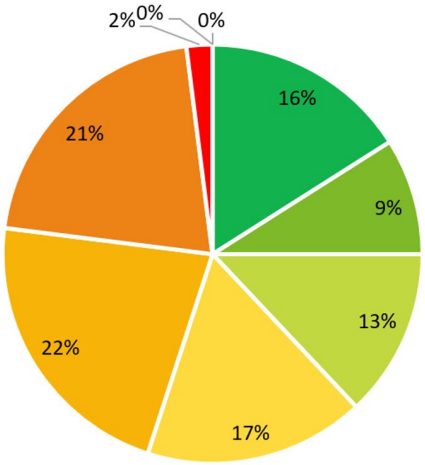
Accelerating condominium Energy Retrofitting

Roadmap for the sustainable, ambitious and efficient renovation of condominiums

Condominiums



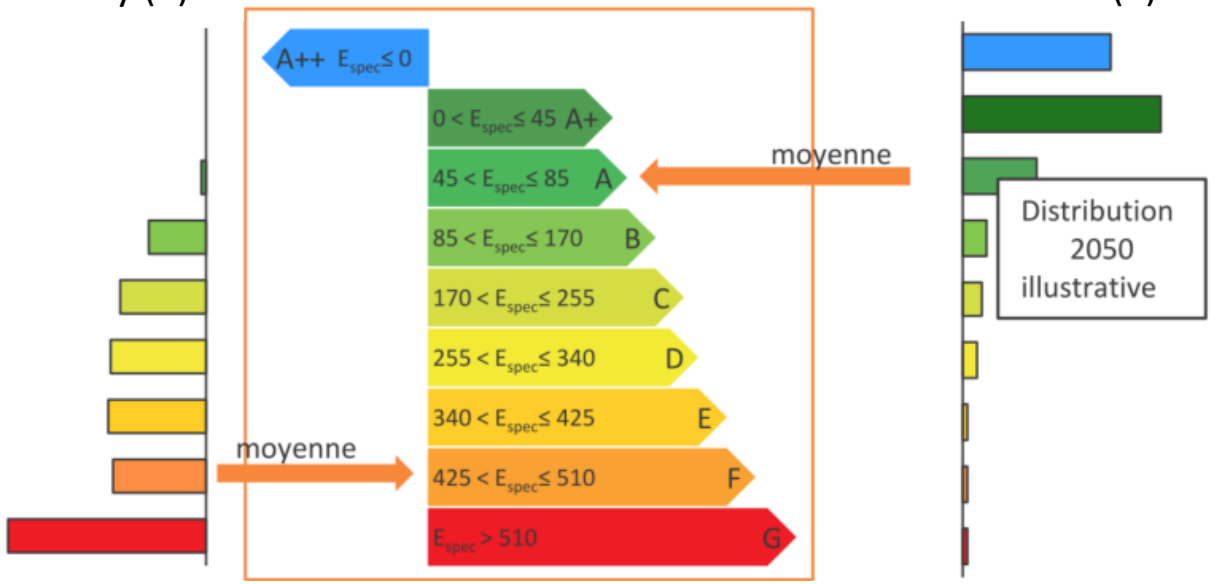
Walloon Stock



Apartments

Distribution of the residential stock's EPCs today (*)

Distribution of the residential stock's EPCs in 2050 (*)

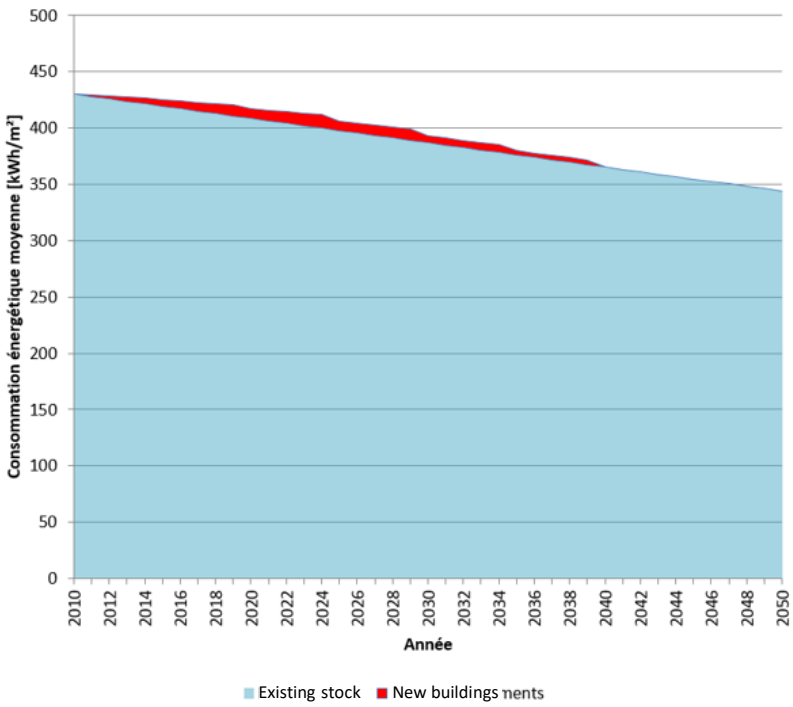


(*) (*) considering the performances of the envelope, systems and renewable energy production

