

CLEAN ENERGY FINANCE CORPORATION

Implications and Emerging Market Characteristics for Rooftop Solar and Storage

Zeno Atherton, Associate Director – Corporate and Project Finance



CEFC Mission

Accelerate Australia's transformation towards a more competitive economy in a carbon constrained world, by acting as a catalyst to increase investment in emissions reduction

Implications & Emerging Market Characteristics in Rooftop solar & Storage

Agenda

1. Overview of the CEFC
2. CEFC Support to Date
3. Solar PV and storage financing
4. Emerging Opportunities



What the CEFC looks for...

- A sponsor with sufficient equity at risk
- A commercial business proposition
- Experienced counterparties
- Scale:
 - \$20m + direct to the opportunity
 - \$20m + via aggregation platform
- A commercial return on its investment



What CEFC is bringing to the table

- A significant source of senior debt
- Fixed rate, but prepayable at no cost after an initial deployment period
- Longer tenor than traditionally available
- Sector knowledge
- Flexible and varied structuring solutions
- Preparedness to take performance risk on established technologies like solar (PPA product) in addition to credit risk (loan product)
- Would not take performance risk on emerging technologies such as batteries, would look to integrated solution providers backed by full warranty package
- Sole underwriting where bank appetite does not exist

Rooftop Solar and Storage

Agenda

1. Overview of the CEFC
- 2. CEFC Support to Date**
3. Solar PV and storage financing
4. Emerging Opportunities



Programs CEFC is supporting

- PPA and guaranteed lease programs being brought to market by:
 - SunEdison
 - ET Solar
 - Lighthouse / Tindo
- Solar loan financing via CBA bank partnership
- CEFC is currently developing:
 - Corporate loan programs to support the corporate roll out of solar
 - Securitisation programs to assist solar financing



Rooftop Solar and Storage

Agenda

1. Overview of the CEFC
2. CEFC Support to Date
- 3. Solar PV and storage financing**
4. Emerging Opportunities



Solar and battery perspective

➤ **Consumers have a choice on how they finance their energy solutions**

- Adding to home mortgage
- Obtaining finance as a separate unsecured loan
- A finance product, like a PPA or lease

➤ **Consider 2 installation models**

- 4kW solar and a 7kWh Tesla Powerwall
- 6kW solar and 2 x 7kWh Tesla Powerwalls – takes us closer to “independence”

➤ **Questions**

- What do payback and Levelised Cost of Electricity (LCOE) and payback look like?
- How much “wasted” solar generation is there?

Assumptions

- **Tesla assumptions* – still emerging, not verified directly with Tesla**
 - Useful 7kWh / nameplate 12kWh (ie 58% DoD assumed)
 - 5,000 cycles (daily use)
 - 92% efficiency
 - Degradation to 80% in lifecycles
 - US\$3,000 gets you a “battery system” excl inverter and installation costs
 - Solar PV system (\$2/W gross, STC \$0.7/W); inverter compatible
 - ~A\$6,100 installed per 7kWh Powerwall (installed Australian price including shipping and retail margin; using solar array inverter)

- **Home owner assumptions**
 - NSW, Sydney, seasonal load profile ACIL Tasman/AER
 - 5.5% interest rate over 25 years
 - Tariff assumptions: current Origin Ausgrid standing offer
 - Avoided tariff is weighted to ability to use and time of use
 - Solar ~26c/kWh ; Battery, 33c/kWh ; Solar + Battery 29c/kWh
 - Solar insolation: NASA

