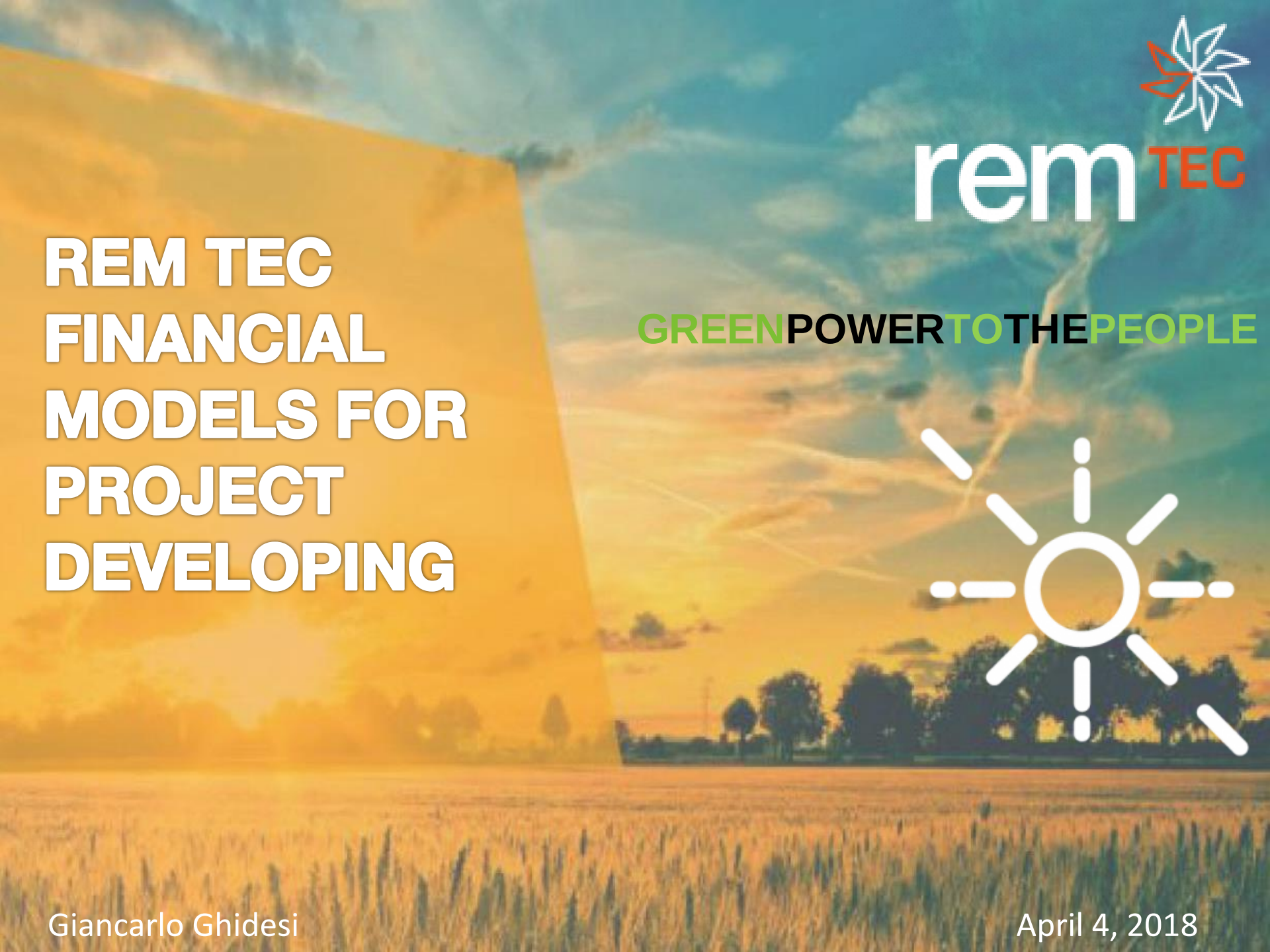


REM TEC FINANCIAL MODELS FOR PROJECT DEVELOPING

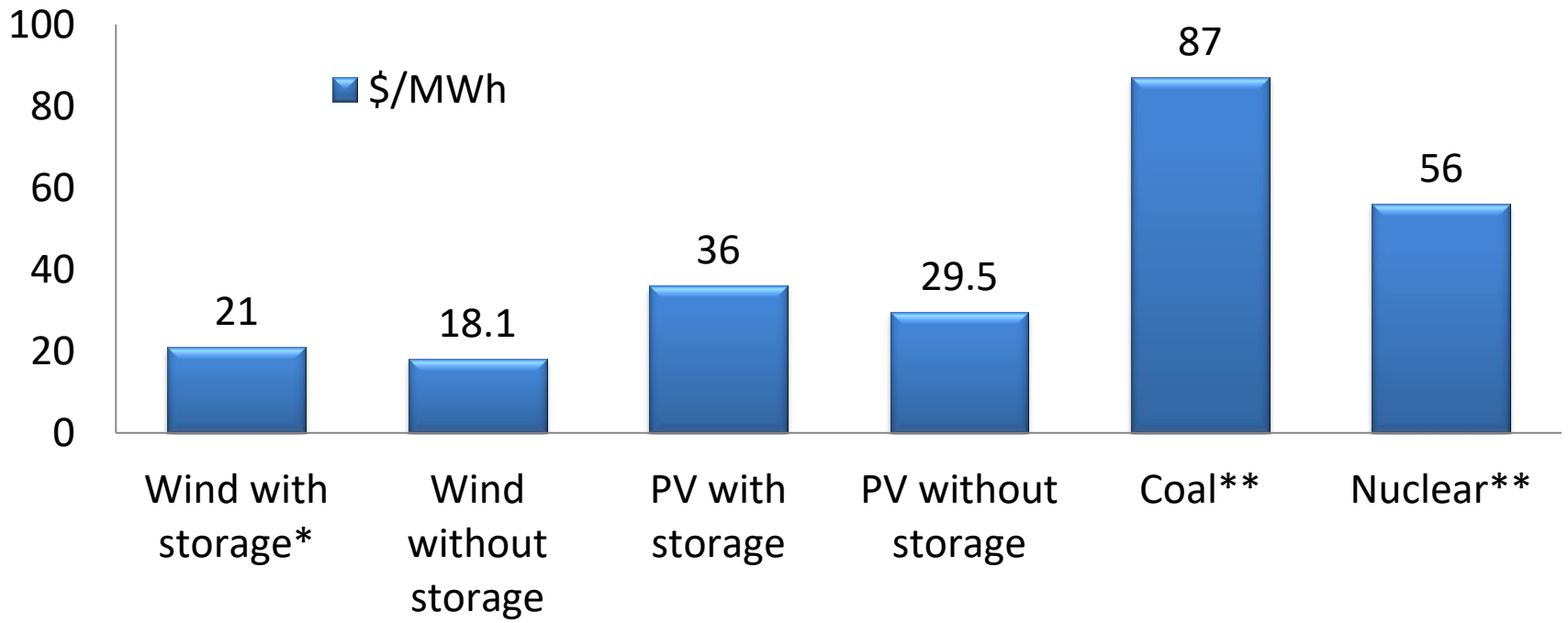
Giancarlo Ghidesi

April 4, 2018

INTRODUCTION

Energy cost in $

December 2017 tender in Colorado for energy production contract for 20 years



* fonte ENEA con tasso di sconto 5%

** QualeEnergia.it

INTRODUCTION

eenergy cost forecast for 2018

Solar	3.71 – 11.54 €cent/kWh
Off shore wind	3.99 – 8.23 €cent/kWh
Lignite	4.59 – 7.98 €cent/kWh
Charcoal	6.27 – 9.86 €cent/kWh
Gas turbine combined cycle	7.78 – 9.96 €cent/kWh
Gas turbine	11.03 – 21.94 €cent/kWh

Forecast 2030 – 2035: 2.41 €cent/kWh for ground plant investments between 350 – 815 €/kW.

*Fraunhofer Institute

AGROVOLTAICO®

Renewable energy competitive with trditional sources.

Agrovoltaico® system:

ELECTRIC PRODUCTION

+

ARICULTURAL PRODUCTION

+

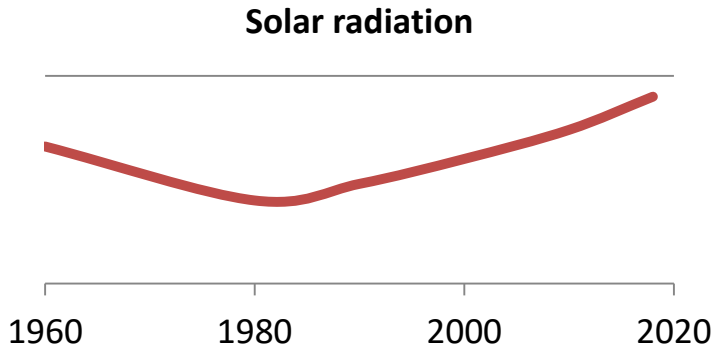
SHADOWING

INCREASE OF SOLAR RADIATION*

- 1960 – 1980: decrease
- 1980 - 2015 8% increase each decade

- Positive effects: more horizontal visibility, increase in **energy production**, improvement in people mood.

- Negative effects: increase in temperatures, with consequent hydrological problems and more energy consumptions.



AGROVOLTAICO®

Example: red berries

	Full light crops		Agrovoltaico® with shadow management	
Agricultural yield	9.000 kg/y x 9 €/kg = 81.000 €/y		85.050 €/y **(+5%)**	
	Cost: 64.800 €/y **(80%)**	**Net profit: 16.200 €/y (20%)**	**Cost:** 68.040 €/y **(80%)**	**Net profit: 20,250 €/y (20%)**