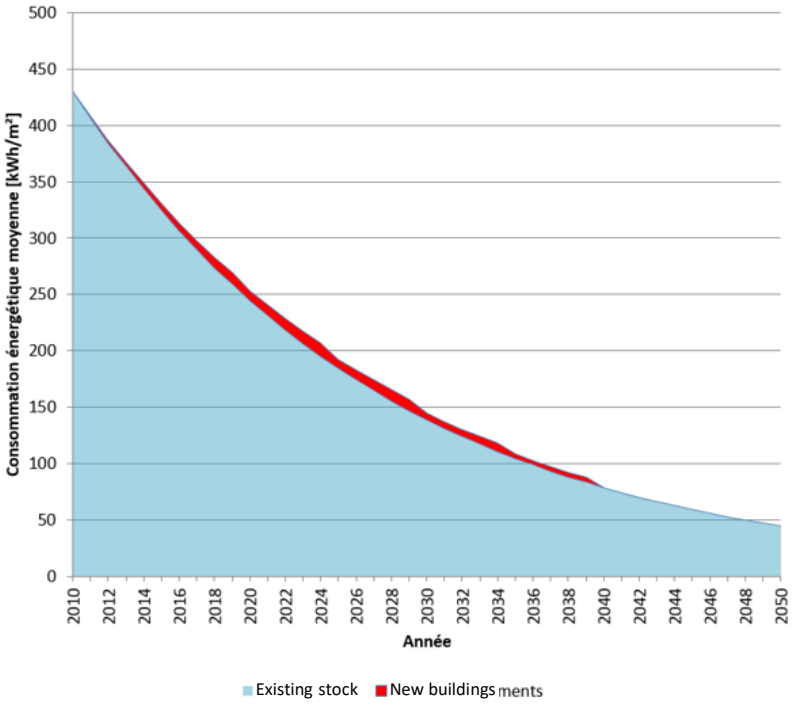
Why should we care for existing buildings… ?

Residential energy consumption

Without improvement of the existing stock



With improvement of the existing stock : 5%/year

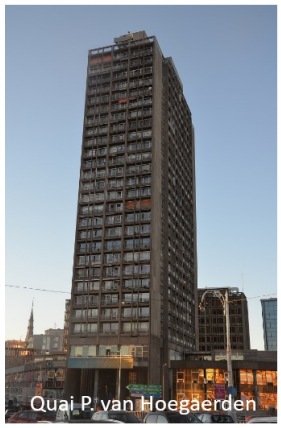


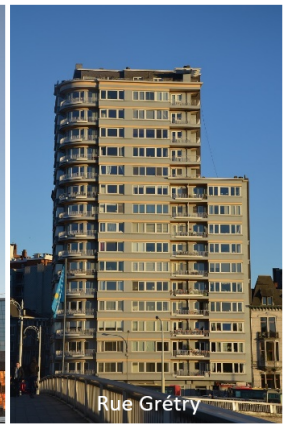

Bvd Frère Orban

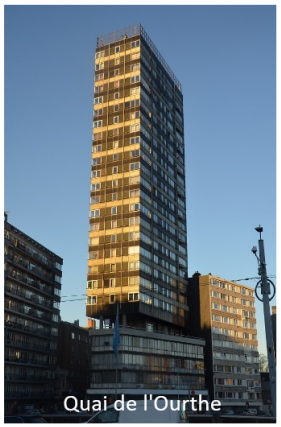

« Terrasses »

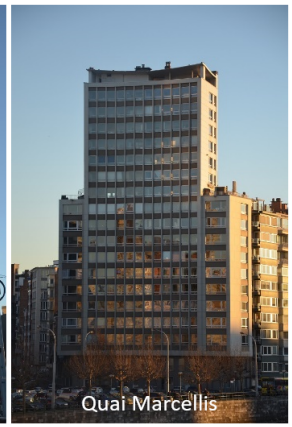

« Terrasses »


Rue Grande Tour


Quai P. van Hoegaerden


Rue Grétry


Quai de l'Ourthe


Quai Marcellis


Pl. B. Vieillevoye


Rue E. Digneffe


Bvd d'Avroy


« Terrasses »


Avenue Maurice Destenay


Bvd de la Sauvenière


Bvd d'Avroy


Quai des Ardennes


Quai de Rome


Esplanade Albert 1er


Rue Adrien de Witte


Pl. B. Vieillevoye


Av. du Luxembourg

Objectives

- Step-by-step renovation guide for the improvement of condominiums considering security, salubrity and healthiness, energy performances and vulnerability to foreseeable climate changes.