Seasonal daily profile - NSW

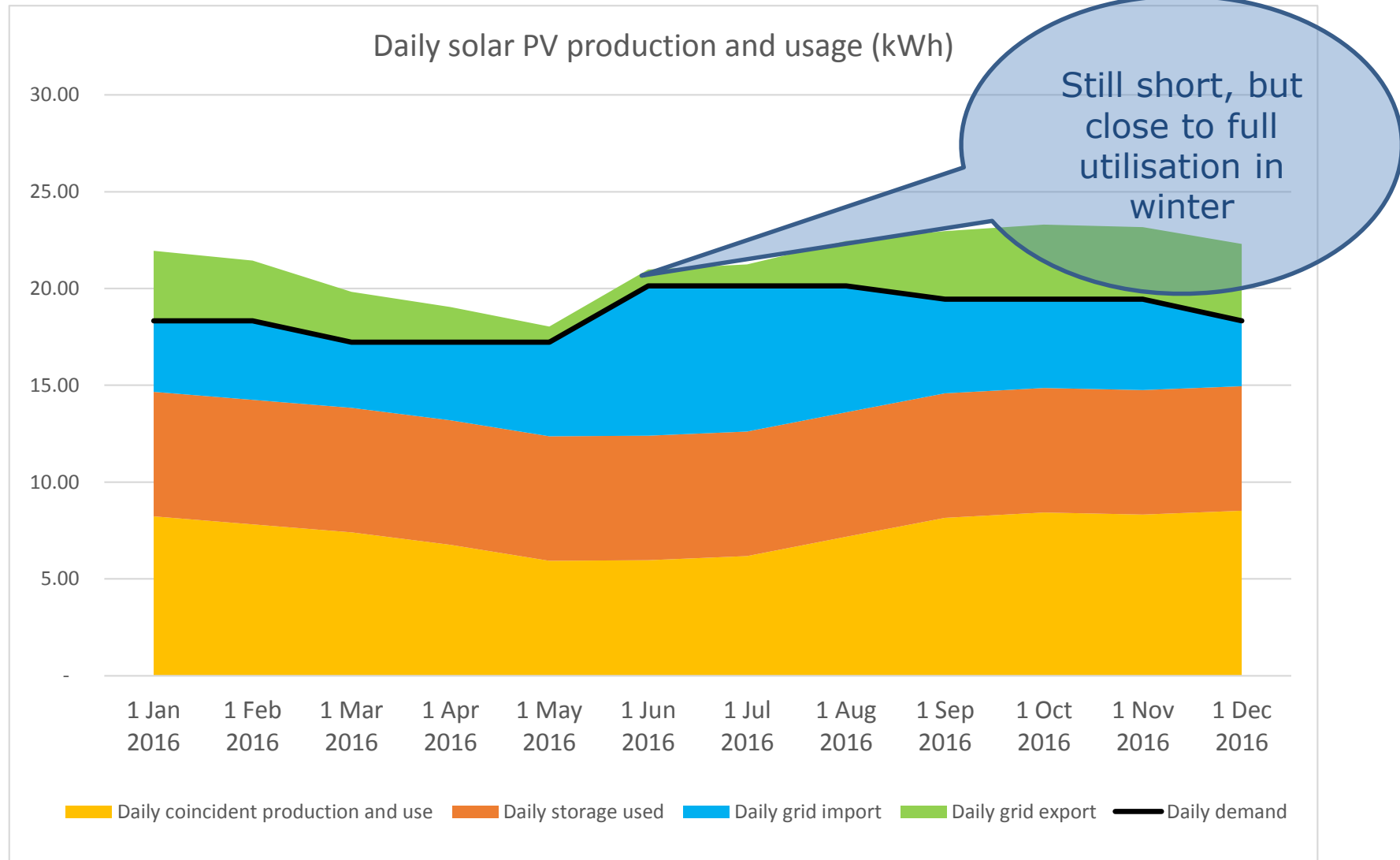
4kW solar + 7kWh battery

Upfront \$5.2k solar + \$6.1k battery
Replacements \$3.2 inverter + 4.2k replace cells

CEFC

CLEAN ENERGY FINANCE CORPORATION

\$11.3k
\$7.4k



Almost "off-grid" NSW?