Energy production			Sold (70%)	Self-consumed (30%)
			420.000 kWh € x 0,05 €/kWh x 0,97= 20 370 €/y	180.000 kWh x 0,18 €/kWh x 0,97 = 31 428 €/y
			51 798 €/y	
TOTAL	**81 000 €/y**		**140 088€/y**	

Agricultural gap= 4 050 €/y → **25 %** more on agricultural income.

With 70% self-consumed the agricultural margin can increase up to 50% thanks to the reduced costs

AGROVOLTAICO®

Example: red berries

- The interesting point is that the value of the agricultural production, in this case, is more than the energy produced.
- **81,000 €** agricultural production **53.400 €** energy production
- This allows to use the shadowing to improve agricultural production, taking into account a small loss in energy production.
- **85,050 €** **Vs** **51,620 €**

INVESTORS TYPOLOGIES

1) **FARMER**: he grows crops under Agrovoltaico® and sells electric energy.

2) **ENERGY INVESTOR**: he produces and sells electric energy and agrees with the farmes for the land management and shadowing.

3) **COMPARTICIPATION**: both sides collaborates in a mutual interest.

CONCLUSIONS

The future cannot ignore some fundamental factors

- Climate change;
- Population increase : 4 Mld in 1975
  7 Mld today
  9,7 Mld in 2050

This means an increase in basic needs::

a) food
b) water
c) energy

Agrophotovoltaic technology satisfy all this needs.

THANK YOU FOR YOUR ATTENTION

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