  - Book 1 : context and stakes (destined to all involved, concerned actors)
  - Book 2 : check-list and methodology (destined to auditors)
  - Book 3 : case studies

Base = dwelling audit

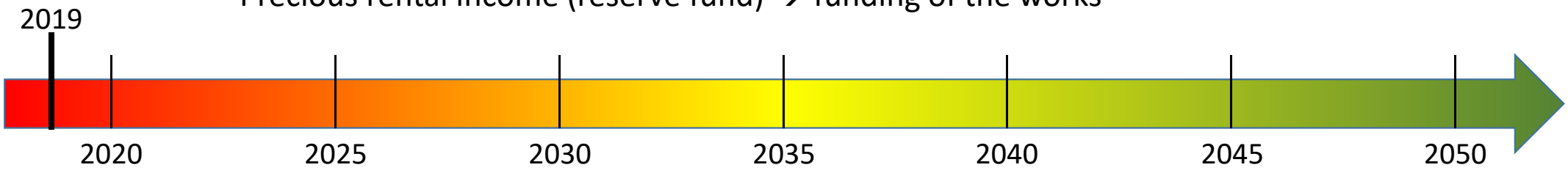
- Global energy assessment of the building and/or apartments
  - Professional input, definition of priorities and order of interventions
- Extended audit
  - Technical constraints due to urban planning
    - Servitudes, contracts with public or private operator, use of the street level…
  - Maintenance planning (realised or foreseen)
  - Security : railings, spandrels, roof edges and fire safety
  - Salubrity : deformities, water damages (infiltrations, humidity, condensation, mould…)…
  - Stability : structural defaults, cracks, disintegrated concrete, overload…
  - Presence of asbestos, lead, radon, dry rot

Base = dwelling audit

- Extended audit
  - State of the water networks : collection, distribution, evacuation
  - Conformity of electricity and natural gas networks, of combustion installations and fume emissions
  - Other installations : lifts, ventilation…
  - Accessibility
  - Interviews of co-owners and managers
    - Satisfaction surveys of private and co-owned zones
    - Investments priorities and possibilities, wishes and intentions
    - Detected problems
    - Possible involvement and input in the project

Example: condominium in Liège (1930)

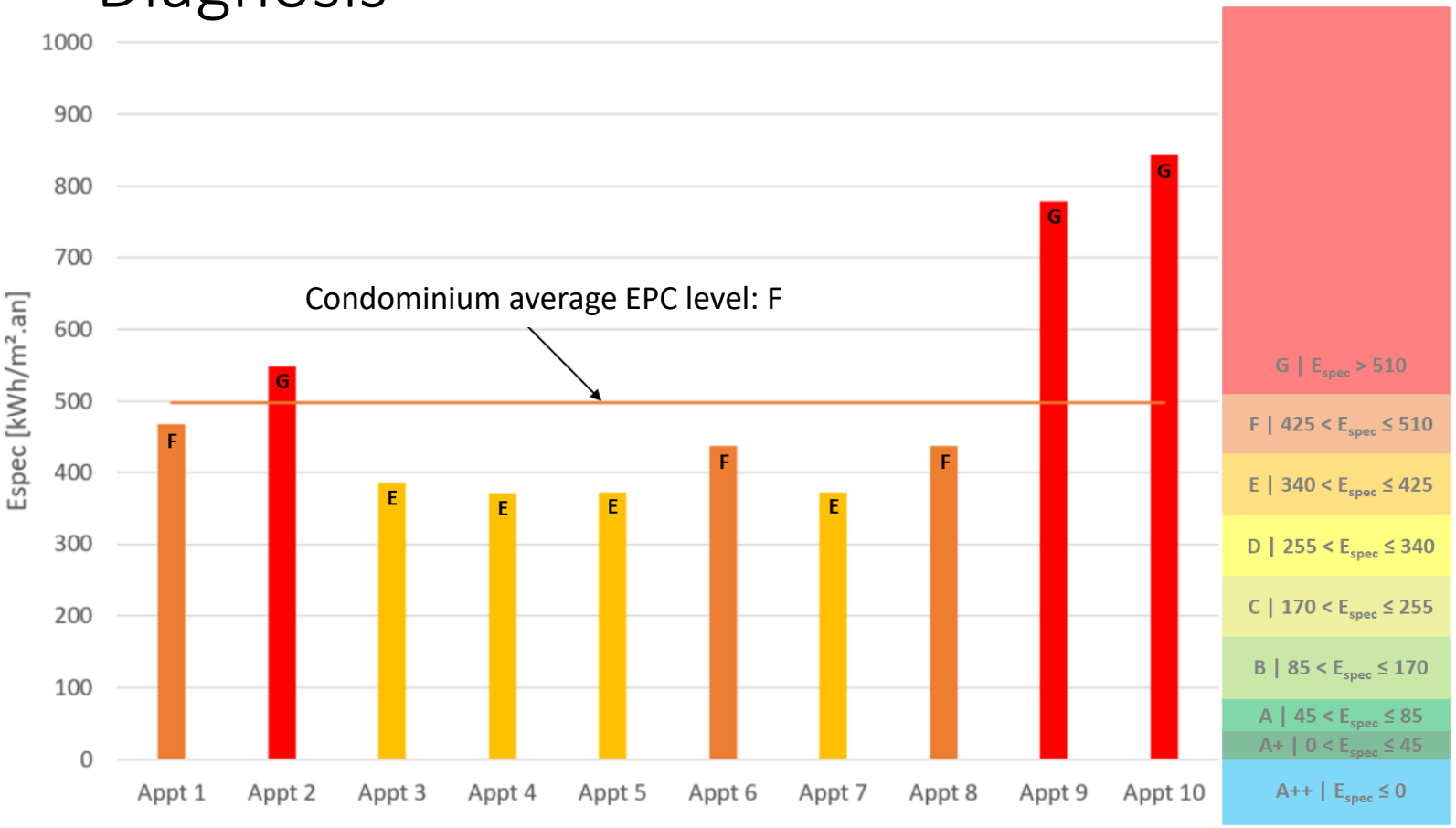
- Step 1 : Diagnosis
  - 10 apartments on 5 levels
    - 2 bedrooms, liveable area between 80 and 100 m² per dwelling (+ joint property)
    - 10 different co-owners (6 dwellers, 3 rentals, 1 unoccupied apartment)
  - Trustee = one owner-dweller
  - General co-owners meeting : once or twice per year
    - Buildings maintenance decisions: mainly curative
  - No condominium council before project
  - Major partner: administrator of 2 rooftop-placed mobile antennas
    - Precious rental income (reserve fund) → funding of the works