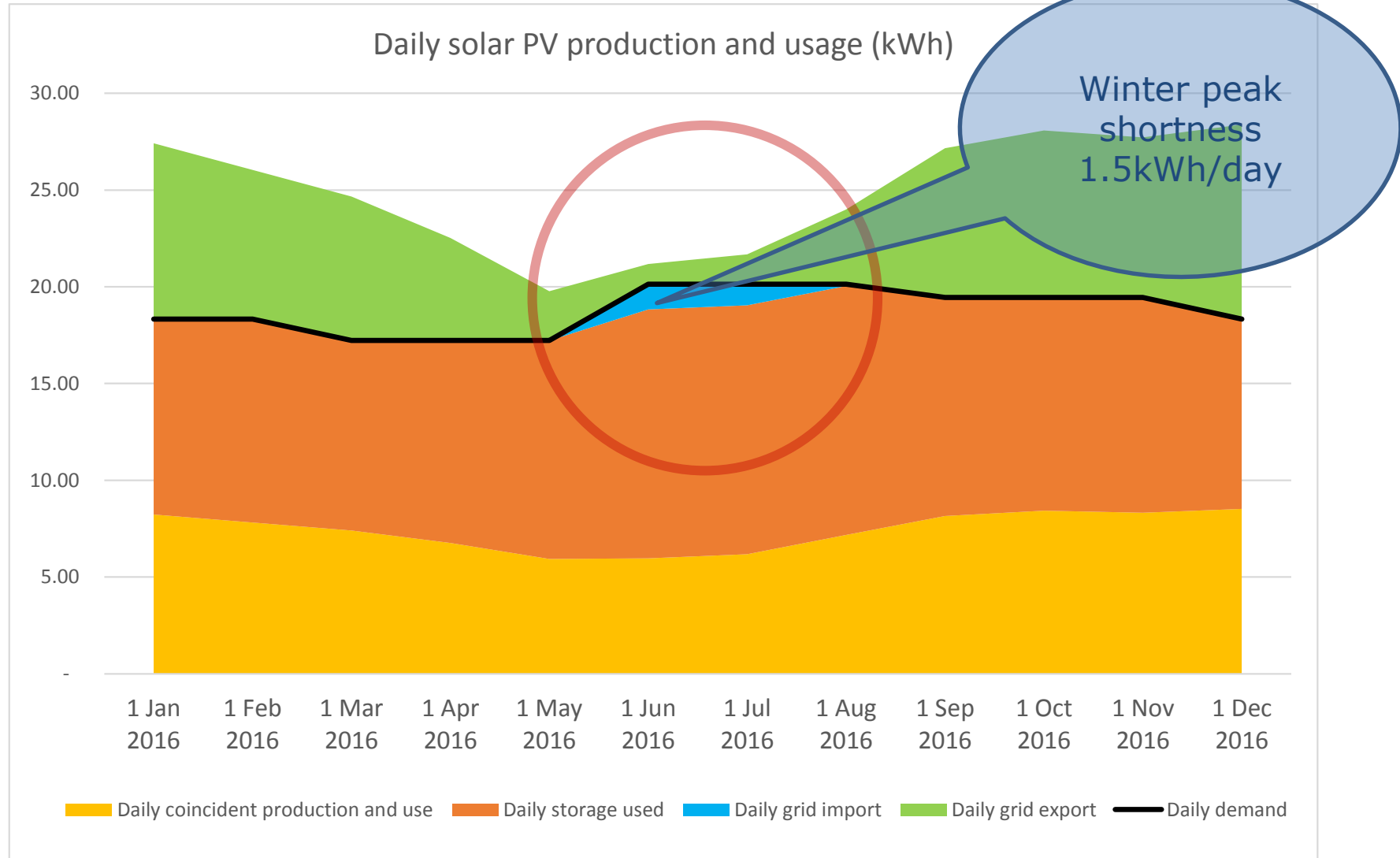
6kW solar + 14KWh battery

Upfront \$7.8k solar + \$11.2k battery
 Replacements \$3.2 inverter + 7.7k replace cells

