I write the differential equation for membrane dynamics, the differential equation for tensile structure and the energy of a membrane.

The Newton's second law for the element dS of the membrane is:

$$\rho \frac{\partial^2 z}{\partial t^2} = \rho g + T\Delta z$$

where T is the tension field norm, and g is the gravitational acceleration.

In the case of stationary equilibrium:

$$\sqrt{T}\Delta z(x,y) = -\frac{\rho g}{\sqrt{T}}$$

It is possible to obtain the energy density of the membrane, using an analogy with the potential formulation of the electromagnetic field (with unitary permeability)

$$\Delta \mathbf{A}(x,y) = -\mathbf{J}(x,y)$$

where $\mathbf{A}(x,y) = \left(x, y, \sqrt{T}z(x,y)\right)$ and $\mathbf{J} = (0, 0, \rho g/\sqrt{T})$, so that the energy is:

$$H = \int dxdy \left[\frac{(\nabla \times \mathbf{A})^2}{2} - \mathbf{J}\cdot\mathbf{A}\right]$$

$$\nabla \times (x, y, Tz(x,y)) = \begin{pmatrix} \mathbf{i} & \mathbf{j} & \mathbf{k} \\ \partial_x & \partial_y & \partial_z \\ x & y & \sqrt{T}z(x,y) \end{pmatrix} = \mathbf{i}\sqrt{T}\partial_y z - \mathbf{j}\sqrt{T}\partial_x z$$

the energy of the membrane is:

$$H = \int dxdy \left[T\frac{(\partial_x z)^2 + (\partial_y z)^2}{2} + \rho g z(x,y)\right]$$

the second term of the energy is the gravitational potential of the membrane, and the first term is the work done by the tensions to deform the membrane: $\partial_x z$ and $\partial_y z$ are angles for little deformations, and the work is done only along the z axis.

I think that the energy of the electromagnetic field can be seen like an energy of a three-dimensional membrane with constant tension, where the deformation is proportional to the magnetic potential, and the external force is the current.