Diagnosis : envelope and systems

- Concrete flat roof, no insulation
  - Recent water damages: pipe leaks
- Solid walls (bricks and other materials), no insulation
- ± 50% of recently changed windows (PVC, insulated + double glazing)
  - Others : simple glazing in old wooden frames, low insulation and not airtight
- Concrete floors on basement, no insulation
- Heating and Domestic Hot Water through recent high temperature fuel boilers
  - Distribution : columns pipes, and DHW loop, uninsulated
- Ventilation : natural exhausts in bathrooms
  - Renewal of interior air by lack of airtightness
- No cooling
- No renewable energy production on site

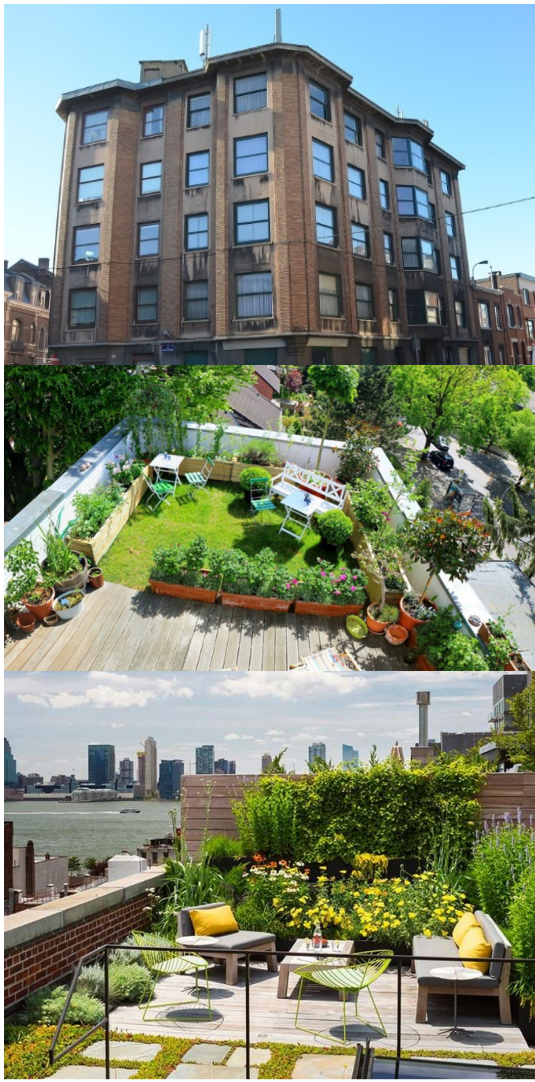
Diagnosis

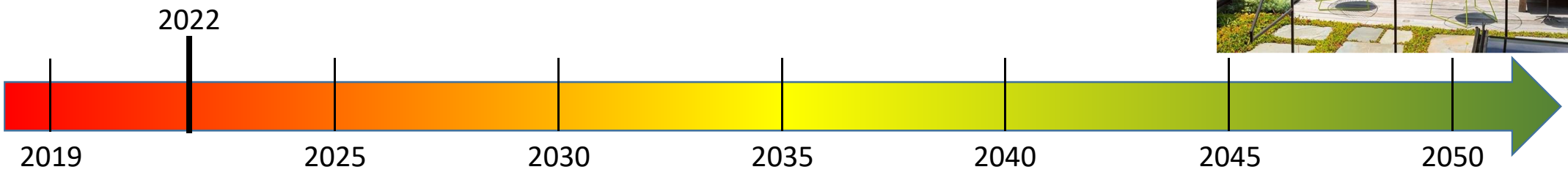


- Average U_m = 2,26 W/m²K
- K level: 168
- E_{spec} between 371 and 843 kWh/m².year
- Average = 500 kWh/m².year