CEFC

CLEAN ENERGY FINANCE CORPORATION

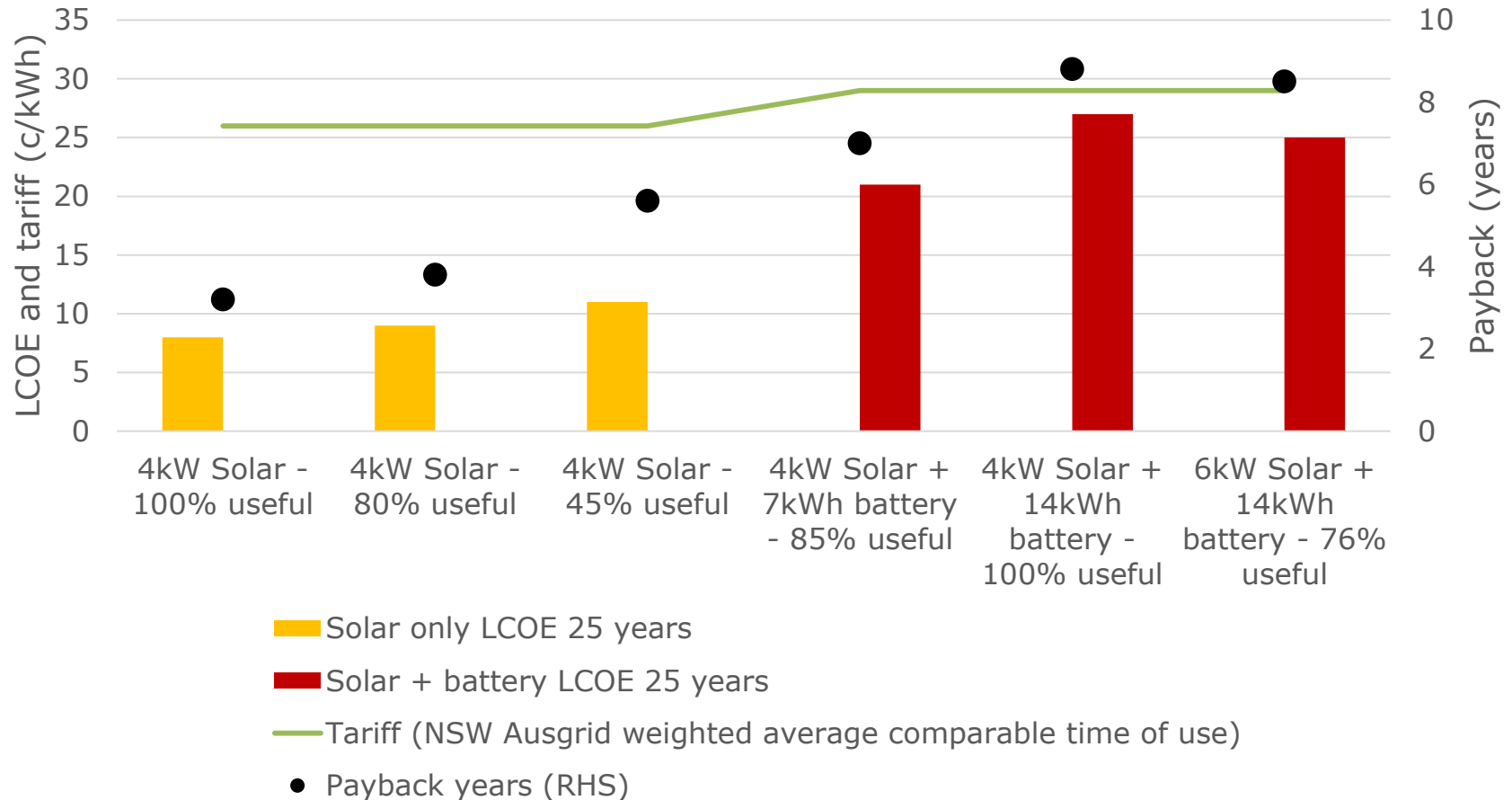
\$19.0k
 \$10.5k



Inverter replaced after y10 & y20, battery cells after y14

How does the solar and/or battery system compare to tariffs?

LCOE based on useful solar production (WACC 5.5% over 25 years)



Solar: \$2/W installed, STC \$0.7/W, new inverter after y10 and y20 (2% real annual cost reduction)
 Storage: ~\$500/kWh nameplate/~\$870/kWh useful (installed, using existing inverter), new cells after y14 (5% real annual cost reduction)

Financing – rate and tenor

➤ Personal mortgage	5.5%	25 years
➤ PPA/Lease	8.5%-11.5%	15-10 years
➤ Personal loan	9.5-10.5%	5 years

