Novel class of insulating panels based on nanomaterials derived from renewable resources to be used for building energy efficient retrofitting. Panels are suitable for three fully operational components: internal and external insulation as well as internal partition.

Name of product	BRIMEE NCC Foam		
Function of product	Implementation of insulating panels to be used in building retrofitting		
Form	Panels		
Raw Material	Nano Crystalline Cellulose (NCC) based foam, strenghtened with natural derived resins		
Properties			
Property	**Unit**	**Value**	**Test methods/standardisation**
Chemical/physical properties			
Bulk density	kg/m^3	40	
Composition of materials			NCC material extracted from waste streams of pulp and paper industry. The NCC material is processed in aqueous solution with functional resins, then foamed and consolidated
Structures and construction			
Dimensions of product	m	0.4 x 0.6 x 0.01	
Mechanical properties			
Compressive strength	N/mm^2	N/A	
Flexural strength	N/mm^2	N/A	
Tensile strength	N/mm^2	N/A	
Thermal properties			
Thermal conductivity	W/(m·K)	0.035	(EN 12667)
Specific heat capacity	J/(g·K)	N/A	
Hygrothermal properties			
Water vapour diffusion resistance factor		N/A	
Moisture buffer value	$kg/(m^2 \cdot \%RH)$	N/A	
Water vapour permeability	kg/(m·s·Pa)	N/A	
Acoustic properties			
Sound absorption coefficient	%	> 0,6	In high frequency region (EN 10534)
Sound reduction index	dB	N/A	
Fire Safety			
Reaction to fire			Fire behavior is drastically affected when the resin infiltration is not performed. Other types of additives and fire retardants need to be identified in the future for granting better performances for the NCC foam. Only the black NCC foam material (with resin infiltration) achieved the fire resistance class E, required for building applications. Other types of additives and fire retardants need to be identified in the future for granting better performances for the NCC white foam.
Resistance to fire	Minutes	N/A	
Environmental properties			
Embodied energy (% renewable)	MJ/kg	N/A	
Embodied energy (% renewable)	MJ/FU*	N/A	
GHG emissions	kg CO_2 eq	N/A	
GHG emissions	kg CO_2 eq/FU*	N/A	
TVOC (SVOC)	$\mu g/m^3$	26 (28)	(ISO 16000-3, -6, -11; prEN 16516)
Radon	Bq/m^3	N/A	
Photocatalytic capacity		N/A	