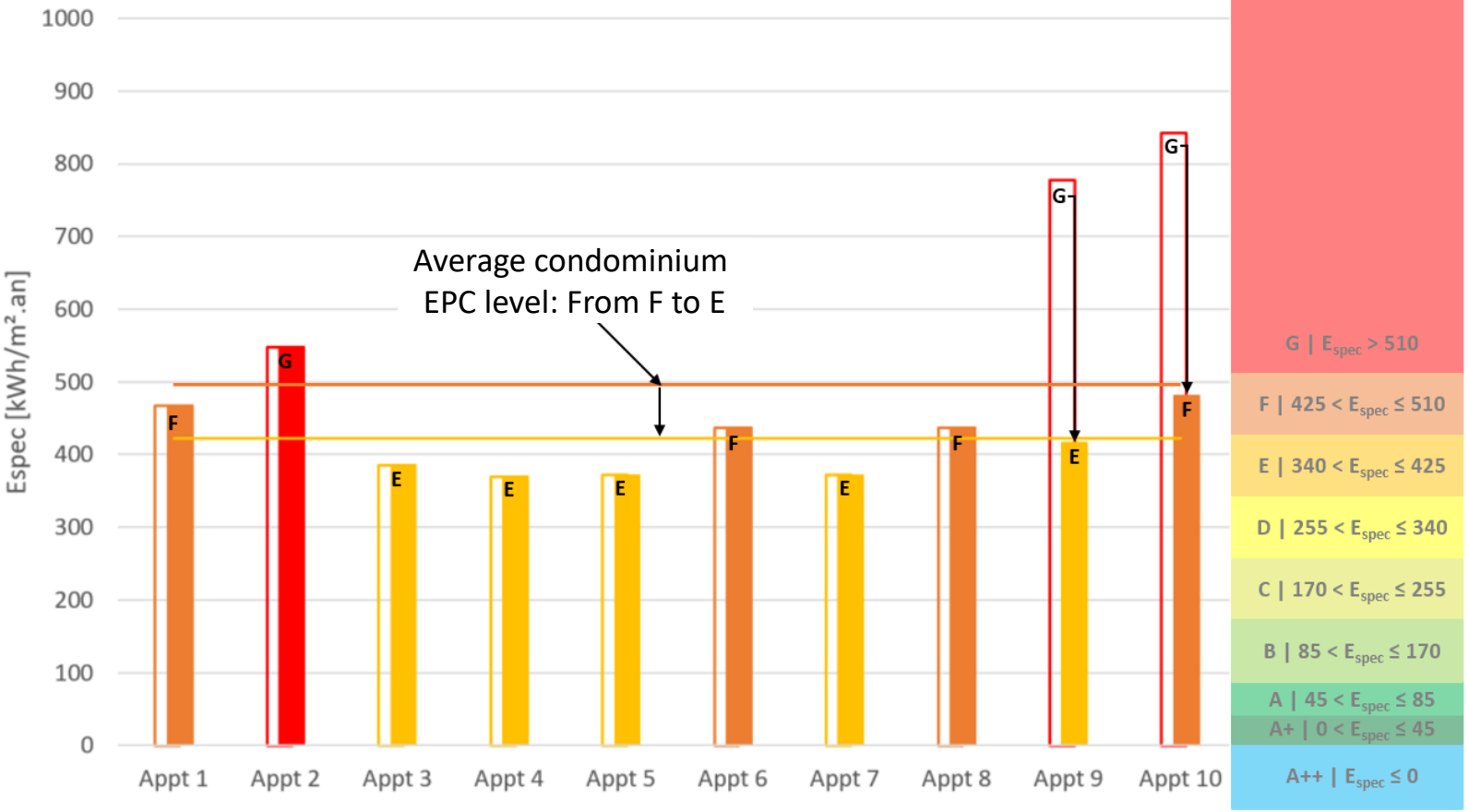
Coherent phasing of operations : phase 1

- Urgency: roof reparations
  - Coordination with the antennas administrators
  - → thermal insulation and waterproofing
    - Insulation placed in wait for facades works
  - Roof landscaping: garden, vegetable garden, social space
- Renovation and thermal insulation of rooftop volumes
- Remodel of rainwater evacuation networks
  - Rainwater recovery for common uses