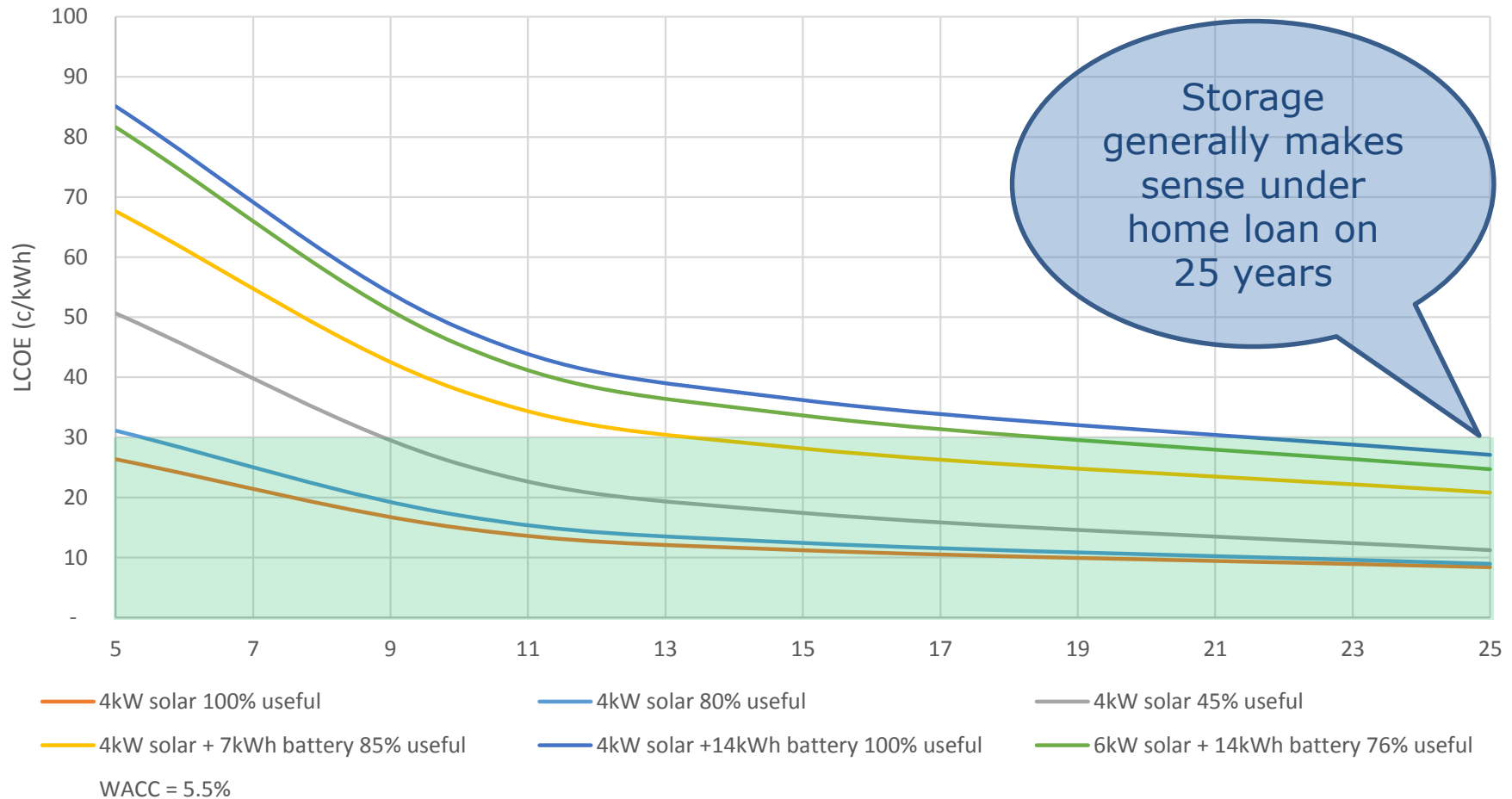
Solar \$2/W installed, STC \$0.7/W, new inverter after y10 and y20 (2% real annual cost reduction)
Storage ~\$500/kWh nameplate/~\$870/kWh useful (installed, using existing inverter), new cells after y14 (5% real annual cost reduction)

Impact of tenor and WACC on pricing

1/3

WACC = 5.5% - home mortgage

LCOE (c/kWh) assessed over varying repayment terms (years)



