



# Day 1 Quick Review (reflections & takeaways)

Mike Hayes

# Benvenuti, history, context & andiamo

## Opening - Chairs

PSMA Energy Harvesting Committee origin & Joe Horzepa commemoration.

Power IoT ecosystem, the need for better batteries & lower power & EH via collaboration

It's **your** event, tell us how to improve

## Keynote - Luca

VITALITY €120M project improves economic condition of Italian territories – innovative devices for industrial applications

Research ALONE on advanced EH materials is a waste, need to focus on energy transformation

Sensing and computing impact – Vatican photo

Need to bridge the energy gap by acting on both arms

Maximise efficiency, reduce entropy, use ICT as the loop to optimize

# Morning session

## Transducers

**Mahmoud** – WPT around since the 60s, need to improve efficiency – uni and omni-directional

Watch out for max regulated power

Novel 3D dielectric lens to improve efficiency

**Carlos** – smart ‘contacts’ – monitoring, diagnostics, drug delivery, **AR (X)** - 25% of the world needs vision correction!

Importance of the energy budget and how it can REALISTICALLY be addressed – 17J/day needed. No batteries!

PV best - Indoor 109uW, outdoor 2.6mW at 3V3

**Meiling** – Real time monitoring of tracks EM harvesting – MUST be retrofittable

## Energy Storage

**Carlos** – Intrinsically safe Solid State SMD batteries, 1V 100uAhr

**Christian** – FastCAP reflowable supercaps , -55 to 150DegC possible

>50% capacity still after 50d, <5uA leakage, 1M cycles

**Alessandro** – Use of low grade recycled PVB as a binder or separator in batteries. Comparable performance after a few cycles (due to impurities)

# Demos, posters and panel session

 **Great discussions, information, networking, hospitality, time management & food!**

## **Demos & posters:-**

Elevator pitches. Lots of workings demos, esp. PV & VEH powered WSN. (Not much TEG and storage?)

Lots of materials modelling and optimizations.

Use them today and tomorrow for networking and discussions!

## **Panel session – Sustainable materials**

**Davide** – plant microbial fuel cells, free energy from bacteria

**Cristina** - Flexible EH:- biofuel, PV, mech, RF – automotive, industrial, manuf, roll to roll – materials, interconnect, system

**Giovanni** – eco friendly temp sensors – gelatin, water, glycerol, graphene nanocomposite -> logic circuit improves linearity, stability and sensitivity

**Hani** – Printable light flex OPV for indoor. Materials research is key to improve absorption spectrum, increased output voltage and interfacial layer efficiency.

**2027 regulations** – IoT devices cannot have non-rechargeable battery! – Opportunity!

Different business models for high volume (direct sales) versus medium (higher sell price but service provided)---

# ANDIAMO!



# EnerHarv 2024

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