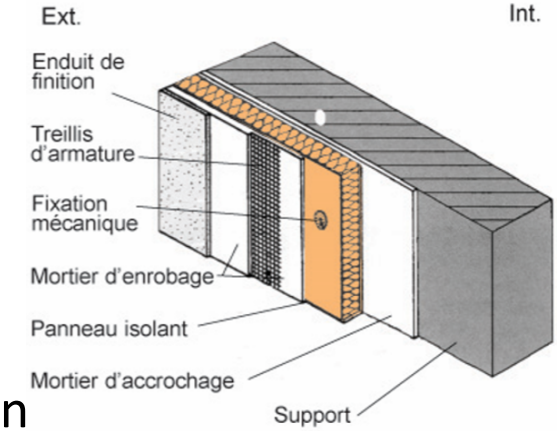
After phase 1

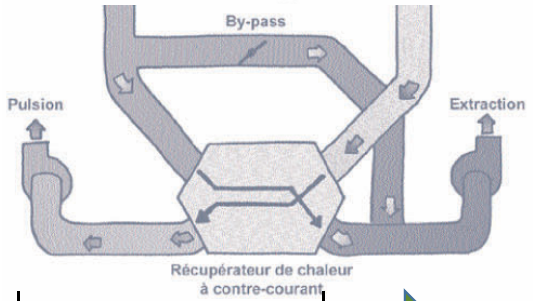


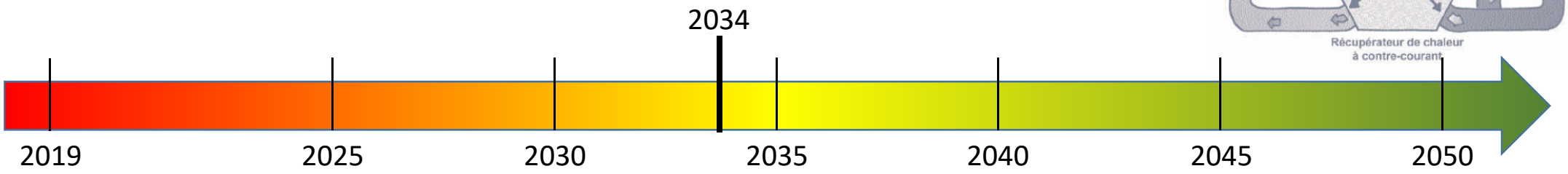
- Average U_m = 1,83 W/m²K
- K level: 136
- Average E_{spec} = 422 kWh/m².year

Coherent phasing of operations : phase 2

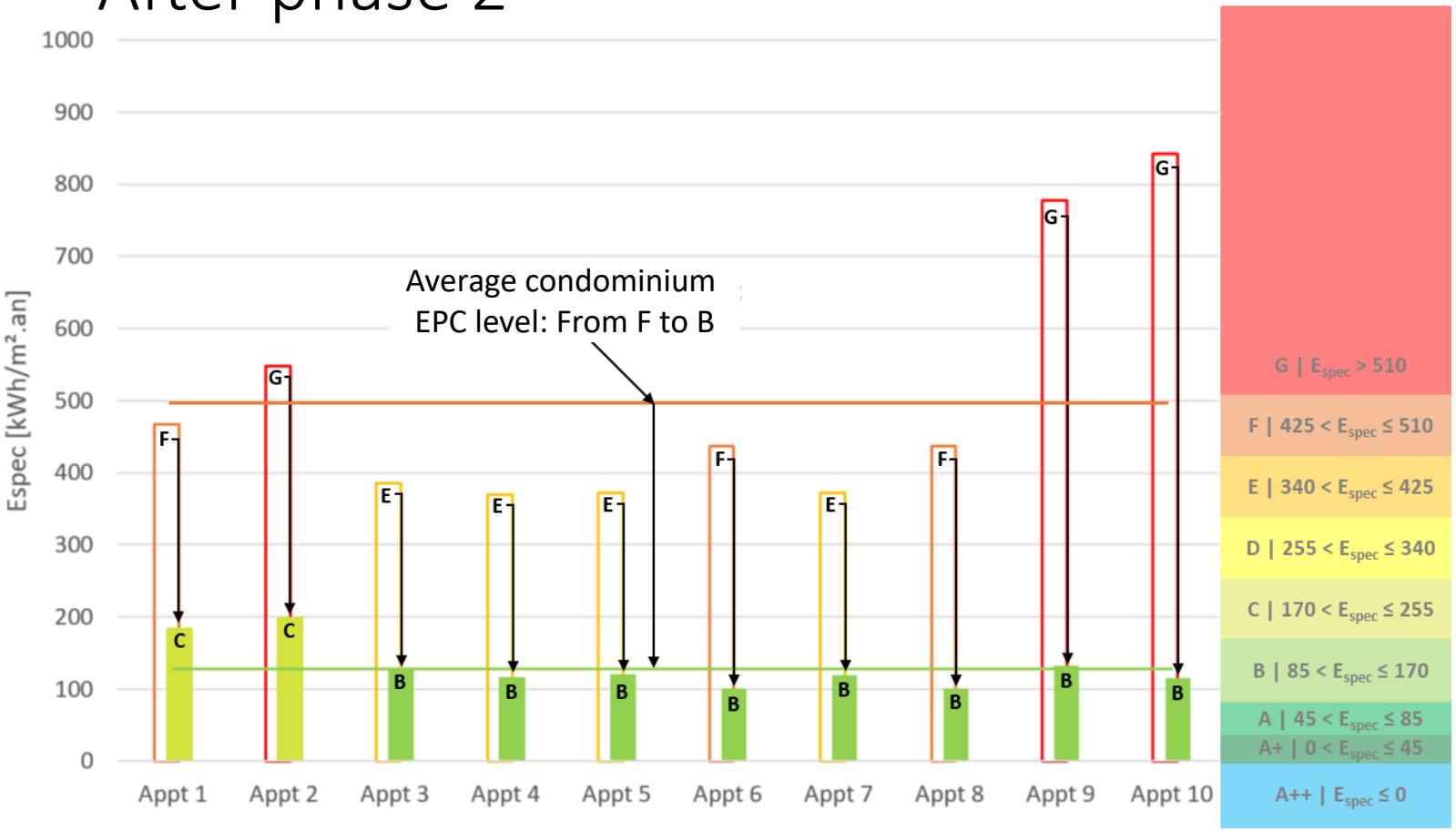
- Between 2022 and 2034:
  - Change of windows: “personal” works
  - Thermal insulation of street level: coordination with sidewalks reparations
- In 2034 :
  - Thermal insulation of facades: roughcast on exterior insulation
    - → Technical study for back façade (balconies to insulate)
  - Envelope rendered airtight → installation of mechanical ventilation with heat recovery in each dwelling