Solar
Storage

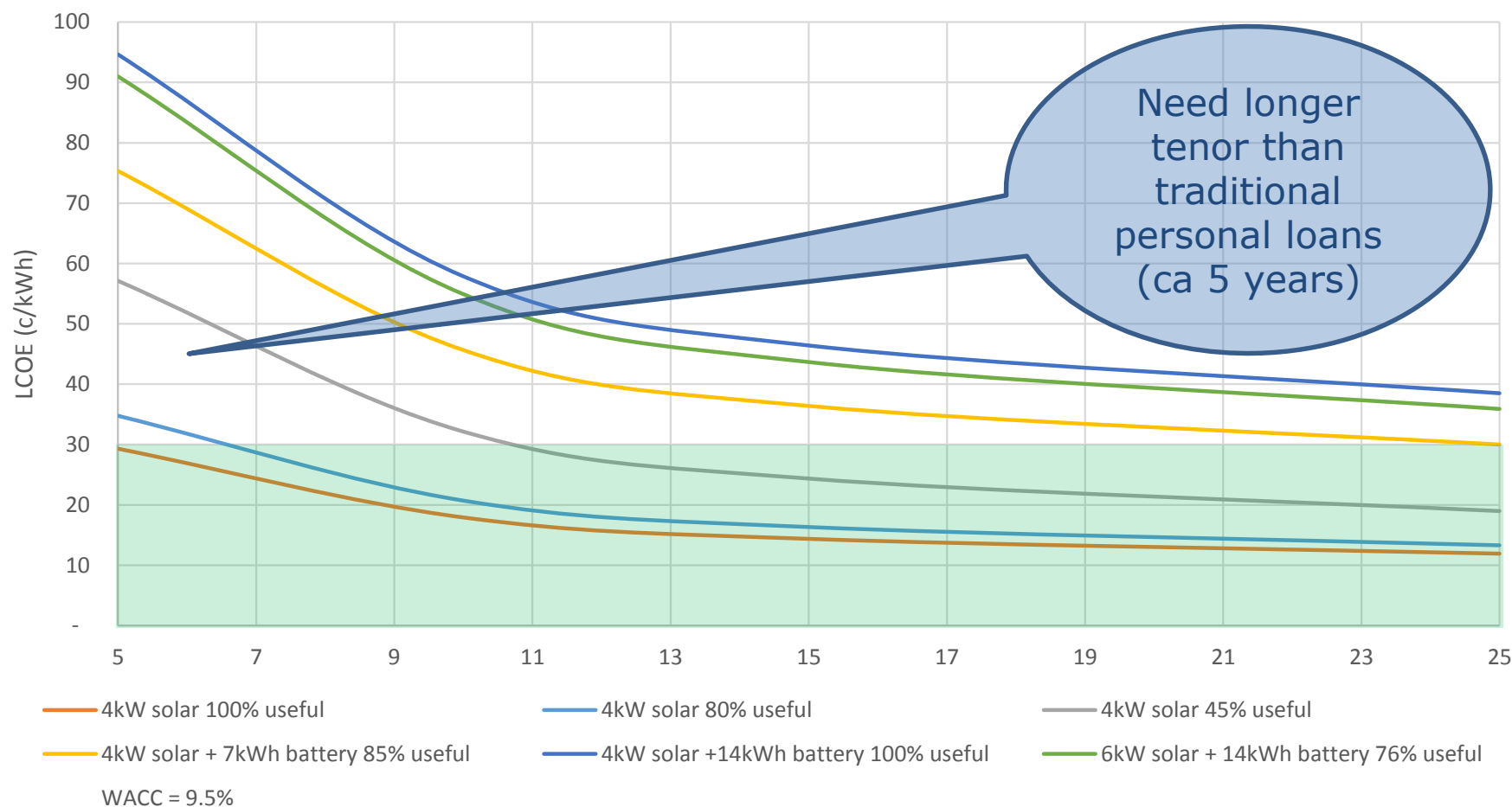
\$2/W installed, STC \$0.7/W, new inverter after y10 and y20 (2% real annual cost reduction)
~\$500/kWh nameplate/~\$870/kWh useful (installed, using existing inverter), new cells after y14 (5% real annual cost reduction)

Impact of tenor and WACC on pricing

2/3

WACC = 9.5% - personal loan

LCOE (c/kWh) assessed over varying repayment terms (years)