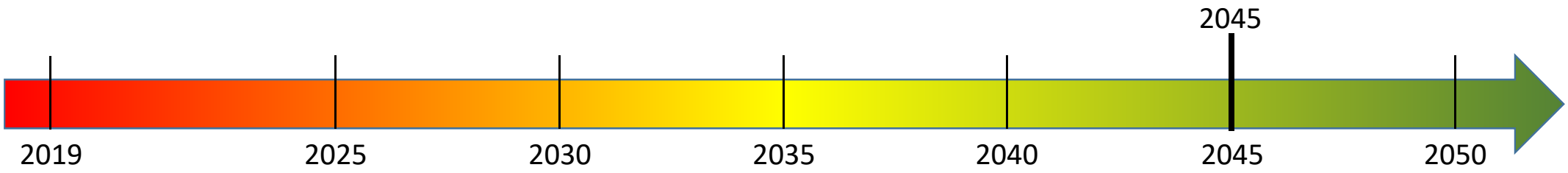
After phase 2



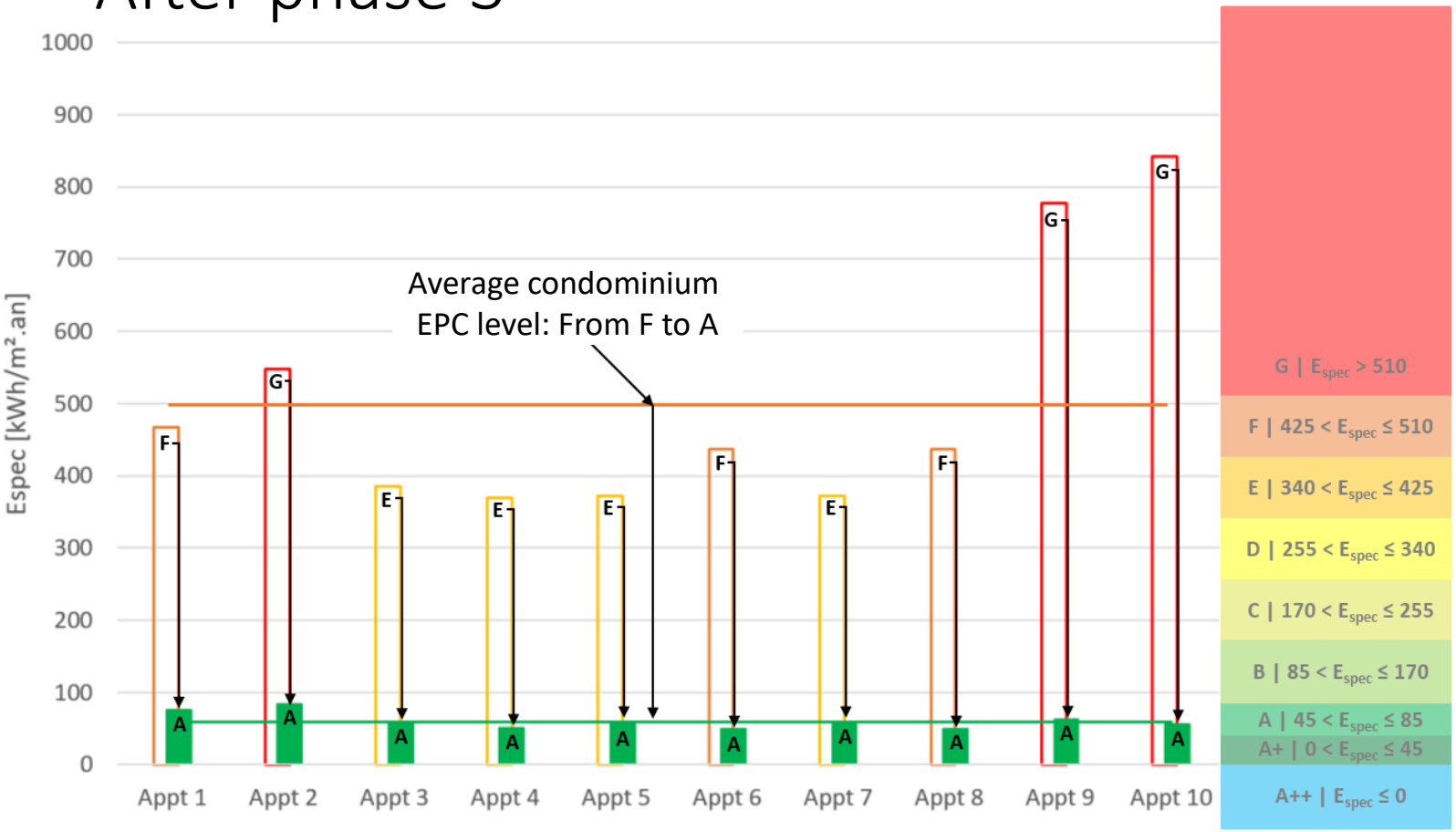
- Average U_m = 0,4 W/m²K
- K level: 30
- Average E_{spec} = 128 kWh/m².year