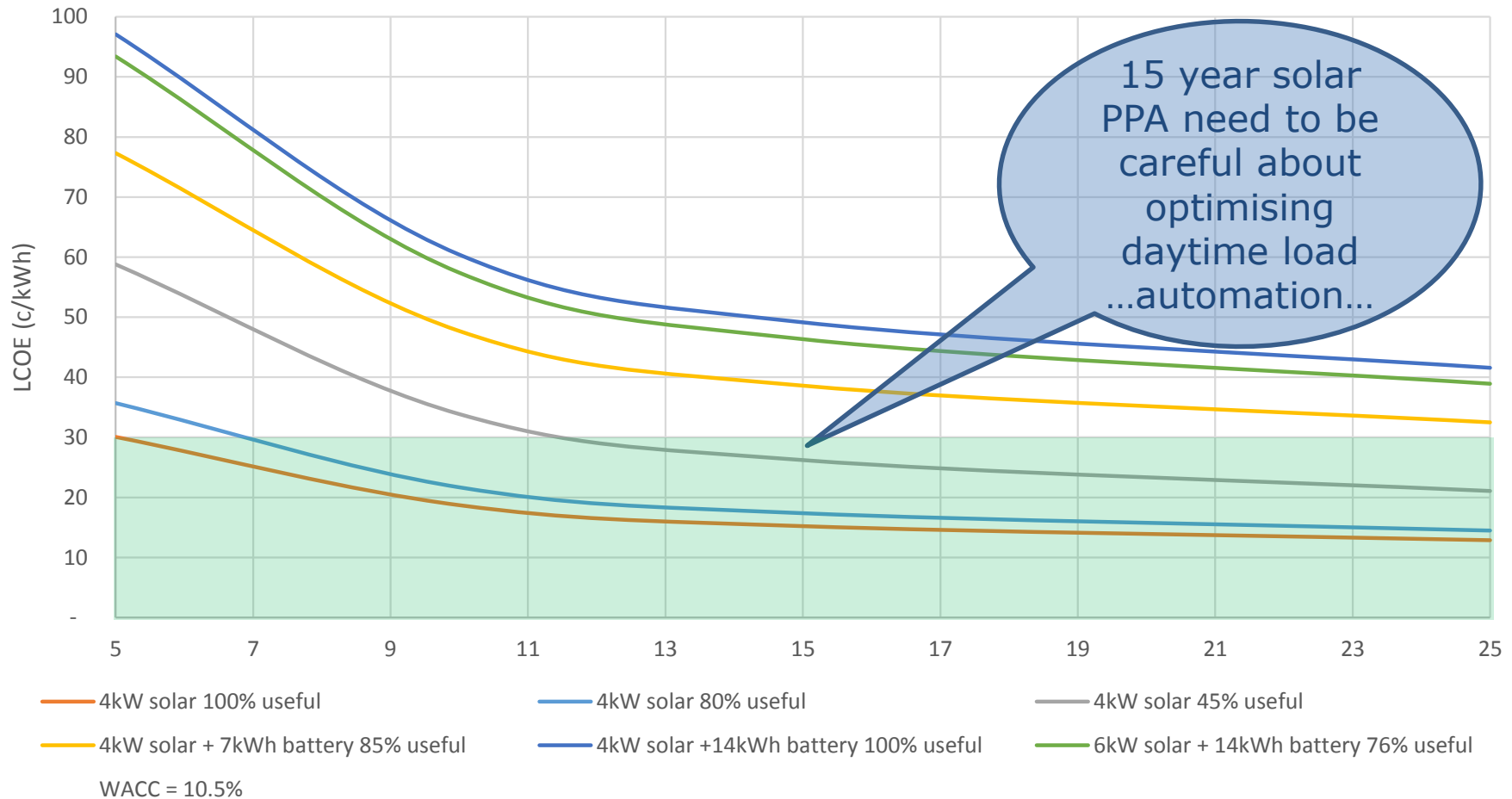
Solar \$2/W installed, STC \$0.7/W, new inverter after y10 and y20 (2% real annual cost reduction)
Storage ~\$500/kWh nameplate/~\$870/kWh useful (installed, using existing inverter), new cells after y14 (5% real annual cost reduction)

Impact of tenor and WACC on pricing

3/3

WACC = 10.5% - PPA

LCOE (c/kWh) assessed over varying repayment terms (years)