Coherent phasing of operations : phase 3

- Insulation of floors on basement
- Change of systems
  - Communal boilers for heating
    - Power appropriate for new needs
  - Decentralised systems for DHW
    - Suppression of DHW loop
- Free space on street floor → creation of bicycle shed with electric charge terminal

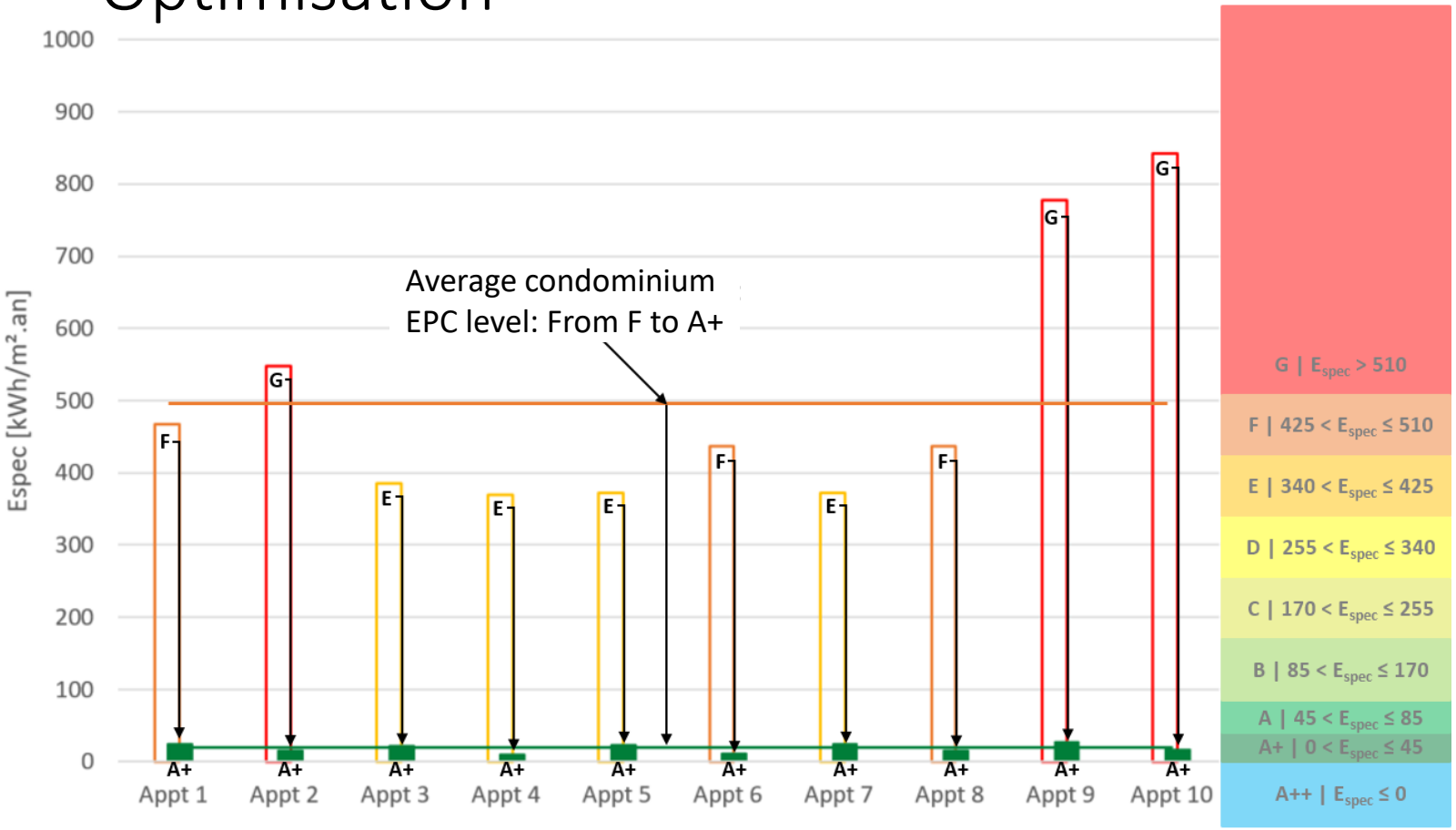


After phase 3



- Average U_m = 0,33 W/m²K
- K level: 25
- Average E_{spec} = 59 kWh/m².year

Optimisation



- Insulation ++
- Solar shades
- On-site renewables
- Heat pump ?