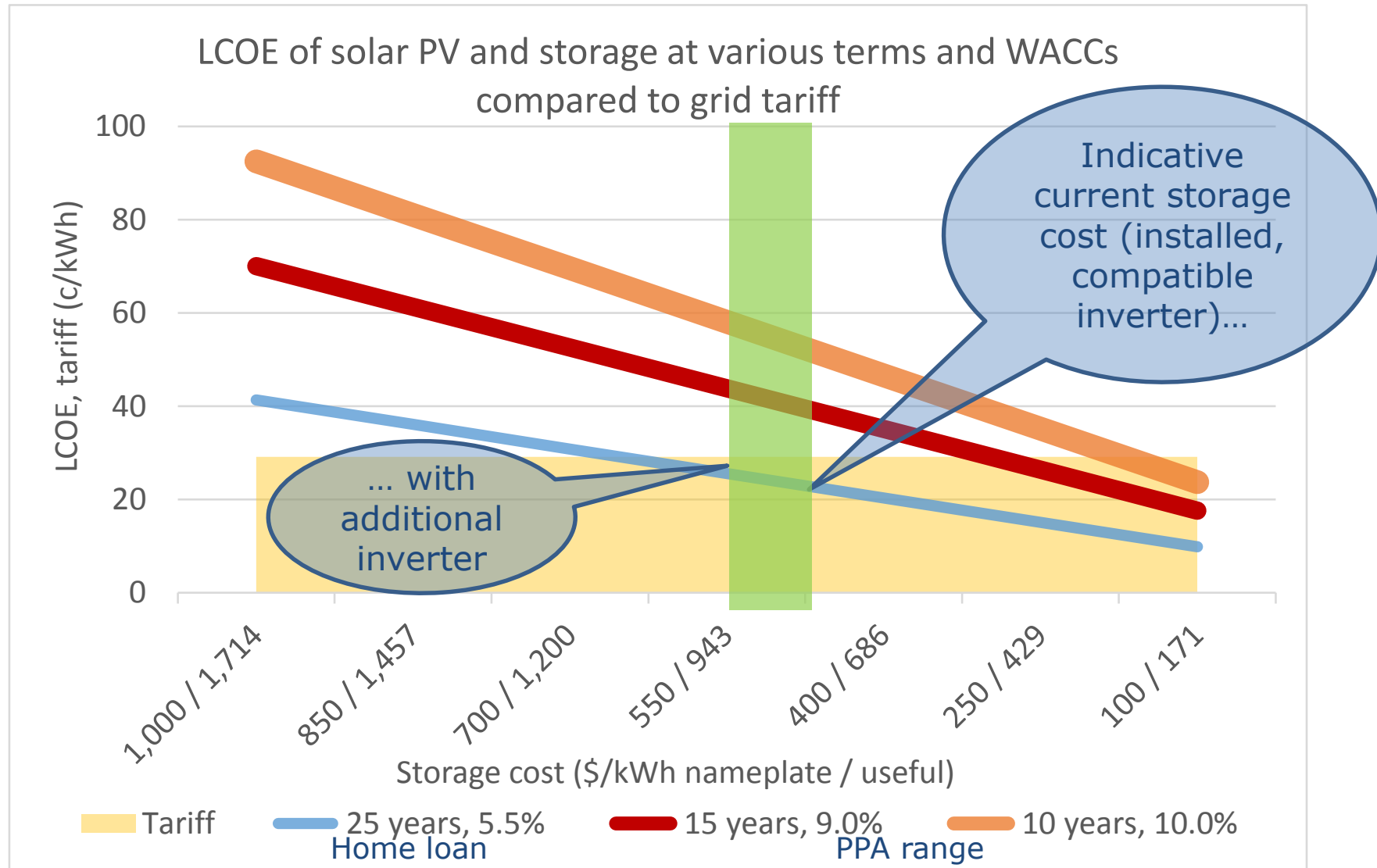


Solar
Storage

\$2/W installed, STC \$0.7/W, new inverter after y10 and y20 (2% real annual cost reduction)
~\$500/kWh nameplate/~\$870/kWh useful (installed, using existing inverter), new cells after y14 (5% real annual cost reduction)

Where does the cost of storage need to get to and the role of finance?

6kW solar + 14kWh storage



Bands indicate spread do to tenor and rate across PV pricing from \$2/W to \$1.5/W (gross)
6kW solar and 14kWh storage with 76% useful production; battery 7kWh useful/12kWh nameplate

Take-outs

➤ **Drivers accelerating decentralized power generation**

- Batteries are close to making economic sense on a new home or mortgage
- Smart battery systems to optimise around peak demand
- Cost reflective pricing will accelerate battery take-up
- Without oversizing batteries around 30% of solar generation is pumped back into the grid without value to customer
- Value of exported power to be addressed – smart/market based dispatch
- A clear road map for storage

➤ **And some key needs**

- Financeable solutions need to be plug and play and single supply source to preserve warranty, limit performance risk
- Battery performance and therefore the value proposition is very opaque. The battery industry needs to consider how its products are communicated and to standardise metrics – Tesla has begun this
- Highlights need for cross-participant engagement on the services the grid offers and how it delivers value

Rooftop Solar and Storage

Agenda

1. Overview of the CEFC
2. CEFC Support to Date
3. Role of Finance in Delivering Value to the Customer
- 4. Emerging Opportunities**



Emerging Opportunities



Technology innovation (e.g. battery)

- Tesla announcement
- AGL/Origin

New retailing models

RET delivery

- Commercial solar

ARENA / CEFC Partnership

- More efficient financing



Solar focused environmental upgrade agreements ("EUA") programs

Bespoke solar loan product

Green Bond financing



**Visit our website for more information at:
cleanenergyfinancecorp.com.au**

Follow us on
Twitter **@CEFCAus**

Follow us on
LinkedIn

Follow us on
YouTube

